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IMPACT OF HEALTH INDICATORS ON ECONOMIC GROWTH IN MYANMAR

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A thesis submitted as a partial fulfillment towards the requirement of the Degree of Master of Public Administration (MPA)

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ABSTRACT

Improvement in health can foster economic growth through various channels, including productivity, workforce participation, education, and investment in human capital. The primary objective of this study is to analyze the link between health indicators—health expenditure, life expectancy, infant mortality rate, and fertility rate—and Myanmar's economic development. Empirical analysis is employed to accomplish these goals. The primary sources of secondary data used in this analysis are the World Bank and the Myanmar National Health, covering the years 2000–2021. Results show that increases in life expectancy, fertility rate, and health spending are positively correlated with GDP per capita, and that both the long- and short-term effects of the infant mortality rate on economic growth are negative. It is required to extend and invest in the health sector in Myanmar for the achievement of great and continuous economic growth.

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CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Health is a fundamental component of human capital and a vital factor in economic growth. "The greatest wealth is health" holds in our lives. Maintaining good health is essential; only healthy individuals can effectively contribute to a country's economic success. Economic growth is directly influenced by the health of its population. Healthy workers are more mentally and physically energetic, leading to increased productivity and higher wages. Moreover, they have a lower chance of being absent from work because of sickness, benefiting both themselves and their families.

These traits not only positively impact social engagements, but they also impact economic development. Therefore, the correlation among the development of economic and health is vital. Economic performance in developing countries can suffer due to poor health among citizens, suggesting that enhancing societal health could stimulate economic growth (Bhargava et al., 2006). In developed nations, healthcare plays a crucial role in capital allocation, spending, and job creation. Therefore, effectively managing a healthcare system is directly connected to the nation's economic prosperity and its citizens. (Morris et al., 2010).

Human capital is essential for economic growth. Nations that invest effectively in healthcare and education usually see stronger GDP growth. Economists widely agree that human capital is a key driver of economic progress. According to the Organization for Economic Co-operation and Development (OECD), human capital encompasses the knowledge, skills, competencies, and attributes individuals possess, which contribute to personal, societal, and economic well-being (Keeley 2007). The connection between human capital and economic development is strong and inseparable, as higher human capital levels generally positively affect economic growth.

Besides, another critical facet of human capital is health, which is indispensable for fostering economic growth. Nations with superior health conditions generally are more affluent than those with inferior health issues. Workers in poor health are less productive contributors to the economy and may impose financial burdens influencing their families and community welfare system. Workers in good health, due to their higher energy levels and mental resilience, are typically more productive and less likely to miss work due to health issues (Teixeira 2007). Michael Grossman (1999) posits that health influences the overall time a worker can dedicate to earning income and producing goods. Reduced productivity of individual unhealthy workers contributes to a decrease in overall labor productivity within society.

In a community facing epidemics or malnutrition, even healthy individuals will have limited opportunities to work productively. From this viewpoint, health becomes a prerequisite for economic growth through increased efficiency (Yetkiner 2006). Besides productivity, societal health levels also indirectly influence the growth of the economy. In a healthy society, the workforce grows larger as life expectancy increases and disability rates among workers decrease. Increased life expectancy reduces the early demise of scholars, policymakers, artists, and creators who could contribute to future societies (Mushkin 1962). Additionally, health indirectly boosts economic growth by increasing savings and investments, as individuals can delay retirement to later ages (Korkmaz 2007).

According to Bloom et al. (2003), enhancements in public health can result in decreased birth rates and smaller households, which in turn increase women's participation in the workforce. This evidence makes it abundantly evident that health is an essential component of human capital, as does the OECD's definition of human capital as the knowledge, skills, competencies, and traits among every kind of person that contribute to personal, social, and economic well-being.

Therefore, it’s essential to view economic growth from a broader perspective. Income per capita serves as a crucial indicator of economic well-being. The strong relationship between health and per capita income underscores one of the most well-established links between human capital and economic prosperity. This relationship was traditionally thought to indicate that income influences health; however, recent views suggest the reverse, that health impacts earnings. It has been noted that the average real earnings are greater in nations with superior standards of living and social welfare. Variations in actual income levels between countries are often linked to significant variations in dietary intake, health status, and additional welfare considerations (Romer 1996).

In the 1950s, in developing countries, life expectancy was merely 40 years, and 28 out of every 100 children died before reaching the age of five. By the 1990s, life expectancy had increased to 63 years, and child mortality rates had significantly decreased because of adequate immunization. However, in less developed countries, absolute mortality rates persistently remain high, with child death rates nearly ten times higher than those in economically developed nations. Maternal mortality rates remain alarmingly high. In 2020, around 287,000 women died during and after pregnancy and childbirth, with nearly 95% of these deaths occurring in low and lower-middle-income countries, many of which were preventable. Despite the high maternal mortality rates in developing countries compared to high-income countries, infant mortality rates have been declining over time due to health policy interventions (WHO, 2010).

In developing countries, illness and disability significantly reduce hourly wages, impacting productivity across various sectors. Many developing and advanced nations have seen improvements in the health sector, with rises in expected lifespan accompanied by reductions in infant death rates and birth rates. Many of these consequences are highlighted by a large body of microeconomic data (Thomas, 1998). Even when worker experience is taken into account as the key element, good health has a favorable, significant, and statistically significant influence on total performance (Sevilla, 2003). Many cross-country growth regressions pertaining to health indicators, such as life expectancy, consistently demonstrate a large positive influence on rates of economic growth (Bloom, 2003).

Despite advancements in healthcare infrastructure and services, health outcomes in Myanmar still fall below international standards. While Myanmar has achieved substantial economic growth in recent decades, significant challenges persist in improving health outcomes for its population as well. It is a challenge that every country must address because of its impact on productivity and economic growth. It is a well held opinion that there is a significant association between economic progress and health. "The linkages of health to poverty reduction and long-term economic growth are capable, much stronger than is generally understood," the World Health Organization (WHO) states. The World Health Organization (WHO) states that "health is defined as the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. Also, it is a crucial indicator of economic growth and human progress, influencing a country's productivity levels.

Myanmar's healthcare system is fragile and confronts numerous difficulties in addressing the healthcare requirements of its people due to prolonged neglect. The Ministry of Health (MOH) plays a pivotal role in enhancing the health status of the population. Overall, healthcare in Myanmar is inadequate, with historical government spending on healthcare ranging from 0.5 percent to 3 percent of the country's GDP during the period from 1962 to 2011 (Myanmar Ministry of Health and Sports, 2016). Myanmar's healthcare system consistently ranks among the lowest globally.

Health is often measured using various indicators, like average lifespan, infant death rate, and birth rate, which are widely used benchmarks. Both developing and developed nations have seen health improvements, characterized by extended life expectancies alongside lower mortality and fertility rates. These demographic changes highlight the growing importance of health, presenting a challenge for all countries due to their implications for productivity and economic growth. There is a widely accepted view that health and economic expansion are interlinked, with notable correlation between them.

Between 2001 and 2011, Myanmar allocated 2.0 percent to 2.4 percent of its GDP to total health expenditure, the least among countries examined by the World Health Organization (WHO). In 2011, Myanmar recorded the lowest life expectancy at birth 63.9 years among ASEAN member countries. The country also recorded a high fertility rate of 231 per 1,000 live births, an under-five mortality rate of 60.5 per 1,000 live births, and an infant mortality rate of 15.7 per 1,000 live births (World Development Indicators, 2011). By looking at these data, it is found that Myanmar has low health expenditure and weak health care. So, the government has been spending more expenditure on healthcare since 2011, which may have an impact on the national economy. Greater investment in healthcare will enhance the national healthcare system and bolster the country's economic development.

The influence of health indicators on economic development in Myanmar can be substantial, reflecting trends observed globally where enhanced health outcomes strongly correlate with economic performance. Enhancements in health indicators can significantly boost economic growth in Myanmar by increasing productivity, lowering healthcare expenses, and fostering a more resilient and effective workforce. Conversely, poor health outcomes can impede economic advancement and impose significant financial strains on the country. Hence, this study seeks to examine the relationship between health outcomes and economic growth in Myanmar.

1.2 Objectives of the Study

The objective of this study is to analyze the impact of health indicators (health expenditure, life expectancy at birth, infant mortality rate and fertility rate) on economic growth in Myanmar.

1.3 Method of Study

This research investigated the link between the health sector and economic growth using an Autoregressive Distributed Lag Model (ARDL) Bounds testing technique. First, the stationarity of the data was assessed using a unit root test. Next, Vector Autoregressive Lag Selection techniques were used to choose the ideal lag length. The Johansen Cointegration test was then used to determine if cointegration is present. Finally, the study applied the ARDL Bounds test to investigate the impact of expected lifespan at birth, rate of infant mortality, rate of fertility, and expenditure of health on economic development.

1.4 Scope and Limitations of the Study

This study focused on the period from 2000 to 2021 and utilized secondary data from sources including the World Bank, IMF, National Statistical Agencies, and Myanmar National Health Account. Limitations included issues related to data availability and quality, as well as the complexity of the relationship between health and economic growth. The study specifically investigated the association between health indicators and economic growth in Myanmar, using GDP as the metric for economic growth. While various health indicators are available, the study specifically examined expected lifespan at birth, rate of infant mortality, rate of fertility, and expenditure of health as a percentage of GDP.

1.5 Organizations of the Study

There are five chapters in this work. The "Introduction," or Chapter I, covers the purpose, goals, techniques, parameters, constraints, and design of the research. A summary of Myanmar's healthcare system, prior research, life expectancy, infant mortality rate, fertility rate, theoretical analysis, and the autoregressive distributed lag model are all included in Chapter II's literature review. Chapter III outlines the research methodology used. Chapter IV presents the results and findings. Finally, Chapter V provides the conclusion and discussion of this thesis.

CHAPTER II
LITERATURE REVIEW

2.1 Health and Economic Growth

The World Health Organization (WHO) defines health as more than just the absence of illness or disability; it is a condition of whole physical, mental, and social well-being. It includes both general health and the absence of sickness or disease. It makes sense to assume that being well raises human capital levels, which in turn raises economic production on both a personal and a societal level. Furthermore, good health is beneficial for enhancing educational attainment and academic performance. Consequently, numerous researchers have conducted various research endeavors to investigate the interconnection between economic development and health.

Previous studies on the topic of economic growth have emphasized the significance and impact of health on national and international economies. Bloom et al. (2001) discovered that enhancements in health can result in higher productivity and economic expansion. Similarly, Acemoglu and Johnson (2007) argued that investments in healthcare can have long-term positive effects on economic growth, too. However, some studies have also noted the challenges of achieving significant improvements in health outcomes in developing countries (WHO, 2018).

Most studies that explore the correlation between economic development and health have utilized cross-sectional and panel data analyses. Barro (1996) determined that a one percent rise in average lifespan raised the development rate by 0.0423 percentage points, whereas a one percent rise in the birth rate reduced the development rate by 0.0161 percentage points. Bloom et al. (2004) estimated that a one-year increase in average lifespan would boost gross domestic product by 1.3 percent.

