SAFE-HAVEN CURRENCIES DURING FINANCIAL MARKET INSTABILITY IN THE 21ST CENTURY

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Purpose: The aim of this article is to verify whether the Swiss franc (CHF), the US dollar (USD), and the Japanese yen (JPY) continue to function as safe haven currencies in the financial markets of the 21st century.

Design/methodology/approach: Analysis of correlations of logarithmic returns of major currency indices with the S&P 500 index during periods of financial instability and additional verification of net positions of selected market participants.

Findings: Based on the analysis of the return correlations of CHF, JPY, and USD with the S&P 500 during periods of heightened uncertainty in the 21st century, these currencies still serve as safe havens. However, the net positions of large speculators in the futures markets do not confirm that this is being utilized.

Practical implications: The conclusions may help both businesses and individuals stabilize portfolio volatility during periods of heightened uncertainty in financial markets.

Social implications: Conclusions may help mitigate social inequalities arising during financial crises by appropriate currency diversification of held assets.

Originality/value: The research comprehensively addresses the current situation during periods of heightened volatility in the 21st century. Additionally, the analysis of return correlations is supplemented by verification of net positions in the futures market using commitment of traders reports. This work is directed towards businesses, households investing surplus finances, and financial institutions.

Keywords: currency market, financial crises, investments, diversification.

Category of the paper: Research paper.

1. Introduction

During periods of financial market instability, the vast majority of financial assets lose value. This leads to a decrease in the value of investment portfolios for investors who allocate their capital to instruments negatively correlated with increased market uncertainty. However, not all instruments move in the same direction during these times. Some appreciate in value during periods of instability and are negatively correlated with the market, thereby acquiring

the designation of safe havens. These assets help preserve portfolio value during downturns, including economic crises accompanied by panic sell-offs in financial markets.

The paper describes the behaviour of safe-haven currencies during periods of financial market instability in the 21st century. According to the proposed hypothesis, the US dollar, the Swiss franc and the Japanese yen should show a lack of positive correlation with the stock market in the 21st century.

To verify the hypothesis, a correlation of logarithmic rates of return analysis of major currency indices with the S&P 500 index was conducted. Six periods characterized by above-average volatility in financial markets in the 21st century were analyzed. The selected events included the Dotcom bubble burst, the 2007 financial crisis, the Eurozone crisis, the US-China trade wars, COVID-19 pandemic and bear market in 2022. The examined correlations were based on the weekly returns of major currency indices and the S&P 500 index. To deepen the analysis, the positions of non-commercial entities on selected currency pair futures contracts were also examined during the given periods.

The primary objective of this paper is to determine whether the US dollar, Japanese yen, and Swiss franc have served as safe haven assets during periods of financial market instability in the 21st century. The research objectives include analyzing the behavior of key market participants in the foreign exchange market during times of heightened uncertainty and examining the performance of the US dollar, Swiss franc, and Japanese yen in comparison to other major currencies during such periods.

The article continues the analysis in this area by providing new empirical data based on current events that have had a high significance for the volatility of financial markets. It also combines the analysis of changes in futures positions. The combination of correlation analysis and the accompanying changes in the number of contacts is an original approach in the analysis of the safe haven currency area.

The conclusions from the study may be useful both in the active investment process and in mitigating the currency exposure of enterprises and households.

2. The role of safe haven assets in risk-averse investment strategies

Increasing risk aversion and heightened tensions in financial markets significantly influence changes in investors' portfolios. These factors lead to a reduction in holdings of riskier investments in favor of safer ones. For instance, in 2007, as issues began to emerge in the interbank market, investors displayed a tendency to flee to high-quality assets (run for quality) and highly liquid assets (run for liquidity) (González-Hermosillo, Hesse, 2009). This flight to quality was reflected in the price of gold, which rose from $660 in August 2007 to around $1000 in the first quarter of 2008. The flight to liquidity, on the other hand, is associated with the

occurrence of liquidity spirals, particularly loss spirals, margin spirals, and asset value reductions (haircuts) (Brunnermeier, 2010).

During periods of heightened risk aversion, investors tend to focus on high-quality assets that offer greater safety or liquidity. Such investments are referred to as safe havens. They are characterized by either a lack of correlation or a negative correlation in their returns relative to other assets and portfolios during times of financial market turmoil (Baur, Lucey, 2010). A defining feature of safe haven assets is their negative correlation with a portfolio during extreme market conditions. This characteristic does not necessitate a generally positive or negative correlation but requires it to be zero or negative during specific periods. Therefore, in normal times, the correlation can take any value.

