Archives of Business Research – Vol. 9, No. 8
Publication Date: August 25, 2021
DOI:10.14738/abr.98.10603.
Dasman, S., & Purnama, P. (2021). Bubble Detection and the Impact of Monetary Policy, Market Sentiment and Market Liquidity on Property Stock Price Index in Indonesia. Archives of Business Research, 9(8). 75-86.

Bubble Detection and the Impact of Monetary Policy, Market Sentiment and Market Liquidity on Property Stock Price Index in Indonesia

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ABSTRACT

The purpose of this study is to detect the existence of a bubble stock and analyze the impact of monetary policy, market sentiment and liquidity on the property stock index in the Indonesian capital market. The data used in this study is secondary data originating from various sources for the period 2016 – 2020 using multiple linear regressions. The bubble stock detection is done by using the ratio between the property stock price index and the consumer nutrient index. The results showed that there was an indication of a moderate bubble stock in the property stock index during the research period 2016 – 2020. The factors that impacted the property stock price index were interest rates, the rupiah exchange rate against the US dollar, market sentiment and market liquidity. The increase in interest rates, the rupiah exchange rate, and market sentiment and liquidity has an impact on the increase in the property stock price index on the Indonesian stock exchange for the 2016 – 2020 periods.

Keywords: Bubble Stock, Exchange Rate, Interest Rate, Inflation, Market Sentiment, Market Liquidity

INTRODUCTION

The optimism for growth in the property sector in year 2020 can be seen from the significant increase in the income of workers in several areas. Only certain areas have an increase of up to eight percent." On the other hand, the association of housing developers is also still seeing the huge demand. Based on data from the Ministry of Public Works and Public Housing (PUPR), there are still 13 million housing needs throughout the country. "This means that all over Indonesia there are markets. It's just a matter of how developers want to survive with this condition of purchasing power so that it doesn't continue to decline [20].

The capital market is part of the financial sector, so in order to support financial sector stability; capital market activities must be considered. The capital market is an alternative place for companies that need a quick injection of funds for company development, company expansion and corporate capital funding. The main instrument of the capital market is in the form of shares which are then traded to the owners of capital (investors), in the capital market an

investor is free to make investment transactions according to their investment style and portfolio that has been regulated and planned, not only that the capital market is also a place attractive for investors because stocks have a more attractive return compared to other investment instruments.

An investor who invests stocks in the long term rationally is usually guided by the fundamental value, but sometimes the price of the stock in the market is not always the same as its fundamental value, sometimes irrational investors who do not have a basis for making decisions in buying shares still buy them, then if the price If the asset experiences a sharp decline in price, it will cause problems for investors in the form of losses. Irrational actions taken by investors are more clearly when they trade excessively, buy stocks based on social media news that have nothing to do with the fundamental value of assets, join in buying stocks that their friends buy, past performance becomes decision making, hold back stocks that decline longer and sell stocks that experience price increases earlier [23]. Irrational decision making by investors can increase the price of an asset excessively.

In addition to the actions of irrational investors, actions and speculative activities carried out by financial specialists in the capital market can also cause prices to soar. The speculative action referred to in this case is when the financial specialist takes action by considering reasonable possibilities through market sentiment created through positive feedback, so that profits can be obtained without any problems in the future. If the action is not in accordance with what is expected, then the loss can become a significant problem in the future.

The assets invested by investors are not only in stocks but vary widely and the prices also vary, but this study focuses more on the property index bubble stock in the Indonesian capital market, because stocks have a very elastic supply and a very high level of market liquidity compared to other types of assets, so that price increases can occur quickly and briefly.

LITERATURE REVIEW

Economic cycles can occur in the short term, medium term, or long term, depending on the economic system adopted and the causes of cycles in a country. The capitalists predict that there will be a crisis (economic downturn) in the business cycle every 25 years, while the socialists predict that the crisis will occur every 45 years. This time period is longer considering the large role of the government in the economy, especially in price regulation. To support the achievement of macroeconomic targets, high economic growth, price stability, equitable development, and balance of payments, a macroeconomic fundamental policy, namely monetary policy, was formulated.

The world economic cycle experiences fluctuating conditions. The economy has been in periods of depression, stability, or crisis. Crisis can arise as a result of several events including an unstable government system that affects asset prices which experience continuous price spikes and eventually experience a "bubble price", economists use the term "bubble" to increase asset prices to an extreme [19].

