

“Precious metals as hedging assets: Evidence from MENA countries”

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PRECIOUS METALS AS HEDGING ASSETS: EVIDENCE FROM MENA COUNTRIES

Abstract

In the context of the global pandemic of 2020 and the Russian invasion of Ukraine in 2022, a newfound interest is emerging in understanding the interconnections between the Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), and MOEX (Russia) indices and the precious metals markets Gold Bullion LBM, Silver, Handy & Harman, London Platinum, from January 1, 2018 to November 23, 2023. The study aimed to determine whether precious metals such as Gold, Silver, and Platinum can be considered hedging assets to the stock markets of the Middle East and North Africa (MENA) countries, i.e., whether investors operating in these regional markets can rebalance their portfolios with these precious metals. The structural vector autoregressive (SVAR) methodology allowed assessing the influence of the analyzed markets on each other regarding price formation. The results show that the markets interacted very significantly during the stress period. Platinum was the market that most influenced its peers (1 to 8 comovements), the MOEX, 1 to 7, MASI, 2 to 6, the Dow Jones went from 4 to 7 comovements, the Amman SE General and EGX 30 markets went from 1 to 4, the Israeli market (ISRAEL TA 125) and Silver went from 2 to 4 comovements, and finally the Gold Bullion LBM from 3 to 4. The study's conclusions contain important information for investors, policymakers, and other participants in the financial energy markets.

Keywords

stock markets, gold, silver, platinum, connectedness, hedge, portfolio rebalancing

JEL Classification

G10, G11, C32

INTRODUCTION

This study addresses whether precious metals such as Gold, Silver, and Platinum can be considered hedging assets to the MENA countries' stock markets. It also examines the US stock market, as it is considered a global benchmark, and the Russian stock market, given the time frame analyzed. In practical terms, this study contributes to the existing literature by testing whether precious metals can be considered portfolio rebalancing assets in these regional markets.

As far as is known, this will be the first study to address this issue during the events of the 2020 global pandemic and the Russian invasion of Ukraine. Based on the literature studied, hedging strategies for investors who hold assets in the stock markets of MENA countries have not been subject to extensive scrutiny. Existing research has ignored the effectiveness of hedging using precious metals and the risks associated with portfolios. Precious metals, often considered safe-haven assets, have historically tended to act as a hedge against market volatility and economic uncertainty. As MENA countries strive for economic stability and growth, it becomes crucial to understand the dynamics of precious metals in the context of their stock markets. The region's investors could benefit from incorporating precious metals into their portfolios as a risk mitigation strategy, especially during market turbulence or geopolitical uncertainty.

Furthermore, the emphasis on portfolio rebalancing underlines the practical implications of such a study. Investors must diversify their portfolios effectively to manage risks and optimize returns. Precious metals can play a crucial role in countering the volatility inherent in stock markets. In summary, studying precious metals in the context of MENA equity markets is about hedging against market risks and providing investors with valuable tools to optimize and rebalance their portfolios in the ever-changing scenario of regional markets.

1. LITERATURE REVIEW

Precious metals, especially Gold, have been considered valuable reserves for centuries. They are tangible assets not subject to the same risks as paper currencies, which can be affected by inflation, political instability, and economic crises. Investors often look for safe-haven assets during geopolitical uncertainty, economic crises, or financial market volatility. Gold is often seen as a safe haven asset because it retains its value when other assets, such as shares or currencies, suffer significant fluctuations. Including precious metals in an investment portfolio can provide diversification benefits. Diversification involves spreading investments across different asset classes to reduce risk. Since precious metals often have a low correlation with traditional financial assets such as stocks and bonds, they can help mitigate the overall risk of the portfolio (Ghazali, 2010; Houcine et al., 2020; Robiyanto et al., 2020; Chemkha et al., 2021; Pisedtasalasai, 2021; Chkili, 2022; Yousaf et al., 2023).

Dee et al. (2013) and Saraç and Zeren (2014) tested whether Gold could be a hedging asset or safe haven against stock markets, inflation, currency risk, and sovereign debt. Dee et al. (2013) show that for short-term investors, Gold cannot always hedge the risk of stocks and inflation in the Chinese capital market. Meanwhile, Saraç and Zeren (2014) show that Gold is an effective investment tool for hedging against inflation and currency risks. Agyeh-Ampamoh et al. (2014) show that other precious metals, particularly palladium, offer investors greater compensation for their losses in the bond market than Gold. These authors suggest that industrial metals, especially copper, tend to outperform Gold and other precious metals as hedging and safe haven assets relative to sovereign bonds.

