# Insights into Gold Investing: Exploring Investor Behavior

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**Abstract**
A content analysis was conducted to examine factors influencing investor behavior when investing in gold and to look into possible reasons for selling gold. The results showed that investors' needs, return expectations, herding behavior, fear of financial collapse, higher appreciation rate, store of value, and liquidity all significantly impact gold investment decisions. The analysis also identified factors that may lead to selling gold in times of crisis, such as uncertainty caused by the Covid-19 pandemic, perception of gold as a safe haven during global financial instability, rise in the price of gold during crisis periods, its value as a hedging instrument, an essential investment source, protection against inflation, and also as a medium of exchange. An important motive for selling gold during these periods is to flee to safer assets. The research also revealed that although the demand for gold is usually higher in times of economic uncertainty and inflation, cash shortages do not significantly impact the decision to sell gold.

**Keywords**
Gold investment, investor's behavior, gold price, gold, safe haven, liquidity, inflation, gold market, selling strategy

**Introduction**

Gold is a globally traded asset and is held in large quantities by investors and central banks (Baur et al., 2020a). Investors and collectors keep gold to protect their savings and wealth. Gold does not pay interest, such as treasury bonds or savings accounts. Gold prices often reflect asset increases and decreases (Sesay et al., 2020). Gold is a base metal in economics and technologies (Xia et al., 2022). It is widely used (Liu et al., 2019). In recent years, China has been not only the world's largest gold producer but also the second-largest gold consumer, hosting one of the fastest-growing gold markets in the world (Pian and Santosh, 2020). This precious metal is highly valued for its important role in the world of investment, savings, and consumption. Gold has always been preferred over all other precious metals used for investment and trade (Tri and Nga, 2019). As gold is the oldest form of currency, it has attracted more attention from people who want to invest in gold exchange (Salis et al., 2019). Gold, which is used for jewelry and ornaments, is now considered a safe metal for investment. In addition to the physical buying and selling of gold, some markets offer electronic trading of gold. The trading volume in these precious metals markets is increasing daily (Nawaz et al., 2020). People generally prefer investing in physical gold. However, the innovativeness of the financial sector in recent years has allowed for an alternative way of investing in gold that is more liquid and secure than holding it in its physical form. Such an investment option is called an e-gold investment (Sathya and Raghavi, 2022).

Gold has traditionally been a popular investment avenue for investors worldwide, particularly in times of crisis. The work by Aliu et al. (2023) emphasizes the importance of Gold on Bitcoin price swings and vice versa. Their work documents that positive shock on BTC causes a symmetrical impact on Gold prices. Irrespective of the nature of the crisis, investors allocate their funds to various gold-backed assets (Madhavan and Sreejith, 2022). In recent times, gold has been considered an essential investment source, a source of inflation hedge, and a medium of exchange. The association between gold and the exchange rate becomes prominent following events such as the sovereign debt crisis, the subprime mortgage crisis, the low-interest rate issue, and the solvency of the global financial market. These events have attracted the attention of researchers and academics to investigate the dynamics of the relationship between gold and exchange rates, with most studies discussing linear dynamics, but the area of non-linear dynamics is ignored (Raza et al., 2021). Akhtaruzzaman et al. (2021) examined the role of gold as a safe haven asset at different stages of the COVID-19 pandemic crisis, corresponding to the timing of fiscal and monetary stimuli to support weakened economies. Using high-frequency data, the related results show that gold served as a safe asset for equity markets during Phase 1 of the pandemic (December 31, 2019 - March 16, 2020). However, gold lost its role during Phase 2 of the pandemic (March 17 – April 24, 2020). The question of "when to invest in gold?" has not been analyzed in much detail; hence, Baur et al. (2020) tested more than 4000 seasonal, technical, and fundamental timing strategies for gold. They found evidence for some ability to time the market and economic gains relative to a passive benchmark of buy and hold. The results were not robust to data tracking bias and were limited to specific evaluation periods. Giannellis and Koukouritakis (2019) examined whether the price of gold is affected by internal and external macroeconomic performance, which is mainly reflected in exchange rate movements. They tested the impact of the effective exchange rate and interest rate on the gold price in G7 countries between 1980 and 2016. They found that investors invest in gold as the mismatch rate of real effective exchange rate increases. When the interest rate increase is relatively high, investors are less willing to sell gold for higher-return assets. Their evidence confirms that gold serves as a hedge only when financial risk is high. The COVID-19 index of reported pandemic cases, the death index, and the global panic index have influenced public perceptions of buying and selling, and thus, it has been recommended to invest in gold rather than in equities (Latif et al., 2021). Turbulence in the financial markets, particularly in equity markets, is forcing investors to seek safer ways to allocate capital. Gold, which has a low or negative correlation with equities, may represent an alternative form of investment for them. Considering the correlation between the returns on shares and gold is important. It has been found that the gold market impacts the stock market in certain countries, whereas changes in the price of gold have not affected stock prices in other countries and vice versa (Mamcarz, 2022).

During the Russian invasion of Ukraine (from February 24, 2022, onwards), the study by Vochozka et al. (2023) showed how vulnerable the European financial system is to external shocks, which can be observed in significant inflationary changes. Another study by Aliu et al. (2022) claims that during the same period, Ruble played a significant role in crashing European currency pairs. Shabbir et al. (2020) recommend that people should invest in gold in times of increased inflation because increased inflation reduces the real value of money. Such an investment will ensure that the value of the assets is preserved and additional returns are obtained. This suggests that investment in gold can be used as a tool to reduce inflationary pressures to a sustainable level. Yousaf et al. (2021) found that portfolio investors should have increased investment in gold during the Covid-19 period. Price changes in all international financial and commodity markets showed a significant correlation. The correlation increased due to the macroeconomic changes that led to the cyclical economic trends caused by the COVID-19 pandemic (Cepel et al. 2020; Belas et al. 2022). There was a change in the investment strategy of both individual

and institutional investors. Demand for purchasing gold in investment portfolios increased as it was considered a safe asset, causing a significant increase in aggregate demand in the international precious metals market (Zivanovic et al., 2022). Price movements of gold as a preferred investment instrument of global investors have increasingly attracted attention. Gold is a weak hedge against political risk, and this weak hedge has lagged effects (Ding et al., 2022). Baur et al. (2021) observed that investors flee from equities, including gold mining stocks, to gold bullion after extreme financial shocks. When the financial shock is less extreme, investors only flee from stocks, excluding gold mining stocks. Being an investment option, gold has some special advantages. It is very popular for financial security purposes.

