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Dynamics of Gold Prices in Indonesia; A Short-Term and Long-Term Estimation Approach

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Abstract: Dynamics of Gold Prices in Indonesia; A Short-Term and Long-Term Estimation Approach

The issue of reinstating the role of gold in the financial system which was no longer supported by gold since 1971 resurfaced. The role of money based on gold is an attempt to create a stable and fair monetary system. This study tries to see the effect of GDP growth, inflation, dollar exchange rate, and the composite stock price index on gold prices in Indonesia. The analysis technique used is ARDL (Autoregressive Distributed Lag). The results showed that the variables of GDP, inflation, dollar exchange rate, and JCI in the long term ARDL had no significant effect. In the short term for 1991Q1 – 2019Q3 data, the dollar exchange rate variable has a positive effect on gold prices. Meanwhile, in the short term, data for 1999Q2 – 2019Q3 GDP and the dollar exchange rate have a negative effect on gold prices. This shows that in the short term gold can be used as safe storage when the country's economic growth is unstable. The implication of this research is the government and other related parties to continue to increase economic growth and gross domestic product, besides the importance of maintaining economic and political stability in order to ensure the sustainability of the economy in Indonesia, so that inflation can be more controlled and the composite stock price index will improve in the future.

Keywords: Gold Price; GDP; Inflation; Dollar Exchange Rate; JCI

INTRODUCTION

According to Sharma (2016) gold is a commodity and a currency, it can also be an important foreign exchange reserve. Several research results show that the application of gold money is relatively stable and even able to support economic growth in general. Gold can protect against inflationary fluctuations, financial market volatility, several studies have also shown that by allocating one-fifth of the money market portfolio, from the four major world currencies such as Dollars, Pounds Sterling, Euros, and Yen to gold, it can provide sufficient returns to offset potential losses. arising from exchange rate risk (Arfaoui & Ben Rejeb, 2017; Cheong, 2018; Ghosh, Levin, Wright, & Macmillan, 2012).

Sriwulan and Ariusni (2020) on an annual basis, the global economy in 2019 is forecasted to grow 2.9%, slower than 2018's 3.6%. Where Indonesia is included in the G20 countries which will affect the growth of the countries in the G20. GDP shows the economic health of a country, while gold is people's distrust in an economy. Therefore, there is a negative correlation between GDP growth and gold which is universal and can be accepted worldwide. When the economy in a country goes down, the demand for gold will increase due to public distrust if there is a decline in growth in a country. Based on data released by the World Gold Council in 2018, Indonesia was ranked eighth with the largest demand for gold in the world with a total of 64.1 metric tons. Of which 41.9 metric tons are jewelry and 22.2 metric tons are Gold bullion and Gold coins. With Indonesia's economic growth declining from 5.2% in 2018 to 5.1% in 2019, according to World Bank data.

According to Haroon, et.al (2019) the global increase in gold and oil prices will have an impact on the economies of countries around the world. The impact varies in developing and developed countries. The results of his research found that gold and oil prices have a significant impact on Pakistan's GDP growth. As an important commodity traded in various countries, the price of gold is also determined by the world market, where this price is influenced by supply and demand. The law of supply and demand applies here, the greater the demand compared to the supply, the higher the price of gold. And vice versa. Abundant supply of gold will make gold prices tend to fall. For example, the world's banks sell their gold reserves, as happened in Venezuela. On the other hand, when the supply of gold decreases, the price of gold will rise. For example, the strike of world gold mining workers, rising exploration prices or energy costs, inflation, and so on. Likewise in terms of demand. Enlarged demand will trigger an increase in gold prices. Conversely, declining demand has the opportunity to reduce the price of gold. The law of supply and demand is what made gold prices skyrocket again, for example at this time China and Russia were the biggest buyers of gold, causing gold prices to soar in 2019 (Verbrugge and Geenen, 2019).

World transaction prices use US Dollars. For this reason, the local gold price is also determined by the local currency exchange rate. If you look at the Indonesian exchange rate in 2018. The risk of a decline is estimated to be even greater with the export-import policies in

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various countries, which of course will further burden world trade. The following is the dollar exchange rate data for the last 10 years (Ha *et al.*, 2019).

