

GOLD INVESTMENTS – REGRESSION ANALYSIS OF THE GOLD PRICE OVER A CERTAIN PERIOD

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Abstract

The global development of the monetary and financial system has evolved over different historical periods. Increasingly, the subject of discussions among economic subjects are the ways to increase their financial well-being through investments in the financial markets. One of the most preferred ways to preserve and increase the financial wealth of individuals is investments in precious metals, in this case – gold, which are realized in specialized financial markets for raw materials. In this regard, the subject of discussions and analyzes in the present development is gold (researched in a global investment aspect), as an element of financial markets and a way of investing, and the subject is emphasized on regression analyzes related to its price values and author's forecasts for future periods from time.

Keywords: gold, investments, precious metals, regression analysis

JEL: G10, G15

Introduction

One of the most significant phenomena of the economic world is money in all its forms. They have changed over the various historical periods, with the main goal being to preserve and store their value and protect against inflation. Among the most preferred ways to increase the financial well-being of economic entities is investing in precious metals, including gold. In an age of digitization and technological upsurge, these trade operations are realized in specialized financial markets. The scientific development aims to track the price of gold globally over a period of time and forecast its future price over a period through regression analysis and time factor research. The scope of the study is focused on the international investment value of the studied precious metal.

Investments in precious metals

During the periods of its evolution, humanity passes through a long and complex stage of development. In the process of asserting his leadership in a numerous

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and hostile world and at the same time aiming at communication, man creates a unique and universal medium of exchange. Money as a financial instrument in different historical periods has changed. Economic agents have been looking for ways not only to preserve the value of their financial well-being, but also to increase it. This demand is tied to the desire to be protected from inflation risk. Such a form of money exists and is used to this day – gold, as a precious metal, possesses these qualities, which is why it is preferred for investments.

At the basis of the investment activities, both in national and supranational aspects, is the idea of rational management of the financial resources of economic subjects who are looking for ways to achieve a profitable and prospective way to increase their income. This drive is embedded in human self-awareness and can be defined as the drive to succeed. Investment, as a concept, is broad-spectrum and has multiple meanings and manifestations. In an economic aspect, it is an action related to the investment of financial capital with the desired end result of return and future expected profit.

The economy is based on multiple investments that have different levels of risk. Any purchase of assets is economic because after a certain time the asset is expected to bring profitability in the form of profit. The investment process is a set of activities related to:

- analysis of possible risks;
- securing the necessary cash capital for the activity/investment;
- selection of investment asset and research of alternative markets for investment trading;
- a strategy based on risk minimization and profit forecasting.

Trading activities for the purpose of purchase and sale are carried out on financial markets specially created for the purpose, on which financial activities are carried out on the exchange of:

- securities (stocks and bonds);
- goods (precious metals, including gold, silver, platinum), etc.
- In economic terms, financial markets have important functions, because through them:
 - the prices of the offered assets are determined and the liquidity of the assets is maintained;
 - lending is implemented;
 - the risk is regulated, by which possible losses of financial resources are minimized;
 - cash flow control is realized in real time (Petrov, 2022).

The 21st century offers economic agents numerous opportunities for investment and increasing monetary well-being, but most of them are high-risk. Of course, risk always exists, and investors are aware of that. Hedging and speculating are

primary means of increasing investment. Hedging aims to reduce the risk of losses, while speculating aims to buy and sell a financial asset/raw materials in order to make a profit.

In ancient times, the precious metal gold was used as a means of payment and predates modern fiat money. Gold as money has maintained its liquidity and price value over the years, reaching today. (Minchev, 2020) The evolution of the monetary system and, in particular, the investment operations in precious metals are carried out on specially created financial markets for raw materials that are digitized.

