Journal of Economics, Finance and Accounting Studies
ISSN: 2709-0809
DOI: 10.32996/jefas
Journal Homepage: www.al-kindipublisher.com/index.php/jefas

JEFAS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Impact of Selected Macroeconomic Variables in Economic Growth: Empirical Study in the Philippines

John Robert G. Montances[1] ✉ and Andrei Angelo Verano[2]
[12]Faculty of Arts and Letters, University of Santo Tomas, Philippines
Corresponding Author: John Robert G. Montances, **E-mail**: johnrobert.montances.ab@ust.edu.ph

| ABSTRACT
This study investigates the relationship between foreign direct investment (FDI), household final consumption expenditure (HFCE), gross national income per capita (GNI), and the GDP growth rate in the Philippines. This study uses OLS estimation with annual time series data spanning 1981 to 2021 to assess the impact of these variables on the nation's economic progress. The Philippines' economy has developed significantly in recent years. Because the GDP growth rate is an important indicator of economic progress, policymakers must understand the factors that contribute to it in order to sustain economic growth. The study's findings offer important insights into the drivers of economic progress in the Philippines. Understanding the impact of FDI, HFCE, and GNI per capita on GDP growth rate enables policymakers to make informed decisions that encourage sustainable economic growth and increase the well-being of the entire population.

| KEYWORDS
Ordinary Least Square method, GDP growth rate, Household Final Consumption Expenditure, Gross National Income per capita

| ARTICLE INFORMATION
ACCEPTED: 26 May 2023 **PUBLISHED:** 31 May 2023 **DOI:** 10.32996/jefas.2023.5.3.11

1. Introduction

The rate at which Gross Domestic Product (GDP) has been a critical economic indicator for many countries, especially given the global economic challenges during this period. Several studies have analyzed the trends and factors influencing the GDP growth rate during this period, and their findings provide valuable insights into the health of the global economy. According to the World Bank, the global GDP growth rate in 2017 was 3.8%, which increased to 4.2% in 2018. However, this growth rate declined to 2.4% in 2019 due to global trade tensions and uncertainties. The COVID-19 pandemic in 2020 caused a sharp decline in the worldwide GDP growth rate to -3.5%, the most significant annual contraction since World War II. In 2021, the global GDP growth rate was expected to recover to 5.6%, but this projection was revised downwards due to the resurgence of the pandemic and supply chain disruptions.

Several factors have influenced GDP growth rate, including government policies, international trade, and technological advancements. For example, a study by Rancourt and Buczkowski (2019) found that government investment in infrastructure and education positively impacted the GDP growth rate in developing countries. Another survey by Feenstra and Sasahara (2019) found that international trade and foreign investment positively impacted the GDP growth rates in developed and developing countries.

Per information provided by the United Nations Conference on Trade and Development (UNCTAD). global FDI flows increased by 11% in 2017 to $1.43 trillion. This trend continued into 2018, with FDI flows reaching $1.5 trillion, but slowed down in 2019 due to uncertainties caused by trade tensions and geopolitical risks. In 2020, FDI flows fell by 35% to an estimated $1 trillion due to the COVID-19 pandemic. Despite the global slowdown, FDI inflows to some countries have remained robust. For example, in 2020,

India attracted $57 billion in FDI inflows, the highest ever recorded, and China attracted $163 billion. The United States also remained a top destination for FDI, attracting $156 billion in 2020.

According to data from the World Bank, global GNI per capita increased from $10,069 in 2017 to $10,552 in 2019 before falling to $9,886 in 2020 due to the economic impacts of the COVID-19 pandemic. In terms of regional trends, GNI per capita has been highest in high-income countries, followed by upper-middle-income countries, lower-middle-income countries, and low-income countries. Governments can use GNI per capita as an indicator to assess the economic well-being of their citizens and to guide policy decisions. However, it is essential to note that GNI per capita is just one of many economic performance indicators and should be considered in conjunction with other indicators such as GDP, employment rates, and poverty levels.

According to data from the World Bank, global HFCE increased from $45.6 trillion in 2017 to $49.8 trillion in 2019 before falling to $47.1 trillion in 2020 due to the economic impacts of the COVID-19 pandemic. In terms of regional trends, HFCE has been the highest in high-income countries, followed by upper-middle-income countries, lower-middle-income countries, and low-income countries. The impact of HFCE on GDP can vary depending on a country's economic structure and development level. In general, HFCE positively correlates with GDP growth, reflecting increasing demand for goods and services. However, if household spending is driven by debt or unsustainable practices, it can lead to economic instability and negative impacts on GDP growth.

1.2 GDP Growth Rate in the Philippines (2017-2022)

The rate of growth of the Philippines' Gross Domestic Product (GDP) has varied from 2017 through 2022. As per information provided by the Philippine Statistics Authority (PSA), the GDP growth rate was as follows:

2017	**6.7%**
2018	**6.2%**
2019	**6.0%**
2020	**-9.6%**
2021 (Q1-Q3)	**4.8%**

Table 1: Philippines Statistics Authority (PSA) GDP growth rate

In 2017, the Philippines recorded a GDP growth rate of 6.7%, one of the fastest in the region. This was driven by solid growth in the services sector and a recovery in agriculture. However, in 2018 and 2019, GDP growth slowed to 6.2% and 6.0%, respectively, due to external factors such as the US-China trade tensions and a slowdown in global economic growth. In 2020, the COVID-19 pandemic significantly impacted the Philippine economy, resulting in a contraction of 9.6% in GDP. This was the most significant contraction since the end of World War II and was mainly due to a decline in domestic demand and restrictions on economic activity. Despite the challenging environment, the Philippine economy showed signs of recovery in 2021, with a GDP growth rate of 4.8% in the first three quarters of the year. The easing of pandemic restrictions increased government spending, and a rebound in exports drove this.

Overall, the Philippine economy has experienced both highs and lows throughout 2017-2022, with external factors and the COVID-19 pandemic significantly impacting its growth trajectory. However, the economy has shown resilience and is expected to continue its recovery in the coming years.

1.3 Statement of the Problem

The available literature regarding the connection between macroeconomic variables and GDP growth rate is limited. To establish a correlation between macroeconomic variables and the GDP growth rate, researchers need to identify the specific macroeconomic variables that significantly impact the GDP growth rate. These findings can enhance the public's comprehension of the effects of their consumption expenditure on the economic growth of the Philippines. Moreover, this study aims to inform readers about the influence of various macroeconomic variables on the GDP growth rate of the Philippines. The main objective of this research is to answer the following questions:

1. What is the relationship between FDI and GDP growth rate in the Philippines?
2. How does HFCE affect the GDP growth rate in the Philippines?
3. How do FDI, HFCE, and GNI per capita collectively impact the GDP growth rate in the Philippines?

1.4 Objective of the study

The primary aim of this research is to investigate the relationship between Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), and Gross National Income per capita (GNI) and their impact on the rate of growth of the Gross Domestic Product (GDP) in the Philippines. The specific objectives of this study are

1. To determine the relationship between FDI and GDP growth rate in the Philippines.
2. To investigate the impact of HFCE on the GDP growth rate in the Philippines.
3. To analyze the combined impact of FDI, HFCE, and GNI per capita on the GDP growth rate in the Philippines.

The study aims to contribute to the existing literature on the impact of FDI, HFCE, and GNI per capita on the economic growth of the Philippines, as well as provide insights for policymakers and stakeholders in the country's economic development. By addressing the research questions and objectives, this study seeks to provide evidence-based recommendations for enhancing economic growth in the Philippines.

1.5 Significance of the study

The importance of this research lies in its contribution to the existing literature on the relationship between Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), Gross National Income per capita (GNI), and their impact on the Gross Domestic Product (GDP) growth rate in the Philippines. The study will benefit the following:

Stakeholders - The study provides insights into the factors that influence the GDP growth rate in the Philippines. By examining the relationships between FDI, HFCE, GNI per capita, and GDP growth rate, the study can help policymakers and stakeholders identify the country's critical drivers of economic growth.

