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The Effect of Crude Oil Price Shocks on Indonesia Stock Market Performance

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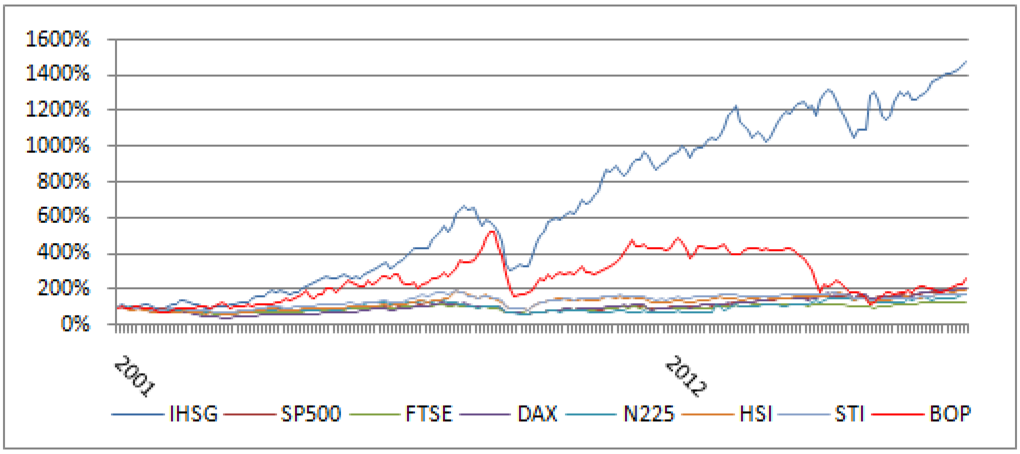
Abstract
The primary purpose of this study is to investigate the effects of crude oil price shocks on Indonesia stock market performance, represented by the composite index (IHSG). We used a vector error correction model (VECM) approach to observe the relationship between Brent crude oil price (BPO) and the seven stock market indices, including IHSG, and the relationship between IHSG and the six global stock market indices. **Findings.** The results show that the Brent crude oil prices cointegrated to the seven stock market indices, including IHSG, and IHSG cointegrated to the six global stock market indices. This finding proves that crude oil price shocks affect the Indonesia stock market performance directly through the co-integration mechanism between the crude oil price and IHSG and indirectly transmitted through the co-integration mechanism between IHSG and the global stock market indices.

1. Introduction

Crude oil plays an essential role in modern economies for all countries (Huang et al., 1995). The trade of crude oil serves as a commodity in the futures exchange but also as an underlying asset for many derivative contracts in financial markets. In any case, crude oil price shocks frequently affect the stock market performance globally, including the Indonesian stock market performance. From 2000 to 2017, BOP moved in various trends and volatility. In the same periods, several stock market indices, including IHSG, also moved with various trends and volatility. Figure 1 shows the movement of Brent oil price, IHSG, and the six global stock market indices in 2000–2017.



Source: finance.yahoo.com

Figure 1. The Movements of BOP and Several Stock Market Indices

The connectivity between the commodity and the equity market has increased primarily by globalization in economic and financial markets (Olson et al., 2014). Many researchers, such as Yamori (2011) in Japan; Creti et al. (2012) in the US; de Boyrie & Pavlova (2016) in the developed and emerging markets; Mensi (2019) in Arab Saudi has investigated the relationship between the crude oil price in the commodity market and stock price in the equity market. Most of these studies conclude that the crude oil price in the commodity market and the stock price in the equity market are cointegrated.

There are several studies from some researchers for the relationship between crude oil price and stock markets in various countries, such as Hamilton (1983), Kaneko & Lee (1995); Kang, Ratti, & Vespignani (2016); and Killian & Park (2009) in the US; Masih, Peters, & De Mello (2010) in South Korea; Hasan & Ratti (2012) in Australia; Olsen & Henriz (2014) in the OECD countries; Najaf & Najaf (2016) in Pakistan and Malaysia; and Atiq & Farhan (2019) in Pakistan. These studies conclude that oil price changes have negative effects on the stock market returns. Jung & Park (2011); Antonakakis & Filis (2013); and Marashdeh & Affandi (2017) divide the stock markets into two groups: the oil-exporter and oil-importer countries. They find that the crude oil price shocks harm the stock market performance of oil-importer countries but have a positive effect on oil-exporter countries.

