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THE RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT, EXPORT AND GDP GROWTH IN INDONESIA

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ABSTRACT

This paper is an attempt to investigate the relationship between foreign direct investment, export, and GDP growth in Indonesia using Vector Error Correction Model (VECM) for the period 1981-2015. The result suggests that there is a relationship between foreign direct investment, GDP growth and export for Indonesia. The Vector Error Correction Model shows that there is long run and short run causality running from FDI and GDP to export.

INTRODUCTION

All countries are very open to the international trade to achieve high economic growth because extensive researches and economic literature claims that international trade has a positive impact on economic growth. There are two main points of views on the FDI study. The first is the majority of the study claims that FDI has positive impacts on the host county. FDI becomes powerful tools and indicators for economic development and global integration. The second argument is the study claims that the FDI can cause growth in the economy only in short term condition and reduce growth in the long run.

According to Salvatore (2007), Capital flows from incoming and outgoing capital from a certain country is one of the economic activities that is primary important for international trading.

Indonesia as one of the expanded growth put FDI as one of the most important engine of power to increase the expected growth of economy. According to Makki and Somwaru (2004), Foreign Direct Investment and trade are substantial catalysts for economic growth and enhancement both in developing countries and developed countries.

The FDI in Indonesia has been believed that the greater the flows and the impact will be positive to the economic growth. In this case, the FDI has power to influence the GDP growth.

FDI in Indonesia becomes a very significant factor influencing the industry and labor potential work. Since 2000s, the government implied the policies that can boost the investment in Indonesia.

Indonesia has a world success story in the economic success stories. However, the country still has long path of the development. Indonesia has been success recovery from the Asian crisis and leads the country to become of the highest growth rate in the world. Annual GDP growth rate in real term of Indonesia is around 6 % in the past eight to nine years, 1999 to 2015. GDP is used by the economists to compare the prosperity of the nations. Real GDP is used to measure growth or decline of a country's economy. The effect of inflation and deflation has been counted in Real GDP. Therefore real GDP becomes one of the best indicators to measure economic growth. If the GDP has a positive growth rate, it indicates that the economy of one nation is high and if the GDP has a negative growth rate, it indicates that the economy of one nation is in recession period.

Export is a crucial factor that can provide the impetus for economic growth in developing countries such as Indonesia. The export led growth strategy becomes an important alternative to the inward development strategy.

Recent studies have shown that there is a positive and significant long term relationship between investment and export with GDP. However the relationship of investment and export is negative. Vector Error correction model analysis for GDP indicates an error correction coefficient which is negative to the value of GDP in short term than long term. Exports and investments have positive coefficient. It means that the variable of the investment and exports is over the long term equilibrium values in short term. The impact of investment and export on GDP are positive in short term. Domestic production effect on investment is positive but negative on export. Exports have a negative effect on investment in the short term and investment can cause increase in exports. Fluctuations in the GDP because of it changes from its values and fluctuations in investments influenced by GDP.

The importance result of this study will give important information for the policy makers and the scholars to do further research on the FDI, export and GDP in specific variables and sub discussion.

LITERATURE REVIEW

There have been literatures on the relationship between FDI, exports and income. According to Xing (2006), FDI is essentially a driving force behind China's rapid expansion. Liu, Wang and Wei (2001) in their previous study concluded that FDI in China facilitated it's exports to the FDI source countries.

Most of the studies examine bivariate relations between GDP and exports, GDP and FDI, or exports and FDI as reviewed in our introduction. There only few of the study deal with the relationships causality among FDI, GDP and exports. Liu, Burridge, and Sinclair (2002) analyzed bidirectional causality between real GDP, real exports, and real FDI in

China. The study found out that in the long run, FDI tends to decrease economic growth. Economic development in China seems to be fueled by domestic capital accumulation and employment growth. FDI inflows crowd out domestic capitals and reduce employment growth. The study used VAR and VECM analysis.

