A TREND ANALYSIS OF THE RELATIONSHIP BETWEEN MACROECONOMIC INDICATORS AND THE PHILIPPINE STOCK EXCHANGE INDICES FROM 2010 TO 2019

Shekinah Marie C. Lao, Rica Marie C. Martin,
Cherry Joy G. Miranda, Shannen S. Ortega

Abstract

This study aims to analyze the relationship between macroeconomic indicators and the Philippine Stock Exchange (PSE) Indices. This research used a correlational approach to explain the relationship between the variables and to determine which macroeconomic indicators significantly affect the performance of the selected sectors. The researchers utilized the historical data from the websites of Bangko Sentral ng Pilipinas and the World Bank covering the years 2010 to 2019. The study used the Pearson correlation coefficient to demonstrate the relationship between the variables, the ANOVA test to know the significant difference in the PSE index among the sectors, and multiple regression analysis to determine the significant predictors of the selected sectors in the PSE. The ANOVA test revealed that there is a significant difference among the indices of the Philippine Stock Exchange. The results of Tukey post-hoc analysis showed that all the indices are significantly different to each other. Based on the results presented by the Pearson Correlation, the Consumer Price Index and Net inflows of Foreign direct investment positively correlate with all the indices except the Service Index while the Peso per US Dollar positively correlates to Financial Index, Property Index, and Mining and Oil Index. The Unemployment Rate showed a negative correlation to Financial Index, Holdings Index, and Property Index. On the contrary, the Unemployment Rate showed a positive correlation to Mining and Oil Index. As for the Service Index, it showed no significant relationship

with all the selected macroeconomic indicators. The results of multiple regression showed that the selected macroeconomic indicators when taken as whole were not found to be significant predictors of the Financial Index, Property Index, Industrial Index, Service Index, and Mining and Oil Index while they were significant predictors of the Holdings Index. When the macroeconomic indicators are taken individually, none of the macroeconomic factors predict all the indices.

Keywords: macroeconomic indicators, Philippine Stock Exchange Indices, Pearson correlation coefficient, ANOVA test, regression analysis

Introduction

The Philippine Stock Exchange (PSE) is one of the important pillars of the economy for it plays a significant role in the Philippines' growth and development. According to Balaba (2017), it is the barometer of business and industry, and its performance reflects the financial health of the Philippine business in general. The share price index is the natural measure of the stock market activity. In the Philippines, it is the Philippine Stock Exchange Index (PSEi). It provides a historical stock market performance of the different sectors in the stock market in a given period that allows investors to evaluate the performance of a particular sector and provide information for forecasting future movements in the market.

According to Engel and Rangel (2005), as cited in Pramod Kumar and Puja (2012), the emerging economies are identified as the most volatile stock markets, and they are likely to be affected by the factors such as changes related to economic activities, political and international economic environment, and macroeconomic factors. The PSE is a volatile stock market; different factors in the economic system affect its movement. In terms of stock market returns, the country's stock market was affected by the economy's

overall macroeconomic factors and activities. And this is the main concern of any investors, the volatility of the stock market, for their returns depend on the various economic factors.

Firms belong in the stock market rely on a sound economic environment. Therefore, it is essential to check the macroeconomic indicators of a country and understand how they will affect the movement of the stock market. According to San Miguel (2019), the key to good investment decision-making is an economic analysis. Though the stock market is impossible to predict entirely, macroeconomic indicators can contribute by helping the investors and firms understand its movement and forecast its future trends. Nevertheless, the stock market is innately linked to some of the economic factors, therefore variables that significantly affects the stock market can be observed to explain the behavior of the stock market. Knowing the impact and relationship of macroeconomic indicators on the PSE sectors will be an advantage for our country, investors, financial regulators, and firms better understanding of the stock market and economic activities.

The goal of the present study is to analyze the relationship between the macroeconomic indicators and the PSE indices. This research will also determine the impact of the selected macroeconomic indicators such as real gross domestic product, inflation rate, interest rate, unemployment rate, peso-dollar exchange rate, consumer price index, and foreign direct investment on the PSE's financial sector, industrial sector, holding firm's sector, property sector, Services sector, and Mining and Oil sector. The study will allow the investors, financial regulators, and firms to determine what are the macroeconomic indicators that significantly affect the Philippine Stock Exchange Sectors and whether the variables have positive or negative relationship.

According to Murcia & Tamayo (2015) macro-economic indicators are important to evaluate the future

outcomes of the stock market. The study would be a great basis for investors, financial regulators, and policymakers in understanding which factors can affect certain indices and when to implement policy interventions to maintain the stock market and to further develop the country's economy. The study will also include trend analysis of the PSE indices. This will provide information about the well performing sector and the best sector to invest in based on their performance in the stock market for the period of 2010 to 2019.

Review of Related Literature

Philippine Stock Exchange Indices

Various studies have been done in this field using different economic factors, methodology, theories, and periods. Many studies aim to find the macroeconomic indicators which affect the Philippine stock exchange index sectors generally and individually.

San Miguel (2019) investigated the relationship between the Philippine Stock Exchange services sector index and selected macroeconomic indicators. The study has found a strong relationship between macroeconomic indicators such as the real gross domestic product, inflation rate, and foreign exchange and the price performance of the PSE services sector index constituents. In contrast, the unemployment rate and interest rate have no significant relationship with the dependent variable.

Macroeconomic Indicators

Macroeconomic**s** is the branch of economics that analyzes the performance, activities, and behavior of an overall economy. Macroeconomic indicators are considered the key to evaluating the future outcomes of the Philippine Stock Market. The existing factors are used to explain the possible influence of these on the stock market returns. Many

researchers stated that in terms of macroeconomic analysis, the overall stock market returns, and the behavior of the stock market are therefore identified by the macroeconomic indicators (Murcia, J. B. and Tamayo A. M., 2015).

Real Gross Domestic Product. Gross Domestic Product or GDP measures the total output in the national income accounts. (Blanchard, 2020). According to Callen (2020), the real GDP growth rate is frequently used to indicate the economy's general health. An increase in RGDP is a sign that an economy is doing well, and employment is likely to increase. However, a decline in RGDP results in decreases in employment.

Joshi and Giri (2015) analyzed the relationship between gross domestic product and stock prices from a sectoral perspective. Observation showed that the manufacturing sector's share of GDP and the manufacturing index had a positive and significant link.

Interest Rate. The relationship between the inflation rate and the stock market has been observed over the years. Kunt (2019) stated that countries with lesser interest rates are likely to be considered having a solid stock market compared to those with higher interest rates (as cited Alam, M.M., & Uddin, M.G.S., 2019, p. 3).

The countries that have good stock market performance with low-interest rates are the developed countries. Studies also show that countries with high-interest rates such as Zimbabwe, South Africa, and Botswana result in a more significant loss for the stock market and its price. Kelen (2000) concluded an inverse relationship between the interest rate and the stock market. In contrast, a higher interest rate led to a weaker stock market (Kelen, 2000, as cited in Alam, M.M., & Uddin, M.G.S., 2009, p. 3).

Inflation Rate. Talla (2013) examined the effect of macroeconomic variables on the Stockholm Stock Exchange

stock prices. The study used regression analysis and Granger causality test to investigate the relationship of variables. The results showed that high inflation and exchange rate have a significant negative relationship to the Stockholm Stock Exchange stock prices. The study also concluded that interest rate and stock price have a negative but insignificant relationship.

Unemployment Rate. The unemployment rate is classified as a vital indicator of a country's status in the labor market. It is the measure of the unemployed workers in the total labor force. It is considered an essential factor in the economy because it does not just affect those who are unemployed, but it also affects the larger economy. (Picardo, 2020)

Peso-dollar exchange rate. Economic theories show a significant link between exchange rate behavior and stock market performance in terms of the exchange rate. They claim that currency appreciation (or depreciation) can affect stock values in a negative (or positive) way (Dornbusch & Fisher, 1980; Jorion, 1991). Furthermore, according to Gavin (1989), the link between the exchange rate and stock prices might be positive or negative depending on the circumstances. Empirical investigations have also produced inconclusive findings.

Consumer Price Index. The Consumer Price Index strongly predicts the six stock indexes in the Philippines. The findings of this study showed critical analysis that answered the fundamental question of whether macroeconomic factors influence stock prices in sectors designated by the Philippine Stock Exchange. According to the seemingly unrelated linked regression process findings, the Consumer Price Index (CPI) is the most crucial predictor of stock market indices. Furthermore, based on the overall analysis, under the industrial, holdings, mining, and oil indexes, the Consumer Price Index positively influences stock prices. (as cited in Tamayo, A. M. & Murcia, J. V. 2015).

Foreign Direct Investment. According to the Philippine Statistic Authority, foreign direct investment (FDI) is a category of investment made by a resident entity in one economy to obtain a lasting interest in an enterprise resident in an economy other than that of the investor. The abiding interest means the existence of a long-term relationship between the enterprise and direct investor as well the significant level of influence the direct investor has on the management of the enterprise. The Organization for Economic Cooperation and Development stated that FDI plays a vital role in economic integration. FDI creates strong links between economies and can be a critical driver of economic development.

