EVALUATING THE EFFECT OF COVID-19 ON MAJOR WORLD INDICES: IN RELATION TO GOLD, SILVER, CRUDE OIL, AND BITCOIN

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ABSTRACT

Purpose – *This research paper estimates the impact of COVID-19 pandemic on leading world indices. The study also measures the degree of association between Gold, Silver, Crude Oil, and Bitcoin with the Major World Indices during COVID-19.*

Design/methodology/approach –*The major indices taken for the research are from America, Europe, the Middle East, Africa, and the Asia-Pacific region. Researchers have conducted research on impact of Major World Indices on the Gold, Silver, Crude Oil and Bitcoin during COVID 19. For defining the relationship, Panel Regression with random effect model is used by the researchers.*

Findings – *It was concluded that the consequences of the pandemic disease are significant, and they have had a direct impact on global stock markets and global commodities but they can also provide an opportunity to hedge and invest after better understanding of the relationship between them. It was also established that the impact can be positive as well as negative during waves, which gives an indication of the performance of indices during this pandemic.*

Practical implications – *Several implications can be drawn in light of these findings. Risk officers, regulators, fund managers, qualified institutional buyers, foreign institutional investors and HNIs may be interested in the study's findings. Investors, who suffer huge losses as a result of COVID, should take note of the study's conclusions.*

Originality/value – *The relationship between the impact of the COVID-19 pandemic on leading world indices, crude oil, gold, and silver has been analyzed using a rich sample of world's leading indices. Proposed model can be the outcome of the study.*

Keywords: Covid 19, World Indices, Gold, Event study methodology, Silver, Crude oil.

INTRODUCTION

The Primary case of pneumonia of unknown etiology (unknown cause) later termed as the Covid 19 pandemic was detected in Wuhan, China, and was reported on December 31st, 2019, by the World Health Organization (World Health Organization, 2020). In January 2020, the coronavirus began to spread in the other territories of China due to the carnival of the New Year of China, which led to a blowout across the nation later. The government in China declared a total travel ban for all residents during January 2020, which was still not sufficient to contain the spread of the virus. On January 30, 2020, the World Health Organization (WHO) declared a worldwide emergency due to the dispersion of coronavirus. It was the 6th time that such a global health crisis has been declared, which included recent years' outbreak of Zika virus and Ebola virus in the African continent. The research from China said that the infection originated from unknown coronaviruses that cause both the Severe Acute Respiratory Disorder (SARS) virus and Middle East Respiratory Syndrome (MERS). The COVID-19 may show symptoms inside as few as 2 days or if 14 days after the close contact with an infected individual, which made it difficult to affirm and control it during the early stages.

On March 11, 2020, WHO classified the virus spread as a severe threat to global level pandemic, due to the death

rates and communicability (I-I Portfolio, Landmark Works, 2020) (Sohrabi, et al., 2020). By the end of March 2020, the WHO urged nations to come together and launch the Solidarity Trials for developing the treatments of Covid- 19 diseases that includes many European countries along with Bahrain, South Africa, Argentina, Iran, Canada, and Thailand. (Ravelo & Jerving, 2020). On 23rd March 2020 during the G-20 countries' finance ministers met through the conference calls, where the World Bank president suggested providing debt relief to low-income countries so that they can focus on the structural reforms including removing the hurdles in getting subsidies, trade protection, excessive regulation, etc. According to the Asian Development Bank, the total economic impact of the COVID-19 pandemic can be between $2-$4 trillion (Ravelo & Jerving, 2020). For China, alone the economic losses can be to the tune of $93 billion to $200 billion, by the end of 2020 (Jin et al., 2021).

As rightly predicted by researchers, there was significant damage to the economy, financial institutions, and financial markets due to Covid-19 pandemic (Goodell, 2020); (Yousf, et al. 2021). According to the study conducted by Burns, et al. (2011), & Lu, et al. (2012) the worldwide stock market was influenced by the investor's perception and sentiment. When the market moved northward, and it looked that the risk was not significant and it appeared that the risk was not only significant then the investors are more positive about the investment, but also investors would wait for the upward movement of the investment if the market were moving southward continuously. In this kind of situation, the investors would always overreact in the short term. Researcher Shu (2010) explained that the movement of the stock market is affected by the investor's behavior of investment. This study defined how investors' sentiments affect the return of the portfolio. Researcher Barber, Odean (2005), Del Giudice, Paltrinieri (2017), Engelberg, and Parsons (2011) proposed that the news of the unpredicted events would always impact the perception of the investor, more articles and news publish, and more would be the withdrawal from the financial market. Siddiqui (2009) opined that decisions about the asset allocation globally by the global investor was always dependent on the global economic condition and the policies because after globalization the economies of different countries were interdependent on each other.