Keho (2015) in his study has analyzed the relationships among foreign direct investment, exports and economic growth in 12 selected sub-Saharan African countries over the period 1970 to 2013. His study uses the multivariate co-integration approach of Johansen and the results suggests that the variables of foreign direct investment, exports and economic growth has a positive long-run effect on FDI in five countries. Exports also are positively related to FDI in four countries.

The recent study has been done by Tapsin (2016). His study finds a significant relation with the trend from GDP to FDI, FDI to exports, GDP to export and export to GDP. There is no significant relation with the trend from export to FDI and from FDI to GDP. The growth rate is the determinant for FDI. Economic growth attracts FDI inflow and FDI inflow increase export. The study also shows a bidirectional relation between export and growth but there is no effect from FDI to GDP.

Khan and Leng (1997) examine the interactions among inward FDI, exports and economic growth for Singapore, Taiwan and South Korea, at the aggregate level during the period from 1965 to 1995. They claim that there is no evidence to support the causal relationship between FDI and Exports in Taiwan and South Korea. Moreover, a one-way causal relationship which flows from exports to inward FDI is found in Singapore.

Table 1. *Asean Six Majors FDI in 2012*

No	Country	FDI in U.S Billion
1	Singapore	56.7
2	Indonesia	19.9
3	Malaysia	10
4	Thailand	8.6
5	Vietnam	8.3
6	Philippines	2.8

Values: in U.S Billion dollars
Sources: Business Times

Sharma (2003) investigates the determinants of export performance in India in a simultaneous equation framework. Results suggest that foreign investment does not have statistically significant impact on export performance although the coefficient of FDI has a positive sign. Findings obtained by Ahmad, Alam and Butt (2003) do not suggest a kind of FDI-led export growth linkage in Pakistan.

Jayachandran and Seilan (2010) examine the causal relationship between trade, FDI and economic growth for India over the period 1970-2007. According to their results, there is no causality relationship from FDI to exports.

Basu, Chakraborty and Reagle (2002) examined the relation between FDI and the economic growth in India. The research finds out that the GDP in India is not granger cause by FDI. It's causality being rather the other way round from GDP to FDI.

Related study focuses only into significant link between two variables of foreign direct investment has been done extensively. Goldberg and Klein (1999) in their study do not find the evidence of a significant link between foreign direct investment and exports in Latin America. Their study finds that the trade promoting effect of foreign direct investment is insignificant with regard to Latin American trade with the United States and Japan. The study has not found a systematic linkage between trade and FDI in Latin America.

Athukorala (2003) suggests that FDI inflows do not exert an independent influence on economic growth. He examines the relationship between FDI and GDP using time series data from Sri Lankan economy. He finds out that the direction of causality is not from FDI growth but from GDP growth to FDI. Eryigit (2012) investigates the relationship between FDI, exports, and GDP for Turkey from 2000 to 2010. His study finds out that there is long term relationship between FDI and export, FDI and GDP, and export and GDP.

Mishra, Mishra, Subudhi, and Phil (2011) in his study, the Dynamics of Relationship between exports and economic growth attempts to reinvestigate the dynamics of the relationship between exports and economic growth for India over the period 1970 to 2009. His finding states that the trend in India is not exports led growth but rather growth-led exports.

The empirical literatures indicate that the results of the causality relation are varied based on the period of time, the methodology used and the treatment of the variables. The study results show causality relation, no causality relation among variables, bidirectional or in directional. Therefore in this study, the research needs to clearly indicate the variables treatment, the sample data used in the study, methodology and model of estimation and specification.

The economy of Indonesia has grown strongly over the three decades. Several factors are responsible for the rapid growth. According to Radelet, Jeffrey, and Lee (2001), in particular economic policies relating to openness have played a significant role to the region's realized economic growth. They states also that the causes for the rapid growth are large potential of catching up the business, Favorable demographic characteristics, demographic dividend and distribution and the policies of the economy and the strategy aimed on growth.

Indonesia has to make a good strategy because Indonesia fulfill the criteria of the rapid growth cause as stated by Radelet, Jeffrey, and Lee (2001). In case of export, the export competitiveness of Indonesia has eroded from 2005 to 2014.