Bubble Stock

Bubble stock in the capital market is an increase in stock prices in a short and drastic period. According to Alan Grespan, who is chairman of the Federal Reserve and at the same time a

leading economist, he believes that the price of securities shows a price bubble. The price bubble in question is a strong and irrational price increase [15]. This irrational behavior is reflected when market participants trade excessively, buy stocks based on social media news that have nothing to do with fundamental values, join in buying stocks that their friends buy, past performance becomes decision making, holding stocks that have decreased more and sell stocks that have increased in price earlier.

The level of irrational behavior carried out by market participants that can affect the price bubble and the fall of the stock price bubble is divided into three levels including: 1) A stable market reacts showing a small bubble around the price fundamentals. 2) A market with a fairly large bubble, when the subject receives the information and begins to react which is then reflected in a bubble that peaks at about 3-4 times the fundamental price, but the bubble is still below the exogenous upper limit. 3) Markets with very large bubbles i.e. bubbles of more than 10 times the fundamental price, and the collapse caused by several subjects reached the highest estimate of 1000 times the fundamental price [3]. Bubble stock is trading in large volumes at prices that are very different from their intrinsic value, in other words trading a product or asset at a price higher than its fundamental value then the price continues to increase that cannot be explained fundamentally and then decreases continuously [16]– [17].

Based on the description above, it can be concluded that the price bubble is a substantial phenomenon of the economic cycle which is characterized by a rapid and irrational increase in market value, especially asset prices. Rapidly rising inflation followed with a rapid decline or contraction in what economists term a "bubble crash" or "bubble burst". Bubbles are created by the influence of market participants who are more optimistic about maintaining prices and also news sentiment that can affect market participants towards an asset. Examples such as unexpected public news reports can affect market participants. Very strong market participants with non-fundamental news that shifts their belief from above to below a certain threshold, finally uncertainty about fundamentals manipulating the market can work through the channel i.e. belief manipulation (market sentiment) which causes a period of price error then the manipulation is reflected in asset prices [21].

Bubble stock can arise through a positive feedback loop mechanism and cannot be ruled out by transverse conditions. Institutional demand for an asset causes asset prices to get overvalued from their true value and these institutions have expertise in time variations to play prices and create price bubbles [11]. According to the analysis of bubble game theory, one of the conditions needed to explain why bubbles occur is the presence of asymmetric information. Investors hold bubble assets because it allows asymmetric information; they believe that they can sell it at a higher price, with a positive probability in the future [2].

Bubble Crash

The collapse of the bubble or the reflection of the anti-bubble is triggered by a reversal of the sign of the expected change in profitability. The price of securities fell tremendously due to the size of risk aversion, risk quality and quantity of risk increased substantially in times of crisis by investors. Corporate managers often have a higher level of personal information about the company's operations, asset values, and future prospects than outside investors. Manager's decision to disclose information if disclosure preferences are not aligned with outside investors then the risk of falling stock prices can occur when a large amount of bad news previously held

by the company's management is released. This makes stock liquidity risk a crash due to the possibility of the formation of bad news, namely the possibility of bad news due to poor managerial performance or negative surprise news [8].

According to experts, the impact caused by the bubble has different views to recognize it and the following is an explanation from the previous literature regarding the impact caused by the bubble. The implications of the bubble stock have a positive effect on the economy. The existence of a bubble stock leads to a higher equilibrium interest rate. This requires product blocking which can result in increased demand for differentiated goods at the individual company level. Large companies can drive incentives for internal R&D through the cost dispersion effect and promote economic growth. A burst of bubble stock in the market can have an impact on many people and the economy. Most companies that grow exponentially through bubble stock can go bankrupt when this happens and have an impact on increasing the number of unemployed. Business and consumer consumption is reduced and this can lead to the start of an economic recession due to the negative effects of the bubble stock explosion.