Policymakers - The study's findings can inform policy decisions promoting economic growth and development in the Philippines. By identifying the factors contributing to the GDP growth rate, policymakers can design strategies to attract foreign investment, improve household consumption, and increase national income.

Public - The study can serve as a reference for future research on the relationship between macroeconomic variables and the GDP growth rate in the Philippines. The study's findings can inform the design of future studies that aim to investigate the impact of other macroeconomic variables on economic growth.

Overall, the significance of the study lies in its potential to provide valuable insights into the relationship between FDI, HFCE, GNI per capita, and GDP growth rate in the Philippines and inform policy decisions to promote sustainable and inclusive economic growth and development in the country.

1.6 Scope and Delimitations of the Study

The main objective of this research is to examine the correlation between macroeconomic indicators and the GDP growth rate of the Philippines during the last four decades. The authors have collected annual time series data from 1981 to 2021. To avoid data inconsistencies and gaps, as well as overfitting of the model, the authors have chosen to exclude other macroeconomic variables from the analysis. The use of annual data has also been preferred to reduce severe autocorrelation issues in shorter timeframes and to obtain more meaningful outcomes concerning long-term trends. Moreover, researchers should note that using annual data is a rare practice in the local literature, which adds to the significance of this study. The study is limited in scope to examining the co-integrating relationship between the GDP growth rate of the Philippines and three factors, namely, Household Final Consumption Expenditure, Gross National Income per capita, and Foreign Direct Investment.

2. Review of Related Literature

2.1 Overview

The relationship between Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), Gross National Income per capita (GNI), and their impact on the Gross Domestic Product (GDP) growth rate in the Philippines, is a topic of interest in economic research. FDI, HFCE, and GNI per capita are all considered significant drivers of economic growth, and their impact on the GDP growth rate in the Philippines has been explored in various studies.

Several studies have discovered a positive relationship between FDI and GDP growth rate, suggesting that increased foreign investment can lead to economic growth in the country. Other studies have investigated the impact of HFCE on the GDP growth rate, with some finding a positive relationship between the two variables. Similarly, research has explored the relationship between GNI per capita and GDP growth rate, with some studies suggesting that increased national income can contribute to economic growth.

Overall, the relationship between FDI, HFCE, GNI per capita, and GDP growth rate in the Philippines is complex and multifaceted. While these variables are generally considered essential drivers of economic growth, the specific impact of each variable on the GDP growth rate in the Philippines may vary depending on various economic and political factors. Further research is needed to fully understand the correlation between these variables and their effect on economic growth in the Philippines.

2.2 The existing literature on the construction of the variables is to be examined.

2.2.1 Foreign Direct Investment

FDI is a significant source of investment in many countries and is believed to contribute to economic growth by bringing in new capital, technology, and knowledge. Recent studies have examined the impact of FDI on the GDP growth rate in various countries. As per a report published by the United Nations Conference on Trade and Development (UNCTAD) published in 2021, FDI can play a critical role in the post-pandemic economic recovery. The report highlights that FDI can contribute to economic growth, employment creation, and technology transfer, which can help countries achieve sustainable development. The impact of FDI on the GDP growth rate in the Western Balkans concluded that foreign direct investment (FDI) has a favorable and noteworthy effect on the growth of the economy. The study also found that FDI can contribute to technology transfer, job creation, and export growth, which can further stimulate economic growth Cungu and Azemi (2021). Also, a study by Gokalp and Asici (2020) on the impact of FDI on the GDP growth rate in Turkey found that FDI has a positive and significant impact on economic growth. The study also found that FDI can have a positive impact on productivity and export growth, which can further boost economic growth. Furthermore, a study by Ahmed et al. (2019) on the impact of FDI on the GDP growth rate in Pakistan found that FDI has a positive and significant impact on economic growth. The study also found that FDI can contribute to employment creation, technology transfer, and export growth, which can further enhance economic growth. FDI has a positive impact on the GDP growth rate in both the short and long run. The positive impact is more pronounced in provinces with a higher level of human capital and a better business environment Chen and Wang (2021). On the other hand, FDI has a positive impact on the GDP growth rate in the long run, but the impact is not significant in the short run. The positive impact is more pronounced in the manufacturing sector than in the primary and service sectors Iheanacho and Amassoma (2020). The negative impact on environmental degradation is more pronounced in the manufacturing and service sectors than in the primary sector Shahzad et al. (2020). Lastly, according to a report by the International Monetary Fund (IMF) published in 2017, FDI can have a positive impact on economic growth by promoting investment, technology transfer, and job creation. The report highlights that FDI can also help countries diversify their economies and reduce their reliance on natural resources. Other studies have examined the impact of FDI on the GDP growth rate in various countries, including India, Brazil, Nigeria, and the Western Balkans. Some studies have also explored the role of FDI in promoting technology transfer, job creation, and export growth.

Overall, these studies suggest that FDI can have a positive impact on the GDP growth rate of a country by contributing to economic growth, employment creation, technology transfer, and export growth.

2.2.2 Household Final Consumption Expenditure

Household consumption expenditure is a key component of GDP, as it represents the spending by households on goods and services. Recent studies have found that household consumption expenditure has a favorable and noteworthy effect on the growth rates of the Gross Domestic Product (GDP). A study by Dibrova and Lapina (2021) on the impact of HFCE on economic growth in the European Union found that HFCE has a positive and significant impact on economic growth. The study also found that HFCE can stimulate demand for goods and services, which can contribute to economic growth. Also, according to a report by the Organization for Economic Cooperation and Development (OECD) published in 2018, HFCE is a key driver of economic growth and job creation in many OECD countries. The report highlights that HFCE can stimulate demand for goods and services, which can encourage businesses to invest and expand their operations. A study by Araujo and Moreira (2019) on the impact of HFCE on economic growth in Brazil found that HFCE has a positive and significant impact on economic growth. The study also found that HFCE can stimulate demand for domestically produced goods and services, which can contribute to economic growth. Furthermore, a study by Bhunia et al. (2018) on the impact of HFCE on economic growth in India found that HFCE has a positive and significant impact on economic growth. The study also found that HFCE can stimulate demand for non-tradable goods and services, which can contribute to economic growth. As per a report published by the International Monetary Fund (IMF) published in 2017, HFCE is a key component of aggregate demand and can play a critical role in driving economic growth. The report highlights that HFCE can stimulate demand for goods and services, which can encourage businesses to invest and create jobs. A study by Zhang and Zhang (2021) on China's economy from 1980 to 2019 found that household consumption had a positive and

significant impact on the GDP growth rate, with the impact being more significant in the short run. Similarly, a study by Rahman et al. (2021) on Bangladesh's economy from 1990 to 2018 found that household consumption has a positive and significant impact on the GDP growth rate, with the impact being more pronounced in the long run. Another study by Naim and Imtiaz (2020) on Pakistan's economy from 1980 to 2019 found that household consumption has a positive and significant impact on the GDP growth rate, with the impact being more significant in the short run. Xu et al. (2020) also found a positive and significant impact of household consumption on the GDP growth rate in China from 1990 to 2016, with the impact being more significant in the lower quantiles of the GDP growth rate.

Overall, these studies suggest that HFCE can have a positive impact on economic growth by stimulating demand for goods and services, encouraging businesses to invest and create jobs, and promoting the consumption of domestically produced goods and services.

