

## The Effects of Government Borrowing to Investment Growth of the Country



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**ABSTRACT:** Government borrowing has emerged as one significant method that helps in mobilization of resources for economic growth especially in emerging economies. Most governments in developing economies resort to borrowing as a way of financing budget deficit. This paper identifies the effects of government borrowing to investment growth in the Philippines. Specifically, it presented the trend of gross domestic product, internal debt, and external debt from 1990-2020. The study used Johansen Co-integration, Granger Causality, and Vector Autoregression (VAR) models to analyze this study. Johansen's Co-integration analysis revealed that the gross domestic product (GDP), internal debt (ID), and external debt (ED) are rejected at a 5% significant level and showing that all relevant variables have a long-term relationship and the data are co-integrated. On the other hand, unrestricted VAR model, there exist a relationship between gross domestic product (GDP), internal debt (ID), and external debt (ED). The Granger Causality test result revealed the direction of the causal relationship between independent and dependent variables; gross domestic product, internal debt, and external debt at the 5% significant level.

**KEYWORDS:** Gross domestic product, internal debt, external debt

### 1. INTRODUCTION

One efficient way to mobilize funds to support economic expansion, particularly in developing nations, is government borrowing—the majority of governments in countries that are developing turn to borrowing to cover fiscal deficits. According to (Hasnaf & Ashraf, 2018), Government borrowing is acceptable because taxes alone cannot generate enough revenue to fund national budgets. It is crucial to remember that any increase in government expenditure would cause budget and monetary instability, which might be partially covered by borrowing from the government. The government's domestic debt is used for a variety of purposes, including financing the budget deficit when the government is unable to fulfill its commitments to pay for expenditures through domestic revenue collection, external grants, and borrowing; assisting in the implementation of monetary policy by way of open market activities; and fostering the growth of financial markets through loans. Additionally, borrowing is done to impact aggregate demand in order to keep the economy stable (Lidiema, 2017). When funds are taken with a future repayment time anticipated, borrowing has occurred. Simply put, government borrowing consists of loans that the government takes out to pay its financial obligations. Government borrowing is an obligation through legislation for the state to repay principal and interest to owners of preset rights according to a set schedule (Muraguri, 2019). Private investment is essential, especially in emerging countries, as evidenced by the industrialized economies' achievements in terms of the contributions provided by the private sector (Ajudua, 2022). To emphasize its importance in relation to the growth and development of a nation, private investment has been alluded to as an aspect of entrepreneurship, with its operations exhibiting a positive impact on a country's economy and a person's standard of living. Adding through the stock of equipment along with assets that could provide profits is called investment. Investing funds in long-term initiatives will increase the investors' wealth to the greatest extent. From an economic perspective, saving, dependent on consumption, affects investment. Hence, private investments encompass an assortment of initiatives that the government is not involved in but promote economic expansion (Suhendra & Anwar, 2017). The country as a whole becomes wealthy through private investments. Private investment spurs economic growth and shapes and affects a nation's capacity for production. The private sector is essential to the economy's expansion in any country. In addition, the private sector supports consumer spending by manufacturing the necessary services and products. Private borrowing, essential for the entire private sector, sustains private investments to a considerable extent (Stowell, 2017). Effective debt management is anticipated to boost the amount of funds the government can invest in infrastructure, encouraging investment and raising domestic economic activity.