Jewellery was considered to be the most common form of gold investment, but now there are more gold investment options available, such as gold bullion, gold ETF, and gold SGBS (Garg, 2021). Market participants purchase gold in the first moments of an economic recession to maintain the value of their assets. However, as a result, they do not have cash and are forced to sell gold again (Brabenec et al., 2020). Pruchnicka-Grabias (2020) showed that gold can be used as a hedging asset, but it depends on the market situation. Including gold in an equity portfolio increases the portfolio return while reducing the risk measured with variance only in a gold bull market. During a bear market, gold helps to minimize risk but also reduces the portfolio return compared to an equity-only portfolio. According to Robiyanto et al. (2021), investors who believe in ethical investment can include gold in their portfolio to reduce risk. According to Bhatia (2023), gold as a precious metal and investment commodity is considered important for risk management, diversification, and hedging. The gold market has undergone significant structural changes during the pandemic and other geopolitical developments that have attracted investor interest. Oil volatility has strongly impacted many financial assets, not to mention its relationship with gold prices, exchange rates, stock markets, and investor sentiment (Bildirici et al., 2022). Sharp increases in the prices of strategic commodities such as gold can harm the macroeconomics of emerging economies and their stock markets (Akkoc and Civcir, 2019). The objective of this paper is to check whether a lack of cash is the reason why investors sell gold in times of crisis. Thus, the following three research questions, i.e., Research Question 1 (RQ1), Research Question 2 (RQ2), and Research Question 3 (RQ3), were formulated:

RQ1: Which factors influence investor behavior when investing in gold?
RQ2: Which factors may cause investors to sell gold in times of crisis?
RQ3: Is there a correlation between cash shortages and gold sales?

The price of gold is primarily influenced by the economic situation worldwide. In a positive economic situation, the price of gold decreases, whereas in a financial crisis or recession, the price of gold increases. Other factors affecting the price of gold include inflation, interest rates, the war in Ukraine and Covid-19, etc. When it comes to inflation, gold serves as a protection against the devaluation of savings. It is, therefore, a value preserver. Furthermore, the price of gold is also influenced by the market, specifically the relationship between the supply and demand for gold. Investors should give proper thought to investing in gold as their goal is to appreciate their savings. Thus, they should buy gold when the economic situation is stable and there is no recession or financial crisis. The price of gold starts to rise the most during the recession, and financial crisis. When investors decide to invest in gold as a commodity, the most common forms to buy it are gold bullion and gold bars, and may also include jewelry, gold coins, and collector coins. There is even virtual gold investing as well, which includes investments in certificates and gold funds. Another option may be to invest in shares of gold mining companies. No investment should involve a bet on one card. Investments may not guarantee a 100% successful return on investment or even appreciation of the resources spent. Hence, potential losses should be avoided by diversifying the investment portfolio. This is an essential activity for all investors. Investors should spread their funds across multiple assets and thus prevent losses in such a manner.

The rest of the paper is structured as follows. Section 2 contains a brief literature review about examinations of factors that influence investor behavior when investing in gold. Section 3 contains the data collection and the methods used. Finally, the results and discussions are in Section 4, while the concluding remarks are in Section 5.

## Literature review

Using 5-time series equalization methods (neural networks, decision tree, gradient boosted tree, linear regression, and nearest neighbors), Brabenec et al. (2020) estimated the future development of the price of gold based on the actual daily gold price from 2006 to July 2020, finding the maximum value at the end of the period under review, estimating a gradual decrease until the beginning of 2021, and forecasting a subsequent increase in the next six months of 2021. Baguda and Al-Jahdali (2021) proposed an intelligent system for predicting and characterizing the gold market trend, and the result showed that this proposed intelligent gold price scheme was able to predict the gold price with high accuracy and significantly reduced the prediction error compared to the

baseline neural network. To determine the mutual relationship between the US dollar exchange rate and the gold price in India, Bogale et al. (2019) used the artificial neural network ANN modeling technique to determine the price in US dollars. Bonato et al. (2021) applied a heterogeneous autoregressive realized volatility (HAR-RV) model to look into the importance of investor happiness in predicting daily realized volatility of gold returns using in-sample and out-of-sample data providing in-sample and out-of-sample predictions, where the in-sample result showed that realized volatility is negatively associated with investor happiness. The out-of-sample result additionally showed that extending the HAR -RV model to include investor happiness significantly improves the accuracy of realized volatility prognosis over short- and medium-term forecast horizons.

Since future gold price fluctuations are particularly difficult to predict, Dichtl (2020) therefore evaluated the predictive power of three approaches having been successfully applied in the context of stock market forecasting: (1) technical indicators, (2) diffusion indices, and (3) economically motivated constraints in predictive regressions; the results were evaluated using statistical and economic evaluation criteria for the entire dataset and separately for expansionary and recessionary business cycles, but none of the three prediction techniques lead to better forecasting of excess gold returns. He et al. (2019) proposed a new gold price forecasting method based on the integration of LSTM and CNN neural networks with an attention mechanism (LSTM-Attention-CNN model), where extensive experiments on real datasets collected from the World Gold Council showed that this proposed approach outperformed other conventional financial forecasting methods. Chen (2022) proposed a new method that combined the SVM and the LSTM model using quotient space theory to forecast the gold price using price factors while using the Pearson correlation coefficient to measure relationships between the nine price factors and the gold price. Chen and Zhang (2019) proposed a combinatorial gold price forecast model based on the pursuit algorithm and neural network to improve the accuracy of gold price forecasting. Kral and Olszanska (2020) wanted to evaluate the benefits of investing in physical gold between 2000 and 2019 and found that there were only a few instances in the last twenty years where an investor would not have made any profit by having purchased gold - in the vast majority of cases, the average annual appreciation would have been around 9% p.a., except for only a few years when the gold price peaked. For more accurate forecasting of the gold price, Liang et al. (2022) developed a new decomposition ensemble model, where first, the original gold prices were decomposed into sublayers with different frequencies by an improved full ensemble empirical mode decomposition with adaptive noise (ICEEMDAN). Second, long-term, short-term memory, convolutional neural networks, and the convolutional block attention module (LSTM-CNN-CBAM) combined the forecasts of all sublayers. Lastly, the forecast of sublayers with different models was reconstructed using the summation method as the final forecast results.