MATERIALS AND METHODS

This study uses annual data from the World Bank online database (World Development Indicators) from 1981 to 2015. The study examines the long term and short term relationships between foreign direct investment (% of GDP), GDP per capita growth (%, annual), and Export (% of GDP).

The objective of this study is to examine the relationship of foreign direct investment, export and GDP growth rate in Indonesia. The

procedures applied in this study are unit root test using Dickey Fuller Augmented tests, Johansen Tests of Co-integration, VECM model, Co-integration equation and Lagrance Multiplier test

The study applies unit root test using Dickey-Fuller Test for unit root, Lag selection criteria, Johansen tests for Co-integration, Error correction model. The study examines the short term and long term relationships between GDP per capita growth, export and foreign direct investment by using Johansen Test of co-integration and the ECM model.

Appropriate test are required to identify the characteristics of the series when dealing with time series data. If a series is stationary, then the shock imposed on is elimination and variable returns to its long-term equilibrium. If the time series is non- stationary, the mean or variance or both are a function of time. And if the time is infinite, varying the variables will be infinitive. Therefore, the variables will be divergent away from its path equilibrium (Stereo & Hall, 2006). The aim of the unit root test therefore is to examine whether or not a series contain a unit root. The results of the regression are spurious when the series have unit root. The null hypothesis is if there is unit root or not stationary and the alternative hypothesis is there is no unit root or stationary. In this study, we use the Augmented Dickey-Fuller (ADF) test.

Co-integration test is one of the important preliminary tests that need to be conducted after the unit root test specifically if the level of the series is non-stationary at levels. Engle and Granger (1987) refers that an important consideration before doing the co-integration tests is that all the series are integrated in the same order.

Johansen (1988 & 1991) and Johansen and Juselius (1990) suggested two test statistic to determine the number of co-integration vectors. The two test statistics are called Trace test and the maximum eigenvalue test.

The co-integration analysis is to indicate whether or not there is a long-run relationship between the three variables. The co-integration analysis does formulate the direction of the causal relationships among the variables. Therefore, we need the ECM granger causality tests.

RESULTS AND DISCUSSIONS

The study explores the causal relationship between foreign direct investment, gross domestic product per capita growth rate (annual %), and export. The dataset is yearly and covers the period 1981 to 2015. All data series are obtained from the World Bank statistics Database.

The study use ADF test to test the integrated of order on foreign direct investment (% of GDP), gross domestic product on GDP per capita growth rate (annual %), and exports (% of GDP), the same test also applied in another two variables, Augmented Dickey-Fuller test on GDP per capita growth rate (annual %) and Augmented Dickey-Fuller test on export (% of GDP).

The null hypothesis of the test is the variable contains unit root or not stationary and alternative hypothesis is the variable does not have unit root or stationary. If the absolute Test statistics are less than the critical value, we should reject null hypothesis.

The test statistic is -1.953 which is less than 5 % critical value of -2.975. For GDP growth rate per capita (annual %) we do not reject the null

hypothesis because the test statistic value is -4.320 which is more than 5 % critical value of -2.975. As stated before that we test all variables in three models of equation 1 for intercept only, equation 2 for trend and intercept and equation 3 for no trend and no intercept. From this there models equation the results are the same.