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The majority of debts incurred from both domestic and external, sovereign and private, sources, however, have not generally been used wisely to promote the development of fundamental infrastructures that attract investment and encourage growth, especially with years of expertise in developing nations (Shittu et al., 2018). The development of the financial sector would change how the assets and instruments of the financial system are structured, According to a study by (Gupta & Atri, 2018). Furthermore, global capital movement accelerates financial market activity through international competition, creative business strategies, and technological innovation. As a result, the financial sector improves, accelerating economic growth (Qamruzzaman & Wei, 2019). External debt financing is regarded as one of the key resources for balancing both the deficits and the twin gaps for economic growth (Biqiong et al., 2020). A country's acquisition of external debt is fundamentally intended to promote economic expansion and eradicate poverty. State debt management needs a benchmark to determine the appropriate ratio to government capacity in order to make the best use of external debt in the development of the national economy. The nation owes it to the debtor nation to avoid a default circumstance or one in which the debtor nation does not profit from external financing (Sudarma & Yasa, 2021). The budgets of both developed and emerging economies are financed by a variety of sources of income. The government had to use domestic debt to pay its deficit budget due to its development ambitions, which included increasing employment opportunities, raising citizenry standards of living, and reducing poverty, among other things. The government seeks both foreign and local loans in order to establish a link between planned initiatives as outlined in expenditure budgets and performance. As a result, the loans help to increase the amount of money that the government receives (Ewubare et al., 2017). Scholars have also determined that debt is one of the fiscal policy tools used by governments to raise money with the hope of enhancing the recipient's standard of living (Akinadewo, 2020). This study examines the effect of government borrowing on investment growth in the Philippines. Respectively, the study seeks to demonstrate the trend variables of government borrowing, which are internal debt and external debt in the Philippines from the period 1990-2020, the trend of the indicator of investment growth, which is the gross domestic product in the Philippines from the period 1990-2020, and the connection of government borrowing and investment growth in the Philippines. An ongoing discussion among economists around the world has revolved around the connection between national debt and growth in the economy. Public finance literature has paid a lot of attention to the lack of tax revenues needed to cover government spending. For developing nations, public debt is just as important to economic development as capital (Hameed et al., 2020). If a government spends more than its income, it must borrow money. As a result, public debt is an essential tool for governments to use to finance public spending, particularly when raising taxes and cutting spending is challenging. Over time, the majority of nations have accrued substantial unpaid obligations as a result of this strategy. Taking on sustainable debt to fund public projects and infrastructure is the key to boosting economic growth. But excessive borrowing without adequate preparation for initiatives may lead to a heavy debt load and high-interest costs, which could have a range of detrimental effects on the economy (Rittu et al., 2020). According to certain theories, internal debt may actually promote economic growth depending on how it is used. The economy would perform better in real terms if governments used the borrowed funds to invest in infrastructure projects, health care, and education (Shvets, 2017). Comparatively, several researchers concur that the accumulation of internal debt substantially speeds up a country's process of development and that it has a more powerful overall effect on economic expansion and development than external debt. These findings indicate that growing internal debt results in rising government spending, which has a knock-on effect on overall demand, production, and employment. Internal debt is the portion of a country's overall public debt owed to lenders throughout that country. Internal debt may have a short-term positive impact on growth. Still, suppose the debt service repayment schedule exceeds the capacity to pay. In that case, it will likely cause a financial crisis, and eventually, the interest will outweigh the principal, negatively affecting it. At this point, the investment will start to be crowded out, and there will be restrictions on the private sector (Harrison et al., 2021). Economic development and internal debt, and public financing have similarities as they impact motivations and utilization of resources, as well as production options. Government borrowing is advantageous and required in addressing structural voids and fostering economic development (Njoroge, 2020). Internal debt significantly impacts the distribution of commodities and services, wealth accumulation, income growth, and other economic indicators (Akhanolu et al., 2018). Comparatively, several researchers concur that the accumulation of internal debt substantially speeds up a country's process of development and that it has a more compelling overall brunt on economic expansion and development than external debt. These findings indicate that growing internal debt results in rising government spending, which has a knock-on effect on overall demand, production, and employment. The use of external debt and its associated costs results in a significant reduction in government revenue. The government's ability to spend a portion of its income on the nation's poor majority is being diminished by the accumulation of external debt and interest payments, as stated by (Ali et al., 2018). As a source of funding, external debt can support economic expansion. This is especially true for nations where capital is limited. According to (Siddika et al., 2022), Foreign currency debt is a crucial funding source for countries with limited domestic financing. Additionally, external debt can promote economic stability and growth by improving public and corporate governance. (Abdullahi et al., 2017) illustrated the direct and indirect relationships between