From the dollar exchange rate data for the last 10 years, it can be seen that the rupiah weakened the most by 26.3% in 2013, which caused the value of the rupiah to weaken from Rp9,637.50 to Rp12,170.00 per 1 United States Dollar. Meanwhile, the rupiah increased by only 2% in 2016, which caused the value of the rupiah to increase from IDR 13,787.50 to IDR 13,472.60 per 1 United States Dollar. But overall the value of the rupiah has continued to decline over the last 10 years from 2011 amounting to IDR 9,067.50 to IDR 14,045.00 in October 2019 or by 55%. With the exchange rate continuing to decline causing the price of gold to also increase.

Table 1. Average US Dollar Exchange Rate to Rupiah in 2019

Year	US Dollar Exchange Rate (Rupiah)	Precentage (%)
2011	9.067,50	
2012	9.637,50	6,3
2013	12.170,00	26,3
2014	12.385,00	1,8
2015	13.787,50	11,3
2016	13.472,60	-2,3
2017	13.567,50	0,7
2018	14.380,00	6
2019	14.045,00	-2,3

Source: IMF (2021).

From data on gold prices in Indonesia for the last 10 years, it can be seen that the price of gold experienced the largest increase of 15.5% in November 2019, which was Rp. 667,496 from the previous year of only Rp. 577,857 per 1 Gram of Gold. The gold price decreased by -8.6% in 2013, which caused the gold price to decrease by Rp477,976 from the previous year of Rp522,828 per 1 gram of gold. But overall the gold price tends to increase if you look at the long-term trend because it is still considered the safest deposit for the world's central banks because of its history. The long-term trend can be seen in the chart below.

Table 2. Average Gold Price in Indonesia in 2011-2019

Year	Gold Price (Rupiah)	Precentage (%)
2011	481.814	7,5
2012	522.828	8,5
2013	477.976	-8,6
2014	478.000	0 5,4
2015	473.562	-0,9
2016	499.061	0
2017	552.094	10,6
2018	577.857	4,7
2019	667.496	15,5

Source: IMF (2021).

Figure 1. Trends in Gold Prices in Rupiah Per Gram in 2010-2019

Source: Investing.com (2019)

Shafiee dan Topal (dalam Weng *et al.*, 2020) in their research also explained that although the price of gold has decreased several times, the value of gold will remain high following a positive trend until early 2019. According to Setiawan, et.al (2010), gold and silver are the most stable commodities and currencies the world has ever known. From the early days of their emergence to the present day, the value of gold and silver has remained stable in relation to consumer goods. According to Febrian (2017), gold has a positive effect on

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Indonesia's GDP growth because the gold price is relatively stable compared to the rupiah exchange rate. The application of gold will be able to support economic growth in general. Gold is relatively stable and not vulnerable, will be able to have a positive impact on the economy. Cristy (2014) in her research found that about the price of gold in Indonesia proves the dollar exchange rate and inflation have a positive effect on gold prices in Indonesia at a certain lag. If inflation in Indonesia rises, the price of gold in Indonesia will also increase, because gold investors are likely to buy gold where gold is a protector of the value of paper money due to inflation which has an impact on the weakening of the value of rupiah banknotes which makes gold demand rise and prices increase. Likewise with the dollar exchange rate, because the use of dollars in gold purchase transactions in the world.

About the price of gold in Indonesia proves the dollar exchange rate and inflation have a positive effect on gold prices in Indonesia at a certain lag. If inflation in Indonesia rises, the price of gold in Indonesia will also increase, because gold investors are likely to buy gold where gold is a protector of the value of paper money due to inflation which has an impact on the weakening of the value of rupiah banknotes which makes gold demand rise and prices increase. Likewise with the dollar exchange rate, because the use of dollars in gold purchase transactions in the world. According to Kurniawan (2019) 334 / 5.000.

