

SAFE HAVEN INSTRUMENTS – A COMPARISON BETWEEN THE GLOBAL FINANCIAL CRISIS AND THE COVID-19 PANDEMIC

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Abstract: During the Global Financial Crisis (GFC) of 2008 and the COVID-19 pandemic, financial markets have touched their lowest levels. This paper tried to compare the performance of safe haven assets during the Global Financial Crisis and the COVID-19 pandemic in such countries as Germany, Great Britain, France, Spain, Italy, and Poland. The author investigated the dynamic relations between gold, silver, the US Dollar Index, the Swiss Franc Index, soybean commodity futures and corn commodity futures. The study estimated the DCC or CCC models to compare the dynamic relation between the above-mentioned stock markets and financial instruments. The results showed that only gold could protect investors from stock market losses during both crises. During the GFC, gold, the USD Index, the Swiss Franc Index in almost all the considered countries could be identified as safe haven instruments. Surprisingly, the Swiss Franc Index acted as a safe haven instrument during the GFC but not during the COVID-19 pandemic.

Keywords: safe haven instruments, Global Financial Crisis, COVID-19 pandemic, gold, dynamic correlation.

1. Introduction

During the Global Financial Crisis of 2008 and the COVID-19 pandemic, the financial markets have touched their lowest levels. During the COVID-19 pandemic, the US stock markets experienced their worst turmoil since the 1930s; for example, the

S&P 50 suffered a one-third drop from December 2019 until March 2020. The FTSE 100 experienced an unexpected drop of 24.80% in value in the first quarter of 2020 (The Guardian, 2020). Most of the G7 countries saw the same level of drops in the value of stock indices from December 2019 (Bloomberg, 2020).

On 20 April 2020, crude oil futures for the West Texas Intermediate (WTI), the US oil benchmark, closed at -\$37.63 per barrel, which was an unusual incident with a deep influence on policymakers and practitioners.

One has to remember that the conduct of the current crisis is different than during the Global Financial Crisis. We are coping with great uncertainty as to when the virus might be fully contained, while financial markets are expecting to see more troubles (Godwell, 2020). The need to search for safe haven assets has arisen for both practitioners and researchers.

Traditionally, gold (Baur and Lucey, 2010; Baur and McDermott, 2010; Hiller, Draper, and Faff, 2006; Pullen, Benson, and Faff, 2014), and currencies such as the US dollar and the Swiss franc (Grisse and Nitschka, 2015; Kaul and Sapp, 2006; Rinaldo and Soderlind, 2010) act as safe havens during periods of stock market turmoil. The question is: are traditional assets that were safe havens during the Global Financial Crisis (GFC) still protecting investments during the current COVID-19 pandemic?

Numerous studies examined the impact of COVID-19 on the financial markets and financial assets (see Al-Awadhi, Al-Saifi, Al-Awadhi, and Alhamadi, 2020; Baker et al., 2020; Corbet, Larkin, and Lucey, 2020; Ramelli and Wagner, 2020; Zhang, Hu, and Ji, 2020). For instance, Baker et al. (2020), Al-Awadhi et al. (2020), and Zhang et al. (2020) found a significant negative impact of COVID-19 on the stock markets.

Gold has been considered a safe haven instrument because of its historical role as natural money or a store of value (Bouri, Shahzad, Roubaud, Kristoufek, and Lucey, 2020). Baur and McDermott (2010) confirmed that gold acted as a hedge and a safe haven for major European and US stock markets, but not for other markets. Beckmann, Berger, and Czudaj (2015) indicated that gold has served as a hedge and an effective safe haven. Hood and Malik (2013) suggested that gold acts as a weak safe haven and strong hedge asset in the US stock markets. Lucey and Li (2015) found out that the strength of gold being a safe haven changes over time.

Moreover, currencies and commodities can also offer a safe haven role in financial markets. Rinaldo and Soderlind (2010) suggested that the Swiss franc and Japanese yen exhibited safe haven properties during a crisis period. Grisse and Nitschka (2015) suggested that the Swiss franc exchange rate can act as a safe haven currency in some cases. Bour et al. (2020) showed that the commodity index is a weak safe haven for some stock indices. Commodities, such as crude oil (Xia, Ji, Zhang, and Han, 2019) and food commodities (like soybeans) have behaved quite differently since the 2008 Global Financial Crisis (Wu, Zhao, Ji, and Zhang, 2020).