When safe haven assets are negatively correlated with another asset or portfolio under adverse market conditions, they compensate for investor losses, as their price increases when the price of another asset or portfolio decreases. Based on the return correlation with traditional investments, safe haven assets can be categorized into (Baur, Lucey, 2010):

- **Hedge investments**: Investments with returns that are either uncorrelated or negatively correlated with the primary investment's return. They do not necessarily reduce losses during market stress or turmoil, as their classification is based on the average correlation coefficient over the entire period.
- **Diversifier investments**: Investments with a weak positive correlation with the primary investment's return. Similar to hedge investments, they do not necessarily reduce losses during financial market turbulence, as the correlation coefficient used for classification is averaged over time. Every hedge investment also serves as a diversifier.
- **Safe haven investments**: Investments with a negative correlation with the primary investment during periods of financial market instability.

In the work of D.G. Baur and T.K. McDermott (Baur, McDermott, 2010), a more detailed distinction is made between strong and weak safe havens. According to this classification, a strong safe haven is negatively correlated with the portfolio during periods of market uncertainty. A weak safe haven, on the other hand, meets the condition of having no correlation with other portfolio assets during uncertain times. In such cases, the investment may not generate profits during unstable periods but can serve as a diversifying asset that reduces risk. It protects investors by not losing value in response to negative market shocks.

A safe haven is thus defined as an asset that allows investors to either generate profits or limit portfolio losses during periods of heightened uncertainty. Numerous studies in the literature address this issue, and various types of investments have been tested to determine their classification as safe havens. Selected literature on safe haven assets is presented in Table 1.

Table 1.

Types of Assets Considered as Safe Havens

References	Type of assets
(Baur, Lucey, 2010), (Baur, McDermott, 2010), (Joy, 2011), (Anand, Madhogaria, 2012), (Reboredo, 2013a), (Reboredo, 2013b),	Gold
(Ranaldo, Soderlind, 2010)	CHF, JPY
(Roache, Rossi, 2010)	Gold, palladium, platinum
(Hood, Malik, 2013)	Gold and other precious metals, as well as the VIX index
(Ciner, Gurdgiev, Lucey, 2013)	crude oil, gold, US dollar, British pound, US and British bonds, US and British stock exchanges

Source: Potrykus, 2015, p. 196.

As shown in Table 1, the concept of safe havens is discussed in numerous studies. There is also a range of considerations regarding other instruments, including less conventional ones such as derivatives and cryptocurrencies (e.g., analyses of the use of credit default swaps (Ratner, Chiu, 2013) or cryptocurrencies (Bouri et al., 2017; Przyłuska-Schmitt, Jegorow, Bučková, 2022) as safe havens).

Assets with the status of a safe haven are usually characterized by certain features, including liquidity, functionality, limited supply, certainty of demand and durability (Admiral Markets, 2024). They encourage and convince investors to hold given instruments in uncertain times. An important factor for investors may also be the fact that given assets have repeatedly confirmed their safe nature in the past, during increased global risk aversion.

3. Research methodology

For the purpose of the analysis, weekly data was collected for the years 2020-2023 on the valuations of the currency indices CHF_I, JPY_I, USD_I, AUD_I, EUR_I, GBP_I, CAD_I, as well as the VIX index and the S&P 500 index. Based on this data, logarithmic returns for these indices were calculated.

Based on the standard deviation of returns for the S&P 500 index and the average weekly change in the VIX index, six periods of heightened volatility were identified for more detailed analysis. The timeframe of each event was determined from the highest weekly closing of the S&P 500 index to the lowest closing, occurring near the event. Each of these periods showed a higher standard deviation value than the average for the entire period, with an increase of 2.5%.

Subsequently, correlations between the returns of major currency indices and the S&P 500 index were calculated for the identified periods of heightened volatility and for the entire dataset.

After obtaining these data, the weighted average by the number of considered weeks and the arithmetic mean correlation of logarithmic returns of the analyzed currency indices during the examined periods were calculated. This aims to better illustrate overall trends and compare the behavior of selected currencies during periods of heightened uncertainty with their average behavior

To deepen the analysis of the behavior of financial entities during times of increased uncertainty in financial markets, an additional verification of entity positions in the futures market was conducted using Commitment of Traders reports published by the Commodity Futures Trading Commission for selected periods and currencies.