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external debt and growth. When funds from outside sources are used for social services like health, welfare, unemployment compensation, or education, this is referred to as a direct relationship. A relationship that is not direct implies investments that lead to economic expansion in which external borrowing is employed to cover the domestic resource imbalance. Several different sorts of relationships among external debt and economic growth can abide highlighted through a quick assessment of the literature analyzing such an impact. Consequently, it is determined that there could be a beneficial, detrimental, neutral, or nonlinear effect of external debt on economic growth (Shkolnyk & Viktoriia, 2018). External debt may result when a nation's investment demand exceeds its domestic savings. The government needs to borrow to meet its budgetary needs in the event of a deficit to close the disparity in resources between savings and investments. Countries that experience this gap often turn to external loans, but they also maintain that debt is one of the primary means of financing capital formation in any economy. According to (Augustine & Kumar, 2020), most nations view foreign investments and borrowing from overseas as the primary causes of economic growth, particularly developing and emerging economies that have difficulties saving money. The focus on external debt is attributed to its vulnerability, which could lead to a debt crisis, given that financing development initiatives are distinctive to industrialized and developing countries. External debt has negative consequences for debt overhang speculation. According to (Ezema & Agbaji, 2018), the effect on investment Debt nations can only partially benefit from expanded production. The motive is that a part of the manufacturing will repay the debt to the creditor country, which is a consideration in investment and manufacturing selections. Economic growth is the proportion of a country's extent and the worth of the economic development determined by gross domestic product. When the GDP develops, it indicates that a nation is expanding. More energy is needed to preserve economic activities and improve economic growth, as stated by (Fernandes & Reddy, 2020). Economic exposure is a problem with borrowing from foreign lands because it increases the demand for primarily foreign currency. (El Aboudi & Khanchaoui, 2021) It is argued that paying a large amount of external debt can drain foreign currency that could have been utilized to provide social services. Local currency depreciation will amplify the external debt service, causing macroeconomic instability. Furthermore, incurring the debt at a variable rate exposes the nation to shifts in the rate of interest on the world market, which may result in higher debt servicing costs (Elhendawy, 2022). The primary measure of prosperity is the scale and rapidity of growth, although it might occasionally correspond to the accurate level of a population's quality of life. Then, according to (Pegkas, 2018), economic growth is a measure of the country's financial processes' dynamics, despite its limitations. Progress in a country's economic situation based on various indicators related to individual economic matters is known as economic growth. (Sebastian, 2018) claims that because GDP is an index of an economy's strength and scale, it is the most significant element in investment decisions. On the opposite side, financial development, as per (Sukirno, 2017), is an advancement in Gross domestic product (GDP), despite population increase. (Sukirno, 2017) continued by stating that developed countries, generally developing nations refer to the increase in GDP as "economic growth," although "economic development" is used in developed countries. Several benchmarks, including state income, income per capita, the number of workers, the unemployment rate, and poverty reduction, measure a country's economic growth. This study is based on Keynesian Theory, which contends that there are particular microeconomic-level acts that, when conducted simultaneously by individuals and firms, might cause macroeconomic variables to be distorted. This is especially true when the economy is functioning beneath its potential increase and quantity of output. Utmost Keynesians advocate proactive stabilization measures to lower business cycles, which are recognized as one of the most severe problems facing countries (Mankiw et al., 1992). According to Keynes, the Great Depression could have been avoided if economies had been encouraged by two methods: lower interest rates and increased government spending. Infrastructure projects funded by the government increase the flow of income and revenue into the economy. As a result, production and investment would rise Keynes (1935). Following the initial stimulus, a series of events occur to increase economic activity and buy through the power of multiplicity. Keynesian economists believe that government-financed funding needs to be accompanied by internal or external borrowing. According to (Hansen & Perloff, 1945), constructive government borrowing is linked to economic improvement and growth. When the economy is regarded to be in recession, according to Keynes (1935), government borrowing is significant. This is a phase in which the economy's level of investment is deficient, with rising unemployment rates, and the economy's growth is prolonged due to low aggregate demand. Borrowing allows the government to establish savings streams and ensure that the resources acquired from indebtedness are put to good use in financing investment initiatives, all of which will help the economy thrive (Okon & Denies, 2013). Because of the consistent flow of income, the government can produce more cash from taxes, making debt payment easier. An increase in government borrowing during a period of high unemployment results in the production of capital, keeping consumption patterns in control, with the potential of more significant spending cuts and investment. Nonetheless, Keynes (1935) warns that governments ought to use borrowing cautiously because it can result in a crowding-out effect. This theory is relevant to the study because it argues for the need for government borrowing and warns against excessive debt because it could cause a crowding-out effect. The primary variable is government borrowing's effect on investment growth in the Philippine industry. The indicators are External debt, the percentage

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of a country's debt that is owed to foreign lenders. Internal debt is the portion of total national debt incurred domestically. Gross domestic product (GDP) gauges a nation's overall efficiency and economic output.