Theoretical Framework

Capital Asset Pricing Model (CAPM)

According to Kenton (2021), this theory developed by Sharpe (1964) and Lintner (1965) is one of the most recognized models for measuring the risk and return relationship. This asset pricing theory describes the relationship between systematic risk and expected return for assets, particularly stocks. The formula for CAPM is as follows.

$$E(Ri) = Rf+\beta i(Rm-Rf)$$

where:

E(Ri) > expected return of investment
Rf > risk-free rate
βi > beta of the investment
(*ERm* −*Rf*)>market risk premium

CAPM states that investors are expected to compensate for risk and the time value of money. This theory assumes that only market factors affect the stock returns (Khan, 2017). CAPM also observes the inconsistency in stock returns. It allows the investors to evaluate their investments

and portfolio performance in comparison to the performance of the market (Stotz, 2020).

Arbitrage pricing theory (APT)

Stephen Ross created a theory of asset in 1976 based on the linear relationship between an asset's expected risk and return. This theory links macroeconomic indicators and stock market returns. According to Chen (1983), as cited in Murcia and Tamayo (2015), this theory states that multiple factors explain the returns of an asset. Unlike the Capital Asset Pricing Model (CAPM), which only considers a single factor of the market's risk level in general, APT considers several macroeconomic factors that influence the risk and return of an asset. (Corporate Finance Institute). The APT has three significant assumptions: (1) the capital markets are entirely competitive, (2) investors choose more wealth than less wealth with certainty, and (3) theoretical process of asset returns can be demonstrated as a direct function of a set of risk factors (Banawa et al.,2015).

Efficient market hypothesis (EMH)

This theory supports the Random Walk Hypothesis, which states that fluctuations in prices represent random variations that cannot be associated with previous prices (Godfrey, Granger & Morgenstern, 1964 as cited in Murcia and Tamayo, 2015). This hypothesis pertains to the unpredictability of stock prices that today's stock prices reflect performances of firms today, which are affected by external factors, and stock prices tomorrow reflect performances of firms tomorrow, which may be affected or not by the external factors. According to the proponent of EMH Fama (1970), as cited in Alhamdan (2014), the random walk model can be described by following the two assumptions. The first assumption is that successive price returns or changes are independent. Moreover, the second assumption is that variables must be distributed identically. This implies that the change in stock price from one day to

another is entirely random, which means the changes in stocks' prices daily should have a mean of zero (Enders, 2012 as cited in Alhamdan, 2014).

Conceptual Framework

The Conceptual Framework of the study explains the predictive relationship of macroeconomic indicators towards the selected sectors of the Philippine Stock Exchange based on the observation and analysis of the data of the years 2010 to 2019.

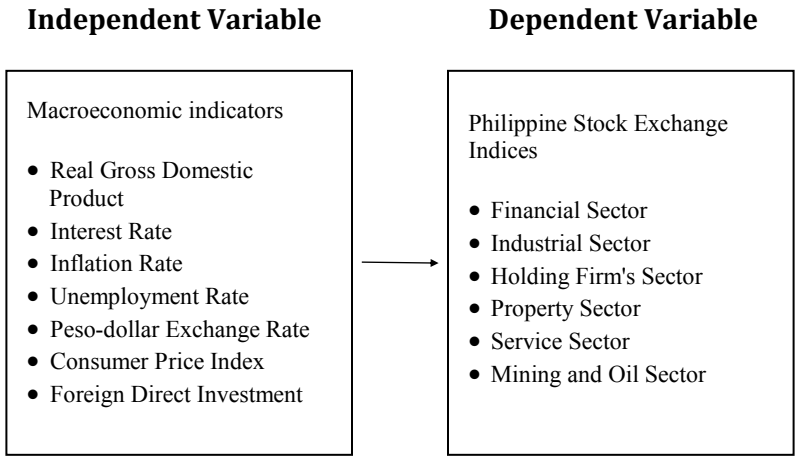


Figure 1. The research paradigm of the study

As shown in Figure 1, The independent variables are the macroeconomic indicators: real gross domestic product, interest rate, inflation rate, unemployment rate, peso-dollar exchange rate, consumer price index, and foreign direct investment. The dependent variables are the Philippine Stock Exchange indices which comprise the financial sector, industrial sector, holding firm's sector, property sector, service sector, and mining, and oil sector.

Statement of the Problem

This study aims to determine the relationship between the macroeconomic indicators and the Philippine Stocks Exchange indices based on the data series from 2010 to 2019. Specifically, it sought answers to the following inquiries:

1. How may macroeconomic indicators of the Philippines for the years 2010 to 2019 be described in terms of the following:
   1.1 Real gross domestic product,
   1.2 Inflation rate,
   1.3 Unemployment rate,
   1.4 Interest rate,
   1.5 Consumer price index,
   1.6 Peso-dollar exchange rate, and
   1.7 Foreign direct investment?

2. How may the PSE for the years 2010 to 2019 be described in terms of the following indices:
   2.1 Financial sector,
   2.2 Industrial sector,
   2.3 Holding firm's sector,
   2.4 Property sector,
   2.5 Services sector, and
   2.6 Mining and Oil sector?

3. Is there a significant difference between or among the indices in the PSE?

4. Is there a significant relationship between the PSE indices and the macroeconomic indicators of the Philippines?

Hypotheses of the Study

The following are the hypotheses formulated by the researchers to analyze further the research study based on the statement of the problem:

HO1: There is no significant difference between or among the indices in the PSE.

HO2: There is no significant relationship between macroeconomic indicators and the Philippine Stock Exchange Indices.

HO3: The macroeconomic indicators do not significantly predict the Philippine Stock Exchange indices.

Method

Research Design

This study employed a quantitative descriptive-correlational research design. The quantitative research design was used to explain the relationship among variables by testing collected quantitative data. The descriptive research design was also used to find information about the macroeconomic indicators and Philippine Stock Exchange indices to describe the relationship between variables. Moreover, the study used correlation analysis to measure the strength of the possible relationship between the variables and compute their association.

The study's independent variables are the macro-economic indicators, namely real gross domestic product, interest rate, consumer price index, inflation rate, unemployment rate, foreign direct investment, and peso-dollar exchange. In contrast, dependent variables are the PSE financial sector, industrial sector, holding firm's sectors, property sector, services sector, and mining and oil sector. Accordingly, specific related data were extracted from

Bangko Sentral ng Pilipinas and the World Bank from 2010 until 2019 to be used as measures of the study to describe and test the relationship among variables.

ANOVA test was used to determine the significant difference among the sectors in the PSEi, while Pearson correlation was used to measure the strength of the relationship between the variables. Moreover, multiple regression analysis was used to ascertain whether macro-economic indicators are significant predictors the Philippine Stock Exchanges indices.

Subjects of the Study

The subjects used in this study are the Philippine Stock Exchange indices. All the sectors from the PSE were considered upon collecting information regarding the research; namely, financial sector, industrial sector, holding firm's sector, property sector, service sector, and mining and oil sector.

The researchers applied the purposive sampling technique in this study to focus on specific characteristics of a population of interest, which will allow the researchers to answer the research questions. Specifically, the study used a maximum variation or the heterogeneous sampling technique that involves cases that vary from each other. The principal objective of this sampling is to gain more significant insights into a phenomenon by examining it from every viewpoint.

The researchers considered all the sectors in the PSE to collect data from the broadest range of perspectives possible regarding the study. The researchers wanted to know how these relate to the study's macroeconomic indicators: real gross domestic product, interest rate, inflation rate, unemployment rate, consumer price index, peso-dollar exchange rate, and foreign direct investment. This study aims to gain an understanding of how strong the

relationship between the variables is and if the macro-economic indicators are significant predictors of the PSE indices.

Research Instruments

The testing of the hypothesis involved secondary data analysis of actual price movements as measured by the macroeconomic indicators as well as PSE indices. These data are available from the websites of Bangko Sentral ng Pilipinas (BSP) and the World Bank. Data observations were collected on an annual basis within ten years from 2010 to 2019 to run the correlation and regression model.

The researchers used secondary data since all the necessary series of data needed for the study were readily available on the official websites of the Central Bank of the Philippines and the World Bank. Since the BSP was authorized to collect data and its quality management is designed to ensure that data given to the public is of high quality, the researchers gained confidence in the reliability of the data gathered. On the other hand, the development data group of the World Bank is guided by professional standards in the gathering, compilation, and dissemination of data. It works closely with the Bank's regions and Global Practices to ensure that all data users may trust the quality and integrity of the data produced.

Data Gathering and Procedure

The financial information was collected by the use of secondary data. This research used the time series data readily available on the website of Bangko Sentral ng Pilipinas (BSP) and the World Bank covering the years 2010 to 2019. The data used in the study may be divided into two sub-groups. The first data set consists of data on macro-economic indicators, and the second data set consists of PSE indices. The researchers gathered the annual time-series data of the macroeconomic indicators such as real gross domestic

product, inflation rate, unemployment rate, and peso-dollar exchange rate from the BSP website while data of consumer price index, foreign direct investment, and interest rate were collected from the website of World Bank. The data for the PSE Indices, namely financial, industrial, holdings, property, service and mining and oil, annual time-series data were also taken from the BSP website. The gathered data were encoded and exported in spreadsheet form, then statistically estimated.