Acemoglu and Johnson (2006) propose that the primary effect of a rise in expected lifespan on gross domestic product is favorable but modest, and it remains uncertain whether a higher average lifespan at birth leads to accelerated per capita development. Beşer et al. (2018) identified the reciprocal relationship between health spending and GDP across eight countries using the Toda-Yamamoto Causality method, revealing a notable long-term cointegration connection between these variables. Eryigit et al. (2014) also calculated that a one percent rise in health spending per capita enhances gross domestic product by 0.9 percent in the Panel Error Correction Model.

Murray et al. (2001) utilized panel data and the Dynamic Random Effects method to determine that higher adult survival rates correlate with increased economic growth, whereas higher fertility rates are associated with decreased economic growth. Morgado (2014) examined the causal connection between economic development and health indicators like the average lifespan at birth and infant death rate in Portugal, concluding economic development influences health outcomes.

2.2 Theoretical Analysis

The correlation between health indicators and economic development is a subject of significant interest in both economics and public health. Health indicators, including expected lifespan, rate of infant mortality, rate of fertility, and expenditure of health, offer essential perspectives on the overall well-being of a population. Economic development, typically determined by gross domestic product per capita, represents the increase in a country's economic output and living standards. Understanding the interplay between health and economic development is crucial for designing policies that promote sustainable development.

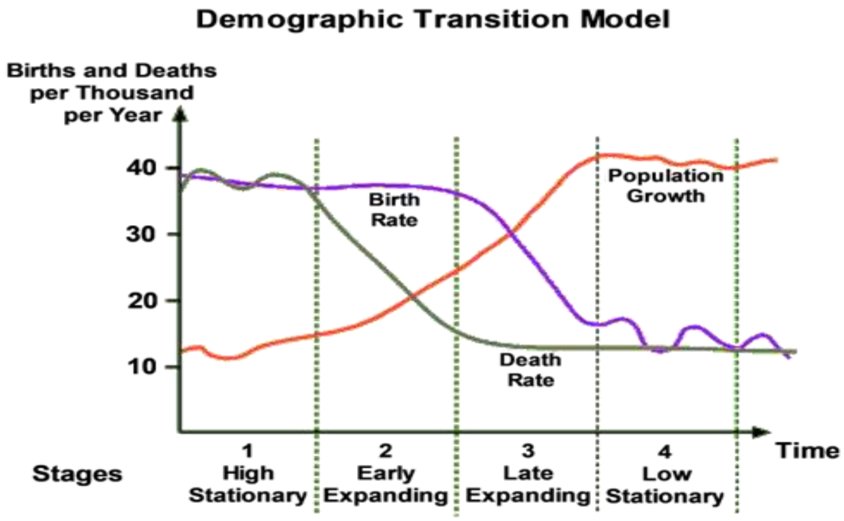
According to Becker (1964), human capital theory posits that health is a type of human capital that enhances economic productivity, suggesting that investments in health can result in heightened productivity and economic growth. The health production function framework emphasizes the role of health inputs, such as healthcare services and sanitation, in producing health outcomes (Grossman, 1972). That framework can be applied to analyze the correlation between health and economic development in Myanmar.

2.2.1 Demographic Transition Model

The demographic transition model outlines the stages a country experiences as it shifts from a non-industrial to an industrial society. This model includes four stages that reflect changes in economic, technological, and social development, impacting population size and social behaviors. The demographic transition describes the movement from higher rates of birth and death to lower rates as a nation advance. This transformation greatly influences a nation's economic growth, making it essential for policymakers in developing countries to understand these changes to leverage them for economic development.

The demographic transition model typically consists of four stages. In the pre-transition stage, both birth rates and death rates are high, keeping population growth sluggish and stable. During the early transition stage, death rates fall due to better healthcare, nutrition, and sanitation, while birth rates stay high, causing rapid population growth. The late transition stage sees birth rates decline due to factors like increased access to contraception, higher female education, and economic shifts, resulting in slower population growth. In the final post-transition stage, both birth and death rates are low, stabilizing the population growth rate. Various mechanisms link demographic transition to economic growth.

Figure (2.1) Demographic Transition Model



Source: World Development Indicators.

The demographic dividend can greatly enhance economic productivity. When fertility rates drop, the working-age population grows in comparison to the number of dependents. This change can result in increased labor force participation and higher savings rates, driving economic growth (Bloom, Canning, & Sevilla, 2003). Modigliani (1986) suggests that increased savings and investment are vital results of demographic transition. A larger working-age population generally saves more, leading to greater capital accumulation. This concept aligns with the life-cycle hypothesis, which suggests that individuals accumulate savings during their employment years and spend their savings during retirement.

Lee and Mason (2006) emphasized that demographic transition can improve human capital. With fewer children to support, families and governments can allocate more resources to each child's education and health, enhancing the quality of the labor force and increasing productivity. Empirical research indicates that countries undergoing demographic transition see significant improvements in education and health outcomes (Lee & Mason, 2006). Bloom, Canning, and Fink (2011) note that changes in age structure can impact government spending and fiscal policies. A lower dependency ratio reduces pressure on public finances, allowing for greater investment in infrastructure, education, and healthcare, which further promotes economic growth.

Demographic transition has significant implications for economic growth, especially in developing countries. By changing the population's age structure, these demographic shifts can create opportunities for increased labor supply, savings, and investment, leading to higher economic productivity and growth. However, realizing these benefits requires effective policies that invest in human capital, promote gender equality, and foster an environment conducive to economic activities. Additionally, addressing the challenges of job creation and an aging population is essential for maintaining long-term economic growth.

2.2.2 Life Expectancy

In every country, life expectancy serves as a key indicator of population health and economic growth globally. Statistically, it represents the average duration that individuals or groups are expected lifespan from a certain age. Moreover, the expected lifespan is frequently utilized when examining growth patterns among different nations and consistently shows a significant and positive impact on the rate of economic development.

The most widely employed is the expected lifespan from birth, which can be defined in two ways: Cohort life expectancy at birth (LEB) represents the expected lifespan of a birth cohort and can only be calculated for cohorts born sufficiently long ago that all members have passed away. It is calculated using a life table, the remaining life expectancy at every age, beginning with birth (age 0) to a maximum value that is normally no more than 100 years.

Barro (1996) employed panel data analysis using various forms of Ordinary Least Squares (OLS). Barro (1996) discovered that a one percent rise in average lifespan from birth elevated the development rate by 0.042 points, while a one percent increase in the rate of birth decreased the rate of development by 0.016 points. Sevilla et al. (2004) estimated that a one-year increase in life expectancy would increase GDP by 1.3 percent.

Spraley, J. (2010) investigated life expectancy as a health indicator to explore its relationship with economic growth. The study found that a one percentage point increase in life expectancy correlated with a 1.34 percentage point rise in GDP per capita and a 3.87 percentage point increase in overall GDP. Consequently, the study concluded that life expectancy and economic growth exhibit a positive and significant correlation.

2.2.3 Mortality Rate

Mortality plays a crucial role in shaping the development and demographics of a population. The mortality rate quantifies the occurrence of deaths, or health events, within a population throughout a specified duration. It represents the number of deaths within a defined geographical area or timeframe, often categorized by specific causes.

These patterns provide valuable insights into the effectiveness of public health services within each country. Various types of mortality rates are utilized to assess mortality levels in populations, including rate of age-specific mortality, rate of maternal mortality, rate of infant mortality, rate of under-5 mortality, and overall death rates.

Wunnava & Zakir (1999) investigated the factors influencing infant mortality rates in 1993. They examined variables such as fertility rate (number of births per woman), rate of female literacy, gross national product per capita, labor force percentage, and government spending on healthcare. However, they found that government spending on healthcare as a proportion of gross national product did not significantly explain the infant mortality rate.

2.2.4 Fertility Rate

Fertility indicators refer to a woman's reproductive performance, typically considered to occur between the ages of 15 and 40. In demographic terms, fertility levels are measured by live birth rates. In developed countries with strong education systems, stable economies, high standards of living, and widespread media exposure, birth rates tend to be low. Conversely, in countries such as India, where the community is agrarian, conventional, and focused on extended families, and where poverty, low literacy, and limited education prevail, conditions often contribute to a higher rate of fertility.

Monitoring the rate of fertility enables more effective planning and allocation of resources within specific regions. In countries with consistently high fertility rates, there may be a need to construct additional schools or enhance access to affordable childcare. Globally, rates of fertility have declined from an average of 5 births per woman in 1950 to 2.3 births per woman in 2021, reflecting the increasing control that individuals, especially women, have over their reproductive decisions. It is projected that overall fertility will further decrease to 2.1 births per woman by 2050.

Yujie Li (2013) examined the correlation between economic development and birth rates in less economically developed nations from 1970 to 2014. The research employed statistical analyses involving regression and correlation, revealing that high fertility rates negatively impact economic expansion at present. The researcher determined that the total birth rate has a notably stronger negative effect on current economic development in poorer nations compared to wealthier ones.

Bloom et al. (1999) examined how demographic shifts affect economic development in Asia from 1965 to 1990. Their findings suggested that the economic success of East Asia and the economic challenges in South Asia can largely be attributed to demographic factors, including differences in health status, dependency ratios, and population distribution. The study also highlighted that while overall fertility rates had minimal impact on economic development, fluctuations in life expectancy, age distribution, and density of population significantly influenced economic outcomes.

2.2.5 Health Expenditure

Health expenditure encompasses all spending directed towards health services, family planning, nutrition programs, emergency aid, and infrastructure aimed at enhancing health within a country or region. Health financing is a crucial aspect of healthcare systems, with national budgets typically allocating funds for health expenditures each fiscal year. Numerous researchers have investigated the correlation among health spending and economic development in both developing and industrialized nations.

Gizem Yıldız (2018) employed the Generalized Method of Moments to analyze health spending. The study found that increasing health spending per capita by one percent leads to a 0.29 percent increase in GDP per capita. Similarly, Eryigit et al. (2014) estimated in their Panel Error Correction Model that a one percent rise in per capita health expenditures boosts GDP by 0.9 percent.

Grossman (1972) stated that empirical as well as theoretical study on health is necessary. He indicated that improvements in health expenditures will have a positive impact on health outcomes in any community. The points of view of Grossman are supported by the findings of Oladosu et al. (2022). Oladosu et al. (2022) also examined how public health spending in Nigeria and Ghana impacted health outcomes (such as maternal mortality, infant mortality, and malaria mortality). In comparison to Ghana's results, Nigeria indicated a positive correlation between public health spending and health outcomes.

Pradhan (2010) investigated the relationship between expenditure on healthcare and economic development in eleven countries from 1961 to 2007. Based on the study, increasing medical expenses causes economic growth, and improving economic growth promotes rising health expenditures as well. It suggests that healthcare expenditure and growth in the economy are correlated.

Beylik and Senol (2022) investigated the correlation between OECD nations' economic development and expenditure on health. The results suggested all health spending indicators have a positive relationship with economic development, with real gross domestic product level being used as the dependent variable. Examining the estimation results, it is estimated that for every one percent increase in the GDP share allocated to health services, there will be a 0.09 percent improvement in GDP. A one percent increase in out-of-pocket healthcare spending is expected to conclude in an expected 0.04% increase in the real GDP.