4. Analysis of correlation between currency indices and S&P 500

The summary of correlation coefficients between the S&P 500 index returns and the returns of major currency indices during the analyzed periods is presented in Table 2. This table also includes the weighted average of the correlation coefficients for the analyzed events, where the weights were determined by the number of weeks in each analyzed period. Additionally, the table provides the arithmetic means of the correlation coefficients for these events.

Table 2.
Summary of correlation coefficients of selected currency indices against the S&P500

Event	Analyzed weeks	Instruments	CHF_I	JPY_I	USD_I	AUD_I	EUR_I	GBP_I	CAD_I
Dotcom bubble	135	S&P 500	-0,21	0,00	0,12	0,32	-0,03	-0,02	0,26
Financial crisis 2007	74	S&P 500	-0,14	-0,57	-0,29	0,76	0,16	0,39	0,54
Eurozone crisis	8	S&P 500	-0,58	0,05	-0,20	0,77	0,53	0,19	0,96
US-China trade wars	14	S&P 500	-0,24	-0,76	0,14	0,66	-0,08	0,28	0,45
COVID-19 pandemic	6	S&P 500	-0,20	-0,58	-0,73	0,86	-0,33	0,82	0,47
Bear market in 2022	43	S&P 500	0,10	-0,24	-0,52	0,51	0,16	0,45	0,38
Weighted average for the analyzed events	**237**	**S&P 500**	**-0,16**	**-0,24**	**-0,11**	**0,50**	**0,05**	**0,20**	**0,38**
Arithmetic mean for the analyzed events		**S&P 500**	**-0,21**	**-0,35**	**-0,25**	**0,64**	**0,07**	**0,35**	**0,50**
Total	**1118**	**S&P 500**	**-0,10**	**-0,30**	**-0,22**	**0,53**	**0,09**	**0,29**	**0,40**

Source: own study based on data from stooq.pl.

The analysis of correlation coefficients between currency indices and the S&P 500 index during periods of heightened market volatility provides important insights into the role of these currencies as safe havens.

The Swiss Franc index consistently showed a negative correlation with the S&P 500 index during all analyzed periods. The correlation ranged from -0.14 during the 2007 financial crisis to -0.58 during the Eurozone crisis.

The Japanese Yen index displayed a slightly positive correlation (0.05) with the S&P 500 only during the Eurozone crisis. During the Dotcom bubble, the correlation was nearly zero. In other periods, it showed a strong negative correlation, exceeding -0.5.

US Dollar index was the least stable during periods of heightened uncertainty. In two cases, it showed a positive correlation with the S&P 500 (during the Dotcom bubble and the US-China trade wars). In other periods, it showed a negative correlation, with the most pronounced negative correlation occurring during the COVID-19 pandemic.

The other analyzed currencies, including the Australian Dollar (AUD), Euro (EUR), British Pound (GBP), and Canadian Dollar (CAD), all exhibited positive correlations with the S&P 500, both for the entire 21st century and during the periods of heightened uncertainty.

5. Analysis of the net position of selected groups of entities on the futures market using Commitment of Traders reports

For better understanding the behavior of selected investor groups analyzed in the Commitment of Traders (COT) reports, an additional examination of the actions of specific financial market entities was conducted. For each period, one currency relative to the U.S. dollar was chosen. The net positions of large speculators are represented in green, commercials in red, and small speculators in blue. In two cases where the dollar exhibited a positive correlation, the positions of currencies considered safe havens relative to the dollar were presented. In the remaining cases, currencies that achieved the highest positive correlation values were selected, allowing for clearer observation of prevailing trends.
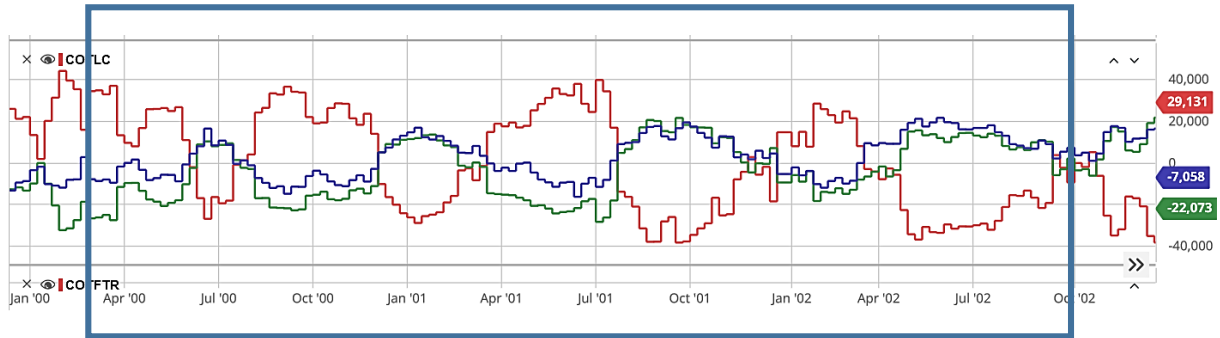
Figure 1. Net positions of various entities in the CHFUSD futures market during the period from January 2000 to December 2002.