All the data, information, studies, journal, and other kinds of literature of this study from the online sources were obtained in the official and legitimate sources. The data gathering procedure was done diligently to gather reliable information. This study was conducted with thoroughness, transparency, and integrity. The researchers practiced and maintained the highest level of objectivity throughout the study.

Data Analysis and Statistical Treatment of Data

The study applied a series of statistical tests to analyze the data gathered. The secondary data collected were analyzed using descriptive statistics and inferential statistics (ANOVA test, Pearson correlation, and multiple regression analysis) with the help of the Statistical Package for Social Sciences (SPSS).

The first statistical treatment applied in this study is descriptive statistics. This method was used to determine the minimum, maximum, mean, and standard deviation of the variables of the study. These were calculated to provide an overview of the trends of the selected macroeconomic indicators and performance of each sector in the PSE from 2010 to 2019, which included a graphical representation for each sector and indicator. The following method applied is the Pearson's correlation coefficient test statistics which measures the association between the variables. This is used in the study to determine the degree of correlation between

the macroeconomic indicators and the PSE indices. This research also utilized the ANOVA test to determine the significant difference among the sectors in the PSE index. In addition to ANOVA test, Tukey post hoc test was applied to determine exactly where the differences between the indices lies and to find out which specific group's means when compared with each other are different. Multiple regression analysis was also used in the study to determine whether the macroeconomic indicators are significant predictors of the PSE indices.

In determining if the macroeconomic indicators influence the PSE indices, the level of significance used in the study was 0.05. The effect of chosen indicators can be seen in its p-value, the significance level. If the p-value is below the 0.05 limit, the macroeconomic indicators affect the PSE indices. On the other hand, the degree of effect can be seen in its R (Coefficient of correlation), which is the measure of the strength of the relationship between variables.

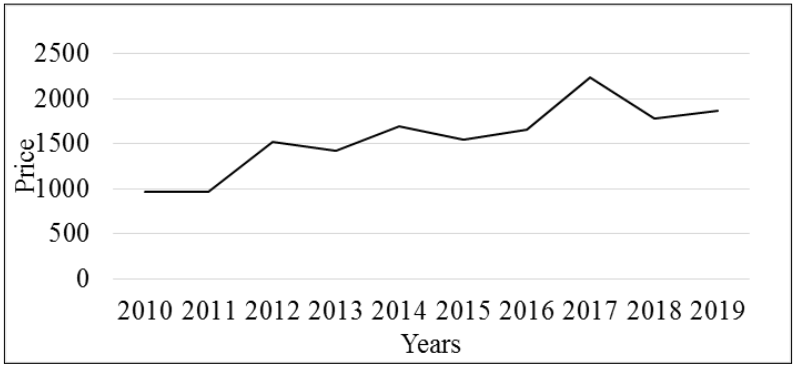
Table 1. Interpretation of Correlation Coefficient

Correlation coefficient	Verbal Interpretation
0.81 to 1.00	Very strong relationship
0.61 to 0.80	Strong relationship
0.41 to 0.60	Moderate relationship
0.20 to 0.39	Weak relationship
0.00 to 0.21	Very weak relationship

Table 1 shows the correlation coefficient's verbal interpretation of the Pearson correlation coefficient. A linear correlation coefficient greater than zero indicates a positive relationship, while a value less than zero signifies a negative relationship. A positive correlation showed that the variables had a direct relationship, indicating that as one variable's

value increased, the other increased as well. On the other hand, a negative correlation indicated a negative relationship between the variables, indicating that as one variable's value increased, the value of the other decreased, and vice versa.

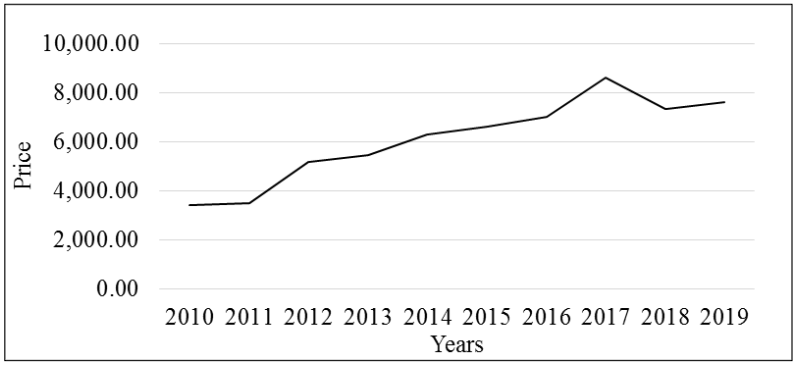
Results and Discussion



Note. The line graph represents the annual price performance of the financial index.

Figure 2. Price Performance of Financial Index

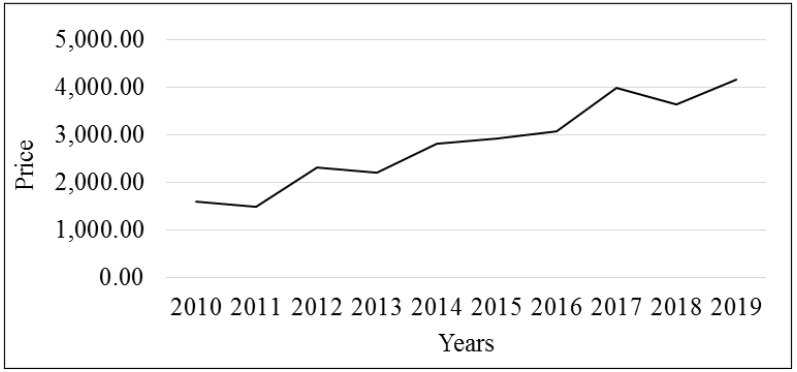
Figure 2 shows the graph of the price performance of the Philippine Stock Exchange Financial Index from 2010 to 2019. The price-performance of the index moves in the range of 900php to 2,200php. The price movement of the PSE Financial Index has an upward trend from 2010 to 2017; however, it had decreased by -20.19% in the year 2018. The highest price performance of the financial index was 2,230.17php in the year 2017, while the lowest was 961.47php in the year 2010. The average price of the PSE Financial Index was 1,566.042php.



Note. The line graph represents the annual price performance of the holdings index.

Figure 3. Price Performance of Holdings Index

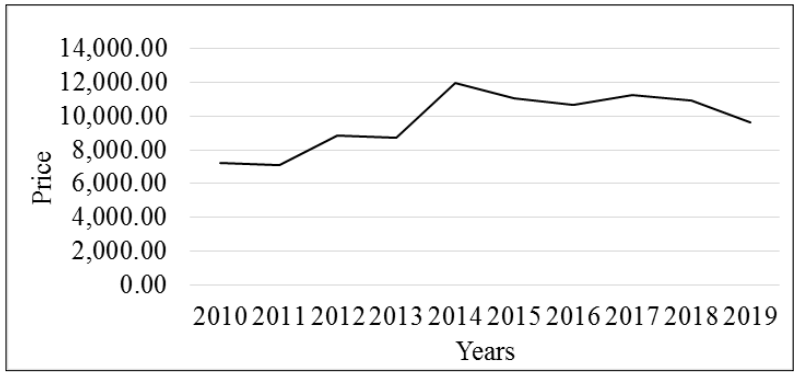
Figure 3 shows the graph of the price performance of the Philippine Stock Exchange Holdings Index from 2010 to 2019. The price-performance of the index moves in the range of 3,300php to 8,600php. The price movement of the PSE Holdings Index has an upward trend from 2010 to 2017; however, it had decreased by -14.74% in the year 2018. The highest price performance of the holdings index was 8,616.51php in the year 2017, while the lowest was 3,388.74php in the year 2010. The average price of the PSE Holdings Index was 6,091.627php.



Note. The line graph represents the annual price performance of the property index.

Figure 4. Price Performance of Property Index

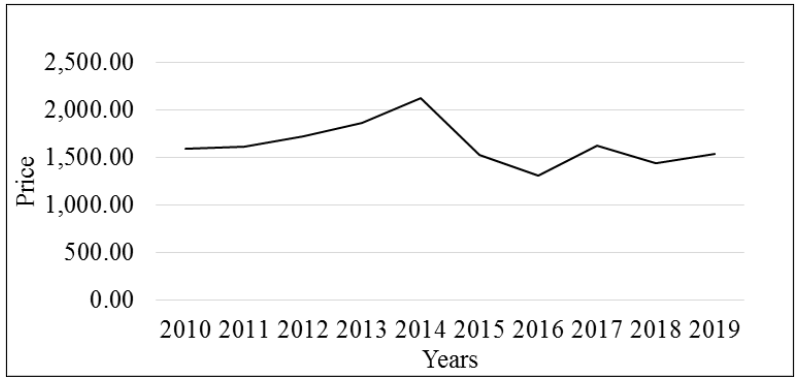
Figure 4 shows the graph of the annual price performance of the Philippine Stock Exchange Property Index from 2010 to 2019. The price-performance of the index moves in the range of 1,400php to 4,100php. The price movement of the PSE Property Index has an upward trend from the year 2010 to 2017; however, it had decreased by -8.80% in the year 2018. In 2019, the price of the Property Index bounced back, where it reached the highest price-performance of 4,154.52php. The lowest price performance within the ten years is 1,481.25php, while the average price of the PSE Property Index was 2,812.68php.