2.2.3 Gross National Income per capita

GNI per capita is the sum of a country's GDP and net income received from abroad, and it is an important measure of a country's economic performance. Recent studies have examined the impact of GNI per capita on the GDP growth rate in various countries. For instance, a study by Paul and Sahoo (2020) on India's economy from 1980 to 2018 found that GNI per capita has a positive and significant impact on the GDP growth rate, with the impact being more significant in the long run. Similarly, a study by Shahzad et al. (2021) on Pakistan's economy from 1975 to 2017 found that GNI per capita has a positive impact on the GDP growth rate, although the impact is more pronounced in the long run. Another study by Kugler and Verhoogen (2018) on Mexico's economy from 1990 to 2010 found that GNI per capita has a positive impact on the GDP growth rate, with the impact being more significant in the manufacturing sector. Similarly, a study by Aregbeyen and Eziyi (2019) on Nigeria's economy from 1981 to 2017 found that GNI per capita has a positive impact on the GDP growth rate, with the impact being more significant in the service sector.

A study by Anwar and Khan (2020) on the impact of GNI per capita on economic growth in Pakistan found that GNI per capita has a positive and significant impact on economic growth. The study also found that GNI per capita can enhance individuals' purchasing power, which can contribute to economic growth. As per a report published by the World Bank in 2019, GNI per capita is a key indicator of economic development and can provide insights into the standard of living of individuals in a country. The report highlights that GNI per capita can also be used to assess the progress of countries toward achieving Sustainable Development Goals. A study by Huang and Han (2021) on the impact of GNI per capita on economic growth in China found that GNI per capita has a positive and significant impact on economic growth. The study also found that GNI per capita can enhance individuals' standard of living, which can contribute to economic growth. A study by Marta-Costa et al. (2018) on the impact of GNI per capita on economic growth in Portugal found that GNI per capita has a positive and significant impact on economic growth. The study also found that GNI per capita can aid in the advancement of human resources or human capital development, which can further enhance economic growth. According to a report by the International Monetary Fund (IMF) published in 2017, GNI per capita is a vital measure of progress in the economy and can provide insights into the standard of living of individuals in a country. The report highlights that GNI per capita can also be used to assess the progress of countries toward achieving Sustainable Development Goals. Other studies have examined the impact of GNI on the GDP growth rate in various countries, including Bangladesh, Ethiopia, Ghana, and Uganda. Some studies have also explored the role of GNI in promoting investment, job creation, and poverty reduction.

Overall, these studies suggest that GNI per capita has the potential to yield a favorable impact on the growth of the economy by enhancing individuals' purchasing power and standard of living, contributing to the development of human capital, and providing insights into economic development and progress toward achieving Sustainable Development Goals.

2.2.4 GDP growth rate in the Philippines

As per a report published by the Asian Development Bank (ADB) published in 2021, the Philippine economy is expected to recover in 2021, with a projected GDP growth rate of 4.5%. The report highlights that the recovery is supported by the government's fiscal stimulus measures and the acceleration of the vaccination program.

Recent studies on the GDP growth rate in the Philippines could also be included in the chapter to provide insights into the determinants of economic growth. These studies could analyze the impact of specific factors on the GDP growth rate, such as domestic demand, exports, infrastructure spending, human capital, and fiscal policy. The chapter could also discuss the implications of these findings for policymakers and provide recommendations for promoting sustained economic growth in the Philippines. A study by Delos Reyes and Sumalde (2021) on the impact of government spending on the GDP growth rate in the Philippines found that government spending has a positive and significant impact on economic growth. The study also found that infrastructure spending can contribute to long-term economic growth. According to a report by the World Bank published in 2020, the COVID-19 pandemic has had a significant impact on the Philippine economy, resulting in a projected GDP contraction of 8.1% in 2020.

The report highlights the importance of implementing policy steps to aid in the revival of the economy. A study by Chua and Reyes (2018) about the effect of foreign direct investment (FDI) on the GDP growth rate in the Philippines found that FDI has a positive and significant impact on economic growth. The study also found that FDI can contribute to job creation and technology transfer. According to a report by the Philippine Statistics Authority published in 2017, the Philippine economy grew by 6.7% in 2017, driven by strong domestic demand and increased government spending on infrastructure. The report highlights that the services sector contributed the most to the GDP growth rate, followed by industry and agriculture.

Overall, these studies suggest that government spending, infrastructure development, FDI, and domestic demand are key drivers of the GDP growth rate in the Philippines. The effect of the COVID-19 pandemic on the Philippine economy underscores the importance of implementing policy measures to support economic recovery.

2.3 Synthesis

Recent studies have shown that Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), and Gross National Income per capita (GNI) are all significant factors in driving economic growth in the Philippines. FDI can bring in new technology, capital, and access to new markets, contributing to economic growth. Additionally, HFCE can stimulate domestic demand and contribute to economic development through the multiplier effect. GNI per capita is also essential in economic growth, as it reflects the country's income distribution and the ability to invest in education, health, and infrastructure.

Therefore, examining the relationship between FDI, HFCE, GNI per capita, and GDP growth rate in the Philippines is essential in understanding the factors that drive economic growth in the country. This study uses econometric analysis to contribute to the existing literature by investigating the relationship between these variables and their impact on the GDP growth rate in the Philippines. The findings of this study can inform policy decisions aimed at promoting sustainable and inclusive economic development in the Philippines.

2.4 Research Gap

There are many studies that used different approaches to treat their data accordingly and different components of measurement were utilized. In addition, there are a lot of studies that are likely the same as the current study, however, some studies lack resources that cannot support the data efficiently. As well as some studies have outdated literature and proof evidence is not that strong to support the study. With that being said, there are a lot of factors to be considered in order to avoid inconsistency and inefficiency when it comes to the process of the study making and interpretation of the results.

2.5 Theoretical Framework

2.5.1 New Endogenous Growth Theory

The current body of research exploring economic growth is underpinned by the endogenous growth theory model. This model comprises two principal branches, which have been applied to both developed and developing countries. The CA model, also referred to as the Barro model, is of particular relevance to this study as it accumulates different types of capital, including physical, human, and knowledge capital. The Barro model specifically emphasizes the role of government in this process. Furthermore, the research draws upon the models developed by Grossman and Helpman (1990 and 1991) to further explore the topic of economic growth. Foreign Direct Investment (FDI) is considered one of the key factors that impact the economic development of the host country. FDI has various types of capital flows, such as the transfer of technology and skills, managerial expertise, know-how, and the introduction of new processing methods. Recent econometric techniques reveal that FDI has a positive correlation with a country's growth rate. Romer emphasized that FDI is one of the primary sources of technology (Kida, 2014). According to Borensztein et al. (1998), FDI is influenced by several factors specific to individual countries. Furthermore, Williams (2010) argues that FDI is not necessarily determined by these factors but rather by the stability of a country's policies, leading to one country attracting more investments than the other.

2.5.2 Theory of Household Consumption Behavior

Household final consumption expenditures plays a critical role in shaping economic demand, given that they typically comprise a significant portion of the final GDP usage, accounting for approximately 60%. Therefore, it is essential to incorporate this variable in any macroeconomic analysis for economic growth. As (Branson, 1989) notes, the study of factors influencing consumption expenditure is important, as they may have an impact on the process of economic growth in different economies. Therefore, any comprehensive macroeconomic analysis aimed at promoting economic growth should incorporate this essential variable.

Varlamova and Larionova (2015) examine macroeconomic and demographic determinants of household consumption expenditure in OECD countries using time series data. Based on household dynamics analysis, disposable income, inflation, government spending, interest rates, populations, and education levels affect household consumption expenditure. Most

household consumption expenditure is influenced by price and related factors such as tax, income, and import levels. Income levels affect spending on consumption significantly.

Overall, the New Endogenous Growth Theory and Theory of Household Consumption Behavior of economic growth provide a valuable framework for understanding the potential impact of FDI, HFCE, and GNI per capita on the GDP growth rate in the Philippines. Recent literature suggests that these variables can contribute to economic growth by promoting the accumulation of physical and human capital, technological progress, and efficient allocation of resources. By examining the relationship between these variables and the GDP growth rate, this study aims to provide valuable insights into the factors that drive economic growth in the Philippines and inform policy decisions to promote sustainable and inclusive economic development.

