

CURRENCY MARKET VOLATILITY DURING THE COVID-19 PANDEMIC

Mykola Benko

State University of Trade and Economics, Kyiv, Ukraine

Oleksandra Kononova

Prydniprovsk State Academy of Civil Engineering and Architecture, Dnipro, Ukraine

Olena Prokopova

State University of Trade and Economics, Kyiv, Ukraine

Olena Kuzmenko

State University of Trade and Economics, Kyiv, Ukraine

Vlasenko Tetiana

National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

ABSTRACT

The currency market is one of the main markets of the world's modern financial and economic systems. With respect to the availability of information, this market is the most data-rich and public. These two features allow it to be viewed as volatile. This study aims to assess the dependence of the currency market's volatility on the conditions and factors that formed during the COVID-19 pandemic. The research used statistical and correlation analysis and general scientific methods (notably, the abstraction method). The study examined the effects of pandemic events on currency market volatility, revealing a quantitative measure of approximately 2% of reactions in response to global economic and political events. Correlation analysis revealed an insignificant effect of the dollar index on the change in currency market volatility during the COVID-19 pandemic ($r = 0.09$). The outcomes indicated the impact of the disease factor on currency trading at the 0.8% level ($r^2 = 0.0081$). The research conclusions suggest that the effects of information on the currency market differed during 2015-2019 and deviated in response to various political and economic events. The study highlights that the COVID-19 pandemic and its aftermath did not significantly influence the currency pairs' volatility. In the future, if crisis trends re-emerge, the findings of this study may influence the behavior of investors and participants in currency markets and global trade. This could affect their investment decisions, currency reserve diversification, insurance strategies, and capital migration.

Keywords: volatility; volatility index; exchange rates; currency market; COVID-19 pandemic

DOI: <https://doi.org/10.15549/jeecar.v11i4.1598>

INTRODUCTION

Volatility is an essential tool for analyzing any area of human activity. This is a system of indicators that characterizes the dynamic changes of the phenomenon and, in some cases, enables the modeling of the future behavior of the study object. Pandemic processes have significantly affected public business practices and identified priorities in changing the volatility of exchange-traded financial instruments.

Stock market volatility was first introduced through the Black-Scholes-Merton option pricing model (Merton, 1973). The practical use of this model pointed to a problem called the 'volatility smile' effect, and the fact is that the prediction of this model indicated a time of different volatility for options with different parameters.

This problem was solved in 1978 when Wilder formed the average true range (ATR) indicator (1978). As a result, the indicator became widespread in modern stock trading. It has been included in the standard arrays of indicators for any trading platform on any trading floor.

Volatility is a market characteristic that facilitates investors' decision-making in the return-risk criterion. Most of the recent research in stock markets has focused on assessing volatility and its underlying factors, as it is the underlying market and is much more attractive to private and institutional investors. Much less research concerns currency markets.

For example, Onali (2020) noted a significant increase in volatility due to reports of COVID-19 and mortality from the disease in the U.S. stock markets. Besides, Haroon and Rizvi (2020) noticed substantial changes in volatility in the stock instruments of the transport, energy, leisure, and travel sectors due to pandemic measures.

The stock market volatility of the Republic of India and the People's Republic of China, namely the Shanghai Stock Exchange and the Bombay Stock Exchange Sensex, in the COVID-19 period, depends on changes in the dollar index and the price of gold filed by Kumar and Robiyanto (2021).

The nature of the news about COVID-19 was determined in a study by Baek et al. (2020) as a basis for changes in volatility and the stock market, as a result of which negative news has a more significant impact on volatility than

positive ones. Baker et al.'s (2020) studies noted that COVID-19 has the most crucial current effect on stock market volatility.

Özdemir (2022) examined cryptocurrency's profitability level from November 17, 2019, to January 25, 2021, in the financial markets during the COVID-19 pandemic due to national quarantines and slowdowns.

The increase in exchange rate volatility in 20 countries, along with an increase in the number of confirmed cases of COVID-19, was noted by Feng et al. (2021).

Baklaci and Yelkenci (2022) found a relationship between the volatility of different currencies in the foreign exchange market, considering various sampling frequencies during 2009–2020 for 11 currency pairs using the multivariate VAR-BEKK-GARC model. They proved that major currencies do not lead to changing exchange rate volatility.

Massimo (2019) noted that exchange rate changes react to major and unique shocks. Among such shocks, Coronavirus messages are quite significant. It is worth mentioning the research Kathiravan et al. (2021) conducted on the significance of behavioral finance in this particular context. The shock can have different sources of origin. While the pandemic was an unprecedented global phenomenon, investors' behavior can depend even on weather conditions, which also can cause volatility. The authors studied the correlation strength between weather-driven investor sentiment and index returns through investor sentiment and investment decisions.

Based on an empirical test of panel data from 45 major countries, Chen (2022) analyzed the impact of trade and financial discovery on actual exchange rate volatility and noted that trade openness correlates negatively with actual exchange rate volatility. Also, financial transparency correlates positively with absolute exchange rate volatility.

Currency market volatility does not directly correlate with the relationship between economic growth. Morina et al. (2020), based on the annual data of 14 Central and Eastern European countries during 2002–2018, studied the volatility impact of the real effective exchange rate on the economic growth of these countries. The authors proved that exchange rate volatility significantly negatively impacts real economic growth.

The results of a study by Olamide et al. (2022) showed that instability in the exchange rate and inflation are negatively related to the economic growth of the African region. It was also shown that the higher the level of instability in the exchange rate, the worse the ratio of inflation and growth in the region.

Liu's (2022) studies noted the economic policy uncertainty index as a factor in changing exchange rates. These works also confirm the priority of the perception of the government's economic information by participants in currency markets.

The Nugroho and Robiyanto (2021) study tracked the so-called cross-sectional volatility of a financial instrument (gold and USD / IDR) concerning the volatility of shares of Johnson Controls International PLC. Their findings confirmed the thesis of the perception priority of external information in contrast to the strict market for financial instruments in the volatility change. Therefore, changing one trading asset's volatility ambiguously changes another's volatility.