The studies produced by the authors Baur and McDermott (2010) and Reboredo (2013) highlight the differentiated role of Gold in the global

financial system, suggesting that its effectiveness as a hedge and safe haven may depend on specific market conditions, regions, and economic sectors. Complementarily, the authors Robiyanto (2017) show that the WTI index could act as a robust safe haven for most capital markets in Southeast Asia. Platinum and Silver could be safe havens only for the Singapore Stock Exchange, whereas Gold could be a robust safe haven in both Singapore and Malaysia. Palladium could only be a safe haven for the Philippine Stock Exchange.

He et al. (2018) and Robiyanto (2018) re-examined the role of Gold as a tool for investors to manage their risk portfolios. He et al. (2018) show no evidence of a safe haven between Gold and the UK or US stock markets. However, Robiyanto (2018) shows that when extreme shocks occur in the Indonesian stock market, Gold can serve as a safe haven asset for sharia stocks in Indonesia.

Following a different approach, the studies by Bouri et al. (2020) and Yang et al. (2022) shed light on the various characteristics of Bitcoin, Gold, and commodities regarding their safe haven properties, diversification benefits, and performance in various market conditions and investment horizons. Bouri et al. (2020) highlight that the comovement between Gold and stock returns significantly influenced the VaR level of the portfolio. Diversification benefits varied in the time-frequency space, with Bitcoin showing superiority over Gold and commodities as a hedging asset. In turn, Yang et al. (2022) revealed that the overall dependence between these assets and the currency market was strongest in the short term. In the long term, Bitcoin showed better hedging capacity, while commodities emerged as the most favorable option for building an ideal currency portfolio in all time horizons.

In 2023, Mensi et al. (2023) investigated the role of Gold as a hedge or safe haven for the Middle East and North Africa (MENA) stock markets. The au-

thors found strong correlations between MENA stock markets and Gold, with positive correlations when both were bullish and negative correlations during market downturns. The study emphasized the caution of investors in MENA markets who consider Gold a safe haven, observing variations in its effectiveness in the region's different stock markets. Likewise, Bahloul et al. (2023) explored the hedging, safe haven, and diversification properties of Islamic indices, Bitcoin, and Gold. The study covered the US, Brazil, the UK, Italy, Spain, Germany, France, Russia, China and Malaysia. The results indicated that Islamic indices did not serve as hedging assets for conventional markets during the 2020 pandemic crisis. Gold, however, demonstrated strong hedging qualities in all countries except Brazil and Malaysia. Bitcoin emerged as a robust hedge in the US and acted as a strong hedge in the Chinese market.

Based on the literature reviewed, it is essential to study hedging assets such as Gold, Silver, and Platinum in the Middle East and North Africa (MENA) stock markets during the significant global events of the 2020 pandemic and the Russian invasion of Ukraine in 2022.

The study aimed to demonstrate valuable insights into how different assets function as hedges during heightened volatility and uncertainty. Therefore, this study examined whether precious metals such as Gold, Silver, and Platinum can be considered hedging assets to the stock markets of the MENA countries.