2.3 Methodology

In this work, several statistical techniques of an Autoregressive Distributed Lag Model (ARDL) Bounds testing process are used to examine the influence of health variables (health spending, life expectancy at birth, infant mortality rate, and fertility rate) on economic development. Unit Root testing, VAR Lag Length Selection, Johansen Cointegration tests, and Vector Error Correction Model tests were some of these techniques.

2.3.1 Unit Root Tests

Unit root tests are statistical methods employed to ascertain whether a time series is non-stationary and possesses a unit root. In other words, these tests help ascertain whether a time series variable is characterized by a persistent, stochastic trend or whether it typically returns to a long-run mean. Detecting the presence of a Unit root is essential in time series analysis, as it influences the choice of appropriate econometric models and the validity of inference.

The unit root test is employed to ascertain whether a dataset is stationary or not. The dataset is taken into account as stationary if its probability distribution stays consistent over a period, indicating that its statistical properties do not change. The NG-Perron, Dickey Fuller GLS (ERS), and Phillips-Perron tests are a few that may be used to look for unit roots. For determining data stationarity, the Augmented Dickey-Fuller (ADF) test is often used. The unit root analysis in this research is performed using both the ADF test and the Phillips-Perron test.

2.3.2 The Optimal Lag Length of the Model

Since the model must include Gaussian Error Terms—standard normal error terms devoid of autocorrelation, non-normality, or heteroskedasticity—figuring out the ideal lag duration is essential (Asteriou & Hall, 2011). The short-term dynamics of the model are impacted by variables that may have been left out because they become absorbed into the error term, which influences the choice of lag length. Moreover, in the Johansen procedure, specifying too few lags can lead to specification distortions, whereas too many lags can reduce the model's effectiveness (Maddala et al., 1998). In such instances, opting for a smaller lag length is more advantageous.

The typical approach to consider the optimal lag length involves estimating a VAR model across a range of lag specifications and then systematically reducing the number of lags while evaluating model fit. This process starts with a higher number of lags, such as twelve, and progressively reduces to lower lags (e.g., eleven, ten, and so forth, down to zero). For yearly data, typically one or two lags are often considered most suitable to avoid overfitting the model and losing degrees of freedom. Each VAR model iteration is assessed using criteria like the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). These criteria measure the balance between model complexity and goodness of fit. Generally, the lag length that reduces the AIC and SBC values is selected as optimal, ensuring the model's robustness and effectiveness in capturing relationships among variables.

2.3.3 Johansen Cointegration Test

The Johansen Cointegration Test is a statistical technique employed to ascertain whether there are cointegration relationships among multiple time series variables. It serves as a critical tool for identifying and quantifying the presence of cointegration, which indicates the presence of long-term equilibrium relationships between the variables. The process involves the following steps:

(1) **Model Selection**: Begin with selecting the appropriate Vector Autoregression (VAR) model, which includes considering the optimal lag length.

(2) **Testing for Cointegration**: The Johansen test utilizes two main statistics:

   (a) **Trace Statistic**: Tests whether the number of cointegrating vectors is less than or equal to a specified number under the null hypothesis.

   (b) **Maximum Eigenvalue Statistic**: Tests the null hypothesis that there are exactly r cointegrating vectors against the alternative of r + 1 vectors.

(3) **Choosing the Number of Cointegrating Vectors**: Based on the test statistics, you can identify the number of cointegrating relationships present. This is important for understanding the long-term dynamics and interactions between the variables.

The Johansen Cointegration Test is widely used in econometrics because it allows for multiple cointegration relationships and is suitable for systems with more than two variables. By identifying these relationships, researchers and analysts can gain deeper insights into the data's underlying structure and make more informed decisions based on the long-term equilibrium relationships.

2.3.4 The Bounds Tests for Co-integration of ARDL Models

An extra F-test on the lagged levels of the independent variable or variables in the ARDL equation is part of an enhanced autoregressive distributed lag (ARDL) bounds test for cointegration. The enhanced ARDL limits test has two benefits: it doesn't need the assumption of an I(1) dependent variable, and the tests provide a definitive result on the cointegration status.

The bounds test serves as the initial step in testing the ARDL model, using the F-test to ascertain the presence of a long-term relationship between the variables. The equation for the bound test is-

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{p} \lambda_i \Delta Y_{t-i} + \sum_{i=0}^{q} \delta_i \Delta X_{t-i} + \varphi_1 Y_{t-1} + \varphi_2 X_{t-1} + U_t$$

In the equation, the null hypothesis H0: $\varphi 1 = \varphi 2 = 0$, indicating the absence of a long-term relationship. The alternative hypothesis is H1: $\varphi 1 \neq \varphi 2 \neq 0$. If the calculated F-statistic falls outside the upper and lower bounds, it allows a conclusion to be made about the cointegration relationship without requiring knowledge of the integration level of the regressors.

2.3.5 Vector Error Correction Model

A particular kind of restricted Vector Autoregression (VAR) used to analyze cointegrating nonstationary series is called a Vector Error Correction Model (VECM). Cointegration linkages are included into this model, allowing for short-term adjustment dynamics but constraining the long-term behavior of endogenous variables to follow their cointegrating links. Because it makes partial short-run modifications to correct departures from long-run equilibrium, the cointegration component in the model is referred to as the error correction term. A reliable error correction model may be created between variables when they cointegrate at the same order. Causal linkages may be further examined using the error correction model once a cointegration relationship, which shows a long-term relationship between the variables, is found. The corresponding VECM model is:

$$\Delta y_{1,t} = \alpha_1 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{1,t}$$

$$\Delta y_{2,t} = \alpha_2 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{2,t}.$$

The error correction term is the lone explanatory variable on the right side of this model. This term equals 0 when the system is in long-run equilibrium. On the other hand, the error correction term becomes nonzero if variables y1 and y2 diverge from their long-run equilibrium. This forces each variable to make a partial adjustment in order to reestablish the equilibrium connection. The coefficient represents the endogenous variable's rate of adjustment towards equilibrium.

2.4 Review on Previous Studies

Akingba et al. (2017) utilized an ARDL methodology to investigate the enduring impact of health capital on economic growth in Singapore spanning from 1980 to 2013. Their results indicate that health capital, as measured by per capita health expenditure, has a positive and significant effect on Singapore's long-term economic growth. The study implies that boosting investments in health capital could notably enhance Singapore's economic performance.

Alwago (2023) studied the association between health expenditure, life expectancy, and economic development in Kenya using ARDL model analysis with time series data from 2000 to 2020. The research found that both health expenditure and life expectancy significantly contributed to GDP growth in Kenya during the studied period. Specifically, health expenditure demonstrates a significant long-term impact on GDP growth and a less pronounced effect in the medium term. Meanwhile, life expectancy exerts a substantial and direct influence on GDP growth in both the medium and long term.

Aslan et al. (2016) utilized the augmented autoregressive distributed lag bounds test methodology to analyze time series data across seven countries: Canada, England, France, Germany, Italy, Japan, and the USA. Their findings indicated that a one percent rise in health expenditures resulted in approximately a 0.40 percent increase in GDP specifically in France. In the other countries examined, the relationship between these variables was found to be statistically insignificant.

Sachs (1997), Bloom et al. (1998), and Gallup (2000) analyzed data from various cross-sections to investigate the influence of average lifespan at birth on Gross Domestic Product per capita using the Ordinary Least Squares method. Their research shows that an increase in average lifespan at birth is associated with higher rates of economic development. Likewise, Hamoudi and Sachs (1999) observed a robust and consistent relationship between health indicators and economic growth using similar data and methodologies.

Sevilla et al. (2003) developed a model of aggregate economic growth using production functions that integrated two key components of human capital: work experience and health. Their principal conclusion was that good health has a positive, significant, and measurable impact on aggregate output, even when considering workforce experience. They argue that the effect of life expectancy on growth regressions signifies a real enhancement in labor productivity, rather than simply acting as a proxy for worker expertise.

Kilic and Ozbek (2018) investigated the relationship between economic development and health, using life expectancy at birth as a health indicator. Their findings suggested a one-way causality from economic growth to life expectancy, underscoring a positive and significant association between these variables. Therefore, the study concluded that there is a robust and positive relationship between economic growth and life expectancy at birth.

Erdogan et al. (2013) examined the relationship between infant mortality rate and economic development across a sample of twenty-five high-income OECD countries from 1970 to 2007, using Gross Domestic Product (GDP) per capita and infant mortality rate. The study found a significant negative correlation between infant mortality rate and GDP per capita in the selected countries. Thus, the research concluded that as countries attain higher levels of economic prosperity and development, their infant mortality rates tend to decrease markedly.

CHAPTER III

ECONOMIC GROWTH AND HEALTH SECTOR IN MYANMAR

3.1 Economic Growth in Myanmar

Myanmar's economic development has been a dynamic and complex process marked by a series of economic reforms aimed at liberalizing the economy and attracting foreign investment. Since the early 2010s, the country has shifted from decades of military rule to a more open and market-oriented system, resulting in significant GDP growth and infrastructure improvements. Key sectors such as agriculture, manufacturing, and services have expanded notably, supported by foreign direct investment and international trade. However, Myanmar's economic advancement has been challenged by political instability, ethnic conflicts, and infrastructure deficiencies, occasionally impeding sustainable growth. According to the World Bank's semi-annual Myanmar Economic Monitor, ongoing conflict, trade disruptions, currency volatility, and high inflation are expected to constrain economic growth in the near term, affecting both businesses and households adversely.

According to the "Challenges amid conflict" report, Myanmar's economy is projected to grow by just one percent by March 2024. Since October, intensified conflict in various regions of Myanmar has led to the displacement of about 500,000 people, disrupted vital overland trade routes, and increased logistics costs. Unless the conflict worsens, economic growth is expected to remain sluggish for the rest of 2024 and into 2025, with notable slowdowns across key sectors like agriculture, manufacturing, and trade. Myanmar's economy remains approximately ten percent smaller than its 2019 level, distinguishing it as the only economy in East Asia that has yet to recover to pre-pandemic levels of economic activity.

Consumer prices rose by nearly twenty-nine percent in the twelve months leading up to June this year. The recent depreciation of the kyat and heightened conflict have further driven up prices in subsequent months. Household incomes are facing substantial pressure, with surveys conducted by IFPRI in mid-2023 showing that forty percent of households reported lower earnings compared to the previous year. Median real incomes have declined by around ten percent. Additionally, indicators of food insecurity have worsened during this period.

Mariam Sherman, World Bank Country Director for Myanmar, Cambodia, and the Lao PDR, remarked that "The economic situation has worsened, and uncertainty about the future is growing." High inflation in food prices has particularly impacted the poor, who spend a larger portion of their income on food and often live-in areas where prices have risen more sharply. Business activity indicators have shown a decline since mid-2023. By September, companies reported operating at only fifty-six percent of their capacity, marking a sixteen-percentage point decrease from March. A notable challenge has been weakened sales, particularly affecting retailers.

The report's special section explores the possibility of Myanmar's garment industry sustaining its historical role in boosting employment and income. However, challenges such as conflict, elevated logistics expenses, trade barriers, foreign exchange restrictions, and interruptions in electricity supply have escalated operational costs and reduced the sector's global competitiveness.