Livieris et al. (2020) proposed a new deep learning model for accurate gold price and movement forecast using the capabilities of convolutional layers for extracting useful knowledge and learning the internal representation of time series data, as well as the effectiveness of long short-term memory (LSTM) layers for identifying short-term and long-term dependencies (Livieris et al., 2020). Zhang and Ci (2020) proposed a deep belief network (DBN) model composed of constrained Boltzmann machines (RBMs) for pre-training and a layer of controlled back-propagation (BP) for fine-tuning and gold price forecasting, where several highly related gold price variables were used as inputs to construct this DBN model for forecasting between 1984 and 2019 with empirical results – it has excellent performance in forecasting and direction, with the lowest root mean squared error (RMSE), mean absolute percentage error (MAPE) and mean absolute error (MAE), and the highest directional statistic ( D-stat), thus having better accuracy compared to traditional neural network and linear models, and making it a very promising methodology for gold price forecasting. The dependence of macroeconomic factors (consumer price index, exports, interest rates, money supply, real effective exchange rates, total reserves and gold price) on the stock markets in the United States was examined using a non-linear NARDL (Autoregressive Distributed Lag) approach, and in the short run, it was found that an increase in the consumer price index has a negative effect on the Dow Jones Industrial Average index, but has a positive effect on the S&P500 index (Beh and Yew, 2021). Crow Search Algorithm (CQCSA) optimized for machine-fuzzy inference system (ELMFIS) optimized for oil and gold price forecasting was proposed, and the consolidation of FIS with ELM was based on the advantages of better ability to handle non-linear data and better adaptation (Das et al., 2022).

Investor behavior varies based on their needs and return expectations (Garg, 2021). Investor attitudes can also be driven by herding behavior (Boako et al., 2019). Gold prices have been used as a store of value for fear of financial collapse (Verghese and Chin, 2022). One of the most important factors is the rate of appreciation (Kral and Olszanska, 2020). Smales and Lucey (2019) compared changes in the liquidity of gold and silver. Tanin et al. (2022) found that uncertainty arising from the COVID-19 crisis attracted investors to gold. According to Burdekin and Tao (2021), gold provided a strong hedging value during the global financial crisis but did not consistently exhibit this attribute in 2020. Chai et al. (2019) proved some negative impacts during 2009-2012, implying that gold's effectiveness as a safe haven is not stable and depends on economic conditions. According to Chimhete (2020), Tanzania experienced an unprecedented crisis from the mid-1970s to the early 1990s, which triggered an

exponential rise in the price of gold in the international market. According to Raza et al. (2021), gold is considered an essential investment source, a source of inflation hedge, and a medium of exchange. Akhtaruzzaman et al. (2021) suggest that during the second phase of COVID-19 (March 17 – April 24, 2020), investors also expanded their investments in gold as a" flight to safety" asset during this crisis. Jain and Jaiswal (2023) highlighted how gold could act as a savior during a global crisis such as COVID-19. As regards the first research question, the content analysis method will be used to determine factors influencing investor behavior related to investing in gold. In the second research question, the content analysis method will also be used to define factors that cause investors to sell gold in times of crisis. The third research question will be addressed using correlation analysis.

**Material and methods**

The first research question (RQ1) will be addressed through content analysis of scientific articles from the Web of Science. Relevant sources for the last 5 years will be searched using the following keywords: "investing in gold" AND "behavior"; "gold" AND "store of value"; "gold" AND "invest*"; "gold" AND "investor*". The aforementioned method will also be applied to address the second research question (RQ2). The keywords needed to find suitable sources for the last 5 years are as follows: "gold" AND "crisis" AND "gold" AND "economic crisis". Using content analysis, 5 articles were selected for RQ1. The following factors that affect investor behavior when investing in gold were found: investors' needs, return expectations, herd behavior, fear of financial collapse, appreciation rate (higher), store of value, and liquidity.

The needs of investors mainly influence investor behavior. Gold investing is also associated with the application of herding behavior, where investors purchase gold to inspire other investors to invest in this commodity. The expected return on investment and profit generation are also decisive factors. They expect a higher rate of appreciation. Good liquidity is an equally important factor as well. Gold is seen as a store of value in times of crisis. As regards RQ2, 7 sources were found within the content analysis. Using this analysis, the following factors that may cause investors to sell gold in times of a crisis were found: uncertainty arising from the Covid-19 crisis, hedging value during the global financial crisis, gold as a safe haven, exponential rise in the price of gold on the international market during a crisis, fundamental investment source, source of inflation hedging, medium of exchange, investment in a "flight to safety" asset, savior in times of global crisis. Gold is one of the basic investment sources and means of monetary exchange. With the advent of Covid-19, uncertainty set in. Investing in gold, both during this pandemic and during other crises, was seen by many as a safe haven, a "flight to safety", and a source of inflation hedging. During such crises, the prices of other commodities on the international market fall, but the price of gold rises. Gold has a strong hedging value during crises such as the global financial crisis. Gold can, therefore, be classified as a savior during a global crisis. As already mentioned, the price of gold rises during a crisis. Hence, investors sell gold in this situation to make a profit, freeing them from the financial problems created by buying gold.