The price of gold in Indonesia, related to the JCI the results have a negative effect on changes in gold prices in Indonesia. So if there is an increase in the JCI, there will be a decrease in the price of Indonesian gold, and vice versa. He thought that if the JCI in Indonesia fell, investors would look for alternative investments, namely gold. In contrary Nurulhuda and Kosasih (2019) regarding the application of the dinar or gold to economic stability in Indonesia, the inflation variable does not have an impact on increasing inflation in Indonesia. He thought that the value of gold made it more stable and was above the inflation rate itself. The use of gold currency is proven not to contribute to inflation, but rather as a barrier or controlling inflation. Likewise with the JCI and the exchange rate against gold prices in Indonesia. According to Anisa (2019) the price of gold rises causing the rupiah to depreciate. When the price of gold increases, investors will prefer to invest in gold rather than holding rupiah. As for the JCI, it has no effect on gold prices in Indonesia, he believes that the rising JCI will not make investors leave gold because at the same time, gold prices continue to show positive movements. So it can be concluded that the price of gold is still showing a positive movement.

The issue of restoring the role of gold in the world financial system has been widely carried out at the international level since the currencies of world countries were no longer backed by gold in 1971. In August 2002 the idea of transacting using gold grew stronger, several countries held a conference with the theme “Stable and Just Global Menetry System” and resulted in the application of the gold dinar in foreign trade transactions with trading partners through Bilateral Payment Arrangements or BPA. This idea was continued at a seminar in Kuala Lumpur in October 2002 with the theme, "The Gold Dinar in Multilateral Trade" by approving the proposal of the Head of the Central Bank of Iran, Bijan Latif for a secretary tasked with coordinating the development of Dinar policy. These ideas and policies made the price of gold a special concern until now (Mirbargkar and Borzabadi Farahani, 2019).

The issue was raised again at the 2019 KL SUMMIT yesterday with a statement by Malaysian Prime Minister Mahatir Mohamad in a speech at the conference, he suggested that major countries review the idea of using the Dinar in international trade transactions. The use of gold money (dinar) is used as a transaction tool and the global monetary base is carried out by several countries. Returning the dinar as a transaction tool and the basis of the global monetary system is an attempt to create a stable monetary system. The application of the dinar in trade will replace the role of the US dollar, and will reduce the dependence of developing countries on paper money to conduct foreign trade transactions (Mirbargkar and Borzabadi Farahani, 2019).

The novelty of this study is to determine the effect of inflation, GDP, exchange rate, JCI on gold prices, using the ARDL model, where this model has an interrelation with the Dynamic Linear Model (MLD). According to Gujarati (2003) there are at least 3 reasons why the MLD specification is used, first, psychological reasons (psychological reasons); second, technological reasons (technological reasons) and third, institutional reasons (institutional reasons). Based on the reasons mentioned above, institutions play an important role in the economy. This is clearly reflected in the short-run and long-term economic methodologies. The use of MLD in addition to avoiding deviated regression can also be used to observe or see short-term and long-term relationships between variables as expected by the related theory. Therefore, researchers are interested in knowing the effect of gold prices on economic stability in terms of GDP, inflation, rupiah exchange rate, and JCI.

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LITERATURE REVIEW

Tronzano (2020) gold as a store of value has long been an investment paradigm, as introduced in the mercantilism school of economics. This school makes gold and land as a parameter of the value of the store of wealth. This view is quite classic and is believed until now, to invest, both individually and in state policy. In the 16th century, with the mercantilist ideology, encouraging European countries to increase trade surpluses and accumulate gold in various ways, including by expansion and colonization (Beltadze and Xinikadze-Gvaramia, 2020; Rössner, 2020a, 2020b; Schwartz, 2020; Barkey, 2021; Chijioke, Aloysius and Obi, 2021; Magnusson, 2021; Repapis, 2021). Physically, gold or precious metal is a shiny yellow metal. Gold is obtained from underground excavations. Soil that has large chunks of rock containing gold particles is a gold mine. Big companies dig gold mines and make it in molds and various kinds. Gold is also a trusted precious metal that can maintain its value and be used in transactions. For that gold has unique and rare properties.

