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Research Article

The Influence of the US Dollar-Philippine Peso Exchange Rate Fluctuations to Inflation Rates, and GDP

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ABSTRACT

The study aims to analyse the empirical relationship between USD/PHP exchange rate, headline inflation and real GDP growth in the Philippines from 2010 - 2024. We utilized secondary data from Bangko Sentral ng Pilipinas (BSP) and Philippine Statistics Authority (PSA) and employed descriptive statistics and bivariate linear regression models as an empirical baseline. The results show a baseline of systematic peso depreciation and stable inflation with supply-driven spikes in 2018 and 2023. The impact of the bilateral exchange rate on the variation of GDP growth is very low ($R^2 = 0.003$) and the impact on inflation is weak and not statistically significant ($R^2 = 0.152$). From this evidence we can say inflation and GDP are far more affected by other factors like food price, energy price and demand at home than exchange rates. Limitations include relatively small sample size and simple modelling approach. Future studies should incorporate more variables and more dynamic methods capturing the interactions between exchange rate, inflation and growth in such a complexity.

Keywords: GDP Growth, Inflation Rate, Macroeconomic Stability, Philippine Peso-US Dollar Exchange Rate

Introduction

From 2010–2024, the Philippine economy experienced steady peso depreciation, moderated inflation generally although there were occasional spikes, and GDP growth that remained resilient despite the pandemic shock (Bangko Sentral ng Pilipinas [BSP], 2025; Philippine Statistics Authority [PSA], 2024, 2025; International Monetary Fund [IMF], 2024a; Asian Development Bank [ADB], 2025). A grasp of the relationship between the peso-US dollar exchange rate and inflation and GDP is of

critical importance for price stability and growth planning in a small, open economy such as the Philippines, where recent research indicates that exchange-rate pass-through to consumer prices is, in general, moderate and state-dependent (Carrière-Swallow et al., 2023; Tsang, 2025; International Monetary Fund [IMF], 2024b). Official annual data allows for a replication for trend analysis and policy evaluation as both BSP and PSA keep full time series for exchange rates, inflation and national accounts (BSP, 2025; PSA, 2024, 2025).

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Our approach builds on the key insights of open-economy macroeconomics. An important concept is its exchange rate pass-through (ERPT), meaning the response of domestic prices to changes in the currency value. Recent literature has shown that ERPT is often state-dependent and the effects are stronger in the case of high inflation or uncertainty (Car-Swallow et al., 2023; Widarjono et al., 2023). The second important paradigm supporting the hypothesis that countries with credible monetary policies experience lower ERPT because of their well-grounded inflation projections is the paradigm of monetary credibility and inflation targeting. The research in South-East Asia shows that the exchange rate exposure of price adjustments is lower in inflation targeting regimes in countries such as the Philippines (Mesa Wanasilp, 2021).

In terms of competitiveness as a key indicator of growth, the study also looks at the real effective exchange rate (REER), which measures a country's currency value against multiple trading partners, and reflects its overall external competitiveness. Commonly, REER is used in macroeconomic research to measure performance of trade and growth capacity (Bank for International Settlements [BIS], 2025). Based on the empirical aspect, this study uses descriptive statistics and simple linear regression models to evaluate the direct link between bilateral peso-US dollar currency exchange rate and two important inflationary variables and GDP growth indicators. Such strategy is in line with the recognized econometric approaches in the field of macroeconomic research (Urrutia et al., 2015).

The results are in line with the previous studies that the exchange rate pass-through (ERPT) has been declining in the economies with credible monetary policy, but sensitive to increase in inflation or uncertain period (Carrière-Swallow et al., 2021; Ha et al., 2019). National economic research widely recognizes domestic demand, especially for services, construction and public investment, as the primary driver of Philippines' GDP growth, with net exports making a marginal contribution (ADB, 2025; ASEAN+3 Macroeconomic Research Office [AMRO], 2024). More recent inflation studies (Valera et al., 2025; AMRO, 2024) have also noted that the dynamics of

food and energy prices, including significant rises in rice and fuel prices, have been major inflation drivers in the Philippines. In this sense, there is a big difference between the usual theories for open economies and empirical evidence at the local level where the measures of domestic supply tend to hide the direct channels of currency pass-through if one looks only at the bilateral exchange rate USD/PHP.

There is little research that provides sound and regular baseline analysis of the Philippine peso-US dollar exchange rate on an annual basis for the period 2010-2024. Most of the Philippine studies and policy reports available to date have used multilateral exchange rate measures such as the nominal and real effective exchange rates (NEER and REER) and not simple bilateral studies of the peso-U.S. dollar exchange rate. More recent international research on exchange rate pass-through has, for the most part, used more sophisticated estimation techniques such as state-dependent, non-linear and panel-data methods rather than simple bivariate analyses (Bank for International Settlements, 2006/2025; Bangko Sentral ng Pilipinas, 2022; Alexius & Holmberg, 2023; Caraña-Swallow et al., 2023; Ha et al., 2019).