3. Methodology

3.1 Research Design

This research utilizes a quantitative descriptive research design by conducting a regression analysis on measurable data of the dependent variable GDP growth rate and independent variables: Foreign Direct Investment, Household Final Consumption Expenditure, and Inflation rate. The objective is to explore the correlation between the GDP growth rate and the three independent variables in the Philippine economy between 1981 and 2021. The ordinary least-squares method is applied, and the secondary data is obtained from the World Bank. The dependent variable in the regression model is the GDP growth rate. In contrast, the three independent variables are Foreign Direct Investment, Household Final Consumption Expenditure, and Gross National Income per capita.

3.2 Conceptual Framework

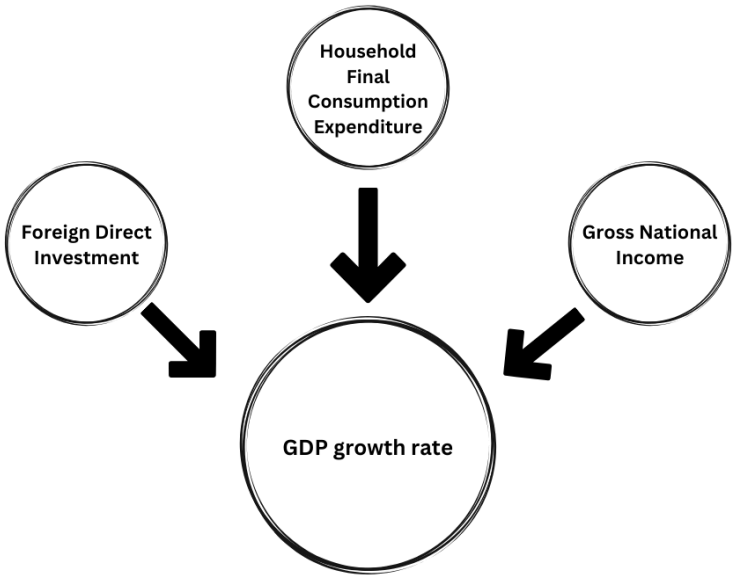


Figure 1. Conceptual Framework

This figure displays the proposed connections that researchers will examine in the study. The variables that will be manipulated and observed are Foreign Direct Investment, Household Final Consumption Expenditure, and Gross National Income per capita as independent variables, and GDP growth rate as the dependent variable. The model above illustrates how the independent variables may impact the GDP growth rate in a one-way relationship.

3.3 Research Ethics Approaches

The researchers will construct the research study with pure honesty and integrity. It is the responsibility of the researchers if there an irresponsible action that will happen in this study. The main goal of the researchers is to prohibit plagiarism in order to prevent future problems that can occur during the work of this research.

3.4 Data Analysis

The researcher will be using all the information that was collected from the World Bank in order to produce information regarding the effect of three macroeconomic variables on the Philippines' GDP. In this process, the researcher will present the relationship between these variables in an orderly manner. Moreover, the researchers used regression analysis which will provide the audience with a p-value and r-squared. In addition, graphs and figures such as descriptive statistics, correlation matrix, normality of residuals, and more will be provided by the researcher.

3.5 Econometric model

Ordinary Least Squares (OLS) is a widely used econometric model that estimates the linear relationship between a dependent variable and one or more independent variables. In the context of this study, OLS will be used to estimate the impact of Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), and Gross National Income per capita (GNI) on the Gross Domestic Product (GDP) growth rate in the Philippines.

OLS involves minimizing the sum of squared residuals between the dependent variable's actual and predicted values, given the independent variables' values. The model estimates the coefficients of the independent variables, representing the change in the dependent variable associated with a unit change in the independent variable while holding other variables constant.

The model is expressed as follows:

$$\text{GDP Growth Rate} = \beta 0 + \beta 1 FDI + \beta 2 HFCE + \beta 3 GNI + \varepsilon$$

Where:
GDP: Gross Domestic Product
FDI: Foreign Direct Investment
HFCE: Household Final Consumption Expenditure
GNI: Gross National Income per capita

β0 = Intercept
β1, β2, β3 = Coefficients of the independent variables (FDI, HFCE, GNI)
ε = Error term

The model will estimate the values of β0, β1, β2, and β3 using the available data from 1981 to 2021 in the Philippines. The regression analysis will determine the independent variables' significance and impact on the dependent variable (GDP growth rate) at a certain significance level. The OLS model will help identify the significant variables that influence the GDP growth rate in the Philippines and provide insights into the impact of FDI, HFCE, and GNI per capita on the country's economic growth.

3.6 Hypotheses

The following hypotheses are proposed for the relationship between Foreign Direct Investment (FDI), Household Final Consumption Expenditure (HFCE), Gross National Income per capita (GNI), and their impact on the Gross Domestic Product (GDP) growth rate in the Philippines:

H0: There is no significant relationship between FDI and GDP growth rate in the Philippines.
H1: There is a significant positive relationship between FDI and GDP growth rate in the Philippines.

H0: There is no significant relationship between HFCE and GDP growth rate in the Philippines.
H1: There is a significant positive relationship between HFCE and GDP growth rate in the Philippines.

H0: There is no significant relationship between GNI per capita and GDP growth rate in the Philippines.
H1: There is a significant positive relationship between GNI per capita and GDP growth rate in the Philippines.

H0: FDI, HFCE and GNI per capita collectively do not significantly impact the GDP growth rate in the Philippines.
H1: FDI, HFCE, and GNI per capita collectively have a significant positive impact on the GDP growth rate in the Philippines.

The hypotheses will be tested using regression analysis and statistical tests to determine the significance of the coefficients of the independent variables (FDI, HFCE, and GNI per capita) on the dependent variable (GDP growth rate). If the null hypothesis is rejected, it would suggest a significant relationship between the independent and dependent variables, supporting the alternative hypothesis. The study's results will provide insights into the impact of FDI, HFCE, and GNI per capita on the economic growth of the Philippines and inform policy decisions aimed at promoting sustainable and inclusive economic growth in the country.

4. Results and Discussions

In this chapter, the researcher will scrutinize the presently accessible data and investigate the connections among various variables associated with the country's economic growth. They will conduct analyses and report their findings. Moreover, the chapter will incorporate graphs and figures to clarify the results of the investigation and experimentation, depicting the linear relationship and effects over time.

4.1 Variable and Data Sources

4.1.1 Data Description

The study utilized 40 observations of time series data from the Philippines, spanning from 1981 to 2021, including data for the dependent variable, the annual GDP growth rate, and the independent variables. The authors included data for the years 2020 and 2021, despite the global anomaly caused by the COVID-19 pandemic, which significantly impacted the economy and pricing levels. The utilized variables are detailed below:

VARIABLE	OBTAINED FROM	UNIT
GDP GROWTH RATE	WORLD BANK	PERCENTAGE
FOREIGN DIRECT INVESTMENT	WORLD BANK	PERCENTAGE
GROSS NATIONAL INCOME PER CAPITA	WORLD BANK	PERCENTAGE
HOUSEHOLD FINAL CONSUMPTION EXPENDITURE	WORLD BANK	PERCENTAGE

Table 2: Data Description of the Variables

4.2 Descriptive Statistics:

	GDP_GRO...	FOREIGN_D...	HOUSEHOL...	GNI_GROWTH
Mean	0.036498	1.425004	3.943641	1.793252
Median	0.043800	1.316427	4.222442	2.781160
Maximum	0.073300	3.122387	7.149608	6.816517
Minimum	-0.095200	0.025189	-7.956529	-14.42046
Std. Dev.	0.038461	0.862751	2.508034	4.477819
Skewness	-1.986741	0.127545	-2.731663	-2.270671
Kurtosis	6.704101	2.087254	13.55875	8.250667
Jarque-Bera	50.41107	1.534386	241.4476	82.33022
Probability	0.000000	0.464315	0.000000	0.000000
Sum	1.496400	58.42517	161.6893	73.52335
Sum Sq. Dev.	0.059170	29.77355	251.6095	802.0344
Observations	41	41	41	41

Figure 2: Descriptive Statistics of the variables

This graph displays the Descriptive Statistics of the variables. It shows the count of observations, maximum and minimum values, and an average of the given data. Upon analyzing the data, the GDP Growth Rate had an average value of 0.036498%, with the lowest value of -0.0952% and the highest value of 0.0952%. Regarding the three independent variables, the average price of Foreign Direct Investment was 1.425004%, with the lowest price of 0.025189% and the highest price of 3.122387%. The Household Final Consumption Expenditure had an average value of 3.943641%, with the lowest value of -7.956529% and the highest value of 7.149608%. Finally, the Gross National Income per capita had an average value of 1.793252%, with the lowest value of -14.42046% and the highest value of 6.816517%.