Furthermore, since 1968, the London gold market standard has been used as a benchmark for world gold prices. Where the system used is known as London Gold Fixing. The pricing process is carried out twice a day, at 10.30 (Gold a.m) and 15.00 (Gold p.m). The currencies used in determining the price of gold are United States Dollars, British Pounds and Euros. The price used as a benchmark for world gold contract prices is the closing price or Gold p.m (Yulianti, et.al, 2019). The market members include; Bank of Nova Scottia, Barclays Capital, Deutsche Bank, HSBC and Societe Generale. The process of determining the price is through an auction between the five members. At the beginning of each trading period, the President of London Gold Fixing Ltd will announce a certain price. Then the five members will report the price to the dealer. This dealer is the one who connects directly with the real buyers of the traded gold. The final price position offered by each dealer to Gold London Fixing members is the net position of their client's accumulated supply and demand. This is where the gold price will form. If the demand is more than the supply, the price will automatically rise, and vice versa.

However, this view of mercantilism was opposed by classical thinkers, including by David Hume. Jocelyne, et.al, (2020) that in this case David Hume launched a strong criticism of the mercantilists through the theory of price specie flow mechanism that the accumulation of gold carried out by each expansionist country triggers the accumulation of precious metals which can actually contribute to extraordinary inflation, which in the end will have an impact on increase in the flow of imports into the country. This view represents a reflection of the classical school of thought on the economic and political policy maneuvers of the mercantilists. This is also supported by other classical thinkers, such as Adam Smith (de Beaufort Wijnholds, 2020; Binmore, 2021; Cazenave, 2020; Charette, 2021; Freeman, 2011; Glasner, 2021; Kurz, 2021; Sugden, 2021). This was also refuted by Adam Smith that precious metals are not the only barometer of a country's wealth, the productivity of a country's production process is largely determined by other production factors such as labor, capital and technology. This thought developed since the era of the industrial revolution that occurred in Europe until it became the largest economic school at that time (Bresser-pereira, 2019; Delanty, 2019; Ellerman, 2019; Smith *et al.*, 2019; Stahl, 2019; Wallerstein, 2019; Wandel, 2019; Jocelyne, et.al, 2020; Rioux, LeBaron and Verovšek, 2020).

However, in its development, gold remains a global measure of value. Knafo (2020) dan Streeck (2020) revealed that entering the early decades of the 1970s, precisely under the rule of Richard Nixon as president of the United States, he delegitimized the dollar (USD) confertibility system against gold. Initially, the price of gold was largely determined by the value of the USD itself, which indicates the dominance of the USD over the global gold market. This momentum also transformed the fixed exchange system into a floating exchange system. This started when the USD weakened, as a result of global private investors in London speculating to buy gold in large quantities, so that it had an impact on the decline in the value of the USD and the depletion of the United States government's gold reserves. Where previously the value of 35 USD is equivalent to 1 ounce of gold, suddenly drastically changed to 40 USD which is equivalent to 1 ounce of gold. This difficult situation confirmed the devaluation of the USD. Investors began to panic and resulted in capital outflows to the detriment of the economic interests of the United States.

This is indicated by the supply of gold flowing out of the United States, thus making this country's gold reserves depleted. The amount of gold that flowed out was 25 times the amount of the country's gold reserves in 1971. Richard Nixon finally left the Bretton Woods system which required the value of the USD to rely on the value of gold. In the end, with a floating exchange rate system, the value of the USD no longer relies on the value of gold. This transformation confirms the face of the global economy which is very monetarist Keynesian towards a neoliberal model (Aspromourgos, 2019; Cömert, 2019; Crotty, 2019; Festré, 2019; Mckee, 2019; Petrović, 2019).