This paper tried to compare the performance of safe haven assets during the Global Financial Crisis and COVID-19 pandemic in such European countries as Germany, Great Britain, France, Spain, Italy, and Poland. The author investigated the dynamic

relation between the most popular instruments such as: gold, silver, the US Dollar Index, the Swiss Franc Index, soybean commodity futures, and corn commodity futures. The study estimated the DCC and CCC models to compare the dynamic relation between the above-mentioned stock markets and financial instruments.

2. Methodology and data

The research analysis was carried out on the main stock exchanges indices, namely DAX – Germany, FTSE250 – Great Britain, CAC40 – France, IBEX35 – Spain, FTSE MIB – Italy, and WIG – Poland, as well as gold, silver, the US Dollar Index, the Swiss Franc Index, soybean commodity futures and corn commodity futures. The author considered three periods: the whole sample is from 01.01.2007 to 31.03.2021, and the subsample for the Global Financial Crisis is from 01.09.2008 to 31.08.2009, while the subsample for the COVID-19 pandemic is from 03.02.2020-31.03.2021. The metals' rates from the Thomson Reuters database are given in US dollars (continuous futures series), while the other data come from the web-portal stooq.pl.

Table 1 presents descriptive statistics for the rates of returns series on gold, silver, the USD Index, the Swiss Franc Index, soybean and corn futures, and stock exchanges indices: DAX, FTSE250, CAC40, IBEX35, FTSE MIB, and WIG for all the considered periods. For the whole sample the mean value was close to zero, and in two cases it was negative, and for the other ten instruments, positive. Volatility measured by standard deviations was highest for silver and corn. The skewness is highest for the Swiss Franc Index, and only for that instrument was it positive. In other cases it was negative, which indicates a long-left tail of the empirical distribution of returns. Surprisingly, the kurtosis was high for the Swiss Franc Index, which might be caused by such a long time of observation.

Figure 1 shows that at the end of the considered period one can obtain the highest value for investment in gold. Additionally, one can observe drops in the value of the DAX Index at the beginning of the September 2008 and at the beginning of February 2020.

Baur and Lucey (2010) defined the requirements to distinguish when an asset can act as a diversifier, hedge, and safe haven. To qualify as a safe haven asset, an instrument must be able to keep or increase in value in case of market downturns. Statistically, the returns from a safe haven asset should be uncorrelated or negatively correlated with the returns of other assets during a crisis period.

Table 1. Descriptive statistics for the rates of return series on gold, silver, USD Index, Swiss Franc Index, soybean, corn, and stock exchange indices from Germany, Great Britain, France, Spain, Italy, Poland, for the considered periods

01.01.2007- 31.03.2021	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
GOLD	-6.6617	9.2347	0.0266	0.9949	-0.0126	6.9540
SILVER	-17.0587	9.7856	0.0166	1.7749	-0.6933	8.9457
USD INDEX	-3.3057	2.5978	0.0032	0.4890	-0.0154	2.4902
SWISSFR INDEX	-8.4649	17.2920	0.0114	0.5860	6.0781	219.5320
SOYBEAN	-13.4128	7.5874	0.0202	1.4813	-0.6219	5.7537
CORN	-13.1563	8.7431	0.0115	1.7703	-0.2365	3.1722
DAX	-8.9808	10.7975	0.0219	1.3984	-0.1193	6.8018
FTSE250	-9.8202	8.0388	0.0174	1.1699	-0.5281	6.9380
CAC40	-13.0983	10.5946	0.0017	1.4306	-0.2643	8.1935
IBEX35	-15.1512	13.4836	-0.0142	1.5245	-0.3552	9.5137
FTSE MIB	-18.5411	10.8742	-0.0144	1.6428	-0.6505	9.3601
WIG	-9.8880	6.1919	0.0034	1.2148	-0.6115	5.6852
01.09.2008-31.08.2009						
GOLD	-6.6617	9.2347	0.0536	1.7074	0.4932	4.5436
SILVER	-12.3914	9.7855	0.0308	2.6320	-0.0020	2.8762
USD INDEX	-3.3057	2.3648	0.0035	0.8524	-0.3023	0.7484
SWISSFR INDEX	-3.1388	3.9284	0.0284	0.8150	0.0713	3.1749
SOYBEAN	-13.4128	7.5873	-0.1083	2.5479	-0.8004	3.0085
CORN	-7.9539	7.5577	-0.2107	2.7264	-0.2130	0.5188
DAX	-7.3355	10.7974	-0.0620	2.5711	0.4087	3.0374
FTSE250	-6.7347	7.4621	-0.0249	2.0688	-0.1813	1.0569
CAC40	-9.4715	10.5945	-0.0777	2.6322	0.2613	2.9211
IBEX35	-9.5858	10.1176	-0.0109	2.4852	0.0796	2.8252
FTSE MIB	-8.5990	10.8742	-0.0959	2.7488	0.1176	1.8232
WIG	-8.2888	6.08374	-0.0426	2.2345	-0.2778	0.9249
03.02.2020-31.03.2021						
GOLD	-5.1139	4.9613	0.0248	1.2375	-0.3786	2.5781
SILVER	-16.0804	8.2430	0.1086	2.7964	-0.9697	6.2273
USD INDEX	-1.5405	2.0103	-0.0173	0.4496	0.5988	2.7824
SWISSFR INDEX	-1.3167	1.3351	-0.0019	0.3622	0.1015	0.7976
SOYBEAN	-4.3631	4.9947	0.1662	1.1106	-0.0417	2.4171
CORN	-4.6361	4.9539	0.1342	1.3891	0.0546	1.1747
DAX	-8.9807	7.9433	0.0475	1.9857	-0.4775	4.7943
FTSE250	-9.8201	8.0387	0.0056	1.7971	-0.7170	6.5761
CAC40	-13.0983	8.0560	0.0089	1.9313	-1.2145	9.8059
IBEX35	-15.1512	8.2252	-0.0343	2.0424	-1.3768	12.0989
FTSE MIB	-18.5411	8.5494	0.0166	2.1152	-2.7627	23.3959
WIG	-9.8880	6.1919	0.0089	1.6781	-1.0814	6.2789