Data related to inflation will be used for RQ3 as it affects the availability of cash. Inflation leads to an increase in commodity prices, including gold. In case of financial distress and inability to raise funds, the demand for gold increases, and there is a consequent increase in the sale of gold. Data for inflation rates in % were found on The World Bank website, whilst data for gold demand in tonnes (specifically investment data) were obtained from the World Gold Council website. The data were for 10 years. The correlation value came out to be 0.014029, which represents a very weak (almost zero) correlation between gold demand and inflation. Approaching 0 indicates that there is not a significant correlation between these two variables, which, in effect, means that these variables are not dependent on each other. Points on the scatter plot below are scattered along the trend line (trend linear). The trend line is meant to predict the direction and tendency of the data. Points near the trend line have a match in direction and tendency. The point farthest from the trend line significantly differs from the predicted direction and trend.

*Figure 1. Correlation*

**Note:** The data were collected for 10 years. Points are scattered along the trend line (trend linear). Points near the trend line have a match in direction and tendency. The point farthest from the trend line sign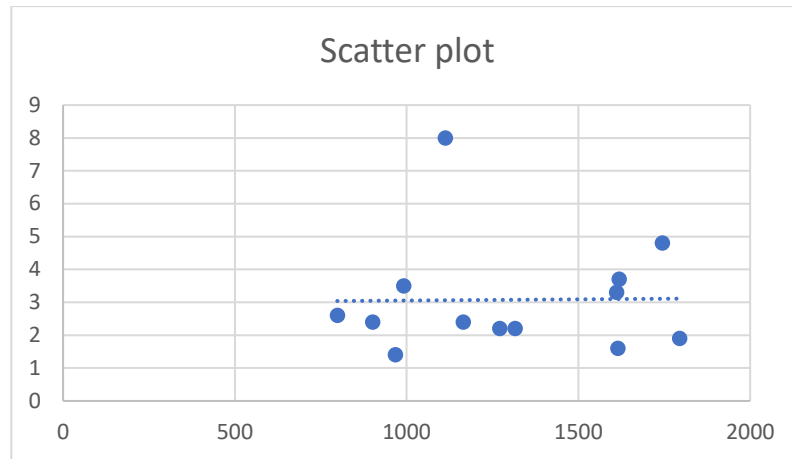ificantly differs from the predicted direction and trend. - *Source: Authors' elaboration based on the* World Gold Council website.

## Results

Factors that influence investor behavior when investing in gold include investor needs return expectations, herding behavior, fear of financial collapse, appreciation rate (higher), store of value, and liquidity. One of the main factors influencing investors includes return on investment. For an investment to be successful, it is necessary to achieve a return and generate a profit. Every investment undoubtedly carries some risk of loss, and therefore, one should invest in more than one type of investment and not merely in gold (the so-called diversification). No investor will be 100% successful; thus, diversification should be an integral part of investing. Diversifying an investment portfolio involves spreading out investments, which in this case means that precious metals investments should be split into, for instance, gold, silver, and platinum to reduce the risk of loss. Then, there is herding behavior, which can be explained as a behavior where investors invest in gold due to an event, and then other investors react and buy gold in large quantities. Some individuals buy gold in anticipation of a crisis, hoping that selling gold during the crisis will solve their financial problems. Gold is also a good store of value, as its value does not fluctuate much over time. Gold and its good liquidity also play a big role, implying that it is easy to convert gold into money.

Factors that may cause investors to sell gold in times of a crisis include the uncertainty arising from the Covid-19 crisis, the strong hedging value during the global financial crisis, gold as a safe haven asset, the exponential rise in the price of gold on the international market during a crisis, a fundamental investment source, a source of inflation hedging, a medium of exchange, an investment in a "flight-to-safety" asset, and a savior during a global crisis. Coronavirus became a global issue in 2020 and has had a negative impact on companies and industries. As share prices fell, the price of oil plummeted, and investors turned to gold as there was uncertainty about how the situation would develop further. People were in danger of becoming insolvent. Gold was seen as a safe haven. In the event of insolvency, investors could use the sale of gold as a source of funds. As the price of gold rises in times of crisis, it is used as an investment instrument. Gold is also an excellent store of value, and yet not only in times of crisis. Investors purchase gold before an expected crisis when the price is stable. By subsequently selling gold in times of crisis, they make a profit as the price of gold rises. For most investors, gold is a hedge in times of crisis. The price of many commodities falls in such times, whereas the price of gold rises, which is why investors invest heavily in gold.

In addition to Covid-19, the war in Ukraine has also negatively affected the economies of many countries. This situation has awakened the gold market as the price of gold has started to increase, with energy, oil, and gas prices rising sharply as well. As a result, some companies went bankrupt. Food prices were also rising sharply. Several households felt the increase in costs. People's fear of inflation and the devaluation of their savings led them to invest in gold. They saw gold as a security and a salvation in uncertain times.
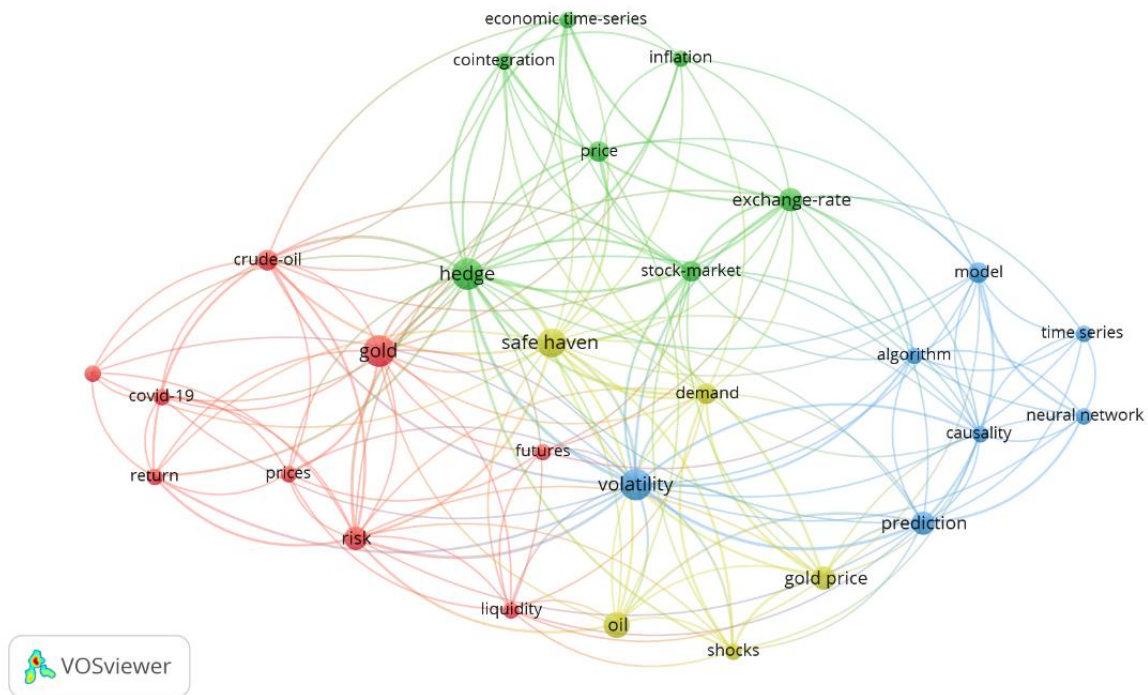
*Figure 2: Visualization of references from Web of Science*