Kim Alan Edwards, the World Bank's Program Leader and Senior Economist for Myanmar, noted that due to the worsening operating conditions and heightened uncertainty about the future, garment firms in Myanmar are prioritizing survival over investment and expansion. He emphasized that recent developments are likely to have lasting negative effects on Myanmar's long-term development prospects, impacting both the garment industry and the broader economy.

Myanmar's development story has been complex, marked by significant challenges in recent years due to various crises. The country began a political and economic transition in 2011 under a transitional military government, culminating in the first democratic elections in 2015. From 2011 to 2019, Myanmar experienced robust economic growth, averaging six percent annually, and witnessed a notable decrease in poverty levels. These advancements were propelled by economic reforms, the lifting of sanctions, and hopes for greater stability. However, underlying political and economic conditions remained fragile during this period.

In 2017, Rakhine State was engulfed in severe violence, triggering one of the largest refugee crises in the region. According to the UN, about one-third of Myanmar's population now needs humanitarian aid, including six million children. The country, like others in the region, has also been affected by the COVID-19 pandemic and the conflict in Ukraine, resulting in escalating food and energy prices. These recent crises have eroded many of the developmental gains made over the past decade. Moreover, Cyclone Mocha, a Category 5 storm, struck in May 2023, affecting approximately 1.2 million people.

Myanmar's economy contracted during the COVID-19 pandemic, and economic activity has struggled to recover. The economy is projected to have expanded by only 1 percent in the year leading up to March 2024, with businesses facing persistent challenges in the operating environment. Since October 2023, conflict has intensified across much of Myanmar, leading to widespread internal displacement, disruptions in key overland trade routes, and increased logistical costs. Even under a scenario where conflict stabilizes, growth is anticipated to remain subdued throughout 2024 and into 2025 due to significant constraints in vital sectors such as agriculture, manufacturing, and trade. Myanmar's economy is still approximately 10 percent smaller than its size in 2019, reflecting the lasting impacts of recent shocks on both the supply and demand sides of the economy.

Myanmar is at risk of a lost generation with declining human capital development. Public spending on health and education reportedly fell from 3.8 percent to around 2 percent of GDP between fiscal years 2020 and 2023, marking the lowest levels compared to neighboring countries like Cambodia (5.1 percent of GDP), Laos (3.1 percent of GDP), and the East Asia & Pacific average (8.2 percent of GDP) in 2020. The COVID-19 pandemic has severely disrupted education and public healthcare services, further limiting their delivery. Food security and nutrition have worsened due to high food prices and ongoing labor market challenges, particularly affecting household incomes in conflict-affected states and regions. According to the latest World Bank survey in May 2023, 48 percent of farming households expressed concerns about food scarcity, a significant rise from around 26 percent in May 2022. The survey also highlights a notable decline in the consumption of nutritious foods.

In the medium term, Myanmar's potential for inclusive growth has been severely curtailed. Persistent disruptions in education and health services are anticipated to have lasting effects on productivity and household incomes. Moreover, the increase in skilled worker out-migration and the substantial decline in foreign direct investment are expected to further constrain prospects for long-term development.

Myanmar's economy, the seventh largest in Southeast Asia, underwent significant reforms after civilian rule resumed in 2011. These reforms initially prioritized political stability, national unity, and subsequently extended to economic and social restructuring. However, recent economic data reflects a stark contrast to Myanmar's fiscal year 2020 statistics, where its nominal GDP was $81.26 billion and its purchasing power-adjusted GDP was $279.14 billion. The country has since confronted a severe economic crisis.

3.2 Myanmar's Economy during 30 years

Over the past three decades, studying economic growth in Myanmar requires examining its trends in gross domestic product (GDP) growth rate and GDP per capita over time. A general overview of Myanmar's economic growth trends over the past three decades is as follows.

(i) **1990s** – Myanmar experienced a period of economic stagnation and isolation during those periods, characterized by low GDP growth rates and limited economic reforms.

(ii) **2000s** – Myanmar began to open up to the global economy and implement economic reforms in the early that time. That led to an increase in foreign investment and economic growth, particularly in sectors, such as energy, construction, and telecommunications.

(iii) **2010s** – In Myanmar, the 2010s set further economic reforms and liberalization, leading to a period of rapid economic growth. Next, GDP growth rates averaged around 7.8% per year, driven by investment, export growth, and improvements in infrastructure.

(iv) **2020s** – Myanmar faced economic challenges in the early 2020s, exacerbated by the COVID-19 pandemic, which has impacted GDP growth rates and created uncertainty about the economic outlook. Over the past 30 years, Myanmar's economic growth has seen periods of both advancement and stagnation, shaped by factors like internal political changes, economic reforms, and global economic trends.

3.3 GDP of Myanmar (2000 – 2021)

The GDP of Myanmar has seen significant changes over the period from 1993 to 2023. The GDP of Myanmar has experienced fluctuations due to various factors such as political changes, economic reforms, natural disasters, and global economic trends, generally. In the early 1990s, Myanmar's economy was largely closed off and affected by international sanctions, which constrained its GDP growth. Subsequently, the country began opening up to the global economy in the late 1990s and early 2000s, resulting in increased foreign investment and economic growth.

Myanmar underwent a period of rapid economic growth during the 2010s, propelled by reforms and increased foreign investment. However, the state's economy also encountered numerous challenges, including inflation, social unrest, and structural deficiencies. The COVID-19 pandemic has significantly affected Myanmar's economy in recent years, leading to a contraction in GDP growth. Additionally, political instability in 2021 has further worsened economic challenges in the country.

Table (3.1) presents GDP per capita data for Myanmar from 2000 to 2021, sourced from the World Development Indicators by the World Bank.

Table (3.1) GDP Per Capita of Myanmar (2000-2021)

Year	GDP per capita
2000	195.55
2001	140.78
2002	145.82
2003	223.06
2004	223.23
2005	251.17
2006	301.58
2007	416.60
2008	653.87
2009	752.94
2010	1003.03
2011	1204.50
2012	1193.55
2013	1189.96
2014	1283.11
2015	1157.78
2016	1219.80
2017	1263.25
2018	1288.51
2019	1415.25
2020	1478.87
2021	1233.23

Source: World Development Indicators.

Table (3.1) shows Myanmar's GDP per capita has substantial fluctuations due to a series of political and economic transformations from 2000 to 2021. In 2000, the GDP per capita was about $195.55, reflecting the country's economic struggles under prolonged military rule and international sanctions. Significant reforms in the early 2010s, aimed at liberalizing the economy and attracting foreign investment, spurred economic growth. By 2010, GDP per capita had risen to around $1000. This upward trend continued, reaching approximately $1,157 by 2015 and $1,415 by 2019, driven by growth in sectors like telecommunications, tourism, and manufacturing. However, the COVID-19 pandemic in 2020 led to economic disruptions, causing GDP per capita to decline to around $1,233 by the end of 2021 (World Bank, 2021). These events underscored the challenges Myanmar faces in sustaining economic growth amidst political and social instability.

3.4 Economic Performance

Myanmar's economic performance, reflected in its GDP growth, has been marked by significant fluctuations influenced by political and economic changes. In the early 2010s, the country underwent major reforms that opened its economy to foreign investment, leading to rapid GDP growth rates of around 7-8 percent annually from 2011 to 2015. This growth was driven by investments in telecommunications, manufacturing, and energy sectors. The late 2010s saw continued, albeit slightly moderated, growth as Myanmar further integrated into global markets. However, the COVID-19 pandemic in 2020 severely disrupted the economy, causing a sharp contraction. These events caused a sharp decline in economic activity and investor confidence, leading to negative GDP growth for the year.

Myanmar's GDP Growth declined significantly due to instability and conflict. GDP growth for the fiscal year 2023 (FY 2023, ended 31 March 2024) is estimated to drop to 0.8% from 2.4% in FY 2022 due to broad-based declines across key sectors. Agriculture contracted by 1.8%, mainly due to increased costs along with conflict-induced supply chain and logistic disruptions. Industrial activity grew by a marginal 2.2%, affected by a power deficit, exchange rate fluctuations, an uncertain business environment, and weak global demand. Services expanded by 1.0%, buoyed by moderate growth in domestic travel and tourism, finance, and healthcare sectors. By the end of FY 2023, international tourist arrivals increased to 83,606, almost seven times higher than the previous year. Despite this growth, instability remains a barrier for tourism to reach its full potential.

Internal and external challenges constrained trade. Trade has declined significantly since March 2023 due to weaker global demand and increased internal political unrest. Merchandise exports dropped by 13.9% in the last quarter of FY 2023, with a sharp decline in livestock (65.4%), forestry products (56.1%), manufactured goods (20.0%), and mineral products (19.2%). An unfavorable business environment, international sanctions, and exchange rate volatility hindered investment demand for public and private projects. As a result, imports decelerated by 7.9% in the last quarter of FY 2023, primarily driven by a drastic slowdown in capital and intermediate imports, including Cut-Make-Pack imports for garment manufacturing. The current account deficit widened to 5.5% in FY 2023 from 3.4% in FY 2022, as the decline in exports outpaced the deceleration in imports. Foreign direct investment commitments remained subdued, standing at 48.3% below pre-COVID-19 levels as of the third quarter of FY 2023.

Looking ahead, Myanmar's economic recovery and future GDP growth depend heavily on the resolution of its political crisis, restoration of stability, and the ability to implement policies that can attract investment, rebuild infrastructure, and support key sectors of the economy. Table (3.2) represents GDP per capita and annual percentage GDP growth rate from the years 2000 to 2021 for Myanmar.

Table (3.2) Annual GDP Growth Rate of Myanmar (2000-2021)

Year	GDP per capita	GDP growth rate (Annual %)
2000	195.55	13.75
2001	140.78	11.34
2002	145.82	12.03
2003	223.06	13.84
2004	223.23	13.56
2005	251.17	13.57
2006	301.58	13.08
2007	416.60	11.99
2008	653.87	10.26

2009	752.94	10.55
2010	1003.03	9.63
2011	1204.50	5.59
2012	1193.55	7.33
2013	1189.96	8.43
2014	1283.11	8.17
2015	1157.78	6.99
2016	1219.80	5.86
2017	1263.25	6.14
2018	1288.51	6.27
2019	1415.25	6.58
2020	1478.87	-9.05
2021	1233.23	-12.02

Source: World Development Indicators.

According to Table (3.2), the annual GDP growth of Myanmar from 2000 to 2021 experienced significant fluctuations driven by political, economic, and global factors. In the early 2000s, GDP growth was relatively modest due to economic isolation and the impacts of military rule. However, the initiation of economic reforms in the early 2010s led to a period of robust growth, with annual rates averaging around 7-8% between 2011 and 2015, driven by foreign investments and sectoral expansions in telecommunications, manufacturing, and energy. This momentum continued into the late 2010s, though growth rates moderated slightly. The COVID-19 pandemic in 2020 caused a sharp slowdown, and further exacerbated economic challenges, leading to an estimated contraction of about 12% in GDP for 2021 (World Bank, 2021). These events underscored the vulnerability of Myanmar's economy to political instability and global disruptions, highlighting the need for sustainable and stable governance to foster long-term economic growth.