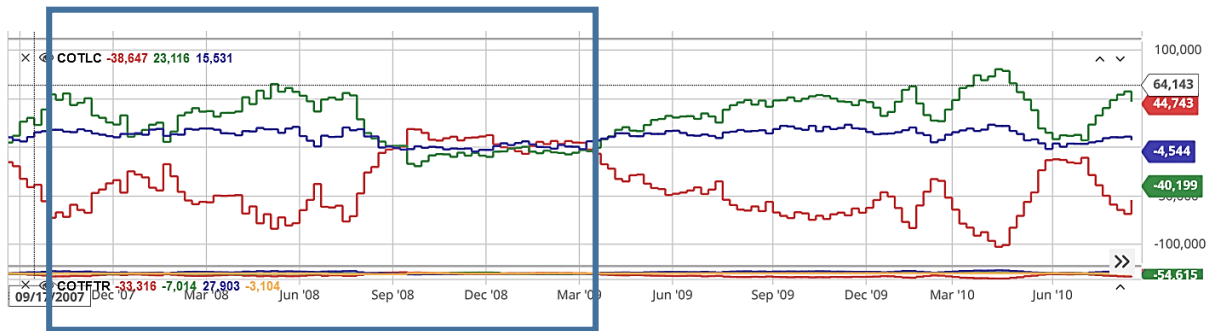Source: www.barchart.com, 11.08.2024.

According to Figure 1, it can be observed that from the onset of the decline, large speculators gradually reduced their short positions in the USD/CHF pair. Starting from July 2001, net positions began to stabilize above zero, indicating a predominance of long positions in CHF by large speculators. In this context, the changes in net positions are consistent with the analyzed correlation between the returns of the CHF index and the S&P 500.
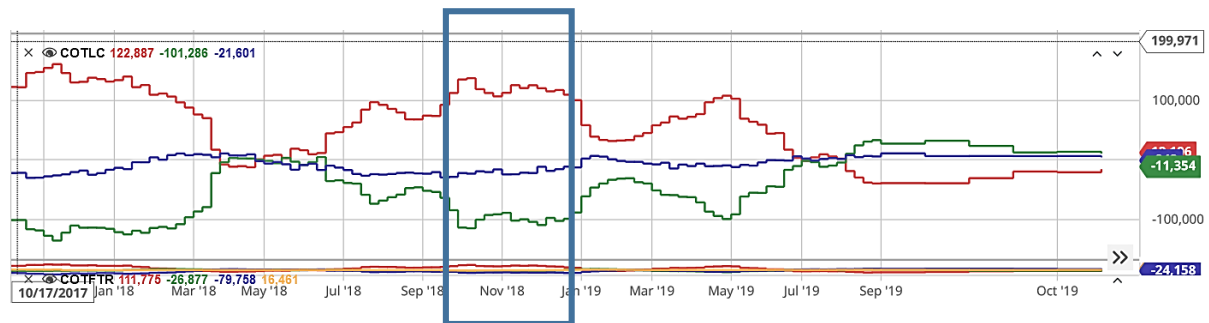
Figure 2. Net positions of various entities in the JPYUSD futures market during the period from November 2017 to October 2018.
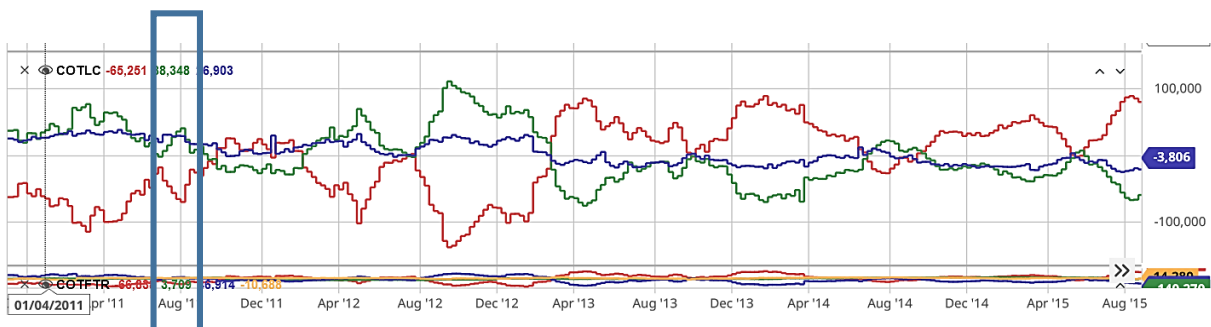
Source: www.barchart.com, 11.08.2024.