The bubble stock helps loosen endogenous credit and allows companies to make greater investments and hire more workers, but when the bubble bursts endogenous credit tightens, causing companies to reduce investment and hiring. As a result, it is more difficult for workers to find work so the number of unemployed is high. The research conducted by the bubble is measured by the stock price affected by the bubble in the Indonesian capital market on the Indonesia Stock Exchange for the period 1998 - 2017. Research conducted to detect asset bubbles using a comparison of the Property Stock Index (PSI) with the Consumers Price Index (CSI). The asset bubble formula is as follows [14]:

$$\textbf{Asset Price Ratio} = \frac{PSI}{CSI} \times 100$$

The bubble level in his empirical research on the asset bubble in the USA into three levels as follows: small bubble (Ratio of asset price to CSI reaches 2:1); medium bubble (Ratio of asset price to CSI reaches 4:1); and explosion bubble (Asset price to CSI ratio reaches 10:1) Property Stock Index (PSI) is an index that summarizes the development of property prices. The Consumers Price Index (CPI) is a measuring tool to assess the average change in the prices of goods and services that are considered very important. CPI is calculated by monitoring price changes for each item. CPI is also useful for determining the level of costs at a fixed price unit. The CPI becomes an indication of an average level of goods and services, which is referred to as a representative group for the average consumer's purchase.

Monetary policy is one of the fundamental parts of economic policy to support the achievement of macroeconomic targets, namely economic growth, price stability, equitable development, and balance of payments balance [21]. Monetary policy was made to anticipate inflation and the decline in the exchange rate due to inflation expectations. Efforts made by the government to minimize inflation expectations by buying Government Securities. The objective of this monetary policy as stated in “Law no. 3 of 2004 article 7 concerning Bank Indonesia “Monetary policy is generally an action by Bank Indonesia in influencing the development of monetary variables such as money supply, exchange rates and loan interest rates to achieve certain economic goals. The interest rate on monetary policy in Indonesia can be reflected by the effect of changes in the BI 7 DRR (Bank Indonesia 7 day reverse repo rate) on banking rates, such as

deposit and credit rates. Banks responded to the BI 7DRR interest rate by lowering or increasing loan interest rates. The company bears a lower or higher cost of capital to finance its investment. A company plans to meet capital requirements it is very important to have the right interest rate, whether to issue equity or debt securities. The addition of bonds or additional debt can only be done by the interest rate is lower than the addition of capital. Lower interest rates will lead to lower borrowing costs and stimulate investment and economic activity which causes stock prices to increase.

Market Sentiment

Market sentiment is the state of the market being in an efficient condition if prices always reflect all available information. The market condition refers to the assumption that investors act rationally, investors in making decisions use logical considerations based on all the information they have. The information comes from both inside and outside the company. Those factors lead to the formation of public perceptions of investment actors which have an impact on stock price movements. A sentiment is an individual feeling that is excessively optimistic or pessimistic about a situation that can lead to feelings among investors about the company's future. Confidence can be said as a feeling of optimism or pessimism of investors about stocks in general [18].

Consumer confidence is a survey of business data reported by the European Commission, economics and organizations with an interest in finance with respondents being assessed on how their economic or financial expectations are in the next 12 months with several topics such as the general economic situation, assessment of unemployment, household financial position and personal savings [9]. The Consumer Confidence is computed as a net balance obtained from the difference between percentage on 'increase' answer and percentage on 'decrease' answer. An index above 100 indicates an improving outlook and below 100 a deteriorating outlook.

Market Liquidity

Stock liquidity or market liquidity is the trading volume associated with the bid-ask spread. The higher the liquidity of the stock indicates that the transaction volume of the stock is also higher. The lower the liquidity of the stock indicates the transaction volume of the stock as well lower [26]. Market liquidity explains the number of share buying and selling activities in each issuer's stock market, which can be seen from the volume of stock transactions. Trading volume activity is the ratio between the numbers of shares traded at a certain time to the number of shares outstanding at a certain time.

Trading volume activity is used to measure changes in stock trading volume. High stock transactions will be marked by a change in the volume of the company's shares. The higher the transaction of the company's shares, the higher the liquidity of the shares, this means that the shares are increasingly in demand by investors. Trading volume activity can be used to assess the phenomenon that causes the level of demand for a stock to be higher than the level of supply of shares so that the volume of trading transactions increases.

METHODOLOGY

This type of research is explanatory research to explain the position of the variables and the relationship between one dependent variable and conduct an investigation of the independent variables. This study is used to determine how the influence between the independent variable

and the dependent variable through hypothesis testing. The dependent variable in this study is the bubble stock index of property stock prices. Meanwhile, the independent variables used in this research are monetary policy (interest rate, inflation rate, and rupiah exchange rate), market sentiment (consumer confidence index), and market liquidity (trading volume activity). This research method uses multiple linear analyses on monthly data with a research period from 2016 to 2020.