Several researchers have also contributed a significant body of literature to the study of the Indonesian stock market. First, Adam et al. (2015) investigate the relationship between WTI crude oil prices and IHSG using the LVAR model and they discover that WTI crude oil price shocks have a positive significant effect on IHSG. Second, Hersugondo, Robiyanto, Wahyudi, & Muharam (2015) analyze the relationship between WTI crude oil price and IHSG using the GARCH (1,1) approach. They discover that WTI crude oil price shocks have no significant effects on IHSG. The last, Rahmanto et al (2016) observe the effect of WTI crude oil price shocks on the sectoral indices of Bursa Efek Indonesia (BEI) by using a multifactor model. Their research shows that the effect of the WTI crude oil price shocks is significant but varies among the sectors.

Other studies focus on the relationships among the stock markets, such as Bekaert, Harvey, & Lumsdaine (2002) on the co-integration relationship in 20 emerging markets; Hardouvelis, Malliaropulos, & Priestley (2006) on the EU stock markets; Arouri & Jawadi (2010) on Philippine and Mexico stock markets; Atje & Titiheruw (2016) on ASEAN country's stock markets; Chang, et al (2017) on BRICs and the US stock markets; and Hillier & Loncan (2019) on Brazil stock market. The important points resulted from those researches reveal that there are numerous emerging stock markets in the world cointegrated into the global stock markets. Therefore, shocks on global stock markets will influence the emerging stock markets through a co-integration mechanism among the stock markets (Bekaert, et al., 2002).

Several researchers have conducted the relationship between the Indonesia stock market and global stock markets. Karim, et al (2009) investigated the relationship between IHSG and several stock markets indices, including SP500 (the US), TOPIX (Japan), STI (Singapore), and SSE-CI (China) by using an autoregressive distributed lag (ARDL) approach. They concluded that IHSG cointegrated to the global stock market indices. Adiyasa, Purbawangsa, & Rahyuda (2014) investigate the relationship between IHSG and several global stock market indices, including DOW (the US), FTSE100 (the UK), N225 (Japan), and SSE-CI (China) by using a multivariate regression method. This study unveils that the global stock market indices have a significant relationship with IHSG; therefore, shocks on these global stock market indices affect IHSG.

In conclusion, the aim set out in the current paper is to examine the effects of crude oil price shocks on the Indonesia stock market performance by using two different relationship mechanisms. This study is based on the movements of the Brent crude oil price, IHSG, and six global stock market indices in 2001–2017. The steps of this research are, the researcher observes the relationship between Brent crude oil prices and seven stock market indices, including IHSG, and then the researcher analyzes the relationship between IHSG and six global stock market indices. The differences between this research and the previous studies are in the model's use and the proxy of the oil price. This study applies a vector error correction model (VECM) and Brent oil price as a proxy of oil price.

2. Research Method

The researcher is using the Brent crude oil price, IHSG, and six main global stock market indices (SP500, FTSE100, DAX30, N225, HSI, and STI) as the main data in this study. The Brent crude oil price functions a proxy of crude oil price, because it is traded in wider futures markets, better than WTI crude oil prices, such as IPE in London, DME in Dubai, MCX in Mumbai, and TOCOM in Tokyo (Maghyereh, 2004). I choose the six stock market indices as the global stock market index benchmarks because they represent the regional stock market indices.

All data used in this study are secondary data. The researcher uses Brent crude oil price data from the Federal Reserve Bank of St. Lois Economic Data (FRED) and the stock market indices data from https://www.yahoo.finance.com. All data used are monthly based and transformed into a natural logarithm (ln). The researcher analyzes all data by applying a vector error correction model (VECM) due to the equal treatment of all variables as an endogenous variable (Sims, 1980). A VECM approach is a VAR model used to examine the relationship among variables in a VAR system. The system requires all variables are stationary in the first difference, and at least there is one co-integration equation(s) that exists in the model (Agung, 2009).

The relationship between Brent crude oil price and seven stock market indices, and the relationship between IHSG and six stock market indices in a VECM approach are modeled as follows:

$$\Delta Z_t = A_0 + \Pi_x Z_{t-1} + \sum_{i=1}^{k-1} \Gamma_k \Delta Z_{t-1} + u_t$$

Where: Ztis a vector that contained (8 x 1) variables, including IHSG, SP500, FTSE, DAX, N225, HSI, STI, and BOP. A0is an intercept vector, and Πxis a matrix that contained the coefficient of variables of Zt-1, where Zt-1is a vector that contained eight variables in-level. Γkis a matrix that contained the coefficient of variables of Zt-i, where Zt-iis a vector that contained eight variables, and utis a vector of the error term.