Global researchers have focused a large amount of research on the effects of the virus on several aspects of the market. The COVID-19 pandemic has been shown to impact financial market volatility in the USA significantly. The negative impact of the COVID-19 pandemic on the Chinese stock market profits was also studied by Apergis and Apergis (2021) using the generalized autoregressive conditionally heteroskedastic (GARCHX) model.

Handoyo (2020) predicted that the COVID-19 pandemic reduced global trade from 12% to 32% in 2020. In addition, Devpura (2021) conducted a study based on the relationship between the U.S. exchange rate and oil prices.

Thus, the pandemic impact on stock market volatility has been actively studied, but much less research has focused on changing the volatility of currency pairs. Volatility is a valuable tool when deciding on financial instruments for investment, currency reserve diversification, and the decision-making process for acquiring volatile assets, as it guarantees profit maximization at significant risks. Therefore, studying the fluctuations in currency pairs' volatility amid the pandemic can provide valuable insights into the functioning of the currency market during a crisis. It can help investors identify crucial aspects while making

investment decisions in an environment of heightened risk and unpredictability. Considering the worsening geopolitical situation worldwide, rising tensions in interstate relations, increasing conflicts, and signs of potential crisis escalation, the study's findings could prove valuable in the future. The research that was conducted made it possible to expand the general understanding of the fluctuations in the power of the prices of currency pairs during global crises, the scale of which does not leave any country of the world aside. The study not only determines the dependence between the pandemic and the functioning of the currency market, the understanding of which is vital for investors and world trade in general but also compares the strength of the reaction with the previous responses of the market to geopolitical news and events, market instabilities, etc. Consequently, the study aims to assess the dependence of the currency market's volatility on the conditions and factors formed during the crisis phenomenon - the COVID-19 pandemic.

According to the set aim, the null and alternative were hypothesized:

H_0 : the impact of the COVID-19 pandemic on currency market volatility is absent or insignificant due to the weak correlation between the stock market volatility indicator (EMVEXRATES) and the dollar index (DXY).

H_1 : the impact of the COVID-19 pandemic on currency market volatility is strong, driven by the strong correlation between the equity market volatility index (EMVEXRATES) and the dollar index (DXY).

METHODOLOGY

The study's aim realization is based on general scientific methods (notably, the abstraction method), as well as the statistical and correlation analysis of the main indicators of the global financial market - equity market volatility (EMVEXRATES) and the dollar index (DXY). Since data that are quantitatively measured were used to investigate the relationships between the selected variables, the type of research methodology chosen is quantitative.

Statistical analysis was used to identify precise zones of currency market volatility. Utilizing statistical methods and descriptive data to analyze currency market volatility is widespread. A notable example is the research conducted by Hung (2021). According to Kotronoulas et al.

(2023), using statistical methods helps assess the strength of one factor's impact on another (in our case, the effect of the pandemic on the currency market), as well as determining the relationship between different factors (such as the volatility of currency pairs and the development of the disease). That is why we have incorporated statistical analysis as a crucial research component.

Correlation analysis determined the relationship between stock market volatility (EMVEXRATES) and the dollar index (DXY). The stock market volatility factor (EMVEXRATES) is chosen as the basis of the time series to analyse and identify specific patterns of stock market volatility. This factor was selected as a dependent variable (y) in the correlation analysis. This index is a permanent indicator, which is created and constantly monitored by the Federal Reserve Bank of St. Louis. It should be noted that this bank is an organizational unit of the Federal Reserve System and focuses its efforts on local, national, and global economic research. This allows it to conduct in-depth analytical activities and develop and own one of the world's most complete economic knowledge bases of the Federal Reserve System Research Division (Baker et al., 2023, online). Economic data are sectioned by groups and provided by the bank free of charge.

The dollar index (DXY) was chosen to indicate the world's purchasing power; it has been used in economic calculations, forecasts, and statistical and correlation analysis. This index was used as an independent factor affecting the dependent variable during the correlation study (x). The choice of the indicator is due to the growth of its role in operations on the currency market. The work of Ilzetzki et al. (2021) proved that the USD is increasingly becoming a central currency and is effectively used as a currency anchor for much of the world. At the same time, this index is a benchmark for investors and stock market players in changing market situations and includes many factors related to currency transactions. In other words, DXY measures political and economic change in the world economy. Due to this role, it has become a typical instrument in the futures market. It reflects the monetary relations ratio of U.S. business partners in international trade and changes in global trade in the current state. Therefore, changes in the world economy are monitored through

international trade in strong world currencies such as the Euro (EUR), Yen (JPY), Pound Sterling (GBP), Canadian dollar (CAD), Swedish Krona (SEK), Swiss Franc (CHF).

Consequently, these two indicators formed the basis for the analysis of changes in volatility for pandemic challenges. All stock market volatility (EMVEXRATES) and dollar index (DXY) data were sourced from the research website DailyFX.com, one of the world's leading sources of data for currency analysis, commodity and index trading. Also used was the website of MarketWatch (2023), a subsidiary of Dow Jones & Company, which contains a collection of stock market data and analysis.

To research the pandemic impact on currency market performance, we examined the period from the pre-pandemic to April 2022. Conventionally, this period covers two sub-periods; pre-crisis and crisis exacerbation due to the pandemic, including until March 2022. How various shock phenomena affected currency market efficiency from August 2015 to August 2019 was used for the analysis of the pre-crisis period. Monthly data, including 30 variables obtained during the pandemic, were monitored to analyze the period (Appendix B). Azzam et al. (2023) used a similar approach to studying the pandemic's role in the currency market's effectiveness, in which the time interval was also divided into separate periods. Also, a similar approach to the analysis of time series data is described in the work of Hung (2021), where the authors studied currency market volatility during the global financial crisis of 2007-2008, and the period under study was divided into pre-crisis and post-crisis stages.

Such data allow a correlation analysis to determine the impact of pandemic factors on the dollar index due to changes in equity market volatility (EMVEXRATES), as well as to find relationships in the data and get the dependence of the average value of the dollar index on the value of changes in exchange rates. Such calculation will determine the form and strength of the connection and the influence of factors on the result. In other words, it assesses the impact of changes in currency market volatility from changes in the dollar index during the pandemic. A similar approach was used by Kumar and Robiyanto (2021) and Devpura (2021).

The study envisages identifying the main factor in the change in currency market volatility in

terms of similarity and isolating the information content of significant events that cause such a shift through abstraction.

