
| RESEARCH ARTICLE

External Debt and its Impact on Exchange Rates in the Philippines

Mikayla Alessandra Mendoza¹ ✉ and Andrew Gonzalez, MBA²

^{1,2}*Department of Economics, Faculty of Arts and Letters, University of Santo Tomas, Manila, Philippines*

Corresponding Author: Mikayla Alessandra Mendoza, **E-mail:** mikaylaamendoza@gmail.com

| ABSTRACT

The exchange rate is a crucial macroeconomic factor within emerging and transition economies. External debt is a driving force for the growth of an economy. This study then aims to determine the impact of external debt on the exchange rate of the Philippines by examining the impact of external debt accumulation on the Philippines' exchange rates. The researcher applies a correlational time series analysis in order to capture the impact of external debt, debt services on external debt, and foreign reserves on the exchange rate of the Philippines within the period from 1980 to 2019. The relationships between variables based on the developed theoretical framework are analyzed through multiple regression analysis. Empirical results show that external debt and debt services positively impact the exchange rate, while foreign reserves exhibit a negative relationship. The corresponding coefficients indicate that a change in any of the independent variables will cause significant but marginal fluctuations in the exchange rate in the case of the Philippines. The author concludes that external debt encourages the growth of exchange rates in the long run in the case of the Philippines due to its positive relationship. This implies that the Philippine government should aim to focus on more efficient external debt management strategies to enhance the value of the exchange rate of the Philippine Peso relative to other countries. Accordingly, the researcher recommends that the government take the necessary means to reduce the country's external debt to better the economy.

| KEYWORDS

External Debt, Debt Services, Foreign Reserves, Exchange Rate, Philippines, Ordinary Least Squares

| ARTICLE DOI: [10.32996/jefas.2022.4.1.6](https://doi.org/10.32996/jefas.2022.4.1.6)

1. Introduction

1.1 Background of the Study

As the world continues to experience economic restructuring towards an increasingly industry-driven society, countries have seen the need to invest in critical areas such as overall technological development and human capital. This specific field of investment is crucial to a country's economic growth, or else it could lead to stagnation and reduced competitiveness in investments in various production methods (World Economic Forum, 2017). This increase in ventures is needed yet adds to the inevitable debt-ridden state of developing countries. Developing countries' debt has since been a global talking point and concern due to this. The external debt pressures translate to higher costs for these countries, resulting in low economic growth and the so-called crowding out of investments. The crowding-out effect leads to a decline in a country's ability to service its debt, which consequently indicates that less money is available for economic growth (Patenio & Tan-Cruz, 2007).

The Philippines' external borrowings significantly increased during the early 1980s, where total foreign debt nearly doubled between 1979 and 1982 (Dohner & Intal, 2007). The cautious borrowing policy seen in the 1970s disappeared in the early 1980s, bringing abruptly increased usage of short-term debts. An increase of two-thirds in borrowing was accounted for in the public sector. The Central Bank of the Philippines borrowed heavily between 1980 and 1982. Overall, debt rose to 47% in 1982, a much higher share than other LDC or less-developed-country debtors. The Philippines declared a moratorium in October of 1983, whereby then, its foreign exchange reserves were nearly exhausted.

The Bureau of Treasury (2020) reported that the National Government's total outstanding debt amounted to Php 10.03 trillion by the end of 2020. This could be attributed to the coronavirus pandemic response, among other factors, adding to the ballooning debt pre-COVID-19 pandemic period. Overall, the total debt stock grew by Php 658.81 billion or 7.03% from the previous month, mainly due to the acquisition of external and domestic loans. Prior to the pandemic of the COVID-19 virus, outstanding debt reached Php 7,939.08 billion in August of 2019 (Bureau of Treasury PH, 2019).

The ASEAN reports that the Philippines' economic growth during the Duterte administration's second year was partly due to the government's drastic increase in public spending (Alibasa & Chiu, 2021). The Build, Build, Build, Build Program's investment allocation towards national infrastructure development was a significant contribution to this growth. Public spending is expected to grow further with the multiple infrastructure projects such as the new roads and highways, proposed bridges, subways, railway expansions, and new airports. The rapid infrastructure expansion is expected to benefit those capitalizing in the construction of these public facilities, which are consequently expected to revitalize economic activity.

The study is relevant as most developing countries are dependent on external borrowing to achieve economic growth. According to the Harrod–Domar model, the key to enhancing economic growth is to invest more (Martin & Artadi, 2002). This then means that this model assumes a direct relationship between investment and economic growth. However, lower-middle-income countries, like the Philippines, might not possess the capability to finance this themselves, which leads to inevitable indebtedness to foreign lenders (Abuzaid, 2011).

The country has been experiencing a steady increase in its Human Development Index (HDI) over the years. In the United Nations Development Programme (2020) report, there was an increase of 0.12 of HDI for the Philippines from 1990, yet it is still considered a lower-middle-income country. The Philippines' 2019 HDI of 0.718 is considered below average for countries in the high human development group and East Asia and the Pacific.

