

Price Environment for Gold and Silver in the Context of the Development of COVID-19

Valeria Baranova¹, Olena Sergienko², Svitlana Stepurina², Vyacheslav Lyashenko³
lyashenko.vyacheslav@gmail.com

¹Department of Travel Business and Regional Studies, V.N. Karazin Kharkiv
National University, Ukraine

²Business, Trade and Products Expertise Department, National Technical University
«Kharkiv Polytechnic Institute», Ukraine

³Department of Informatics, Kharkiv National University of RadioElectronics, Ukraine

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Abstract

The precious metals market is an integral part of the overall financial market. This part of the financial market plays an important role in the redistribution of financial flows. The precious metals market is currently under the influence of factors related to the spread of the COVID-19 pandemic. We investigated the dynamics of gold and silver prices in the context of the current pandemic development. For this analysis, we use the wavelet ideology. The results can be used in exchange trading in precious metals, investing in gold and silver.

Keywords: Sale Price, Gold, Silver, Financial Market, COVID-19, Wavelet Coherence

Introduction

The COVID-19 pandemic has a significant impact on human life. These are direct infection with the virus, restrictions on movement, restrictions on the ability to freely carry out certain types of economic activities, changes in the way of conducting economic activities. At the same time, the dynamics of prices for the main types of energy resources (Mustafa et al., 2020; Zhang, Wang & Li, 2019) is changing; the architecture of the modern economy is changing (Megahed & Ghoneim, 2020). Thus, among the factors that significantly affect the dynamics of economic development, the key is the dynamics of the development of the COVID-19 pandemic.

It should also be noted the impact of the COVID-19 pandemic on the stable functioning of financial markets. This is manifested in changes in price dynamics, the cost of credit resources, fluctuations in various currency pairs (Vasiurenko, Lyashenko, Baranova & Deineko, 2020). As a result of this influence, the volatility and dynamics of key financial resources may change significantly.

To analyze the dynamics of prices in financial markets, you can use various tools and methods (Jiang, Xie, Zhou & Sornette, 2019; Babur et al., 2020). At the same time, it is important to analyze hidden trends that allow us to understand and assess the consequences of those processes that are taking place. It is advisable to carry out such an analysis step by step - step by step, using the general concept of a microsituation (Kuzemin & Lyashenko, 2011).

Thus, the main goal of this work is to study the dynamics of prices for key goods in the financial markets. We consider precious metals as such goods: gold and silver. For the analysis, we will use such a technique as wavelet analysis. Then we can look at the general dynamics of gold and silver prices, as well as possible hidden trends of such dynamics.

Brief Literary Review

Price analysis is one of the key research topics. This is due to the fact that financial markets ensure the concentration and redistribution of financial resources between different business entities.

C. T. Albulescu is conducting a detailed study of the impact of COVID-19 on financial market volatility in the United States (Albulescu, 2020). To do this, the author compares the dynamics of COVID-19 infections and the corresponding mortality rate with data on key financial parameters. In particular, the author shows that the volatility of the S&P 500 index is increasing. The author also concludes that the COVID-19 pandemic is the main source of financial instability at the present time.

B. N. Ashraf is considering the possibility of state regulation of financial markets in the context of the COVID-19 pandemic, the effectiveness of containing the pandemic and the impact of such containment on the development of financial markets (Ashraf, 2020). For this, the author examines the change in stock market returns in a pandemic. The author highlights the positive and negative aspects of this influence.

D. Zhang, M. Hu and Q Ji investigate the dynamics of the development of financial markets in the current global pandemic (Zhang, Hu & Ji, 2020). The authors note that the COVID-19 pandemic is having a negative impact on financial markets around the world. This leads to significant financial losses. The work shows the general patterns of risk development, which are associated with the ineffectiveness of the development of processes in the financial markets. The authors also analyze the impact of various instruments on the efficiency of financial markets.

The work (Calvimontes et al., 2020) analyzes changes in gold mining prices in the context of the COVID-19 pandemic. The paper shows that the impact of the COVID-19 pandemic on gold mining is diverse and unpredictable. This has a significant impact on the price of gold, as well as the development of the industry.

P. Mukherjee and S. Bardhan assess the impact of COVID-19 on the interaction of gold with other commodities in financial markets (Mukherjee & Bardhan, 2020). The authors investigate the relationship between the price of gold and the decline in production growth and labor productivity. It also highlights the significant volatility of gold prices in the current pandemic.