Note. The line graph represents the annual price performance of the industrial index.

Figure 5. Price Performance of Industrial Index

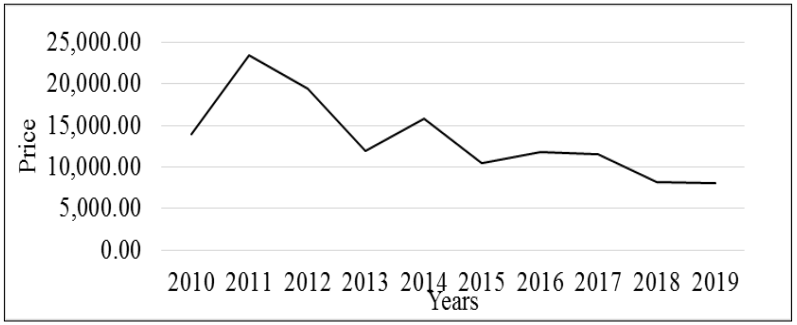
Figure 5 shows the graph of the annual price performance of the Philippine Stock Exchange Industrial Index from 2010 to 2019. The price movement of the PSE Industrial Index has an upward trend from the year 2010 to 2014 with an average of 8,769.13php. However, it had decreased by -11.12% from 2015 to 2016. For the years 2015 to 2019, the sector has a stable moving price performance that ranges from 9,600php to 11,200php. The highest price performance of the industrial index was 11,982.76php in the year 2014, while the lowest was 7,074.65php in the year 2011. The average price of the PSE Industrial Index was 9,734.48php.



Note. The line graph represents the annual price performance of the services index.

Figure 6. Price Performance of Service Index

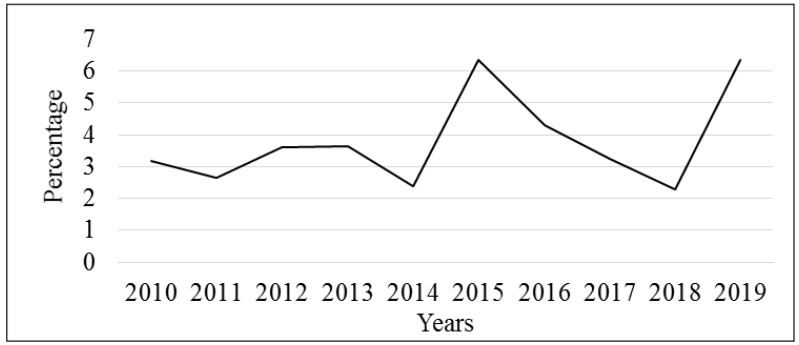
Figure 6 shows the graph of the annual price performance of the Philippine Stock Exchange Service Index from 2010 to 2019. The price movement of the PSE Service Index has an upward trend from 2010 to 2014 with an average of 1,784.72php. However, it had decreased by -38.72% from 2015 to 2016, reaching its lowest price of 1,302.86. The index regained strength from 2017 to 2019, having a stable moving price performance with an average of 1531.22php. The highest price performance of the service index was 2.126.19php in 2014, while the average price was 1,635.03php. According to the Board of Investments Philippines, the Philippines' services sector has been a significant source of economic growth. From 2010 to 2014, The sub-components of trade and private services provided the most value-added. The finance, construction, and real-estate sub-sector is also notable to the sector's growth.



Note. The line graph represents the annual price performance of the mining and oil index.

Figure 7. Price Performance of Mining and Oil Index

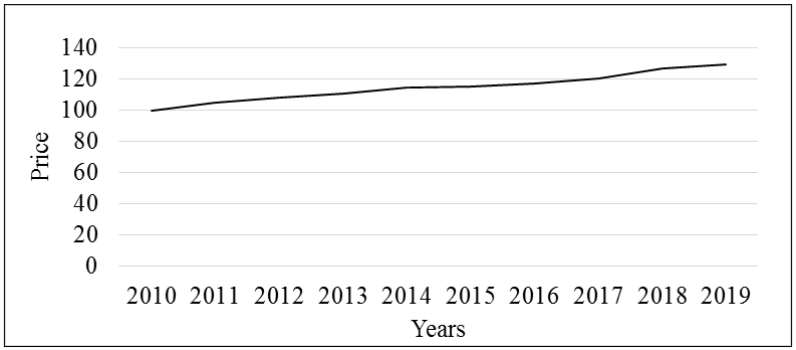
Figure 7 shows the graph of the price performance of the Philippine Stock Exchange Mining and Oil Index from 2010 to 2019. The price-performance of the index moves in the range of 8,000php to 23,000php. The PSE Mining and Oil price movement has increased by 68.52% from 13,947.58php in 2010 to 2011, where it recorded its highest performance of 23,504.75php. However, the trend declined at the start of 2012 and continued until 2019, when it recorded its lowest price of 8,091.98php. The average price of the PSE Holdings Index was 6,091.627php. The decline starting the year 2012 may be attributed to the issued Executive Order No. 79 on July 6, 2012, by President Benigno Aquino III, which restrained the approval of new mining contracts until the revenue sharing schemes and system have passed and taken effect. The imposed moratorium put the mining industry on halt, resulting in a decline in its price performance.



Note. The line graph represents the real interest rate at end of the period from 6454 to 645[3].

Figure 8. Real Interest Rate

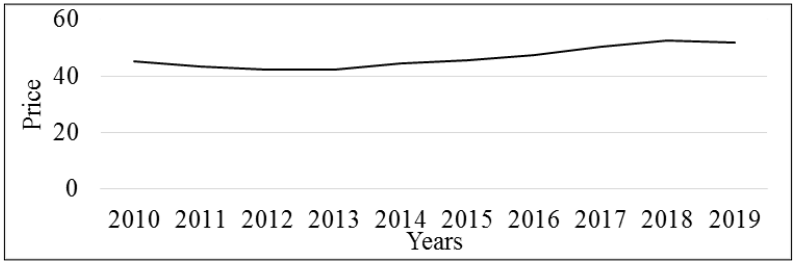
Figure 8 shows the graph of the annual movement of the real interest rate from 2010 to 2019. The movement of real interest rate has a stable movement from the year 2010 to 2014 with an average of 3%. In the year 2015, it had a sudden increase of 164.17%. However, it declined from 2016 to 2018 by -63.88%, reaching its lowest percentage of 2.29%. The index has regained strength in 2019, where it reached its highest peak of 6.35%. The average percentage of the Real Interest Rate is 3.80%. In 2014, the Bangko Sentral ng Pilipinas increased the rates on the reverse repurchase on the assessment that the inflation in the year 2015 may not reach the target rate. (BSP, 2014). In 2018, the BSP increased policy rates five consecutive times to mitigate the expected high inflation rate 2018; this resulted in an increase in the benchmark interest rate on the reverse repurchase by 4.75%. (BSP, 2015).



Note. The line graph represents the annual price performance of consumer price index.

Figure 9. Consumer Price Index

Figure 9 shows the graph of the annual price performance of the Consumer Price Index from 2010 to 2019. The price-performance of the Consumer Price Index moves in the range of 100php to 129php. The Consumer Price Index has an upward trend from 2010 to 2019. The highest price performance of the Consumer Price Index was 129.61php in the year 2019, while the lowest was 100php in the year 2010. The average price of the Consumer Price Index was 114.65php.

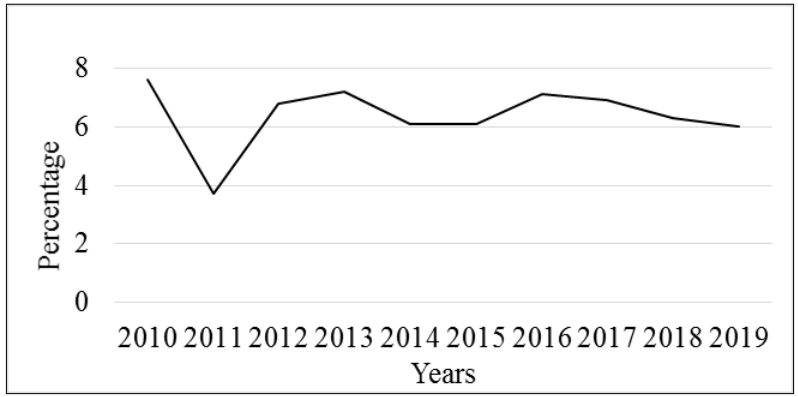


Note. The line graph represents the annual average Peso per US Dollar exchange rate at the end of each period.