Source: own calculations.

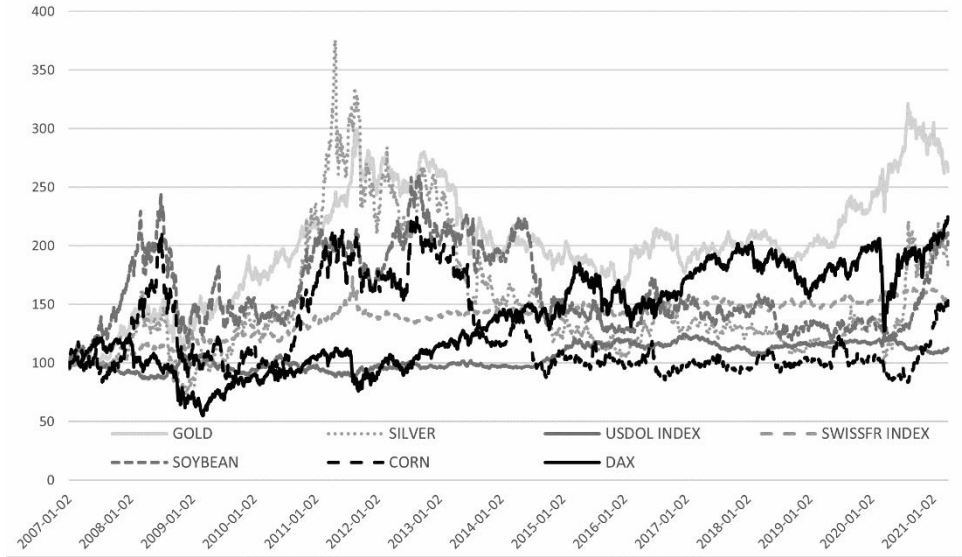


Fig. 1. Gold, silver, USD Index, Swiss Franc Index, soybean, corn, and DAX normalized quotations during 01.01.2007-31.03.2021

Source: own elaboration.

2.1. Dynamic conditional correlation (DCC) and Constant conditional correlation (CCC)

Let $Y_t = (y_{1,t}, \dots, y_{k,t})$ be the k -sized vector of observation at time t . The total number of observations is $n \in \mathbb{N}$. Let us assume that $E_{t-1}[\varepsilon_{i,t}] = 0$ and $E_{t-1}[\varepsilon_{i,t}, \varepsilon'_{i,t}] = H_t$. The dynamic conditional correlation model of Engle (2002) reads:

$$Y_t = \mu_t + \varepsilon_t, \text{ with } \varepsilon_t = \mathbf{H}_t^{1/2} \mathbf{z}_t, \quad (1)$$

$$\mathbf{H}_t = \mathbf{D}_t \mathbf{R}_t \mathbf{D}_t, \quad (2)$$

$$\mathbf{D}_t = \text{diag}(\sqrt{h_{11,t}}, \dots, \sqrt{h_{kk,t}}), \quad (3)$$