Variable Operationalization

The dependent and independent variables in this study consist of bubble stock, property stock index, interest rate, inflation rate, consumer confidence and trading volume activity. The definition and measurement of each independent variable can be seen in table 1.

Table 1 - Variable Operationalization

Variable	Definition	Indicator	Source
Bubble Stock (BS)	Ratio between Property Stock Index (PS) and Composite Stock Index (CS)	BS = $\frac{PS}{CS}$	https://www.investing.com/
Property Stock Index (SP)	Property Stock Index (PS)	Monthly property stock index	https://www.investing.com/
Interest Rate (IR)	The BI 7- day reverse rate at which central banks lend or discount eligible paper for deposit money banks, typically shown on an end-of-period basis.	Monthly interest rate (%)	https://www.bi.go.id/
Inflation Rate (IF)	The inflation rate measures the price of a selection of goods and services for a typical consumer.	Monthly inflation rate (%)	https://www.bi.go.id/
Rupiah Exchange Rate (KR)	The USDIDR spot exchange rate specifies how much one currency, the USD, is currently worth in terms of the other, the IDR.	KR = $\frac{IDR}{USD}$	https://www.bi.go.id/
Consumer Confidence Index (CC)	A net balance obtained from the difference between	$CC = CCp - CCn$	https://data.oecd.org/

Variable	Definition	Indicator	Source
	percentages on 'increase' answer (CCp) and percentage on 'decrease' answer (CCn).		
Trading Volume Activity (TV)	Trading volume is the total number of shares of a security was traded during a given period of time.	IDR value	https://id.investing.com/

EXPERIMENTS AND ANALYSIS

Descriptive Statistical Analysis

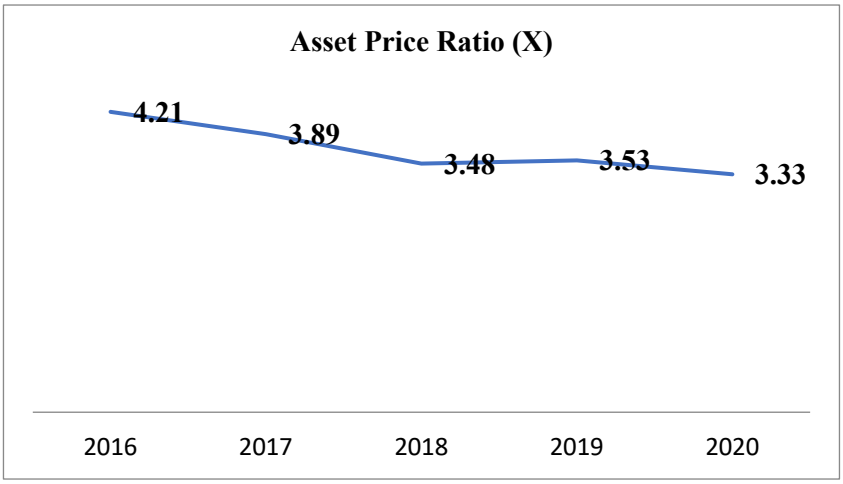
The variables used in this study include monetary policy which includes the interest rate (IR), inflation rate (IF) & the rupiah exchange rate against the US dollar (KR), market sentiment proxied by consumer confidence index (CC), market liquidity proxied by trading volume activity (TV) and property stock index (SP) for the period 2016 - 2020 as shown in table 2 below:

Table 2 - Descriptive Statistic

Variable	Minimum	Maximum	Mean	Std. Deviation
BS	2.80	4.53	3..69	0.44
SP	29,305	56,702	46,553	7,094
IR (%)	3.75	7.25	5.11	0.89
IF (%)	1.32	4.45	3.12	0.74
KR (10,000 IDR/USD)	0.61	0.77	0.72	0.03
CC	98.52	101.79	100.91	0.98
TV (1,000,000 IDR)	1,353,000	12,330,000	3,554,550	2,023,296

Bubble Stock

Asset price ratio is used to measure property stock index and consumer price index. The Bubble stock can occur because the value of the stock price index exceeds the average stock formed in the composite stock price index. Bubble stock is divided into 3 categories, namely low (2:1), medium (4:1) and burst (10:1). Based on the test results, there was a medium category bubble stock on property stocks with an average of 3.69. In the 2020 period where the COVID-19 pandemic did not reduce the bubble stock level in the property sector with an average bubble stock of 3.33 as shown in graphic 1.