Figure 10. Peso per US Dollar Exchange Rate

Figure 10 shows the graph of the Peso per US dollar exchange rate performance from 2010 to 2019. Peso per US dollar exchange rate moves from 42php to 52php. The price had decreased from 45.1097php in 2010 to 42.2288php in

2012. However, the Philippine peso increased in 2014 and continued to weaken until 2018, when it reached the highest exchange rate of 52.6614php. In 2019, the exchange rate had experienced a -1.64% decrease. During the end of this year, the Philippine peso emerged as the second-best performing currency in Asia, reversing its 2018 performance where it ranked as the third worst-performing currency. According to Ricafort (2019), as cited in Agcaoili (2019), the peso closed in 2019 at its strongest level primarily because of the steep decline in local interest rates and inflation and the high gross international reserves recorded that serve as a safeguard for the peso. It also improved the balance of payment surplus and decreased the trade deficit, resulting in a reduced net outflow of US dollars. The average exchange rate from 2010 to 2018 is 46.5349php.

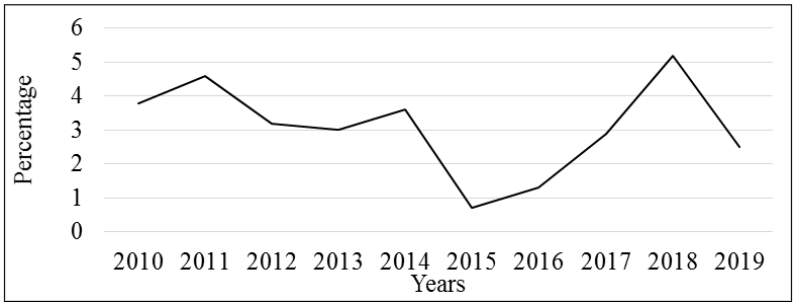


Note. The line graph represents the annual percentage of real gross domestic at the end of each period.

Figure 11. Real Gross Domestic Product

Figure 11 shows the annual movement of the real gross domestic product (RGDP) from 2010 to 2019. In the year 2011, the real gross domestic product had a sudden decline of -51.32%; however, it regained strength from 2012 to 2014 by 94.59%, reaching a stable movement that continued until 2019. The highest percentage of the RGDP was 7.6% in 2010, while the lowest was 3.7% in 2011. The

average percentage of RGDP is 6.38%. The sudden drop of RGDP in 2011 is due to the woeful economies and natural disasters that affected the trading partners, dropping the exports by 5.6%, one of the country's top dollar earners. Disasters also affected the Philippines, resulting in a drop in its growth. The government's underspending in infrastructure also played a role in the decline of RGDP (PSA, 2012).

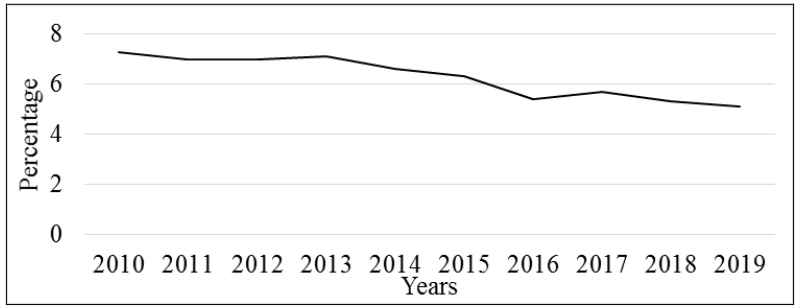


Note. The line graph represents the inflation rate at the end of each period.

Figure 12. Inflation Rate

Figure 12 shows the graph of the performance of the inflation rate of the Philippines from 2010 to 2019. The inflation rate moves from 0.7% to 5.2% within the ten years. The rate has increased from 3.8% in 2010 to 4.6% in 2011. Nevertheless, it was stable from 2012 to 2014, where it only moved in the range of 3% to 3.6%. However, a significant decrease of -80.56% was recorded in 2015 when the inflation rate hit its lowest rate of 0.7%. The 2015 full-year inflation is the lowest inflation rate recorded since 1986. Based on the open letter on 2015 inflation available at the website of Bangko Sentral ng Pilipinas, the factors that contributed to slower price increases in 2015 when taken together are the following: drop in oil prices, decrease in electricity rates, a decline in international crude oil prices due to low demand for oil, and slow increase in food prices. During 2016, the inflation rate started to bounce back with a rate of 1.3%, and it continued to increase until 2018 when it reached its peak of 5.2%.

However, the 2018 inflation rate goes beyond the government's inflation target range of only 2% to 4%. Supply -side factors drove the inflation rate in 2018 (BSP,2019). An increase in domestic oil prices and rise in food inflation attributed to the effect of typhoon happened in the middle part of the year are the primary drivers of inflation in 2018. During the start of the year, the excise tax reforms also contributed to price pressures. Due to overinflation in 2018, Bangko Sentral ng Pilipinas hikes interest rates to stabilize the inflation rate by lowering consumer spending in the economy and slowing down the demand for goods, which would encourage businesses to lower their prices. These events can be attributed to the -51.92% decrease in the inflation rate during 2019.

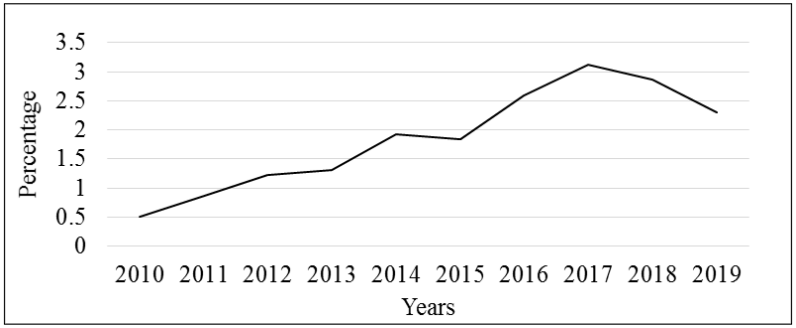


Note. The line graph represents the unemployment rate at the end of each period.

Figure 13. Unemployment Rate

Figure 13 shows the performance of the Philippines' unemployment rate from 2010 to 2019. The unemployment rate moves in the range of 5% to 7%. The movement of unemployment has been downward throughout the ten years. The highest unemployment rate was 7.3% in 2010, while the lowest was 5.1% in 2019. The average unemployment rate from 2010 to 2019 was 6.28%. The unemployment rate in 2019 was the lowest recorded since the year 2005. The estimated annual employment rate in 2019 was at 94.9%, with total employed persons of 42.4 million, which implies that around 1.3 million jobs were

created this year which exceeds the government's annual target of 900,000 to 1.1 million jobs. Moreover, the unemployment rate of 5.1% in 2019 is near the upper end of the 4.3% to 5.3% target set by the Philippine Development Plan 2017 to 2022 for this year. Philippines' workers were grouped into services, industry, and agriculture. The services sector workers composed the majority with 58% of the total employed in 2019, while agriculture and industry sectors composed 22.9% and 19.1%, respectively.



Note. The line graph represents the annual foreign direct investment net inflows as percentage of gross domestic product at the end of each period.

Figure 14. Foreign Direct Investment- Net Inflows

Figure 14 shows the performance of the Philippine's foreign direct investment (FDI) net inflows (as a percentage of Gross Domestic Product) from 2010 to 2019. The FDI moves in the range of 0.5% to 3%. The trend of foreign direct investment is upward from 2010 to 2017, where it reached its highest rate of 3.1%. According to economist Jiao (2020), the growth in the performance of FDI inflows can be attributed to the improvements in the economic, policy, and institutional environment. The government's efforts in reforming governance and fighting corruption resulted in significant development in the business environment, government accountability, and administrative efficiency.

Overall, the positive developments in our country attract foreign investors and change their perspective towards the Philippine economy. The foreign direct investment fell slightly from 3.1% in 2017 to 2.87% in 2018. However, the declines continued until 2019, when the rate dropped to 2.30%. According to the Department of Finance, the FDI decline in the Philippines reflects the decrease in global FDI flows in the past two years. The decrease is possibly due to Brexit policy, Fed interest rate hikes, volatile petroleum prices, and the US-China trade war, which slowed down the world economy.

Table 2. Difference in the PSE among the indices

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit	HO1
Between Groups	1.19+09	5	2.37E+08	45.825	3.10E-18	2.386	Reject
Within Groups	2.79E+08	54	5172253.912				
Total	2.57E+09	59					

A one-way ANOVA was performed to determine if there are significant differences among the indices of the Philippine Stock Exchange. Based on the results revealed in the table above, there was a statistically significant difference in Philippine Stock Exchange among the indices $F(5, 54) = 45.825$, $p < .001$. Considering this, the null hypothesis HO1 is deemed rejected. This means that the indices significantly differ from each other.