RESULTS

Volatility indicates the fluctuations in the amplitude of a given variable depending on the factors influencing the study object. In the trading charts, this is seen in the change in the range of price movements (Figure 1).

Volatility is affected by various factors. First of all, changes in the financial market determine the change in preferences of significant players.

Among them are the changes in central bank policy, changes in the energy market, political and geopolitical situations, manipulation and speculation in financial markets, and force majeure situations worldwide.

From a logical point of view, such factors are nothing but certain events. From a managerial point of view, however, an event is not what happened but what happens. What happens determines the violation of the initial state or environment. The event does not lead to volatility; people's reactions are volatility's driving force and potential.

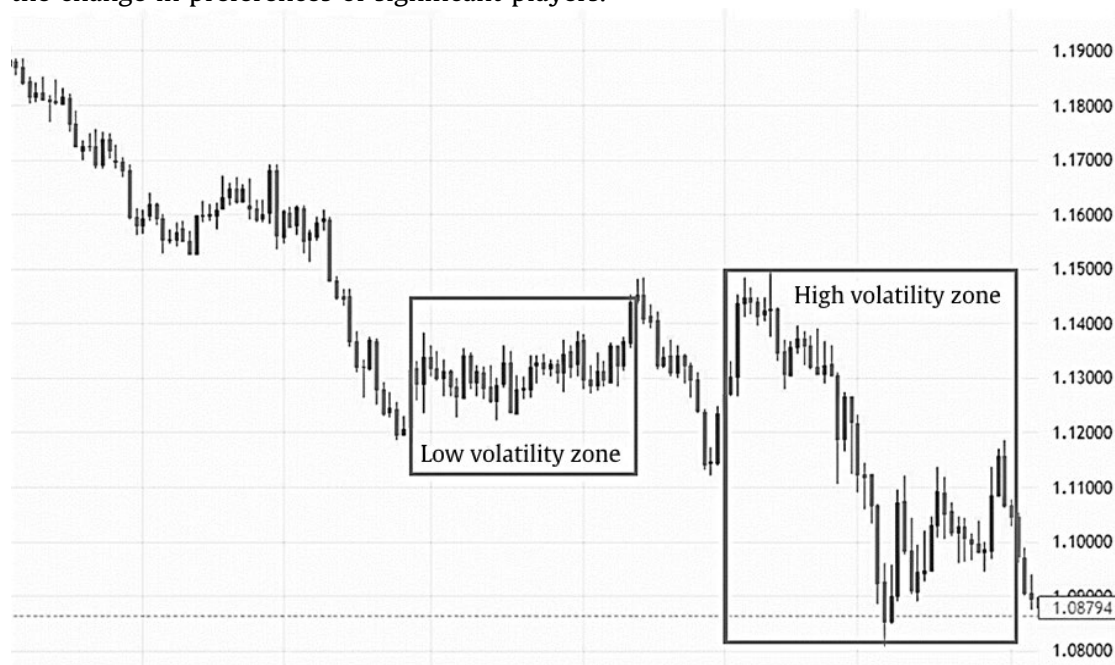


Figure 1: Graphical representation of changes in volatility during June 2019 – May 2020.

Source: DailyFX (n.d.).

Figure 1 reflects the functioning of the currency market at different stages of its development and, accordingly, with different process volatility levels. The zone marked as low volatility corresponds to the pre-pandemic period from November 2019 to February 2020. The period from February 2020 to May 2020 became the most difficult during the COVID-19 pandemic. This period is described by increased market volatility, marked as a high volatility zone in Figure 1. The initial pandemic stage was a powerful informational aspect that shook the currency market from February 2020 to May 2020. However, the overall impact on its volatility was moderate and adjusted as the market participants adjusted to the conditions of

the pandemic, which will be confirmed during the study's implementation. In the financial market, the reaction of market players creates volatility. The reaction depends on the information content of a particular event. Therefore, the information content determines both the vector and its strength, which is realized in volatility. Volatility is always based on the nature and direction of the information displayed at the event. The combination of the human motive for profit and the direction of the event information coverage is the root cause of the speculative nature of stock trading.

A mechanism for assessing economic events and reactions of bidders has been developed, forming the so-called fundamental analysis of

the stock market. This analysis is based on projected economic developments to assess the economy of countries through fundamental macroeconomic indicators. Simultaneously, such

events are ranked according to the potential for response to economic events, increasing the volatility in the financial instruments market (Table 1).

Table 1: The reaction of exchange traders to economic events that change the volatility of financial instruments

Volatility change	Event
High	Changes in the country's GDP
	Speech by a world politician or head of the World Financial Institute
	Comments on monetary policy
	Changes in inflation
	Changes in unemployment rates
Average	Change in the consumer price index
	Changes in the number of repeated applications for unemployment benefits
	Decisions to change interest rates
Low	Change in the producer price index
	Change in the housing price index
	Change in the import price index
	Changes in private-sector lending
	Changes in consumer spending

Source: Author's work.

If the financial indicator is less than the forecast value, traders perceive it negatively. Conversely, if the rate is higher than expected, the market grows, leading to changes in financial instrument volatility.

Thus, by having public data on events, market players can assess the reaction of market participants to these planned events and hence change the market volatility over time (Appendix A).

As for the COVID-19 pandemic, it was generally unrated in the perception of exchange traders. Thus, the most significant currency market volatility before the Coronavirus was observed in August 2019, an index of 1.17088. Such a jump in volatility was connected with the following events: U.S. President Trump announced the possibility of acquiring Greenland (BBC News, 2019a), the start of the G7 summit in France (European Council, 2019), Queen Elizabeth II's statement in support of the British Parliament termination with a view to Britain's exit from the E.U. (BBC News, 2019b).

Official information on the Coronavirus was dated December 2019. The currency market volatility index increased from 0 to 0.31483 but decreased to 0.13185 the following month. The subsequent increase in the volatility index occurred in March 2022, which amounted to 0.32746. Until December 2020, volatility remained virtually unchanged; only in January 2021 and March 2022 did the index partially increase and reach the corresponding values of 0.34306 and 0.32044. In December 2021, the volatility level rose to 0.29819. Thus, clear zones of volatility are distinguished (Figure 2). However, information on the disease and the spread of COVID-19 did not cause a significant shift in volatility, which was corrected in low- and medium-volatility areas.