2. METHODS

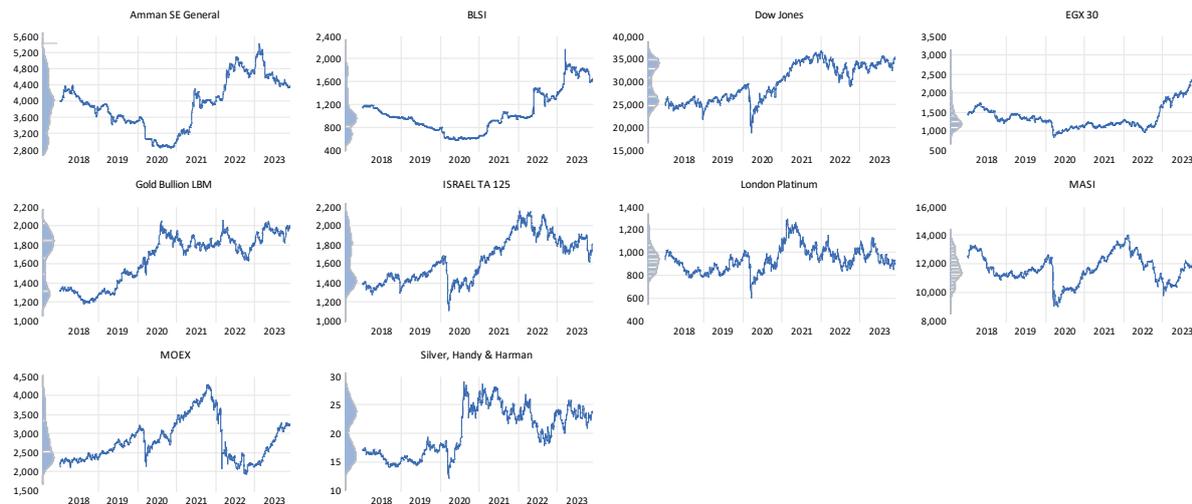
The sample data are the daily prices of the stock indices, Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), MOEX (Russia), and the precious metals markets, Gold Bullion LBM, Silver, Handy & Harman, London Platinum, from January 1, 2018 to November 23, 2023. To provide more robustness to the study and to have a method of comparison, the sample was divided into two sub-periods: Tranquil, which corresponds to the period from January 1, 2018 to January 31, 2019, while the sub-period incorporating the events of 2020 and 2022, referred to as

Stress, comprises the period from January 1, 2020 to November 23, 2023. The daily quotations are in local currency to minimize exchange rate distortions and have been retrieved from the Thomson Reuters Eikon database.

This study will be developed in different stages. Firstly, the levels' graphs will be presented to understand the fluctuations of the markets in question. To characterize the sample, the main measures of descriptive statistics and the Jarque and Bera (1980) adherence test will be used to assess whether the distributions are Gaussian. The unit root panel tests of Breitung (2000), Levin et al. (2002) will be used to validate the stationarity of the time series and to validate the results, the Dickey and Fuller (1981), Phillips and Perron (1988) tests with Fisher Chi-square transformation were used. The econometric model of Granger causality SVAR (Autoregressive Vector) will be used to answer the research question. SVAR is a statistical model used to analyze the causal relationship between variables in a multivariate time series scenario. The concept of Granger causality within a SVAR model is based on the idea that if the past values of one variable help to improve the prediction of another variable, then the first variable is considered a "Granger cause" of the second variable. For a better understanding of the model, the papers by Granger (1969) and Granger and Newbold (1974) are helpful.

3. RESULTS AND DISCUSSION

Figure 1 shows, in levels, the stock indices Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), MOEX (Russia), and the precious metals markets Gold Bullion LBM, Silver, Handy & Harman, and London Platinum, from January 1, 2018, to November 23, 2023. During the first half of 2020, there was a significant drop in the Stock, Silver, and Platinum markets. However, when looking at the fluctuation of gold prices, the trend was upward during the 2020 pandemic and downward during the Russian invasion of Ukraine in 2022. This downward trend in the stock markets during the 2020 pandemic is also confirmed by Dias et al. (2023), Chambino et al. (2023), and Dias, Horta, et al. (2023) for the international markets.



Note: Thomson Reuters Eikon: 1540 time data.

Figure 1. Evolution, in levels, of the fluctuations of the markets analyzed from January 1, 2018 to November 23, 2023

Tables 1 and 2 show the summary tables of the main descriptive statistics for the Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), MOEX (Russia) stock indices, and the precious metals Gold Bullion LBM, Silver, Handy & Harman, London Platinum, for the period from January 1, 2018 to November 23, 2023. Based on the results, it was found that all the indices had positive mean returns, with the exception being the MASI (-2.074e-05) and the Platinum market (-2.10e-05), while concerning the index with the greatest risk, it was found that the MOEX (0.0175) had the most significant deviation from the mean. To check whether these are Gaussian distributions, it is clear that the asymmetries are different from 0 (reference value), with the highest value in the BLSI market (6.175), the Jordanian market has positive asymmetries, to a lesser extent (0.177), and the other markets have negative asymmetries. Regarding kurtosis, it was

found to be higher than 3 (reference value), with the Lebanese market (BLSI) having the most significant statistic (165.447). The Jarque and Bera (1980) model was estimated to validate the evidence of asymmetry and kurtosis, corroborating the results so far, that is, was rejected at a significance level of 1%. These results were expected due to the presence of fat tails, i.e., extreme values, resulting from the 2020 and 2022 events. These results in the time series are also described by Vasco et al. (2021), Pardal et al. (2021), Guedes et al. (2022), Dias, Chambino et al. (2023), Dias, Horta, et al. (2023), and Dias, Alexandre, et al. (2023).