The researcher uses several steps to analyze the relationship between the Brent crude oil price and IHSG, and the relationship between IHSG and six global stock market indices, and the result is presented below. All steps are processed using eviews 9.0.

1. Testing the stationary of all variables using the Augmented Dickey-Fuller (ADF) test is conducted by using the τ (tau) statistics and MacKinnon one-side p-value criteria to identify a unit root of the variables. It uses a 5% critical value to observe the existence of a unit root of the variables for both criteria. Gujarati (2003) suggests that the existence of a unit root can be identified by observing the drift parameter (δ) of each variable is presented as follows:

   $$\Delta Y_t = \beta_1 + \beta_{2}t + \delta Y_{t-1} + \alpha_1 \Delta Y_{t-1} + \alpha_2 \Delta Y_{t-2} + ... + \alpha_n \Delta Y_{t-n} + u_t (2)$$

   Where: Yt is a variable of IHSG, SP500, FTSE, N225, HSI, STI, and BOP. B is the intercept, t is the time trend, δ is the drift parameter, and ut is the error term.

   $\Delta Y = Y_2 - Y_1, Y_3 - Y_2, Y_4 - Y_3$, etc.

   The existence of a unit root is identified by comparing the τ (tau) statistic or the MacKinnon *p*-values of each variable at a certain critical value. If the τ (tau) statistic is less than its critical value, the null hypothesis (H_0) should be accepted, indicating that the data are non-stationary.However, if the τ (tau) statistic exceeds its critical value, H_0 should be rejected and the alternative hypothesis (H_1) is accepted, meaning that the data are stationary.
2. Selecting the optimum lag of the model is conducted by using the smallest value of the Final Prediction Error (FPE) criterion, or the highest value of Akaike Information Criterion (AIC), Schwarz Criterion (SC), Hannan-Quinn (HQ), and Likelihood Ratio (LR) criteria. It is required because the sensitivity of the VAR model depends on the lag length of each variable. The optimum lag selected is based on the lag recommended by the most criterion. If there are two or more optimum lags recommended by the same amount criteria, the optimum lag will be chosen based on the AIC criterion (Gujarati, 2003).
3. Testing the VAR stability model is conducted by using the roots characteristic polynomial criterion. VAR stability test is required to ensure that the VAR model is stable, and the analyses of IRF and FEVD are valid. VAR model is considered stable if its reverse characteristic polynomial has no root on the complex unit circle, or eigenvalues of the root characteristic polynomial have modulus less than 1(Jordà, 2009).
4. Analyzing the co-integration relationship among variables in the model using the *Johansen multivariate approach*. The trace and maximum eigenvalue statistics at a 5% critical value can identify the existence of a co-integration equation in a VAR model. In this case, there is a different result recommended by the trace and the maximum eigenvalue statistic. Lutkepohl and Reimers (1992) suggest the trace statistic criterion as it is more robust to the skewness and kurtosis.
5. To estimate the short-run and long-run relationships between IHSG and Brent crude oil price, and between IHSG and six global stock market indices, the researcher applies the parameter resulted from *error correction estimation to observe t*he short-run relationship, and the parameter resulted from *Johansen cointegration* analysis for examining a long-run relationship.

6. The *impulse response function* analysis is applicable for analyzing the responses of IHSG to the shocks to the Brent crude oil price and six global stock market indices for 36 months ahead.
7. Analyzing the contribution of the Brent crude oil price and six global stock market indices on IHSG variabilities for 36 months ahead is conducted by using *forecast error variance decomposition* analysis.

3. Results And Discussions

3.1. Stationary Test

The results of the stationary test of each variable using the ADF approach, as presented in Table 1, show that all variables in the model are non-stationary in the level form. It can be observed using the τ (tau) statistics and McKinnon's one-side p-value criteria. By using the τ (tau) statistics criterion (on the 4th column), each variable has a higher τ (tau) statistic than its 5% critical value (-2.875608). It indicates that all variables are non-stationary in the level form. By using the MacKinnon one-side p-value (on the 5th column), each variable has a higher p-value than 0.05. It also implies that all variables are non-stationary in the level form at a 5% critical value.