Recent studies have focused on analyzing the connections between certain country's exchange rates and the causal factors affecting economic growth. Tahara and Vinayagathan (2017) noted that the exchange rate is one of the most crucial macroeconomic factors within emerging and transition economies and is therefore expected to stimulate the price of those traded products. Ultimately, this paper intends to determine whether increased levels of external debt have any significant impact on the Philippine economy through its exchange rate, given the variables used for the econometric model. Through empirical analysis, the hypothesis on whether the increasing external debt of the country continues to bring any significant impact on the exchange rate is tested.

1.2 Statement of the Problem

The Philippines has been experiencing significant increases in its external debt due to recent rises in public expenditures the country accumulates towards better living conditions, among others. External debt is a driving force for the growth of an economy. This is also defined as the financial obligation that ties one party, the debtor country, to another, the lender country (Ijirshar, Joseph, & Godoo, 2016). Hence, this paper aims to answer the research question of whether the country's external debt significantly affects the country's exchange rate and aims to determine the nature of this relationship. Specifically, the author seeks to determine the effect of External Debt, Debt Services on External Debt, and Foreign Reserves on the country's Exchange Rate between 1980 and 2019. Through these variables, the researcher gains a general understanding of the relationship between selected independent variables to the exchange rate in the case of the Philippines.

1.3 Formulation of Hypotheses

As stated previously, this study aims to determine the impact of external debt, debt services on external debt, and foreign reserves on the exchange rate of the Philippines. To verify if there happens to be a significant relationship between the variables, the author utilizes multiple regression analysis using least squares estimation in testing the hypotheses. Multiple Regression Analysis is applied in order to investigate the possible relationship between the designated single dependent variable and various independent variables (Hesketh & Skronal, 2008). Therefore, the hypotheses of the research are the following:

Null Hypothesis (H_0): There is no significant relationship between External Debt, Debt Services on External Debt, and Foreign Reserves and the Exchange Rate of the Philippines.

Alternative Hypothesis (H_a): There is a significant relationship between External Debt, Debt Services on External Debt, and Foreign Reserves and the Exchange Rate of the Philippines.

1.4 Scope and Limitations

The research focuses on the external debt of the Philippines from 1980 up until 2019. The data needed to conduct this research are the Official Exchange Rate as the dependent variable, with External Debt, Debt Service on External Debt, and Foreign Reserves as independent variables. The study is limited to the Philippines. Only a few studies examine the state of exchange rates of the Philippines to the external debt and focus on data solely from the 1980s and 90s. Hence, there is a need for an updated analysis of this in the context of the Philippines today.

With the continuous increase in public expenditures and low capital formation in many developing countries, governments have resorted to borrowing either within or outside the country. However, most borrowings come with interest attached, which results in debt servicing. Servicing external debt may involve a demand for foreign currency, which tends to affect the country's exchange rate. Hence, this study examines the impact of external debt on the exchange rate in the Philippines now.

A shortage of capital resources characterizes the least developed countries need to meet the increasing public expenditures. As primary products constitute a significant fraction of the exports in most developing countries, a decline in the prices of primary products results in a reduction in the foreign reserve used for external financing payments. Developing countries facing a scarcity of capital then acquire external debt to supplement domestic savings (Saheed, Sani, & Idakwoji, 2015).

1.5 Significance of the Study

This study is deemed significant to ensure society's awareness of the effect of external debt, whether it be increasing or decreasing, on one aspect of the Philippine economy. Additionally, this study may aid society's response to the possibilities of debt overhang. The researcher uses External Debt, Debt Servicing, and Foreign Reserves to discern whether there is a significant existing impact of external debt on the country's economy through its exchange rate.

Existing studies regarding debt and exchange rates in the Philippines are very few and outdated. While these are good points of reference, the researcher finds that there is a need to analyze whether the results apply in the present time, given the changes over the years. Future researchers can use this as a reference for analyzing the country's economy through its exchange rate. Moreover, the results could be useful in policymaking for the government to consider when thinking of increasing the country's external debt.

2. Literature Review

2.1 Review of Related Literature

An important factor of a country's exchange rate variations is the amount of external debt borrowed from foreign investors (Davis, 2016). Countries engage in wide-ranging investments in order to fund their government projects. While this stimulates the economy, countries with larger external debts are less appealing to foreign investors. This is due to more debt-encouraging inflation and debt services, wherein the debt will be serviced and paid off in the future. Should a government not possess the ability to service its debt through domestic means, an increase in the supply of securities is needed, thereby lowering prices (Jonasson, Williams, & Papaioannou, 2019). Furthermore, large debt is less attractive to investors if they believe the country risks failure to pull through with its possible obligations.

Andriyani, Marwa, Adnan, and Muizzuddin (2020) stated that foreign reserves could be affected by foreign debt, exchange rates, inflation, and exports. A deficit in capital resources demonstrates situations of most less developed countries in meeting increasing public expenditures. Saheed, Sani, and Idakwoji (2015) noted that as primary products comprise a significant fraction of exports in most developing countries, this indicates reductions in the foreign reserve used for financing external payments. Thus, it is generally expected that developing countries will acquire external debt to supplement domestic savings, which leads to public borrowing. Moreover, theory affirms the vital role foreign debt plays in resolving domestic shortages to stimulate the growth of savings and foreign exchange (Todaro & Smith, 2011). For these reasons, a country's external debt is found to be a critical determinant of its exchange rate.