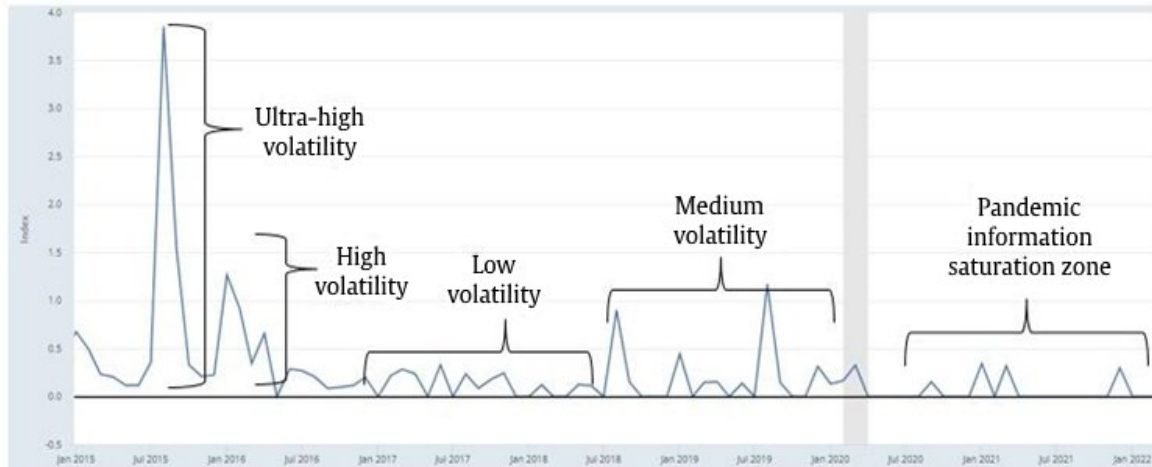


Figure 2: Change in the volatility index of the currency market for political and economic events and Coronavirus activities during 2015–2022.

Source: Compiled by the author, based on Baker et al. (2023).

Stock market volatility exchange rates reacted to these events but were not active enough compared with the economic and political events of 2015–2019. If the average volatility index

during this period was 0.30913, then at the beginning of the Coronavirus fixation (December 2019), the indicator increased by only 0.0057 (or 1.84%) and reached 0.31483 (Table 2).

Table 2: The chronological ratio of currency indices to political and economic world events and Coronavirus measures

Periods	Equity market volatility (EMVEXRATES)	Dollar index (DXY)	World political and economic events
2015			
Average value	0.69598	96.74	
August 2015	3.85762	95.93	Falling apart of the U.S. stock market. Completion of the formation of the Eurasian Economic Union.
2016			
Average value	0.37047	97.18	
January 2016	1.26721	99.53	Referendum on British membership in the E.U.
2017			
Average value	0.15167	95.95	
June 2017	0.33064	95.63	-
2018			
Average value	0.11825	93.81	
August 2018	0.90132	95.14	The USA renewed sanctions against the Islamic Republic of Iran. The E.U. protected European companies from U.S. sanctions against the Islamic Republic of Iran.
2019 (01 – 11.2019)			
Average value	0.20018	97.53	
August 2019	1.17088	93.30	The beginning of the US-China trade war. Exacerbation of China's relations with Hong Kong. 45 G7 Summit. Statements on Britain's exit from the E.U.

Table 2: Continued

The Coronavirus Pandemic (12.2019 – 12.2021)			
December 2019	0.31483	96.45	Coronavirus disease fixation in the People's Republic of China.
March 2020	0.32746	98.82	Introduction of quarantine (Italy, Canada, USA, France, Brazil, Russian Federation, and the Republic of South Africa). The Bank of England halves interest rates. Crude oil prices fell by 25%.
September 2020	0.15390	93.78	Announcement of clinical trials of Coronavirus vaccines.
January 2021	0.34306	90.65	Joe Biden's election victory. Mass protests against forced vaccination.
March 2021	0.32044	93.29	The USA announced sanctions against the Russian Federation.
December 2021	0.29419	95.681	In the USA, the rate of Coronavirus spread reached a record for the entire pandemic period.
Average value of volatility (EMVEXRATES)			
Pre-pandemic (2015 – November 2019)		0.30913	
Pandemic (December 2019 – December 2021)		0.08229	

Source: Compiled by the author, based on Baker et al. (2023), MarketWatch (2023), and World Health Organization (n.d.).

Thus, the stock market reacted to the fact that the volatility level differed from economic and political events by less than 2% (0.31483/0.30913*100). The response to the Coronavirus is not significant compared to a quarter of a percent of the world's economic and political events. Thus, the average volatility of the pandemic period reached 0.08229, with five-period jumps.

Despite the information overload of the pandemic from the WHO rostrum (120 media briefings, 38 briefings and briefings for member state leaders, 53 meetings of the strategic and technical advisory group on infectious hazard sources, 52 promising vaccines undergoing clinical trials, and 162 vaccines at the stage of pre-clinical assessment (World Health Organization, n.d.) and media publicity, no

extraordinary change in currency volatility was observed at stock exchanges. The volatility of such a change was relatively low and did not change the reaction of traders in financial instruments. At the same time, their response remained inconspicuous and was not perceived by financial market traders as a precarious stock situation.

First, we performed a statistical calculation using regression analysis. The initial data are the dollar index (DXY) and equity market volatility (EMVEXRATES) (Table 2, Table 3) during the COVID-19 pandemic (Appendix B).

Next, we performed a statistical calculation of the impact of the dollar index on exchange rate volatility. Statistical calculations are presented in Table 3.