A. Syahri and Robiyanto examine the relationship between the price of gold, the exchange rate and the main parameters of the stock market during the current pandemic (Syahri & Robiyanto, 2020). The authors consider data for different countries and come to the conclusion that there is significant volatility in gold prices.

The authors use a variety of tools to analyze accordingly. First of all, these are methods of statistical analysis: descriptive statistics, correlation analysis, analysis of variance. Also, to study the dynamics in financial markets, methods of cluster analysis, methods of data visualization, methods of the theory of neural networks are used. Among the new methods for studying the corresponding financial data, the methods of the wavelet theory should be highlighted. These methods show good and reliable results (Mustafa et al., 2020; Vasiurenko, Lyashenko, Baranova & Deineko, 2020; Baranova et al., 2020).

Below we will consider one of the methods of the wavelet ideology, which is advisable to use to analyze the dynamics of gold and silver prices in the context of the COVID-19 pandemic.

Wavelet Ideology as an Analysis Tool

The wavelet ideology has a whole arsenal of methods and approaches for data analysis, which are presented in the form of a time series. These methods allow you to explore and identify the features of each time series. At the same time, there are methods that help to carry out mutual analysis between data series. This analysis is based on the study of cross-references for the respective data series. To do this, each time series is divided into detail coefficients and approximation coefficients. This allows you to analyze data in the frequency and time domains simultaneously. This contributes to a more detailed analysis of the data, allow you to identify all the relationships between the data. For this we use wavelet coherence.

Suppose we have two series of data $g(t)$ and $q(t)$ then we can determine the wavelet coherence (Torrence & Webster, 1999; Vasiurenko & Lyashenko, 2020):

$$L^2(g, q) = \frac{|\Omega(q^{-1}V_{xy}(g, q))|}{\Omega(q^{-1}|V_x(g, q)|^2)\Omega(q^{-1}|V_y(g, q)|^2)}, \quad (1)$$

where: $V_{xy}(g, q)$ – values of cross wavelet spectra (x is the variable that displays the data number in the series under investigation and y is the variable that displays the depth of cross-links for a time series); Ω – is a smoothing operator; $L^2(g, q)$ – the squared wavelet coherency coefficient. $0 \leq L^2(g, q) \leq 1$. If these values tend to zero, then we have a weak correlation. Otherwise, we have a strong correlation (Torrence & Webster, 1999).

Data for Analysis

We use data from 22.01.2020 to 01.11.2020 to carry out the relevant analysis. This is the period when we can observe the different phases of the COVID-19 pandemic. We consider such data as the total number of confirmed cases of the COVID-19 pandemic (cumulative total and data in the context of each day from the studied interval). We also look at the dynamics of gold and silver prices.

Figure 1 shows the dynamics of the total number of confirmed cases of the COVID-19 pandemic (cumulative total).

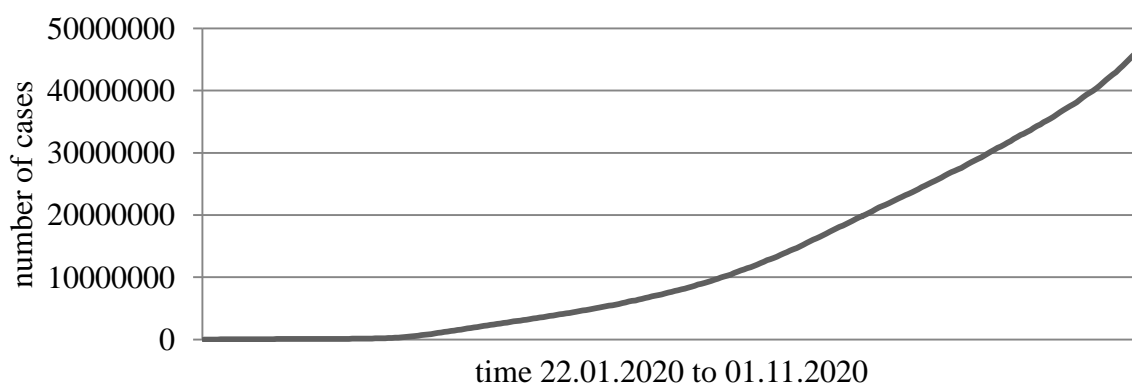


Figure 1. Dynamics of the total number of confirmed cases of the COVID-19 pandemic (cumulative total)

Figure 2 shows the dynamics of the total number of confirmed cases of the COVID-19 pandemic (data in the context of each day from the studied interval).

