THE ANALYSIS OF INDONESIAN ECONOMIC AND GLOBAL UNCERTAINTY: A VECTOR AUTO REGRESSION APPROACH

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Abstract

The global economic uncertainty paradigm is part of the issue of VUCA World in recent years. Several studies on uncertainty were developed to understand the global dynamics and the spillover impacts in order to anticipate the global turmoil. One of the proxies used to show economic uncertainty is the Economic Policy Uncertainty (EPU) index Introduced by Baker et al (2015). This study aims to Be Able to know the impact of spillover from the global economic uncertainty on the economy in Indonesia as measured by Gross Domestic Product (GDP). The VAR analysis method is used to review the dynamics of the GDP turmoil that Occurs due to the shock of global uncertainty. Variables in the models are estimated at 1st difference to satisfy stationary Assumptions. Cointegration test results show a long-term relationship between the Indonesian economies, with global uncertainty. The global cointegration models of Indonesia's GDP shows that Indonesia is not significantly affected by the turmoil of global changes. The conclusion in this study is that global uncertainty does not directly give a shock effect on the Indonesian economy.

Keywords: Indonesian GDP, Global EPU, Spillover Effect, VAR

INTRODUCTION

The global uncertainty that is part of the paradigm VUCA (Volatility, Uncertainty, Complexity and ambiguity) *world* studied more intensively since the 2008/09 global crisis , Volatility and uncertainty that occur in the United States (US) and Europe has associated with fiscal and monetary policies and regulations that contribute to the economic downturn in 2008/09 [1]. China's slowing economy in the year 2016 also known global impact so that the economy is becoming increasingly difficult to predict the direction [2]. Some economic issues that have an impact spread to many countries resulted in the emergence of global uncertainty.

[1] developed the Economic Policy Uncertainty Index (EPU) by measuring the frequency of articles that include on various matters related to economic uncertainty in 10 leading newspapers in the country[1]. Their results showed that the index of US EPU increase volatility and reduce investment, *output* and employment. These results are supported by the findings [3] that the US EPU shocks contribute substantially to the volatility of the unemployment rate during the recession in the country. [4] found that in China investment company has inverted correlation with index levels EPU countries.

EPU index is also used in international economic studies which uncertainty of a country is able to have an impact on other economies. [2] found that the EPU China have a significant impact on the US economy during an economic slowdown while in times, EPU China boom does not have an impact on the US. China could affect the US economy because of linkages both within the field of international trade. South Korea's economy is known to significantly receives the impact of domestic EPU and EPU AS [5].

Inflation in Indonesia in times of crisis to increase, especially the third and fourth quarter of 2008, respectively amounted to 11.96% and 11.5% after only amounted 6:52% in the first quarter of the same year. The increase in inflation followed Indonesia's economic growth slowed by 5.3% in the fourth quarter of 2008 to the lowest point 4:14% in the second quarter of 2009 but was later able to gradually recover in the coming quarters. When compared with the 1997/98 financial crisis Indonesian economy in 2008/09 to say tend to be stronger to face global crisis shocks. This study aims to assess the impact of global uncertainty on economic growth in Indonesia by using the volatility index value EPU and US, China and Global as your proxy.

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[1] US EPU index was first compiled using data from the frequency of the word "economic" or "economy"; "Uncertain" or "uncertainty"; and also including a "congress", "deficit", "Federal Reserve", "legislation", "regulation" or "White House". Information on the EPU indexes can be accessed at http://www.policyuncertainty.com
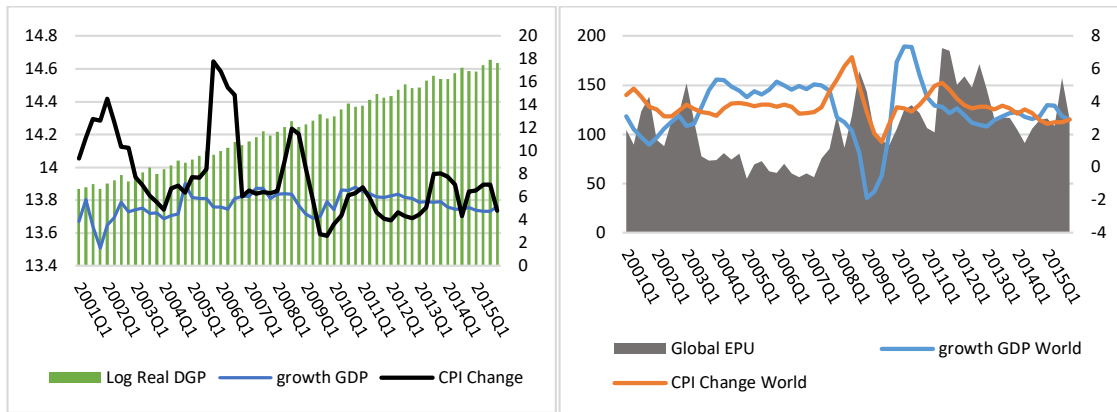
DATA

| 1a. Indonesia Economic Outlook | 1b. World Economic Outlook and EPU Index |

Figure 1. Data Indonesia and the world economy as well as the Global EPU index

Source: BI, Data IMF and EPU official site index (processed, 2017)