Table 3. Initial and calculated data for calculating correlation characteristics (paired rectilinear correlation)

No	Dollar index (DXY) (x)	Equity market volatility (EMVEXRATES) (y)	Estimated values				
			x^2	y^2	$x \cdot y$	y_x	$x - \bar{x}$
1	98.17	0.00	9637.55	0.00	0.00	-7201142.81	3.30
2	96.45	0.00	9302.60	0.00	0.00	-312.23	1.58

Table 3: Continued

3	97.46	389.90	9499.23	152022.01	38001.21	-28599428.50	2.59
4	98.11	163.30	9625.38	26666.89	16021.20	-11978346.82	3.24
5	98.82	207.40	9764.60	43014.76	20494.44	-15213076.31	3.94
6	98.03	405.60	9610.08	164511.36	39761.37	-29751021.54	3.16
7	98.20	0.00	9643.44	0.00	0.00	-312.23	3.33
8	97.37	0.00	9481.31	0.00	0.00	-312.23	2.50
9	93.44	0.00	8731.03	0.00	0.00	-312.23	1.43
10	92.18	0.00	8497.34	0.00	0.00	-312.23	2.69
11	93.78	190.60	8794.31	36328.36	17874.09	-13980798.41	1.09
12	94.05	0.00	8846.15	0.00	0.00	-312.23	0.82
13	91.87	0.00	8440.65	0.00	0.00	-312.23	3.00
14	90.03	0.00	8105.40	0.00	0.00	-312.23	4.84
15	90.65	424.90	8216.52	180540.01	38515.06	-31166674.13	4.23
16	90.86	0.00	8255.54	0.00	0.00	-312.23	4.01
17	93.29	396.90	8702.28	157529.61	37025.21	-29112877.63	1.59
18	91.15	0.00	8308.50	0.00	0.00	-312.23	3.72
19	89.79	0.00	8062.60	0.00	0.00	-312.23	5.08
20	92.38	0.00	8534.80	0.00	0.00	-312.23	2.49
21	92.07	0.00	8477.62	0.00	0.00	-312.23	2.80
22	92.61	0.00	8576.24	0.00	0.00	-312.23	2.26
23	94.27	0.00	8887.59	0.00	0.00	-312.23	0.60
24	94.13	0.00	8860.83	0.00	0.00	-312.23	0.74
25	95.87	0.00	9190.29	0.00	0.00	-312.23	0.99
26	95.68	369.30	9154.85	136382.49	35334.99	-27088421.08	0.81
27	96.69	0.00	9348.57	0.00	0.00	-312.23	1.82
28	96.78	0.00	9365.40	0.00	0.00	-312.23	1.90
29	98.32	0.00	9667.02	0.00	0.00	-312.23	3.45
30	103.67	0	10746.85	0.00	0.00	-312.23	8.79
Σ	2846.17	2547.90	270334.57	896995.49	243027.58	-194098344.02	82.79
Average value	94.87	84.93	9011.15	29899.85	8100.92	-6469944.80	2.76
Regression statistics							
Multiple R			0.089687				
R-square			0.008044				
Normalized R-square			-0.02738				
Standard error			155.2794				
Observations			30				
Coefficients							
	Coefficients	Standard error	t-statistics	P-value	Lower 95%	Upper 95%	
Y-crossing	-313.036	835.6657	-0.37459	0.710784	-2024.82	1398.748	
X	4.194749	8.803248	0.4765	0.637416	-13.8379	22.22738	

Source: Compiled by the author.

Explanation

Microsoft Excel data analysis tools were used to conduct statistical and correlation-regression studies. Table 3 contains the calculated data necessary to determine the coefficients of the regression equation, its construction, and determination of the strength of the correlation. According to the estimated data, the equation will have the following form: $y = -313.036 + 4.195x$. Thus, if the value of the x factor (DXY) changes by 1 unit, the y factor (EMVEXRATES) will change by 4.195 units.

We carry out the typicality and homogeneity of the observation data; for this, we determine the standard deviation (σ) and the coefficient of variation (V).

Standard deviation:

$$\sigma = \sqrt{\frac{\sum(x-x)^2}{n}} = \sqrt{\frac{82.79}{30}} = 1.661274 \quad (1)$$

The coefficient of variation:

$$V = \frac{\sigma}{x} = \frac{1.66}{94.87} = 0.018 \text{ or } 1.8\% \quad (2)$$

The variation of the factor trait is very low (1.8%), which means it is weak.

We assume that the dependence in the model is linear, so the closeness of the relationship between the studied indicators is determined by the linear correlation coefficient (Pearson) r by the formula:

$$r = \frac{xy - x \cdot y}{\sigma_x \cdot \sigma_y} = \frac{8100.92 - 94.87 \cdot 84.93}{3.22 \cdot 150.62} = 0.09 \quad (3)$$

With:

$$\sigma_x = \sqrt{x^2 - (x)^2} = \sqrt{9011.15 - 94.87^2} = 3.22 \quad (4)$$

$$\sigma_y = \sqrt{y^2 - (y)^2} = \sqrt{29899.85 - 84.93^2} = 150.62 \quad (5)$$

Correlation coefficient $r=0.09$. Accordingly, the connection is direct and weak.

Then, find the coefficient of determination (D), which characterizes the extent of the influence of factors on the performance trait:

$$D = r^2 = 0.09^2 = 0.0081 \quad (6)$$

Based on the calculated indicators, the impact of the COVID-19 pandemic on currency market volatility was insignificant. This is due to a weak correlation of 0.09 between the stock market volatility indicator (EMVEXRATES) and the dollar index (DXY). As a result, the alternative hypothesis H1 has been rejected, and the null hypothesis H0 has been proved. This result enables us to conclude that the currency market is sustainable and can withstand global shocks

such as that caused by the COVID-19 pandemic. During the pandemic, the currency transaction risk level remained controlled, allowing investors to maintain financial assets and protect themselves from significant financial losses. The obtained results confirm that foreign currency, particularly the USD, is a safe asset. It can act as an effective alternative to gold and a hedging asset in case of severe volatility in the oil market.

DISCUSSION

This research has focused on the importance of the informational aspect of currency market volatility. In particular, the events of December 2019 (recording the first cases of the disease) contributed to a slight but still significant increase in the volatility indicator equity market volatility (EMVEXRATES) level by 0.0057 units (or by 1.84%) (Table 2). The main conclusions are distinguished based on the fact that the perception of stock market players causes changes in volatility. In particular, we partially agree with the opinion of Haritha and Rishad (2020), who proved that in the Australian stock market, the priority of information perception by investors is private information over public information. Nevertheless, researchers have not considered the mechanisms of processing this information for investors and traders to assess the profitability and risk of changes in the stock market's volatility, nor have they specified the level of its perception. The results obtained in our work prove that the informational aspect also occurs when implementing investment decisions in the currency market. Its role is much lower than its impact on the behavior of stock market participants, however, which proves only a partial correlation with the conclusions of Haritha and Rishad (2020).

