JAPAN'S ECONOMY AND ITS IMPACT ON INDONESIA'S ECONOMY: CAPITAL MARKET, FOREIGN EXCHANGE MARKET, GOODS MARKET

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Abstract

Japan and Indonesia has a very close economic relationship for the past several decade. There are ways to analyse this economic relationship. They are among others are from capital market, foreign exchange market and trade market. Under the hypotheses that the Indonesia's capital market is related to the Japan's capital market, the Indonesia's foreign exchange market is related to the Japan's foreign exchange market, and the Indonesia's good market is related to the Japan's good market, visual inspection, correlation coefficient, Johansen cointegration, and regression are run using Indonesia's and Japan's data. The result shows that the first and second hypotheses are rejected. Indonesia and Japan's capital market is not related, and Indonesia and Japan's foreign exchange market is also not related. While the third hypotheses is accepted. The Indonesia and Japan's good market are related through export and import.

JEL Classifications: F14, F31, F41.

I. INTRODUCTION

For the past several decades. Indonesia has a very close economic relationship with Japan. It was started when Indonesia reached its independence in the 1945 and continue up to these days. There are ways to analyse economic relationship between countries, among others from capital market points of view, foreign exchange market points of view, and goods market points of view. This paper is trying to analyse the relationship of Indonesia's economy with Japan's economy from those 3 points of view. The hypotheses are, the Indonesia's capital market is related to the Japan's capital market, the Indonesia's foreign exchange market is related to the Japan's foreign exchange market, and the Indonesia's goods market is related to the Japan's goods market. The data covered between 1994 1st quarter until 2018 2nd quarter. All data are taken from CEIC data stream. All analysis are done using E views version 8 statistical program.

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II. CONTENT

1. Background (Masashi, 1976; Welfeld, 1988; Linblad et al, 2002;

As early as 1945, there has been a bilateral economic relationship between Indonesia and Japan. This was done regarding the Japan's occupation of Indonesia between 1942 until 1945 to reach a settlement regarding the payment of compensation after Japan's defeat in the Pacific War in 1945. But most importantly was to lay the foundation for economic cooperation. In 1958, after the Treaty of Peace, there was a Reparation Agreement which has becoming the basis for Official Development Assistance (ODA). This was followed by a mutual and beneficial relationship such as the Agreement on Amicable Relations and commerce in 1963, until the year of 1965, when the Indonesian government shifted from the Old Order under President Sukarno to the New Order under President Suharto. In this payment compensation, Japan disburse a reparation fund to build infrastructure. Japan's government also invited the Japanese private sector to participate in the development project, thereby initiated and also facilitated the incoming of Japanese private investment in Indonesia.

The introduction of the Foreign Investment Law by the New Order government in 1967 improved the climate for foreign direct investment in Indonesia significantly. This was in line with the easing of Japan restriction on international capital movements while at the same time large Japanese firms facing rising wage costs at home and thereby started investing heavily in Indonesia. Under the government of New Order, Japan, together with the United States of America and the European countries, had becoming one of the prominent countries which support the Indonesia's economic development. Japan provided economic assistance, among others, and became the country which provide one-third of the emergency aid credits to Indonesia which at that time suffered economic disaster due to high debt burden, and hyper-inflation, among others. (Welfield, 1988).

In 1977, there was a diplomatic approach by the Prime Minister Fukuda Takeo, called "*dari hati ke hati",* or "from heart to heart". This was followed by Agreement on Scientific and Technical Cooperation and Agreement on Avoidance of Double Taxation and the Prevention of Income Tax Evasion. The import substation policies and strong import protection implemented by the government In the 1980s restrained the Japan investment in Indonesia somewhat. However, the shift to export-oriented manufacturing by the end of the oil boom era, needed many deregulation policies to boost more efficient and internationally competitive private non-oil sector with participation from foreign companies. This attracted Japanese companies to invest in Indonesia, increasing the numbers of newly established Japanese firms in 1988.

Before the Asian Financial Crisis which hit Indonesia between 1997 and 1998, the cooperation in terms of interdependence was continued under the influence of post-Cold War economic cooperation. Note that only a few months before the shift of the government of the Old Order to the New Order, Japan was still giving loan to Indonesia in amount of US$37 million worth of textiles and other consumer goods, showing the good faith of the Japanese government (Masashi, 1976; Boyd, 2009)

Following the Asian Financial Crisis in 1997/1998 and the change of the government from the New Order regime to the Reform Order regime, the cooperation between Indonesia and Japan became an aid diplomacy. This was followed by an interdependence between economy, politics, and socio-cultural.