The most used integrated models for forecasting and policy formulation by the researchers in the Philippines are PAMPh (Policy Analysis Model for the Philippines) and QPM (Quarterly Projection Model) (BSP Research Academy, 2020). Inflation usually comes from too much supply. Data are available (World Bank, 2025), but estimates of ERPT in a multilateral context have been quite limited (Remolona, 2024; AMRO, 2025). There is a lack of empirical studies on the bilateral USD/PHP rate and GDP YoY and Inflation. The present study fills this gap by providing bivariate clean relations for the years from 2010 to 2024.

The problem at its core is simple. For the peso devaluation, the inflation spurt that has been occurring on a seasonal basis and the divergence of growth, it is unclear how much the bilateral peso-US dollar exchange rate explains changes in Philippine inflation and GDP growth each year. Building on this evidence helps demonstrate whether currency changes are fundamental forces or auxiliary to others.

The study is built on this problem with the guide of three main research questions. First, it

measures the relative strength of the annual peso-US dollar exchange rate and Philippine inflation rate between 2010 and 2024. Second, it probes how tightly the same exchange rate is linked with Philippine GDP growth in the same interval. Third, through simple linear regression models, how much of the variation in inflation and GDP growth can be explained solely by movements in the bilateral exchange rate is examined in the study. Moreover, two null hypotheses are tested: the first hypothesis, that the peso-US dollar exchange rate has no statistically significant effect on inflation, and the second hypothesis, that it has no statistically significant effect on GDP growth. The above hy-

potheses give a good foundation for exploring the significant relationship within the framework proposed.

The study utilized the Philippine Peso-US Dollar exchange rate as the primary independent variable that served as the conceptual framework. One chart illustrates how this variable is related to the two main economic determinants, inflation rate and GDP growth rate. The visual shows the study's relationships and analytical structure in a clear and orderly way, with arrows pointing in a direction indicating how currency exchange rate movements could affect each one of them.

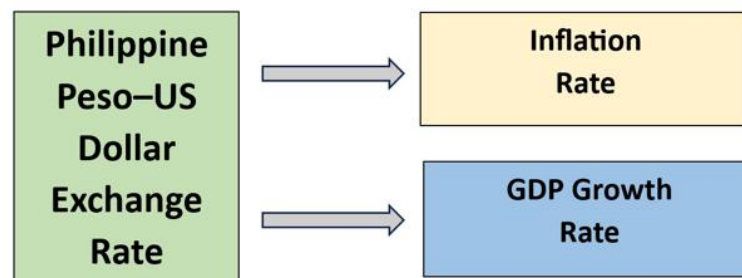


Figure 1. Evaluated Bivariate Framework: Theoretical Exchange-Rate Channels and Empirical Outcomes in the Philippine Economy (2010–2024)

Figure 1 is an Evaluated Bivariate Framework, not a model of direct causal impact. The framework considers the Philippine peso-US dollar exchange rate as the main explanatory variable, while inflation rate and GDP growth rate are the outcome variables that are studied empirically for their relations with exchange-rate movements. The directional arrows are based on theoretically anticipated channels from open-economy macro theory and exchange-rate pass-through literature, where currency depreciation can influence domestic prices and overall economic performance. But these arrows are to be read as suggested analytical trajectories, not as established causal effects. The aim of the framework is not to assume that fluctuations in the exchange rate directly determine inflation or GDP growth, but to examine if such relationships can be seen in the Philippines during the period 2010–2024. In this sense, the framework offers a first bivariate test of theoretical expectations against empirical evidence.

Importantly, the regression results showed that the peso-US dollar exchange rate had weak and statistically insignificant relations with inflation and GDP growth. The results imply that the transmission mechanisms one would expect on theoretical grounds do not seem to be strongly reflected in the observed data. The study does not provide evidence of a direct causal channel but rather indicates a discrepancy between the expected channels of exchange-rate effects and the actual macroeconomic outcomes during the period under study.

Such a disconnection is consistent with the operation of a credible inflation-targeting regime, in which monetary policy, domestic demand conditions, food and energy prices, and other structural factors may exert a more powerful influence on inflation and economic growth than bilateral exchange-rate changes alone. Figure 1 is therefore presented as a framework that has been evaluated for hypothesized relationships to be tested for support of theoretically proposed associations by empiri-

cal evidence, not as a representation of proven causal effects.