Graphic 1 – Asset Price Ratio

Correlation Matrix

The correlation between the independent variables can be seen in table 3. The biggest correlation occurs between the IF variable (inflation rate) and CC (consumers' confidence index). When there is an increase in inflation, investors tend not to invest in the property sector capital market. However, this value is below 60% so it can be said that there is no multicollinearity between those variables.

Table 3 – Coefficient Correlations

Variable	TV	CC	KR	IR	IF
TV	1.000				
CC	-0.003	1.000			
KR	-0.279	0.069	1.000		
IR	0.275	-0.079	0.050	1.000	
IF	0.144	-0.568	-0.510	-0.247	1.000

Goodness of Fit

Goodness of fit of to estimate the property stock price (PS) can be seen from the R-square value as in table 5 which has an R-square value of 87.8% and an adjusted R-square 87.% which indicates that the model has a predictor variable interest rate (IR). , the rupiah exchange rate (KR), trading volume activity, and consumer confidence (CC) are very feasible or fit as shown at table 4.

Table 4 – Coefficient Determination Model 1 & Model 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	.938[a]	0.879	0.868	0.25800	1.074
Model 2	.937[a]	0.878	0.870	0.25620	1.040

Testing the feasibility of the property stock regression model (PS) can be done by looking at the F test value (ANOVA test) of each model. The results of the ANOVA test can be seen in table 5. The results of the ANOVA test model 2 show a better value than model 1 with F = 99,340 with

a significance far below ($\alpha < 0.01$) which means the model is feasible or fit in predicting the property stock price index.

Table 5 – ANOVA Test Model 1 & Model 2

Model		Sum of Squares	Df	Mean Square	F	Sig.
Model 1	Regression	26.097	5	5.219	78.414	.000[b]
	Residual	3.594	54	0.067		
	Total	29.691	59			
Model 2	Regression	26.081	4	6.520	99.340	.000[b]
	Residual	3.610	55	0.066		
	Total	29.691	59			

Multiple Linear Regression Analysis

The results of the multiple regression model 1 involving all variables, namely interest rate (IR), inflation rate (IF), trading volume activity (TV), the rupiah exchange rate against the US dollar (KR) and consumer confidence (CC) as shown in table 6. The results t-test of IF and TV showed a small value with a significance level above = 0.05. Furthermore, the variable that has the smallest t value is removed in the regression model. The independent variables that affect property stock prices are interest rate (IR) with a significance below ($\alpha < 0.10$), trading volume activity with significance ($\alpha < 0.05$). The independent variables that have a significant impact are the rupiah exchange rate (KR) and the consumer confidence index (CC) with significance below ($\alpha < 0.01$) on the property stock index (SP) as shown at table 6.

Table 6 – Coefficient Regression Model 1 & Model 2

Model	Variable	Standardized Coefficients Beta	Standard Errors	Standardized Coefficients Beta	T	Sig.
Model 1	(Constant)	-43.968	4.712		-9.330	0.000
	IR	0.083	0.044	0.104	1.887	0.064
	IF	-0.036	0.074	-0.038	-0.485	0.629
	KR	13.563	1.325	0.613	10.237	0.000
	CC	0.381	0.047	0.526	8.154	0.000
	TV	0.035	0.018	0.100	1.910	0.061
Model 2	(Constant)	-42.524	3.628		-11.720	0.000
	IR	0.078	0.042	0.097	1.837	0.072
	KR	13.235	1.132	0.598	11.695	0.000
	CC	0.368	0.038	0.508	9.636	0.000
	TV	0.036	0.018	0.104	2.015	0.049

The regression equation based on the results of regression model 2 to predict the stock property index (SP) using the variable interest rate (IR), rupiah exchange rate (KR), consumer confidence index (CC) and trading volume activity (TV) is as follows:

$$SP_{i,t} = -42.524 + 0.078*IR_{i,t} + 13.235*KR_{i,t} + 0.368*CC_{i,t} + 0.036*TV_{i,t} + \varepsilon_{i,t}$$

Research Finding

H_1: The property stock price index experienced a bubble stock on the Indonesia Stock Exchange. Based on the results of the calculation of the ratio between the property stock price index and the composite stock price index, the average value is 8,221 with a minimum value of 5,677 and a maximum value of 10,852. It can be said that property stock prices are experiencing a moderate to exploding bubble. Thus the hypothesis that the property stock index experiences a bubble stock in the Indonesian capital market is accepted. Investors see that the property sector is a leading sector. Investment in the property sector has a small risk because the price continues to increase. This condition has an impact on investor confidence to invest in property stocks, resulting in a bubble stock.