Researchers In, Kim, and Yoon (2010) examined that the Asian stock markets were interlinked, which was witnessed during the financial crisis also except the countries like Malaysia. Therefore, the linkage between the country's stock market in terms of movement was the same. But few markets looked more correlated with each other. Lee and McKibbin's (2004) studied that Globalization plays a very positive role in the global economies even during this pandemic. We have seen that over the past several decades, N number of infectious diseases have spread across the world such as Zika virus, SARS, Nipah virus, MERS, avian flu, Rift valley fever, etc. These kinds of diseases not only affect the health of the people, but it affects the health of the nation also. It affects the GDP, Export, Import, Per Capita Income, etc. During this pandemic, many countries' economies suffer due to lockdowns, which affect businesses all over the world and lead to a slowdown in the economy (Sharif, 2020). A company's market capitalization is deteriorated; the volume of trade comes down, and evens a challenge for the survival of livelihood. There is an increase in the global financial market risks due to the responses given by various governments towards handling pandemic. This has an impact on individual investor's stock market reactions. The individual investor's stock market reactions are clearly linked to the severity of the outbreak of pandemic in each country (Zhang, Hu, & Ji, 2020). Researcher's Kaplanski, and Levy (2010), recommend that because of the anxiety and pressure on the individual during a pandemic even the optimistic investor could convert as pessimistic and could be more risk averse. This leads to moving outside the investment psychology and further deteriorates the return of the financial products.

The abnormal circumstance created by COVID-19 offers us an opportunity to survey the pandemic impact of the first wave and second wave on the worldwide indices of affected countries due to an unexpected and dreaded infection. According to (O'Donnell, Shannon, & Sheehan, 2021), the daily total count of Covid-19 cases had a significant influence on equity indices. This study has controlled the other variables like investor sentiment, counterparty credit risk, liquidity risk, safe- haven asset demand, and the price of oil (O'Donnell, Shannon, & Sheehan, 2021).

The objective of this research paper is to measure the impact of the of covid 19 on major world indices from the countries viz., America, Europe, the Middle East, Africa, and the Asia Pacific region. The study also documents the degree of association between Gold, Silver, Crude Oil, and Bitcoin with the Major World Indices during COVID-19. 6 global market indices have been taken for the research. The timeline of the coronavirus outbreak as a first wave and second wave were taken from the websites of WHO and devex.com. The first wave starts from 1st January 2020 to 30th September 2020 and the second wave starts from 1st October 2020 to 30th June 2021. So, for both the waves, data of 9

months for each wave have been taken for the research. Historical data of Indices have been taken from the website: finance.yahoo.com for the research.

The paper is presented in the following sections. After introduction the literature related to the study is discussed in detail. In the third section deals with research methodology. In the fourth section deals with data analysis and interpretation. Last section concludes the whole gamut of discussion.

REVIEW OF LITERATURE

There is a significant impact of COVID 19 on the stock market of different countries and it is necessary to study its relations with the world economy. Due to the global spread of the pandemic, there was a wide impact on various world economies. Within the first 100 days during Covid-19 pandemic, the investors lost nearly 30% of wealth off various indices (Ali, Alam, & Rizvi, 2020). Few previous empirical studies have explained about the impact of COVID 19 on the stock market or indices of emerging and developed economies individually. Widespread review of literature suggested that there are diverse outcomes related to Covid 19 and its impact on the stock market.