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In terms of prices in gold, get to know futures prices and spot prices. The spot price is a physical base price that changes at any time following the development of the current

1 troy per ons = 31,1034768 gram

commodity. Secondly, prices complement each other or in other words are positively related because usually investors in determining prices in the physical market use futures prices and vice versa if investors want to invest in the futures market, they usually take the price reference from the physical market, namely the spot price (Yulianti, et.al, 2019). Most people use the term gram to refer to the unit of weight of gold. However, this term does not apply in the world market, the designation for the unit of weight of gold is troy ounce or troy oz. . The unit of calculation for the price of pure gold is troy per ounce in US$. To convert the world gold price into rupiah, you can use the following formula:

$$\text{In ruphia} = \frac{\text{Gold Price}}{31{,}1034768} \text{ x kurs ruphia}$$

METHODS

The analytical method to determine the effect of inflation, GDP, exchange rate, JCI on gold prices, is to use the Dynamic Linear Model (MLD). According to Gujarati (2003) there are at least 3 reasons why the MLD specification is used, first, psychological reasons (psychological reasons); second, technological reasons (technological reasons) and third, institutional reasons (institutional reasons). In this study, the researcher estimates several factors that influence changes in gold prices in Indonesia as dependent variables on the influence of the independent variables, namely the GDP growth rate, inflation rate, dollar exchange rate, the Indonesian Composite Stock Price Index during the period March 1991. until September 2019. The period observed was from January 1991 to September 2019 so that the number of data observed was 115 months for approximately 29 years.

The model used is ARDL, the advantage of this model is that it can see long-term relationships, the relationships between the variables being tested (Ghatak and Siddiki, 2001; Shrestha and Chowdhury, 2005; Hye, 2012; Bildirici, 2014; Choudhry, Hassan,et.al, 2014; Bölük and Mert, 2015; Menegaki, 2019; Rahmasari *et al.*, 2019). The first steps are data stationarity test, cointegration test and ARDL model estimation. The ARDL model equation can be written as follows:

$$\Delta \mathbf{Emas_t} = \mathbf{\alpha_0} + \textstyle\sum_{i=1}^{n} \alpha_{1i}\Delta \mathrm{Emas}_{\mathbf{t-1}} + \sum_{i=1}^{n} \alpha_{2i}\Delta \mathbf{PDB_{t-1}} + \sum_{i=1}^{n} \alpha_{3i}\Delta \mathbf{Inf_{t-1}} + \sum_{i=1}^{n} \alpha_{4i}\Delta \mathbf{Kurs_{t-1}} + \sum_{i=1}^{n} \alpha_{5i}\Delta \mathbf{IHSG_{t-1}} + \mathbf{\theta_1 Emas_{t-1}} + \mathbf{\theta_2 PDB_{t-1}} + \mathbf{\theta_3 Inf_{t-1}} + \mathbf{\theta_4 Kurs_{t-1}} + \mathbf{\theta_5 IHSG_{t-1}} + \mathbf{e_t}$$

Δ is (*lag*). The coefficient $\alpha_{1i} - \alpha_{5i}$ is a short-term dynamic relationship model and coefficient $\theta_1 - \theta_5$ shows a long-term dynamic relationship model. Crucial in estimating the ARDL model is determining the length of the lag. The optimal length of lag can use the criteria from Akaike (*Akaike Information Criterion = AIC*) or Schwarz (*Schwarz Information Creterion = SIC*).

Whether or not there is a long-term relationship between the variables in the ARDL model is tested using the cointegration Bound Testing Approach test based on the F statistic test. The hypothesis (H0) and the alternative hypothesis (Ha) from the cointegration Bound Testing Approach can be written as follows:

$\boldsymbol{H_0} : \mathbf{\theta 1 = \theta 2 = \theta 3 = \theta 4 = \theta 5 = 0}$

$\boldsymbol{H_0} : \mathbf{\theta 1 \neq \theta 2 \neq \theta 3 \neq \theta 4 \neq \theta 5 \neq 0}$