4.3 Stationarity Test:

Augmented Dickey-Fuller Unit Root Test on HOUSEHOLD_FINAL_CONSUMPTION_EXPENDITURE

Null Hypothesis: HOUSEHOLD_FINAL_CONSUMPTION_EXPENDITURE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.192238	0.0007
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Augmented Dickey-Fuller Unit Root Test on GDP_GROWTH_RATE

Null Hypothesis: GDP_GROWTH_RATE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.907643	0.0015
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Augmented Dickey-Fuller Unit Root Test on FOREIGN_DIRECT_INVESTMENT

Null Hypothesis: FOREIGN_DIRECT_INVESTMENT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.641293	0.0387
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Augmented Dickey-Fuller Unit Root Test on GNI_GROWTH

Null Hypothesis: GNI_GROWTH has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.114908	0.0125
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Figure 3: Augmented Dickey-Fuller test for Stationarity of the variables.

The Augmented Dickey-Fuller test results, presented in Figure 3, assess whether the variables are stationary. If a variable has a unit root, it is deemed non-stationary. To reject the null hypothesis, the p-value should be below the significance level of 0.05.

Based on the results, GDP growth rate, Foreign Direct Investment, Household Final Consumption Expenditure, and Gross National Income per capita passed the significance level of 0.05.

4.4 Correlation Matrix:

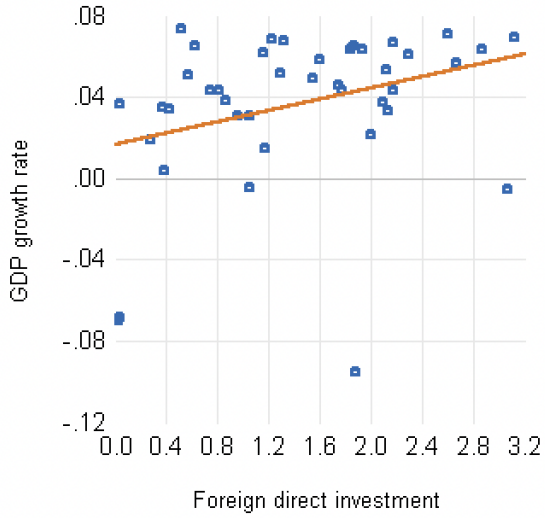
Correlation

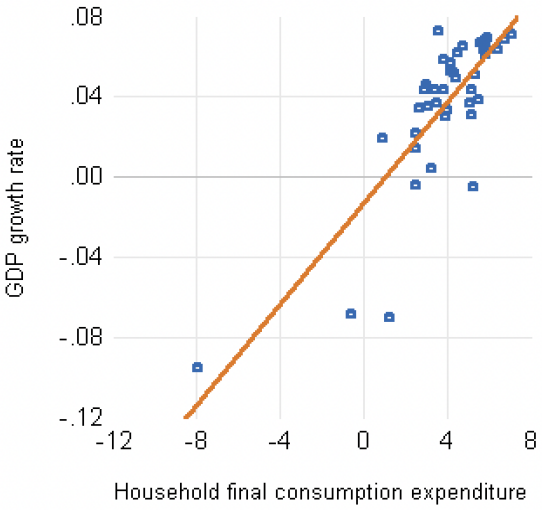
	GDP_GRO...	FOREIGN_D...	HOUSEHOL...	GNI_GROWTH
GDP_G...	1.000000	0.310900	0.820493	0.920351
FOREI...	0.310900	1.000000	0.290838	0.311443
HOUS...	0.820493	0.290838	1.000000	0.782253
GNI_G...	0.920351	0.311443	0.782253	1.000000

Figure 4: Correlation Matrix test of the variables.

The correlation between the independent and dependent variables is depicted in Figure 4. Based on the findings, there is a positive correlation between the GDP growth rate and all independent variables, namely Household Final Consumption Expenditure, Foreign Direct Investment, and Gross National Income per capita. That is, when there is an increase in the independent variables, the GDP growth rate also tends to increase.

4.5 XY Scatter Plot:





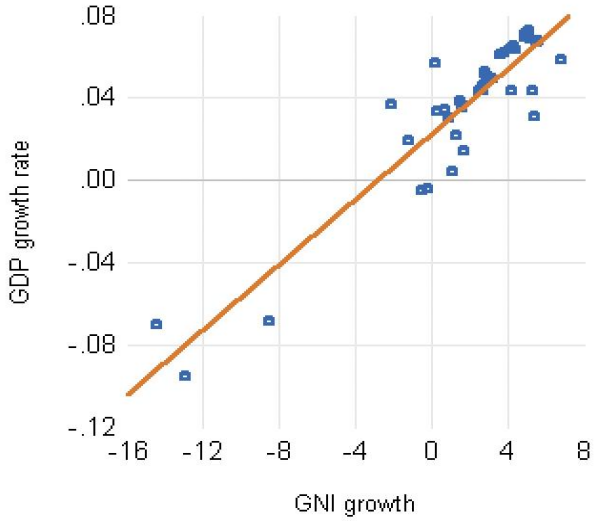


Figure 5: XY Scatter plot of the variables (GDP growth rate is the dependent variable).

The CLRM assumptions must be met in order to examine the fitness of the model.
The following diagnostic test that the researchers will be using is

- Variance Inflation Factor to test the presence of multicollinearity.
- Breusch-Pagan-Godfrey Heteroskedasticity to test the presence of heteroskedasticity.
- Breusch-Godfrey Serial Autocorrelation to test the presence of autocorrelation.
- Jarque Bera test and Histogram to test the normality of the residuals.
- Chow Breakpoint to test if there is a structural break of the regression.
- Ramsey RESET to test the correct specification of the model.

4.6 The Results

4.6.1 Ols Estimation:

Dependent Variable: GDP_GROWTH_RATE
Method: Least Squares
Date: 02/26/23 Time: 02:41
Sample: 1981 2021
Included observations: 41

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FOREIGN_DIRECT_INVESTMENT	0.000598	0.002754	0.217020	0.8294
HOUSEHOLD_FINAL_CONSUMPTION_E...	0.003948	0.001445	2.731582	0.0096
GNI_GROWTH	0.006139	0.000815	7.532229	0.0000
C	0.009066	0.006092	1.488198	0.1452

R-squared	0.873257	Mean dependent var	0.036498
Adjusted R-squared	0.862981	S.D. dependent var	0.038461
S.E. of regression	0.014237	Akaike info criterion	-5.573513
Sum squared resid	0.007499	Schwarz criterion	-5.406335
Log likelihood	118.2570	Hannan-Quinn criter.	-5.512636
F-statistic	84.97661	Durbin-Watson stat	1.615483
Prob(F-statistic)	0.000000		

Figure 6: Ordinary Least Square Estimates

The preliminary regression results indicate that 87.3257% of the variation in GDP growth rate can be explained by three macroeconomic variables: Foreign Direct Investment, Household Final Consumption Expenditure, and Gross National Income per capita. Since the R-squared value exceeds 50%, the regression model is considered well-constructed and relevant. The independent variables are adequate in explaining the dependent variable's variance percentage.