Table 2. *Co-integration test*

```
. dfuller fdi, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -1.953            -3.689            -2.975           -2.619
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3074

------------------------------------------------------------------------------
       D.fdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         fdi |
         L1. |   -.2232037   .1142672    -1.95   0.060    -.4559583    .0095509
             |
       _cons |    .272509   .1816143     1.50   0.143    -.0974273    .6424453
------------------------------------------------------------------------------

. dfuller fdi, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -2.172            -4.297            -3.564           -3.218
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5056

------------------------------------------------------------------------------
       D.fdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         fdi |
         L1. |   -.2669074    .122887    -2.17   0.038    -.5175372   -.0162776
       _trend |    .0156497   .0161006     0.97   0.339    -.0171877    .0484872
       _cons |    .0394944   .3008498     0.13   0.896    -.5740928    .6530816
------------------------------------------------------------------------------

. dfuller fdi, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -1.300            -2.646            -1.950           -1.604
------------------------------------------------------------------------------

------------------------------------------------------------------------------
       D.fdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         fdi |
         L1. |   -.122359   .0941483    -1.30   0.203    -.3139051    .0691872
------------------------------------------------------------------------------
```

```
. dfuller gdp, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.320             -3.689            -2.975           -2.619
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0004

------------------------------------------------------------------------------
       D.gdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |
         L1. |   -.7324577   .1695588    -4.32   0.000    -1.077838   -.3870778
             |
       _cons |    2.660602   .8842478     3.01   0.005     .8594478    4.461756
------------------------------------------------------------------------------

. dfuller gdp, trend regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.249             -4.297            -3.564           -3.218
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0038

------------------------------------------------------------------------------
       D.gdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |
         L1. |   -.7324464   .1723709    -4.25   0.000    -1.083999   -.3808936
       _trend |    .000124   .0642577     0.00   0.998    -.1309305    .1311784
       _cons |    2.658391   1.456349     1.83   0.078    -.3118535    5.628635
------------------------------------------------------------------------------

. dfuller gdp, noconstant regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.780             -2.646            -1.950           -1.604
------------------------------------------------------------------------------

------------------------------------------------------------------------------
       D.gdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp |
         L1. |   -.3687686   .1326312    -2.78   0.009    -.6386088   -.0989283
------------------------------------------------------------------------------

. dfuller export, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        34

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.932             -3.689            -2.975           -2.619
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0417

------------------------------------------------------------------------------
    D.export |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      export |
         L1. |   -.4400508   .1500616    -2.93   0.006    -.7457163   -.1343852
             |
       _cons |    12.44789   4.438645     2.80   0.008     3.406665    21.48911
------------------------------------------------------------------------------
```

```
. dfuller export, trend regress lags(0)
```

Dickey-Fuller test for unit root — Number of obs = 34

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.877	-4.297	-3.564	-3.218

MacKinnon approximate p-value for Z(t) = 0.1702

D.export	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
export L1.	-.4409472	.1532896	-2.88	0.007	-.7535835	-.1283109
_trend	.0053759	.0957986	0.06	0.956	-.1900066	.2007584
_cons	12.37975	4.670055	2.65	0.013	2.85511	21.90439

```
. dfuller export, noconstant regress lags(0)
```

Dickey-Fuller test for unit root — Number of obs = 34

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-0.829	-2.646	-1.950	-1.604

D.export	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
export L1.	-.028353	.034188	-0.83	0.413	-.097909	.041203

For lag selection (Table 3), the study uses lag 4 in all models because the model is system equation model. In Johansen co integration test, when the trace statistic is more than critical value, we can reject null hypothesis and can accept alternative hypothesis but if the trace statistic less than critical value, we do not reject null rather we accept null. Meaning there is no co integration among ours three variables. The null hypothesis for rank 0 is there is no co integration. The result is the trace statistics are more than the critical value. It means we reject the null hypothesis. We continue to test rank 1 which means there is 1 co-integration (Table 4). In this case, we reject the null hypothesis. In this test, we find out that there is one co-integration in this model. The trace statistics is smaller (8.9015) than critical value of 5 % (15.41%). It means that our three variables foreign direct investment, gross domestic product growth, and export are co-integrated. The variables have long association and move together in the long run.

Table 3. *Lag Selection*

Selection-order criteria
Sample: 1985 – 2015 Number of obs = 31

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-223.654				450.012	14.6228	14.6681	14.7616
1	-193.704	59.899	9	0.000	116.975	13.2712	13.4522	13.8263
2	-181.953	23.504	9	0.005	99.8674	13.0937	13.4104	14.0651
3	-165.802	32.3	9	0.000	66.0524	12.6324	13.0848	14.0201
4	-145.636	40.334*	9	0.000	35.2925*	11.912*	12.5001*	13.716*

