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# Dynamics of PLDT Stock Price

Roseanne Kaw[1],* and Robert Roleda[1]
[1] *Physics Department, De La Salle University, 2401 Taft Avenue, Manila*
**Corresponding Author: raly_anne_kaw@yahoo.com*

**Abstract:** Investing in stocks is commonly held to be a risky enterprise because of the unpredictable nature of the market. While it may be true that forecasting the exact value of stock price at some time in the future is impossible, it is believed that one can at least calculate the probability that a certain price occurs. Calculation of probabilities is generally based on past prices. This study evaluates the dynamics of PLDT stock prices by looking at the evolution of the probability density function that describes the stock price return over a period of 24 years, divided into 30-day segments with 15-day overlaps. Gaussian distribution is assumed and the mean and standard deviation (sigma) for each segment are determined. Graphical analysis of the mean, sigma, increment mean, increment sigma, and time showed that only sigma has a deterministic characteristic, with a curve-fit sine-square time dependence. With a time-dependent sigma, it is then shown that the evolution of the probability density function follows the Fokker-Planck equation. Comparison with the Feynman-Kac equation indicates that the dynamics can be described by a sigma-dependent potential, which has an oscillatory characteristic.

**Key Words:** stock market; probability density function; Fokker-Planck equation