In the first-different form, the τ (tau) statistics value of each variable (on the 6th column) is less than its 1% critical value (3.462574) and has a lower p-value than 0.01 (1%). These two criteria point out that all variables are stationary in the first-different form; therefore, they meet the first requirement of a VECM approach.

Table 1. ADF Unit Root Test

Variables	Critical Value		Level		1st difference	
	(1%)	(5%)	*τ* statistics	*p*-value	*τ* statistics	*p*-value
LnIHSG	-3.462574	-2.875608	-1.168281	0.6881	-9.697782	0.0000
LnSP500			-0.106067	0.9461	-10.98060	0.0000
LnFTSE			-1.085238	0.7217	-12.38773	0.0000
LnDAX			-0.211033	0.9336	-12.29231	0.0000
LnN225			-1.066159	0.7290	-13.89641	0.0000
LnHSI			-1.375156	0.5939	-10.10605	0.0000
LnSTI			-1.641834	0.4593	-9.635144	0.0000
LnBOP			-1.934424	0.3160	-10.64168	0.0000

Sources: Eview's output

3.2. Lag Optimum Selection

Table 2 exhibits the result of the lag order selection, it shows that the FPE and AIC criteria recommend lag-2; the S.C. and H.Q. criteria recommend lag-1, and the L.R. criterion recommends lag-7 as the optimum lag. Because there are more than one optimum lags recommended by the same amount of criteria, the optimum lag is chosen based on the AIC criterion as proposed by Gujarati (2003). Therefore, we analyze the relationship between the

Brent crude oil price and IHSG, and the relationship between IHSG and six global stock market indices using VAR (2) model.

Table 2. VAR Lag Order Selection

Lag	Log.L	LR	FPE	AIC	SC	HQ
0	1004.855	NA	5.28e-15	-10.17199	-10.03819	-10.11782
1	3058.153	3918.029	8.07e-24	-30.47095	-29.26675*	-29.98343*
2	3149.788	167.3735	6.11e-24*	-30.75294*	-28.47833	-29.83207
3	3194.664	78.30357	7.48e-24	-30.55779	-27.21278	-29.20357
4	3239.793	75.06134	9.20e-24	-30.36523	-25.94981	-28.57766
5	3306.305	105.1975	9.19e-24	-30.39086	-24.90504	-28.16994
6	3372.973	100.0028	9.28e-24	-30.41809	-23.86186	-27.76382
7	3444.878	101.9875*	9.01e-24	-30.49876	-22.87212	-27.41113
8	3479.260	45.95912	1.31e-23	-30.19653	-21.49949	-26.67555

Sources: Eview's output

3.3. VAR(2) Stability Test

The result of the VAR (2) stability test in Table 3 shows that all variables in the model have modulus value of the *roots characteristic polynomial* less than 1.0. It shows that the VAR (2) model is in stable condition. Therefore, the *impulse response function* (IRF) and *forecast error variance decomposition* (FEVD) analysis are used to study the relationship between the Brent crude oil price and IHSG, and the relationship between IHSG and six global stock market indices to be valid.

Table 3. VAR(2) Stability Test

Root	Modulus
0.996907 - 0.002269i	0.996910
0.996907 + 0.002269i	0.996910
0.933714 - 0.037756i	0.934477
0.933714 + 0.037756i	0.934477
0.902246	0.902246
0.825841 - 0.117679i	0.834183
0.825841 + 0.117679i	0.834183
0.634586	0.634586
0.342174 - 0.239817i	0.417846
0.342174 + 0.239817i	0.417846
0.285279	0.285279
0.047410 - 0.248817i	0.253294
0.047410 + 0.248817i	0.253294
0.167029	0.167029
-0.075928 - 0.048404i	0.090045
-0.075928 + 0.048404i	0.090045

Sources: Eview's output.

3.4. Co-integration Test

Johansen's cointegration test results, as presented in Table 4, show that there is a co-integration equation at the 5% level in the trace value and maximum statistics. It shows that there is a significant long-run relationship in VAR (2) model. This conclusion can be checked by using the critical value and probability value of the trace and maximum eigenvalue statistics on the 2nd column (for the trace statistics) and the 5th column (for maximum eigenvalue statistics). Both trace and maximum eigenvalue statistics have a higher value than their critical value at none hypothesized numbers of Cointegrating Equation (CE). It means that there is one co-integration equation existing in VAR (2) model at the 5% level.