After the Asian Financial Crisis hit Indonesia in 1997/1998, the government has changed from the New Order to the Reform Order. In the beginning of the Reform Order, from trade point of view, one of the negative impact of the crises was the decrease in trade related to Japan. Since 1997, the Japanese trade i.e. import from Indonesia or export to Japan has fallen dramatically. Before 1997, between 1988 until around the beginning of 1990s, Japan's portion of Indonesia export to abroad reached almost 50 percent, fluctuated between 45 percent and 42 percent of total Indonesia's export. However, in 1998, that portion has dropped to 18 percent. Even though Japan's portion has grown to around 25 percent, this figure never reached the original figures before the Asian Crisis. Nevertheless, Japan still one of Indonesia's largest trading partner and export destination, besides China and the United States of America or the USA.

According to Linblad et al (2002), from Japan direct investment to Indonesia point of view, numbers of new Japanese companies arrived in Indonesia collapsed and there was an effective net outflow of some $350 million from Indonesia in fiscal year of 1998/1999, while in 1999, there was again a net outflow of $2.7 billion.

After the change to the new Reform Order, as stated above, Japan still one of Indonesia's largest trading partner and export destination, besides China and the United States of America. This and the creation of a democratic government in Indonesia in the Reform Oder, has motivated Japan to strengthen the economic cooperation with Indonesia. Thus there were many agreement between Indonesia and Japan which develop an economic partnership to increase bilateral economic cooperation beyond just trade and investment, for example opportunities for Indonesian business to enter the Japanese market and the establishment of Japan-Indonesia Economic Partnership Agreement or JIEPA since 2008.

A long relationship has developed between Japan and Indonesia. An analysis using quantitative approach is needed to see how Indonesia can benefit the economic growth of Japan. There are ways to do this, among others, analysis from capital market point of view, foreign exchange point of view, and export-import of goods point of view.

From capital market point of view, the relationship could be seen from correlation of Indonesian capital market indicator or Jakarta Capital Market Index and Japan capital market indicator or Tokyo Nikei 225 Capital Market index. When both are correlated, a high short-term capital inflow and outflow from Japan to Indonesia moving into and out of the Indonesian capital market, which might represent the perspective of Japanese investor, will affect the Indonesian capital market.

From foreign exchange point of view, when there exist a correlation between the Indonesia foreign exchange of Rupiah and Japan foreign exchange or Yen, a movement of Yen into and out of the Indonesian foreign exchange market will definitely affect the position of Rupiah versus Yen.

From export and import point of view, using an established demand function, Indonesian export to Japan will be affected by the economic growth of Japan. When the

elasticity of Japan economic growth is positive and significant, an increase in Japan's economy will increase Indonesia's export to Japan, create a positive net export, and contribute significant boost to Indonesian economic performance. Note that this analysis has becoming more important in light of Indonesia's current account condition which has been deficit until recently. The issue of Indonesia's export and import or Indonesia's current account need to be addressed in line with global condition particularly the trade partner countries of Indonesia, in this case Japan.

The next part will examined some literature review or research papers which analysed the impact of Japan's economy on Indonesia either using qualitative or quantitative approaches.

2. Literature Review

As stated in Berument H. (2006), a shock in large country such as Japan will affect the performance of other small open economy country such as Indonesia, providing that, that large country is an important trading partner of the small country. Running a structural vector auto-regression or VAR on the data of Indonesia and Japan between 1998 1st quarter until 2004 1st quarter, it is found that, among others, higher growth in Japan will increases growth in Indonesia. The study also found out that the Indonesian economic performance did not affect the Japan economy at all.

Kiyota (2014) analysed the impact of export on employment in Indonesia, in addition to Japan, China, and Korea. This paper does not directly related to analyse of the impact of Japan's growth on Indonesia's export and import. However, the result of this paper could be used to support the conclusion of whether Japan economy could affect Indonesia's current account in particular export and thereby the reduction of unemployment. In general, the paper shown that higher export increased employment in machinery related industries such as electrical and optical equipment, and transport equipment. Also, even though more than 80 percent of export are from manufacturing industries, the effects of exports on employment are not limited to manufacturing industries. Non-manufacturing industries account for between 40 and 60% of the implied employment from exports. A significant number of workers in non-manufacturing industries depend upon manufacturing exports through vertical inter-industry linkages. An implication of this is that, even in cases where an industry is not particularly directly export-oriented, the industry may still be subject to potential effects – positive or negative – of changes in export demand. An industry's export dependence will be large if downstream customers are highly export dependent (Kiyota, 2014).

Linblad et al (2002) in their paper tried to analyze the impact of Japanese technology to Indonesia. They conclude that the accumulation of Japanese investment in Indonesia has allowed for both an accelerated expansion and an increasing diversification. This enhances the potential scope for technological contributions to local growth.