Methods

Research Design

Quantitative research was conducted, based upon secondary data from official sources. In terms of annual statistics, the peso-US dollar exchange rate, inflation rate, and GDP growth from 2010 to 2024 were collected from the Bangko Sentral ng Pilipinas (BSP) and the Philippine Statistics Authority (PSA).

The study's design was a chronological ordering and summarizing and describing the trend of data. This design enabled the examination of long-term macroeconomic patterns and provided an empirical basis for assessing whether exchange-rate movements were associated with changes in inflation and economic growth over time. Next, it examined association between exchange rate and two important economic variables, inflation and GDP growth, using simple linear regression models. So, the study measured strength and significance of those relationships on the historical data.

This study provides a preliminary bivariate baseline assessment of the associations between the peso-US dollar exchange rate, inflation, and GDP growth. Rather than offering a comprehensive macroeconomic model, the analysis is intended to establish an initial empirical benchmark that may serve as a foundation for future multivariate and time-series investigations.

Sources of Data and Instrument

The analysis was based on secondary data from well-known official sources. Annual peso – dollar exchange rate was obtained from the Bangko Sentral ng Pilipinas (BSP) . The GDP growth and inflation rates using Consumer Price Index (CPI) were obtained from the Philippine Statistics Authority (PSA) . The timeline also goes to 2010-2024, to study the entire economy. The secondary data is also from Bangko Sentral ng Pilipinas (BSP) and Philippine Statistics Authority (PSA). The collection provides annual data of peso – US dollar exchange rate, inflation rate and GDP for the Philippines. The analysis used the peso-US dollar exchange rate as the independent variable and

inflation rate and GDP as the dependent variables.

Data Collection and Analysis

The data for this work was collected in the form of yearly monetary data (exchange rate of peso to US dollar, inflation rate, and GDP growth) between the years 2010-2024. The data were taken from the official databases of the Bangko Sentral ng Pilipinas (BSP) and the Philippine Statistics Authority (PSA). The annual observations from authoritative government sources were consistent, which increased the comparability of the indicators across years, and strengthened the reliability of the trend analysis.

Time series of annual macroeconomic indicators 2010-2024 chronologically aggregated. Descriptive metrics (mean, median, standard deviation and range limits) mapped central tendency and macroeconomic volatility . To test the core hypotheses, two separate ordinary least squares (OLS) bivariate regressions are run. The first models headline inflation as a function of nominal exchange rate. The second considers real GDP growth regressed on the same currency predictor. These measures gave a statistical description of the variables and were useful for identifying periods of stability, volatility and structural change within the period of study.

Then two simple regression analyses were carried out. The first studied the relationship between the exchange rate and inflation and the second studied the relationship between exchange rate and GDP growth. These bivariate models were applied to obtain baseline empirical evidence of the direction and strength of the observed relationships before employing more complex multivariate or time-series methods.

The analysis deliberately uses a bivariate framework to provide a simple assessment of the historical association between exchange-rate movements and some macroeconomic indicators. The benefit of this approach is that it is interpretable, but it ignores other economic variables that may also be correlated with inflation and GDP growth. The importance of these relationships was tested and presented by correlation for each model, R2 value, F-test,

p-value and regression coefficients. Each model had 15 observations and showed a weak or non-significant relationship.

Ethical Considerations

Since this study was based solely on publicly available secondary data collected from official government entities, namely the Bangko Sentral ng Pilipinas (BSP) and the Philippine Statistics Authority (PSA), no direct involvement of human participants was required. This made formal ethical clearance unnecessary for this study. By no means were these factors considered ethical risks, as we are to hold accountable to ethical principles on transparency, accuracy, and responsibility in data use. Proper acknowledgment and citation

of BSP and PSA as authoritative data sources were maintained, and all analyses and findings were reported objectively to maintain academic integrity and scholarly credibility.

Results and Discussions

Annual Peso-Dollar Rate, Inflation Rate, and GDP Growth Rate of the Philippines

The 2010–2024 period encompasses the major economic events in the Philippines including currency depreciation, periods of high inflation, and the economic impact of the COVID-19 pandemic. Looking at these indicators together can give us some insight into how exchange-rate movements were related to the wider macroeconomic environment.