Engelhardt et al. (2021) used an opposite approach to the awareness impact on stock market volatility. Their study noted that trust in government information and public perception is the main factor in market volatility. In our opinion, the perception of information by stock market participants is the main factor in changing market volatility, while trust is only a derivative of the information perception component. Despite ongoing debates about the significance of these factors, our study neither supports nor denies the equality of the impact of trust and information on currency market volatility. As a result, this line of inquiry shows

promise for future research.

Research by Massimo (2019) and Kathiravan et al. (2021) clearly illustrated the impact of information on market volatility. These studies focused on essential factors of exchange rate changes, such as the side effects of so-called primary and special (internal) shocks. From our point of view, shocks are nothing but events that, if correctly perceived by traders, dramatically change market volatility. In the context of our study, shocks are informational events and their interpretation by the currency market participants themselves. Consequently, our results complement the work of Massimo (2019), since the pandemic was a specific manifestation of shock, unprecedented in scale and potentially changing investor behavior, focusing their attention on methods of diversifying currency reserves and minimizing the risks of asset loss.

Baklaci and Yelkenci's (2022) work highlighted our reasoning about the priority of the event's impact on volatility. The authors argued that currency pairs alone do not lead to changing exchange rate volatility. The market itself does not create changes in volatility; therefore, an external influence on this market is necessary to trigger a market reaction, the consequence of which is a change in its volatility. Based on the performed research, this hypothesis was also confirmed because the market shows fluctuations due to informational events on the world stage (Figure 2).

Our research's essential element is the conclusion about the rationality of choosing a foreign currency as an investment asset. The results complement previous studies' findings (Bai & Ho, 2022), which aimed at searching for reliable assets that can be used as worthy hedging assets in the event of severe fluctuations in oil or stock prices. Gold has previously been proven trustworthy as a safe-haven asset of choice for investors in the global crude oil market due to its low volatility, ability to preserve wealth during inflation and protect investments during financial crises/uncertainty, as well as hedging effects when other potential assets are less efficient (Ji et al., 2020). The results highlighted in our work increase foreign currency attractiveness as an investment asset on a level with gold, which complements and expands the topic of safe assets for investment and risk diversification in crisis conditions.

The results obtained closely correlate with

Boubaker et al.'s (2021) study, which found that correlations between currency pairs decreased significantly during the COVID-19 outbreak. The findings complement the previous conclusions because it was proven that the equity market volatility index (EMVEXRATES) played a low role - only 0.8% of the indicator determined the exchange rate volatility during the pandemic. Considering that the political and economic events of 2015-2019 had a more substantial impact on volatility in most cases (Table 2), the market's dependence on the disease dynamics was minimal compared to what was potentially possible. It should be noted that this conclusion is controversial. Mo et al. (2023) demonstrated that while examining currency market volatility on a national level, it is crucial to consider the dynamics of the incidence, not just the informational pressure resulting from the event. Countries with a higher level of infection experienced a higher degree of vulnerability of the currency market to the pandemic. Such countries experienced a more significant currency devaluation, which caused currency risks to spread to other countries. This aspect proves the perspective of a more in-depth study of the issue at the national level, which was not studied in this work.

In research by Zhang et al. (2022), which was close to our concept, in particular, the hypothesis that restrained volatility during a pandemic has a positive effect is confirmed because excessive volatility and profitability characterize the market as inefficient due to asymmetric aspects. Although the author does not directly mention the factor of event volatility, logically, its role is derived as primary. Our research confirmed the low currency market volatility, which proves the perspective of choosing a currency as an investment object. Although excessive profitability is unlikely, the risk-profit ratio in investing in foreign currency is optimal.

Chen (2022) analyzed financial openness as an essential driver of volatility change. At first glance, this factor is not directly related to the impact of the Coronavirus on volatility. Regardless, this study confirmed that information saturation determines volatility. Nevertheless, the authors focused not on the information itself but on its availability in the market, which aligns with our views on the primary source of volatility.

Despite numerous volatility studies, most

current works have not focused enough on the primary sources that drive volatility changes. All scholars mainly study derivatives that lead to volatility changes. Nonetheless, our research reflects various aspects of currency market dependence, focusing not only on volatility trends during the pandemic but also on the role of information in changing volatility. It should be noted that the quantitative impact of information about COVID-19 has not been thoroughly investigated. That could be a promising area of research, given the current character of interstate conflicts and complex geopolitical situations that may exacerbate the crisis. Additionally, there is a risk of repeated spread of the disease, particularly if it continues to develop in a wave-like pattern.

Practical implications

Studying currency market volatility during global socio-economic upheavals such as the COVID-19 pandemic enables the formation of a complete picture of the change in exchange rates during a crisis. The conclusions obtained in this study will allow currency market participants to form or adapt a strategy for their behavior in response to the subsequent global social and economic instability or unforeseen market changes. The findings presented in this study hold significant practical value for investors as they provide insights into the workings of the currency market during times of global crisis. This information can be used to minimize portfolio risk by strategically allocating investments across different assets such as gold, shares, and foreign currency. The conclusions obtained at the national economic level can serve as an informational basis for forming effective currency policy or risk management to protect national interests during geopolitical, economic and social crises.

Limitations

Certain factors acted as limitations during this research. First of all, it is data. If other indices are selected for the study, the results may differ. Second, it is the specifics of the period chosen for the study. The pandemic is considered an unprecedented shock to the global economy and trade, significantly adjusting the behavior and decisions of investors, companies, and other market participants. Such an event created the prerequisites for socio-economic and financial instability, which can be defined as a global crisis in terms of its scale. However, each crisis has its

prerequisites and consequences. Therefore, currency market dependence strength and the influence of its volatility level in subsequent crises, which may arise against the current exacerbation of interstate contradictions and conflicts, may differ. Third, there are geographical limitations. The research focused on global indices, but it is worth noting that studying the impact of the pandemic on individual national currency markets could reveal additional insights. This is because different countries have varying levels of development, stability, and resilience when managing crises and economic instabilities.