The zero hypothesis states that there is no cointegration and the alternative hypothesis states that there is cointegration between the variables studied. The F value of the cointegration test critical test is based on the critical value developed. There are two critical F values, namely the lower bound or I(0) and the upper bound or I(1). If the calculated F value is greater than the upper bound value, then there is cointegration. If the calculated F value is smaller than the lower bound, there is no cointegration. Meanwhile, if the calculated F value is between the lower bound and the upper bound, then there is no decision. The ARDL model in the form of an error correction model from the ARDL equation can be written as follows:

$$\Delta \mathbf{Emas_t} = \mathbf{\alpha_0} + \textstyle\sum_{i=1}^{n} \alpha_{1i}\Delta \mathrm{Emas}_{\mathbf{t-1}} + \sum_{i=1}^{n} \alpha_{2i}\Delta \mathbf{PDB_{t-1}} + \sum_{i=1}^{n} \alpha_{3i}\Delta \mathbf{Inf_{t-1}} + \sum_{i=1}^{n} \alpha_{4i}\Delta \mathbf{Kurs_{t-1}} + \sum_{i=1}^{n} \alpha_{5i}\Delta \mathbf{IHSG_{t-1}} + \boldsymbol{\vartheta} \mathbf{ECT_{t-1}} + \mathbf{u_t}$$

ECT_{t-1} is the error correction variable, namely the residual error of the previous period.

RESULT AND DISCUSSION

In the last 29 years, from January 1991 to September 2019, it shows that the lowest gold price during that period occurred in January 1993, which was Rp. 21,971.00 per gram,

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the highest of Rp. 689,287.00 per gram which occurred in September 2019 The average price during the study period was Rp. 239.716.70 per gram with a standard deviation of Rp. 207.725.90. This shows that gold as an investment commodity has a value that is quite profitable in the long term.

Table 3 Descriptive Statistics of Research Variables for the Period January 1991-September 2019 in Indonesia

	Gold Price (Rp/gram)	GDP (%)	Inflation (%)	USD Exchange Rate (Rp)	JCI (Point)
MIN	21.971	-17,9	-0,6	1.912	247
MAX	689.287	10,7	78,4	14.901	6.468
MEAN	239.716,7	5	9,4	8.497	2.189
STDEV	207.725,9	4	11,6	3.989	2.063

Sumber: Secondary data output after processing, 2019; (Angga, 2019).

The Effect of Gross Domestic Product on Gold Prices in Indonesia

Changes in Gross Domestic Product for the entire 1991Q1 – 2019Q3 data in the short term D(GDP) have no significant effect on changes in gold prices in Indonesia with a regression coefficient value of 906.102052. The results are different for the data after the 1999Q2 – 2019Q3 crisis in the short term D(GDP(-1) and D(GDP(-2) have a negative and significant effect on changes in gold prices in Indonesia with a regression coefficient value of -12422,395207 for D(GDP(-1) and the value of the regression coefficient -8269,003242 for D(GDP(-2). The decline in GDP changes in the previous quarter will make gold prices will rise in the short term. Changes in Gross Domestic Product for the entire 1991Q1 – 2019Q3 data on the long-term GDP have no significant effect on changes in gold prices in Indonesia with a regression coefficient value of -90546,696234. Likewise, the data after the 1999Q2 – 2019Q3 crisis in the long term GDP does not have a significant effect on changes in gold prices in Indonesia with a regression coefficient value of -14492,259320.

This is certainly different from the results of the study Rusydiana (2017) according to the results of his research the GDP variable responds positively to the price of gold. The results in this study are different, where the GDP variable responds negatively in the short term but not in the long term to changes in gold prices in Indonesia for data after the 1999Q2

– 2019Q3 crisis. This is certainly in accordance with the safe-heaven theory, GDP shows the economic health of a country, while gold is part of people's distrust in an economy. Therefore, there is a negative correlation between GDP growth and gold prices. As the economy develops, the demand for gold investment (attracted by safe-heaven gold) falls, and vice versa. The same results occur in the study Haroon, et.al, (2019) regarding the impact of oil and gold prices on Pakistan's growth rate, there is a significant and negative correlation between GDP and gold prices. This certainly supports the results of this study.

The Effect of Inflation on Gold Prices in Indonesia

Changes in inflation for the entire 1991Q1 – 2019Q3 data in the short term D(INF) have no significant effect on changes in gold prices in Indonesia with a regression coefficient of 284,722164, as well as for data after the 1999Q2 – 2019Q3 crisis in the short term D(INF) has no significant effect with changes in gold prices in Indonesia with a regression coefficient of -1882.530638. Changes in inflation for the entire 1991Q1 – 2019Q3 data in the long term D(INF) have no significant effect on changes in gold prices in Indonesia with a regression coefficient of -14492.259320, as well as for data after the 1999Q2 – 2019Q3 crisis in the long term (INF) it has no significant effect with changes in gold prices in Indonesia with a regression coefficient of -79947.505760.