Table 3 shows the results of the panel unit root tests of Breitung (2000), Levin et al. (2002), and the validation tests of Dickey and Fuller (1981), Phillips and Perron (1988) with Fisher Chi-square transformation. The intersection of the tests is robust to the level of lag of each time series until it reaches equilibrium (mean zero and variance one).

Table 1. Summary statistics for the markets studied from January 1, 2018 to November 23, 2023

STATISTICS	AMMAN SE GENERAL	BLSI	DOW JONES	EGX 30	ISRAEL TA 125
Mean	5.38e-05	0.000228	0.000231	0.000478	0.000176
Standard Deviation	0.00661	0.01428	0.01278	0.01228	0.01093
Skewness	0.177	6.175	-0.950	-0.599	-0.756
Kurtosis	8.760	165.447	23.266	8.512	9.641
Jarque-Bera	2135.66	1701981.57	26569.018	2040.77	2974.87
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	1539	1539	1539	1539	1539

Note: The price indices were transformed into returns using the Neperian logarithm of first differences.

Table 2. Summary statistics for the markets analyzed from January 1, 2018 to November 23, 2023

STATISTICS	GOLD	PLATINUM	MASI	MOEX	SILVER
Mean	0.00027	-2.10e-05	-2.074e-05	0.00027	0.00021
Standard Deviation	0.0086	0.0170	0.0075	0.0175	0.0167
Skewness	-0.346	-0.445	-1.877	-7.915	-0.454
Kurtosis	7.149	8.406	30.171	199.234	9.0143
Jarque-Bera	1134.367	1924.019	48215.885	2483779.882	2370.897
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	1539	1539	1539	1539	1539

Note: The price indices were transformed into returns using the Neperian logarithm of first differences.

The results show that the time series have unit roots when estimating the original price series. The logarithmic transformation in first differences had to be performed to achieve stationarity, and the null hypothesis was rejected at a significance level of 1%.

To understand the impact on the connections between the stock markets of the MENA countries, the USA, Russia, and the precious metals markets, Gold, Silver, and Platinum, during the event of 2020 (COVID-19 pandemic crisis) and 2022 (armed conflict between Russia and Ukraine), the full period studied was divided into two sub-periods, Tranquil (January 1, 2018 to December 31, 2019) and Stress (January 1, 2020 to November 23, 2023). Starting by estimating the autoregressive vector, the first step is to rule out the possibility of autocorrelation in the serial residuals. Therefore, using the LR information criterion, it was possible to determine that for the Tranquil period, sequential modified LR test statistic (each test at 5% level) shows 8 days of lag for estimating the SVAR model. Figure 2 shows the results of the VAR Structural Residuals using Cholesky (d.f. adjusted) factors and shows that the test validates the absence of

autocorrelation with 9 days of lag, thus validating the VAR Lag Order Selection Criteria test at 8 lags.