Future research directions

The prospect of further research from the standpoint of expanding the theory of volatility in foreign exchange markets is to assess the information component of volatility through mechanisms and approaches to changing the goals, preferences, and priority of news. Another interesting area of applied research is the assessment of volatility under the pressure of the Coronavirus for regional markets, especially the Chinese market, as the threat of a pandemic in the country is still growing.

CONCLUSION AND RECOMMENDATION

The COVID-19 pandemic was a global trend and spread to almost every country. Such events in stock trading were perceived solely as information content through the assessment of the level of potential trade profits in comparison with the level of risk of possible currency transactions.

Institutional events that instantly change the currency market's volatility, such as the stock market and significant banks' financial and credit policies in developed countries, are paramount regarding the potential for volatility change. These events are highlighted in the figures by very high peaks and have a repeated effect in an asymmetric form.

The pandemic events did not and do not have such an impact on the change in currency market volatility, as the stock market collapse did not occur despite the injection of the information content of pandemic events. Simultaneously, the stock market changed its structural priorities for investment instruments, but its state did not change. Market players perceived the factor of the pandemic at the initial stage of events at a

low level compared to the event at the beginning of the trade war between the USA and the People's Republic of China. Over time, this level decreased and lost its significance in the impact on volatility, and volatility reached medium and low values. The linear function resulting from the regression calculation confirms the hypothesis' validity.

The studied model statistically confirms that the impact of the pandemic factor on the currency market's volatility is feeble, not exceeding 1%. This means that the effect of pandemic measures on changes in currency exchange market volatility was minimal and, therefore, was not perceived by stock market players as a significant factor in changing stock trading trends. The obtained results can be exploited to forecast the volatility of the currency market under the influence of crisis phenomena, and they can be helpful primarily to stock market players, investors, and traders.

REFERENCES

- Apergis, E., & Apergis, N. (2021). Inflation expectations, volatility and Covid-19: Evidence from the U.S. inflation swap rates. *Applied Economics Letters*, 28(15), 1327–1331. <https://doi.org/10.1080/13504851.2020.1813245>
- Azzam, I., El-Masry, A.A., & Yamani, E. (2023) Foreign exchange market efficiency during COVID-19 pandemic. *International Review of Economics & Finance*. 86, 717–30. 10.1016/j.iref.2023.03.043.
- Bai, M., & Ho, L. (2022). How do gold and oil react to the COVID-19 pandemic: A review. *Energy & Environment*, 2, article number 0958305X221127645. 10.1177/0958305X221127645.
- Baek, S., Mohanty, S. K., & Glambosky, M. (2020). COVID-19 and stock market volatility: An industry level analysis. *Finance Research Letters*, 37, article number 101748. <https://doi.org/10.1016/j.frl.2020.101748>
- Baker, S. R., Bloom, N., & Davis, S. J. (2023, October 5). *Equity market volatility tracker: Exchange rates*. FRED. Retrieved September 13, 2023, from <https://fred.stlouisfed.org/series/EMVEXRATES>
- Baker, S. R., Bloom, N., Davis, S. J., Kost, K. J., Sammon, M. C., & Viratyosin, T. (2020). *The unprecedented stock market impact of COVID-19* (Working paper No. 26945). National bureau of economic research. <https://doi.org/10.3386/w26945>
- Baklaci, H. F., & Yelkenci, T. (2022). Cross-time-frequency analysis of volatility linkages in global currency markets: An extended framework. *Eurasian Economic Review*, 12(2), 267–314. <https://doi.org/10.1007/s40822-022-00209-5>
- BBC News. (2019a, August 16). *Greenland: Trump warned that island cannot be bought from Denmark*. <https://www.bbc.com/news/world-us-canada-49367792>
- BBC News. (2019b, August 28). *Parliament suspension: Queen approves PM's plan*. <https://www.bbc.com/news/uk-politics-49493632>
- Boubaker, H., Zorgati, M. B. S., Bannour, N. (2021). Interdependence between exchange rates: Evidence from multivariate analysis since the financial crisis to the COVID-19 crisis, *Economic Analysis and Policy*, 71, 592–608. <https://doi.org/10.1016/j.eap.2021.06.014>.
- Chen, Z. (2022). The impact of trade and financial expansion on volatility of real exchange rate. *PLoS ONE*, 17(1), article number e0262230. <https://doi.org/10.1371/journal.pone.0262230>
- DailyFX. (n.d.). *EUR/USD: Euro - Dollar Chart*. Retrieved September 13, 2023, from <https://www.dailyfx.com/eur-usd>
- Devpura, N. (2021). Effect of COVID-19 on the relationship between Euro/USD exchange rate and oil price. *MethodsX*, 8, article number 101262. <https://doi.org/10.1016/j.mex.2021.101262>
- Engelhardt, N., Krause, M., Neukirchen, D., & Posch, P. N. (2021). Trust and stock market volatility during the COVID-19 crisis. *Finance Research Letters*, 38, article number 101873. <https://doi.org/10.1016/j.frl.2020.101873>
- European Council. (2019, August 26). *G7 Leaders' declaration - Biarritz, France*. <https://www.consilium.europa.eu/en/press/>