Gold, as a representative of the precious metals, is traded in the financial markets and its value is influenced by many factors related to supply and demand, namely:

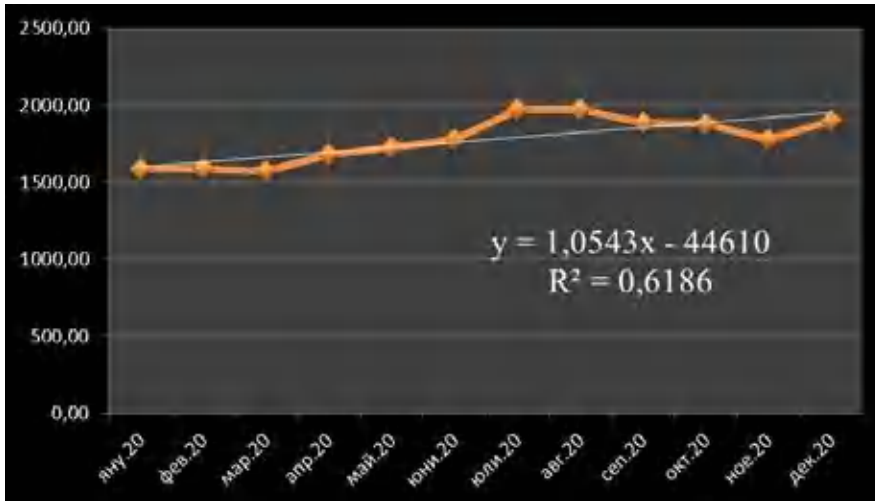
- the world economic situation – it can be assumed that changes in the international economic conjuncture would have an impact on the demand for the precious metal;
- US dollar (USD) – it is accepted to denominate gold with this currency unit, i.e. when the price of a unit of USD goes down, the price of a unit of gold rises and vice versa;
- geopolitical changes – when the economic situation changes and declines, the price of gold rises as a result of its greater demand (Petrov, 2022).

Investing in precious metals creates security of value as these metals retain their convertibility in both national and international financial markets. Although the price value of gold is determined in US dollars, it is not tied to currency units (Konagan, 2013). It is important to distinguish between the types of gold investments. The gold offered in the jewelry stores is about twice the price value compared to the gold offered in the financial markets. This price difference is expressed in compensation for the artisanal labor in the manufacture of the jewelry and the accompanying trade costs. Through the trade in precious metals, an investment activity is realized with a profit expected by the economic subjects.

Regression analysis of the price value of gold for a certain period and forecast for a future period

Over time, the price of gold and ways to trade for profit have changed. To date, this precious metal is considered one of the most stable, maintaining relatively stable price values. In view of this, the author chooses an analysis based on a regression method to study the factors price and period (time), through which to look for the relationship between them. The total investigated time period is from 01/2020 to 12/2022, with the periods organized by years, and in the last period 01/01/2022 – 12/2022, a four-month forecast analysis is set. The data is

carefully extracted from reliable sources (Investing.com, 2022) and is subject to the author's calculation and systematization using Microsoft's data management system, Excel.



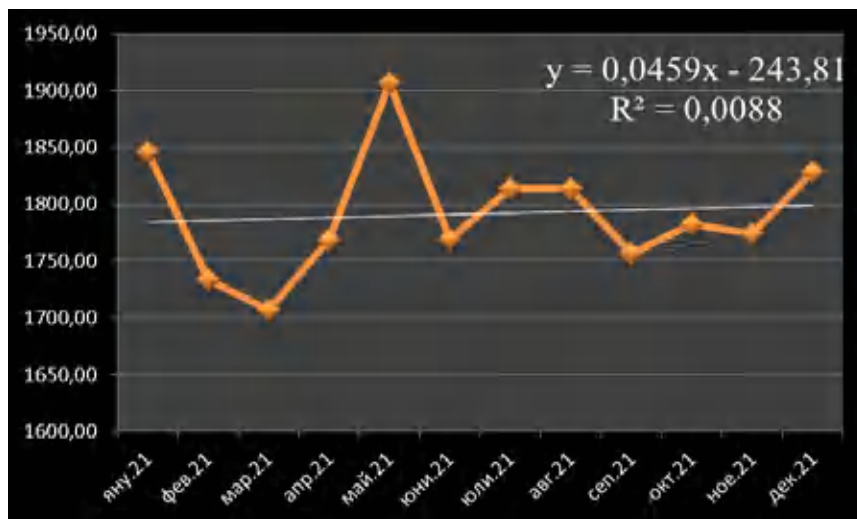
Source: investing.com and own calculations.

