**PSEI Monthly Price Prediction Simulation**

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**Abstract**

**The Philippine Stock Exchange (PSE)’s primary stock index is the Philippine Stock Exchange Composite Index (PSEi). The top 30 publicly traded firms in the Philippines are used to calculate the PSEi, often known as component stocks. It gives one number by which the performance of the Philippine stock market may be measured. Unfortunately, the PSE does not reveal these weights, which can change for each trading day. In this paper, we propose a simulation to predict the monthly price of the Philippine Stock Exchange using the Monte Carlo simulation.**

**Keywords:**  Philippine Stock Exchange, Philippine Stock Exchange Composite Index, Price prediction.

# I. INTRODUCTION

The Philippine Stock Exchange Composite Index (PSEi), formerly known as Phisix, offers financial institutions, and other providing market participants a benchmark for measuring the stock market's performance in the Philippines. It is 30 common stocks of listed firms make up the composition. Which the Philippine Stock Exchange has chosen with careExchange (PSE). In order to get chosen, a corporation must place amongst the top 25% of median daily values in nine of the reviewed year's twelve months and have a free float level of at least 12%. Stock in the Philippines Exchange (PSE) selects the top 30 eligible based on the total market capitalization of the companies.

PSEi acts as a gauge for changes in the price level of the whole Philippine stock market. It also provides a useful benchmark against which to measure an investor’s portfolio. Due to them, it is necessary to model and predict the PSEi's value. The PSE plays a vital role in the financing of productive enterprises that use the funds for growth and expansion of new jobs. It is therefore essential to the growth of the Philippine economy. Furthermore, the PSE facilitates the selling and buying of the issued stocks and warrants.

In this paper, we propose a simulation to predict the monthly price of the Philippine Stock Exchange using Monte Carlo simulation.

Monte Carlo Simulation, also known as the Monte Carlo Method or a multiple probability simulation, is a mathematical technique, which is used to estimate the possible outcomes of an uncertain event [1]. By creating models of potential outcomes and replacing any factor that has intrinsic uncertainty with a range of values—a probability distribution—Monte Carlo simulation does risk analysis. Then, it repeatedly calculates the outcomes using a new set of random values drawn from the probability functions.

# II. REVIEW OF RELATED LITERATURE AND STUDIES

This section presents various related literature and studies which are guidelines to the framework of predictive models.

## Monte Carlo Simulation

Monte Carlo simulations are used to model the probability of different outcomes in a process that cannot easily be predicted due to the intervention of random variables. It is a technique used to understand the impact of risk and uncertainty in prediction and forecasting models [2].

A Monte Carlo simulation can be used to tackle a range of problems in virtually every field such as finance, engineering, supply chain, and science. It is also referred to as a multiple probability simulation [2].

# III. METHODOLOGY

The dataset used in the study is from the Wall Street Journal (WSJ)’s market-data website. This WSJ’s market—data website is composed of Philippine Stock Exchange Composite Index (PSEi)’s prices way back in its first year until today.

## Model Creation

Using the commercial software tool Microsoft Excel, Microsoft produced Microsoft Excel, a spreadsheet, for Windows, macOS, Android, and iOS. It has calculating or computing capabilities, graphing tools, pivot tables, and the Visual Basic for Applications macro programming language. The Microsoft Office program package includes Excel. The data from the Wall Street Journal’s market website was extracted in Excel form.

## NORMALINV Function

* Returns the inverse of the normal cumulative distribution for the specified mean and standard deviation.

Syntax

* NORMALINV(probability,mean,standard\_dev)
* The NORMALINV function syntax has the following arguments:
* Probability Required. A probability corresponding to the normal distribution.
* Mean Required. The arithmetic mean of the distribution.
* Standard\_dev Required. The standard deviation of the distribution.

## STDVA Function

* Standard deviation is calculated based on a sample. The standard deviation serves as a gauge for how widely values deviate from the mean (the mean).

Syntax

* STDEVA(value1, [value2], ...)
* The STDEVA function syntax has the following arguments:
* Value1, value2, ... Value1 is required, subsequent values are optional. 1 to 255 values corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

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# IV. RESULTS AND DISCUSSION

The succeeding are the results and discussion from the study, which aimed to develop and validate a model to simulate the monthly price of the Philippine Stock Exchange Composite Index (PSEi).

## Days in Future Trading and its prices

Table

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*Table 1: Simulated Prices*

Table 1 shows the days in future trading which is composed of days in a month. The trading days in a month are 21 days only. In the right side, simulated prices are shown for each trading day.

# A screenshot of a computer Description automatically generated with low confidence

*Table 2: 10000 Possible Outcomes*

Table 2 shows the starting price, which is 6,352.32. The Table reveals the mean price, median price, standard deviation, variance, and percentile of the 10000 possible outcomes. It also shows the mean price, standard deviation, and variance for the Real Data.

*Figure 1: Shows the Simulated Price in a graph*

Chart, line chart

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*Model Validation*

To validate this simulation model of the PSEi’s monthly prices, a statical test namely, the t-test has been used. A statistical test called a t-test contrasts the means of two samples. It is used in hypothesis testing, where the null hypothesis is that there is no difference between the group means, and the alternate hypothesis is that there is a difference between the two.

Text, letter

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*Table 3: Shows how to calculate t,*

Table

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*Table 4: T-test*

*Table

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*Table 5: T-test score*

Tables 4 and 5 show the t-test and the score itself. With a t-score of 1.759729793 and a t-value of 1.64485 the t-test shows that the model is considered statistically non-significant. Thus, shows that the model is valid.

# V. CONCLUSION

In this study, the researchers developed a simulation to predict the monthly price of the Philippine Stock Exchange Composite Index (PSEi). The research was successful to achieve its goal by using the simulation method which is called Monte Carlo Simulation. Creating a model to predict the probability of different outcomes with the present intervention of random variable. With the use of Microsoft Excel, the researchers implemented the simulation method and applied the data. The simulation shows that the price of PSEi would drop from 6358 Php to 5864 Php decreasing by 7.77%. The model in this paper is proven to be valid using the t-test that shows that the model is statistically non-significant. Thus, the model is valid.

# REFERENCES

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