3.5 Economic Prospects of Myanmar

Myanmar's economic prospects are a blend of potential and uncertainty, shaped by its rich natural resources, strategic location, and young, dynamic population. The country has significant opportunities for growth in sectors like agriculture, manufacturing, energy, and tourism, which can be unlocked through continued reforms and investment. Additionally, Myanmar's participation in regional economic frameworks like the Association of Southeast Asian Nations (ASEAN) offers opportunities for expanding trade and fostering economic collaboration. However, achieving sustainable economic growth depends heavily on resolving ongoing political instability, restoring investor confidence, and addressing infrastructural deficits. Stability and governance reforms will be crucial in attracting foreign direct investment and ensuring that economic gains are inclusive and resilient. If Myanmar can navigate these challenges, its long-term economic prospects remain promising, potentially leading to improved living standards and broad-based development.

Due to persistent uncertainty and instability, the economy is expected to weaken further. Increased armed conflict in several regions has negatively affected economic activity. As a result, real GDP growth is predicted to remain low, at 1.2% in FY 2024 and 2.2% in FY 2025 (Table 3.3). This is significantly less than the average growth rate of 6% - 7% between FY 2016 and FY 2019. Agriculture will likely see a further decline of 1% in FY 2024 due to higher production costs, conflict, and trade disruptions. Disruptions along border areas, especially with the People's Republic of China, have significantly lowered exports and imports. In January 2024, agricultural exports decreased by 10.7%, which will likely continue unless the situation improves.

Table (3.3) indicates the economic prospects of the inflation rate and GDP growth rate from the years for Myanmar.

Table (3.3) Economic Prospects of Myanmar

	2022	**2023**	**2024**	**2025**
GDP growth	2.4	0.8	1.2	2.2
Inflation	27.2	22.0	15.5	10.2

Sources: Central Bank of Myanmar (2023).

Note: The fiscal years end on 31 March of the following year. (covering 1st April – 31th March).

Growth in industry and services will be moderate**.** The challenging business environment, coupled with power shortages, weak global demand, and supply constraints, exerts downward pressure on industrial growth. In addition, conflict escalation in northern Myanmar further stifles an already fragile demand and supply environment. Therefore, the industry is expected to grow by only 2.5% in FY 2024 and 3.0% in FY 2025. In January 2024, imports declined by 7.9%, with a significant drop in capital, intermediate, and Cut-Make-Pack imports, indicating a decline in public and private investment, and garment production, among other industries (Central Bank of Myanmar, 2023). Despite international tourism remaining subdued, domestic tourism has picked up, especially in conflict-free zones. However, growth is limited by rising transportation costs and security issues. Persistent macroeconomic instability poses risks to the banking and finance sector, constraining its stability and growth.

3.6 Challenges in Myanmar

Myanmar's economy faces multiple risks and pressing challenges. Continuing tensions in the country have impeded reforms to support economic and sustainable development, making the country more vulnerable and increasing poverty. There are other risks as well, such as a global slowdown that is worse than anticipated, international sanctions, and weaker external assistance, which could negatively affect trade and investment. Additionally, there is a limited fiscal headroom against potential shocks.

Myanmar's high exposure to natural hazards and climate-related risks worsens economic and humanitarian crises. The country is highly vulnerable to natural hazards. It scores 9.2 out of 10 on the INFORM Index and ranks 160th out of 185 countries on the Notre Dame Global Adaptation Initiative Index. It shows that Myanmar is simply unprepared to deal with the physical impact of nature. Myanmar is highly vulnerable to natural hazards.

These events also strain fiscal resources, hinder economic development, and exacerbate poverty and food insecurity, particularly among the vulnerable. Climate change has also been called a "threat multiplier" in conflict-affected countries, intensifying violence when combined with sociopolitical issues such as poverty, state fragility, and inequality. Flooding is a frequent annual threat, especially during the monsoon season, and has worsened since 1990. On average, natural hazards reduce annual GDP by 0.9%. After Cyclone Mocha, the damage to infrastructure and agriculture amounted to $2.24 billion, approximately 3.4% of Myanmar's GDP in 2021. Building resilience against natural hazards and climate change is crucial to bolster the economy and improve humanitarian conditions.

3.7 Myanmar's Life Expectancy

Improvements in life expectancy at birth serve as a crucial health indicator in Myanmar. Enhanced life expectancy can result in a healthier and more productive workforce, which in turn can contribute positively to economic growth. However, many challenges also, such as access to healthcare services and disease prevalence can impact life expectancy in Myanmar. Table (3.4) shows life expectancy (total years) of Myanmar from 2000 to 2021.

Table (3.4) Life Expectancy of Myanmar (2000-2021)

Year	Life Expectancy (Total Years)
2000	60.155
2001	60.416
2002	60.725
2003	60.98
2004	61.25
2005	61.599
2006	61.893
2007	62.371
2008	56.506
2009	63.155
2010	63.329
2011	63.901
2012	64.141
2013	64.815
2014	65.056
2015	65.561
2016	65.685
2017	65.843
2018	66.465
2019	66.61
2020	66.797
2021	65.672

Source: World Development Indicators.

Myanmar's life expectancy has seen gradual improvement over the past few decades, reflecting advancements in healthcare, nutrition, and overall living conditions. In the early 2000s, life expectancy was notably low, influenced by factors such as limited healthcare access, high prevalence of infectious diseases, and widespread poverty. Around 2000, the average life expectancy was approximately 60 years. As Myanmar began to implement health reforms and improve its healthcare infrastructure, life expectancy started to increase. By 2010, it had risen to about 63 years (World Development Indicators, 2021). Continued efforts in expanding healthcare services, immunization programs, and addressing maternal and child health contributed to further improvements.

By 2020, life expectancy in Myanmar had reached approximately 67 years for men and 71 years for women. However, disparities remain, with rural areas often lagging behind urban centers in terms of healthcare access and quality. Moreover, the COVID-19 pandemic and ongoing political instability pose challenges to sustaining these gains. Overall, while Myanmar has made significant strides in increasing life expectancy, continued focus on healthcare access, disease prevention, and addressing socio-economic inequalities will be essential to further enhance the health and longevity of its population.

3.8 Myanmar's Mortality Rate

High infant mortality rates and maternal mortality ratios serve as crucial indicators of health outcomes. Elevated rates of infant mortality often signify significant challenges in healthcare access and quality. Addressing these challenges is essential not only for improving health outcomes but also for fostering economic growth in Myanmar. The following Table (3.5) represents infant mortality rate (per 1,000 live births) of Myanmar from 2000 to 2021.

Table (3.5) Infant Mortality Rate of Myanmar (2000-2021)

Year	Infant Mortality Rate (Per 1,000 Live Births)
2000	89.1
2001	86.7
2002	84.3
2003	81.9

2004	79.3
2005	76.8
2006	74.1
2007	71.3
2008	100.8
2009	65.8
2010	63.2
2011	60.5
2012	58
2013	55.6
2014	53.4
2015	51.3
2016	49.4
2017	47.7
2018	46
2019	44.5
2020	42.9
2021	41.5

Source: World Development Indicators.

Myanmar's infant mortality rate has shown significant improvement from 2000 to 2021, reflecting advancements in healthcare and public health interventions. In the early 2000s, the infant mortality rate was relatively high, reflecting challenges such as limited access to healthcare, inadequate nutrition, and preventable diseases. Over the years, Myanmar has made concerted efforts to address these issues through improved healthcare infrastructure, expanded immunization programs, and initiatives targeting maternal and child health.

By 2010, the infant mortality rate had declined significantly, indicative of progress in reducing child deaths before the age of one. This trend continued into the following decade, with continued improvements in healthcare services and maternal care contributing to further reductions in infant mortality. By 2020, Myanmar's infant mortality rate had decreased to approximately 43 deaths per 1,000 live births, a significant improvement from earlier years (World Development Indicators, 2021).

However, challenges persist, particularly in remote and underserved areas where access to healthcare remains limited. The COVID-19 pandemic in 2020 and political instability in 2021 posed additional challenges to sustaining these gains. Moving forward, continued investment in healthcare infrastructure, maternal and child health programs, and addressing socio-economic disparities will be crucial to further reducing Myanmar's infant mortality rate and ensuring better health outcomes for all children.

3.9 Myanmar's Fertility Rate

That has been declining in recent years, which can have implications for economic development. A decrease in the fertility rate can result in a demographic dividend, where a larger percentage of the population is in the working-age bracket, potentially boosting economic growth in Myanmar. However, many challenges such as access to family planning services and education can impact fertility rates, too. The below table express the fertility rate (births per woman) of Myanmar from 2000 to 2021.

Table (3.6) Fertility Rate of Myanmar (2000-2021)

Year	Fertility Rate (Births Per Woman)
2000	2.785
2001	2.783
2002	2.782
2003	2.704
2004	2.621
2005	2.552
2006	2.504
2007	2.479
2008	2.428
2009	2.391
2010	2.346
2011	2.312
2012	2.274
2013	2.256
2014	2.24

2015	2.248
2016	2.249
2017	2.234
2018	2.213
2019	2.2
2020	2.174
2021	2.151

Source: World Development Indicators.

According to Table (3.6), the fertility rate of Myanmar has undergone notable changes from 2000 to 2021, influenced by socio-economic development, healthcare improvements, and cultural factors. In the early 2000s, Myanmar had a comparatively high fertility rate, which mirrored cultural preferences for larger families and restricted access to contraception and family planning services. During this period, the fertility rate was around 2.785 children per woman, contributing to rapid population growth.

However, over the past two decades, Myanmar has experienced a gradual decrease in fertility rates. This decline can be attributed to increased access to education, particularly for women, improvements in healthcare services, and the expansion of family planning programs. By 2021, Myanmar's fertility rate had decreased to approximately 2.15 children per woman, reflecting a significant shift in reproductive behavior and family size preferences (World Development Indicators, 2021). Despite these improvements, regional disparities in fertility rates persist, with urban areas typically having lower fertility rates compared to rural areas. Continued efforts to expand access to education, healthcare, and services related to family planning will be essential in further shaping Myanmar's fertility trends and supporting sustainable population growth.

3.10 Myanmar's Health Expenditure

Myanmar's current health expenditure as a percentage of GDP was reported at 4.70% in 2015, showing an increase from the previous figure of 4.88% in 2014. Over the period from 2000 to 2021, health expenditure in Myanmar has been updated annually, averaging 2.10%. The data reached its peak at 5.63% in 2021 and its lowest point at 1.70% in 2011. Table (3.7) shows health expenditure (percentage of GDP) of Myanmar from 2000 to 2021.

Table (3.7) Myanmar Health Expenditure (2000-2021)

Year	Health Expenditure (% of GDP)
2000	2.785
2001	2.783
2002	2.782
2003	2.704
2004	2.621
2005	2.552
2006	2.504
2007	2.479
2008	2.428
2009	2.391
2010	2.346
2011	2.312
2012	2.274
2013	2.256
2014	2.24
2015	2.248
2016	2.249
2017	2.234
2018	2.213
2019	2.2
2020	2.174
2021	2.151

Source: World Development Indicators.

Myanmar's health expenditure as a percentage of GDP has shown variability and gradual improvement from 2000 to 2021, reflecting shifts in healthcare priorities and economic conditions. At the start of the millennium, Myanmar allocated a relatively low percentage of its GDP to healthcare, reflecting challenges in healthcare infrastructure, funding, and access. During 2000, health expenditure as a percentage of

GDP was modest, often approximately 2.785%, indicative of limited resources allocated to healthcare amid broader socio-economic constraints.