Endogenous: fdi gdp export
Exogenous: _cons

varsoc fdi gdp export

Selection-order criteria
Sample: 1985 – 2015 Number of obs = 31

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
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1	-193.704	59.899	9	0.000	116.975	13.2712	13.4522	13.8263
2	-181.953	23.504	9	0.005	99.8674	13.0937	13.4104	14.0651
3	-165.802	32.3	9	0.000	66.0524	12.6324	13.0848	14.0201
4	-145.636	40.334*	9	0.000	35.2925*	11.912*	12.5001*	13.716*

Endogenous: fdi gdp export
Exogenous: _cons

Table 4. *Johansen Test of Co-Integration*

Johansen tests for cointegration
Trend: constant Number of obs = 31
Sample: 1985 – 2015 Lags = 4

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	30	-160.65319	.	30.0351	29.68
1	35	-150.08639	0.49426	8.9015*	15.41
2	38	-146.5493	0.20403	1.8273	3.76
3	39	-145.63562	0.05724		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	30	-160.65319	.	21.1336	20.97
1	35	-150.08639	0.49426	7.0742	14.07
2	38	-146.5493	0.20403	1.8273	3.76
3	39	-145.63562	0.05724		

In the VECM model, there are two issues that we will analyze. They are Long Run Causality and Short run causality.

In the VECM, we need to make sure the sign and significance of the error correction term (CE1). Error correction term is also called speed of adjustment towards equilibrium. It is to find out whether or not there is long term causality running from FDI to the growth rate of GDP per capita. We will find out also the short-term causality of the growth of GDP per capita with the lags of export and foreign direct investment.

Table 5. *VECM Model*

Vector error-correction model

Sample: 1985 - 2015 No. of obs = 31
AIC = 11.94106
Log likelihood = -150.0864 HQIC = 12.46882
Det(Sigma_ml) = 3.219937 SBIC = 13.56008

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_fdi	11	.773345	0.5466	24.10666	0.0123
D_gdp	11	4.23347	0.3621	11.35498	0.4140
D_export	11	6.04227	0.3622	11.36024	0.4136

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_fdi						
_ce1						
L1.	-.1018961	.1144302	-0.89	0.373	-.3261752	.1223829
fdi						
LD.	-.2694921	.2580304	-1.04	0.296	-.7752223	.2362382
L2D.	-.178335	.1897295	-0.94	0.347	-.550198	.1935281
L3D.	.2417329	.1857716	1.30	0.193	-.1223728	.6058386
gdp						
LD.	.1525017	.0922002	1.65	0.098	-.0282075	.3332108
L2D.	.1181744	.0597668	1.98	0.048	.0010336	.2353153
L3D.	.0893428	.0576859	1.55	0.121	-.0237195	.202405
export						
LD.	.013841	.0574688	0.24	0.810	-.0987957	.1264777
L2D.	-.0714186	.0497567	-1.44	0.151	-.1689399	.0261026
L3D.	-.0492299	.0388595	-1.27	0.205	-.125393	.0269333
_cons	.0479588	.1456866	0.33	0.742	-.2375818	.3334994
D_gdp						
_ce1						
L1.	-.8368377	.6264168	-1.34	0.182	-2.064592	.3909167
fdi						
LD.	.435553	1.412517	0.31	0.758	-2.332929	3.204035
L2D.	-.2159211	1.038622	-0.21	0.835	-2.251584	1.819741
L3D.	-.3982882	1.016956	-0.39	0.695	-2.391485	1.594909
gdp						
LD.	.047673	.5047249	0.09	0.925	-.9415697	1.036916
L2D.	-.1397323	.3271771	-0.43	0.669	-.7809877	.5015231
L3D.	.0972172	.3157856	0.31	0.758	-.5217112	.7161455
export						
LD.	.3671724	.314597	1.17	0.243	-.2494264	.9837712
L2D.	.1938963	.2723792	0.71	0.477	-.3399572	.7277497
L3D.	.1104048	.2127256	0.52	0.604	-.3065297	.5273392
_cons	-.036235	.7975217	-0.05	0.964	-1.599349	1.526879
D_export						
_ce1						
L1.	.1432444	.8940606	0.16	0.873	-1.609082	1.895571
fdi						
LD.	-.9960595	2.016031	-0.49	0.621	-4.947407	2.955288
L2D.	1.02255	1.482386	0.69	0.490	-1.882872	3.927973
L3D.	2.014224	1.451462	1.39	0.165	-.8305896	4.859037
gdp						
LD.	.9442263	.7203745	1.31	0.190	-.4676817	2.356134
L2D.	-.2454714	.4669673	-0.53	0.599	-1.160711	.6697677
L3D.	.173719	.4507086	0.39	0.700	-.7096536	1.057092
export						
LD.	.0236584	.4490122	0.05	0.958	-.8563893	.9037061
L2D.	-.3127493	.3887564	-0.80	0.421	-1.074698	.4491992
L3D.	-.0210866	.303615	-0.07	0.945	-.6161611	.5739878
_cons	-.1775705	1.138272	-0.16	0.876	-2.408543	2.053402