The results of the research on the inflation variable on the gold price are different in the study Rusydiana (2017) where the gold variable responds negatively to the inflation variable and is significant and assumes that gold is a buffer against inflationary fluctuations. In this study, there was no significant effect, maybe this was due to differences in the amount of data or the distance between each data. In this study, using quarterly data to measure the effect of inflation on gold prices. Research result of Huang, et.al, (2019) revealed, inflation has a positive effect on gold prices and significant on gold prices. High inflation rates encourage people to tend to exchange securities-type wealth for physical wealth such as houses or jewelry. This encourages investors to avoid risk and divert investments in gold. Likewise with research conducted in Turkey that inflation has a positive effect on gold prices and significantly on gold prices, thus giving preference to consumers to invest in other investment variants so that they tend to hold back investing in gold commodities (Yildirim, et.al, 2021).

The Effect of the Dollar Exchange Rate on Gold Prices in Indonesia

Changes in the dollar exchange rate for the entire 1991Q1 – 2019Q3 data in the short term D(EXCHANGE) have a significant positive effect on changes in gold prices in Indonesia with a regression coefficient of 9.044645, so if there is a change in the dollar exchange rate in

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the quarter it increases by 1 USD/IDR, then the gold price will also go up. Research result of Nurulhuda and Kosasih (2019) support this research, where the exchange rate has a positive and significant effect on gold prices. There is a positive influence between the dollar exchange rate and the gold price because the world gold spot price, which is the main determining factor for the gold price in the Indonesian market, is generally published in dollars. So, when the dollar strengthens the price of gold also strengthens and vice versa. For data after the 1999Q2 – 2019Q3 crisis in the short term D(EXCHANGE (-1)) has a significant negative effect on changes in gold prices in Indonesia with a regression coefficient of -14.856010, so that if there is a change in the dollar exchange rate in the quarter, it will decrease by 1 USD/IDR, then the price of gold will rise after the crisis. The results put forward Nurulhuda and Kosasih (2019) they thinks there is a negative influence between the exchange rate on the price of gold in Indonesia. If the price of gold rises, it will cause the rupiah to depreciate. Investors will prefer to invest in gold compared to holding paper money.

Changes in the dollar exchange rate for the entire 1991Q1 – 2019Q3 data in the long term (EXCHANGE) have no significant effect on changes in gold prices in Indonesia with a regression coefficient of -103.855071, while for data after the 1999Q2 – 2019Q3 crisis in the long term (EXCHANGE), there is no significant effect on price changes. gold in Indonesia with a regression coefficient of 205.869807. Macroeconomic variables, such as the dollar exchange rate, do not fully influence the movement of global gold prices, including those in Indonesia, because this is a sentiment for investors to choose gold commodity investments. However, the dollar exchange rate variable does not seem to have an effect on gold, such as research conducted in the United States because the dollar exchange rate is no longer based on global gold prices, as the monetary policy adopted in that country (Liya *et al.*, 2021).

The Effect of the Composite Stock Price Index in Indonesia

Changes in the JCI for the entire 1991Q1 – 2019Q3 data in the short term D(JCI) had no significant effect on changes in gold prices in Indonesia with a regression coefficient of 0.3750, while for the data after the 1999Q2 – 2019Q3 crisis in the short term D(EXCHANGE(-1)) has a significant negative effect on changes in gold prices in Indonesia with a regression coefficient of -19,550090. If there is a change in IHSG points in the previous quarter down by 1 point, then the price of gold will also rise. The results of this study are in line with research Kurniawan (2019) according to him, the JCI variable has a negative and significant effect on changes in gold prices in Indonesia. According to several investors, the advantage of gold is investment diversification to reduce the risk of losses due to the plummeting Indonesian stock market. Different research results were also expressed by Gumilang (2014) according to him, there is a positive and significant effect of the JCI variable on the gold price variable. If the stock price rises, investors also buy gold to increase profits. Changes in the JCI for the entire 1991Q1 – 2019Q3 data in the long term (JCI) have no significant effect on changes in gold prices in Indonesia with a regression coefficient of -57.345641, while for data after the 1999Q2 – 2019Q3 crisis in the long term (JCI) also has no significant effect on price changes. gold in Indonesia with a regression coefficient of -150,814006.