- [press-releases/2019/08/26/g7-leaders-declaration-biarritz-26-august-2019](#)
- Feng, S., Phillips, D. J., White, T., Sayal, H., Aley, P. K., Bibi, S., Dold, C., Fuskova, M., Gilbert, S. C., Hirsch, I., Humphries, H. E., Jepson, B., Kelly, E. J., Plested, E., Shoemaker, K., Thomas, K. M., Vekemans, J., Villafana, T. L., Lambe, T., . . . Oxford Group. (2021). Correlates of protection against symptomatic and asymptomatic SARS-CoV-2 infection. *Nature Medicine*, 27(11), 2032–2040. <https://doi.org/10.1038/s41591-021-01540-1>
- Handoyo, R. D. (2020). Editorial: Impact of Covid 19 on trade, FDI, real exchange rate and era of digitalization: Brief review global economy during pandemic. *Journal of Developing Economies*, 5(2), 84–88. <https://doi.org/10.20473/jde.v5i2.23641>
- Haritha, H. P., & Rishad, A. (2020). An empirical examination of investor sentiment and stock market volatility: Evidence from India. *Financial Innovation*, 6, article number 34. <https://doi.org/10.1186/s40854-020-00198-x>
- Haron, O., & Rizvi, S. A. R. (2020). COVID-19: Media coverage and financial markets behavior—A sectoral inquiry. *Journal of Behavioral and Experimental Finance*, 27, article number 100343. <https://doi.org/10.1016/j.jbef.2020.100343>
- Hung, N. T. (2021). Volatility Behaviour of the Foreign Exchange Rate and Transmission Among Central and Eastern European Countries: Evidence from the EGARCH Model. *Global Business Review*, 22(1), 36–56. <https://doi.org/10.1177/0972150918811713>
- Ilzetzki, E., Reinhart, C.M., & Rogoff, K.S. (2021). Rethinking exchange rate regimes. In: Gopinath G, Helpman E, Rogoff K (eds.) Handbook in international economics, vol. 5. Elsevier, Amsterdam.
- Ji, Q., Zhang, D., & Zhao, Y. (2020). Searching for safe-haven assets during the COVID-19 pandemic. *International Review of Financial Analysis*, 71, article number 101526. [10.1016/j.irfa.2020.101526](https://doi.org/10.1016/j.irfa.2020.101526)
- Kathiravan, C., Selvam, M., Venkateswar, S., & Balakrishnan, S. (2021). Investor behavior and weather factors: evidences from Asian region. *Annals of Operations Research*, 299, 349–373. [10.1007/s10479-019-03335-7](https://doi.org/10.1007/s10479-019-03335-7)
- Kotronoulas, G., Miguel, S., Dowling, M., Fernández-Ortega, P., Colomer-Lahiguera, S., Bağçivan, G., Pape, E., Drury, A., Semple, Ch., Dieperink, K. B., & Papadopoulou, C. (2023). An Overview of the Fundamentals of Data Management, Analysis, and Interpretation in Quantitative Research, *Seminars in Oncology Nursing*, 39(2), article number 151398. <https://doi.org/10.1016/j.soncn.2023.151398>
- Kumar, J. J. A., & Robiyanto, R. (2021). The impact of Gold Price and U.S. Dollar Index: The volatile case of Shanghai Stock Exchange and Bombay Stock Exchange during the crisis of Covid-19. *Journal of Finance and Banking*, 25(3), 508–531. <https://doi.org/10.26905/jkdp.v25i3.5142>
- Liu, L. (2022). Economic uncertainty and exchange market pressure: Evidence from China. *SAGE Open*, 12(1), 1–19. <https://doi.org/10.1177/21582440211068485>
- MarketWatch. (2023, October 4). *U.S. Dollar Index (DXY)*. Retrieved September 13, 2023, from <https://www.marketwatch.com/investing/index/DXY>
- Massimo, F. M. (2019). Emerging market currencies: The role of global risk, the U.S. dollar and domestic forces. *Economic Bulletin Boxes*, 3. <https://ideas.repec.org/a/ecb/ecb/box/20190032.html>
- Merton, R. C. (1973). An intertemporal capital asset pricing model. *Econometrica: Journal of the Econometric Society*, 41(5), 867–887. <https://doi.org/10.2307/1913811>
- Morina, F., Hysa, E., Ergün, U., Panait, M., & Voica, M. C. (2020). The effect of exchange rate volatility on economic growth: Case of the CEE countries. *Journal of Risk and Financial Management*, 13(8), article number 177. <https://doi.org/10.3390/jrfm13080177>
- Mo, W.-S., Yang, I.J., Chen, Y.-L. (2023). Exchange rate spillover, carry trades, and the COVID-19 pandemic. *Economic Modelling*, 121, article number 106222. <https://doi.org/10.1016/j.econmod.2023.106222>
- Nugroho, A. D., & Robiyanto, R. (2021). Determinant of Indonesian stock market's volatility during the Covid-19 Pandemic.

- Journal of Finance and Banking*, 25(1).
<https://doi.org/10.26905/jkdp.v25i1.4980>
- Olamide, E., Ogujiuba, K., & Maredza, A. (2022). Exchange rate volatility, inflation and economic growth in developing countries: Panel data approach for SADC. *Economies*, 10(3), article number 67.
<https://doi.org/10.3390/economies10030067>
- Onali, E. (2020). COVID-19 and stock market volatility. *SSRN*.
<https://doi.org/10.2139/ssrn.3571453>
- Özdemir, O. (2022). Cue the volatility spillover in the cryptocurrency markets during the COVID-19 pandemic: Evidence from DCC-GARCH and wavelet analysis. *Financial Innovation*, 8(1), article number 12.
<https://doi.org/10.1186/s40854-021-00319-0>
- Wilder, J. W. (1978). *New Concepts in Technical Trading Systems*. Trend Research.
- World Health Organization. (n.d.). *Timeline: WHO's COVID-19 response*.
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline>
- Zhang, Y., Wang, Q., Tian, T., & Yang, Y. (2022). Volatility in natural resources, economic performance, and public administration quality: Evidence from COVID-19. *Resources Policy*, 76, article number 102584.
<https://doi.org/10.1016/j.resourpol.2022.102584>

ABOUT THE AUTHORS

Mykola Benko, email:

mykola.benko55@gmail.com

(Corresponding author)

Mykola Benko is a Doctor of Economic Sciences and a Professor in the Faculty of Finance and Accounting at the State University of Trade and Economics. His research interests include basic and applied research in economics, accounting, analysis, and auditing.

Oleksandra Kononova is a Doctor of Economic Sciences and Associate Professor in the Department of Economics, Management, and Entrepreneurship at the Prydniprovsk State Academy of Civil Engineering and Architecture. Her research interests include the methodology of formation and evaluation of the effectiveness of development strategies in Ukraine's construction industry.

Olena Prokopova has a PhD in Economics and is an Associate Professor in the Faculty of Finance and Accounting at the State University of Trade and Economics. Her research interests are accounting for tourism enterprises and managerial accounting.

Olena Kuzmenko is a Senior teacher in the Department of Accounting and Taxation at the State University of Trade and Economics. Her research interests include accounting and taxation in international business and tax consulting.

Tetiana Vlasenko holds a PhD in Economics and is an Associate Professor in the Department of Production and Investment Management at the National University of Life and Environmental Sciences of Ukraine. Her research interests are management, economics, and investment.