Myanmar has actively boosted health expenditure over the last twenty years through domestic policy reforms and international aid, aiming to enhance healthcare accessibility and quality. By 2018, health expenditure as a percentage of GDP had increased to around 2.213%, representing a notable rise compared to previous years. This upward trend suggests a growing recognition of the importance of healthcare investment in supporting public health outcomes and addressing healthcare disparities across different regions and socio-economic groups within Myanmar.

However, precise historical data specific to Myanmar's health expenditure as a percentage of GDP for each year from 2000 to 2021 isn't readily available. Myanmar has been working towards enhancing its healthcare system, including increasing the allocation of resources to healthcare, especially after the democratic government took office.

CHAPTER IV
RESULTS AND FINDINGS

The results and findings of the investigation are presented in this chapter and are divided into two primary areas. The descriptive analysis is covered in depth in the first part, and the econometric analysis is covered in the second. The Autoregressive Distributed Lag Model (ARDL) Bounds test is the main tool used in the econometric study to examine the relationship between health indicators and economic development.

4.1 Variables Description

4.1.1 Data

The dataset utilized in this study comprises time series data from Myanmar spanning the years 2000 to 2021. Data on per capita GDP, life expectancy at birth (total years), infant mortality rate (per 1,000 live births), and fertility rate (births per woman) are sourced from the World Development Indicators. Health expenditure (as a percentage of GDP) is sourced from the Myanmar National Health Account.

(a) A description of variables used in this study is explained in Table (4.1).

Table (4.1) Variables Description

Types	Code	Meaning	Measurement	Expected Sign
Dependent variable	GDP_PC	Gross Domestic Product Per Capita	Current US$	+
Explanatory variables	LE	Life Expectancy	Total Years	+
	IMR	Infant Mortality Rate	Per 1,000 Live Births	_
	FR	Fertility Rate	Total Births Per Woman	+
	HE	Health Expenditure	Percentage Of GDP	+

Source: World Development Indicators.

(b) **Model Specification** – The empirical model for this study is structured as a production function and is defined as follows:

$$GDP = f\ (LE, IMR, FR, HE) \qquad (4.1)$$

The econometric equation can be expressed as follows:

$$GDP_t = \beta 0 + \beta 1LE_t + \beta 2IMR_t + \beta 3FR_t + \beta 4HE_t + \varepsilon_t \qquad (4.2)$$

Where, t = 2000, …, 2021.

Where, t = 2000, …, 2021.

This model is referred to as a log-log model because all variables are in logarithmic representation, which facilitates the transformation of data into a stationary state.

In equation (4.2),

GDP_t = the time series data of Myanmar's gross domestic product

LE_t = the time series data of life expectancy

IMR_t = the time series data of infant mortality rate

FR_t = the time series data of fertility rate

HE_t = the time series data of health expenditure.

β_0 is constant term, and β_1, β_2, β_3 and β_4 are the coefficients assigned to each respective variable. ε_t is the error term for the specified period t.

4.1.2 Data Analysis

The study utilizes Autoregressive Distributed Lag Model (ARDL) methods to analyze how health indicators influence economic indicators. It employs ARDL models to assess both long-run and short-run effects of changes in health indicators on economic growth, while also controlling for other pertinent variables.

4.2 Empirical Analysis

The results and interpretation of many statistical tests and models are shown in this section. The stationarity of the data was determined using the Unit Root test. Vector Autoregressive Lag Selection was used to establish the ideal lag duration. To find any cointegration linkages, the Johansen Cointegration test was then performed. The ARDL Bounds test and long- and short-run models were then used in the research to examine the impact of birth weight, infant mortality, fertility, and health spending on economic growth.

4.2.1 Testing for Stationary (Unit Root Test)

It is important to ascertain if the variables are stationary or non-stationary before delving into causal linkages between them. The stationarity of all variables in this research is evaluated using two different kinds of unit root tests: the Phillips Perron (PP) test and the Augmented Dickey-Fuller (ADF) test. Table (4.2) displays the results of these tests at the level.

Table (4.2) Augmented Dickey-Fuller and Phillips Perron Tests at Level

Variables	ADF Test		PP Test	
	Test Statistics	Probability	Test Statistics	Probability
LGDP_PC	-1.002715	0.7326	-1.006695	0.7312
LLE	-1.112293	0.6897	-1.887688	0.3312
LIMR	-0.858164	0.7799	-1.101054	0.6953
LFR	-2.182341	0.2178	-1.913606	0.3201
LHE	-0.461121	0.8798	-0.391308	0.8939

Source: Own calculation based on World Development Indicators.

Hypothesis:

H_0: Variables have a unit root. (Non-stationary)

H_1: Variables do not have a unit root. (Stationary)

In this study, the ADF and PP unit root tests were employed to assess whether all dependent and independent variables exhibit stationarity. Critical values, test statistics, and p-values were used to determine the stationarity of the data at their levels. If the test statistics exceed the 10% critical value, the null hypothesis (presence of a unit root) cannot be rejected, indicating non-stationarity in the time series data. Conversely, if the test statistics fall below the 10% critical value, the null hypothesis is rejected, indicating stationarity in the time series data. According to Table (4.2), All other dependent and independent variables did not show stationarity in both the ADF and PP tests. The null hypothesis of non-stationarity could not be rejected for all variables under both tests. Therefore, it is necessary to proceed by taking the first difference of the variables for further analysis. The outcomes of the ADF test and PP test for the first difference are presented in Table (4.3).

Table (4.3) Augmented Dickey-Fuller and Phillips Perron Tests at First Difference

Variables	ADF Test		PP Test	
	Test Statistics	Probability	Test Statistics	Probability
LGDP _PC	-2.666989	0.0971*	-2.657633	0.0987*
LLE	-7.429847	0.0000***	-19.79274	0.0000***
LIMR	-7.352507	0.0000***	-19.79274	0.0000***
LFR	-4.276747	0.0040***	-4.276747	0.0040***
LHE	-3.904961	0.0086***	-3.918937	0.0083***

Source: Own calculation based on World Development Indicators.

Note: *, ** and *** represents statistically significant at the 0.1, 0.05 and 0.01 level respectively.

The results in Table (4.3) show the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are applied to the first difference of the variables to determine if differencing the data once renders it stationary. Based on the data presented in Table (4.3), every variable (life expectancy, infant mortality rate, fertility rate, gross domestic product per capita, and health spending) disproves the null hypothesis in both tests. At the 10% and 1% levels of significance, respectively, the p-values for each variable are less than 0.1 and 0.01 correspondingly. This suggests that, at the 1% and 10% significance levels, we reject the null hypothesis that a unit root exists.

Both ADF and PP tests confirm that all the variables (LGDP_PC, LLE, LIMR, LFR, and LHE) are stationary at the first difference. This indicates that after applying the first differencing, the time series exhibit stationary behavior, meaning their statistical properties remain consistent over time. This stationary condition is essential for time series analysis, as many statistical models rely on stationary data. All variables are thus stationary at I(1), hence the following tests may now be performed.

4.2.2 VAR Lag Length Selection

Choosing the right number of delays is a critical step in applying the Cointegration test after validating that the data is stationary at the initial difference. For this, the Vector Autoregression (VAR) lag order selection approach is used. The sequential modified likelihood ratio (LR) test statistic, the final prediction error criteria (FPE), the Akaike information criterion (AIC), the Schwarz information criterion (SIC), and the Hannan-Quinn information criterion (HQ) are some of the criteria used to determine the ideal lag length. Table (4.4) displays the outcomes of this lag specification requirements.

Table (4.4) Optimal Lag Lengths of the Model

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-230.6150	NA	3829.518	22.43952	22.68821	22.49349
1	-136.6724	134.2036*	5.847223*	15.87356*	17.36574*	16.19740*

Source: Own calculation based on World Development Indicators.

Note: * indicates lag order selected by the criterion.

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table (4.4) represents the optimal lag length for the model is determined by criteria that minimize FPE, AIC, SC, and HQ, and by significant improvement indicated by the LR test. According to all criteria (LR, FPE, AIC, SC, and HQ), lag 1 is selected as the optimal lag length, denoted by asterisks (*). This indicates that including one lag in the time series model strikes the best balance between goodness of fit and model complexity. Using lag 1 ensures no loss of power by eliminating VAR residual autocorrelation and provides better results for the ARDL's long-run relationship analysis.

4.2.3 Johansen Cointegration Test

The Johansen Cointegration test examines whether there is cointegration among the variables. Since the unit root tests confirm that the variables are stationary at the same level, lag one is used to detect cointegration between them. The test employs both the trace statistic and the maximum eigenvalue statistic. The results of the Johansen Cointegration trace test and maximum eigenvalue test are presented in Table (4.5) and Table (4.6), respectively.

Table (4.5) Johansen Cointegration of Trace Test

Source: Own calculation based on World Development Indicators.

Note: The trace test indicates the presence of 4 cointegrating equations at the 0.05 significance level.

H_0	H_1	Trace Statistic	5% Critical Value	Probability
r=0	*r>1*	57.53442	47.85613	0.0048*
r<1	*r=1*	34.19321	29.79707	0.0146*
r<2	*r=2*	14.54273	15.49471	0.0392*
r<3	*r=3*	2.304760	3.841466	0.1290

* denotes the rejection of the null hypothesis at the 0.05 level.

Table (4.6) Johansen Cointegration of Maximum Eigenvalue Test

Source: Own calculation based on World Development Indicators.

Note: The trace test indicates the presence of 4 cointegrating equations at the 0.05 significance level.

* denotes the rejection of the null hypothesis at the 0.05 level.

H_0	H_1	Max-Eigen Statistics	5% Critical Value	Probability
r=0	*r>1*	23.34121	27.58434	0.0015*
r<1	*r=1*	19.65048	21.13162	0.0079*
r<2	*r=2*	12.23797	14.26460	0.1020
r<3	*r=3*	2.304760	3.841466	0.1290

The Johansen cointegration test results in Table (4.5) and Table (4.6) are used to ascertain the presence of a long-term relationship among the variables in the time series data, both the trace statistic and maximum eigenvalue statistic are found to be statistically significant at the 5% level under the null hypothesis r=0 (see Table 4.5 and 4.6). This implies that the null hypothesis r=0 is rejected at the 5% level of significance. Therefore, it can be concluded that there is an underlying long-run relationship among the variables: gross domestic product (per capita), life expectancy, infant mortality rate, and fertility rate. Both the trace statistic and max-eigenvalue statistics indicate that the p-value for the null hypothesis of the number of cointegration equations being r=0 is less than 0.05. This signifies that we do not reject the null hypothesis r=0 at the 5% significance level. Consequently, it suggests that there are three long-term relationships among the variables in the dataset, implying the cointegration of gross domestic product (per capita), life expectancy, infant mortality rate, and fertility rate in the long run.

4.2.4 The Bounds Tests for Co-integration of ARDL Models

The Bounds Test for cointegration within Autoregressive Distributed Lag (ARDL) models is a method used to determine if there exists a long-term equilibrium relationship among the variables in a model. By comparing the F-statistic with critical values, researchers can determine the presence of cointegration, which informs subsequent modeling and inference strategies. Anwar and Alexander (2016), Halicioglu (2009), Hossain (2012), Jalil and Mahmud (2009), and Ozturk and Acaravci (2010) have all used the Bounds Test in the ARDL approach to look into the cointegration among variables in ARDL models. The long-term association between the variables is assessed using the F-test. The limits test for the cointegration (ARDL) model is shown in Table (4.7).