Becker (2020) observed that there is a sharp decline in the prices of oil i.e. approximately 80%. It hampered the revenue of the economy badly and was more critical than the US subprime crisis 2008. Researchers also found the enormous gap between the sharp declines in the oil prices of around 80% and declines in the exchange rate of around 20%. Herfero (2020) explained that the business ventures in the emerging economies were hit hard during the 3rd wave of covid pandemic. Because of the unexpected spread of pandemic all over the world, investors of emerging economies have changed their way of investing in financial instruments. Pandemic taught investors to be more risk averse about their investments. Due to the reliance of Latin America on external financing, the region was affected significantly during pandemic. Import and export have fallen because of the restriction on the mobility from one country to another and global supply chains were frozen. Tourism sector faced a lot of challenges because of the restrictions imposed internationally. Hyun- Jung (2020) has conducted a study on the South Korean stock market, and found that exports declined in the month of January, moving northward in February, and again falling in March and June 2020. There was a dip in exports in comparison to the previous year of around 11.20 %. Authors said that the Korean stock market faced huge ups and downs during the pandemic. Investor's higher trust in government's action during the fight against COVID-19 pandemic has reduced the uncertainty in the stock market (Engelhardt, Krause, Neukirchen, & Posch, 2021). The government's stimulus packages, lockdown policies, and travel bans had an impact on the stock returns during the lockdown (Narayan, et al. 2021). Ravi (2020) has conducted research on the Indian stock market by comparison between Pre-covid and during Covid period. Before January 2020, it was found out that, NSE and BSE have touched the highest level of 12362 and 42273 and suggested that indices are in a mood of generating higher returns but after January 2020, both the indices have shown sharp fall by around 38 percent. Some sectors like Hospitality, Tourism, and Transport have been drowned by more than 40 percent because of the restriction imposed by the international community. Mondal (2020) has expressed the bloodbath of the Indian stock market during the beginning of the pandemic phase. The author's findings says that Sensex have observed a single day biggest fall around 13.2 percent during covid which was even much bigger than the decline on April 28, 1992. The Nifty also faced a sharp decline of 29%, which surpassed the tragedy of 1992. Shezad et al. (2020) led research to examine the nonlinear pattern of the stock market of China, Japan, US, and Italy by using the methodology of the GARCH model. This study explains that there was inconsequential impact on the Nasdaq Composite Index and reveals that covid affects the stock returns of Standard & Poor 500 index. Cepoi (2020) studied the effect of covid related news on the stock market of various countries. Author has used panel quantile regression and found that there was an asymmetry in the covid news and stock market performance. Nippani and Washer (2004) investigated the impact of SARS coronavirus on China and Canada. They emphasized more on the region of Indonesia, China, Singapore, Philippines, Vietnam, Thailand, and Hong Kong and concluded that it affects only the stock market of Vietnam and China. Del and Paltrinieri (2017) conducted research on 78 equity mutual fund schemes spread across Africa for understanding of changes in volumes and performance during the period between 2006 to 2015. Fund flows and the performance of mutual fund schemes was badly affected by the Ebola virus and Arab spring. Wang, Yang, and Chen (2013) advised that the return of biotechnology stocks in Taiwan have been severely affected by the infectious disease (Ichev, 2018). Ye Bai (2014) & Baker, Wurgler, and Yuan (2012) investigated that due to the

communicable disease disaster, stock market investors can be more risk averse while selecting stocks for investment and also shedding off the stocks from their existing portfolio.

Several studies have also explained that the stock market and different crises are interrelated to each other. Also suggested that there will be a deep impact of the crisis on the stock market.

Chiang, Nam, & Li (2007) observed that during the period between 1996 to 2003, volatility in the stock returns of nine Asian countries and found high correlation between the crisis and the sample Asian stock market. Morales and Callaghan (2012) explained stock markets globally are interlinked. Crisis in one country can affect the stock market of another country. There is a presence of correlation in the stock market of countries. Donadelli, Kizys & Riedel (2016) observed that a crisis related to infectious disease could negatively affect the perception of investors about the investment, which may lead to downfall in the stock prices. Zouaoui, Nouyrigat, & Beer (2011) concluded that countries where the investors react on the voice of others, countries where the institutions are not much participated in the investment, effect of investor perception or sentiment is more noticeable on the stock market indices. Awadhi, Saifi, Awadhi, & Alhamadi (2020) suggested that there is an impact of contagious infection on the stock market returns. Researchers also suggested that there is a significant negative impact across all the companies in the stock market due to Covid 19 related deaths & total confirmed cases. Ashraf (2020) examined the impact of covid 19 on the stock market. The study used the data of 64 countries for the period between 22 January 2020 to 17 April 2020 and concluded that stock market reacts negatively to the growth in the cases of covid 19 pandemic. The study also observes that as the changes in covid cases happen accordingly returns in the stock market varies. Ramelli, et al. (2020) found the amplified effect on the financials of the companies in the different areas of the world i.e., China, US and Europe because of covid 19 health crisis.