Ume and Ndubuaku (2019) found that with the Auto Regressive Distributed Lag (ARDL) approach, a positively significant relationship exists between the real exchange rate and reserves in Nigeria. The researchers enact redirection to ensure the evolution of appropriate exchange rate policies to enable the economy to build its reserves. It is further pointed out that reserves provide a buffer in economic difficulties, especially for developing economies. The results from an analysis of exchange rate fluctuations and external debt in Pakistan suggested that there exists a long-run cointegration relationship between the exchange rate and external debt variables (Palić, Banić, & Matić, 2018). The long-run equilibrium exchange rate was determined through the employment of the natural real exchange rate or NATREX model, which considers the economies' nature and scale and their influences on the world economy.

A study by Yien, Abdullah, and Azam (2017) found that debt is found to granger cause exchange rate in the case of Malaysia. They determined that there exists a unidirectional relationship between external debt and exchange rate. The granger causality analysis concluded that external debt significantly influences inflation, where external debt causes an exchange rate leading to inflation. Another study estimated the fitted value of external debt, exchange rate, and unemployment between four ASEAN countries using EViews. Cahyadin and Ratwianingsih (2020) used the ARDL-ECM and Granger Causality methods to conclude a tendency of the development of external debt, exchange rate, and unemployment in ASEAN Countries to be a co-movement. Additionally, the causality between unemployment and external debt in the Philippines when regressed with other ASEAN countries was unidirectional, while the causality between unemployment and exchange rates was indirection.

Existing empirical studies which regress external debt to a country's exchange rate conclude different findings. Research conducted by Saheed, Sani, and Idakwoji in 2015 contained findings revealing that external debt, debt service payment, and foreign reserves positively influenced exchange rate fluctuation in Nigeria. The researchers recommended that their government should ensure that public borrowing should be directed towards constructive economic activities. Alternatively, findings from a study conducted in Chad showed that external debt also positively affected the real exchange rate, although debt servicing negatively affected this (Kouladoum, 2018). Similarly, Thahara and Vinayagathan (2017) concluded that external debt and foreign reserves have positive and significant impacts on Sri Lanka's exchange rate in the long run, while debt services have negative effects on it. Andriyani et al. (2020) found that foreign debt and exchange rates significantly affect the fluctuation of foreign exchange reserves in Indonesia, wherein the exchange rate negatively impacts foreign exchange reserves. One study by Bunescu (2014) even failed to show a significant econometric relationship between the exchange rate of Romania and its external debt. This further leads to the conclusion that this cannot be predicted by theory alone, considering the evolution of public and private external debt.

2.2 Theoretical Framework

This research is primarily anchored on the concepts, namely, Classical and Keynesian Schools of Thought and the Debt Overhang Theory. For the researcher to answer the question of whether increases in public expenditures the country accumulates significantly affect the country's exchange rate, the researchers refer to Ricardo's Theory of Public Debt.

2.2.1 Classical and Keynesian Schools of Thought

This study employs two economic schools of thought, the Keynesian and Classical schools of thought (Kouladoum, 2018). According to the classical economic school of thought, external debt is considered a tax that can be harmful to the economy in the long run. On the other hand, Keynesians argue that external debt has neither short nor long-run negative effects on the economy due to the new investments which are created through these. This school of thought supports the necessity for public indebtedness in order to relaunch the economy. Economists then argue that the general price level is the only variable that could adjust the real values of external debts and the future anticipated sum of actualized budget balances.

2.2.2 The Debt Overhang Theory

Krugman (1988) defined the negative relationship between foreign debt and investment, which results in lower capital formation, as a "debt overhang" where the potentials of repayment of outstanding facilities, the money expected to pay for external debt, will decrease as the debt amount increases. Similarly, a link between a country's ability to service debt and the current level of public debt exists (Krugman, 1989). This occurs when payment obligations exceed the country's ability to pay. Here, a government may be discouraged from improving economic performance because the benefits are going to creditors instead of their country.

The theory states that if future debt exceeds the affordability of a country, then the expense plan for debt service payments will constrain the domestic investment, which will, in turn, have a poor effect on economic growth (Van Cuong, 2018). Debt overhang happens when the burden is quite significant, where all earnings are allocated to paying off existing debt instead of investing in new projects, making the potential for evasion of payment obligations higher. The Debt Laffer Curve (see Figure 1) supports the Debt Overhang theory.

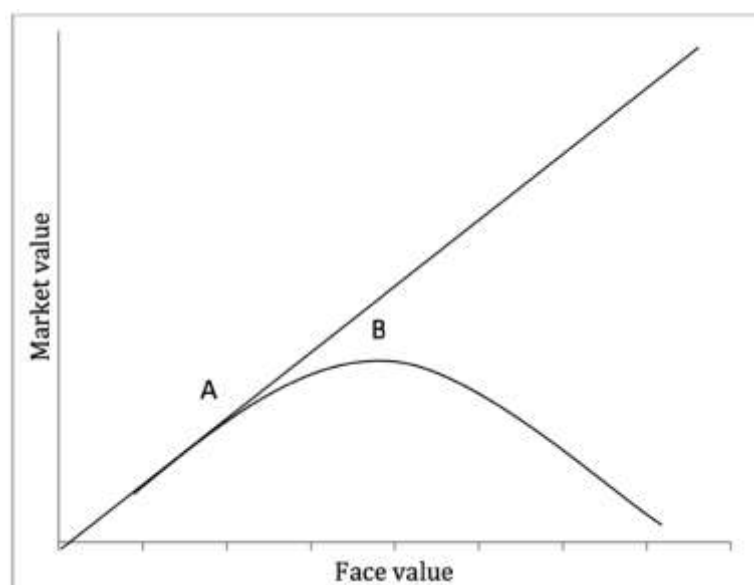


Figure 1 Debt Laffer Curve

Source: An Application of Debt Laffer curve: Empirical Evidence for Romania's case (Tatu, 2014)