A Tukey post-hoc analysis was done to create pair-wise comparisons of the indices. This determined whether there is a significant difference in each paring of indices. It was found that Financial Index ($M = 1566.04$, $SD = 386.33$) significantly differs with Holdings Index ($M = 6091.63$, $SD = 1720.15$), $p = .001$; with Industrial Index ($M = 9734.83$, $SD = 1716.75$), $p < .001$; and with Mining and Oil Index ($M = 13467.40$, $SD = 4904.84$), $p < .001$.

Aside from being significantly different from Financial Index, Holdings Index (M = 6091.63, SD = 1720.15) was also found to be significantly different from Property Index (M = 28126.80, SD = 931.64), p = .025; Industrial Index (M = 9734.83, SD = 1716.75), p = .009; with Services Index (M = 16350.33, SD = 229.57), p = .001, and with Mining and Oil Index (M = 13467.40, SD = 4904.84), p < .000.

As for Property Index (M = 28126.80, SD = 931.64), aside from being significantly different from Holdings Index, it was also found to be significantly different with Industrial Index (M = 9734.83, SD = 1716.75), p < .000, and with Mining and Oil Index (M = 13467.40, SD = 4904.84), p < .000.

As mentioned, Industrial Index (M = 9734.83, SD = 1716.75) significantly differ with Financial, Holdings, and Property Indices. In addition, it also significantly differs with Services Index (M = 16350.33, SD = 229.57), p < .000, and with Mining and Oil Index (M = 13467.40, SD = 4904.84), p = .007.

Aside from being significantly different with Holdings Index and Industrial Index, Services Index (M 16350.33, SD = 229.57) was found to be significantly different with Mining and Oil Index (M = 13467.40, SD = 4904.84), p < .001.

Finally, Mining and Oil Index (M = 13467.40, SD = 4904.84) was found to be significantly different with all the other indices.

Table 3. Pearson correlation analysis of financial index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	0.193	0.593	HO2	Accept
Consumer price index	0.82	0.004	HO2	Reject
Peso per US Dollar Rate	0.654	0.04	HO2	Reject
Real Gross Domestic Product	0.26	0.469	HO2	Accept
Inflation Rates	-0.259	0.47	HO2	Accept
Unemployment rate	-0.746	0.013	HO2	Reject
Foreign direct investment - Net inflows	0.913	0	HO2	Reject

As shown in Table 3, the Pearson analysis for Financial Index and Macroeconomic Indicators showed that Real interest rate, Real Gross Domestic Product, and Inflation Rates have a p-value of greater than 0.05; therefore, HO2 was accepted. Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment – net inflows showed p-values of 0.004, 0.040, 0.013, and 0.000 respectively, below the 0.05 level of significance; therefore, HO2 was rejected. Consumer Price Index and Foreign direct investment – net inflows showed a very strong positive correlation to Financial Index with an R-value of 0.820 and 0.913, respectively. In contrast, the Peso per US dollar rate showed a strong positive correlation with an R-value of 0.654. Moreover, the Unemployment rate showed a strong negative correlation with an R-value of -0.746.

Table 4. Pearson correlation analysis of holdings index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	0.305	0.391	HO2	Accept
Consumer price index	0.891	0.001	HO2	Reject
Peso per US Dollar Rate	0.738	0.015	HO2	Reject
Real Gross Domestic Product	0.225	0.531	HO2	Accept
Inflation Rates	-0.346	0.327	HO2	Accept
Unemployment rate	-0.849	0.002	HO2	Reject
Foreign direct investment - Net inflows	0.959	0	HO2	Reject

For macroeconomic indicators and Holdings Index, as shown in Table 4, Real interest rate, Real Gross Domestic Product, and Inflation Rates showed a p-value of greater than 0.05. Therefore, HO2 was accepted. There was no significant relationship between the real interest rate, Real Gross Domestic Product, and Inflation Rates and Holdings Index. For Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment– net inflows, p-values were 0.001, 0.015, 0.002, and 0.000, respectively, below the 0.05 level of significance. The result indicated substantial evidence to reject the null hypothesis for the Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment– net inflows.

Therefore, HO2 was rejected for Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment – net inflows. For the Consumer Price Index and Foreign direct investment – net inflows, there was a very strong positive correlation to the Holdings Index with an R-value of 0.891 and 0.959, respectively. It agrees with the result of a study by Murcia and Tamayo

(2015) consumer price index positively affected stock prices under the holdings indices. For Peso per US dollar rate, there was a strong positive correlation to the Holdings Index with an R-value of 0.738. In contrast, the Unemployment rate showed a very strong negative correlation with an R-value of -0.849.

Table 5. Pearson correlation analysis of property index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	0.36	0.307	HO2	Accept
Consumer price index	0.95	0	HO2	Reject
Peso per US Dollar Rate	0.846	0.002	HO2	Reject
Real Gross Domestic Product	0.169	0.64	HO2	Accept
Inflation Rates	-0.251	0.484	HO2	Accept
Unemployment rate	-0.905	0	HO2	Reject
Foreign direct investment - Net inflows	0.916	0	HO2	Reject

As shown in Table 5, Real interest rate, Real Gross Domestic Product, and Inflation Rates all showed p-values of greater than 0.05; therefore, HO2 was accepted. There was no significant relationship between the real interest rate, Real Gross Domestic Product, Inflation Rates, and Property Index. Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment – net inflows showed p-values of 0.000, 0.002, 0.000, and 0.000, respectively, below the 0.05 level of significance. This indicated strong evidence to reject the null hypothesis. Consumer Price Index, Peso per US dollar rate, and Foreign direct investment – net inflows showed a very strong positive correlation to Property Index with an R-value of 0.950, 0.846, and 0.916, respectively. This opposes the result of Murcia and Tamayo (2015), whose study found that a decrease in the

value of the US dollar positively affects the property index. The unemployment rate showed a very strong negative correlation to the Property Index with an R-value of -0.905.

Table 6. Pearson correlation analysis of industrial index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	0.118	0.745	HO2	Accept
Consumer price index	0.68	0.031	HO2	Reject
Peso per US Dollar Rate	0.462	0.179	HO2	Accept
Real Gross Domestic Product	0.193	0.594	HO2	Accept
Inflation Rates	-0.334	0.346	HO2	Accept
Unemployment rate	-0.615	0.059	HO2	Accept
Foreign direct investment - Net inflows	0.818	0.004	HO2	Reject

The table above for Industrial Index and Macro economic Indicators, Real interest rate, Peso per US Dollar rate, Real Gross Domestic Product, Inflation rates, and Unemployment rate all showed p-values greater than 0.05; therefore, HO2 was accepted. There was no significant relationship between, Real interest rate, Peso per US Dollar rate, Real Gross Domestic Product, Inflation rates and Unemployment rate, and Industrial Index. On the other hand, Real interest rate and Foreign direct investment – net inflows showed p-values of 0.031 and 0.004, respectively, which was below the set level of significance; therefore, HO2 was rejected. For the Consumer price index and Foreign direct investment – net inflows, there was a strong positive correlation to the Industrial Index with an R-value of 0.680 and 0.818, respectively. It agrees with the result of the study of Murcia and Tamayo (2015) consumer price index positively affected stock prices under the industrial index.

Table 7. Pearson correlation analysis of service index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	-0.359	0.308	HO2	Accept
Consumer price index	-0.283	0.429	HO2	Accept
Peso per US Dollar Rate	-0.532	0.113	HO2	Accept
Real Gross Domestic Product	-0.035	0.924	HO2	Accept
Inflation Rates	0.242	0.501	HO2	Accept
Unemployment rate	0.556	0.095	HO2	Accept
Foreign direct investment - Net inflows	-0.317	0.373	HO2	Accept

As shown in the table above, for the Service Index, macroeconomic indicators all showed p-values greater than 0.05. This meant weak evidence against the null hypothesis; therefore, HO2 was accepted. There was no significant relationship between the macroeconomic indicators and Service Index. The study of San Miguel (2019) has found a strong relationship between macroeconomic indicators such as the real gross domestic product, inflation rate, and foreign exchange and the price performance of the PSE services sector index constituents. Such results were opposing each other.

Table 8. Pearson correlation analysis of mining and oil index and macroeconomic indicators

Macroeconomic Indicators	R-value	p-value	Hypothesis	HO2
Real interest rate	-0.449	0.192	HO2	Accept
Consumer price index	-0.733	0.016	HO2	Reject
Peso per US Dollar Rate	-0.726	0.017	HO2	Reject
Real Gross Domestic Product	-0.513	0.129	HO2	Accept
Inflation Rates	0.333	0.348	HO2	Accept
Unemployment rate	0.689	0.028	HO2	Reject
Foreign direct investment - Net inflows	-0.642	0.045	HO2	Reject

As shown in Table 8 for Mining and Oil index and macroeconomic indicators, Real interest rate, Peso per US Dollar rate, Real Gross Domestic Product, Inflation rates, and Unemployment rates all showed p-values greater than 0.05; therefore, HO2 was accepted. Consumer Price Index, Peso per US dollar rate, Unemployment rate, and Foreign direct investment – net inflows showed p-values of 0.016, 0.017, 0.028, and 0.045, respectively, which were below the 0.05 level of significance; therefore, HO2 was rejected. For Consumer Price Index, Peso per US dollar rate, and Foreign direct investment – net inflows, there was a strong negative correlation to Mining and Oil index with an R-value of -0.733, -0.726, and -0.642. The result was contrary to Murcia and Tamayo (2015) consumer price index positively affected stock prices under the mining and oil indices. There was a strong positive correlation to the Mining and Oil index for the Unemployment rate with an R-value of 0.689.