The Indonesian economy are proxied by the Gross Domestic Product (GDP) is shown in Figure 1a on. Indonesia's real GDP increased each year with a relatively stable growth annually. Indonesian inflation tends to fluctuate, especially in 2006 due to the fuel price policy, and also in 2008 as a result of the shocks of the global crisis in the year.

METHODS

The basic model used in this study is the functional equation of multiple linear regression follows:

Model 1

LGDP = f (gWorld infIDN, infWorld, EPU)

Model 2

gIDN = f (gWorld, infIDN, infWorld, EPU)

description:

gIDN	:	Indonesia GDP growth
LGDP	:	Log form from Indonesia real GDP
gWorld	:	growth GDP of World
infIDN	:	Indonesia CPI Change
infWorld	:	World CPI Change
EPU	:	World Economic Policy Uncertainty Index

The model was then transformed into a model of Vector Auto Regression (VAR) to be able to study the response of the dependent variable of each model to changes in the independent variable shock. The main focus of this research is to be able to review the test results Impulse response function (IRF) and Varian Decomposition (VD). Data were processed form of the quarter with a span between the years 2001-2015. Secondary data were obtained from various sources such as Bank Indonesia, the IMF database, and the official website EPU index. The first stage of this study was to test the serial data held stationary.

RESULTS AND DISCUSSION

Test Unit Root

Table 1. Test of Dickey Fuller stationary

gIDN	LGDP	gWorld	infIDN	infWorld	EPU
			p-value At Level		
0.0073	0.9289	0.0004	0.1347	0.0000	0.0532
			p-value 1st Different		
0.0000	0.0136	0.0000	0.0000	0.0000	0.0000
			p-value 2nd Different		
0.0000	0.0001	0.0000	0.0000	0.0000	0.0000

Source: Data Processed, 2017

Table 1 shows that there are three variables that are not stationary at the level of the 1st level but different stationary. Roots test results show that the VAR model unit should be run at different 1st of data. It is based on the basic assumption that the serial data must be stationary so that the data does not bias the estimation results.

Lag Length Test Criteria

We can use the value of the Akaike (AIC) or the Schwarz criterion (SC) to see which lag is best, the lower the value, the model is said to be the most excellent [6]. This research manually comparing each AIC and SC values generated by each model. In this study, the optimum lag that can be used is up to the eighth lag so that comparisons were made to the lag. Table 2 shows the results of comparison criteria values of each model for each lag that exists.

Table 2. Comparison of AIC and SC values of the two equations to lag 8

Lag	Log Real GDP		Growth	
	AIC	SC	AIC	SC
0				
1	-4.575926	-4.362777	2.408147	2.621296*
2	-4.715486	-4.321213	2.385186	2.779459
3	-6.889144	-6.310472	2.291173	2.869845
4	-7.286989*	-6.520552*	2.049874	2.816310
5	-7.207225	-6.249566	2.119555	3.077214
6	-7.172461	-6.020027	1.974466	3.126901
7	-7.359664	-6.008803	1.922971	3.273832
8	-7.336812	-5.783776	1.812050*	3.365086

Source: Data Processed, 2017

In the first equation, there is a difference in value between AIC and SC, while in the second equation, the best value AIC and SC showed lag 4. In the first equation, the selection of the best lag will not only be determined by the value of the criteria, but also use other indicators such as adjusted R-square. From the results adjusted R-square, lag 8 has the highest value, it is more due to the number of independent variables more.