where μ_t is the k -dimensional conditional mean structure, \mathbf{H}_t denotes the $(k \times k)$ -sized conditional variance matrix, \mathbf{z}_t is a k -dimensional vector of independent and identically distributed random variables with zero mean and unit variance, \mathbf{R}_t is the dynamic correlation matrix of size $(k \times k)$ from which one obtains the time-varying correlation coefficient estimates, and \mathbf{D}_t is a diagonal matrix of conditional standard deviations of ε_t . Assuming $\mathbf{z}_t \sim St - t_v(0, I_k)$, let $\xi_{i,t}$ denote the standardised residual

with respect to the idiosyncratic volatility given as $\xi_{i,t} = \varepsilon_{i,t} / \sqrt{h_{ii,t}}$. The dynamic correlation matrix then decomposes to:

$$\mathbf{R}_t = (\text{diag } \mathbf{Q}_t)^{-1/2} \mathbf{Q}_t (\text{diag } \mathbf{Q}_t)^{-1/2}, \quad (4)$$

where \mathbf{Q}_t denotes the covariance matrix of the standardized residuals $\xi_t = (\xi_{1,t}, \dots, \xi_{k,t})$. Engle (2002) introduced a GARCH (1,1)-like structure on the elements of $\mathbf{Q}_t = [q_{ij,t}]_{i,j=1}^{k,k}$ with:

$$\begin{aligned} q_{ij,t} &:= \bar{\rho}_{ij} + \alpha (\xi_{i,t-1} \xi_{j,t-1} - \bar{\rho}_{ij}) + \beta (q_{ij,t-1} - \bar{\rho}_{ij}) = \\ &= \bar{\rho}_{ij} (1 - \alpha - \beta) + \alpha \xi_{i,t-1} \xi_{j,t-1} + \beta q_{ij,t-1}, \end{aligned} \quad (5)$$

which is mean reverting as long as $\alpha + \beta < 1$ and where $\bar{\rho}_{ij}$ is the unconditional expectation of $q_{ij,t}$ with $\bar{\rho}_{ii} = 1$ for all $i = 1, \dots, k$. An estimator for the dynamic correlation is then obtained by calculating:

$$\begin{aligned} \rho_{ij,t} &= \frac{q_{ij,t}}{\sqrt{q_{ii,t} q_{jj,t}}} \\ &= \frac{\bar{\rho}_{ij} (1 - \alpha - \beta) + \alpha \xi_{i,t-1} \xi_{j,t-1} + \beta q_{ij,t-1}}{\sqrt{1 - \alpha - \beta + \alpha \xi_{i,t-1}^2 + \beta q_{ii,t-1}} \sqrt{1 - \alpha - \beta + \alpha \xi_{j,t-1}^2 + \beta q_{jj,t-1}}}. \end{aligned} \quad (6)$$

The difference between the DCC and CCC models is in equation (2), where \mathbf{H}_t is defined:

$$\mathbf{H}_t = \mathbf{D}_t \mathbf{R} \mathbf{D}_t, \quad (7)$$

where \mathbf{H}_t is the conditional variance matrix and \mathbf{R} is the constant conditional correlation matrix of the process ε_t .

Vector GARCH (p, q) process of ε_t is defined as follows (Nakatani and Terasvirta, 2009):

$$\mathbf{h}_t = \mathbf{a}_0 + \sum_{i=1}^q \mathbf{A}_i \varepsilon_{t-1}^{(2)} + \sum_{j=1}^p \mathbf{B}_j \mathbf{h}_{t-j}, \quad (8)$$

where $\varepsilon_{t-1}^{(2)} = (\varepsilon_{1,t-1}^2, \dots, \varepsilon_{N,t-1}^2)'$, \mathbf{a}_0 is a k -dimensional vector, and \mathbf{A}_i and \mathbf{B}_j are $(k \times k)$ matrices with elements such $h_{ii,t}$ in \mathbf{h}_t are positive for all t .

Equations (1), (2), (8) jointly define the k -dimensional CCC-GARCH (p, q) model if \mathbf{A}_i and \mathbf{B}_j are diagonal for all i and j .

3. Results and discussion

This section presents the research results obtained with the use of the methodology mentioned above on the markets of Germany, Great Britain, France, Spain, Italy, and

Poland. The study considered three periods: the whole sample from 01.01.2007 to 31.03.2021, the subsample for the Global Financial Crisis from 01.09.2008 to 31.08.2009, and the subsample for the COVID-19 pandemic from 03.02.2020-31.03.2021. The calculations of the DCC-GARCH and CCC-GARCH model parameters were made using the professional program OxMetrics by J.A. Doornik.