Table 9. Multiple linear regression analysis for financial index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	-1757.338	7418.846	-.237	.835	Reject
Real Interest Rate	198.072	296.264	.669	.573	Reject
Consumer Price Index	-.278	45.119	-.006	.996	Reject
Peso per US Dollar Rate	-35.432	85.094	-.416	.718	Reject
Real GDP	62.448	89.768	.696	.559	Reject
Inflation Rate	176.882	328.564	.538	.644	Reject
Unemployment Rate	294.440	396.167	.743	.535	Reject
Foreign direct investment - Net inflow	785.762	537.129	1.463	.281	Reject

$R^2 = 0.969$, Adj. $R^2 = 0.939$, $F(7, 2) = 4.404$, $p = .198$

A multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Financial Index. Results show that the model is not significant, R2 = 0.969, Adjusted R2 = 0.939, F(7, 2) = 4.404, p = .198.

Specifically, none of the macroeconomic indicators was found to be a significant predictor of Financial Index.

Table 10. Multiple linear regression analysis for holdings index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	-14721.804	11656.874	-1.263	.334	Reject
Real Interest Rate	294.432	465.505	.633	.592	Reject
Consumer Price Index	60.866	70.893	.859	.481	Reject
Peso per US Dollar Rate	17.998	133.704	.135	.905	Reject
Real GDP	93.904	141.048	.666	.574	Reject
Inflation Rate	16.351	516.257	.032	.978	Reject
Unemployment Rate	1145.650	622.478	1.840	.207	Reject
Foreign direct investment-Net inflow	2172.352	843.966	2.574	.124	Reject

R2 = 0.992, Adj. R2 = 0.966, F(7, 2) = 37.370, p = .026

Again, a multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Financial Index. Results show that the prediction model is significant, R2 = 0.992, Adj. R2 = 0.966, F (7, 2) = 37.370, p = .026 when indicators are taken as a whole.

However, when taken individually, none of the macroeconomic indicators was found to be a significant predictor of Holdings Index.

Table 11. Multiple linear regression analysis for property index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	-9316.898	11933.453	-.781	.517	Reject
Real Interest Rate	238.383	476.550	.500	.667	Reject
Consumer Price Index	38.899	72.575	.536	.646	Reject
Peso per US Dollar Rate	40.260	136.876	.294	.796	Reject
Real GDP	72.537	144.395	.502	.665	Reject
Inflation Rate	129.556	528.506	.245	.829	Reject
Unemployment Rate	404.163	637.248	.634	.591	Reject
Foreign direct investment - Net inflow	802.653	863.990	.929	.451	Reject

R2 = 0.973, Adj. R2 = 0.878, F(7, 2) = 10.254, p = .092

A multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Property Index. Results show that the model is not significant, R2 = 0.973, Adjusted R2 = 0.878, F(7, 2) = 10.254, p = .092.

Specifically, none of the macroeconomic indicators was found to be a significant predictor of Property Index.

Table 12. Multiple linear regression analysis for industrial index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	-46547.429	44900.550	-1.037	.409	Reject
Real Interest Rate	-2097.303	1793.058	-1.170	.363	Reject
Consumer Price Index	376.134	273.070	1.377	.302	Reject
Peso per US Dollar Rate	366.191	515.007	.711	.551	Reject
Real GDP	-351.697	543.298	-.647	.584	Reject
Inflation Rate	-2498.606	1988.547	-1.256	.336	Reject
Unemployment Rate	2592.498	2397.695	1.081	.393	Reject
Foreign direct investment - Net inflow	-1217.079	3250.830	-.374	.744	Reject

R2 = 0.887, Adj. R2 = 0.491, F(7, 2) = 2.242, p = 0.343

A multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Industrial Index. Results show that the model is not significant, R2 = 0.887, Adjusted R2 = 0.491, F(7, 2) = 2.242, p = 0.343.

Specifically, none of the macroeconomic indicators was found to be a significant predictor of Industrial Index.

Table 13. Multiple linear regression analysis for services index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	-10449.908	6427.170	-1.626	.245	Reject
Real Interest Rate	-335.068	256.662	-1.305	.322	Reject
Consumer Price Index	80.087	39.088	2.049	.177	Reject
Peso per US Dollar Rate	44.956	73.719	.610	.604	Reject
Real GDP	-50.560	77.769	-.650	.582	Reject
Inflation Rate	-332.446	284.645	-1.168	.363	Reject
Unemployment Rate	673.427	343.212	1.962	.189	Reject
Foreign direct investment - Net inflow	-430.468	465.331	-.925	.453	Reject

R2 = 0.870, Adj. R2 = 0.417, F(7, 2) = 1.921, p = 0.385

A multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Services Index. Results show that the model is not significant, R2 = 0.870, Adjusted R2 = 0.417, F(7, 2) = 1.921, p = 0.385.

Specifically, none of the macroeconomic indicators was found to be a significant predictor of Services Index.

Table 14. Multiple linear regression analysis for mining and oil index and macroeconomic indicators

Macroeconomic Indicators	B	Std. Error	t	p	HO3
Constant	205729.600	104878.130	1.962	.189	Reject
Real Interest Rate	3319.719	4188.201	.793	.511	Reject
Consumer Price Index	-906.713	637.834	-1.422	.291	Reject
Peso per US Dollar Rate	-1796.678	1202.947	-1.494	.274	Reject
Real GDP	-1260.923	1269.028	-.994	.425	Reject
Inflation Rate	4827.442	4644.823	1.039	.408	Reject
Unemployment Rate	-5924.954	5600.505	-1.058	.401	Reject
Foreign direct investment - Net inflow	7043.086	7593.248	.928	.452	Reject

$R^2 = 0.924$, Adj. $R^2 = 0.660$, $F(7, 2) = 3.496$, $p = 0.240$

A multiple linear regression analysis was performed to determine whether the macroeconomic indicators significantly predict Mining and Oil Index. Results show that the model is not significant, R2 = 0.924, Adjusted R2 = 0.660, F(7, 2) = 3.496, p = 0.240.

Specifically, none of the macroeconomic indicators was found to be a significant predictor of Mining and Oil Index.

Conclusion

The main objective of this study is to determine the relationship between the selected macroeconomic indicators and the six indices of the Philippine Stock Exchange. This is done by analyzing the secondary data of the variables. After analyzing the results and summarizing the findings of the study, the researchers arrived at the following conclusions:

The findings of the ANOVA test revealed that there is a significant difference among the indices of the Philippine Stock Exchange. The Tukey post-hoc analysis found that Financial Index significantly differs from Holdings Index, Industrial Index, and Mining and Oil Index. In contrast, aside from being significantly different from the Financial Index, the Holdings index also differs from Property Index, Industrial Index, Service Index, and Mining and Oil index. Furthermore, Property Index, aside from being different from the Holdings index, was also different from Industrial Index and Mining and Oil Index. The service Index was also significantly different from Mining and Oil Index aside from the Holdings Index and Industrial Index. Lastly, the Mining and Oil index was significantly different from all the other indices. Therefore it can be concluded that the all indices are significantly different from each other.

According to Pearson correlation analysis, the real interest rate, real gross domestic product, and inflation rate have no significant relationship to all the six indices of the Philippine Stock Exchange. Moreover, none of the selected macroeconomic indicators showed a significant relationship towards the Service Index. This opposed the findings of San Miguel (2019) that macroeconomic indicators such as the Real gross domestic product, foreign exchange rate, interest rate, and inflation rate have a strong relationship on the price performance of the service index of the PSE. On the other hand, the results revealed that the consumer price index has a positive relationship towards the Financial Index, Holdings Index, Property Index, Industrial Index, and Mining and Oil

index. Furthermore, Peso per US dollar rate showed a significant relationship towards the Financial Index, Holdings Index, Property Index, and Mining and Oil Index.

These results supported the conclusion of Murcia and Tamayo (2015), who determined that the peso-dollar exchange rate and consumer price index are predominantly indicators of the stock market indices. However, the results of Murcia and Tamayo showed that the Peso-dollar exchange rate has an inverse relationship with the PSE indices. However, the current study results revealed that it has a positive relationship. The correlation analysis also showed that the unemployment rate positively correlates with Mining and Oil Index while it shows an inverse relationship to Financial Index, Holdings Index, and Property Index. This means that a drop in the unemployment rate will increase the financial, holdings, and property index of the PSE. Lastly, Foreign direct investment – net inflows was found to have a significant relationship to the Financial Index, Holdings Index, Property Index, and Industrial Index; however, it has an inverse relationship to the Mining and Oil Index.