Summarising the literature, it is observed that there are few studies related to impact of covid specific indices and there are few studies related to impact of covid on Gold, Bitcoin etc. For example, studies by Al- Awadhi et al (2020) and Ali et al (2020) are based on impact of covid on Indian stock market. A study by AL Samman et al (20210 is based on impact of covid on GCC countries. Also, a study by Goodell and Goutte (2021) is based on movement of covid and Bitcoin. However, this is a comprehensive study based on the impact of the of covid 19 on six major world indices. The study also measures the degree of association between Gold, Silver, Crude Oil, and Bitcoin with the Major World Indices during COVID-19.

RESEARCH METHODOLOGY

In this research paper, we have conducted research on how pandemic covid 19 affects the major stock market indices of different countries, like America, Europe, the Middle East, Africa, and the Asia Pacific region. Gold, Crude Oil, Silver and Bitcoin in USD were also taken for the research to provide a comparative analysis of the global market indices. 06 global market indices have been taken for the research. For the purpose of the study the stock indices in Table 1 were considered. They mostly represent the indices of the stock market of the countries which were affected due to COVID-19 outbreak.

Table 1 WORLD INDICES, COMMODITIES AND BULLION DATA		
Stock Indices	Abbreviation	Country
Nikkei index	NIKKEI	Japan
Russell 2000	RUSSELL	United Kingdom
Hang Seng Index	HANGSENG	Hong Kong
Jakarta Composite Index	JAKARTA	Indonesia
Nifty 50	NIFTY	India
Kospi Composite Index	KOSPI	Korea
Crude Oil Futures	CRUDE	United States
Gold Futures	GOLD	United States
Silver Futures	SILVER	United States
Bitcoin USD	BITCOIN	N.A.

The data was collected from www.finance.yahoo.com (website), which records the performance of all the stock indices around the world daily. The data was collected between 1st January 2020 and 30th September 2020 for the first wave and 1st October 2020 and 30th June 2021 for the second wave. The Covid-19's impact on financial markets and other world indices was evident. In the beginning it negatively affected the financial markets and indices (O'Donnell, Shannon, & Sheehan, 2021). The focus of the study was to analyze the impact of various world indices on the prices of crude, gold, silver, and bitcoin. The method employed for the purpose of the study was Panel data analysis (Yaffee, 2003). Panel data also referred to as longitudinal or cross-sectional time series data is used when the behaviour of the entities is observed across time (Wooldridge, 2010) (Bayrakdaroglu, et al., 2013).

Data Analysis & Interpretation

Descriptive statistics results are stated in table 2. The Paired T-test is used to test the significance of the results and strengthen the robustness of the study. Moreover, it helps in understanding if there are any significant differences between the price of stock indices and that of crude, gold, silver and bitcoin. The results of the descriptive statistics are mentioned in table 2.

Table 2
DESCRIPTIVE STATISTICS

	NIKKEI	RUSSELL	HANGSENG	JAKARTA	NIFTY	KOSPI	CRUDE	GOLD	SILVER	BITCOIN
Mean	24945.4	1774.23	26609.07	5573.276	12479.14	2540.622	47.653	1783.392	22.749	22804.05
Median	23827.73	1681.92	26451.54	5797.6	12129.5	2395.9	46.78	1798.7	24.58	11779.77
Maximum	30467.75	2360.17	31084.94	6435.21	15869.25	3301.89	74.05	2051.5	29.4	63503.46
Minimum	16552.83	991.16	21696.13	3937.63	7610.25	1457.64	10.01	1477.3	11.73	4970.79
Standard Deviation	3457.43	370.099	2079.303	608.277	2094.265	479.131	13.273	123.477	4.487	17367.02
Skewness	-0.159	0.0348	-0.0226	-0.4491	-0.1738	0.071	-0.2506	-0.471	-0.589	0.89391
Kurtosis	2.0701	1.8155	1.892	2.022	2.013	1.7609	2..825	2.452	1.907	2.306
Jarque Bera	0.0048	4.2e-04	0.0011	5.9e-05	0.0024	1.9e-04	0.2112	0.0014	6.4e-07	1.5e-09
Probability	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observation	264	264	264	264	264	264	264	264	264	264

All the data has been converted into their log return form $[\ln(Y_t/Y_{(t-1)})]$; where Y_t is the exchange rate or the stock indices at the day t. This was done in order to have better elasticity and to reduce the effect of multicollinearity. The study tries to examine the impact of exchange rate on stock indices using the either panel fixed effects or random effects model with the help of Hausman's test. Correlation is used to identify the trend of the stock indices which strengthen the robustness.