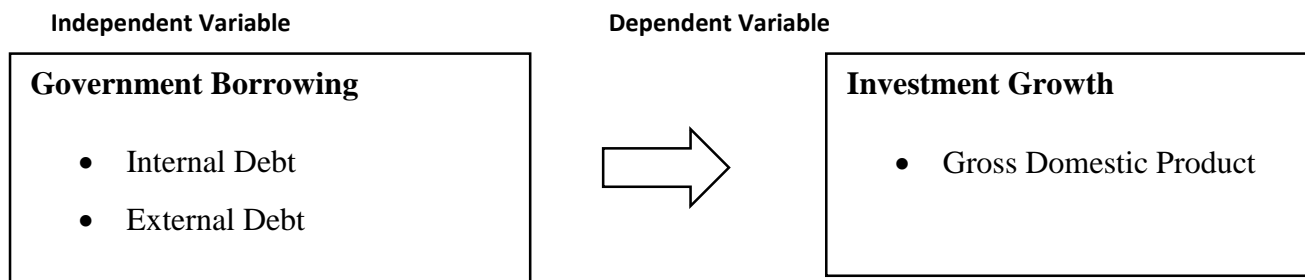


Figure 1. Conceptual framework of the study

This research benefits these individuals in various ways by providing relevant information and suggestions, including the government, readers, and future researchers. The government allows promoting budgetary responsibility and effective financial policy to prevent the negative consequences of borrowing for the corporate sector. To readers in order for them to learn about the effects of public borrowing on private investments. This was also assisting readers in comprehending the positive and negative aspects of government borrowing and its contribution to and effect on Philippine economic growth. The theories and data presented in this study may guide future researchers in conducting related research and evaluating the reliability of related finding.

## 2. METHOD

### Data Source

The data used in this study was gathered from secondary sources. Data on the indicators of government borrowing, which are internal debt and external debt, was sourced from World Development indicators published by World Bank from the period 1990-2020, and the indicator of investment growth, which is the gross domestic product, was sourced from Trading economics which also published by World Bank from the period 1990-2020, the World Bank issues both Data Source to confirm the data's authenticity; each data point is yearly and considering the limitations of data availability, all indicators cover a period of 30 years from 1990 to 2020. Secondary data is gathered by others rather than primarily for the current study issue. Guides to collections of collected data demonstrate the fantastic range of forms that secondary data can take. Some authors who write on research methodologies merely list potential data sources, while others try to categorize them (Cowton, 2019).

### Research Instrument and Materials

The researcher used secondary data to gather the needed data for this study. Data on the indicators of government borrowing, which are internal debt and external debt, was sourced from World Development indicators, and the indicator of investment growth, which is the gross domestic product, was sourced from Trading economics, the data availability is from the period 1990-2020, which aimed to gather relevant information concerning on the effects of government borrowing on investment growth in the country. The researchers identify and assess research sources as the researchers searched and evaluate relevant reliable research sources and will provide the most relevant existing data and information about the relationship between government borrowing and investment growth in the Philippine Economy.

### Research Design and Procedure

The quantitative research methodology was used for this study. Quantitative research describes strategies for using statistical or numerical information to study social concerns methodically. Therefore, measurement is necessary for quantitative research, which also presupposes that the occurrences under study can be measured. Its goal is to confirm the measurements made and look for trends and correlations in the data (Vivanco, 2018).

This research study used Time series Analysis, a technique for assessing data on a sequence of data points accumulated over time, was employed in this study. Time series analyses gather the data points at predictable times throughout a predetermined period rather than just irregularly or haphazardly. Time series analysis has two main objectives: to determine the phenomenon's nature from the chronology of observations and to predict or estimate the variable's future values. The structure of the observed time series data must be recognized and roughly appropriately represented for both of these objectives. The trend can then be assessed, merged with additional data, and the results used in some investigation phenomena after being identified. Understanding if the variables are stationary is essential when dealing with time series analysis to prevent erroneous outcomes, such as obtaining estimates with a very high R2 but no statistical significance.