Table 2. The parameters of the DCC or CCC models of pairwise synchronized return data of the chosen instrument and stock exchange index from Germany for the considered periods. Robust standard errors are available upon request

DAX	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	v
Gold	0.454155	0.314694	0.684698	19.414306
Silver	0.191829	0.345218	0.653780	20.470459
USD Index	-0.337291	0.304709	0.694764	25.742956
SwissFr Index	0.764854	0.305671	0.693223	21.815109
Soybean	0.425076	0.349115	0.649589	18.463040
Corn	0.391807	0.369584	0.628002	18.317157
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	v
Gold	0.065954	0.089203	0.831253	7.887173
Silver	0.044743	–	–	8.496740
USD Index	-0.293293	–	–	15.649143
SwissFr Index	-0.052294	–	–	5.660732
Soybean	0.379889	–	–	5.999898
Corn	0.374819	–	–	14.214340
	03.02.2020-31.03.2021			
	$\bar{\rho}$	α	β	v
Gold	0.010914	0.001337	0.873349	4.940858
Silver	0.114382	0.026691	0.860876	4.278054
USD Index	no model			
SwissFr Index	0.196310	0.205921	0.793777	2.288835
Soybean	0.035991	0.061127	0.824622	5.199916
Corn	0.059974	0.026086	0.915480	5.785158

Source: own calculations.

Table 2 presents the parameters of the DCC and CCC models of pairwise synchronized return data of the chosen instrument and stock exchange index from Germany for the considered periods. It can be observed that if one considers the whole sample, the USD Index (the bold number of $\bar{\rho}$) can be identified as a safe haven instrument. When estimating the CCC model, one only obtained the values of $\bar{\rho}$ and v . The bold number of $\bar{\rho}$ means that this instrument can be considered as a safe haven for the considered financial market. One can observe such results of estimation for the GFC subsample. For that period, gold, silver, the USD Index, and the Swiss Franc Index can be identified as safe haven instruments. For the COVID-19 pandemic

subsample, it can be observed that gold, soybean, corn can be identified as safe haven instruments. Moreover, there were changes in safe haven instruments between the GFC and the COVID-19 pandemic. Parameter ν is the Student-t degrees of freedom, which is also highly significant for all the considered markets.

Table 3. The parameters of the DCC and CCC models of pairwise synchronized return data of the chosen instrument and stock exchange index from Great Britain for the considered periods. Robust standard errors are available upon request

FTSE 250	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	0.516413	0.307105	0.692380	22.115887
Silver	0.287231	0.330077	0.669102	20.831520
USD Index	-0.527038	0.274361	0.725346	39.155642
SwissFr Index	0.882878	0.310123	0.687677	25.110362
Soybean	0.590003	0.322644	0.676480	21.556808
Corn	0.496611	0.323081	0.675611	20.881902
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	ν
Gold	0.142721	0.090877	0.868059	14.871908
Silver	0.185677	0.037537	0.928268	17.868146
USD Index	-0.255546	–	–	39.468108
SwissFr Index	-0.072539	–	–	8.761861
Soybean	0.391215	0.007045	0.956976	8.878211
Corn	0.386217	–	–	69.639579
	03.02.2020-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	no model			
Silver	0.208320	0.006344	0.954870	4.840090
USD Index	no model			
SwissFr Index	0.902774	0.541756	0.458009	2.411919
Soybean	0.070960	0.020233	0.951973	6.508704
Corn	0.153586	0.032465	0.947840	7.669558

Source: own calculations.

Table 3 presents the parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Great Britain for the considered periods. One can observe that for the whole sample, the USD Index can be identified as a safe haven instrument. For the GFC subsample, the USD Index and the Swiss Franc Index can be identified as safe haven instruments. For those instruments, the study could obtain only the parameters of the CCC model. For the COVID-19 subsample, the study could not estimate the parameters model for gold and the USD Index. Only soybean could be considered as a safe haven instrument.

Table 4 presents the parameters of the DCC and CCC models of pairwise synchronised return data of chosen the instrument and stock exchange index from

France for the considered periods. One can observe that for the whole sample all the considered instruments can be identified as safe haven instruments. For the GFC subsample, gold, silver, the USD Index, and the Swiss Franc Index can be identified as safe haven instruments. Moreover, for the USD Index and the Swiss Franc Index, the author could only estimate the parameters of the CCC model. For the COVID-19 pandemic subsample, gold, silver, the USD Index, and soybean can be identified as safe haven instruments. For the Swiss Franc Index, the study could not estimate any model. The parameters were non-essentials.