In the case of the US-China trade wars period (Figure 2), despite the strong negative correlation between JPY and the S&P 500, no clear trends of large speculators reversing their short positions were observed during the analyzed period. In fact, such a reversal only occurred after the S&P 500 index reached its low point in December 2018. In this case, the changes in net positions can be considered neutral.

Figure 3. Net positions of various entities in the AUDUSD futures market during the period from September 2007 to October 2010.

Source: www.barchart.com, 11.08.2024.

During the 2007 financial crisis (Figure 3), the AUD exhibited the highest positive correlation coefficient with the S&P 500. It can be observed that large speculators initially reduced their positions at the onset of the crisis, only to rebuild a similar volume of net long positions by mid-2008. However, in September 2008, there was a notable reduction in long positions once again, leading to a stabilization of the net position with a balance between long and short position In this case, the changes in net positions can be considered consistent with the analyzed correlation between the returns of the AUD index and the S&P 500.
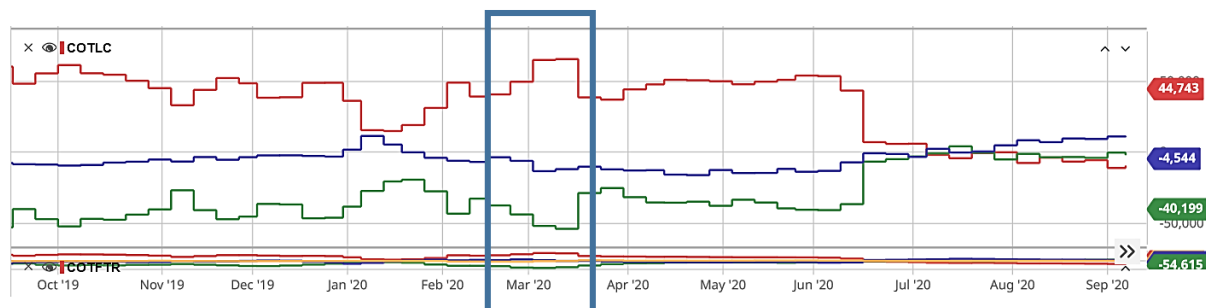

Figure 4. Net positions of various entities in the CADUSD futures market during the period from December 201- to August 2015.

Source: www.barchart.com, 11.08.2024.