H_2: An increase in interest rates has an impact on an increase in the property stock price index on the Indonesia Stock Exchange. An increase in interest rates has an impact on an increase in the property stock price index. Investors want high returns in investing their funds. The property sector is a promising sector as evidenced by the existence of a bubble stock so that investors are competing to get high returns in this sector. The government's policy by raising interest rates can increase investor interest in allocating their funds in the capital market, more specifically in the property sector.

H_3: An increase in the inflation rate has an impact on an increase in the property stock price index on the Indonesia Stock Exchange. The increase in inflation has no impact on the increase or decrease in the property stock price index on the Indonesia Stock Exchange. Investors want high returns during periods of inflation to cover the high risks they face. On the other hand, issuers are also not very interested in getting funding through the issuance of shares because of the high costs that must be incurred during the inflation period. The market is not conducive, which means that demand decreases due to the declining purchasing power of the people. Therefore, the increase or decrease in the inflation rate does not affect the property stock price index.

H_4: The increase in the rupiah exchange rate has an impact on the increase in the property stock price index on the Indonesia Stock Exchange Monetary policy related to the stability of the rupiah exchange rate against foreign currencies, especially the US dollar, is very important to be carried out by the government. The appreciation of the rupiah exchange rate has an impact on the increase in the property stock price index. The increase in the rupiah exchange rate has an impact on economic growth which in turn has an impact on increasing stock prices, including property shares. An increase in economic growth can be interpreted as increasing investor confidence because of the decreasing possibility of failure risk. Therefore, investors are increasingly interested in investing their funds in stocks, including property stocks. Property stocks are in high demand by investors, as evidenced by the occurrence of a property stock bubble stock ten times higher than the composite stock price index in the Indonesian capital market.

H_5: The increase in market sentiment has an impact on the increase in the property stock price index on the Indonesia Stock Exchange The increase in investor sentiment also greatly affects the public's perception of property stock prices. The average increase in the consumer confidence index during the study period was 100.91%, which means that public sentiment towards Indonesia's economic growth is still positive. This affects public interest

in the property stock index. Property stocks are stocks that are of interest to the public, which are marked by the occurrence of a bubble stock during the study period. Public sentiment decreased slightly during the COVID-19 pandemic from March 2020 which was marked by a 98.8% decline in public sentiment.

H_6: The increase in market liquidity has an impact on the increase in the property stock price index on the Indonesia Stock Exchange Market liquidity, which is proxied by trading volume activity, shows a positive direction towards an increase in the property stock price index. The increase in trading volume in the property sector encourages investors to invest in the sector. The more liquid property stocks are, the more attractive they are to investors because people can sell or buy shares at any time relatively quickly. Even though the COVID-19 pandemic has hit the world, including Indonesia, it has not reduced the public's interest in investing their shares in the property sector. This can be seen from the occurrence of bubble stock which is still above 4 times the combined stock price index during the pandemic period in 2020.

CONCLUSION

Based on the test results, both descriptive statistical and inferential statistical tests have been carried out, it can be concluded that the research results are as follows:

1. The property stock index experienced a bubble stock on the Indonesia Stock Exchange during the research period 2016 – 2020.
2. An in crease in interest rates has an impact on an increase in the property stock price index on the Indonesia Stock Exchange the research period 2016-2020.
3. The increase or decrease in the inflation rate has no impact on the increase in the property stock price index on the Indonesia Stock Exchange the research period 2016-2020.
4. The increase in the rupiah exchange rate has an impact on increasing the property stock price index on the Indonesia Stock Exchange the research period 2016-2020.
5. The increase in investor sentiment has an impact on increasing the property stock price index on the Indonesia Stock Exchange the research period 2016-2020.

In the future work, we will work on how to measure and calculate bubble stock not only property sector but also the others asset. We plan also to cover the other region such as South East Asia, Asia or global.

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