

# FRACTAL ANALYSIS OF PHILIPPINES INFLATION RATE

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## **Abstract**

*Forecasting the movement of the inflation rate is essential in determining economic growth and stability. This study examined the volatility of Philippine inflation rate for the past six decades using the concept of fractal analysis as a basis for forecasting the inflation rates in the next ten years. The study revealed that despite a mixture of domestic and international problems, an inflation rate of our country remains to be stable. Moreover, a minimal dwindle in the projected inflation rate was noted but showed significant unstable result in the fractal dimension due to unforeseen factors and events that may happen in the future.*

**Keywords:** *inflation rate, trend, forecasting, fractal*

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## **1.0 Introduction**

Inflation underscores a sustained increase in the general price level of goods and services in the economy over a period of time. A sudden increase in the general price level decreases the purchasing power of money. Hence, analyzing the inflation rate is a worthy research endeavors because any movement of inflation significantly poses either opportunity or danger in macroeconomics stability not just in developing countries but as well as first-world countries. This study attempted to investigate the trend and project Philippine inflation volatility using fractal analysis.

A lot of studies have previously been conducted to forecast volatility in Philippine inflation. It is humbling to note that a naïve random walk model, which predicted that the one- period- ahead inflation forecast is equal to the previous inflation, outperforms highly developed models of inflation (Fisher et al., 2002; Atkeson and Ohanian, 2001). Thus, in practice, statistical models of inflation are usually complemented by “anecdotal and other ‘extramodel’ information and professional judgment (Bernanke, 2007). Mariano (1985), on the

other hand, explained a statistical procedure for forecasting monthly inflation as measured by the changes in the Consumer Price Index. The procedure used a price equation which was specified in terms of its own past values, and including cost-push and demand-pull factors. This approach anticipates the subsequent work of Mariano in specifying the Single-Equation Model (SEM) for inflation forecasting. Mariano et al., (2003) presented a structural long-term inflation forecasting model for the Philippines. The forecasting model served as a quantitative tool to forecast headline and core inflation rates one to two years into the future. Moreover, it provides more detail on the determination of prices in the economy.

The science of forecasting inflation rate is usually benchmarked against various models supported by rich literature. While there is considerable amount of established studies on forecasting inflation volatility in the Philippines using different models, no study yet applying the concept of fractal that embodies the key feature of self-organization, self-similarity and dynamism

to examine and project inflation rate the country. In this study, the concept of fractal was applied

Forecasting inflation rate is very significant for many reasons: (1) it guides economic policy makers in their policy-decision making; (2) it gives baseline reference for owners and business administrators in their financial projections; and (3) workers impute inflation forecasts help determine wages that they ask from their employers.

### 2.0 Research Methodology

This study developed a short-term forecasting model that explored the volatility features of Philippine inflation from 1961 up to 2012. The data were taken from the World Bank, World Development Indicators Updated April 23, 2013. To perform the trend analysis of the Philippine inflation trend for more than six decades, mini tab software was employed. Similar step was also considered in projecting the inflation

rate in the next ten years.

Meanwhile, frackout software was used to generate the fractal dimensions of the inflation rate. The idea of fractal analysis states that the higher the fractal dimension of an object, the more rugged it is, which suggests that the higher the fractal dimension of the inflation rate, the more unstable the economy of the country is.

### 3.0 Results and Discussions

Figure 1 presents the inflation movement rate of Philippine Economy in the past six decades. The figure reveals significant movements in Philippine inflation rate for more than six decades. After experiencing years of positive economic growth from 1960's to 1970's, the inflation volatility of the country increased significantly for the period of 1973 to 1986 because Philippine economy, during these times, suffered from a downturn due to a mixture of domestic and international problems.