Table 3
CORRELATION AND MATRIX OF CORRELATIONS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NIKKEI	1.000									
RUSSELL	0.983	1.000								
HANGSENG	0.867	0.889	1.000							
JAKARTA	0.846	0.863	0.922	1.000						
NIFTY	0.966	0.982	0.889	0.887	1.000					
KOSPI	0.975	0.974	0.823	0.786	0.961	1.000				

CRUDE	0.854	0.891	0.879	0.867	0.898	0.825	1.000			
GOLD	0.311	0.247	-0.037	-0.009	0.269	0.394	0.048	1.000		
SILVER	0.790	0.762	0.526	0.547	0.777	0.830	0.608	0.765	1.000	
BITCOIN	0.885	0.893	0.776	0.677	0.838	0.885	0.736	0.154	0.648	1.000

As per the table 3, NIKKEI is strong positively correlated to crude (0.854), silver (0.790) and Bitcoin (0.885) and weak positively correlated to gold (0.311). RUSSELL is strong positively correlated to crude (0.891), silver (0.762) and bitcoin (0.893) while gold (0.247) is weak positively correlated. HANGSENG is strong positively correlated to crude (0.879) and bitcoin (0.776). While silver is moderate (0.526) positively correlated while gold is weak negatively (-0.037) correlated. JAKARTA has strong positively correlated to crude (0.867) and bitcoin (0.677), while silver (0.547) is moderate positively correlated and gold (-0.009) is weak negatively correlated. NIFTY is strong positively correlated to crude (0.898), silver (0.777) and bitcoin (0.838), while gold (0.269) is weak positively correlated. KOSPI is strong positively correlated to crude (0.825), silver (0.830), bitcoin (0.885) while gold is weak positively correlated.

Interpretation

As the prices of NIKKEI increases the prices of the crude, silver and bitcoin increases instantaneously while prices of gold may not rise instantaneously. As the prices of the RUSSELL increase the prices of crude, silver and bitcoin also change while prices of gold do not change drastically as the prices of HANGSENG increases crude and bitcoin prices change drastically, while silver changes at a steady rate and gold changes at a slower pace. As the prices of JAKARTA increases crude and bitcoin rises immediately, while silver prices moderately. As the prices of JAKARTA rise gold prices decreases slowly. As the prices of NIFTY increases, price of crude, silver and bitcoin increases immediately, while silver prices change slowly. As the prices of KOSPI increases, crude, silver and bitcoin increase immediately while gold prices rise slowly.

Panel Regression

Earlier studies confirm that panel regression with time fixed effects can be used for panel inference (Imai and Kim, 2021) (Allison, 2019). Initially the panel regression was carried out using both fixed effect model and random effect model. To decide the suitable model for the purpose of the study Hausman test was used. Hausman test checks whether unique errors (ui) are correlated with the regressor (Amini et al, 2012).

Fixed effect model is used when one needs to analyze the impact of variable that vary over time (Clark and Linzer, 2015). It explores the relationship between predictor and outcome variable within entity.
The equation for fixed effect model can be denoted as,

- $Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it}$ Where,
- α_i (i=1....n) is the unknown intercept for each entity (n entity-specific intercepts).
- Y_{it} is the dependent variable (DV) where i = entity and t = time.
- X_{it} represents one independent variable (IV),
- β_1 is the coefficient for that IV,
- u_{it} is the error term

Random effect model is used when the variation across the entities is assumed to be random and uncorrelated with the predictor or independent variable included in the model (Bell et al, 2019).

The equation for random effect model can be denoted as $Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it}$

Where,

- α_i (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).
- Y_{it} is the dependent variable (DV) where i = entity and t = time.
- X_{it} represents one independent variable (IV),
- β_1 is the coefficient for that IV,
- u_{it} is the between entity error term
- ε_{it} is the within entity error term

Based on the results of Hausman test, random effect model was used for the study (Al Samman, 2021). The results for Hausman test can be found in table 4.