The existence of a co-integration equation in the VAR (2) model shows that the variables in the VAR (2) model are co-integrated in an equation relationship. It fulfills the second requirement for the VECM approach. Therefore, the relationship between Brent oil price and IHSG and the relationship between IHSG and six global stock market indices can be analyzed by using a VECM approach.

Table 4. Johansen Co-integration Test

Hypothesized No.of CE(s)	Trace			Max-Eigen		
	Statistic	Critical Value	Prob**	Statistic	Critical Value	Prob**
None *	173.6348	159.5297	0.0067	56.22237	52.36261	0.0192
At most 1	117.4124	125.6154	0.1418	36.03111	46.23142	0.3961
At most 2	81.38133	95.75366	0.3200	27.52925	40.07757	0.5955
At most 3	53.85208	69.81889	0.4680	23.42126	33.87687	0.4985
At most 4	30.43082	47.85613	0.6967	15.21793	27.58434	0.7308
At most 5	15.21289	29.79707	0.7661	8.456374	21.13162	0.8737
At most 6	6.756521	15.49471	0.6061	6.751718	14.26460	0.5189
At most 7	0.004803	3.841466	0.9438	0.004803	3.841466	0.9438

*Trace and max eigenvalue test indicates 1 cointegrating equation exist at the 0.05 level

3.5. The Relationship between Brent Oil Price and IHSG

I present the relationships between Brent crude oil prices and seven stock market indices in Tabel 5 for the short-run, and Table 6 for the long-run. As shown in Table5, there is no short-run significant parametric of Brent oil price [D(LnBOP (-1)) or D(LnBOP (-2))] on the seven stock market indices at 10% critical value (<1.65). It indicates that there are no significant relationships between Brent's crude oil price and the seven stock market indices. In other words, Brent crude oil price shocks have no short-run significant effects on the seven stock market indices.

Table 5. Short-run Relationship between Brent Oil Price and Seven Stock Market Indices

	D(LnIHSG)	D(LnSP500)	D(LnFTSE)	D(LnDAX)	D(LnN225)	D(LnHSI)	D(LnSTI)
D(LnBOP (-1))	-0.054613	0.042631	0.007438	0.022873	0.020926	0.053400	0.030754
	[-1.12932]	[1.27210]	[0.22084]	[0.47162]	[0.34550]	[1.15271]	[0.79159]
D(LnBOP (-2))	0.013765	0.014876	0.002954	-0.053077	0.028820	0.038148	-0.023863
	[0.28681]	[0.44728]	[0.08837]	[-1.10274]	[0.47945]	[0.82976]	[-0.61890]

Sources: Eview's output

In the long-run, all Brent crude oil prices parametric on the seven stock market indices are higher than its 1% critical value (> 2.35). It means that Brent crude oil price has significant effects on the seven stock market indices, including IHSG. Therefore, this finding supports the study of Adam et al. (2015). In their research, they apply WTI crude oil price as a proxy of world oil price and employ the LVAR model from January 2004 to December 2013 and they conclude that world oil price has significant effects on IHSG. This finding is contradictory to the research of Hersugondo et al. (2015). They use the WTI crude oil price as a proxy of world oil prices and by employing the GARCH (1.1) approach from January 2003 to December 2013. At the end of the study, they discover that the world oil price has no significant effect on IHSG.

Table 6. Long-run Relationship between Brent Oil Price and The Seven Stock Market Indices

	LnIHSG	LnSP500	LnFTSE	LnDAX	LnN225	LnHSI	LnSTI
LnBOP(-1)	-0.054613	0.042631	0.007438	0.022873	0.020926	0.053400	0.030754
	[-3.59837]*	[3.30249]*	[-3.61410]*	[3.69832]*	[-3.20841]*	[-3.20759]*	[3.20174]*

Sources: Eview's output

3.6. The Relationship between IHSG and Six Stock Market Indices

Table 7 shows the short-run and table 8 for the long-run relationships between IHSG and six stock market indices. In the short-run, the six stock market indices have no significant relationships on IHSG at 5% critical value, except for the DAXindiex at the two periods before (D(LnDAX(-2))). It can be seen in Table 7 that almost all six stock market indices have less absolute t-statistic values than their 5% critical value (1.96). This result confirms that shocks to the global stock market indices have no short-run effects on IHSG.