Agénor and Aizenman (2005) explained the Debt Laffer curve by stating that the risk of default increases when point A is passed due to an increase in the face value of debt. When nominal value rises past point A, market value begins to rise slower, shown by the declining slope. This is proven as the more a country accumulates debt, the more difficult it is to finance due to default risks (Tatu, 2014). Therefore, debt accumulation points to a decrease in market value, and marginal profitability of debt begins to decline from point A. If debt levels rise past the threshold level, denoted by point B, increasing the face value will fail to compensate for the decline in market value, the country then suffers from debt overhang.

The Laffer curve shows that the larger the total debt, the smaller the repaying capability is. The curve exhibits an inverted U shape where the higher the debt, the debt repaying capability will also increase. Sachs (1989) initially analyzed this with the debt overhang context. He found that when a country borrows too much, its ability to finance this decreases, increasing the risk of default. If the expected value is less than the actual value of the debt, reducing this value reduces the risk of default, leading to an increase in the expected value of future repayments (Tatu, 2014). However, according to Van Cuong (2018), when the debt amount reaches its optimum debt, it reaches the debt threshold. At this point, a country can hold on to its debt without worrying about the consequences of economic growth. Once debt exceeds the threshold point, it will restrain the economy, and debt repaying starts negatively affecting economic growth.

2.2.3 Ricardo's Theory of Public Debt

The theory of Public Debt by David Ricardo is based on the emphasis of the primary burden to the community being derived from the wasteful nature of public expenditure itself rather than from the methods adopted to finance such expenditure (Roberts, 1942). Regarding financing public expenditure, Ricardo viewed that essential funds would have to be brought from the liquid resources of the community, and it makes no significant difference whether taxes or loans raised such funds. The latter is then referred to as public or external debt. External debt involves debt servicing, which in turn requires a payment in the form of foreign currency. The continued change in the demand for foreign currency tends to influence the exchange rate (Alagidede & Ibrahim, 2017).

2.3 Conceptual Framework

This research employs the Input-Process-Output (IPO) model (see Figure 2) in presenting the impact of external debt on the exchange rate in the Philippines. The variables used in the study are the primary factors of the input. These consist of External Debt, Debt Services on External Debt, Foreign Reserves, and the country's Exchange Rate. The researcher utilizes multiple linear regression analysis via gretl to empirically analyse the data variables. This is used to determine the statistical significance between variables. Subsequently, diagnostic tests are done to confirm the validity of the estimated regression model. The output of this research is the analysis of the relationship between the dependent and independent variables. The researcher then is able to form conclusions and recommendations for generalization and policy direction regarding the management of exchange rate and its interface with external debt and its related factors.

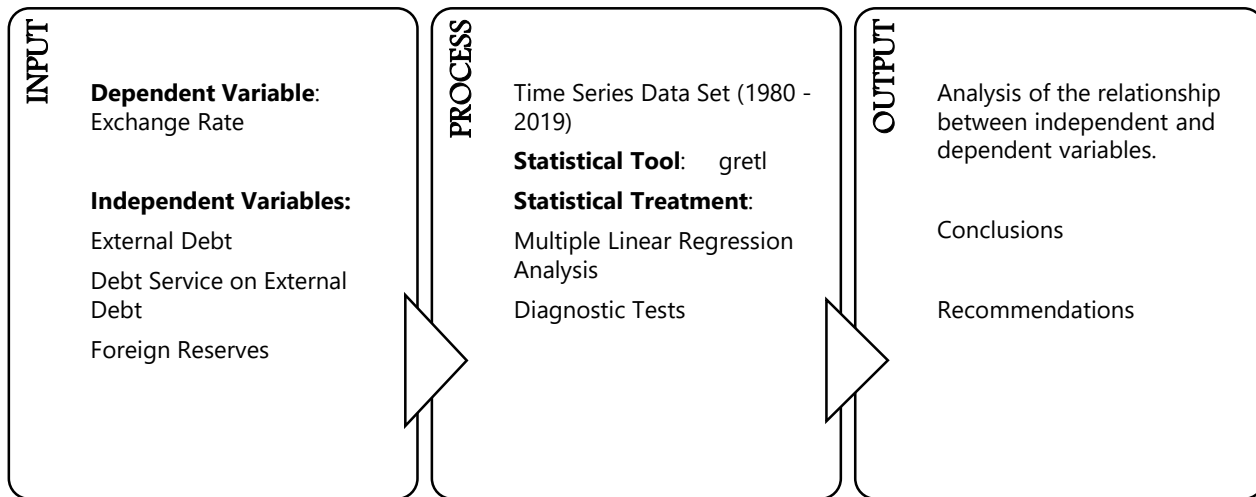


Figure 2 IPO Model

2.4 Summary

Economic theory states that external debt involves debt servicing, which requires payment in the form of foreign currency. The changes in the demand for foreign currency tend to affect the exchange rate of a country. Existing empirical studies on the relationship between external debt and exchange rate generally agree that external debt itself positively influences exchange rate fluctuation. However, once debt exceeds its threshold point, debt repaying starts to affect the economy negatively, as supported by the Debt Laffer Curve, leading to differing results amongst various countries. The researcher utilizes these empirical conclusions in analyzing the economic relationship between external debt and the exchange rate in the Philippines.