**Note:** This figure shows the content analysis of scientific articles from the Web of Science. Relevant sources for the last 5 years were searched using the following keywords: "investing in gold" AND "behavior"; "gold" AND "store of value"; "gold" AND "invest*"; "gold" AND "investor*". The keywords needed to find suitable sources for the last 5 years are as follows: "gold" AND "crisis" AND "gold" AND "economic crisis". – *Source: Authors' elaboration based on the* Web of Science.

There is not a strong correlation between gold sales and cash shortages. Using data analysis, the correlation value of 0.014029 is found, representing a weak (almost zero) correlation between gold demand and inflation. Cash shortages do not cause significantly higher gold sales. When considering the Czech Republic, the almost zero correlation values are completely indifferent. Inflation is not the only factor affecting gold sales. Inflation can increase gold prices and gold saleability, but it is not a requirement. Other factors affect the purchasing and subsequent sale of gold. Before the expected crisis, investors are buying gold at relatively low prices. During the crisis itself, prices rise, leading most investors to sell gold to achieve higher appreciation. Most investors choose to diversify their investment portfolio to minimize the risk associated with investing merely in gold. They combine gold with other commodities. If investors holding gold have a pessimistic view of its investment value and expect the price of gold to develop unfavorably, they begin to sell gold and look for alternative investment opportunities.

**Discussion of results**

RQ1: Which factors influence investor behavior when investing in gold?

Using content analysis, the following factors that influence investor behavior when investing in gold were found: investors' needs, return expectations, herding behavior, fear of financial collapse, appreciation rate (higher), store of value, and liquidity. Investors' needs are influenced by several factors, such as inflation protection, diversification of investment portfolio, or the need for gold as a "safe haven". As for some investors, gold can help them provide stability and protection against uncertainty in an economic or financial crisis. Investors may opt for gold in anticipation of a positive return on investment and a higher rate of appreciation. There may be situations where more investors decide to invest in gold, and others follow suit. This phenomenon is called herding behavior, where investors influence each other. Gold is classified as a long-term store of value. Therefore, investors use it, for instance, in times of economic or financial crisis. Later on, it can help when there is a shortage of cash. An equally important factor is the liquidity of gold, which determines how gold is convertible into cash. According to Garg (2021), investor behavior varies based on the needs of investors and return expectations. According to Boako et al. (2019), investors' attitudes can also be influenced by herding behavior. According to Verghese and Chin (2022), gold prices have been used as a store of value for fear of financial collapse. Kral and Olszanska (2020)

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stated that appreciation rates are among the most important factors. Smales and Lucey (2019) compared changes in gold and silver liquidity.

RQ2: Which factors may cause investors to sell gold in times of crisis?

Using content analysis, the following factors that may cause investors to sell gold during a crisis were identified: uncertainty arising from the Covid-19 crisis, strong hedging value during the global financial crisis, gold as a safe haven, exponential rise in the price of gold on the international market during a crisis, a core investment source, a source of inflation hedging, a medium of exchange, an investment in a "flight-to-safety" asset, and a savior during a global crisis. Covid-19 brought uncertainty and instability in the economy. Investors could raise the funds that are missing by selling gold at this time. However, not all investors sold gold for this reason. One reason may have been higher profits as gold prices rose in this difficult situation. When a crisis occurs, gold is seen as a strong hedge, as its value, as mentioned above, increases. Once the crisis is over, its value goes down again. Many investors see gold as a hedge against inflation. They can sell gold for a higher profit and avoid a loss if inflation is high. Gold is used as a "flight to safety" during any crisis. Despite this, portfolio diversification should be carried out to avoid losses. For example, investors can focus their investment portfolio on a combination of gold and equities. In this case, gold can be a hedging instrument against a fall in the value of shares. Another example could be a combination of real estate and gold. Gold can also be combined, for instance, with investments in oil and agricultural products.

Tanin et al. (2022) found that uncertainty arising from the Covid-19 crisis attracted investors to gold. According to Burdekin and Tao (2021), gold provided a strong hedging value during the global financial crisis but did not consistently exhibit this attribute in 2020. Chai et al. (2019) showed negative impacts during 2009-2012, implying that gold's effectiveness as a safe haven is not stable and depends on economic conditions. According to Chimhete (2020), Tanzania experienced an unprecedented crisis from the mid-1970s to the early 1990s, which triggered an exponential rise in the price of gold on the international market. According to Raza et al. (2021), gold is considered to be an essential investment source, a source of inflation hedge, and a medium of exchange. Akhtaruzzaman et al. (2021) suggested that during the second phase of COVID-19 (March 17 - April 24, 2020), investors also expanded their investments in gold as a "flight to safety" asset during this crisis. Jain and Jaiswal (2023) highlighted how gold could act as a savior during a global crisis such as Covid-19.

RQ3: Is there a correlation between cash shortages and gold sales?