Table 7. Short-run Relationship between IHSG and the Six Stock Market Indices

Global Stock Market Indices	IHSG	
	Coefficient	*t*-statistic
D(LnSP500 (-1))	0.022042	[0.08881]
D(LnSP500 (-2))	-0.287592	[-1.16433]
D(LnFTSE (-1))	-0.171730	[-0.65643]

Global Stock Market Indices	IHSG	
	Coefficient	*t*-statistic
D(LnFTSE (-2))	-0.221198	[-0.88001]
D(LnDAX (-1))	0.211782	[1.65192]
D(LnDAX (-2))	0.280083	[2.32013]*
D(LnN225 (-1))	-0.095826	[-1.33485]
D(LnN225 (-2))	-0.114777	[-1.61862]
D(LnHSI (-1))	0.199610	[1.44041]
D(LnHSI (-2))	-0.068370	[-0.49172]
D(LnSTI (-1))	0.154268	[0.79675]
D(LnSTI (-2))	0.242683	[1.25635]

In the long-run, all six stock market indices had significant relationships on IHSG at 1% critical value. This conclusion can be observed from Table 8, which shows that all six stock market indices had a higher absolute t-statistic value than its 1% critical value (2.35). This result shows that IHSG was co-integrated to the global stock market indices; therefore, in the long-run, shocks to the global stock market indices had a significant effect on IHSG. This finding supports Amizuar, Ratnawati, & Andati (2017). By using VECM method and by covering both emerging market and developed market, their analysis provides the evidence of integration between Indonesia stock market and international stock markets.

Table 8. Long-run Relationship between IHSG and the Six Stock Market Indices

Global Stock Market Indices	IHSG	
	Coefficient	*t*-statistic
D(LnSP500 (-1))	-7.011178	[-6.18082]
D(LnFTSE (-1))	0.145844	[7.76049]
D(LnDAX (-1))	-0.231838	[-6.36072
D(LnN225 (-1))	16.17719	[5.57650]
D(LnHSI (-1))	0.317586	[4.87726]
D(LnSTI (-1))	-0.253653	[5.59362]

Source: Eview's output

3.7. Responses of IHSG

Responses of IHSG's shocks to the Brent crude oil prices and six stock market indices in 36 months ahead are shown in Figure 2. The responses, which in the red line graph, are negative, meaning that the increasing Brent crude oil prices will decrease IHSG and vice versa. The negative responses of IHSG to the Brent crude oil price shock takes place because of the position of Indonesia as a net-importer oil country. This finding confirms the study of Jung & Park (2011), and Antonnakis &Filis (2013).

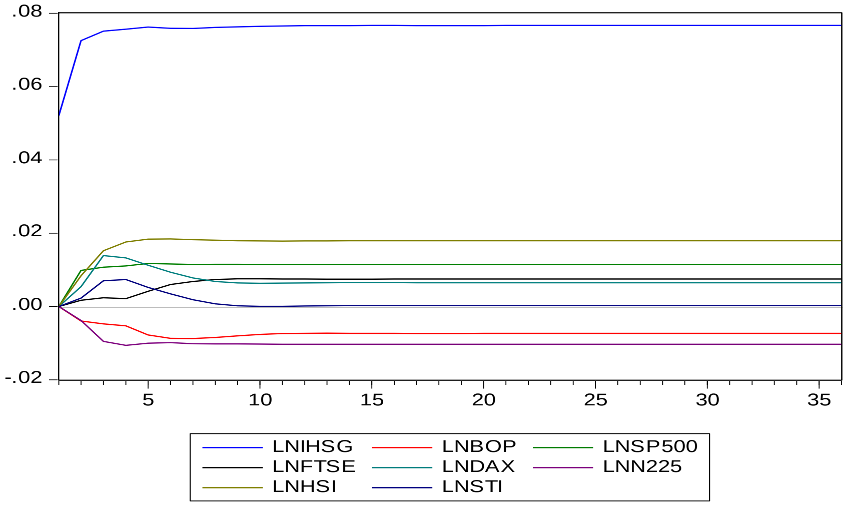


Figure 2. Responses of IHSG to Shocks to the Brent Oil Priceand the Six Stock Market Indices

Responses of IHSG's shocks to the six stock market indices are positive, except N225, the result is negative. Activities in the IHSG influence the highest IHSG response. One standard deviation shock on IHSG is responded by increasing 0.08%, while shock on the global stock market indices is responded by IHSG less than 0.02%.