Table 1. Annual Peso-Dollar Rate, Inflation Rate, and GDP Growth Rate of the Philippines (2010-2024)

Year	Peso-Dollar (P/USD)	Inflation Rate (%)	GDP Growth Rate (%)
2010	45.11	3.8	7.3
2011	43.31	4.7	3.9
2012	42.23	3.2	6.9
2013	42.45	2.6	6.8
2014	44.40	3.7	6.3
2015	45.50	0.6	6.1
2016	47.49	1.3	7.1
2017	50.40	2.9	6.9
2018	52.66	5.2	6.3
2019	51.80	2.4	6.1
2020	49.25	2.4	-9.5
2021	49.25	3.9	5.7
2022	54.48	5.8	7.6
2023	55.63	6.0	5.5
2024	57.29	3.2	5.6

Note. Exchange rate data (2010–2024) were obtained from Bangko Sentral ng Pilipinas (2025, <https://www.bsp.gov.ph>); GDP and inflation rate data, based on the Consumer Price Index (CPI), were sourced from the Philippine Statistics Authority (2025, <https://psa.gov.ph>).

In 2010, the Philippine peso was ₱45.11 against the USD. In 2024, the peso has depreciated to ₱57.29. The depreciation will continue to place more pressure on the country's external sector, which will also increase the costs of imports and could also lead to inflationary pressure and larger trade deficits (Bangko Sentral ng Pilipinas [BSP], 2025). Currency depreciation has been linked to increasing demand

for foreign currency, external trade deficits, changes in capital flow and monetary policy, which affect exchange rate movements and economic stability (International Monetary Fund [IMF], 2024a).

Secondly, the risk to price value stability from inflation volatility caused by global commodity price swings and supply chain disruptions with peaks in 2018 (5.2%) and 2023

(6.0%) High inflation eats away at the value of money, and it hurts poor households most of all. Hence, fiscal and monetary interventions ought to be selective (International Monetary Fund [IMF], 2024a).

Third, the COVID-19 shock was large as shown by the large GDP decline in 2020 (-9.5%) and strong rebound in 2022 (7.6%). The Philippine economy recovered in 2023 from the pandemic, and domestic demand stabilized; But the recent trend of growth points to the fact that the recovery is starting to fade, especially over 2023-2024. This requires more structural reforms to foster long-term growth and enhance the economy's resilience to future shocks (Asian Development Bank [ADB], 2024). Global inflation and geopolitical tensions as external pressures (ADB, 2024). "The

trends indicate policymakers are looking at the whole spectrum of issues. Ultimately, macroeconomic fundamentals, exchange rate stability and inclusive policies are essential to shield vulnerable economies from inflation and external shocks.

Descriptive Statistics for Exchange Rate, Inflation, and GDP Growth

Descriptive statistics provide an overview of the mean and dispersion of the three macroeconomic indicators over the period of study. Before examining the statistical relationships between exchange rates, inflation and economic growth, it is useful to think about the measures of the overall behavior of these three variables.

Table 2. Descriptive Statistics for Exchange Rate, Inflation, and GDP Growth (2010–2024)

Variable	Mean	Median	SD	Min	Max
Peso–Dollar Exchange Rate	48.75	49.25	4.91	42.23	57.29
Inflation Rate (%)	3.45	3.20	1.54	0.60	6.00
GDP Growth Rate (%)	5.24	6.30	4.18	-9.50	7.60

Note. SD = Standard deviation. Values are based on annual data from 2010 to 2024. Peso–US dollar rate is the nominal exchange rate (PHP per USD) from BSP; inflation is headline CPI from PSA; GDP growth is real GDP at constant 2018 prices from PSA.

Table 2 Summary of the Philippine economic indicators' focal tendency and variability from 2010 – 2024. The median Peso to US\$ was ₱49.25, and the average was ₱48.75, at what was then considered a normal value (around ₱49). With a standard deviation of 4.91 showing moderate dispersion, values ranged from ₱ 42.23 to ₱ 57.29 The peso opened at its strongest at 42.23 pesos and closed at its weakest at 57.29 pesos. Average inflation was 3.45% (median 3.20%), with low variability (SD = 1.54), and relatively stable . The majority of the GDP growth fell between 0.60% and 6.00%. The average GDP growth was 5.24%, which showed the highest variability (SD = 4.18) and ranged from -9.50% to 7.60%. We find the mean growth rate is 5.24% and the median growth rate is 6.30% which is larger than the mean growth rate. So the distribution is skewed left. This is mainly attributable to the severe economic contraction of -9.5% in 2020 in the context of the COVID-19 pandemic that drags down the overall average

despite relatively strong growth in most other years. Overall, the data show a normal exchange rate of ₱49. Inflation is mostly mild. GDP growth is generally positive, but fluctuates, for the whole 15-year period.

Table 2. Philippines economy: Key trends 2010-2024 Average exchange rate of Philippine peso to US dollar was 48.75 with relatively small standard deviation (SD = 4.91) which denotes moderate exchange rate volatility during the period of study. However, the peso's depreciation in 2024 to P57.29 per U.S. dollar indicates that the currency will continue to depreciate, which will lead to higher import costs and possible inflationary pressures (Bangko Sentral ng Pilipinas [BSP], 2025; International Monetary Fund [IMF], 2024a). Depreciation is usually associated with appreciation of the US dollar, trade deficits, and changes in monetary policy (International Monetary Fund [IMF], 2024a).