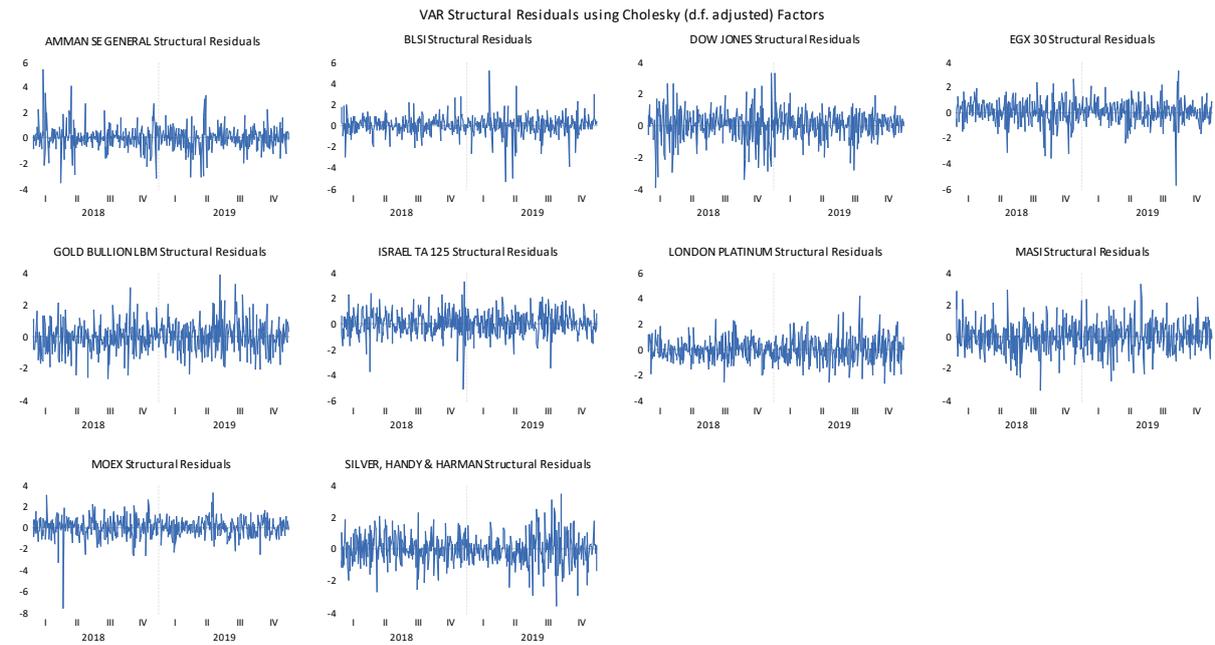
Table 4 shows the results of the VAR Granger Causality/Block Exogeneity Wald test for the Tranquil period for the Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), and MOEX (Russia) stock indices and the precious metals markets Gold Bullion LBM, Silver, Handy & Harman, London Platinum. The results indicate that of the 90 possible movements, 17 significantly impact their counterparties.

The Dow Jones index in the United States stands out as a key influencer, affecting the price formation of four stock indices (EGX 30, Israel, MOEX, and Gold). This suggests that the Dow Jones can be considered a hedge for the other markets. Gold, in turn, influences three markets (EGX 30, Israel, and Platinum), proving to be a hedge asset for the other markets. The Israeli market (TA 125) also acts as a hedge, influencing only the Dow Jones and Silver indices. Similarly, the MASI market influences precious metals (Gold and Silver), while the Silver market influences the EGX 30

Table 3. Summary table of the unit root tests for the markets analyzed from January 1, 2018 to November 23, 2023

Group unit root test: Summary				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-188.38	0	10	15358
Breitung t-stat	-92.43	0	10	15348
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-121.66	0	10	15358
ADF-Fisher Chi-square	2490.11	0	10	15358
PP-Fisher Chi-square	2633.91	0	10	15370

Note: The price indices were transformed into returns using the Neperian logarithm of first differences. ** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.



Note: * Indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

Figure 2. VAR structural residuals using Cholesky (d.f. adjusted) factors, for the Tranquil subperiod

and Platinum, demonstrating characteristics of a hedge asset with other markets.

The most robust markets with significant hedging characteristics are identified as the Jordanian market (Amman SE General), Egypt (EGX 30), Lebanon (BLSI), Russia (MOEX), and Platinum (London Platinum). Jordan only influences Lebanon, Egypt influences the Jordanian market, Russia influences the Silver market, and Platinum only influences the Gold market. The Lebanese market (BLSI) is considered a “complete market” in terms of coverage since it does not influence any of its peers. This implies that the Lebanese mar-