3. Methodology

3.1 Research Design

The researcher applies a correlational time series analysis to the study to capture the impact of external debt on the exchange rate of the Philippines from 1980 to 2019. This time period is operated on to cover the time during the start of accelerated external borrowing in the country up to the most recent data available. Using secondary time series data, a quantitative research method is required as the research topic involves the relationship between quantifiable variables (Abuzaid, 2011). Saunders, Lewis, and Thornhill (2007) stated that secondary data comes from various sources such as government or institution reports, which is an advantage mainly for the timesaving, reduction of costs, and reduced likelihood of bias in the data (Sinkovics, Penz, & Ghauri, 2005).

The author conducted a correlational study. Findings from correlational research can determine prevalence and relationships among variables or forecast events from current data and knowledge (Curtis, Comiskey, & Dempsey, 2016). Conclusions generated from correlational research supplement decision-making and allow for improvements in economic activities. Multiple regression analysis is used to interpret the results of the study. The results of this analysis allow the researcher to determine, explore, and observe the relationships between the dependent and independent variables.

3.2 Data Variables

The data necessary to conduct this research is the Official Exchange Rate as the dependent variable, with External Debt, Debt Services on External Debt, and Foreign Reserves as independent variables. The study used annual data from 1980 to 2019 from the Philippines. The said data is collated from the World Bank's Open Data site (2021).

3.3 Model Specification

In order to accomplish the objectives of the study, the multiple linear regression model is adopted in estimating the impact of the variables, namely, External Debt, Debt Services on External Debt, and Foreign Reserves on the Exchange Rate in the Philippines. This model was constructed on Saheed, Sani, and Idakwoji's (2015) econometric model and is specified thus as the following:

$$EXR_t = b_0 + b_1*EXD_t + b_2*DSV_t + b_3*RSV_t + \mu_t$$

Where EXR = Official Exchange Rate
 EXD = Total External Debt
 DSV = Total Debt Services on External Debt
 RSV = Total Foreign Reserves

t = 1980,...,2019
 μ = White noise error term

Moreover, after model estimation, a model misspecification test was used to examine whether non-linear combinations of the fitted values helped explain the dependent variable. Model specification bias arises when a potential independent variable is omitted from the model, which results in a biased estimate of the coefficient of the included variable (Gujarati, Porter, & Gunasekar, 2012). Furthermore, standard diagnostic tests were applied to verify the model's regression analysis validity.

3.4 Statistical Treatment

The study utilizes Ordinary Least Squares (OLS) multiple linear regression to test the hypotheses. The OLS method is one of the more widely used methods for regression analysis and is used to compute estimations of parameters and fit data (Abuzaid, 2011). This method is used in understanding the significance of the relationship between the dependent and independent variables. In this particular research, regression analysis is done through the Gnu Regression, Econometrics and Time-series Library (gretl).

The researcher utilizes regression analysis to confirm the relationships between variables based on the developed theoretical framework. In satisfying the assumptions of multiple linear regression, diagnostic tests are done after the model estimation to the regression model to verify the estimated model's validity. All diagnostic tests employed in this research are in compliance with the assumptions of multiple linear regression analysis.

4. Results and Discussion

4.1 Results

As previously stated, the study aims to evaluate whether increases in external debt, possibly due to the recent rise in public expenditures in the country, significantly affect the country's exchange rate. Specifically, the author assesses the effects of the three independent variables, namely external debt, debt servicing, and foreign reserves, on the exchange rates between 1980 and 2019. In doing so, the researcher utilizes multiple regression analysis on the data gathered. All tests are done using the gretl econometric software package.

4.1.1 Unit Root

Before OLS estimation, a standard econometric test in the form of the Augmented Dickey-Fuller Unit Root test was conducted in testing the stochastic properties of the data to avoid estimating spurious regression results. Stationarity tests are done to establish the linearity of the trend in the given data and to determine the reliability and usability for estimation in the long run (Abina, 2019). In estimating the slope coefficients, one must reject the null hypothesis of having a unit root. If the test confirms the differenced data to be stationary, the OLS method can be effectively used in estimating the slope coefficients for economic analysis.