CONCLUSION

Based on the results of data analysis and discussion that has been stated in the previous section, several conclusions can be drawn, including; 1). The GDP variable in the short term ARDL for data 1991Q1 – 2019Q3 has no significant effect on changes in gold prices in Indonesia, while the GDP variable in the short term ARDL for data 1999Q2 – 2019Q3 D(GDP(-1)) and D(GDP(-2)) significant negative effect on lag -1 a significant negative of =1%(0.0009) and a significant negative lag of =1%(0.0190) on changes in gold prices in Indonesia. The decline in GDP changes in the previous quarter will make gold prices will rise in the short term. 2). The ARDL short-term inflation change variable for 1991Q1 – 2019Q3 data has no significant effect on changes in gold prices in Indonesia, while the ARDL short-term inflation change variable for 1999Q2 – 2019Q3 data also has no significant effect on changes in gold prices in Indonesia.

Although some researchers and market analysis state that there is an influence between inflation variables on gold prices in Indonesia. This study cannot prove the influence between the two, this is due to different data distance data or there are other variables that affect the inflation variable on gold prices in Indonesia. 3). The dollar exchange rate variable in the short term ARDL for data 1991Q1 – 2019Q3 had a significant positive effect of =1% (0.0095) on changes in the increase in gold prices in Indonesia, while the dollar exchange rate variable in the short term ARDL for data 1999Q2 – 2019Q3 had a significant negative effect on lag -1 is a significant positive of =1% (0.0067) on changes in gold prices in Indonesia. For data 1991Q1 – 2019Q3 the change in the dollar exchange rate in the previous quarter increased by 1 USD/IDR, so the price of gold will also increase. In the short term ARDL data 1999Q2 – 2019Q3 after the crisis, the change in the dollar exchange rate in the previous quarter fell by 1 USD/IDR, it will make gold prices rise.

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This is certainly in accordance with the safe-heaven theory, GDP shows the economic health of a country, while gold is people's distrust in an economy. Therefore, there is a negative correlation between GDP growth and gold prices. As the economy develops, the demand for gold investment (attracted by safe-heaven gold) falls, and vice versa. This difference may be due to the economic crisis in Indonesia in 1998.

4). The JCI variable in the short term ARDL for data 1991Q1 – 2019Q3 did not significantly affect changes in gold prices in Indonesia, while the JCI variable in the short term ARDL for data 1999Q2 – 2019Q3 had a significant negative effect of =10%(0.0782) on the increase in gold prices. . If there is a change in the JCI points in the previous quarter, it increases by 1 point, then the price of gold will also increase. 5). The variables of GDP, inflation, dollar exchange rate, and JCI in the long term ARDL for data 1991Q1 – 2019Q3 and 1999Q2 – 2019Q3 have no significant effect. In this study, there may still be many shortcomings that are less specific in explaining the ECM model used due to the limitations of the researcher. And researchers suggest.

There are still other variables that explain the effect of changes in gold prices in Indonesia. Other variables include the amount of world gold production, gold supply, gold demand and other determining factors. Besides that, there are many other determinants that theoretically can affect gold prices, especially those that cause economic stability to be disrupted such as politics and security, therefore it is recommended for further researchers to consider or add other more comprehensive determinants.

The implication of this research is the government and other related parties to continue to increase economic growth and gross domestic product, besides the importance of maintaining economic and political stability in order to ensure the sustainability of the economy in Indonesia, so that inflation can be more controlled and the composite stock price index will improve in the future. future. In addition, gold as an alternative investment for the community, the government should accelerate financial literacy and investment related to gold, so that people are able to increase savings and improve their welfare both in the short and long term.

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