

## Literature Review on Detecting Bubbles in Stock Market

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### ABSTRACT

Stock market bubbles are times when valuation dynamics are momentarily explosive. Stock bubbles can be interpreted as a deviation of stock prices from their fundamental value. LPPLS is one of model to calculate bubble, which assuming that an asset's observed price trend during a bubble era differs from its intrinsic fundamental value. This research is qualitative study or descriptive research to review the LPPLS as a model to calculate bubbles in stock. This study uses secondary data sourced from articles which published in Scopus Indexed International Journal. The conclusion of the research that the LPPLS model can calculate, predict and identify accurately bubbles related historical event such as the black Monday, dot com, and subprime crisis periods. The LPPLS model has the advantage, including construct end of bubble signals accurately.

## INTRODUCTION

Although a stock price may occasionally have bubble issues, in the long term the stock price is governed by the fundamental factors. Stock market bubbles are times when valuation dynamics are momentarily explosive. When a series of anticipated improvements in profitability result in high valuation and mix with one another, bubbles are more likely to emerge. The valuation is momentarily mean averting during bubble situations. This suggests that even if the market is pricy and values are high and anticipated to rise further, predicted returns from valuation change are positive. A price for an asset that is out of line with the level that is supported by economic fundamentals is another way to describe a bubble. In actuality, multiple abrupt increases in stock values appear to have taken place throughout history in various nations and eras, and as a result, they have been labeled as bubbles.

One of the financial markets' holy grails is up-front bubble spotting. In order to minimize systematic financial risks and ensure financial stability, regulators can learn a lot from spotting and detecting stock market bubbles. The findings calls into question whether it is wise to try to pop a bubble. It requires a decision between preventing a financial collapse and permitting profitable investment if a bubble is linked to investments in innovative technologies with high economic promise and high economic uncertainty.

To diversify their portfolios, investors must also recognize and avoid bubbles. While making investment decisions in the midst of uncertainty, it is important to consider the likelihood of possible outcomes and various perspectives on these possibilities. Understanding bubbles that did not burst is just as important for investors as understanding those that did. For the long-term investor, putting too much emphasis on avoiding a bubble or miscalculating how frequently a crash follows a boom is risky since it ignores the equity risk premium.

## THEORETICAL REVIEW

Stock bubbles can be interpreted as a deviation of stock prices from their fundamental value, which adopting the Cochrane model, which uses the ratio of stock prices to dividends which is influenced by expected returns and dividend growth rates. In general, if there is no bubble, the ratio of stock prices to dividends will be balanced in the long term or stationary. However, when a bubble occurs, the ratio explodes.

There are several other approaches to measuring bubbles, including rational bubbles (Blanchard and Watson, 1982, bubbles caused by non-fundamental factors. Through the equation  $P_t = P^* + C_t$ , where asset prices deviate from the fundamental price of the bubble component. This bubble component grows at the level of long-term return on assets with a probability  $\pi$  and will crash (break) with a probability  $1-\pi$ . Prior to the occurrence of the bubble burst phenomenon, based on the above theory it was stated that the return on assets at that time experienced faster growth than the average return journey.

Another approach to bubble measurement is Froot and Obsfeld's bubble model, which is called an intrinsic bubble, a bubble that has an asset

dependency on its fundamentals. Through the equations  $P(Dt) = P_{pvt} + B(Dt)$  and  $B(Dt) = cDt^\lambda$ , dividends are influenced by the present value of the stock price or fundamental and intrinsic bubble prices. The intrinsic bubble is influenced by  $c$ , which is a constant that has a positive value ( $c > 0$ ) while  $\lambda$  is more than 1 ( $\lambda > 1$ ). The intrinsic bubble is determined by the dividend growth trend, dividend log, and random events with zero conditional mean and variance. If the fundamentals remain unchanged, the bubble component remains constant at a constant value. If the fundamentals show increasing activity, then the bubble component and the price of the asset will be affected by a persistent deviation from the value of the fundamental.

The Log-Periodic Power Law Singularity (LPPLS) model is one of model to calculate bubbles, which assuming that an asset's observed price trend during a bubble era differs from its intrinsic fundamental value. The LPPLS model simulates the price trajectory in a bubble regime as a process of fast-than-exponential power law development interrupted by transient corrections by combining two characteristic bubble features: the transitory super-exponential growth and the increasing log-periodic volatility fluctuations. When the data amount is minimal, as it frequently is for financial time series analysis, the LPPLS model can beat machine learning algorithms that are less parametric and more data driven, and therefore less agile and sensitive.

## METHODOLOGY

This research is qualitative study to describe the LPPLS as a model to calculate bubbles in stock. The qualitative study is called also as descriptive research. The qualitative study focuses on providing review of the selected journals. This study uses secondary data sourced from articles which published in Scopus Indexed International Journal.

## RESULTS AND DISCUSSION

Based on selected articles, we can highlight about the excellence of the LPPLS. *First*, the LPPLS can identify both the positive and negative bubbles relating to well-known historical events, displaying its exceptional ability to predict the bubbles beforehand. *Second*, LPPLS technique generates fresh statistical evidence of bubbles for some other events, efficiently constructs End-of-Bubble signals for all of the well-documented bubbles, and accurately diagnoses positive and negative bubbles. *Third*, the LPPLS can accurately anticipate the crucial date by describing the behavior of the super-exponential (power law with finite-time singularity) increase or drop of the CSI300 index. *Fourth*, the LPPLS can capture significant bubbles across various time scales, such as the Black Monday, Dot-com, and Subprime Crisis periods. *Fifth*, the LPPLS has the advantage of including the bubble's end time as a defining parameter, which allows it to be approximated over a range of time windows. The parameter  $t_1$  identifying the start of the time window with the best goodness of fit and that complies with the requirements of the LPPLS model has been proposed to be endogenized in the cost function in order to estimate the commencement of a bubble.

## CONCLUSIONS AND RECOMMENDATIONS

The conclusion of the research that the LPPLS model can calculate, predict and identify accurately bubbles related historical event such as the black Monday, dot com, and subprime crisis periods. The LPPLS model has the advantage, including construct end of bubble signals accurately.

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