Table 4 RESULTS FOR HAUSMAN TEST			
	Chi2	V_b-V_B	p
Crude	6	1.49	0.9599
Gold	6	0.45	0.9983
Silver	6	0.00	1.0000
Bitcoin	6	0.02	1.0000

As per the Hausman test the null hypothesis states that the preferred model is random effect while the alternative hypothesis states as the preferred model as fixed effect.

As per table 4, the p value for crude, gold, silver, bitcoin > 0.05. Thus, the null hypothesis is accepted, and the random effect model is chosen Tables 5-8.

Panel Regression, Random Effect Model

Table 5 REGRESSION RESULTS 1							
Log_CRUDE	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log_NIKKEI	.52	.44	1.18	.237	-.343	1.384	
Log_RUSSELL	-.329	.21	-1.57	.116	-.74	.081	
Log_HANGSENG	.168	.442	0.38	.703	-.698	1.035	
Log_JAKARTA	1.045	.364	2.87	.004	.331	1.759	***
Log_NIFTY	-.773	.348	-2.22	.026	-1.456	-.091	**
Log_KOSPI	-.243	.433	-0.56	.575	-1.091	.605	
Constant	.002	.005	0.42	.673	-.007	.011	
Mean dependent var	0.001		SD dependent var	0.073			
Overall r-squared	0.054		Number of obs	264			
Chi-square	14.743		Prob > chi2	0.022			
R-squared within	0.054		R-squared between	1.000			

***p<0.01, **p<0.05, *p<0.1.

The panel data analysis with fixed effect model for crude indicates that the model was significant (0.022) < 0.05. With R2 explaining the variance of the model by 5.4%. Only Jakarta (0.004) and Nifty (0.026) was found to be significant while other stock indices were found to be insignificant.

Interpretation

Only Jakarta and NIFTY stock indices were found to be significant. In case of Jakarta the average effect of Jakarta over crude is 1.045 when Jakarta changes by one unit. i.e., if Jakarta will 1.045 then there will increase in one unit in crude price. In case of Nifty the average effect of NIFTY over crude is – 0.773 when NIFTY changes by one unit. i.e., if NIFTY falls by 0.773 then there will be an increase in one-unit in crude price.

Table 6 REGRESSION RESULTS 2							
Log_GOLD	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log_NIKKEI	.043	.096	0.45	.653	-.144	.23	
Log_RUSSELL	-.035	.045	-0.77	.444	-.124	.054	
Log_HANGSEN G	.075	.096	0.78	.433	-.113	.263	
Log_JAKARTA	.1	.079	1.26	.207	-.055	.254	
Log_NIFTY	-.087	.076	-1.16	.248	-.235	.061	
Log_KOSPI	-.048	.094	-0.51	.607	-.232	.136	
Constant	.001	.001	0.65	.516	-.001	.003	
Mean dependent var	0.000	SD dependent var			0.016		
Overall r-squared	0.013	Number of obs			264		
Chi-square	3.395	Prob > chi2			0.758		
R-squared within	0.013	R-squared between			1.000		

*** p<.01, ** p<.05, * p<.1

The panel data analysis with fixed effect model for gold was found to be insignificant (0.758) < 0.05. The R2 was found to explain 1.3% of the variance for the model. All the stock indices were found to be insignificant.

Interpretation

The stock indices are found to be insignificant in case when gold is the dependent variable.

Table 7 REGRESSION RESULTS 3							
Log_SILVER	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log_NIKKEI	.375	195	1.92	.054	-.007	.757	*
Log_RUSSELL	.127	093	1.37	.17	-.054	.309	
Log_HANGSEN G	.121	196	0.62	.535	-.262	.505	
Log_JAKARTA	.205	161	1.27	.204	-.111	.521	
Log_NIFTY	-.243	154	-1.57	.115	-.545	.059	
Log_KOSPI	-.122	192	-0.64	.523	-.498	.253	
Constant	.001	002	0.68	.499	-.003	.005	
Mean dependent var	0.001	SD dependent var		0.033			
Overall r-squared	0.058	Number of obs		264			
Chi-square	15.909	Prob > chi2		0.014			

R-squared within	0.058		R-squared between	1.000		
*** p<0.01, ** p<0.05, * p<0.1						

The panel data analysis with fixed effect model for silver was found to be significant (0.014) < 0.05. The R2 was found to explain 5.8% variance of all the variables of the model. Only Nikkei stock indices were found to be significant while other stock indices were found to be insignificant.