Table 3. Estimation Output from both equations

	Probability	p-value		Probability	p-value
LGDP (-1)	-0.3068	[0.0255]	gIDN (-1)	-0.52179	[0.0952]
LGDP (-2)	-0.344815	[0.0079]	gIDN (-2)	-0.16602	[0.5646]
LGDP (-3)	-0.33424	[0.0101]	gIDN (-3)	-0.17783	[0.5597]
LGDP (-4)	0.620348	[0.0000]	gIDN (-4)	0.00477	[0.9864]
gWORLD (-1)	0.000416	[0.7856]	gIDN (-5)	-0.2162	[0.3716]
gWORLD (-2)	0.001438	[0.3259]	gIDN (-6)	-0.10189	[0.7022]
gWORLD (-3)	0.000327	[0.8124]	gIDN (-7)	0.20693	[0.4453]
gWORLD (-4)	0.000487	[0.7043]	gIDN (-8)	0.020251	[0.9298]
infIDN (-1)	-0.000229	[0.5555]	gWORLD (-1)	-0.08618	[0.8344]
infIDN (-2)	-0.000314	[0.4081]	gWORLD (-2)	0.026819	[0.9362]
infIDN (-3)	-0.0000342	[0.9308]	gWORLD (-3)	0.29824	[0.4361]
infIDN (-4)	0.000511	[0.1995]	gWORLD (-4)	0.32115	[0.3398]
infWORLD (-1)	0.000684	[0.7482]	gWORLD (-5)	0.113167	[0.6539]
infWORLD (-2)	0.004347	[0.0969]	gWORLD (-6)	-0.03797	[0.8854]
infWORLD (-3)	-0.003771	[0.1723]	gWORLD (-7)	-0.01128	[0.9539]
infWORLD (-4)	-0.000919	[0.6947]	gWORLD (-8)	0.109681	[0.61 56]
EPU (-1)	-0.0000177	[0.7115]	infIDN (-1)	0.004567	[0.9451]
EPU (-2)	0.0000533	[0277]	infIDN (-2)	-0.04443	[0.4566]

	Probability	p-value		Probability	p-value
EPU (-3)	0.0000702	[0.1138]	infIDN (-3)	-0.09721	[0.1358]
EPU (-4)	0.0000328	[0.4706]	infIDN (-4)	0.058603	[0.4353]
C	0.018288	[0.0088]	infIDN (-5)	0.000303	[0.9961]
			infIDN (-6)	0.067186	[0364]
			infIDN (-7)	-0.05106	[0.5127]
			infIDN (-8)	0.000455	[0996]
			infWORLD (-1)	0.058314	[0.8978]
			infWORLD (-2)	0.052914	[0.8971]
			infWORLD (-3)	-0.05379	[0.9149]
			infWORLD (- 4)	-0.4148	[0.5203]
			infWORLD (-5)	0.100619	[0.8668]
			infWORLD (-6)	-0.44898	[0.5659]
			infWORLD (-7)	0.490081	[0.4776]
			infWORLD (-8)	0.534373	[0.4337]
			EPU (-1)	0.000746	[0.9288]
			EPU (-2)	-0.00385	[0.6846]
			EPU (-3)	0.007897	[0.3648]
			EPU (-4)	0.000939	[0.9079]
			EPU (-5)	0.000789	[0.9203]
			EPU (-6)	-0.00854	[0268]
			EPU (-7)	-0.00086	[0.9124]
			EPU (-8)	-0.00254	[0.7557]
			C	0.006975	[0.9426]

Source: Data Processed, 2017

The estimation results in table 3 show that four independent variables did not leave a significant impact on the second shock dependent variable. In the first equation, the global economic growth had a positive effect, inflation globally positive impact until the second lag and then have a negative impact to the fourth lag, while inflation in Indonesia itself have a negative impact until the third lag. In this study, the main concern is the impact produced by global uncertainty. EPU index only impact negatively on the first lag of log real GDP for Indonesia. The second equation also shows that all independent variables do not have a significant effect partially. Each of these independent variables have an influence which varies for each of its lag in the dependent variable. EPU index has positive and negative influences are varied depending on the level of lag.

Impulse Responses function (IRF)