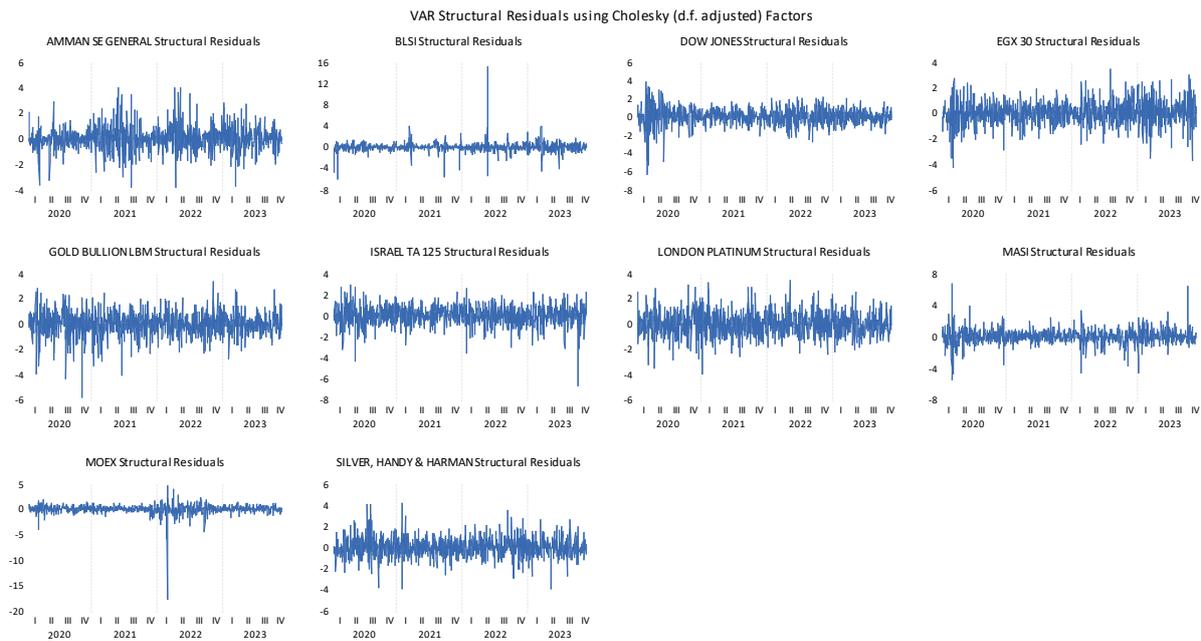
ket operates independently, without being significantly affected or influencing other markets during the tranquil period. In practical terms, these markets, and during this period of apparent calm in the international financial markets, have mostly proved to be significant hedging assets; therefore, these findings are relevant for portfolio managers operating in these markets.

Figure 3 shows the results of the VAR Structural Residuals using Cholesky (d.f. adjusted) factors at 11 lags and shows that the autocorrelation of the residuals is absent, a fundamental factor for a robust SVAR estimation. The LR information crite-

Table 4. Granger causality/Block Exogeneity Wald tests, Tranquil subperiod

	Dow Jones	Amman SE	BLSI	EGX 30	ISRAEL	MASI	MOEX	Gold	Silver	Platinum
Dow Jones	*****	0.82	0.71	0.81	2.49**	1.06	0.79	0.96	1.37	1.41
Amman SE	1.45	*****	1.41	2.44**	0.31	1.45	0.51	0.67	0.51	0.71
BLSI	0.66	2.36**	*****	1.13	0.97	0.24	0.70	1.11	0.79	1.36
EGX 30	1.91*	0.10	0.40	*****	0.98	1.08	0.60	1.69*	1.94*	1.03
ISRAEL	5.98***	0.87	1.68	1.09	*****	1.33	0.64	1.71*	1.36	1.09
MASI	0.29	0.44	1.46	0.59	1.11	*****	0.75	0.38	0.82	0.73
MOEX	3.46***	0.69	0.98	0.73	1.65	0.78	*****	0.94	0.83	1.53
Gold	2.06**	1.15	0.54	1.00	1.49	2.58***	1.24	*****	1.29	2.71***
Silver	1.93	0.84	1.13	0.66	1.89*	2.55***	1.71*	1.16	*****	1.07
Platinum	0.77	0.83	1.59	0.59	0.66	0.34	0.44	2.34**	3.92***	*****

Note: The markets in the column cause the markets in the row in the Grangerian sense. The asterisks ***, **, and * correspond to the significance levels of 1%, 5% and 10%, respectively.



Note: * Indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

Figure 3. VAR structural residuals using Cholesky (d.f. adjusted) factors, for the stress subperiod

ria: sequential modified LR test statistic (each test at 5% level) and FPE (Final prediction error) indicated that the best lag would be reached with a 10-day lag; hence, the SVAR was estimated with the same number of lags.