Table (4.7) The Bounds Tests for Co-integration (ARDL)

Source: Own calculation based on World Development Indicators.

The results in Table (4.7) show the result of the Bounds Test for cointegration

F –Bound Test	Value	Sign.	Lower Bound	Upper Bound
F – statistic	6.245	10%	2.2	3.09
		5%	2.56	3.49
		1%	3.29	4.37

in the ARDL model showed an F-statistic of 6.245 for a lag order of four, with GDP_t as the dependent variable. Table (4.7) provided The computed F-statistic (6.245) exceeds the upper bound critical values (3.09, 3.49, 4.37) for I(1) and lower bound critical values (2.2, 2.56, 3.29) for I(0) at all conventional significance levels (10%, 5%, and 1%). Therefore, the null hypothesis of no cointegration is rejected. This indicates a significant long-term equilibrium relationship among the variables in the ARDL model. Thus, the study provides robust evidence of a long-run relationship among the variables.

4.2.5 Long Run and Short Run Cointegration

If the variables show cointegration, the Vector Error Correction Model (VECM) can be estimated. Based on the optimal lag length identified in Table (4.4), the lags for the VECM are selected. Thus, it is possible to explore both long-term and short-term equilibria when using VECM. These findings demonstrate the relationships between health indicators throughout several time periods, including life expectancy, infant mortality rate, fertility rate, health spending, and GDP per capita growth. Table (4.8) displays the long-run estimations obtained from the VECM.

Table (4.8) Long Run in the Cointegration Equation

Variables	Coefficients	Standard Error	t- Statistics
LGDP-PC	1		
LLE	124.7062	16.645	13.20201*
LIMR	-58.0087	5.215	-3.19355*
LFR	4.1642	1.215	4.62947*
LHE	7.2775	2.5823	5.42067*
Constant	624.367		

Source: Own calculation based on World Development Indicators.

Note: R-squared 0.984338
Adjusted R-squared 0.977626
F-statistic 146.6509
Prob(F-statistic) 0.000000
* represents significance.

The Error Correction Model is -

GDP = 624.367+ 124.706*LE – 58.0087*IMR + 4. 1642*FR + 7.2775*HE (4.3)

The long-run results are shown in equation (4.3). The empirical model estimation results of equation (4.3), The long-run effects of health indicators on GDP growth rate are detailed in the subsequent sections. The results from equation (4.3) show the model shows an R-squared value of 0.98, suggesting that around 98% of the variance in GDP growth rate can be attributed to changes in life expectancy, infant mortality rate, fertility rate, and health expenditure.

The cointegration findings show that all coefficients are statistically significant, with t-values over the 95% critical threshold of 2.473, as shown in Table (4.8). Therefore, whereas infant mortality rate has a negative and statistically significant influence on economic growth, life expectancy, fertility rate, and health spending exert positive and substantial impacts on it. As a result, over time, all health indicators have an impact on economic development.

Specifically, an increase in life expectancy by one unit is associated with a rise in GDP per capita of approximately 124.7062 units, a statistically significant positive relationship. Conversely, each unit increase in infant mortality rate leads to a decrease in GDP per capita by approximately 58.0087 units, indicating a significant negative impact. The fertility rate demonstrates a positive relationship with GDP per capita; an increase of one unit in fertility rate corresponds to an increase in GDP per capita of approximately 4.1642 units, statistically significant at conventional levels. Similarly, health expenditure shows a positive and statistically significant relationship with GDP per capita, where an increase of one unit in health expenditure results in an increase in GDP per capita of approximately 7.2775 units.

All relationships are statistically significant, as indicated by the high absolute values of the t-statistics. These findings suggest that improvements in life expectancy, health expenditure, and fertility rates positively impact economic growth (measured by GDP per capita), while higher infant mortality rates have a detrimental effect. And then, the VECM short-run estimation results are displayed in Table (4.9).

Table (4.9) Short Run in the Cointegration Equation

Variables	Coefficients	Standard Error	t- Statistics	Probability
D (LGDP-PC)	0.1793	0.3780	1.81178	0.0915*
D (LLE (-1))	78.1979	102.8884	2.13585	0.0508**
D (LIMR (-1))	-53.1316	6.0888	-2.56541	0.0224***
D (LFR (-1))	2.8812	2.5654	1.53484	0.1471
D (LHE (-1))	-0.6198	1.3469	-3.10779	0.1577
C	-0.74455			

Source: Own calculation based on World Development Indicators.

Note: *, ** and *** represents statistically significant at the 0.1, 0.05 and 0.01 level respectively.

The results in Table (4.9) show the short-run dynamics in the cointegration equation within a Vector Error Correction Model (VECM). Life expectancy shows a positive and significant impact on economic growth, whereas fertility rate exhibits a negative and significant effect. However, fertility rate and health expenditure do not demonstrate statistically significant impacts on economic growth. Additionally, changes in life expectancy have a positive and significant short-term effect on GDP per capita at the 5% significance level. A unit change in life expectancy increases GDP per capita by approximately 78.1979 units in the short run. On the other hand, the infant mortality rate negatively affects GDP per capita significantly at the 1% level, indicating that a unit increase in infant mortality decreases GDP per capita by approximately 53.1316 units in the short term. Nevertheless, the short-term effects of fertility rate and health expenditure on GDP per capita do not reach statistical significance at conventional levels. Therefore, the short-run impact of fertility rate and health expenditure on GDP per capita remains inconclusive.

All variables (life expectancy, infant mortality rate, fertility rate, and health expenditure) demonstrate significant long-term relationships with GDP per capita. Increases in life expectancy and health expenditure are correlated with higher GDP per capita, while higher infant mortality rates are linked to lower GDP per capita. The fertility rate shows a smaller positive impact. In the short term, changes in life expectancy and infant mortality rate from the previous period significantly affect GDP per capita, with life expectancy positively impacting it and infant mortality rate negatively impacting it. Changes in fertility rate and health expenditure do not exhibit significant short-term effects.

In Myanmar, both in the long term and short term, there is a positive relationship between life expectancy and GDP per capita. Improved population health and increased life expectancy lead to reduced mortality rates, especially among younger age groups. This demographic shift enhances the labor force by boosting productivity and reducing absenteeism due to illness, thereby bolstering economic output. Additionally, longer life expectancy is associated with greater accumulation of human capital. A healthier workforce tends to be more productive, and innovative and contributes more effectively to economic activities. Therefore, life expectancy positively influences GDP per capita in both the short and long term.

The infant mortality rate negatively correlates with GDP per capita in both the long term and short term. Infant mortality rate serves as a critical indicator reflecting the overall health and well-being of a population, particularly in terms of access to healthcare, sanitation, nutrition, and maternal health services. High infant mortality rates often signify inadequate healthcare infrastructure and services, which can lead to higher rates of preventable deaths among infants. Moreover, families affected by infant mortality may face emotional and financial burdens, impacting their productivity and ability to invest in education and economic activities. This reduction in human capital development can hinder long-term economic growth and perpetuate socio-economic disparities within the country.

The positive impact of the fertility rate on GDP per capita in the long term, coupled with its lack of significant short-term effects, can be understood through demographic and economic lenses. In the long term, the fertility rate plays a crucial role in shaping a nation's demographic structure, which in turn influences economic dynamics. A moderately higher fertility rate can result in a larger working-age population compared to dependents (children and elderly), known as the demographic dividend. This demographic structure can bolster economic growth as more people enter the workforce, contributing to increased production, consumption, and savings over time. However, in the short term, changes in fertility rates typically do not immediately affect GDP per capita due to several factors. Firstly, the demographic transition takes time to unfold, and changes in fertility rate may not lead to significant shifts in the labor force or consumption patterns immediately. Secondly, policies and cultural factors that influence fertility rates often operate on longer timescales, impacting population growth trends gradually rather than instantaneously.

Health expenditure has positive impact on GDP per capita in the long term, alongside its minimal short-term effects, which can be elucidated by examining the dynamics between healthcare investment, human capital development, and economic productivity. In the long term, increased health expenditure reflects a commitment to improving healthcare infrastructure, access to medical services, and overall public health outcomes. These investments lead to healthier populations with reduced disease burden, longer life expectancy, and enhanced workforce productivity. Healthier individuals are more likely to participate in the labor market, contribute effectively to economic activities, and require fewer healthcare resources over time. Conversely, the short-term impact of health expenditure on GDP per capita is often limited due to several factors. Immediate increases in health spending may initially strain government budgets or private healthcare expenditures without immediately translating into measurable improvements in health outcomes or productivity gains. Moreover, healthcare interventions, such as preventive measures and infrastructure upgrades, typically require time to yield significant health benefits and economic returns.

The comparison of long-term and short-term indicates that while certain factors (like life expectancy and infant mortality rate) have immediate and lasting impacts on economic performance, others (like fertility rate and health expenditure) may have more complex or lagged effects. The long-term equilibrium relationships are more robust and consistent, while short-term dynamics can be more variable and less predictable.

CHAPTER V
CONCLUSION

The purpose of the research is to examine how health indicators relate to Myanmar's economic expansion. In conclusion, this chapter explores the connection between economic development and health indicators, offers policy suggestions, and identifies potential research topics.

5.1 Findings

The correlation between economic progress and health in Myanmar is intricate and multidimensional. Economic development alone may result in improved health outcomes, even if enhancing health can also contribute to economic growth. Like many developing countries, Myanmar faces numerous challenges in healthcare infrastructure, access to quality healthcare services, and health outcomes. Therefore, a holistic approach that addresses both health and economic factors is essential for promoting sustainable growth in Myanmar and other developing countries. The purpose of this research is to examine how health indicators—such as health spending, life expectancy at birth, infant mortality, and fertility—affect Myanmar's economic development. Using secondary data from sources including the World Bank and Myanmar National Health Account, the analysis focuses on the years 2000–2021. To achieve this objective, the study employs Unit Root tests to assess the stationarity of the time series, conducts Johansen Cointegration tests, applies Error Correction Regression (ARDL), analyzes the Long Run Form, and uses Bounds tests (ARDL). This chapter summarizes the findings, highlighting the significant effect of health on economic growth in Myanmar.

All of the variables—life expectancy, infant mortality rate, fertility rate, and health expenditure—show substantial long-term associations with GDP per capita, according to the data. Increases in life expectancy and health expenditure are associated with higher GDP per capita, highlighting the positive impact of improved public health and healthcare investment on economic performance. Conversely, higher infant mortality rates correlate with lower GDP per capita, emphasizing the economic costs of inadequate healthcare and social support systems. The fertility rate shows a modest positive effect on GDP per capita over the long term.

In contrast, short-term fluctuations reveal distinct impacts: changes in life expectancy and infant mortality rate from the previous period significantly influence GDP per capita. Higher life expectancy positively affects GDP per capita, reflecting immediate gains from improved health outcomes, while elevated infant mortality rates have a negative short-term impact, indicating economic repercussions from preventable health crises. Changes in fertility rate and health expenditure do not show significant short-term effects on GDP per capita, implying that their economic influences manifest more gradually over time.