Figure 1: Regression analysis of the price of gold for the period 01.2020 – 12.2020

Analysis of the above graph-regression period shows that for the reported time period from 01.2020 to 12.2020, the lowest price was for 1 XAU in the month of 03.2020, which was traded for USD 1 571.05, as can be seen from figure 1, the price of gold is rising at a constant and stable rate. The price of the precious metal was the highest in 07.2020, when it reached a value of USD 1 974.69 and showed an increase in price by nearly 25% compared to that recorded in 03.2020.

The author's study of the coefficient of determinant (R^2) for the period from 01.2020 to 12.2020 (figure 1) shows a value of 0.6186, which indicates that the research factor time has a moderate weight (about 62%) on the price of gold. Therefore, this is a reason to argue that the price per unit of gold is also influenced by other factors. Among the possible factors that can affect the increase in the price per ounce of gold are supply and demand factors, geopolitical changes at the supranational level. A chronological overview indicates that the increase in the price of XAU may also be the result of the 2020 pandemic that has occurred internationally, which has changed the geopolitical conjuncture. There are many claims that COVID-19 has negatively affected the economy on a global scale, with the resulting recession being comparable to that of World War II. (TheWorldBank, 2022) According to the same electronic document, the recession

is expected to lead to a decline in investment, a decrease in investment capital of economic agents and their financial well-being, an increase in unemployment, etc. The last quarters of 2020 also saw a drop in the price of gold by nearly 19% compared to the same period of the previous year 2019 (3ENews, 2020).



Source: investing.com and own calculations

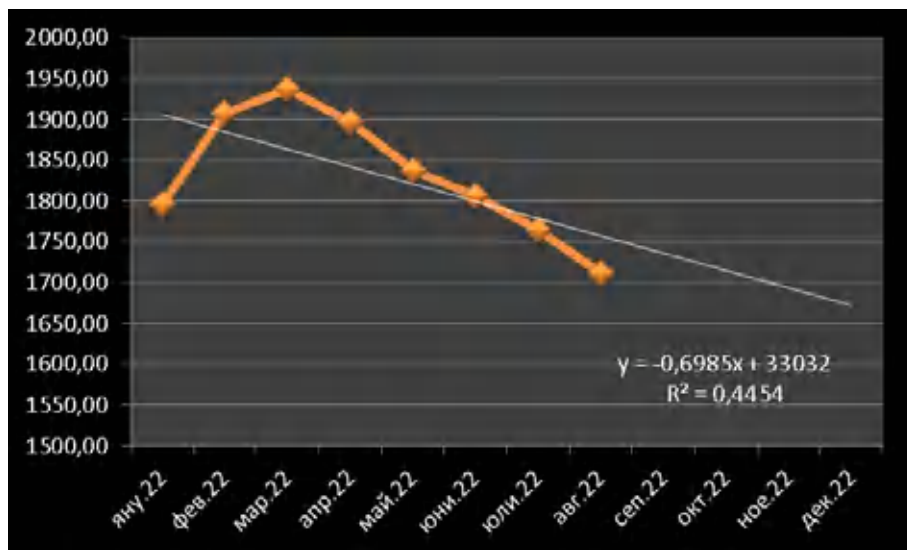
Figure 2: Regression analysis of the price of gold for the period 01.2021 – 12.2021

Figure 2 graphically presents a regression analysis of the price of gold for the period from 01.2021 – 12.2021, processed by a graph clearly expressing multiple price amplitude changes in the values per ounce of gold. It can be seen from figure 2 shows a downward trend in the price of a unit of XAU against the USD. In the researched year 2021, the lowest value for 1 XAU was in 03.2021, when it was traded for USD 1 707.01 and the highest in 05.2021 – USD 1 906.36. It can be seen that during the period 01.2021 – 12.2021, the price varied in close values, and in 12.2021 it reached a relatively average value of USD 1 828.39 per unit of the precious metal – gold.