During the Eurozone crisis (Figure 4), when the correlation coefficient between the Canadian dollar index and the S&P 500 index was nearly 1, there was an initial tendency among large speculators to increase long positions during the early phase of the downturn. However, as the crisis progressed, these long positions were gradually reduced to levels seen before the analyzed period. In this case, the changes in net positions can be considered neutral.
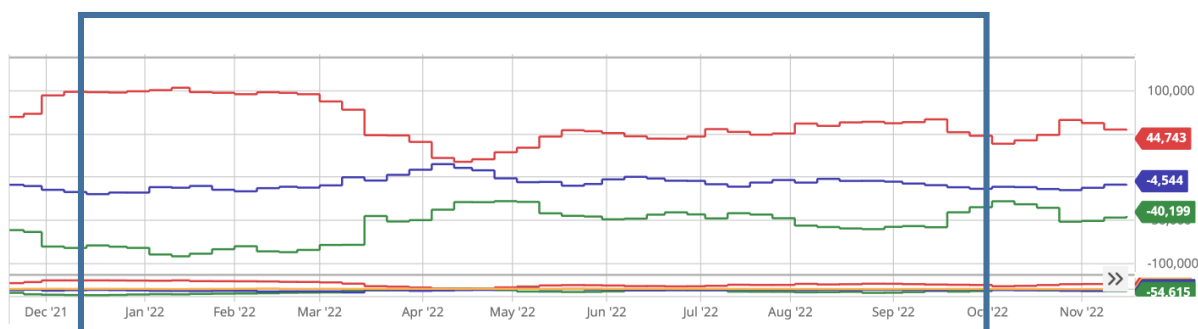
Figure 5. Net positions of various entities in the AUDUSD futures market during the period from September 2019- to October 2021.

Source: www.barchart.com, 11.08.2024.

During the COVID-19 pandemic (Figure 5.) period, despite a clearly positive correlation coefficient between the AUD index and the S&P 500 during the initial phase of declines, there was an observable increase in short positions on the AUD. In the final phase of the declines, however, short positions began to be reversed, and the scale of this reduction offset the earlier increase in short positions. Subsequently, the net position achieved did not significantly differ the levels observed before the onset of the market declines. In this case, the changes in net positions can be considered neutral.

Figure 6. Net positions of various entities in the AUDUSD futures market during the period from December 2021 - to Nobember 2022.

Source: www.barchart.com, 11.08.2024.

In the most recent bear market analyzed for the year 2022 (Figure 6) it is observed that large speculators reduced their short positions on AUDUSD for most of the period. This reveals a divergence relative to the calculated correlations between the AUD index and the S&P 500. In this case, the change in net positions appears inconsistent with the correlation analysis of returns.

6. Discussion

The results contained in the first part of the empirical analysis, where the Pearson linear correlation coefficients were calculated, can be summarized for individual currencies as follows:

Swiss Franc (CHF) - Both the weighted and arithmetic averages of the CHF's correlation with the S&P 500 during the analyzed periods were more negative than the average correlation over the entire period. This indicates that the Swiss Franc consistently exhibited a stronger negative correlation with the S&P 500 during times of heightened volatility, reinforcing its role as a reliable safe haven currency. The stability of this relationship across different crises suggests that CHF is a key asset for investors seeking protection in turbulent market conditions.

Japanese Yen (JPY) - The weighted average correlation for the analyzed events was less negative than for the entire 21st century, largely due to the near-zero correlation observed during the Dotcom bubble. However, the arithmetic average of -0.38 was notably more negative compared to the overall average for the entire period. This makes JPY the currency with the most strongly negative average correlations during periods of increased market uncertainty, despite some fluctuations. These results confirm the Yen's position as a robust safe haven, especially during significant financial stress.

US Dollar (USD) - The weighted average correlation during the analyzed periods was only slightly negative, primarily due to the positive correlation observed during the Dotcom bubble. The arithmetic average for these periods was somewhat more negative than the overall average for the 21st century, at -0.22. This suggests that while the USD played a role as a safe haven, its consistency was less reliable compared to the CHF and JPY.

Other Analyzed Currencies (EUR, GBP, AUD, CAD) - The Euro showed the weakest positive correlation with the S&P 500, with its weighted and arithmetic averages not exceeding 0.07. In three of the six analyzed periods, the Euro demonstrated a negative correlation, which may reflect its international significance and susceptibility to external influences during periods of instability. GBP, AUD, and CAD indices generally exhibited positive correlations with the S&P 500 during the analyzed periods, resulting in distinctly positive average correlations. Their arithmetic average correlation coefficients were higher for the analyzed periods than for the entire 21st century.

This positive correlation for GBP, AUD, and CAD indicates that these currencies were often sold off sharply alongside equity indices by investors during times of instability. In contrast, the lower correlations for CHF, JPY, USD, and EUR demonstrate that during stock market declines, demand for these currencies increased significantly as investors sought safety or moved to close carry trade positions. Other factors influencing currency strength appear to have diminished in importance during these periods.