Table 1 summarizes the test results done using the Augmented Dickey-Fuller Unit Root Test. At level, all variables assume the presence of a unit root given the p-values greater than the 0.05 significance level. Moreover, all variables do not have a unit root at the first difference as the p-values are less than 0.05, indicating a rejection of the H_0 of having a unit root. It can then be concluded that the variables are integrated into their first differences, and a cointegration test may be utilized in order to analyze the relationships between variables.

	without constant		with constant		with constant and trend	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
EXR	0.9664	0.0000	0.4789	0.0004	0.8720	0.0016
EXD	0.9989	0.0000	0.9020	0.0000	0.3888	0.0000
DSV	0.7858	0.0000	0.4158	0.0000	0.1303	0.0000
RSV	0.9597	0.0079	0.9867	0.0239	0.7655	0.0419

Note: I(0) indicates p-values at level, and I(1) indicates p-values at the first difference

Table 1 Augmented Dickey-Fuller (ADF) Unit Root Test Results

4.1.2 Cointegration

As the variables are integrated into the first difference, cointegration tests are done on the non-stationary variables prior to estimating the regression results. If the p-value of the eigenvalue and trace tests are less than the significance value, the null hypothesis of no cointegrating relations is rejected. The result of the Johansen test in Table 2 shows that there are two cointegrating equations and confirms that there exists a long-run relationship between exchange rate and the independent variables considered in this study, namely external debt, debt services on external debt, and foreign reserves since the null hypothesis of no cointegration between the variables at the given significance levels is rejected. As there is a cointegrating relationship, wherein a linear combination of I(1) variables are found to be stationary, OLS regression can be employed in the data set.

Johansen test:					
Estimation period: 1981 - 2019 (T = 39)					
Rank	Eigenvalue	Trace test	p-value	Lmax test	p-value
0**	0.51191	54.189	[0.0101]	27.973	[0.0413]
1*	0.38862	26.215	[0.1257]	19.190	[0.0923]
2	0.14688	7.0260	[0.5808]	6.1953	[0.5950]
3	0.021074	0.83067	[0.3621]	0.83067	[0.3621]

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 2 Cointegration Test (Johansen) Results

4.1.3 Regression

OLS, using observations 1980-2019 (T = 40)

Dependent variable: EXR

	Coefficient	Std. Error	t-ratio	p-value	
const	-7.88391	2.41374	-3.266	0.0024	***
EXD	7.75904e-10	9.15884e-11	8.472	<0.0001	***
DSV	1.49167e-09	3.63603e-10	4.102	0.0002	***
RSV	-2.17985e-10	4.23872e-11	-5.143	<0.0001	***

Mean dependent var	35.33271	S.D. dependent var	14.95898
Sum squared resid	544.5398	S.E. of regression	3.889229
R-squared	0.937603	Adjusted R-squared	0.932404
F(3, 36)	180.3182	P-value(F)	9.74e-22
Log-likelihood	-108.9788	Akaike criterion	225.9575
Schwarz criterion	232.7131	Hannan-Quinn	228.4001
rho	0.333495	Durbin-Watson	1.324598

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 3 OLS Regression Estimates

Using Ordinary Least Squares Multiple Regression Analysis, the researcher observed that external debt and debt services on external debt are positively related to the exchange rate of the Philippines from 1980 to 2019, while foreign reserves of the same time period are negatively related (see Table 3). All coefficients were found to be statistically significant, wherein all p-values garnered a value of less than 0.05, indicating a rejection of the null hypothesis of no significance to the country's exchange rate.

The given coefficient of multiple determination or R² at 0.9376 indicates that there is a positive statistical model estimated from the regression equation, and approximately 93.76% of the values fit the multiple regression analysis models. This reflects the percentage of the dependent variable variation that the multiple regression model explains. The estimated multiple regression model with EXR as the dependent variable and EXD, DSV, and RSV as independent variables using gretl, is then given as follows:

$$\text{EXR} = -7.88 + 7.76\text{e-}10\text{*EXD} + 1.49\text{e-}09\text{*DSV} - 2.18\text{e-}10\text{*RSV} + \mu$$

(2.41) (9.16e-11) (3.64e-10) (4.24e-11)

T = 40, R-squared = 0.938
(standard errors in parentheses)

4.1.4 Diagnostic Tests

Before analyzing the estimated regression model through economic analysis, diagnostic tests were performed to satisfy the assumptions for multiple linear regression. These include tests in confirming the normality of residuals, misspecification of the model, serial correlation, heteroskedasticity, and multicollinearity. The specific econometric tools employed include the Normality of Residual Test, Ramsey RESET Test, Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey Test, and the Variance Inflation Factors, respectively. The results of the diagnostic tests (see Table 4) state that the errors are normally distributed, the model is correctly specified, free from serial correlation, homoscedastic, and free from multicollinearity.

CLRM Assumptions	Diagnostic Test	Null Hypothesis	P-value	Decision
Normality of the Errors	Normality of Residual Test	Error is Normally Distributed	0.910855	Accept
Misspecification	Ramsey RESET Test	Specification is Adequate	0.326484	Accept
Serial Correlation	Breusch-Godfrey test	No Serial Correlation	0.124107	Accept
Heteroskedasticity	Breusch-Pagan-Godfrey test	No Heteroskedasticity	0.764222	Accept
Multicollinearity	Variance Inflation Factors	All Centered VIFs must be less than 10	EXD 7.905 DSV 3.649 RSV 3.831	No Multicollinearity Detected

Table 4 Results of the Diagnostic Tests

4.2 Discussion

Table 3 shows that the estimated regression model indicates that external debt and debt services on external debt positively impact exchange rates, while foreign reserves display a negative relationship. Additionally, all the independent variables are statistically significant in explaining the exchange rate in the Philippines. The corresponding coefficients imply that a change in any of the independent variables will cause significant but marginal fluctuations in the exchange rate in the Philippines. Additionally, the Johansen Cointegration test results confirm a long-run relationship exists between the variables in this study.