Time series analysis is the main methodology employed in this study; an overview is provided in the following sections.

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### A.1 Test for Stationarity

Prior to estimating any relationship of variables in a time series analysis, it is essential to know whether are stationary or not in order to avoid spurious results (War, 2009). Estimation based on non-stationary variable may lead to spurious regression of it is possible to obtain very high values for R2 but parameters estimates are insignificant.

A stochastic process  $Y_t$  is stationary if it satisfies the following requirements:

$E\{Y_t\} = 0$  is independent of  $t$ .

$Var\{Y_t\} = \delta^2$  is a finite, positive constant, independent of  $t$ .

$Cov\{Y_t, Y_{t-k}\} = \delta_{\tau}$  the covariance between any two terms of the series is a function only of the distance between them.

Assumptions (1) and (2) imply that the means and variances are constant over time, while condition (3) means that the covariance between observations depends only on how far apart they are, and not on the time of occurrence (Greene, 2000). Failure to satisfy one or more of the conditions would mean that the series is non-stationary, and proceeding with regression analysis may result to spurious results.

### A.2 Testing for Unit Roots

A typical unit root test on each variable is required to be run as a preliminary step before beginning the estimating procedure. The Augmented Dickey-Fuller (ADF) algorithm is used to determine whether a unit root exists. Was sed in the data series used in this research. The prerequisites are:

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + \alpha \sum \Delta Y_{t-1} + \epsilon_t$$

Where  $\epsilon_t$  is a word for white noise error. It is assumed that the error term will have an identical distribution and be independent. To address the AR process in the variables, devised the ADF test (Dickey and Fuller, 1979). If the ADF test fails to eliminate the null hypothesis, the data set is stationary and does not have a unit root. The series is non-stationary if the ADF error appears to reject the null hypothesis and reveals the existence of a unit root. In this situation, data "smoothing" is required, and differencing is one method to do this.

### A.3 Lag Length Determination

The ideal lag period for the VAR model could be determined using the Schwarz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC). AIC's primary objective is to select the framework with the smallest negative probability. Weighted by parameter count. Alternately, one of the popular information criteria is the Schwarz Bayesian Criterion (SBC) is calculated inside a Bayesian framework, in contrast to AIC, and serves as a gauge for the Bayes factor between two opposing models.

Even though they have different definitions of what constitutes a good model, AIC and SBC share the same primary objective of finding good models. Here, we'll pick the model with the smallest AIC and SBC values. Below are the AIC and SBC equations:

$$AIC = T \log |\Sigma| + 2N$$

$$SBC = T \log |\Sigma| + N \log (T)$$

where:

$|\Sigma|$  = the determinants of the variance/covariance matrix of the residuals;

$N$  = total number of the parameters estimated in all equations; and

$T$  = the number of usable observations.

## B. Vector Autoregressive Analysis (VAR)

The vector autoregressive (VAR) model is one of the best, most flexible, and most straightforward approaches for time series analysis. The logical progression for fluid time series is the univariate autoregressive model. The VAR model is beneficial for predicting and describing the shifting movements of economic and financial time series. Forecasts utilizing VAR models can be flexible since they can be created depending on the probable future courses of specific model variables. One way to do causality tests is through the use of the VAR. It is an empirical model that expands on univariate autoregressive (AR) models to depict the evolution and relationships among numerous series. The current and previous values of the other variables in the framework and their lagged values are used to assess each variable in the VAR model and interpret it. As a result, a distinction no longer exists separating exogenous and endogenous factors. A VAR method only considers the past evolution of the set of  $k$  variables when describing their evolution throughout the same sample period ( $t = 1, \dots, T$ ) Watson, 1994). The multimodal VAR technique in this study is shown as follows using matrix notation:

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$$\begin{pmatrix} \underline{BOP}_t \\ \underline{DEBT}_t \\ \underline{INF}_t \end{pmatrix} = \begin{pmatrix} A_{10} \\ A_{20} \\ A_{30} \end{pmatrix} + \begin{pmatrix} A_{11}^{(1)} & A_{12}^{(1)} & A_{13}^{(1)} \\ A_{21}^{(1)} & A_{22}^{(1)} & A_{23}^{(1)} \\ A_{31}^{(1)} & A_{32}^{(1)} & A_{33}^{(1)} \end{pmatrix} \begin{pmatrix} BOP_{t-1} \\ DEBT_{t-1} \\ INF_{t-1} \end{pmatrix} \\
 + \dots + \begin{pmatrix} A_{11}^{(p)} & A_{12}^{(p)} & A_{13}^{(p)} \\ A_{21}^{(p)} & A_{22}^{(p)} & A_{23}^{(p)} \\ A_{31}^{(p)} & A_{32}^{(p)} & A_{33}^{(p)} \end{pmatrix} \begin{pmatrix} \underline{BOP}_{t-p} \\ \underline{DEBT}_{t-p} \\ \underline{INF}_{t-p} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix}$$

Where:

t = time subscript;

GDPT = gross domestic product observed over time period t;

DEBTt = external debt observed over time period t;

IDt = internal debt observed over time period t;

Aio = the parameters representing intercept terms

Aij = the polynomial in the lag operator

p = lag length

$\varepsilon_t$  = the white noise or disturbance term

### C. Granger Causality Test

While doing economic analysis, it is crucial to comprehend that adjustments to one variable may impact alterations in other variables. The current research will examine this matter using the Granger causality test. Granger invented the commonly used Granger causality test, which assesses whether alterations to one variable in the past impact changes in the other variables currently being made. The statistical method used for determining whether one time series aids in the prediction of another time series is the Granger causality test. Suppose a time series X can be shown to have a Granger connection to time series Y, frequently by performing a series of t-tests and F-tests on lagged values of X. In that case, it has a Granger relationship with Y. This test's core concept is that if X causes Y, X's alterations must have occurred before Y's developments. More specifically, if Granger's law is true and X causes Y, previous values of X can help forecast Y, but the inverse may not be true.

The Granger Causality test looks at the precedent and data that X provides, contrasting the present moment value of Y with the term's usual usage. X is regarded as the Granger cause of Y if it helps predict Y or if the coefficients on the lagged X's are statistically relevant. It is observed that two-way causality frequently occurs: Granger often causes X to lead to Y, and Granger frequently causes Y to cause X. Understanding that "X Granger affects Y" does not imply that Y is an outcome of X is crucial.

## 3. RESULTS AND DISCUSSION

### Augmented Dickey-Fuller (ADF) Test for Unit Root

It is imperative to remember that a critical premise of VAR analysis is that time series are stationary. It is decisive to determine whether the indicators are stationary before examining Information regarding individual bidirectional causal relationships to prevent erroneous results and conclusions. The study simulated that unit roots was present and used time series data for the test. Therefore, the study used the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) test to determine whether the data contained unit roots. The absence of a unit root, which indicates that the data are non-stationary, is the null hypothesis for this study. The method is to move on to the first difference when the data are non-stationary at certain levels. The test for unit roots is frequently used to assess the time series behavior of the studied variables. The test determines the order in which endogenous and exogenous variables are integrated into a particular model. To prevent the issue of false regression, which is frequently associated with non-stationary time series, the study used the Augmented Dickey-Fuller test to test for the occurrence of a unit root. Researchers may regulate how many times a variable would be differentiated to reach stationarity by examining the order

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of integration. Additionally, it will give us the basis to draw valid conclusions from estimating the investigated variables. The time series data utilized in this current study was rendered stationary to avoid the trap of drawing incorrect conclusions from non-stationary regression. A 5% test critical value is applied in this investigation. As a result, tables 1 show the unit root test results.

**Table 1. Summary of Results of Augmented Dickey-Fuller (ADF) Unit Root Test**

Variables	Log (level)	Log First-Difference
Internal debt	0.4185	0.0027*
External Debt	0.9753	0.0007*
Gross Domestic Product	0.9966	0.0017*

Note: \*statistically significant at 5%

Table 1 above demonstrates that the first difference between gross domestic product, external debt, and internal debt is found to be stationary. The claim of differencing for the null hypothesis that the variables have a unit root, is thus rejected at the 5% significance level. The work of (Ehikioya et al., 2020) supports this study. Dynamic Relations Between Public External Debt and Economic Growth in African Countries is the title of their research project. They employed time series analysis data and assumed that unit roots were present. The results imply that the data became stationary at the first difference.