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	2	13.00582	0.0015

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
fdi	1	.	.	.	.	.
gdp	.5494804	.2303691	2.39	0.017	.0979653	1.000996
export	.3105106	.0861892	3.60	0.000	.1415828	.4794384
_cons	-12.19902	.	.	.	.	.

The next is test linear hypothesis (Table 6) shows that the probability chi2 is 0.79% which is less than 5%. In this case, we can reject null hypothesis and we accept alternative hypothesis. It means that there is short run causality running from FDI to GDP. For overall analysis, the study finds out that there is long run and short run causality running from FDI and GDP to Export.

Table 6. *Linear Hypothesis*

```
. test ([D_fdi])

 ( 1)  [D_fdi]L._ce1 = 0
 ( 2)  [D_fdi]LD.fdi = 0
 ( 3)  [D_fdi]L2D.fdi = 0
 ( 4)  [D_fdi]L3D.fdi = 0
 ( 5)  [D_fdi]LD.gdp = 0
 ( 6)  [D_fdi]L2D.gdp = 0
 ( 7)  [D_fdi]L3D.gdp = 0
 ( 8)  [D_fdi]LD.export = 0
 ( 9)  [D_fdi]L2D.export = 0
 (10)  [D_fdi]L3D.export = 0

           chi2( 10) =   23.88
         Prob > chi2 =    0.0079
```

To make more confident about the results, the study run the diagnostic VECM using Lagrance Multiplier test (Table 7). This test is very important to decide whether the variables have serial auto correlation or not. If the variables have autocorrelation it means that the model is not correct.

Table 7. *Lagrance Multiplier Test*

```
. veclmar, mlag(1)
```

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	5.3661	9	0.80129

H0: no autocorrelation at lag order

The Probability Chi2 is 80.12% which is more than 5%. The model has no autocorrelation. It is desirable and accepted. The VECM model has perfect result to explain the model.

CONCLUSIONS

This study examines the co-integrating and causal relationships between foreign direct investment, GDP and exports in Indonesia over the period 1981 to 2015. The study perform the unit root test of Augmented Dickey-Fuller test, lag selection criteria, Johansen test of co-The empirical analysis showed the evidence that integration and the VECM.

The study finds out that there is one co-integration in this model. The trace statistics is smaller (8.9015) than critical value of 5 % (15.41%). It means that the three variables foreign direct investment, gross domestic product growth, and export are co-integrated. The variables have long association and move together in the long run. There is no short run causality running from FDI (LD, L2D, L3D) to GDP. The probability chi2 is 0.79% which is less than 5%. In this case, we can reject null hypothesis and we accept alternative hypothesis. It means that there is short run causality running from FDI to GDP.

For overall analysis, the study finds out that there is long run and short run causality running from FDI and GDP to Export. The model has no autocorrelation so the model is significant.

The private sector in Indonesia has opportunity to develop the business since the FDI growth in Indonesia is getting increase and there is long run prediction in the relationship of the financial determinants. In this case, the government has to do better and flexible mutual understanding strategy to boost the investment in Indonesia.

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