Table 5 shows the results of the VAR Granger Causality/Block Exogeneity Wald test for the Stress period, which includes the events of 2020 and 2022, for the Dow Jones (United States), Amman SE General (Jordan), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), and MOEX (Russia) stock indices and the Gold Bullion LBM, Silver, Handy & Harman, and London Platinum precious metals markets.

The results show 42 movements (out of a possible 90) that influenced the stock indices and the precious metals markets during this period of turbulence in the international financial markets. The comovements between these stock indices were significant, calling into question the hedging hypotheses.

The platinum market influences all markets except for the Jordanian market (8 out of a possible 9); the Dow Jones and MOEX stock markets also influence the price formation of their peers, the exception being the Jordanian (Amman SE General), and

Lebanese (BLSI) markets, which very significantly lost their hedging properties during the 2020 and 2022 events. MASI has also partially lost its hedging characteristics by influencing the prices of 6 markets, except the Jordanian and Lebanese markets and Silver, thus being considered a hedging asset for these markets. The Jordanian (Amman SE General), Egyptian (EGX 30), Israeli (TA 125), and precious metals Gold and Silver markets influence 4 of their peers. The Jordanian stock index influences the Dow Jones, BLSI, Gold, and Platinum markets, thus losing its hedging properties for these markets. The Egyptian index also influences the Dow Jones, BLSI, Silver, and Platinum markets and cannot be a safe haven for these markets in this global financial markets Stress period. The Israeli (TA 125) and Gold markets jointly influence the Dow Jones, EGX, MASI, and Platinum markets, thus losing the hedging characteristics with these markets. The Silver market also significantly influences the Dow Jones, EGX, Gold, and Platinum markets and is considered a hedging asset for the other markets.

As in the Tranquil period, the Lebanese market (BLSI) is considered a “broad market” in terms of hedging, indicating that it operates independently, without exerting influence or being significantly affected by other markets during the tranquil pe-

Table 5. Granger causality/Block Exogeneity Wald tests, stress subperiod

	Dow Jones	Amman SE	BLSI	EGX 30	ISRAEL	MASI	MOEX	Gold	Silver	Platinum
Dow Jones	****	1.98**	0.63	3.43***	3.72***	5.12***	2.02**	2.73***	2.45***	3.37***
Amman SE	0.80	****	0.50	0.73	1.59	0.84	1.51	0.41	0.66	0.66
BLSI	0.88	1.65*	****	0.41	0.41	0.90	1.32	0.42	0.92	1.74*
EGX 30	4.62***	0.86	0.68	****	2.85***	2.84***	1.71*	1.68*	2.30*	3.16***
ISRAEL	7.72***	1.02	0.81	0.60	****	3.89***	1.98**	1.39	1.15	2.37***
MASI	3.36***	1.39	0.24	2.21**	4.28***	****	4.27***	1.69*	0.86	1.61*
MOEX	3.79***	0.54	1.15	0.79	0.74	2.33**	****	1.25	1.05	1.84**
Gold	2.35***	1.98**	1.48	1.36	0.31	2.25**	2.77***	****	2.29**	2.73***
Silver	2.56***	1.36	1.21	1.66*	1.44	1.14	2.01**	0.98	****	1.64*
Platinum	4.78***	2.11**	0.61	2.27**	3.48***	2.06**	2.61***	4.39***	6.78***	****

Note: The markets in the column cause the markets in the row in the Grangerian sense. The asterisks ***, **, and * correspond to the significance levels of 1%, 5% and 10%, respectively.

riods and the 2020 and 2022 events. This independence highlights a distinct characteristic of the Lebanese market, suggesting that its dynamics are less intertwined with that of its peers during the specified periods. Investors and analysts can interpret this independence when considering market behavior in the context of broader economic and financial trends.