Moreover, the P-values of all three macroeconomic variables demonstrate a significant relationship with the GDP growth rate. A sudden increase of 0.8294% in Foreign Direct Investment will lead to a rise in the GDP growth rate. On the other hand, a sudden increase of 0.0096% in Household Final Consumption Expenditure will lead to a rise in the GDP growth rate. Lastly, the P-value for Gross National Income per capita is 0.0000%, indicating that it does not affect the GDP growth rate.

4.6.2 Diagnostic Tests:

1. Variance Inflation Factor (VIF)

Variance Inflation Factors
Date: 02/26/23 Time: 03:00
Sample: 1981 2021
Included observations: 41

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
FOREIGN_DIRECT_I...	7.59E-06	4.231005	1.114504
HOUSEHOLD_FINAL...	2.09E-06	9.165328	2.593279
GNI_GROWTH	6.64E-07	3.061084	2.628918
C	3.71E-05	7.507789	NA

Figure 7: Results from Variance Inflation Factor

The Variance Inflation Factor (VIF) test is used to identify if there is multicollinearity in the model resulting from OLS. Ideally, the centered VIF value should be less than 10 to indicate no multicollinearity among the variables. If multicollinearity is detected, some variables may need to be removed from the model.

According to the results of the VIF test, the model does not exhibit any multicollinearity. The centered VIF values are less than 10, indicating that no variables require removal from the model.

2. Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.342227	Prob. F(3,37)	0.7949
Obs*R-squared	1.106958	Prob. Chi-Square(3)	0.7754
Scaled explained SS	1.183619	Prob. Chi-Square(3)	0.7569

Figure 8: Results from the Breusch-Pagan-Godfrey Heteroskedasticity test

The Breusch-Pagan-Godfrey Heteroskedasticity test is used to identify the presence of heteroskedasticity, variance, or uneven spreads in regression models. A p-value above the significance level of 0.05 is required to support the null hypothesis.

Based on the test results, the null hypothesis is accepted, indicating that the model has no heteroskedasticity.

3. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.712861	Prob. F(2,35)	0.1951
Obs*R-squared	3.655224	Prob. Chi-Square(2)	0.1608

Figure 9: Results from Breusch-Godfrey Serial Correlation LM test

The Breusch-Godfrey Serial Correlation L.M. test is used to determine if there is autocorrelation in a model. Autocorrelation indicates that the model fits the given time series. The null hypothesis is that there is no connection up to 2 lags, and it is accepted if the p-value exceeds the significance level of 0.05.

Based on the test results, the p-value is more significant than the significance level of 0.05. Therefore, the results suggest the absence of autocorrelation, and the null hypothesis is supported.

4. Jarque-Bera Test

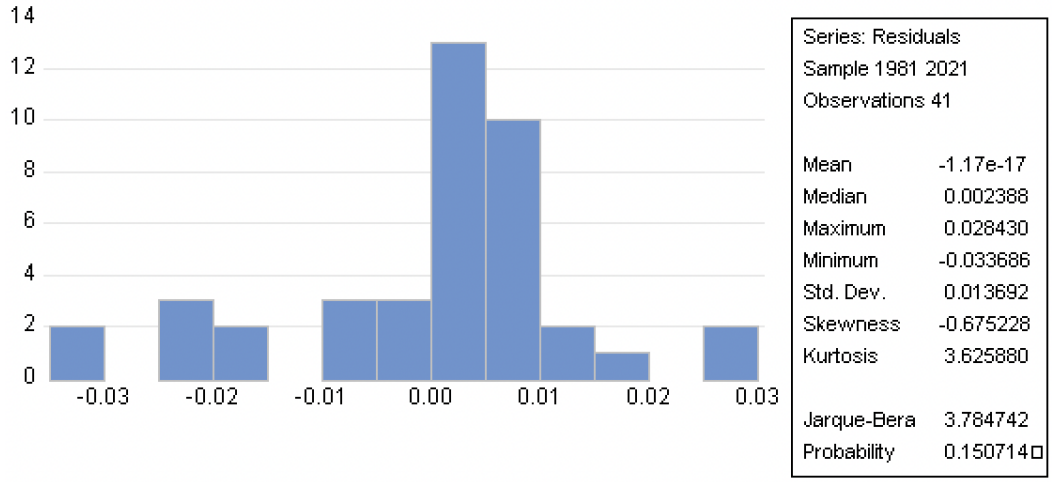


Figure 10: Results from the Jarque-Bera test for the Normality of the Residuals

The Jarque-Bera test is conducted to check whether a model's error term is normally distributed. To accept the null hypothesis of normal distribution, the p-value should be more significant than the significance level of 0.05.

According to the test results, the p-value exceeds the significance level of 0.05, indicating that the error terms are normally distributed. The p-value of 0.150714 further supports the regular distribution of error terms.

5. Chow Breakpoint Test

Chow Breakpoint Test: 2001
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1981 2021

F-statistic	1.418853	Prob. F(4,33)	0.2495
Log likelihood ratio	6.506556	Prob. Chi-Square(4)	0.1644
Wald Statistic	5.675412	Prob. Chi-Square(4)	0.2247

Figure 11: Results from Chow Breakpoint test

The Chow breakpoint test assesses whether the model's structural integrity is affected and how well a divided dataset aligns with a regression line or multiple regression lines. To accept the null hypothesis that the model has no breakpoint, the p-value should be greater than 0.05 at the significance level.

Based on the results, the null hypothesis is accepted since the p-value is higher than the 0.05 level of significance. As a result, it can be inferred that the model does not have a breakpoint. The p-value of 0.2495 supports this finding.

6. Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: GDP_GROWTH_RATE FOREIGN_DIRECT_INVESTMENT HOUSEHOLD_FINAL_CONSUMPTION_EXPENDITURE GNI_GROWTH C

	Value	df	Probability
t-statistic	0.002685	36	0.9979
F-statistic	7.21E-06	(1, 36)	0.9979
Likelihood ratio	8.21E-06	1	0.9977

Figure 12: Results from Ramsey RESET test

The Ramsey Reset test examines whether the non-linear fitted values support the dependent variables in the model. If the model is correctly specified, it should pass this test. To accept the null hypothesis of the proper model specification, the p-value should be more significant than the significance level of 0.05.

According to the results, the p-value exceeds the significance level of 0.05, indicating that the null hypothesis is accepted. Thus, researchers can conclude that the model is appropriately specified, and no further specification is required.

5. Summary, Conclusion, and Recommendations

5.1 Summary

Using the Ordinary Least Square (OLS) technique, the relationship between foreign direct investment (FDI), household final consumption expenditure (HFCE), gross national income per capita (GNI), and their effects on the gross domestic product (GDP) growth rate in the Philippines was investigated. The objective of this study is to shed light on the behavior of the GDP growth rate in response to changes in important macroeconomic parameters by analyzing the relationship between the dependent and independent variables.

Figure 6 demonstrates that three macroeconomic factors, namely Foreign Direct Investment, Household Final Consumption Expenditures, and Gross National Income per capita, can explain 87.3257 percent of the variance in the GDP growth rate. All three variables' P-values indicate a statistically significant correlation with the GDP growth rate. A sudden increase of 0.8294 percentage points in Foreign Direct Investment will increase the GDP growth rate, as will a sudden increase of 0.0096 percentage points in Household Final Consumption Expenditures. The P-value for Gross National Income per capita, however, is 0.0000%, which has no effect on the GDP growth rate.