It was found that there is almost a minimal correlation between cash shortages and gold sales, indicating that there is not a strong relationship between cash shortages and gold sales. Cash shortages do not cause significantly higher gold sales. The lack of cash may partly affect the demand for gold. Various economic, financial, or political changes can trigger a financial shortage. If investors fear instability or inflation, they may consider gold either as a "safe haven" to help them overcome inflation or as an investment to make a profit if subsequently sold at a higher price. However, gold is not the only commodity that can be invested in ahead of an expected crisis. Other investment opportunities include, for instance, real estate, stocks, bonds, and artwork. It is up to investors to decide. It is important to diversify the investment portfolio to reduce investment risks. According to Brabenec et al. (2020), market participants buy gold in the first moments of an economic recession to maintain the value of their assets. However, as a result, they do not have cash and are forced to sell gold again (Brabenec et al., 2020).

**Conclusion**

Five factors influencing investor behavior when investing in gold were identified based on the content analysis conducted. These factors are investors' needs, return expectations, herding behavior, financial failure concerns, higher appreciation rates, store of value, and liquidity. These results suggest that individual investors' needs significantly impact their gold investment decisions. The expected return is an integral part of investing as it involves an increase in the price of gold and generating a certain amount of profit. Every investment can also carry some risk, so a way to diversify an investment portfolio should be chosen. If investors expect investment in gold to be safe, a situation of herding behavior will arise where other investors decide to invest in gold as well. Gold is seen as a safe haven in times of economic uncertainty since it reduces the fear of financial collapse. Investors prefer a higher rate of appreciation in gold. This higher appreciation will also attract more investors. Gold is considered a good store of value in times of crisis. Liquidity is an equally important factor that reflects how convertible gold is into money. These factors can be beneficial for investors planning to invest in gold. Furthermore, content analysis was used to identify the factors that may cause investors to sell gold in times of crisis. In total, 7 professional articles were found. Uncertainty arising from the Covid-19 crisis, strong hedging value during the global financial crisis, gold as a safe haven, exponential growth of the price of gold on the

international market during the crisis, a fundamental investment source, a source of inflation hedging, a medium of exchange, investment in a "flight-to-safety" asset, and a savior during the global crisis may cause investors to sell gold during the crisis. Gold is seen as a safe haven in times of crisis when uncertainty sets in. The COVID-19 pandemic or a global financial crisis can cause uncertainty and generally influence investor behavior. Investor insolvency leads to more frequent gold sales. In this way, investors sell gold to raise funds that are missing. If investors anticipate a crisis, they start buying gold. This is because gold prices start to rise during a crisis, and they can make a profit by selling gold. In case of inflation, investors turn to gold as it can preserve the value of their savings. Gold is thus seen as an investment instrument that helps investors secure funds in times of crisis.

Moreover, the authors attempted to examine whether there is a correlation between cash shortages and gold sales. Data related to the development of inflation were used for cash shortages, as inflation and cash availability are closely linked. Inflation causes the prices of goods and services to rise and the value of money to fall. People need more money to buy the same amount of goods and services; hence, there is a shortage of cash. As a result of inflation, the price of commodities, including gold, also increases. The correlation value between inflation and gold sales came out to be 0.014029, which represents a very weak (almost zero) correlation between these two variables. Since this is close to 0, it implies that there is not a significant correlation between these two variables, and thus they are not dependent on each other. Considering the Czech Republic as an example, the values are indifferent. Therefore, cash shortages do not cause significantly higher gold sales. Although inflation may lead to a higher demand for gold, as it can preserve the value of investors' assets, it may also lead to higher gold prices. However, a shortage of cash does not result in higher gold sales.

The objective of the paper was achieved. It cannot be stated that a lack of cash is the reason why investors sell gold in times of crisis, and it does not affect higher gold sales either. However, this can be an issue for several investors in times of economic or financial crisis. Investors consider gold as a haven or "flight to safety" in times of uncertainty and increased inflation, but it is not the case that they are turning more to selling gold due to the lack of cash. In times of a crisis, the price of gold is higher, and any sale would be beneficial to investors due to the higher profit, yet selling gold in times of the crisis is not always for the reason that investors will thereby obtain the missing cash, but rather to achieve a higher appreciation of their investment.

## References

Akhtaruzzaman, M., Boubaker, S., Lucey, B. M., & Sensoy, A. (2021). Is gold a hedge or a safe-haven asset in the COVID–19 crisis?. Economic Modelling, 102, 105588. https://doi.org/10.1016/j.econmod.2021.105588

Akkoc, U., & Civcir, I. (2019). Dynamic linkages between strategic commodities and stock market in Turkey: Evidence from SVAR-DCC-GARCH model. Resources Policy, 62, 231-239. https://doi.org/10.1016/j.resourpol.2019.03.017

Aliu, F., Asllani, A., & Hašková, S. (2023). The impact of bitcoin on gold, the volatility index (VIX), and dollar index (USDX): analysis based on VAR, SVAR, and wavelet coherence. Studies in Economics and Finance. https://doi.org/10.1108/SEF-04-2023-0187.

Aliu, F., Hašková, S., & Bajra, U. Q. (2023). Consequences of Russian invasion on Ukraine: evidence from foreign exchange rates. The Journal of Risk Finance, 24(1), 40-58. https://doi.org/10.1108/JRF-05-2022-0127.

Baguda, Y. S., & Al-Jahdali, H. M. (2021). An Intelligent Gold Price Prediction Based on Automated Machine and k-fold Cross Validation Learning. IJCSNS, 21(4), 65. https://doi.org/10.22937/IJCSNS.2021.21.4.10

Baur, D. G., Beckmann, J., & Czudaj, R. L. (2020). The relative valuation of gold. Macroeconomic Dynamics, 24(6), 1346-1391. https://doi.org/10.1017/S1365100518000895

Baur, D. G., Dichtl, H., Drobetz, W., & Wendt, V. S. (2020). Investing in gold–Market timing or buy-and-hold?. International Review of Financial Analysis, 71, 101281. https://doi.org/10.1016/j.irfa.2018.11.008

Baur, D. G., Prange, P., & Schweikert, K. (2021). Flight to quality–Gold mining shares versus gold bullion. Journal of International Financial Markets, Institutions and Money, 71, 101296. https://doi.org/10.1016/j.intfin.2021.101296

Beh, W. L., & Yew, W. K. (2021). The asymmetric responses of stock prices in US market. In ITM Web of Conferences (Vol. 36, p. 01013). EDP Sciences. https://doi.org/10.1051/itmconf/20213601013

Belas, J., Gavurova, B., Dvorsky, J., Cepel, M., & Durana, P. (2022). The impact of the COVID-19 pandemic on selected areas of a management system in SMEs. Economic Research-Ekonomska Istraživanja, 35(1), 3754-3777.