Responses of IHSG's shocks to HSI, N225, and SP500 indices are greater than those of other global stock market indices, while STI gets the smallest response. Higher responses of IHSG's shocks to the HSI, N225, and SP500 indices are related to strong trading relationships among Indonesia, China, Japan, and the US, based on the annual reports of the Central Bureau of Statistics of Indonesia (BPS). China, Japan, and the US are the three biggest countries that have higher values of international trading (export and import) with Indonesia. This finding supports Zhang's study (2018), who concludes that China, Japan, and the US are playing an essential role in international trading with Indonesia, and economic problems in these countries will affect Indonesia's stock market performance.

3.8. Decomposition of IHSG

Table 9 displays the variance decompositions of IHSG to the Brent crude oil price and six stock market indices shocks. For the next 36 months, the variability of IHSG is mainly due to its shock, and the contribution is 89% to 100%. In the first month, 100% variability of IHSG takes place. Shock to Brent crude oil price and six stock market indices contribute to the variability of IHSG in the 2nd month. In general, the contribution of Brent crude oil price shock to the variability of IHSG is less than 1% in the next 36 months. Contribution of Brent oil prices shock to the variability of IHSG is stable in the 12th month.

In total, the contribution of the six stock market indices to the variability of IHSG in 36 months ahead is less than 10%. The three stock market indices that gave the highest contributions to the variability of IHSG are HSI (4.30%), N225 (1.88%), and SP500 (1.73%). These results are relevant to the IRF analysis, which assumes that China, Japan, and the US are playing a crucial role in international trading with Indonesia.

Table 9. Decomposition Analysis of IHSG

Months ahead	Stock market indices and crude oil price contributionson IHSG							
	IHSG	SP500	FTSE	DAX	N225	HSI	STI	BOP
1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	97.14	1.09	0.02	0.45	0.24	0.76	0.03	0.27
3	93.53	1.34	0.04	1.72	0.82	1.94	0.30	0.31
6	90.26	1.59	0.14	2.10	1.42	3.48	0.32	0.70
12	89.57	1.68	0.44	1.51	1.71	4.00	0.16	0.95
24	89.38	1.71	0.58	1.20	1.84	4.22	0.08	0.98
36	89.32	1.73	0.63	1.10	1.88	4.30	0.06	0.99

Source: *output* eviews

4. Conclusions

Crude oil prices shock affects the Indonesia stock market performance through two different relationship mechanisms. First, crude oil prices shock directly influence the Indonesia stock market performance through a significant long-run relationship between the crude oil price and IHSG (oil market-stock market cointegration mechanism). Second, the effects of the crude oil price shock indirectly affect the Indonesia stock market performance through a significant long-run relationship between IHSG and the global stock market indices (among stock markets cointegration mechanisms).

Shock to Brent crude oil prices in 36 months ahead is reacted by IHSG negatively and contribute to the variability of IHSG less than 1%. The negative responses of IHSG to shocks to Brent crude oil prices are primarily caused by the position of Indonesia as a net-importer oil country. The negative effect of Brent crude oil price shocks on IHSG can be a piece of important knowledge for all stakeholders of Bursa Efek Indonesia. Investors need to manage their portfolio investment globally to minimize the negative effect of the crude oil price shock on their portfolio returns. The BOD of BEI, Bank Indonesia (BI), and also the Government of Indonesia must have a concern and prepare an effective policy to muffle the negative effects on the economy of Indonesia. The impact will affect capital outflow from Indonesia and can be a severe problem for the economy of Indonesia.

In general, the shock to the global stock market indices is responded by IHSG positively and contribute to the variability of IHSG by 10%. Responses of IHSG to shocks to HSI, N225, and SP500 indices are greater than those of other stock market indices. Shock to HSI, N225, and SP500 indices also give a higher contribution to the variability of IHSG compared to other stock market indices. The higher response of IHSG to the shock to HSI, N225, and SP500 means the higher contribution of these three stock market indices to the variability of IHSG, showingthat the Indonesian stock market has a strong connection with the stock market of China (HSI), Japan (N225), and the US (SP500). The strong relationships between the Indonesia stock market with China, Japan, and the US are related to the contribution of international trading value (export-import) between Indonesia with China, Japan, and the US.

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