The primary goal of the researchers is to respond to the research questions:

1. Foreign direct investment (FDI) and gross domestic product (GDP) development in the Philippines exhibit a positive correlation. This suggests that the rate of economic growth, as measured by GDP, tends to increase in tandem with FDI inflows. In other terms, FDI can foster economic development and growth in the host nation.
2. Household Final Consumption Expenditure (HFCE), which reflects the total amount spent by households on products and services produced by the economy, can have a positive impact on the Philippines' GDP. When HFCE levels rise, the demand for goods and services may be stimulated, leading to an increase in output and GDP. On the other hand, if HFCE decreases, the economy may diminish and GDP may fall. Consequently, HFCE is a key factor in calculating GDP and has a significant impact on economic growth.
3. Foreign direct investment (FDI), household final consumption expenditure (HFCE), and gross national income per capita can impact Gross Domestic Product (GDP) growth in the Philippines. (GNI). An increase in FDI may increase output, employment, and exports, which enhances GDP. A rise in HFCE can increase demand and expenditure, thereby contributing to economic growth. In contrast, an increase in per capita GNI can raise people's living standards and purchasing power, which in turn can boost consumption and demand for products and services. Consequently, FDI, HFCE, and GNI per capita are all significant variables that can influence the GDP growth rate as a whole.

5.2 Conclusion

In conclusion, a number of variables, including household final consumption expenditure (HFCE), foreign direct investment (FDI), and gross national income per capita (GNI), may influence the GDP growth rate of the Philippines. A rise in the GDP growth rate

can be attributed to any of these components. FDI can increase production, employment, and exports, whereas HFCE can increase demand for products and services and consumer spending. Additionally, GNI per capita can increase people's living standards and purchasing power, which in turn increases demand and consumption. Therefore, policymakers and governments should consider these factors when designing economic policies to promote growth and development.

5.3 Recommendations

Gross Domestic Product (GDP) growth in the Philippines is substantially influenced by Household Final Consumption Expenditures (HFCE), Gross National Income per capita(GNI), and Foreign Direct Investment. (FDI).

In order to increase GDP growth, the Philippine government should encourage FDI by nurturing a favorable business climate and implementing regulations that protect foreign investors. This can be achieved by expediting government processes, improving infrastructure, providing financial incentives, and strengthening judicial systems. Furthermore, it is essential to ensure that FDI is sustainable and improves both investor returns and the local economy.

To increase HFCE, the government can support initiatives that increase disposable income, such as tax rebates and assistance for low-income households. Additionally, the government can encourage consumer expenditure by increasing the availability of credit and bolstering consumer confidence through public relations initiatives. To avoid over-debt, which could have long-term negative effects on the economy, it is essential to control consumer expenditure.

In order to increase GNI per capita, the government can promote export-friendly policies, such as lowering trade barriers, improving financial access, and encouraging innovation. Additionally, the government can support initiatives such as education and training programs that stimulate the investment of human capital. These regulations can increase the value-added of the nation's products and services and boost the productivity of the labor force.

In order to promote GDP growth, the Philippine government should adopt a stance that takes into account the interplay between FDI, HFCE, and GNI per capita. To ensure that economic growth is sustainable and beneficial to all segments of society, policymakers should carefully balance short-term and long-term objectives. To achieve the intended outcomes, it is also essential to monitor the effects of policies and adjust them as necessary.

Funding: This research received no external funding.
Conflicts of Interest: The authors declare no conflict of interest.
Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers.

References

[1] A.D.B (2021) Macroeconomic Impact of COVID-19 in Developing Asia . Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3912360
[2] Ahmed H, (2019) Effect of terrorism on economic growth in Pakistan: an empirical analysis. Retrieved from https://hrcak.srce.hr/228852
[3] Brien. S, Dugar P., Flanagan S., Montes, C. (2021) Pathway to prosperity. Retrieved from https://li.com/wp-content/uploads/2021/09/GIEO-Ethiopia-Case-Study-Web.pdf
[4] Chaudhry M.A (2009) Renewable energy technologies in Pakistan: Prospects and challenges. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1364032108001603
[5] First European quality of life survey: Life satisfaction, happiness and ... (n.d.). Retrieved April 24, 2023, from https://edz.bib.uni-mannheim.de/www-edz/pdf/ef/05/ef0591en.pdf
[6] Hassan M. & Zeb R. (2021) Analyzing the Impact of Good Governance on Socio-Economic Development: A Case Study of Pakistan. Retrieved from https://www.semanticscholar.org/paper/Analysing-the-Impact-of-Good-Governance-on-A...
[7] How does foreign direct investment affect economic growth? (n.d.). Retrieved April 24, 2023, from https://olemiss.edu/courses/inst310/BorenszteinDeGLee98.pdf
[8] Mukherjee S., & Das R.C Do Spending on R&D Influence Income? An Enquiry on the World's Leading Economies and Groups. Retrieved from https://link.springer.com/article/10.1007/s13132-019-00609-0
[9] Ogunbiyi S.S & Abina P.A (2016) Foreign Direct Investment and Economic Growth Nexus: An Empirical Investigation, Bound Testing Approach. Retrieved from https://www.researchgate.net/profile/Adedigba-Abina-2/publication/327154712_Foreign...
[10] Pramanik M.U., Hossain Y., & Paul A.K. (2016) Biometric indices and size at first sexual maturity of eight alien fish species from Bangladesh. Retrieved from https://www.sciencedirect.com/science/article/pii/S1687428516300541
[11] Shahzad M. (2021) Environmental impacts of shifts in energy, emissions, and urban heat island during the COVID-19 lockdown across Pakistan. Retrieved from https://www.sciencedirect.com/science/article/pii/S0959652621000263
[12] Tatulici, A. (n.d.). Foreign Direct Investment Environment and Economic Growth. Acta Universitatis Danubius. Œconomica. Retrieved April 24, 2023, from https://journals.univ-danubius.ro/index.php/oeconomica/article/view/2384/2642#sdfootnote1sym

[13] Tran, N. V. (2022, October 1). Understanding household consumption behaviour: What do we learn from a developing country? De Gruyter. Retrieved May 6, 2023, from https://www.degruyter.com/document/doi/10.1515/bejeap-2022-0036/html
[14] Williams, K. (2010, July 15). Essays on FDI, growth, and political instability in developing countries. Essays on FDI, growth, and political instability in developing countries - Nottingham ePrints. Retrieved April 24, 2023, from https://eprints.nottingham.ac.uk/11420/
[15] (Kuznets, 1962) https://static1.squarespace.com/static/5536fbc7e4b0d3e8a9803aad/t/554d19f6e4b0005c69696961/1431116278720/Kuznets_How+to+judge+Quality_1962.pdf
[16] World B. (2020) The Global Economic Outlook During the COVID-19 Pandemic: A Changed World. Retrieved from
[17] https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world
[18] World B. (2020) The impact of COVID-19 in 12 charts. Retrieved from https://blogs.worldbank.org/voices/2020-year-review-impact-covid-19-12-charts
[19] Yasir M. (2021) Time series Model selection via stepwise regression to predict GDP Growth of Pakistan. Retrieved from www.ashwinanokha.com/resources/v20-4 - 21-124.pdf
[20] Yoshino N, Paraminik R.N, Gopakumar K.U, Taghizadeh F., Revellia M.L & Seetharam M.E (2020) An Aggregate-Level Macro Model for the Indian Economy. Retrieved from https://www.adb.org/publications/aggregate-level-macro-model-indian-economy
[21] Zeb R. (2021) Analyzing the Impact of Good Governance on Socio-Economic Development: A Case Study of Pakistan. Retrieved from https://njssh.nust.edu.pk/index.php/njssh/article/view/73
[22] Zhang Y.J, Liu Z, Zhang H. & Tan T.D (2014). The impact of economic growth, industrial structure and urbanization on carbon emission intensity in China. Retrieved from https://link.springer.com/article/10.1007/sC11069-014-1091-

Appendices:

Appendix A: Raw Data

Year	GDP growth rate	Household final consumption expenditure	GNI per capita
1981	3.42%	2.655735731	0.756789129
1982	3.70%	3.501034167	-2.10862075
1983	1.90%	0.92660419	-1.231768823
1984	-7.04%	1.2367268	-14.42046353
1985	-6.86%	-0.546282595	-8.531208985
1986	3.51%	3.107427976	1.646880246
1987	4.36%	3.462290172	4.27106557
1988	6.70%	5.595709999	5.572796181
1989	6.18%	4.553764997	3.793724348
1990	3.08%	5.220629003	5.390695007
1991	-0.44%	2.498832256	-0.1682115
1992	0.42%	3.236731539	1.159827327
1993	2.18%	2.528019086	1.342957806
1994	4.37%	2.914994369	2.536252722
1995	4.63%	2.985639414	2.774967882
1996	5.86%	3.82032999	6.816516752
1997	5.19%	4.332885442	2.781160019
1998	-0.51%	5.292290262	-0.522856247
1999	3.35%	4.028263763	0.335807963
2000	4.38%	5.197103462	5.328206323
2001	3.05%	3.942284446	0.947779772
2002	3.72%	5.099981977	1.602110961

2003	5.09%	5.379560364	2.910494212
2004	6.57%	5.904392305	4.347489388
2005	4.94%	4.444467567	3.239893183
2006	5.32%	4.182405385	2.781774544
2007	6.52%	4.809431401	4.352858451
2008	4.34%	3.8526134	2.712497559
2009	1.45%	2.531448925	1.757466346
2010	7.33%	3.589799511	5.147139017
2011	3.86%	5.552134218	1.516270863
2012	6.90%	6.798970258	5.210435294
2013	6.75%	5.819003213	5.633756635
2014	6.35%	5.784455182	4.477671972
2015	6.35%	6.444572485	4.361532013
2016	7.15%	7.149608461	4.941466507
2017	6.93%	5.957366501	4.97355466
2018	6.34%	5.765216374	4.125762784
2019	6.12%	5.866914546	3.646518054
2020	-9.52%	-7.956529277	-12.88925175
2021	5.70%	4.22244201	0.201612605

Diagnostic tests on Ordinary Least Square Method

APPENDIX B: Variance Inflation Factor (VIF)

1. **Variance Inflation Factor (VIF)**

Variance Inflation Factors
Date: 02/26/23 Time: 03:00
Sample: 1981 2021
Included observations: 41

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
FOREIGN_DIRECT_I...	7.59E-06	4.231005	1.114504
HOUSEHOLD_FINAL...	2.09E-06	9.165328	2.593279
GNI_GROWTH	6.64E-07	3.061084	2.628918
C	3.71E-05	7.507789	NA

Figure 7: Results from Variance Inflation Factor

The Variance Inflation Factor (VIF) test is used to identify if there is multicollinearity in the model resulting from OLS. Ideally, the centered VIF value should be less than 10 to indicate no multicollinearity among the variables. If multicollinearity is detected, some variables may need to be removed from the model.

According to the results of the VIF test, the model does not exhibit multicollinearity. The centered VIF values are less than 10, indicating that no variables require removal from the model.

2. Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.342227	Prob. F(3,37)	0.7949
Obs*R-squared	1.106958	Prob. Chi-Square(3)	0.7754
Scaled explained SS	1.183619	Prob. Chi-Square(3)	0.7569

Figure 8: Results from the Breusch-Pagan-Godfrey Heteroskedasticity test

The Breusch-Pagan-Godfrey Heteroskedasticity test is used to identify the presence of heteroskedasticity, variance, or uneven spreads in regression models. A p-value above the significance level of 0.05 is required to support the null hypothesis.

Based on the test results, the null hypothesis is accepted, indicating that the model has no heteroskedasticity.

3. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.712861	Prob. F(2,35)	0.1951
Obs*R-squared	3.655224	Prob. Chi-Square(2)	0.1608

Figure 9: Results from Breusch-Godfrey Serial Correlation LM test

The Breusch-Godfrey Serial Correlation L.M. test is used to determine if there is autocorrelation in a model. Autocorrelation indicates that the model fits the given time series. The null hypothesis is that there is no connection up to 2 lags, and it is accepted if the p-value exceeds the significance level of 0.05.

Based on the test results, the p-value is more significant than the significance level of 0.05. Therefore, the results suggest the absence of autocorrelation, and the null hypothesis is supported.

4. Jarque-Bera Test

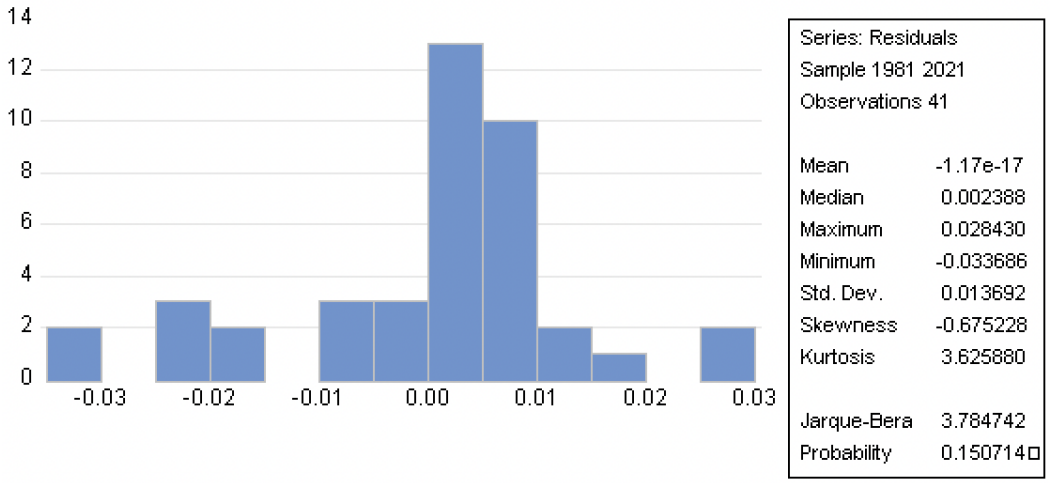


Figure 10: Results from the Jarque-Bera test for the Normality of the Residuals

The Jarque-Bera test is conducted to check whether a model's error term is normally distributed. To accept the null hypothesis of normal distribution, the p-value should be more significant than the significance level of 0.05.

According to the test results, the p-value exceeds the significance level of 0.05, indicating that the error terms are normally distributed. The p-value of 0.150714 further supports the regular distribution of error terms.

5. Chow Breakpoint Test

Chow Breakpoint Test: 2001
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1981 2021

F-statistic	1.418853	Prob. F(4,33)	0.2495
Log likelihood ratio	6.506556	Prob. Chi-Square(4)	0.1644
Wald Statistic	5.675412	Prob. Chi-Square(4)	0.2247

Figure 11: Results from the Chow Breakpoint test

The Chow breakpoint test assesses whether the model's structural integrity is affected and how well a divided dataset aligns with a regression line or multiple regression lines. To accept the null hypothesis that the model has no breakpoint, the p-value should be greater than 0.05 at the significance level.

Based on the results, the null hypothesis is accepted since the p-value is higher than the 0.05 level of significance. As a result, it can be inferred that the model does not have a breakpoint. The p-value of 0.2495 supports this finding.

6. Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: GDP_GROWTH_RATE FOREIGN_DIRECT_INVESTMENT
HOUSEHOLD_FINAL_CONSUMPTION_EXPENDITURE
GNI_GROWTH C

	Value	df	Probability
t-statistic	0.002685	36	0.9979
F-statistic	7.21E-06	(1, 36)	0.9979
Likelihood ratio	8.21E-06	1	0.9977

Figure 12: Results from the Ramsey RESET test

The Ramsey Reset test examines whether the non-linear fitted values support the dependent variables in the model. If the model is correctly specified, it should pass this test. To accept the null hypothesis of the proper model specification, the p-value should be more significant than the significance level of 0.05.

According to the results, the p-value exceeds the significance level of 0.05, indicating that the null hypothesis is accepted. Thus, researchers can conclude that the model is appropriately specified, and no further specification is required.