Table 4. The parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from France for the considered periods. Robust standard errors are available upon request

CAC 40	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.111693	0.289752	0.709913	23.967039
Silver	-0.328587	0.280473	0.718929	27.756065
USD Index	-0.382487	0.256510	0.743180	50.794620
SwissFr Index	-0.634752	0.267325	0.732454	29.073067
Soybean	-0.495371	0.335839	0.662225	25.124020
Corn	-0.589468	0.303219	0.695152	23.886229
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	ν
Gold	0.072893	0.094568	0.831177	8.284136
Silver	0.087991	0.016716	0.924715	8.787917
USD Index	-0.291051	–	–	15.227042
SwissFr Index	-0.061184	–	–	5.999928
Soybean	0.408178	0.011841	0.950488	6.686418
Corn	0.380423	0.008356	0.964772	15.769578
	03.02.2020-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.061977	0.0000001	0.630948	5.023196
Silver	0.084791	0.041560	0.859521	3.922632
USD Index	-0.091411	0.029066	0.500201	8.070789
SwissFr Index	no model			
Soybean	0.080930	0.033181	0.922228	5.659776
Corn	0.130967	0.042199	0.931961	6.133494

Source: own calculations.

Table 5 presents the parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Spain for the considered periods. One can observe that for the whole sample all the considered instruments can be identified as safe haven instruments. The study could only estimate the parameters of the CCC model. For the GFC subsample, gold, silver, the USD Index, and the Swiss Franc Index can be considered as safe haven

instruments. For the USD Index, the Swiss Franc Index, soybean and corn, the author could only estimate the CCC model parameters. For the COVID-19 pandemic subsample, only the Swiss Franc Index cannot be considered as a safe haven instrument. For gold and the USD Index the study obtained the CCC model parameters.

Table 5. The parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Spain for the considered periods. Robust standard errors are available upon request

IBEX 35	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.003252	–	–	92.753053
Silver	0.001710	–	–	104.355424
USD Index	0.015681	–	–	159.459842
SwissFr Index	0.002405	–	–	125.366908
Soybean	-0.002724	–	–	84.238137
Corn	-0.019103	–	–	66.386719
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	ν
Gold	0.039751	0.091764	0.849756	10.751785
Silver	0.073136	0.027959	0.915576	12.184039
USD Index	-0.294884	–	–	25.996181
SwissFr Index	-0.079944	–	–	6.996398
Soybean	0.380609	–	–	7.109211
Corn	0.369003	–	–	26.334174
	03.02.2020-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.037817	–	–	5.590900
Silver	0.096538	0.030079	0.882070	4.391082
USD Index	-0.109094	–	–	9.940436
SwissFr Index	0.409208	0.285351	0.714413	2.345541
Soybean	0.010224	0.028799	0.948437	6.108007
Corn	0.087124	0.043335	0.937333	7.166026

Source: own calculations.

Table 6 presents the parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Italy for the considered periods. One can observe that for the whole sample all the instruments can be considered as a safe haven. For that period, the essentials were the parameters of the DCC-IGARCH and DCC-GJR (for silver) models. For the GFC subsample, gold and the Swiss Franc Index can be identified as safe haven instruments. For the USD Index, the author could not obtain the essential parameters of any model. For the COVID-19 pandemic subsample, gold, the USD Index, and soybean can be

identified as safe haven instruments. For gold and the USD Index it was possible to obtain the CCC model parameters.

Table 6. The parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Italy for the considered periods. Robust standard errors are available upon request

FTSE IMB	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.905459	0.313474	0.685111	20.714690
Silver	-0.756582*	0.365967	0.631163	20.397730
USD Index	-0.072280	0.348577	0.649803	20.068708
SwissFr Index	-0.925481	0.293203	0.706160	18.527786
Soybean	-0.450040	0.339938	0.658690	21.277529
Corn	-0.468726	0.318126	0.680777	21.647921
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	ν
Gold	0.087857	0.626057	0.298057	341.248745
Silver	0.146045	0.820584	0.025565	341.248749
USD Index	No model			
SwissFr Index	-0.292304	0.597082	0.231977	118.929247
Soybean	0.271237	–	–	341.248733
Corn	0.537148	0.502772	0.446010	341.247871
	03.02.2020-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	-0.000296	–	–	4.732137
Silver	0.195548	0.008773	0.921560	4.042324
USD Index	-0.134967	–	–	7.535584
SwissFr Index	0.347140	0.266768	0.733009	2.275620
Soybean	0.057202	0.018392	0.954323	5.224603
Corn	0.102953	0.023381	0.947635	5.454724

* Model GJR is represented by the blue numbers, the green numbers are for the IGARCH model.

Source: own calculations.