IRF test is useful for evaluating the response of the independent variables for each shocks given by the independent variable in the model. In Figures 2 and 3 show the IRF test results for each model. Periods shown in the figure is up to the period of the 40th which means up to 10 years.
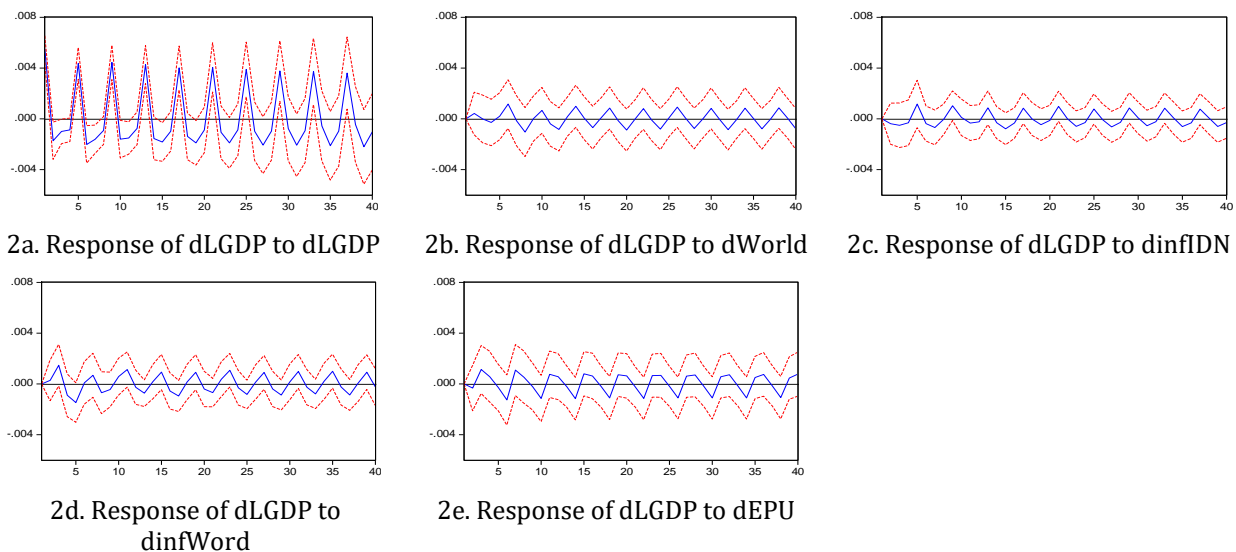

2a. Response of dLGDP to dLGDP

2b. Response of dLGDP to dWorld

2c. Response of dLGDP to dinfIDN

2d. Response of dLGDP to dinfWord

2e. Response of dLGDP to dEPU

Figure 2. Impulse Response Function of equation 1

Figure 2 shows that the change in log GDP individually have a greater impact shocks. Broadly speaking, all independent variables have a stable pattern of shocks any particular period. Changes in GDP log respond quite volatile but relatively stable for any changes EPU index data.
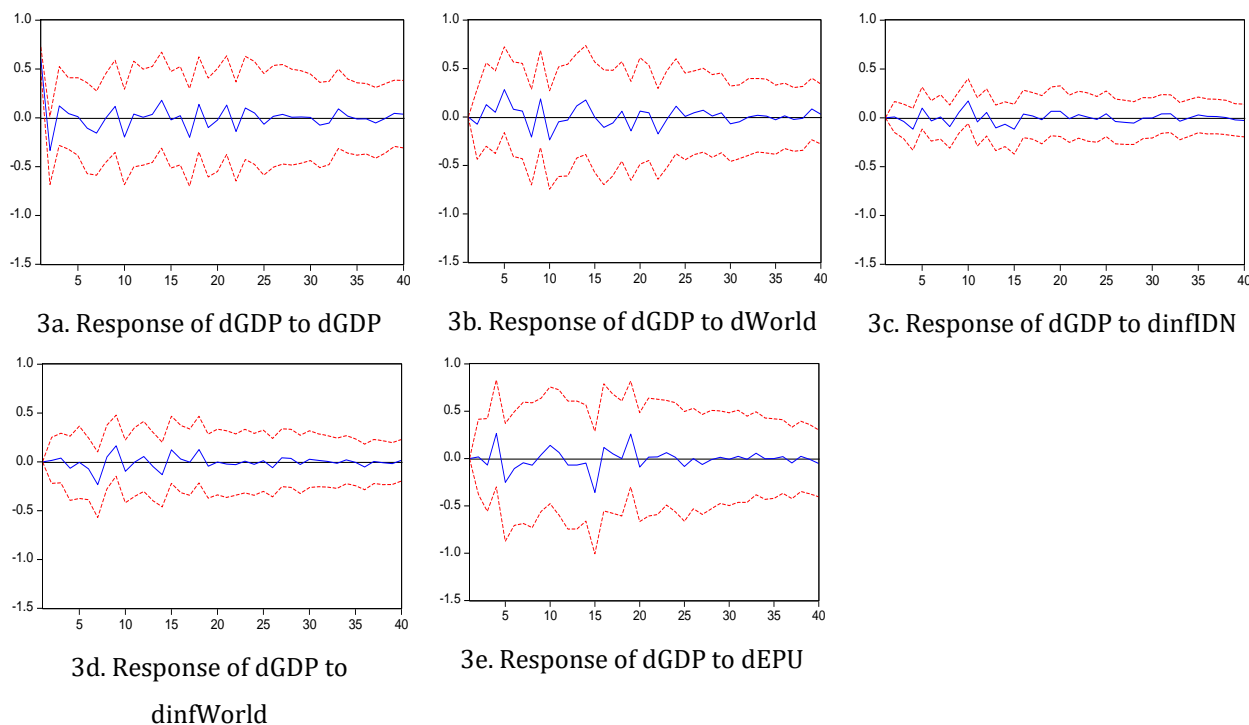
3a. Response of dGDP to dGDP