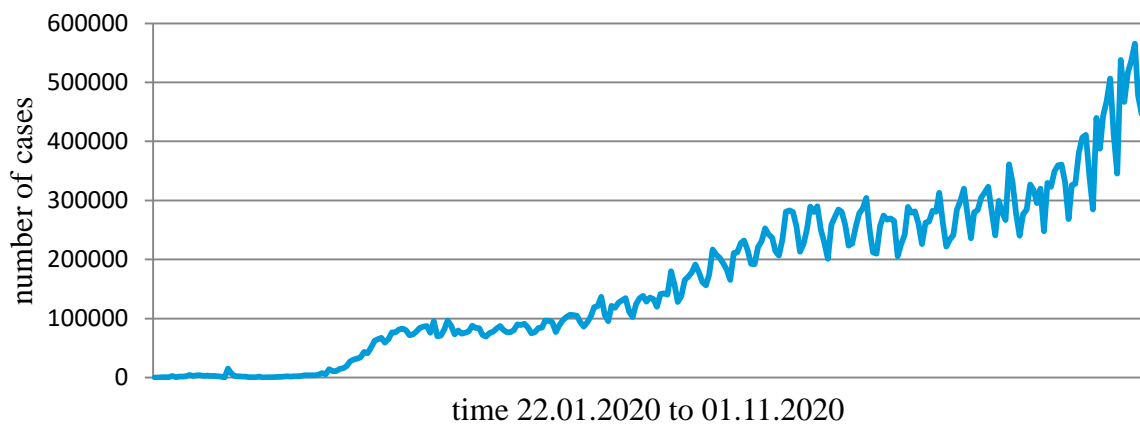


Figure 2. Dynamics of the total number of confirmed cases of the COVID-19 pandemic (data in the context of each day from the studied interval)

Source: Figure 1 and Figure 2 show generalized data from the site <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.

Figure 3. shows the dynamics of prices for gold (Figure 3a) and silver (Figure 3b).

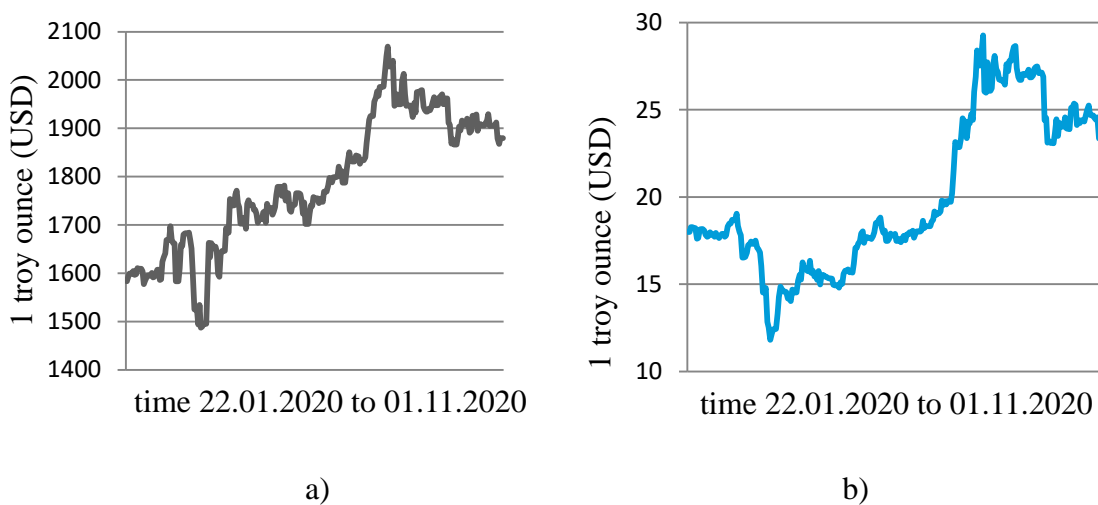


Figure 3. Dynamics of prices for gold (a) and silver (b)

Source: The data for Figure 3 was taken from <https://investing.com>.

Results and Discussion

First of all, note that the data in Figure 1 and Figure 2 show the same trend. At the same time, the data in Figure 2 are more detailed. At the same time, Figure 2 shows the different phases in the development of the COVID-19 pandemic. Thus, we can make a comparative assessment of the impact of the COVID-19 pandemic on the dynamics of gold and silver prices when we have a different form of data presentation.