The regression analysis results concluded that macroeconomic indicators, when taken as a whole, do not significantly predict the Financial Index, Property Index, Industrial Index, Service Index, and Mining and Oil Index. In contrast, results showed that the macroeconomic indicators significantly predict the Holdings index when taken as a whole. However, when taken individually, none of the macroeconomic indicators was a significant predictor of the Holdings Index.

Recommendations

For Investors:

Investors may consider this study as a basis for their future investment decisions. The investors may examine the macroeconomic indicators that showed a significant

relationship in the study when structuring their portfolios and diversifying their strategies. Moreover, understanding the relationship of macroeconomic indicators in the PSE is crucial for better apprehension of the risk and opportunities related to macroeconomic indicators and the stock market, which could help the investors manage the systematic risk associated with the PSE.

For Companies Listed in the PSE:

The companies listed in the PSE may use the macroeconomic indicators that show a significant relationship to mitigate the risks when faced with macroeconomic changes. The study's findings should not be seen as conclusive evidence; the researchers recommend the companies consider other variables such as political, environmental, and economic issues and events that may affect the price movement of the sector to which they belong in the PSE.

For Financial Regulators and Policymakers:

Understanding the dynamic relationship between the macroeconomic indicators and the PSE indices can help the financial regulators and policymakers to understand the behavior of the PSE. The results of the study can be considered by them in establishing economic and financial regulations to develop a healthy and positively growing economy as well as help to efficiently direct the flow of savings and investment in the economy. The researchers recommend not to solely based on the results of the study but to also include other issues, factors, and observations that may affect the Philippine stock exchange indices.

For Future Researchers:

The researchers recommend using another statistical model to test the relationship between macroeconomic indicators and the Philippine stock exchange indices and to

account for the impact of the macroeconomic factors on the stock market. Moreover, to further enhance and deepen the understanding of the relationship between the variables, inclusion of other macroeconomic indicators such as trade variables (import and exports), producer price index, good governance index, and consideration of a longer period could improve the results of the study. The inclusion of these things may be a significant matter to analyze further the relationship of the macroeconomic variables to the PSE indices.

References

Acheampong I.K. and Wiafe, E.A. (2013). Foreign direct investment and stock market development: evidence from Ghana. *International Journal of Finance and Policy Analysis, 5*(1). https://www.researchgate.net/publication/255702022

Agcaoili, L. (2019, December 28). *Peso rebounds in 8675, 8nd best performer in Asia.* Philippine Star. Retrieved January 13, 2022, from https://www.philstar.com/business/2019/12/29/1980410/peso-rebounds-2019-2nd-best-performer-asia

Aje, S.O. and Daferighe, E.E. (2009). Impact analysis of real gross domestic product inflation and interest rates on stock prices of quoted companies in Nigeria. *International Research Journal of Finance and Economics.* https://vdocuments.site/reader/full/an-impact-analysis-of-real-GDP-inflation-and-interest-rates-on-stock-prices-of-quoted-companies-in-Nigeria

Al-abedallat, A. Z., & Al Shabib, D.K. (2012). Impact of the investment and gross domestic product (GDP) on the Amman stock exchange index. *Investment Management and Financial Innovations, 9*(3). https://

www.businessperspectives.org/images/pdf/applications /publishing/templates/article/assets/4771/imfi_en_2012_03_Al.pdf

Arčabić, V. and Krištić, I.R. (2013). The relationship between the stock market and foreign direct investment in Croatia: evidence from VAR and cointegration analysis. *Financial theory and practice, 37* (5), 54^{3}-126. https://doi.org/10.3326/fintp.37.1.4

Arsenio, J. et al., (2009) Is there a synchronicity between the Philippine stock exchange and New York stock exchange? The International Journal of Business and Finance Research, 3(1). https://www.theibfr.com/download/IJBFR/2009-ijbfr/ijbfr-v3n1-2009/IJBFR-V3N1-2009-6.pdf

Bangko Sentral ng Pilipinas. (2016) *Price Stability – Open Letter to the President.* Retrieved January 5^{2}, 6466, from https://www.bsp.gov.ph/SitePages/PriceStability/OpenLetter

Bangko Sentral ng Pilipinas. (2019). *Price Stability - Open Letter to the President.* Retrieved January 57, 6466, from https://www.bsp.gov.ph/SitePages/PriceStability/

Banawa et al., (2015). The impact of inflation rates on stock prices in the Philippines. https://www.researchgate.net/publication/286666081_ Assessing_the_Impact_of_Inflation_Rates_on_Stock_Prices_in_the_Philippines

Balaba, J. M. (2017). Does the stock market drive the Philippine economy? *DLSU Research Congress 8673.* https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/research -congress-proceedings/2017/RVREBM/RVREBM-I-003.pdf

Business World Online. (2019). *Unemployment, Underemployment decline in 2019*. Retrieved January 5^2, 6466, from https://www.bworldonline.com/ unemployment-underemployment-decline-in-2019/

Callen, T. (2020, February 24). *Gross domestic product: An economy's all*. International Monetary Fund. https:// www.imf.org/external/pubs/ft/fandd/basics/ gdp.htm

Carlstrom, C. T., Fuerst, T., & Ioannidou, V. P. (2002). Stock prices and output growth: an examination of the credit channel. *Federal Reserve Bank of Cleveland, Economic Commentary*. https://www.clevelandfed.org/ ~/media/content/newsroom%20and%20events/

Department of Finance. (2019). *DOF Economic Bulletin on Foreign Direct Investment*. Retrieved January 57, 6466, from https://www.dof.gov.ph/economic_bulletin/dof -economic-bulletin-on-foreign-direct-investment/

Iqbal, J. and Haider, A. (2005). Arbitrage pricing theory: Evidence from an emerging stock market. *Munich Personal RePEc Archive.* https://core.ac.uk/ display/7306217

Joshi, P. & Giri, A.K., (2015). Examining the relationship between sectoral stock market indices and sectoral gross domestic product: An empirical evidence from India. *Global Journal of Management And Business Research.* https://www.journalofbusiness.org/ index.php /GJMBR/article/view/1819/1721

Marquit, M. (2019, August 5).*1 Economic Factors That In⁶luence Stocks*. U.S. News & World Report. https:// money.usnews.com/money/blogs/the-smarter-mutual-fund-investor/ slideshows /economic-factors -that-influence-stocks

Murcia, J. B. (2014). Macroeconomic estimation of selected Philippine stock market indices. *Southeast Asian Interdisciplinary Research Journal, 2*(2). https:// www.researchgate.net/ publication/301822200

Murcia, J. B. and Tamayo A. M. (2015). Simulating the effects of macroeconomic activities on the sectoral indices of Philippine stocks exchange. *Proceedings of Business and Social Sciences Research Conference*. Thailand https://www.researchgate.net/ publication/301822331

Njane, R. (2017). The effect of foreign direct investment on stock market development in Kenya. *University of Nairobi.* http://erepository.uonbi.ac.ke/bitstream/ handle/11295/103350/

Olokoyo, F., Ibhagui, O. & Babajide, A. (2020). Macroeconomic indicators and capital market performance: Are the links sustainable? *Cogent Business & Management, (7)*5, $5^{1\,3}669^2$. https://doi.org/10.1080/ 23311975.2020.1792258

Omodero, C. and Ekwe, M.C. (2016). Impact of Foreign Direct Investment (FDI) On the Stock Market Performances in Nigeria (1985- 2014). *Applied Finance and Accounting, 3*(5). URL: http://dx.doi.org/ 54.55558/ AFA.v3i1.1932

Organization for Economic Cooperation and Development. (n.d.). *Foreign Direct Investment (FDI)*. OECDiLibrary. https://doi.org/10.1787/9a523b18-en

Picardo, E. (2020, September 24) *How the unemployment rate affects everybody.* Investopedia.https:// www.investopedia.com/articles/economics/10/ unemployment-rate-get-real.asp

San Miguel, E.B. (2019). Interrelationship between Philippine stock exchange services sector index and selected macroeconomic indicators. *Indian Journal of Science and Technology, 12*(74), 5 – 10. http://dx.doi.org/10.17485/ijst /2019/v12i30/145444

Seth, R. & Tripathi, V. (2014). Stock market performance and macroeconomic factors: the study of Indian equity market. *Global Business Review, 71*(2), 291–316. https://doi.org/10. 1177/0972150914523599

Sin-Yu Ho & N.M. Odhiambo. (2018) Analysing the macroeconomic drivers of stock market development in the Philippines. *Cogent Economics & Finance, (2)* 1,1451265. https://doi. org/10.1080/23322039.2018.1451265

Tsaurai, K. (2014). Stock market and foreign direct investment in Zimbabwe. *Risk governance & control: financial markets & institutions*, *4*(6*),* 54-60. https://doi.org/ 10.22495/rgcv4i2art4

Varsha, M., Sikarwar, T. S. & Mehta, S. (2011) Macroeconomic factor and stock returns: Evidence from Taiwan. *Journal of Economics and International Finance, 2*(4),217-227. https://www.researchgate.net/publication/228985237