When comparing the two sub-periods, it was found that the influence movements between these indices increased from 17 to 42 movements (out of a possible 90), which shows that the interdependence between these indices increased significantly. The Dow Jones stock index went from 4 influences to 7, thus losing part of its hedging characteristics. In the Tranquil period, the Amman SE General market only influenced the BLSI and now influences the Dow Jones (United States), the BLSI (Lebanon) markets, and the Gold and Platinum precious metals markets. The EGX 30 stock index, which during the calm period in the international financial markets only influenced the Amman SE General, during the period of stress began to influence the Dow Jones, MASI, Silver, and Platinum, no longer being a hedge for these markets. During the Tranquil period, the ISRAEL TA 125 market only influenced the Dow Jones and Silver. During the 2020 and 2022 events, it began to influence the price formation of the Dow Jones, EGX 30, MASI, and Platinum markets, thus ceasing to be a hedging asset for these markets. The MASI (Morocco), during the Tranquil period, only influenced Gold and Silver and now influences the Dow Jones (United States), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MOEX (Russia) stock indices, and the Silver, Handy & Harman,

London Platinum precious metals markets, thus losing its hedging properties with these markets very significantly. During the Tranquil period, the MOEX stock index (Russia) only influenced the Silver market. During the 2020 and 2022 events, it began to influence the price formation of the Dow Jones (United States), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), and the Gold, Silver, and Platinum precious metals markets, also losing its characteristics as a hedging asset. During the Tranquil period, the Gold Bullion LBM market influenced the prices of EGX 30, ISRAEL TA 125, and London Platinum indices. During the Stress period, it began to influence the Dow Jones and MASI. Concerning the EGX 30 and Platinum markets, it maintained this influence. During the calm period, the Silver, Handy & Harman market influenced the EGX 30 and London Platinum markets; during the period of turbulence, it influenced the price formation of the Dow Jones and Gold Bullion LBM markets; regarding the EGX 30 and Platinum indices, it maintained this influence and cannot be considered a hedge for these markets. The precious metal London Platinum only influenced Gold Bullion during the Tranquil period and went on to influence the Dow Jones (United States), BLSI (Lebanon), EGX 30 (Egypt), ISRAEL TA 125 (Israel), MASI (Morocco), MOEX (Russia), Gold Bullion LBM, Silver, Handy & Harman markets, being the market that lost the most hedging properties between the Tranquil and Stress periods. The BLSI (Lebanon) market proved to be a total hedging asset during the two sub-periods, showing that it is an isolated market compared to its regional or international peers, with no distinct behavior. Overall, it is evident that assets that do not exhibit “hedging” properties are not considered a good place to place mon-

Table 6. Summary table of the Granger causality/Block Exogeneity Wald tests for the tranquil and stress subperiods

Markets	Tranquil	Stress	Evolution
Dow Jones	4/9 possible	7/9 possible	+
Amman SE General	1/9 possible	4/9 possible	+
BLSI	0/9 possible	0/9 possible	=
EGX 30	1/9 possible	4/9 possible	+
ISRAEL TA 125	2/9 possible	4/9 possible	+
MASI	2/9 possible	6/9 possible	+
MOEX	1/9 possible	7/9 possible	+
Gold Bullion LBM	3/9 possible	4/9 possible	+
Silver, Handy & Harman	2/9 possible	4/9 possible	+
London Platinum	1/9 possible	8/9 possible	+

ey in times of uncertainty in the global economy. The lack of these properties implies that the value of such assets may be more susceptible to market volatility during these periods, making them less attractive for portfolio diversification. The results of

not displaying hedging properties have significant implications for investment strategies, as investors may have to reassess their portfolio composition and look for alternative assets to provide stability during periods of uncertainty (see Table 6).

CONCLUSION

The study aimed to verify whether Gold, Silver, and Platinum can serve as effective hedging assets for investors in the MENA region, thus allowing them to rebalance their portfolios during market uncertainties. The US and Russian stock markets were also examined. The study used the structural vector autoregressive (SVAR) methodology to analyze the influence of these markets on each other's price formations, providing information on their interconnected dynamics.

To conclude, based on the results, assets with hedging properties are crucial for portfolio diversification, especially during economic uncertainty. The BLSI market in Lebanon emerged as a consistent hedging asset, showing isolated behavior compared to its regional and international counterparts. In contrast, other assets, such as the London Platinum market, have shown a significant loss of hedging properties during periods of Stress. The implications of assets without hedging properties are substantial for investment strategies. Investors may need to re-evaluate their portfolios and look for alternative assets that offer stability during uncertain economic times. The study highlights the importance of understanding the evolution of interconnections between different markets and the role of precious metals as potential hedges in times of global financial turmoil.

AUTHOR CONTRIBUTIONS

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