### Lag Length Determination

Examining the consequences of structural shocks and forecasting are common uses for vector autoregressive (VAR) models. A critical stage in the definition of VAR models is determining the lag length of the VAR. 1993's Braun and Mittnik provide a case study of the importance of lag length determination, who points out that the variability of breakdowns and impulse response equations generated by a calculated VAR are contradictory when the estimated VAR's lag length differs from the valid lag length. Underfitting the lag length frequently results in autocorrelated errors, and overfitting (choosing a more considerable order lag length than the correct lag length) rises in the VAR's mean-square prediction errors. For distinct lag lengths, the VAR models' forecasting accuracy varies greatly. This study is additionally supported by the work of (Ebhotemhen, 2022), who used the lag order selection criterion to choose the right lag length in his paper The Effects of External Debt and Other Selected Macroeconomic Variables on Investment In Nigeria. The Final Prediction error determined his study's lag length, which produced the least amount among the most competing lag length criteria. The suitable lag length was chosen using the lag length selection criteria listed in Table 2 below, including the sequential modified LR test statistic, final prediction error (FPE), and the Akaike information criterion (AIC). Hence, among most competing lag length criteria, the lag length for this investigation, as indicated by the Final Prediction error, produced the most negligible value.

**Table 2. VAR Lag Order Selection Criteria**

Lag	LR	FPE	AIC
0		0.000026	-2.035
1	152.97*	1.8e-07*	-7.03402*
2	16.508	1.90E-07	-6.97875
3	10.659	2.270E-07	-6.70685
4	5.5186	5.10E-07	-6.24458

Note: \* indicates lag order selected by the criterion

### Johansen Co-integration Test

Using the Johansen 1991 Co-integration test, the study determined the factors' long-term equilibrium connection. Similar to the Granger Causality Test, this test tends to conform to its strictness by assessing the co-integration of the data. Furthermore, even though, in this instance, the test additionally considers the long-term association between the variables. When time-series data are not long-term related, the co-integration test is essential for deciding which Granger test to employ and preventing misleading

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results. Nevertheless, prior to using Stata's Johansen Co-integration analysis function, the ideal number of lags there must be established (as shown in Table 3).

**Table 3. Summary of Results of Johansen Co-integration Test**

Variables	Trace Stat	5% Critical Value	Hypothesis No
Co-Integration			
Internal Debt	4.5886	15.41	Reject
External Debt	1.1256	3.76	Reject
Gross Domestic Product	28.2242	29.68	Reject

Note: The full Results of this test are in Appendix D.

The result in Table 3 above demonstrates that at the 5% critical level, the trace statistics suggest one co-integrating equation at a 0.05 level. The null hypothesis that cointegration does not exist is implied to be rejected by this result. This conclusion proved an equilibrium relationship over the long term between GDP, external debt, and internal debt. This study is also supported by the work of (Ehikioya et al., 2020), in which they apply the Johansen 1991 Co-integration analysis. The findings of the study revealed that economic growth and the explanatory factors have a long-run equilibrium relationship.

### VAR Analysis

VAR can describe the statistical interdependence that exists among exogenous and endogenous variables. It is predicated chiefly on the idea that these variables will interact concurrently. The macroeconomic factors taken into account in this study, as shown in Table 4, comprised the Investment growth (IG), internal debt (ID), external debt (ED), and GDP growth rate (GDP). With the help of Stata package version 14.0, the outcomes were achieved. The unrestricted VAR model's estimations of the relationships between the macroeconomic variables can then be used to explain how one variable affects another and how historical values affect current values. The work of (Pegkas, 2018), who used the VAR Analysis to identify the long-run structure corrected and tested before the short-run dynamics was added, supports this study. It also illustrates the impact of a single shock to one of the innovations on the endogenous variables' present and potential future values. This method demonstrates how each variable reacts to a previous disturbance to one variable over time, as well as disturbances to other variables. The effects of one variable on the others and the impact of previous values on another can be explained using the estimations among the macroeconomic factors under the unrestricted VAR model. The present research findings showed that the chosen macroeconomic indicators explained 83% of the shifts in the previous values of the variables' gross domestic product, 60% of the changes in those values for internal debt, and 80% of the shifts in those values for external debt. This is supported by the work of (Nsor-Ambala & Anarfo, 2022), titled A vector autoregression (VAR) analysis of corruption, economic growth, and foreign direct investment in Ghana, which shows how the variables may be modeled using a VAR framework.