The results of the study are in line with Ricardo's Theory of Public Debt, where the continued change in the demand for foreign currency influences the exchange rate as external debt, which involves debt servicing, which then requires a payment in the form of foreign currency. The positive relationships of external debt and debt servicing are similarly in agreement with the Debt Overhang Theory supported by the Debt Laffer Curve, where the curve implies that the higher the debt, the higher the economic growth, and debt repaying capability will also increase.

The foreign reserve's negative impact on exchange rates can be attributed to the observation made by Fukuda and Kon (2012), that when the governments increase their foreign reserves, large current account surpluses could persist, followed then by the depreciation of exchange rates. The relationship coincides with the conclusion made by Andriyani et al. (2020) that the exchange rate in Indonesia has a significant and negative effect on foreign reserves. However, this opposes the analysis made by Saheed, Sani, and Idakwoji (2015), where foreign reserves positively impacted exchange rates in Nigeria. The findings of the aforementioned study may be due to Nigeria's foreign reserves fluctuating substantially in recent years compared to the generally continuous increase for the Philippines. Nevertheless, the results corroborate the general belief that foreign reserves greatly influence fluctuations in exchange rates.

5. Conclusions and Recommendations

5.1 Conclusions

The exchange rate is considered a significant macroeconomic variable to emerging and transition countries as it affects exports, imports, and economic activity (Odera, 2015). This paper aims to establish whether recent increases in public expenditures the country accumulates towards better overall economic conditions significantly affect the country's exchange rate. The author studies

the correlation between external debt, debt services on external debt, and foreign reserves with the country's exchange rate from 1980 through 2019.

Based on the data analysis done in this study, it is concluded that external debt and debt servicing effects on the exchange rate are positive in the case of the Philippines. Alternatively, foreign reserves were found to negatively affect the country's exchange rate. Overall, the results garnered from conducting standard OLS multiple regression indicate that external debt, services of external debt, and foreign reserves have statistically significant effects on the exchange rates in the long run in the Philippines.

The Debt Overhang Theory suggests that an accumulation of external debt is seen as a tax on future income and the crowding-out hypothesis states that external debt service payments would negatively affect the economy (Abuzaid, 2011). In line with this, multiple regression analysis results demonstrate that debt service payments on external debt display a statistically significant positive relationship to the exchange rate. Therefore, this implies that external resources may discourage the economy. Similarly, the nature of the derived relationships suggests that external debt, alongside the servicing of debt, is correlated to the appreciation of the exchange rates. This further implies that external debt encourages exchange rate growth in the Philippines.

5.2 Recommendations

The researcher recommends that the government take the necessary means to reduce the country's external debt to better the economy. This implies that the Philippine government should also aim to focus on more efficient external debt management strategies to enhance the value of the exchange rate of the Philippine Peso relative to other countries. Additionally, external borrowing should be cautiously made towards more productive activities, as the increase in debt garnered from this consequently increases the country's exchange rate.

Further recommendations are directed to the government in ensuring that external borrowing should, when possible, be reduced, and when needed, directed towards productive economic activities that could generate returns to service and pay up the debt at maturity. As debt service payments on external debt positively affect the country's exchange rate, the government must be aware that the country's debt servicing places pressure on the foreign exchange market and leads to exchange rate variations in terms of devaluation and depreciation of the exchange rate. Therefore, proper utilization of foreign resources, given its macroeconomic implications and management, is recommended.

Moreover, the researcher looks forward to other studies which aim to investigate similar relationships of external debt, including different variables to the exchange rate of the Philippines. It could also be critical for more comprehensive research to be undertaken using a more frequent or more extensive data set and the use of additional robust statistical analysis methods.

References

- [1] Abina, P. A. (2019). External Debt, Exchange Rate, Foreign Investments and Economic Growth Inter-Relationships Further Empirical Evidence from Nigeria. *Asian Journal of Economics and Empirical Research*, 6(2), 101-107.
- [2] Abuzaid, L. E. M. (2011). External debt, economic growth and investment in Egypt, Morocco and Tunisia (*Doctoral dissertation, University of Gloucestershire*).
- [3] Agénor, P. R., & Aizenman, J. (2005). Financial sector inefficiencies and the debt Laffer curve. *International Journal of Finance & Economics*, 10(1), 1-13.
- [4] Alagidede, P., & Ibrahim, M. (2017). On the causes and effects of exchange rate volatility on economic growth: Evidence from Ghana. *Journal of African Business*, 18(2), 169-193.
- [5] Alibasa, B., & Chiu, E. (2021). Philippines under DUTERTE: Opportunities and Risks. *ASEAN Briefing*.
- [6] Andriyani, K., Marwa, T., Adnan, N., & Muizzuddin, M. (2020). The Determinants of Foreign Exchange Reserves: Evidence from Indonesia. *The Journal of Asian Finance, Economics, and Business*, 7(11), 629-636.
- [7] Bunescu, L. (2014). The impact of external debt on exchange rate variation in Romania. *Economics & Sociology*, 7(3), 104.
- [8] Bureau of Treasury PH. (2019, September). National Government Debt Recorded at P7,939 Billion as of end-August 2019 [Press release]. Retrieved from www.treasury.gov.ph
- [9] Bureau of Treasury PH. (2020, December). National Government Debt Recorded at P10.03 Trillion as of end-October 2020 [Press release]. Retrieved from www.treasury.gov.ph
- [10] Cahyadin, M., & Ratwianingsih, L. (2020). External debt, exchange rate, and unemployment in selected ASEAN countries. *Jurnal Ekonomi & Studi Pembangunan*, 21(1), 16-36.
- [11] Curtis, E. A., Comiskey, C., & Dempsey, O. (2016). Importance and use of correlational research. *Nurse researcher*, 23(6).
- [12] Davis, J. S. (2016). External debt sheds light on drivers of exchange rate fluctuations. *Economic Letter*, 10(4), 1-4.
- [13] Dohner, R. S., & Intal, P. (2007). 8. Debt Crisis and Adjustment in the Philippines. In *Developing country debt and the world economy*. University of Chicago Press, 169-192.