The mean inflation rate for the study period was 3.45% with a low standard deviation

(SD=1.54) indicating relative price stability despite steep hikes in 2018 and 2023. Such volatilities are indicative of the country's vulnerability to shocks in global commodity prices, as well as supply chain disruptions that could impact the purchasing power of households and require appropriate fiscal and monetary policy responses (Asian Development Bank [ADB], 2024; International Monetary Fund [IMF], 2024a). Price stability and sustainable and inclusive growth of the economy depend on inflation remaining within the target range.

Average growth rate of GDP was 5.24%. The very high variance (SD= 4.18) and extreme minimum value (-9.50%) in 2020 also reflect the unprecedented economic disruption due to COVID-19 pandemic. This single observation accounts for much of the overall variation in GDP growth and negative skewness of the distribution. Domestic demand and government

stimulus will support the growth to 7.6% in 2022. However, the slowdown in 2023–24 shows a return to pre-COVID-19 growth rates in an uncertain global environment (Asian Development Bank [ADB], 2024). Philippine economy more resilient but headwinds still there. Structural reforms, diversification needed to sustain growth, protect from external shocks.

Philippine Peso - US Dollar Exchange Rate and Philippine Inflation Rate

Model Summary for Philippine Peso - US Dollar Exchange Rate and Inflation Rate. A regression analysis was performed to see if changes in the peso-dollar exchange rate were related to changes in inflation. The model not only quantifies the strength of the relationship but also the proportion of variation in inflation explained by exchange rate movements.

Table 3. Model Summary for Philippine Peso - US Dollar Exchange Rate and Inflation Rate

Statistic	Value
R	0.389
R ²	0.152
Adjusted R ²	0.086
SE of estimate	1.457
Observations	15

The correlation coefficient (R) of 0.389 is observed in the model which shows that the association between exchange rate and inflation is weak and positive. An R² value of 0.152 indicates that approximately 15.2% of the variation in inflation is associated with changes in the peso-US dollar exchange rate. and R² = 0.086 (adjusted) indicates the less explanatory ability due to the sample size. The 1.457 standard error gives the average of deviations of the observed values from the predicted values, and analysis is based on 15 observations. The

model itself indicates a poor predictive ability, in which the variability of inflation is most determined by non-exchange rate factors.

ANOVA Summary for Philippine Peso - US Dollar Exchange Rate and Inflation Rate.

An analysis of variance (ANOVA) was performed to evaluate the overall significance of the regression model and determine whether the observed relationship was statistically meaningful.

Table 4. ANOVA Summary for Philippine Peso - US Dollar Exchange Rate and Inflation Rate

Source	df	SS	MS	F	Significance F
Regression	1	4.935	4.935	2.324	.151
Residual	13	27.602	2.123		
Total	14	32.537			

ANOVA results demonstrate that the regression model yields $F = 2.324$ and has a significance level of 0.151. Thus, the model is not significant at the standard 0.05 level, as the exchange rate does not cover much ground for explaining inflation under this scenario. The sum of squares for regression is 4.935, and 27.602 for residuals, indicating that most of the variance in inflation we see is not to be attributed to the exchange rate. In any case, the model does not account for much of the variation, and it is reasonable to assume that other

aspects play a larger part in the variable's inflation.

Regression Coefficients for Philippine Peso - US Dollar Exchange Rate and Inflation Rate. Table 5 shows the regression coefficients for a model considering the relationship of a Philippine Peso-US Dollar exchange rate to the inflationary rate. The table presents unstandardized coefficients (B), standard errors (SE), t-values, p-values and 95% confidence intervals for the intercept and predictor variable.

Table 5. Regression Coefficients for Philippine Peso - US Dollar Exchange Rate and Inflation Rate

Predictor	B	SE	t	p	95% CI
Intercept	-2.45	3.89	-0.63	.539	[-10.85, 5.95]
Peso-Dollar Rate (₱/US\$)	0.12	0.08	1.52	.151	[-0.05, 0.29]

On the basis of the regression, the intercept has a coefficient of -2.45 and a t-value of -0.63 and a p-value of 0.539, suggesting it is not significant. The coefficient of the Peso-Dollar exchange rate is 0.12, thus indicating a positive correlation with inflation although its t-value of 1.52 along with its p-value of 0.151 mean that this result is not significantly different from the conventional 0.05 level. The 95% confidence interval of the exchange rate stretches from -0.05 to 0.29 (0 is included) again confirming failure to be significant. On the whole the predictor does not give strong insight in influencing inflation in this model.