Similarly to the previous period, it is important for the research to analyze the coefficient of determination (R^2), which is 0.0088. This percentage value is expressed in 0.1% and is the basis for the author's statement that the time factor does not affect the price per ounce of gold. A chronological analysis of the past year 2021 points to hypotheses that the COVID crisis and increased inflation expectedly led to a decline in the financial well-being of economic entities and this is probably the reason for maintaining a moderately low value of the price of gold in the first quarter of 2021.

Although the COVID pandemic, as a possible macro factor that could have an impact on the price of gold, was not included in the study, the author suggests that it may be the subject of future analyses (TheEconomicTimes, 2022). Restrictions introduced on a global scale to control infections and prevention based on mass vaccination are still in their infancy and could have an impact on the value of precious metals including gold due to its proven liquidity over different time periods (Dimitrova, 2021).

The world's adjustment to the "new changes" as well as other factors may also be the basis for the charted increases in the price of gold per ounce in the coming months. Despite global geo-economic and political changes, investors do not lose interest in gold as an instrument for attracting financial capital, which once again shows its resilience and liquidity in times of recession and rising inflation.



Source: investing.com and own calculations

Figure 3: Regression analysis of the price of gold for the period 01.2022 – 08.2022 and trends for the period until 31.12.2022

In the scientific development, the time period from 01.2022 to 08.2022 was also studied, and for the current year 2022, a forecast trend until the end of the year was specially developed, which will be useful in determining future trends in the price per unit of the studied precious metal. From the graphical regression analysis for the period of 01.2022 – 08.2022, it can be seen that the highest price of gold was in the month of 03.2022, when a unit of the precious metal was

traded on international stock exchanges for USD 1 937.23. It can be seen from the graph that the price per ounce is decreasing as in 08.2022 USD 1 710.70. In order to predict the future value, the author has put in the regression analysis of the scientific development and a trend line describing the future value per ounce of gold for the period until December 2022. Based on the information in figure 3, the author's hypothesis is also formed that the price of gold as a precious investment metal is expected to fall analogously to the trend line.

Regarding the regression coefficient (R^2) for the studied time period is 0.4454, which is 45% and the time factor can be argued to have a moderate effect on the price of gold. Of course, the author does not exclude the influence of factors that are not included in the model, among which can be not only the macroeconomic factor related to the COVID pandemic and rising inflation, but also the military operation in Ukraine, etc. (Royal, 2022).

Regardless of the geopolitical and economic changes at the national and global level, the author's interpretation of the price of gold points to a systematic analysis of its price values for the period 2020 – 2022, namely:

- In January 2020, a unit of gold was traded on the international financial market for USD 1 589.81, and at the end of the reporting period, August 2022, it was USD 1 710.70. This shows that regardless of changes in supply and demand and investor interest, the price of the precious metal continues to be a preferred means of payment and trade;
- The studied coefficient of determination (R^2) is different during different time periods (2020 – 2022), which points to the author's hypothesis that the time factor does not have a strong influence on the value of gold as an investment instrument. Perhaps the unexplored factor related to inflation and prices of basic goods and services, an increase in the price of the dollar against major currencies can have a stronger impact on the price of gold because it is affected by supply and demand (Money.bg, 2022). Therefore, a reduced demand for investment by economic agents will lead to a reduced demand for gold and lower its value.
- Based on the studied time period, the author is of the opinion that investing in the precious metal gold will continue to be preferred by investors due to its liquidity, proven during the various chronological-historical time periods.

Conclusion and recommendations

The investment market is complex and dynamic, involving many relevant decisions. In a world of global changes, a global financial crisis and the impoverishment of the finances and savings of economic agents, they are increasingly looking for ways to preserve their well-being through investments

in gold and other precious metals. Despite the prominent price amplitudes, gold continues to maintain stable values without sharp increases and decreases in values, but the trend outlined in the research is towards maintaining a lower price per ounce against the dollar. As can be seen from the above, many other factors, in addition to the studied time factor, have an impact on the price values in a global aspect.

In view of the above, I make an author's recommendation aimed at the interested persons and researchers in this field that in the future factors related to inflation, dollar price, as well as current topics of our time focused on the COVID pandemic, as a possible macro-level factor and socio-psychological attitudes of economic agents etc. which would be useful for this field.

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