This detailed analysis underscores the different roles of currencies during periods of financial instability, with CHF, JPY, and USD emerging as reliable safe havens, while the other currencies generally tracked equity market trends. Considering the arithmetic mean of the correlations with the S&P 500 index during periods of instability, as well as the frequency of not achieving negative correlations, it can be observed that the USD served as a safe haven to a lesser extent compared to the JPY and CHF.

When considering the arithmetic average for the analyzed periods, the correlation of USD, CHF and JPY during times of instability is negative and more pronounced than for the entire period under review. However, the weighted average correlation by the number of weeks for JPY and USD does not consistently confirm this relationship.

These results are in line with studies conducted by other scientists. Similar conclusions for the CHF and JPY were drawn by (Ranaldo, Soderlind, 2010) for the period 1993-2008. According to this study, these currencies fulfilled their safe haven role. Park (2023) conclusions are also consistent with the results in a more detailed dimension, confirming that during the 2007 crisis the JPY best fulfilled the safe haven criterion, while in the uncertainty of 2022 (Ukraine war), the USD performed better. Discrepancies can be found in the analysis by Cheema, Faff, and Szulczyk (2022) regarding the US dollar during the pandemic. In this study, where a regression analysis method was used, the USD only weakly met the criteria of a safe haven during the pandemic. However, in the case of the global financial crisis period and the analysis of the Swiss franc for both periods of instability examined, the conclusions from the analyses were consistent with the results obtained.

The second part of the empirical analysis, which involved examining the net positions of selected groups of entities on the futures market using Commitment of Traders reports, did not clearly confirm the conclusions from the first part of the analysis. In two instances, changes in the net positions of large speculators were consistent with the tendency to reallocate from risky assets or increase long positions in currencies considered safe havens. In three cases, the changes in the net positions of large speculators were neutral, with no significant changes observed at the end of the analyzed periods compared to their beginnings. In one case, the changes in net positions were inconsistent.

The findings are inconclusive, which may suggest that the analysis of futures market data is not fully representative and does not adequately capture market trends, or that the assumption large speculators accurately reflect market tendencies may be flawed. A deeper analysis of these relationships could provide valuable insights for a better interpretation of the data available in the COT reports.

In summary, the conclusions from the two studies can be seen as expanding previous analyses of safe haven currencies by providing a structured approach for the 21st century, while also examining other major currencies, adding a broader perspective to the analysis. By doing this, it also confirms that apart from the currencies considered in the past, no new currency (apart from the EUR) aspires to play the role of a safe haven. The practical implications

regarding the safe haven functions of CHF, JPY, and USD, as well as the behavior of other currencies during periods of instability, can be useful both in the active investment process and in mitigating currency exposure for enterprises and households.

7. Conclusions

The analysis conducted confirms the main research question affirmatively: the US Dollar (USD), Japanese Yen (JPY), and Swiss Franc (CHF) exhibit a negative correlation with the stock market during periods of uncertainty in the 21st century. The negative correlation for these currencies is stronger compared to other analyzed currencies.

The main limitation of the study was the restriction of correlation analyses to the S&P 500 index. As this index includes large global companies in the world's largest economy, it should reasonably reflect global trends.

Investor behavior, as reflected in the Commitments of Traders reports for selected currencies and periods, showed that changes in net positions of large speculators were inconclusive. Neutral changes predominated across most cases. Clear shifts consistent with the correlations between the analyzed currencies and the S&P 500 index were observed in only 2 out of the 6 cases. Additionally, in one instance, the direction of changes was contrary to expectations.

The presented analysis provides a foundation for further research, such as exploring whether there is also a nonlinear negative correlation for the studied currencies. It could also be valuable to complement the analysis with the return rates of currency indices during the examined periods or to include other currencies with lesser significance in global trade.

An interesting area of research could involve investigating whether the analyzed relationships might prove useful in specific investment strategies, such as contrarian or momentum strategies. Exploring these questions could offer deeper insights into the behavior of currencies during periods of market instability and their potential applications in financial strategies.

The main conclusions of the study certainly contribute to the current body of knowledge regarding the potential for hedging a currency portfolio in today's environment, allowing both businesses and individuals to reduce exposure to exchange rate fluctuations and stabilize their investment portfolios. It also offers a new perspective, indicating that analyzing the positions of selected entities in the futures markets may not always confirm capital flows into currencies considered safe havens or outflows from currencies deemed risky.

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