Figure 4 shows the values of the wavelet coherence between the data, which reflect the dynamics of the pandemic and the dynamics of gold prices: Figure 4a is the dynamics of the pandemic when the data is cumulative total; Figure 4b is the dynamics of the pandemic, when the data is in the context of each day from the studied interval.

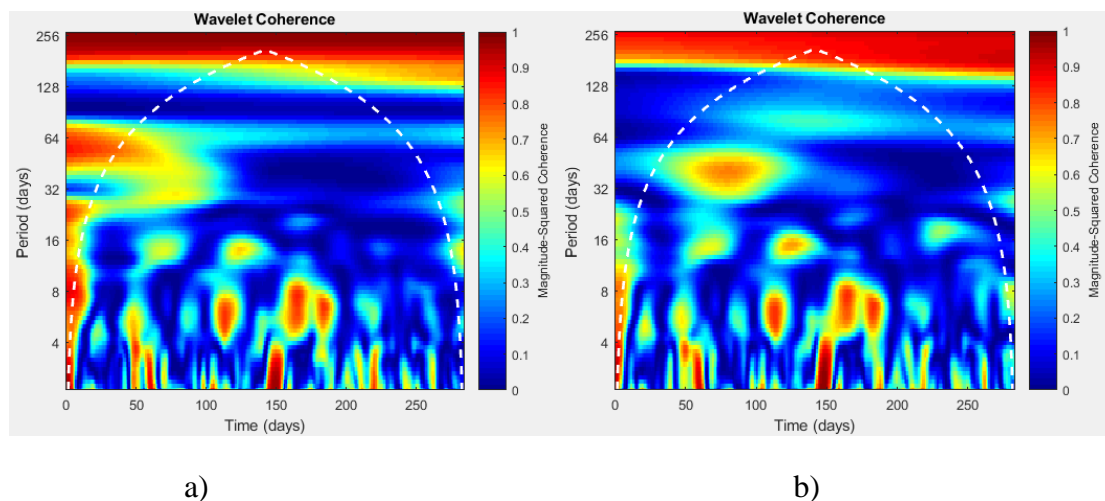


Figure 4. Wavelet coherence between the data, which reflect the dynamics of the pandemic and the dynamics of gold prices (a – the dynamics of the pandemic when the data is cumulative total; b – the dynamics of the pandemic, when the data is in the context of each day from the studied interval)

We can observe approximately the same picture for different forms of representation in the development of the dynamics of the pandemic. At the same time, it should be noted that expectations of an increase in the price of gold in the long term were characteristic of the initial stage of the COVID-19 pandemic. This can be seen from the data in Figure 4b.

We can also see some details in Figure 4b that are not in Figure 4a. These details point to increased volatility in gold prices amid the COVID-19 pandemic. Much less is the expectation of an increase in the price of gold for the last time periods from the time period being analyzed. Moreover, these expectations cover a shorter time period. This can be seen from the data in Figure 4a and Figure 4b. Moreover, it is important to note that there is a characteristic trend for a decrease in gold prices in the context of an increase in the total number of confirmed cases COVID-19. This can be seen from the data in Figure 4a and Figure 4b, as well as the data in Figure 2 and Figure 3a. Figure 5 shows the values of the wavelet coherence between the data, which reflect the dynamics of the pandemic and the dynamics of silver prices: Figure 5a is the dynamics of the pandemic when the data is cumulative total; Figure 5b is the dynamics of the pandemic, when the data is in the context of each day from the studied interval.