Table 7 presents the parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Poland for the considered periods. One can observe that for the whole sample, silver, soybean, and corn can be considered as safe haven instruments. For the Swiss Franc Index, the author was able to estimate the CCC model parameters. For the GFC subsample all the considered instruments can be identified as safe haven instruments. For gold, silver, and the Swiss Franc Index, the study could obtain the CCC model parameters. For the COVID-19 pandemic subsample, gold, the USD Index, soybean, and corn can be identified as safe haven instruments. One could observe the changes

in safe haven instruments if the GFC period and COVID-19 pandemic subsample were considered.

Table 7. The parameters of the DCC and CCC models of pairwise synchronised return data of the chosen instrument and stock exchange index from Poland for the considered periods. Robust standard errors are available upon request

WIG	01.01.2007-31.03.2021			
	$\bar{\rho}$	α	β	ν
Gold	0.288376	0.312920	0.684106	324.609563
Silver	-0.190891	0.419069	0.573752	227.282676
USD Index	0.413558	0.281966	0.714879	341.248749
SwissFr Index	0.507404	–	–	341.248749
Soybean	-0.334979	0.469996	0.519240	197.175040
Corn	-0.164527	0.335086	0.661541	341.248749
	01.09.2008-31.08.2009			
	$\bar{\rho}$	α	β	ν
Gold	-0.056884	–	–	8.440039
Silver	0.001867	–	–	10.315535
USD Index	-0.057076	0.039719	0.910702	19.703132
SwissFr Index	0.020360	–	–	6.900238
Soybean	0.019901	0.019414	0.930593	6.217298
Corn	0.020712	0.039603	0.899605	9.072848
	03.02.2020-31.03.2021			
	$\bar{\rho}$	Λ	β	ν
Gold	0.090595	–	–	6.571531
Silver	0.140441	–	–	4.838727
USD Index	-0.139925	–	–	13.640336
SwissFr Index	0.243537	0.212795	0.786945	2.354907
Soybean	0.070992	0.011588	0.804939	6.995422
Corn	0.080587	0.032237	0.657619	7.453202

Source: own calculations.

Table 8 presents a static correlation between the considered instruments for the whole period from 01.01.2007 until 31.03.2021. This only confirms that gold, the USD Index, and the Swiss Franc Index can be identified as safe haven instruments, for which the correlation coefficient is negative (the bold numbers).

Table 9 presents a static correlation between the considered instruments for the Global Financial Crisis subsample from 01.09.2008 until 31.08.2009. One can observe that gold, the USD Index, and the Swiss Franc Index can be identified as safe haven instruments.

Table 8. Static correlation between the considered instruments for the period 01.01.2007-31.03.2021

01.01.2007- -31.03.2021	GOLD	SILVER	USD INDEX	SWISSFR INDEX	SOYBEAN	CORN
SILVER	0.6975	1.0000	-0.2201	0.0763	0.1225	0.0901
USD INDEX	-0.2221	-0.2201	1.0000	-0.2927	-0.1713	-0.1499
SWISSFR INDEX	0.1117	0.0763	-0.2927	1.0000	0.0139	0.0254
SOYBEAN	0.0706	0.1225	-0.1713	0.0139	1.0000	0.5082
CORN	0.0693	0.0901	-0.1499	0.0254	0.5082	1.0000
DAX	-0.0509	0.0941	-0.1619	-0.0572	0.2064	0.1521
FTSE250	-0.0031	0.1486	-0.1544	-0.0462	0.2135	0.1519
CAC40	-0.0726	0.0879	-0.1615	-0.0478	0.2234	0.1690
IBEX35	-0.0807	0.0553	-0.1864	-0.0434	0.1918	0.1423
FTSE MIB	-0.0827	0.0612	-0.1790	-0.0432	0.2118	0.1556
WIG	0.0191	0.0487	-0.0701	0.0012	0.0777	0.0252

Source: own calculations.

Table 9. Static correlation between the considered instruments for the period 01.09.2008-31.08.2009

01.09.2008- -31.08.2009	GOLD	SILVER	USD INDEX	SWISSFR INDEX	SOYBEAN	CORN
SILVER	0.7382	1.0000	-0.2771	0.1220	0.1897	0.2158
USD INDEX	-0.2944	-0.2771	1.0000	-0.3559	-0.3620	-0.3877
SWISSFR INDEX	0.1736	0.1220	-0.3559	1.0000	0.0151	0.0590
SOYBEAN	0.0857	0.1897	-0.3620	0.0151	1.0000	0.6828
CORN	0.1274	0.2158	-0.3877	0.0590	0.6828	1.0000
DAX	-0.1202	0.0093	-0.3187	-0.0683	0.3770	0.4203
FTSE250	-0.0618	0.1430	-0.2892	-0.0887	0.4190	0.4277
CAC40	-0.1491	0.0616	-0.3273	-0.0654	0.4500	0.4640
IBEX35	-0.1322	0.0234	-0.3451	-0.0953	0.4142	0.4190
FTSE MIB	-0.1627	0.0445	-0.3383	-0.0956	0.4321	0.4449
WIG	-0.0090	0.0407	-0.1730	0.0198	0.1576	0.1230

Source: own calculations.