Interpretation

Only Nikkei was found to be significant. In the case of Nikkei the average effect of NIKKEI over silver is 0.375 when NIKKEI changes by one unit. i.e., if NIKKEI increases by 0.375 then there will be an increase in one-unit silver price.

Table 8
REGRESSION RESULTS 4

Log_BITCOIN	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log_NIKKEI	.926	341	2.72	.007	.259	1.594	***
Log_RUSSELL	.462	162	2.85	.004	.145	.78	***
Log_HANGSENG	.086	342	0.25	.802	-.584	.756	
Log_JAKARTA	-.006	282	-0.02	.983	-.558	.546	
Log_NIFTY	.347	269	1.29	.197	-.181	.875	
Log_KOSPI	-.654	335	-1.95	.051	-1.31	.002	*
Constant	.005	003	1.42	.156	-.002	.012	
Mean dependent var	0.006		SD dependent var	0.059			
Overall r-squared	0.129		Number of obs	264			
Chi-square	37.905		Prob > chi2	0.000			
R-squared within	0.128		R-squared between	1.000			
*** p<.01, ** p<.05, * p<.1							

The panel data analysis with fixed effect model for bitcoin was found to be significant (0.000) <0.05. The R2 was found to explain 12.8% of variance of the entire variable. Nikkei, Russell and Kospi were found to be significant while other stock indices were found to be insignificant.

Interpretation

Russell, Nikkei and Kopsi were found to be significant. In the case of Nikkei the average effect of NIKKEI over bitcoin is – 0.926 when NIKKEI changes by one unit. i.e., if NIKKEI increases by 0.926 then there will be an increase in one-unit BITCOIN price. In the case of Russell the average effect of RUSSELL over bitcoin is 0.462 when RUSSSELL changes by one unit. i.e., if RUSSELL increases by 0.462 then there will be an increase in one-unit bitcoin price. In the case of Kospi the average effect of KOSPI over bitcoin is – 0.654 when KOSPI changes by one unit. i.e., if KOSPI falls by 0.654 then there will be an increase in the one-unit bitcoin price.

CONCLUSION

The Covid-19 pandemic has provided the opportunity to identify the impact of Covid -19 pandemic on the major stock indices and also find the relationship between the major world indices with the Bullions, Crude, and Bitcoin.

Employing the random effect model, the study delved into the associations between stock indices and prominent commodities like crude oil, silver, gold, and bitcoin. The Jakarta Composite Index and NIFTY are significantly influenced by crude oil. There exists a negative correlation between NIFTY and crude oil, whereby a decrease in NIFTY results in an increase in crude oil prices. This information can be leveraged by the fund manager to hedge the overall portfolio of the index. In relation to GOLD, researchers have discovered no discernible correlation with other global indices. However, when examining the association with silver, they observed a significant relationship solely with the NIKKEI index. Conversely, Bitcoin has a noteworthy influence on the NIKKEI, RUSSELL, and KOSPI indexes. Notably, the NIKKEI and RUSSELL exhibit a positive impact, while the KOSPI demonstrates a negative impact.

The implications of our findings hold significant value for international investors. For instance, these investors can monitor the co-movements between metal markets (such as Gold and Silver) and other commodities (like crude oil, bitcoin, etc.), allowing them to adapt their strategies effectively to maximize returns on investment or minimize potential losses. Global investors, such as QIBs (Qualified Institutional Buyers) and FIIs (Foreign Institutional Investors), have the opportunity to make informed decisions when the NIKKEI exhibits an upward trend. Simultaneously, they can consider investing in BITCOIN. Additionally, during a pandemic crisis like COVID-19, fund managers and other investors, including QIBs, FIIs, HNIs (High Net worth Individuals), etc., can strategically reassess the composition of their portfolios and their client's portfolios. They can also implement a positive hedge with Crude oil when the Nifty experiences a decline amid a pandemic.

The aforementioned connections between various global indices and commodities such as Gold, Silver, Bitcoin, and Crude oil offer valuable insights for investors and fund managers, enabling them to make more informed decisions and adopt advantageous positions in future market crises like the COVID-19 pandemic.

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