Implications for Relationship between Philippine Peso - US Dollar Exchange Rate and Inflation Rate. There is also a weak positive correlation between the exchange rate peso - dollar and the inflation. $R^2 = .152$ Thus the exchange rate accounts for only 15.2% of the variation in inflation. This low explanatory power is consistent with the findings on inflation impacts beyond exchange rate issues for emerging economies such as the Philippines within the same period including food and energy shocks and domestic demand factors (Ha et al., 2019; Carriere-Swallow et al., 2023). The results suggest that exchange rate movements are determined within a wider inflationary context in which domestic supply conditions and the volatility of commodity prices affect

consumer prices more directly than movements in the currency per se.

The ANOVA results indicate that the regression model is not statistically significant at the .05 level ($F = 2.324$, $p = .151$). This suggests that the inclusion of peso-US dollar exchange rate does not improve significantly the performance of inflation forecast compared to a mean-only model. In economies with credible inflation targeting regimes and flexible exchange rate regimes, the pass-through from exchange rate changes to domestic prices can be contained (Bangko Sentral ng Pilipinas [BSP], 2024; International Monetary Fund [IMF], 2024b; Wanasilp, 2021). The coefficient of the exchange rate is positive ($B = .12$, $p = .151$). However, the coefficient is questionable since the confidence interval includes zero. We find that, as monetary policy credibility increases, the ERPT in the Philippines is low and declining. This is consistent with the non-significance of the model (Beirne et al., 2023; Tsang, 2025).

The large residual sum of squares indicates that the exchange rate explains little of the variation in inflation. In the Philippines, inflation has been affected recently by food prices, especially rice, and global energy shocks, second-round effects and wage adjustments (Department of Finance [DOF], 2025; Bangko Sentral ng Pilipinas [BSP], 2024). The effect has been obscured by exchange rate changes. Under normal times the model predicts low ERPT.

However previous research shows that pass-through can be high during times of higher inflation or global uncertainty. In addition, ERPT is asymmetric: depreciation has a bigger impact than appreciation, which linear models are unable to capture (Carrière-Swallow et al., 2023; Delloro et al., 2017; Wiseman et al., 2021).

The results are limited and not significant, indicating that the model should be considered with the like of global oil prices, rice prices and policy rates in addition to the model. More sophisticated methods do better at picking up lagged and non-linear effects. From a policy perspective, it is still important to maintain monetary credibility and use supply side measures to address inflation as the impact of exchange rate movements on inflation is limited under the current regime (Bangko Sentral ng Pilipinas [BSP], 2024; International Monetary Fund [IMF], 2024b).

Philippine Peso - US Dollar Exchange Rate and Philippine GDP

Model Summary for Philippine Peso - US Dollar Exchange Rate and GDP. The second regression model examined whether shifts in the peso-U.S. dollar exchange rate were associated with changes in Philippine GDP growth. In this analysis, the strength of the relationship and the explanatory power of the relationship has been analyzed to find if the exchange rate movements could explain meaningfully the changes in the country's economic growth. Exchange rate stability is important, as it affects trade, investment and overall economic performance. The analysis also sought to determine whether the fluctuations in the peso – dollar exchange rate had a measurable impact on GDP in the period under study.

Table 6. Model Summary for Philippine Peso - US Dollar Exchange Rate and GDP

<i>Statistic</i>	<i>Value</i>
<i>R</i>	<i>0.050</i>
<i>R²</i>	<i>0.003</i>
<i>Adjusted R²</i>	<i>-0.074</i>
<i>SE of estimate</i>	<i>4.34</i>
<i>Observations</i>	<i>15</i>

The model indicates an $R = 0.050$ between the exchange rate and GDP which is an extremely weak correlation, almost no linear relationship. The R^2 of 0.003 means that only 0.3% of GDP variation can be attributed to changes in the exchange rate, and the negative adjusted R^2 (-0.074) means that the model performs worse than an average based model. The standard error of 4.34 reflects an extreme mean spread of observed GDP values from predicted values of GDP. In 15 observations, it seems that the explanation of GDP is in fact hardly driven by the exchange rate in this dataset.

ANOVA Summary for Philippine Peso - US Dollar Exchange Rate and GDP. The ANOVA test was used to verify the significance of the regression model in explaining the GDP growth other than the random variations. It particularly looked into the contribution of the changes in the peso-U.S. dollar exchange rate as an independent variable in explaining the variations in the Philippine GDP growth. A statistically significant ANOVA result would mean that the regression model explains a meaningful proportion of the variation in GDP growth and is better than a model with no predictor variable.