- [14] Fukuda, S. I., & Kon, Y. (2012). Macroeconomic impacts of foreign exchange reserve accumulation: Theory and international evidence. In *Monetary and Currency Policy Management in Asia*. Edward Elgar Publishing.
- [15] Gujarati, D. N., Porter, D. C., & Gunasekar, S. (2012). *Basic Econometrics*. Tata McGraw-Hill Education.
- [16] Hesketh, S., & Skrondal, A. (2008). Multilevel and longitudinal modelling using Stata. *STATA press*.
- [17] Ijirshar, V. U., Joseph, F., & Godoo, M. (2016). The relationship between external debt and economic growth in Nigeria. *International Journal of Economics & Management Sciences*, 6(1), 1-5.
- [18] Jonasson, T., Williams, M., & Papaioannou, M. (2019). Debt Management. *Sovereign Debt: A Guide for Economists and Practitioners*, 192.
- [19] Kouladoun, J. C. (2018). External debts and real exchange rates in developing countries: evidence from Chad.
- [20] Krugman, P. (1988), Financing vs forgiving a debt overhang: Some analytical notes. *Journal of Development Economics*, 29, 253-268
- [21] Krugman, P. (1989), Market-based Debt-reduction Schemes. NBER Working Paper No. 2587. *Washington, DC: National Bureau of Economic Research*.
- [22] Martin, X., & V Artadi, E. (2003). Economic growth and investment in the Arab world.
- [23] Odera, Q. A. (2015). An analysis on the effect of external public debt on exchange rate volatility in Kenya (Doctoral dissertation, University of Nairobi).
- [24] Palić, I., Banić, F., & Matić, L. (2018). The analysis of the impact of depreciation on external debt in the long run: Evidence From Croatia. *Interdisciplinary Description of Complex Systems: INDECS*, 16(1), 186-193.
- [25] Patenio, J. A. S., & Tan-Cruz, A. (2007, October). Economic growth and external debt servicing of the Philippines: 1981-2005. In *10th National Convention on Statistics (NCS)*.
- [26] Roberts, R. O. (1942). Ricardo's theory of public debts. *Economica*, 9(35), 257-266.
- [27] Sachs, J. (1989), The Debt Overhang of Developing Countries. *Debt, Stabilization and Development, Essays in Memory of Carlos F. Diaz-Alejandro*.
- [28] Saheed, Z. S., Sani, I. E., & Idakwoji, B. O. (2015). Impact of public external debt on the exchange rate in Nigeria. *International Finance and Banking*, 2(1), 15-26.
- [29] Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods. Business Students 4th edition Pearson Education Limited, England*.
- [30] Sinkovics, R. R., Penz, E., & Ghauri, P. N. (2005). Analyzing textual data in international marketing research. *Qualitative Market Research: An International Journal*.
- [31] Tatu, Ş. (2014). An application of debt Laffer curve: Empirical evidence for Romania's case. *Romanian Journal of Fiscal Policy (RJFP)*, 5(1), 29-38.
- [32] Thahara, A. F., & Vinayagathan, T. (2017). Exchange Rate and External Debt Nexus: ARDL Model Approach to Sri Lanka. *Peradeniya International Economics Research Symposium*.
- [33] Todaro, M. P., & Smith, S. C. (2011). *Development Economics*.
- [34] Ume, K. E., & Ndubuaku, V. (2019). Exchange rate and foreign reserves interface: empirical evidence from Nigeria. *The Economics and Finance Letters*, 6(1), 1-8.
- [35] United Nations Development Programme. (2020). The Next Frontier: Human Development and the Anthropocene. *2020 Human Development Reports*.
- [36] Van Cuong, H. (2018). Determine the external debt threshold of the southeast Asian countries: Analysis using laffer curve. *Экономика региона*, 14(3).
- [37] World Bank. (2021). The World Bank Open Data - Philippines. Retrieved from <https://data.worldbank.org/country/philippines?view=chart>
- [38] World Economic Forum. (2017). The global competitiveness Report 2017–2018. *Geneva: World Economic Forum*.
- [39] Yien, L. C., Abdullah, H., & Azam, M. (2017). Granger causality analysis between inflation, debt and exchange rate: Evidence from Malaysia. *International journal of academic research in accounting, finance and management sciences*, 7(1), 189-196.