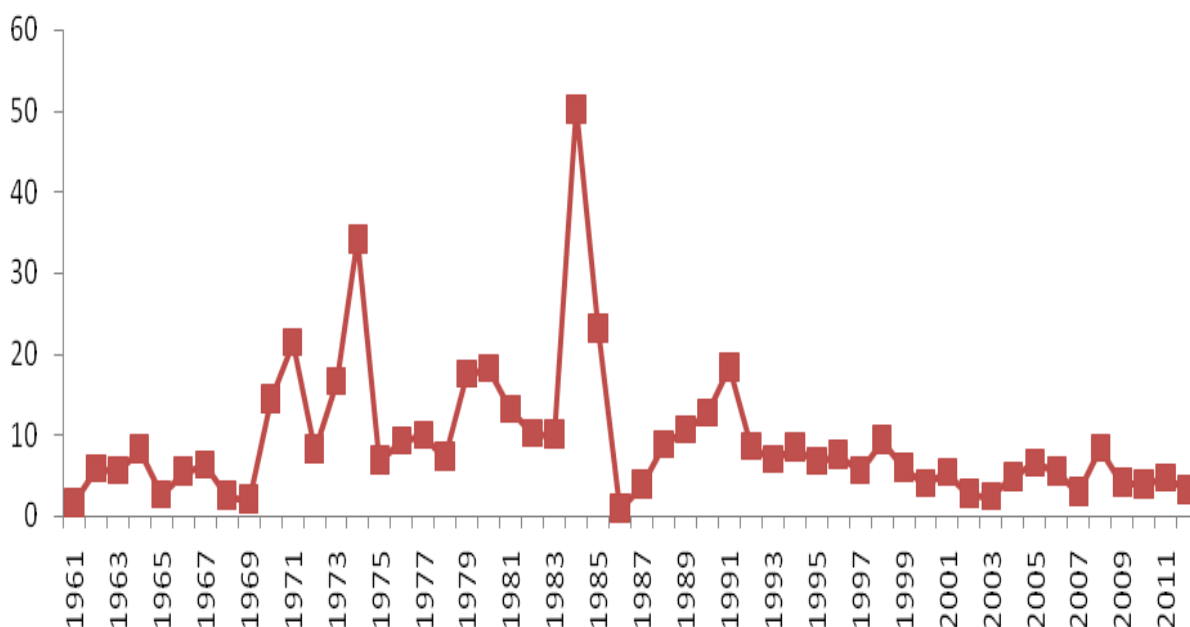


Figure 1. Inflation rate in the Philippines from 1961 to 2012

These were the years that saw the country under President Ferdinand Marcos and martial law, the assassination of Benigno Aquino, Jr., changes to the Philippine energy law, and the success of the EDSA People Power Revolution (Kushida, 2008).

By fall 1984, highest increase of inflation rate was recorded because of somewhat negative picture of the Philippines emerged. By the year's end, the nation's external debt was almost doubled from the projected \$18 billion to \$30 billion, and the balance-of-payment deficit has climbed above \$ 2 billion. In September, industrial production fell for the first time in many years, and huge lay out seemed imminent in the first quarter of the next year, given an extremely low inventory of materials in manufacturing firms. The rate of inflation doubled following two devaluations of the peso in June and October. Also, the country faced its worst liquidity crisis since 1945 due to an estimated \$ 1 billion capital flight from late

August to December (Kushida, 2008). After these periods, the efforts of Philippine administration for radical changes and democratic reforms lead to the recovery of the economy that is felt up to the present.

Result of the fractal analysis of the inflation rate for the past six decades is presented below. Despite remarkable movements of the country's inflation rate, generally, our economy remains to be stable based on the fractal dimension of 1.0449.

This shows that the notable problems and challenges the country faces for the past six decades do not affect our economic stability.

### Forecasting of Philippine Inflation Volatility

Following the trend analysis, the forecast inflation movement rate from 2013 to 2022 and its fractal analysis are enumerated below:

Table 1. Fractal results of the actual inflation rate

Width , Height	819,460
Cover or Bright Diff	1.1
R (n)	-0.9969(8)
<b>Fractal Dimension</b>	<b>1.0449</b>

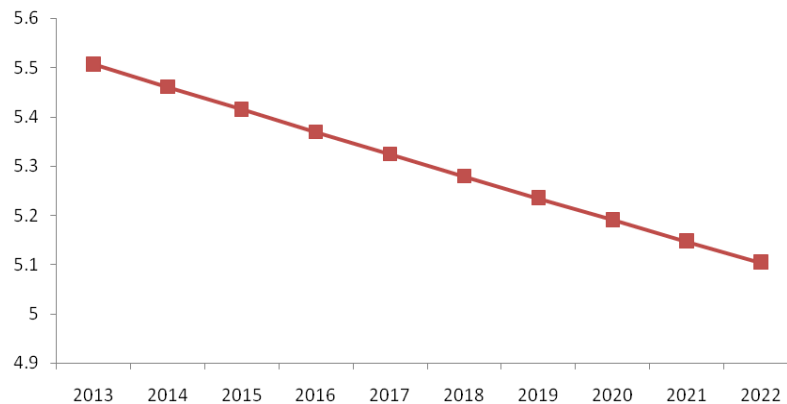


Figure 2. Projected inflation rate from 2013-2022

Table 2. Fractal result of the projected inflation rate

Width , Height	1,360,658
Cover or Bright Diff	0.9
R (n)	-0.9996(9)
<b>Fractal Dimension</b>	<b>1.1401</b>

Figure 2 shows a downward sloping line that signifies a minimal decrease of the inflation rate for the coming years. This minimal decrease tells that our economy will grow in a subtle way over years. However, the fractal dimension of 1.1401 of the inflation rate forecast is higher than the actual fractal dimension of 1.0449 of the inflation rate. The difference in the fractal dimensions implies a state of instability. This can be attributed by many factors and unforeseen events may happen in the future that can either affect positively or negatively Philippine economic growth.

#### 4.0 Conclusion

The inflation rate of our country remains to be stable amidst major local and foreign issues the country faces for the past six decades. However, the observed unstable condition in the projected inflation rate may be attributed to the issues that may happen in the future.

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