Table 7. ANOVA Summary for Philippine Peso - US Dollar Exchange Rate and GDP

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.623	0.623	0.033	.858
Residual	13	244.311	18.793		
Total	14	244.933			

The ANOVA results demonstrate that the regression model has an F-statistic of 0.033 with a significance level of 0.858 and therefore the model is not statistically significant at the traditional 0.05 level. This means the exchange rate has no relevant explanatory value for GDP in this dataset. A value of 0.623 for the sum of squares for regression is very small compared to that for the residual sum of squares (244.311), implying that nearly all variations of GDP remain unexplained by the exchange rate. Overall, there is no evidence of a substantial relationship between the two variables in the model.

Regression Coefficients for Philippine Peso-US Dollar Exchange Rate and GDP. The regression coefficients of the model for the relationship between the Philippine peso–U.S. dollar exchange rate and GDP growth are shown in Table 8. The table presents the unstandardized coefficients (B), standard errors (SE), t-values, p-values and 95% confidence intervals for both the intercept and the predictor variable. These statistics were used to determine the direction, magnitude and statistical significance of the association, and the precision of the estimated regression coefficients. Combined, they serve as the basis for testing whether the movements in the peso – dollar exchange rate are meaningful predictors of Philippine GDP growth.

Table 8. Regression Coefficients for Philippine Peso - US Dollar Exchange Rate and GDP

Predictor	B	SE	t	p	95% CI
Intercept	7.36	11.56	0.64	.535	[-17.62, 32.34]
Peso–Dollar Rate (₱/US\$)	-0.04	0.24	-0.18	.858	[-0.55, 0.47]

From the results of the regression the intercept has a coefficient of 7.36 with a t value of 0.64 and a p-value of 0.535, suggesting that it is not statistically significant. The coefficient of the Peso–Dollar exchange rate is -0.04, indicating very little effect, since there is nothing at all negative about Peso exchange rate in relation to GDP, but its t -0.18 and p - .858 that the effect is not statistically significant. The 95% confidence interval is in the range of -0.55 to 0.47 (0 including no significance). In general, the predictor does not statistically impact GDP in this model.

Implications for Relationship between Philippine Peso - US Dollar Exchange Rate and GDP. The result was that the exchange rate of the peso to the USD serves scarcely as an explanation of Philippine GDP, seen as evidenced by near-zero R^2 and un-significant F-statistic. This is consistent with evidence that the principal determinant explaining Philippine economic growth is domestic demand (such as household consumption, services and infrastructure investments) not exchange rate fluctuations (Asian Development Bank [ADB], 2024; International Monetary Fund [IMF], 2024a). However, when employing only the

peso – US dollar rate, one misses a more extensive channel of trade competitiveness that comes from multiple trading partners using real effective exchange rate (REER). According to studies, the relative sensitivity of GDP to shifts in exchange rates is most apparent when multilateral instruments such as REER are considered, as they reflect the overall external competitiveness better (International Monetary Fund [IMF], 2024b). The result reinforces the view that economic growth in the Philippines is shaped by multiple interacting factors, making it unlikely that a bilateral exchange rate measure alone can adequately explain changes in national output.

In emerging markets the effect of exchange rates on output is state dependent. Depreciation, however, can also drive up prices of imported goods and inflation, tighter financial conditions, and even lower GDP if there is a large stock of foreign currency debt. This helps to explain the lack of a positive relationship between the exchange rate and GDP in the simple regression for this instance (International Monetary Fund [IMF], 2023). The drivers of services, construction and public investment have been more important than net exports in supporting recent Philippine growth, espe-

cially in the last year. The effect of exchange rate movements on GDP is smaller than these structural factors and, therefore, the bilateral rate is a poor measure of economic performance (Asian Development Bank [ADB], 2024; International Monetary Fund [IMF], 2024a).

Due to the small sample size (15 observations) there would be insufficient power to detect small/slight effects in the regression. Furthermore, the omission of the relevant variables such as consumption, investment and international commodity prices might lead to the omitted variable bias, which can bias the estimated relationship between exchange rate and GDP (Maxwell, 2000). Moreover, the analysis of macro-economic data should be supplemented by NEER or REER, indicators of external demand and components of domestic spending. To better understand the long-run effects of exchange rate changes on GDP, dynamic models (e.g. Autoregressive Distributed Lag (ARDL) or local projections) that allow for lagged and asymmetric effects can be employed (International Monetary Fund [IMF], 2023; Asian Development Bank [ADB], 2024).