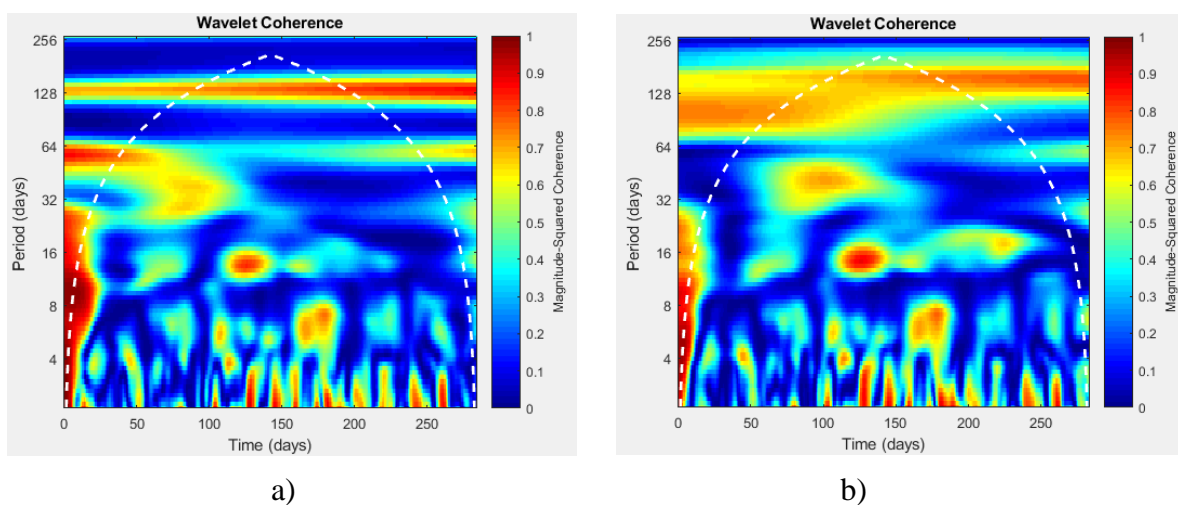


Figure 5. Wavelet coherence between the data, which reflect the dynamics of the pandemic and the dynamics of silver prices (a – the dynamics of the pandemic when the data is cumulative total; b – the dynamics of the pandemic, when the data is in the context of each day from the studied interval)

The data in Figure 5a and Figure 5b are also comparable. At the same time, in Figure 5b we see more detail than in Figure 5a. These details highlight the existing expectations for a long-term rise in silver prices. These expectations are characteristic of the entire time interval that we study. For gold prices, such expectations are most typical for the medium term. This distinguishes the data in Figure 4 from the data in Figure 5. However, recent time intervals are characterized by a decline in the price of silver with an increase in the total number of confirmed cases of COVID-19.

To fully understand the data in Figure 5 and Figure 6 in their comparative aspect, it is necessary to consider the wavelet coherence between gold price data and silver price data.

Figure 6 shows the values of the wavelet coherence between gold price data and silver price data.

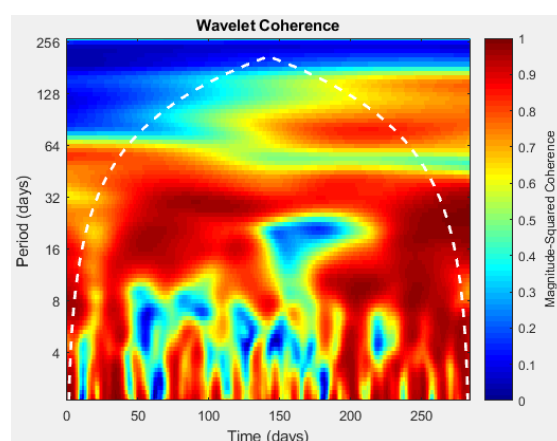


Figure 6. Values of the wavelet coherence between gold price data and silver price data

We see that the mutual dynamics of prices for gold and silver is not completely identical. The most consistent such dynamics is in the recent periods of time, which we are studying. Then we can say that in a pandemic, the impact of the coronavirus on the dynamics of gold and silver prices is equalized over time. At the same time, at the beginning and in the middle of the study period, the consistency of prices for gold and silver is more dynamic and volatile. Higher consistency of such dynamics is characteristic of the long-term perspective and long-term expectations. This fact must be taken into account when trading on the exchange and investing in these precious metals.

Conclusion

The paper discusses the key aspects of the dynamics of prices for gold and silver in the context of the modern COVID-19 pandemic development. We analyzed the dynamics of gold and silver prices in the context of the dynamics of the total number of confirmed cases of COVID-19. We made this analysis using the ideology of wavelets, namely the wavelet coherence method. For the analysis, we used data from open sources, which cover the time period 22.01.2020 to 01.11.2020. As a result, it was shown that it is better for such an analysis to use the total number of confirmed cases of the COVID-19 pandemic, where data in the context of each day from the studied interval. We examined expectations for the price

of gold and silver in the context of the dynamics of the total number of confirmed cases of COVID-19. The relationship between the dynamics of prices for gold and silver has been investigated. The results can be used to determine the strategy for trading on the stock exchange, investing in gold and silver.

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