Table 10 presents a static correlation between the considered instruments for the COVID-19 pandemic subsample from 03.02.2020 until 31.03.2021. One can observe that the USD Index and the Swiss Franc Index can be identified as safe haven instruments. Surprisingly, for investors from France, Italy, and Spain, only gold can be considered a safe haven instrument.

Table 10. Static correlation between the considered instruments for the period 03.02.2020-31.03.2021

03.02.2020- -31.03.2021	GOLD	SILVER	USD INDEX	SWISSFR INDEX	SOYBEAN	CORN
SILVER	0.5553	1.0000	-0.2552	-0.0225	0.1599	0.1874
USD INDEX	-0.3234	-0.2552	1.0000	-0.1213	-0.0576	-0.0932
SWISSFR INDEX	0.0100	-0.0225	-0.1213	1.0000	-0.0868	0.0109
SOYBEAN	0.0365	0.1599	-0.0576	-0.0868	1.0000	0.7249
CORN	0.0669	0.1874	-0.0932	0.0109	0.7249	1.0000
DAX	0.0856	0.2615	-0.2004	-0.1145	0.1827	0.1460
FTSE250	0.0968	0.2956	-0.2271	-0.0827	0.1573	0.2048
CAC40	-0.0547	0.2201	-0.0974	-0.1028	0.2173	0.1963
IBEX35	-0.0514	0.1804	-0.0665	-0.0996	0.1783	0.1579
FTSE MIB	-0.0187	0.2192	-0.0738	-0.0959	0.2025	0.1910
WIG	0.1416	0.1967	-0.1695	-0.0502	0.1325	0.0792

Source: own calculations.

4. Conclusions

Searching for safe haven instruments is an important issue during market turmoil. This paper examined the performance of gold, silver, the USD Index, the Swiss Franc Index, soybean, and corn, as safe haven assets from stock market losses of European economies during the Global Financial Crisis and the COVID-19 pandemic. The results showed that only gold could protect investors from stock market losses during both crises. During the GFC, gold, the USD Index, and the Swiss Franc Index in almost all the considered countries could be identified as safe haven instruments.

Surprisingly, the Swiss Franc Index acted as a safe haven instrument during the GFC but not during the COVID-19 pandemic. Soybean acted as a safe haven instrument during the COVID-19 pandemic in all six countries, but only in Poland during the GFC.

The study's findings are in line with the literature stating that safe haven instruments can change over time and across countries. Moreover, when searching for safe haven instruments, one have to remember that the COVID-19 pandemic crisis differ from the Global Financial Crisis in their fundamental characteristics of market turmoil.

These findings are useful for investors and fund managers searching for safe haven instruments. Further research might be carried out to identify other safe haven instruments during the COVID-19 pandemic.

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INSTRUMENTY *SAFE HAVEN* – PORÓWNANIE MIĘDZY GLOBALNYM KRYZYSEM FINANSOWYM A PANDEMIĄ COVID-19

Streszczenie: Podczas globalnego kryzysu finansowego i pandemii COVID-19 rynki finansowe zanotowały najniższe wartości indeksów giełdowych. Należy pamiętać, że aktualny kryzys różni się od globalnego kryzysu finansowego. W artykule porównano dynamikę instrumentów *safe haven* podczas globalnego kryzysu finansowego oraz pandemii COVID-19. Przeanalizowano dynamiczną relację między złotem, srebrem, indeksami US Dollar, Swiss franc, kontraktami terminowymi na soję i kukurydżę oraz rynkami giełdowymi dla inwestorów z Niemiec, Wielkiej Brytanii, Francji, Hiszpani, Włoch oraz Polski. Wyestymowano parametry modeli DCC albo CCC, by porównać dynamiczną relację między wspomnianymi rynkami giełdowymi i instrumentami finansowymi. Wyniki pokazują, że jedynie złoto może być traktowane jako instrument *safe haven* podczas obu rozważanych kryzysów. Podczas globalnego kryzysu finansowego złoto, indeksy US Dollar i Swiss franc w prawie wszystkich krajach zidentyfikowano jako instrument *safe haven*.

Słowa kluczowe: instrumenty *safe haven*, globalny kryzys finansowy, pandemia COVID-19, złoto, dynamiczna korelacja.