In Myanmar, the positive relationship between life expectancy and GDP per capita can be attributed to several interconnected factors that drive economic growth and development. Firstly, improvements in life expectancy often indicate advancements in healthcare infrastructure, access to medical services, and overall public health measures. As the population's health improves and life expectancy rises, mortality rates, particularly among younger age groups, decrease. This demographic shift positively impacts the labor force by increasing productivity and reducing absenteeism due to illness, thereby enhancing economic output. Additionally, longer life expectancy correlates with higher human capital accumulation. A healthier workforce tends to be more productive, innovative, and capable of contributing effectively to economic activities. This creates a positive cycle where increased economic prosperity leads to further investments in healthcare, education, and infrastructure, thus sustaining economic growth. Consequently, there exists a positive relationship between life expectancy and GDP per capita in both the long term and short term.

The negative impact of the infant mortality rate on GDP per capita can be attributed to several interconnected factors that affect both the economy and society. High infant mortality rates often signify inadequate healthcare infrastructure and services, which can lead to higher rates of preventable deaths among infants. Economically, a high infant mortality rate imposes significant costs on the healthcare system, requiring resources for emergency care and treatment that could otherwise be allocated to more sustainable health investments. Socially, high infant mortality rates can contribute to a cycle of poverty by reducing the labor force and productivity, as families may struggle with the loss of potential future workers and caregivers. This reduction in human capital development can hinder long-term economic growth and perpetuate socio-economic disparities within the country.

The long-term positive impact of the fertility rate on GDP per capita, alongside its limited short-term effects, can be analyzed from demographic and economic perspectives. Long term, the fertility rate shapes a nation's demographic composition, influencing economic dynamics significantly. A higher fertility rate can contribute to a larger working-age population relative to dependents, known as the demographic dividend, which stimulates economic growth through increased productivity, consumption, and savings. However, in the short term, changes in fertility rates do not immediately impact GDP per capita due to several reasons. Firstly, demographic shifts evolve gradually, meaning changes in fertility rate may not promptly alter labor force dynamics or consumption patterns. Secondly, policies and cultural influences that affect fertility rates operate over extended periods, influencing population growth trends gradually rather than instantly. Additionally, initial investments required for supporting a larger, younger population—such as increased healthcare and education expenditures—can initially outweigh immediate economic benefits.

Health expenditure has a substantial positive impact on GDP per capita over the long term, human capital development, and economic productivity. Increased health expenditure signifies a commitment to bolstering healthcare infrastructure, enhancing medical service accessibility, and improving overall public health outcomes. These investments lead to healthier populations, characterized by reduced disease burdens, longer life expectancies, and heightened workforce productivity. However, the short-term influence of health expenditure on GDP per capita is typically modest due to various factors. Immediate rises in healthcare spending can strain governmental or private healthcare budgets without yielding immediate improvements in health outcomes or noticeable gains in productivity. Healthcare initiatives, such as preventive measures and infrastructure upgrades, necessitate time to materialize significant health benefits and economic returns.

5.2 Suggestions

This study's findings affirm that all health indicators significantly impact long-term economic growth. Consequently, the study recommends increasing investment in health facilities and expenditure to enhance GDP growth rates. It also suggests that sustained economic growth requires expanded investments in the health sector, allocating a higher percentage of GDP to health compared to other sectors. The Ministry of Health and Sport is crucial to promote health awareness and distribute healthcare information effectively to the public.

To enhance the positive relationships between life expectancy, infant mortality rate, fertility rate, health expenditure, and GDP per capita in Myanmar, several strategic suggestions can be considered for optimization. Firstly, enhancing healthcare infrastructure and accessibility is crucial. This includes expanding medical facilities, particularly in rural areas, and improving the quality and availability of healthcare services to reduce infant mortality rates and increase life expectancy. Secondly, promoting family planning and reproductive health services can help manage fertility rates effectively. Balanced fertility rates can contribute positively to economic growth by aligning population growth with available resources and reducing dependency ratios in the long term. Thirdly, continuing to increase health expenditure in a sustainable manner is essential. This involves allocating resources efficiently towards healthcare systems, focusing on both immediate healthcare needs and long-term public health outcomes. Lastly, fostering a supportive policy environment that integrates healthcare with broader economic strategies is critical. By adopting these measures, Myanmar can strengthen its healthcare system, improve public health outcomes, and sustainably improve economic prosperity for all its citizens.

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APPENDIX

EViews Outputs

Table (4.2) Augmented Dickey Fuller and Phillips Perron Tests at Level

Unit Root Test for GDP at Level

Null Hypothesis: LGDP_PC has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.002715	0.7326
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LGDP_PC has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.006695	0.7312
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for LE at Level

Null Hypothesis: LLE has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.112293	0.6897
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LLE has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.887688	0.3312
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for IMR at Level

Null Hypothesis: LIMR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.858164	0.7799
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LIMR has a unit root

Exogenous: Constant

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.101054	0.6953
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for FR at Level

Null Hypothesis: LFR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.182341	0.2178
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LFR has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.913606	0.3201
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for HE at Level

Null Hypothesis: LHE has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.461121	0.8798
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LHE has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.391308	0.8939
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

*MacKinnon (1996) one-sided p-values.

Table (4.3) Augmented Dickey Fuller and Phillips Perron Tests at First Difference

Unit Root Test for GDP at First Difference

Null Hypothesis: D(LGDP_PC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.666989	0.0971
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(LGDP_PC) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.657633	0.0987
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for LE at First Difference

Null Hypothesis: D(LLE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.429847	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LLE) has a unit root
Exogenous: Constant
Bandwidth: 19 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-17.87304	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for IMR at First Difference

Null Hypothesis: D(LIMR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.352507	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LIMR) has a unit root
Exogenous: Constant
Bandwidth: 19 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-19.79274	0.0000
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for FR at First Difference

Null Hypothesis: D(LFR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.276747	0.0040
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LFR) has a unit root
Exogenous: Constant
Bandwidth: 19 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.276747	0.0040
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Unit Root Test for HE at First Difference

Null Hypothesis: D(LHE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=4)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.904961	0.0086
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LHE) has a unit root
Exogenous: Constant
Bandwidth: 19 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.918937	0.0083
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

*MacKinnon (1996) one-sided p-values.

Table (4.4) Optimal Lag Lengths of the Model

VAR Lag Order Selection Criteria
Endogenous variables: LGDP_PC LLE LIMR LFR LHE
Exogenous variables: C
Sample: 2000 2021
Included observations: 21

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-230.6150	NA	3829.518	22.43952	22.68821	22.49349
1	-136.6724	134.2036*	5.847223*	15.87356*	17.36574*	16.19740*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table (4.5) Johansen Cointegration of Trace Test

Sample (adjusted): 2002 2021
Included observations: 20 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDP_PC LLE LIMR LFR LHE
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.744884	84.85520	69.81889	0.0020
At most 1 *	0.688719	57.53442	47.85613	0.0048
At most 2 *	0.625635	34.19321	29.79707	0.0146
At most 3	0.457680	14.54273	15.49471	0.0392
At most 4	0.108846	2.304760	3.841466	0.1290

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table (4.6) Johansen Cointegration of Maximum Eigenvalue Test

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.744884	27.32078	33.87687	0.0024
At most 1*	0.688719	23.34121	27.58434	0.0015
At most 2*	0.625635	19.65048	21.13162	0.0079
At most 3	0.457680	12.23797	14.26460	0.1020
At most 4	0.108846	2.304760	3.841466	0.1290

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table (4.7) The Bounds Tests for Co-integration (ARDL)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.244911	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Table (4.8) (4.9) Long Run and Short Run Cointegration

Vector Error Correction Estimates
Sample (adjusted): 2002 2021
Included observations: 20 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LGDP_PC(-1)	1.000000
LLE(-1)	124.7062 (16.645) [13.20201]
LIMR(-1)	-58.0087 (5.215) [-3.19355]
LFR(-1)	4.1642 (12.215) [4.62947]
LHE(-1)	7.2775 (5.5823) [2.42067]
C	6247.3670

Error Correction:	D(LGDP_PC)	D(LLE)	D(LIMR)	D(LFR)	D(LHE)
CointEq1	-0.083789 (0.10314)	0.001375 (0.00167)	-0.006709 (0.00866)	-3.99E-05 (1.6E-05)	-0.000275 (0.00043)

	[-0.81241]	[0.82307]	[-0.77518]	[-2.47040]	[-0.63516]
D(LGDP_PC(-1))	0.179382	0.005736	-0.027782	-4.57E-05	0.000783
	(0.37805)	(0.00612)	(0.03173)	(5.9E-05)	(0.00159)
	[0.47449]	[0.93671]	[-0.87566]	[-0.77182]	[0.49221]
D(LLE(-1))	78.19798	0.697683	-5.238833	-0.053637	-0.308493
	(102.8884)	(3.90167)	(20.2157)	(0.03776)	(1.01304)
	[2.13585]	[0.17882]	[-0.25915]	[-1.42032]	[-0.30452]
D(LIMR(-1))	-53.13161	0.211151	-1.399953	-0.009805	-0.056096
	(6.0888)	(0.74650)	(3.86784)	(0.00723)	(0.19382)
	[-2.56541]	[0.28285]	[-0.36195]	[-1.35700]	[-0.28942]
D(LFR(-1))	2.8812	-21.87516	110.3875	0.731516	1.014495
	(2.5654)	(21.4534)	(111.157)	(0.20765)	(5.57023)
	[1.53484]	[-1.01966]	[0.99308]	[3.52289]	[0.18213]
D(LHE(-1))	-1.61983	1.733430	-7.904155	0.004529	0.506316
	(1.3469)	(1.25279)	(6.49108)	(0.01213)	(0.32528)
	[-3.10779]	[1.38366]	[-1.21770]	[0.37346]	[1.55656]
C	-0.744552	-1.399953	2.436376	-0.011746	0.061320
	(0.00723)	(0.90867)	(4.70810)	(0.00879)	(0.23593)
	[0.93671]	[-0.81938]	[0.51749]	[-1.33558]	[0.25991]
R-squared	0.224568	0.387268	0.362087	0.612484	0.245836
Adj. R-squared	0.133323	0.104469	0.067666	0.433630	-0.102240
Sum sq. resids	0.188781	49.52564	1329.556	0.004640	3.338746
S.E. equation	0.120584	1.951836	10.11304	0.018892	0.506781
F-statistic	1.627475	1.369409	1.229826	3.424496	0.706271
Log likelihood	3.94049	-37.44635	-70.34745	55.30970	-10.47740
Akaike AIC	0.12690	4.444635	7.734745	-4.830970	1.747740
Schwarz SC	0.13039	4.793142	8.083251	-4.482464	2.096246
Mean dependent	0.54622	0.262800	-2.260000	-0.031600	0.174000
S.D. dependent	0.11396	2.062543	10.47360	0.025103	0.482705
Determinant resid covariance (dof adj.)		2.285284			
Determinant resid covariance		0.265159			
Log likelihood		-128.6196			
Akaike information criterion		16.86196			
Schwarz criterion		18.85343			
Number of coefficients		40			