3b. Response of dGDP to dWorld

3c. Response of dGDP to dinfIDN

3d. Response of dGDP to dinfWorld

3e. Response of dGDP to dEPU

Figure 3. Results of Impulse Response function of the equation 2

Figure 3 above shows the response of changes in GDP growth to volatile happens to the data of independent variables. Indonesian inflation variables are known to have a surprising effect that the lowest compared with other independent variables. This is in contrast with the results of the IRF for world inflation shock that has a greater impact. The turmoil of GDP growth occurred because of a surprise by the changes in the index data EPU.

Varian Decomposition

4a. VD equation 1
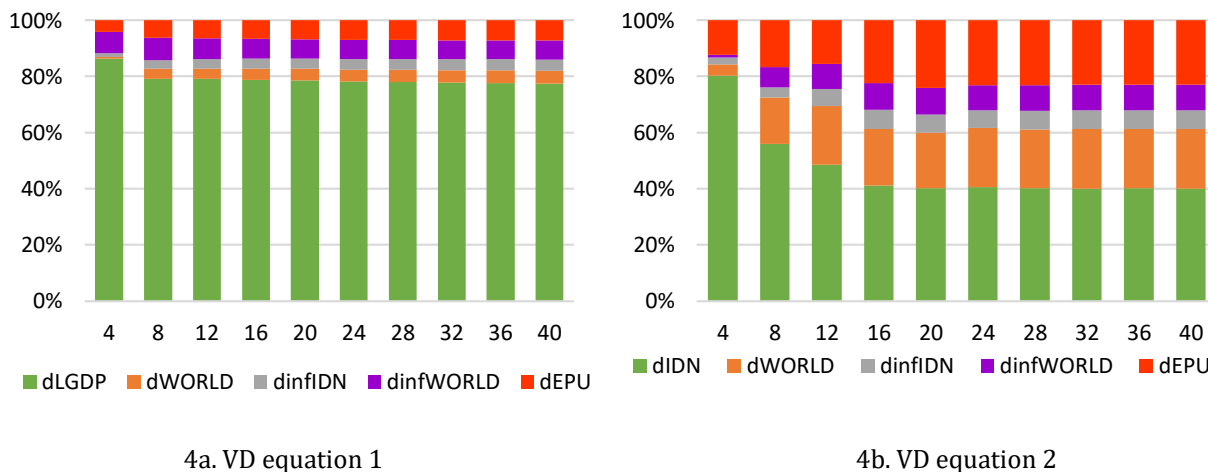
4b. VD equation 2

Figure 4. VD of equations 1 and 2

VD shows the composition of the contribution of independent variables periodically. Equation 1 shows the low contribution of each independent variable. The VD value owned by the world inflation but relatively very low. Biggest contribution is from the change log GDP itself.

Equation 2 shows the results of different contributions change GDP growth decreased to lag 16 and moving steadily until 40. Contributions lag is the largest independent variable in the value of the EPU and the growth of world GDP. However, the biggest composition retained by changes in economic growth.

DISCUSSION

Global uncertainty into one concept of VUCA World warmer discussed in the realm of academics and practitioners. Global economic integration is known to provide a chain effect among countries around the world are interrelated. Global uncertainty refers to a wide range of phenomena that occur in various parts of the world resulting in future increasingly unpredictable direction, especially in the aspect of economy. The phenomena

such as international political instability, natural disasters, wars and so on which can influence the economic movement of the country. Economic Policy Uncertainty Index (EPU) developed by Baker, Bloom and Davis [1] in this paper is used as a proxy of global uncertainty.

The results showed that changes in global uncertainty could have an impact but not significant surprises responded by changes in the Indonesian economy. This shows that the global shocks do not have a big impact even though the Indonesian economy is relatively integrated in the global economy. Indonesia countercyclical policies are the key to global economic uncertainties absorb shocks that occurred in 2008 [7].

CONCLUSION

The conclusion of this study is the economy of Indonesia, represented by the value of GDP is stable enough to face global economic uncertainty. Inflation in Indonesia was also no surprise that a significant impact on the Indonesian economy. Referring to other studies, the stability of the Indonesian economy can be maintained because of government policies that tend countercycle so that the current global shocks occur, the Indonesian economy is relatively stable.

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