**Table 4. Utilization of Data and Granger Causality Test Methods**

Conditionality	Granger Causality Method/Data	Causality Applicability
Level X and Y data are Stationary and have co-integration	Unrestricted VAR Granger/Level of Data	GDP-ID GDP-ED ID-GDP ID-ED ED-GDP ED-ID
Level of X and Y are not Stationary but have co-Integration	Error Correction VAR Granger/Level of Data	None
Level of X and Y are	Unrestricted VAR	



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Stationary but have no  
Co-integration

Granger/ Level  
of Data

None

The Granger Causality technique result for the unrestricted VAR model is shown in Table 5. The findings reveal how the independent and dependent variables are causally connected; internal debt, external debt, and gross domestic product—at the 5% significant level. Table 5 displays the conclusion of the Granger Causality analysis. The null hypothesis that GDP does not cause ID, ID does not cause GDP, and ID does not cause ED is rejected at the 5% significant level. ID and GDP have a one-way relationship. However, at a 5% significance level, GDP does not cause ED, ED does not cause GDP, and ED does not because ID is accepted, showing indicating there is a strong correlation between the variables. The findings of the study supported the conclusion of the research study by (Ebhotemhen, 2022), and (Pegkas, 2018).

**Table 5. Granger Causality Test Results**

Null Hypothesis	Chi-square	Probability	Inference
GDP does not ID	6.6418	0.036	Reject
GDP does not cause ED	0.26084	0.878	Reject
ID does not GDP	15.772	0.000	Reject
ID does not ED	6.829	0.033	Reject
ED does not cause GDP	0.58428	0.747	Reject
ED does not cause ID	0.51263	0.774	Reject

The study (Pegkas, 2018), which concentrated on The Effect of Government Debt and Other Determinants on Economic Growth, lends support to our research findings. The results of the empirical research demonstrate the co-integration of the variables GDP, investment, private and public consumption, trade openness, population growth, and debt-to-GDP. This suggests that an equilibrium relationship governs the variables' long-term motions. The factors that have been examined appear to have a considerable impact on economic growth. The findings show that every aspect contributes favorably to economic expansion. On the other hand, (Bashire, 2019) proposes that loans be used to make profitable investments to boost economic growth.

## 4. CONCLUSION AND RECOMMENDATIONS

### Conclusion

This study determines the government Borrowing to investment growth of the country. The study was carried out to present the trend of the independent variables, internal and external debt, in the Philippines from 1990–2020. To present the trend of the dependent variable, the GDP in the Philippines, from 1990–2020. This period was chosen as this was the only available data in the country. The parameters of the data period were initially statistically evaluated using standard time series techniques in order to prevent misleading regression errors. In order to evaluate the long-term relationships among indicators and select the best VAR technique, this study uses the Johansen Co-integration test. The unrestricted Vector Autoregression method was utilized on the VAR model to calculate the VAR equation's key parameters and examine the connection between economic variables. The Granger causality analysis was run on the VAR 2 method at the 5% significance level to ascertain the variables' path of causation.

Based on the Johansen Co-integration analysis result, the research revealed that all variables, internal debt, external debt, and gross domestic product, have a long-term relationship and play direct roles in the Philippines in the long run.

### Recommendation

This study gives recommendations to the following individuals in various ways: It is recommended to the government that the borrowed funds be allocated to finance economically and technically feasible projects. In addition, it is recommended that the government engage with key stakeholders such as local communities, private sector partners, and development partners to ensure that the proposed projects are aligned with their needs and priorities. Thus, the government should prioritize investing in projects with high transparency and accountability standards, such as transparent and open procurement processes and effective anti-corrupt measures. The government must ensure that the funds obtained through borrowing are used effectively to strengthen investment opportunities and promote the economy. It is suggested that readers pay closer attention to what would happen if

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the government borrowed outside or within the country and how that might affect the country's investment growth. Additionally, future researchers are encouraged to conduct additional research on government borrowing and investment growth, particularly in the Philippines. That implies that more knowledge is required.

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