Bhatia, M. (2023). On the efficiency of the gold returns: An econometric exploration for India, USA and Brazil. Resources Policy, 82, 103574. https://doi.org/10.1016/j.resourpol.2023.103574

Bildirici, M. E., Salman, M., & Ersin, Ö. Ö. (2022). Non-linear contagion and causality nexus between oil, gold, VIX investor sentiment, exchange rate and stock market returns: The MS-GARCH copula causality method. Mathematics, 10(21), 4035. https://doi.org/10.3390/math10214035

Boako, G., Tiwari, A. K., Ibrahim, M., & Ji, Q. (2019). Analysing dynamic dependence between gold and stock returns: Evidence using stochastic and full-range tail dependence copula models. Finance Research Letters, 31. https://doi.org/10.1016/j.frl.2018.12.008

Bogale, D., Muley, A., Bhalchandra, P., & Kulkarni, G. (2019). US Dollar's Influence on Indian Gold Price: Assessment Using Artificial Neural Network. In Information and Communication Technology for Competitive Strategies: Proceedings of Third International Conference on ICTCS 2017 (pp. 81-88). Springer Singapore. https://doi.org/10.1007/978-981-13-0586-3_8

Bonato, M., Gkillas, K., Gupta, R., & Pierdzioch, C. (2021). A note on investor happiness and the predictability of realized volatility of gold. Finance Research Letters, 39, 101614. https://doi.org/10.1016/j.frl.2020.101614

Brabenec, T., Suler, P., Horák, J., & Petras, M. (2020). Prediction of the Future Development of Gold Price. Acta Montanistica Slovaca, 25(2). https://doi.org/10.46544/AMS.v25i2.11

Burdekin, R. C., & Tao, R. (2021). The golden hedge: From global financial crisis to global pandemic. Economic Modelling, 95, 170-180. https://doi.org/10.1016/j.econmod.2020.12.009

Cepel, M., Gavurova, B., Dvorsky, J., & Belas, J. (2020).The impact of the COVID-19 crisis on the perception of business risk in the SME segment. Journal of International Studies, 13(3), 248-263. doi:10.14254/2071-8330.2020/13-3/16

Gao, C., You, D. M., & Chen, J. Y. (2019). Dynamic response pattern of gold prices to economic policy uncertainty. Transactions of Nonferrous Metals Society of China, 29(12), 2667-2676. https://doi.org/10.1016/S1003-6326(19)65173-3

Chen, L., & Zhang, X. (2019, February). Gold price forecasting based on projection pursuit and neural network. In Journal of Physics: Conference Series (Vol. 1168, No. 6, p. 062009). IOP Publishing. https://doi.org/10.1088/1742-6596/1168/6/062009

Chen, W. (2022). Estimation of International Gold Price by Fusing Deep/Shallow Machine Learning. Journal of Advanced Transportation, 2022. https://doi.org/10.1155/2022/6211861

Chimhete, N. (2020). Prosperity in a crisis economy: the Nyamongo gold boom, Tanzania, 1970s–1993. Journal of Eastern African Studies, 14(3), 572-589. https://doi.org/10.1080/17531055.2020.1774706

Das, S., Sahu, T. P., & Janghel, R. R. (2022). Oil and gold price prediction using optimized fuzzy inference system based extreme learning machine. Resources Policy, 79, 103109. https://doi.org/10.1016/j.resourpol.2022.103109

Dichtl, H. (2020). Forecasting excess returns of the gold market: Can we learn from stock market predictions?. Journal of Commodity Markets, 19, 100106. https://doi.org/10.1016/j.jcomm.2019.100106

Ding, Q., Huang, J., Gao, W., & Zhang, H. (2022). Does political risk matter for gold market fluctuations? A structural VAR analysis. Research in International Business and Finance, 60, 101618. https://doi.org/10.1016/j.ribaf.2022.101618

Garg, S. (2021). A study of factors influencing investor behaviour towards gold as an investment avenue with factor analysis. Materials Today: Proceedings, 37, 2587-2590. https://doi.org/10.1016/j.matpr.2020.08.503

Giannellis, N., & Koukouritakis, M. (2019). Gold price and exchange rates: A panel smooth transition regression model for the G7 countries. The North American Journal of Economics and Finance, 49, 27-46. https://doi.org/10.1016/j.najef.2019.03.018

He, Z., Zhou, J., Dai, H. N., & Wang, H. (2019, August). Gold price forecast based on LSTM-CNN model. In 2019 IEEE Intl Conf on Dependable, Autonomic and Secure Computing, Intl Conf on Pervasive Intelligence and Computing, Intl Conf on Cloud and Big Data Computing, Intl Conf on Cyber Science and Technology Congress (DASC/PiCom/CBDCom/CyberSciTech) (pp. 1046-1053). IEEE. https://doi.org/10.1109/DASC/PiCom/CBDCom/CyberSciTech.2019.00188

Jain, M., & Jaiswal, S. (2023). Dynamics of Gold in the Contemporary Era. Vision, 27(1), 7-10. https://doi.org/10.1177/09722629211004296

Král, M., & Olszanska, A. (2020). Investing in Gold: Good or Bad Choice? 20-Year History. https://doi.org/10.36689/uhk/hed/2020-01-044

Latif, Y., Shunqi, G., Bashir, S., Iqbal, W., Ali, S., & Ramzan, M. (2021). COVID-19 and stock exchange return variation: empirical evidences from econometric estimation. Environmental Science and Pollution Research, 28(42), 60019-60031. https://doi.org/10.1007/s11356-021-14792-8