Summary of Findings

The study found that the Philippine peso depreciated against the US dollar throughout the study period, from ₱45.11 in 2010 to ₱57.29 in 2024. The depreciation is a sign of increasing pressures on the country's external sector and the risk of higher import prices. In the meantime inflation was 3.45 percent on average, but relatively stable, with some sharp spikes in 2018 and 2023. The differences show that besides exchange rate movements, inflation was influenced by other macro-economic factors including global price shocks for commodities, supply chain disruptions and domestic economic developments.

The statistical analysis showed that the peso-dollar exchange rate has a weak relationship with inflation and explains about 15% of its variability. The case of the exchange rate and the GDP relationship was even weaker and practically no results were established. This implies that the exchange rate is not the main factor affecting inflation and GDP changes but other external factors.

Implications of the Study

Between 2010 and 2024, the Philippine peso depreciated from ₱45.11 to ₱57.29 versus the U.S. dollar, increasing the prices of imported goods and the economy's susceptibility to external shocks. It might have added to inflationary pressures and larger trade deficits. The importance of exchange rate stability However the results also show that inflation over the study period was more influenced by shocks to food and energy prices, supply-side factors and domestic demand than by the exchange rate per se. The increase in inflation during the period 2018 to 2023 has significantly impacted the purchasing power of lower-income households. Thus, these results suggest that the exchange rate variability should be analysed in the context of structural and macroeconomic variables. This reinforces the need for consistent monetary, fiscal and supply-side policies to support price stability and sustainable economic growth.

Average GDP growth 2010-24 is 5.24% but with high volatility especially with the sharp -9.5% contraction in 2020 due to COVID-19 pandemic and strong rebound in 2022. The pattern is a sign of the Philippine economy's resilience to big shocks. It also highlights the need for structural reforms and wider economic diversification to sustain growth and reduce vulnerability to future shocks. The volatility in GDP growth also shows that the economic performance of the country depends on a combination of domestic and external factors such as investment, consumption, government spending and global economic conditions and not only exchange rate fluctuations. The regression results also supported this interpretation as the effect of the change in peso-U.S. dollar exchange rate is insignificant on the GDP growth for the period of study.

The regression analysis also confirms the weak effect of the peso-U.S. dollar exchange rate on inflation (15.2% of the variation) and the negligible effect on GDP growth. This means that the Philippine economic performance is more driven by domestic demand, services sector and infrastructure investment rather than merely by the movement of exchange rates.

These results indicate that policy should be influenced by enhancement of macroeconomic fundamentals, as well as monetary credibility, and by the adoption of inclusive policies aimed to shield at risk sectors from growing inflation and foreign shocks. Wider-ranging models that incorporate world commodity prices, domestic spending and multilateral exchange rates are better for predicting and designing policies.

Conclusion

The Philippines' peso has systematically depreciated against the dollar for a period of 15 years, inflation has stayed largely stable, with only occasional spikes, and GDP growth has bounced back in the face of severe declines in the pandemic. Its statistical analysis confirmed that there is a weak influence of the peso-dollar exchange rate on inflation and virtually no influence on GDP growth, and that food prices, energy costs and domestic demand have a more considerable influence on output. These trends indicate that while currency movements are certainly important, they are not key drivers of economic performance.

However, our ability to capture lagged or non-linear effects is limited by the small sample size and simple regression models used in the current study. Another limitation is the use of a preliminary bivariate framework in which the only explanatory variable was the peso-US dollar exchange rate. A number of factors influence inflation and GDP growth, including commodity prices, domestic demand, fiscal policy, investment activity, external trade conditions and monetary policy interventions. Thus, the estimated relationships are likely to be affected by omitted-variable biases and the results should be interpreted as exploratory associations rather than as definitive causal explanations.

A limitation is the nature of the data as a time series. The analysis used annual macroeconomic indicators over time, but did not formally test for stationarity or unit-roots. Such estimated relationships should therefore be treated with caution, since the regression results may be contaminated by underlying trends in the variables, irrespective of any direct economic link existing. Future work can improve the analysis using stationarity tests, cointegration procedures and more sophisti-

cated time series techniques. Future research studies should incorporate more variables such as global commodity prices, interest rates and multilateral exchange rates and more sophisticated models to understand dynamic and asymmetric linkages. The findings will supplement the dataset and structural factors and will provide a better understanding of the relationship of exchange rate, inflation and growth in the Philippines economy.

The future studies can improve the analysis with the use of time series econometric frameworks such as Autoregressive Distributed Lag (ARDL) model or Vector Error Correction Model (VECM). The approaches are capable of capturing short-run and long-run dynamics among macroeconomic variables and can also reduce the risk of spurious relationships when trending data are available. Future researchers may also consider using logarithmic first differences where appropriate and conduct formal tests for stationarity and cointegration to increase robustness of the model and inference.

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