Liang, Y., Lin, Y., & Lu, Q. (2022). Forecasting gold price using a novel hybrid model with ICEEMDAN and LSTM-CNN-CBAM. Expert Systems with Applications, 206, 117847. https://doi.org/10.1016/j.eswa.2022.117847

Liu, J., Yang, T., Hu, Z., & Feng, G. (2019). The development of unimolecular conjugated polymeric micelles for the highly selective detection and recovery of gold from electronic waste. New Journal of Chemistry, 43(30), 11811-11815. https://doi.org/10.1039/c9nj02077b

Livieris, I. E., Pintelas, E., & Pintelas, P. (2020). A CNN–LSTM model for gold price time-series forecasting. Neural computing and applications, 32, 17351-17360. https://doi.org/10.1007/s00521-020-04867-x

Madhavan, S., & Sreejith, S. (2022). A Comparative Analysis on the Role and Market Linkages of Gold Backed Assets During COVID-19 Pandemic. Scientific Annals of Economics and Business, 69(3), 417-433. https://doi.org/10.47743/saeb-2022-0019

Mamcarz, K. (2022). Gold market and selected Nordic stock markets: Granger causality. Ekonomia i Prawo. Economics and Law, 21(2), 463-487. https://doi.org/10.12775/EiP.2022.026

Nawaz, M. S., Azam, M., & Aslam, M. (2020). Probable daily return on investments in gold. Gold Bulletin, 53, 47-54. https://doi.org/10.1007/s13404-020-00273-2

Pian, H., & Santosh, M. (2020). Gold deposits of China: Resources, economics, environmental issues, and future perspectives. Geological Journal, 55(8), 5978-5989. https://doi.org/10.1002/gj.3531

Pruchnicka-Grabias, I. (2020). Equity Portfolio Optimization With Gold. Problemy Zarządzania, 18(4 (90)), 62-77. https://doi.org/10.7172/1644-9584.90.4

Ali Raza, S., Shah, N., Ali, M., & Shahbaz, M. (2021). Do exchange rates fluctuations influence gold price in G7 countries? New insights from a nonparametric causality-in-quantiles test. Zagreb International Review of Economics & Business, 24(2), 37-57. https://doi.org/10.2478/zireb-2021-0010

Robiyanto, R., Nugroho, B. A., Huruta, A. D., Frensidy, B., & Suyanto, S. (2021). Identifying the Role of Gold on Sustainable Investment in Indonesia: The DCC-GARCH Approach. Economies, 9 (3), 119. https://doi.org/10.3390/economies9030119

Salis, V. E., Kumari, A., & Singh, A. (2019). Prediction of gold stock market using hybrid approach. In Emerging Research in Electronics, Computer Science and Technology: Proceedings of International Conference, ICERECT 2018 (pp. 803-812). Springer Singapore. https://doi.org/10.1007/978-981-13-5802-9_70

Sathya, R., & Iyswarya Raghavi, P. (2022). A study on investors behaviour towards e-gold vs physical gold. Journal of Statistics and Management Systems, 25(5), 1039-1045. https://doi.org/10.1080/09720510.2022.2060597

Sesay, A., Suhartono, S., & Prastyo, D. D. (2020). Forecasting Exchange Rate Across Countries with Gold Price as Exogenous Variable Using Transfer Function and VARI-X Model. MATEMATIKA: Malaysian Journal of Industrial and Applied Mathematics, 181-196. https://doi.org/10.11113/matematika.v36.n3.1211

Shabbir, A., Kousar, S., & Batool, S. A. (2020). Impact of gold and oil prices on the stock market in Pakistan. Journal of Economics, Finance and Administrative Science, 25(50), 279-294. https://doi.org/10.1108/JEFAS-04-2019-0053

Smales, L. A., & Lucey, B. M. (2019). The influence of investor sentiment on the monetary policy announcement liquidity response in precious metal markets. Journal of International Financial Markets, Institutions and Money, 60, 19-38. https://doi.org/10.1016/j.intfin.2018.12.003

Tanin, T. I., Sarker, A., Brooks, R., & Do, H. X. (2022). Does oil impact gold during COVID-19 and three other recent crises?. Energy economics, 108, 105938. https://doi.org/10.1016/j.eneco.2022.105938

Ho, T. T., & Vo, T. N. (2019). Factors affecting the disparity of Vietnamese gold prices and worldwide gold prices. Journal of Competitiveness. https://doi.org/10.7441/joc.2019.03.10

Verghese, J., & Chin, P. N. (2022). Factors affecting investors' intention to purchase gold and silver bullion: evidence from Malaysia. Journal of Financial Services Marketing, 1-11. https://doi.org/10.1057/s41264-021-00092-2

Vochozka, M., Škapa, S., & Apanovych, Y. (2023). Changes in real income of households in the Czech Republic due to the Russian invasion of Ukraine. Entrepreneurship and Sustainability Issues, 11(2), 37-53. https://doi.org/10.9770/jesi.2023.11.2(3).

Xia, J., Marthi, R., Twinney, J., & Ghahreman, A. (2022). A review on adsorption mechanism of gold cyanide complex onto activation carbon. Journal of Industrial and Engineering Chemistry, 111, 35-42. https://doi.org/10.1016/j.jiec.2022.04.014

Yousaf, I., Bouri, E., Ali, S., & Azoury, N. (2021). Gold against Asian stock markets during the COVID-19 outbreak. Journal of Risk and Financial Management, 14(4), 186. https://doi.org/10.3390/jrfm14040186.

Zhang, P., & Ci, B. (2020). Deep belief network for gold price forecasting. Resources Policy, 69, 101806. https://doi.org/10.1016/j.resourpol.2020.101806.

Živanović, V., Vitomir, J., & Đorđević, B. (2022). Portfolio Diversification during Covid-19 Outbreak: Is Gold a Hedge and a Safe-Haven Asset? Prague Economic Papers, 31(2), 169-194. https://doi.org/10.18267/j.pep.802.