Abimanyu (2013) analyzed the impact of the so called "Abenomics", Japan's economic policies, introduced a few years ago in Japan, named after Mr. Shinzo Abe, the Prime Minister of Japan. The policies meant to resolve Japan's low economic growth and deflation. This include among others, monetary policy expansion through quantitative

easing. The monetary expansion, or "beggar thy neighbor policy" expanded the money supply, reduce domestic interest rate, lower relative to trade partners, depress the Yen exchange rate, increases export, decreases import, improve the trade balance and thereby generating an expansion in Japan's economic growth. The reduction of Japan's interest rate would push capital out of Japan into trade partners' country i.e. Indonesia, appreciate the Indonesia exchange rate, deteriorate the trade balance, and shrunk the economy. Thus the impact would be through the capital account and current account. Not that however, Japan's higher growth will lead to Indonesia's larger export, which is positive on the trade and current account of Indonesia.

The next part will explain models which will be used for analysis in this paper.

3. The Model

Four models would be run here. The first one is the graphical presentation, or visual inspection. In this one, series or variables will be compared using graph. Comparison using graph would be the easiest way to analyse variables. This does not need any theory. However, this approach is subjective. Depend on how people looking at the graph, two different economist would have two different opinion and conclusion.

To formalize the visual inspection approach, the second model is coefficient correlation or cross correlations. Following Green (2018) and Enders (2014), cross correlation between two series x and y are given by the Pearson product-moment correlation coefficient, also known as r, R, or Pearson's r. It is a measure of the strength and direction of the linear relationship between two variables that is defined as the covariance of the variables divided by the product of their standard deviations. This is the best known and most commonly used type of correlation coefficient. Note that, unlike the autocorrelations, cross correlations are not necessarily symmetric around lag 0 (Green, 2018).

The third one is the more advanced Johansen Cointegration. In this method, it is assumed that all concerned variables are integrated of the same order, i.e. integrated of order one and the residual sequence is stationary, i.e. integrated of order zero. In this case, there to be a linear combination of the integrated variables that is stationary. The variables are said to be cointegrated and there exist a long-run relationship between the variables. The maximum likelihood estimation used in the procedure circumvents the use of two-step estimators In the Error Correction method and can estimate and test for the presence of multiple cointegrating vectors. Also, this test can be used to test restricted versions of the cointegrating vectors and speed of adjustment parameters. Johansen (1988) relies on the relationship between the rank of a matrix and its characteristic roots (Johansen, 1995 1991; Davidson, 2000; Green, 2018).

The fourth method is the Ordinary Least Squares method. In this classical regression method, it is run under the assumptions that if the model to be run is a fully specified model, all the variables are stationary and the error has a zero mean and finite variance (Green, 2018).

4. Analysis

A. Unit root tests.

There are several ways to run a unit root test. Phillips and Perron developed a procedure that allows for fairly mild assumption concerning the distribution of errors. the Phillips-Perron test allows the disturbance to be weakly dependent and heterogeneously distributed. In addition to that the Phillips-Perron tests have the advantage that the choice of specifying the lag length does not have to be made (Holden and Perman, 1994). Also, the standard other tests i.e. Augmented Dickey Fuller test may provide somewhat biased result toward nonrejection of unit root due to major changes in the data, such as oil shock, financial deregulation, and major intervention in the monetary policy by the Central Bank, where these changes could have created a permanent change in the series. In this case, the Phillips-Perron test could provide a more appropriate test (Christiano, 1992; Chu and White, 1992; Perron and Vogelsang, 1992a; Perron and Volgesang, 1992b; Perron, 1990; Perron, 1989). The null hypothesis is similar, where $H_0 : \gamma^* = \gamma - 1 = 0$, except in this case the t-statistic of the γ^* coefficient is corrected for serial correlation in ε_t. Based on the above consideration, i.e. considering some major changes in the data, the more robust Phillips-Perron test will be done here to test for the presence of a unit root in all series. Under the null hypotheses that unit root exist, the result of the Phillips-Perron test for all series could be seen in table 1 below.

The table below shows that almost all series are non stationary or integrated of order one or I(1) while one of them which is Indonesia Export Price is stationary.

Table 1: Phillips-Perron unit root test

Series	Constant	Constant & Trend	No Constant nor Trend	Order of Integration
Jakarta Index	0.031805	-3.337753*	1.856797*	I(1)
Tokio Nikei 225	-1.337569	-2.052071	-0.114093	I(1)
Rp/USD	-1.036219	-1.973826	1.256696	I(1)
Log(Rp/USD)	-2.171286	-2.292564	1.198606	I(1)
Yen/USD	-1.801359	-1.898244	-0.031479	I(1)
Log(Yen/USD)	-2.254020	-2.329965	0.064848	I(1)
Indonesia Export to Japan	-2.008666	-1.820634	0.234886	(1)
Log(Indonesia Export to Japan)	-1.910697	-2.116832	0.404964	I(1)
GDP Japan Constant Price	-1.758902	-1.858347	-0.165315	(1)
Log(GDP Japan Constant Price)	-2.185468	-2.623826	0.255071	I(1)
GDP Japan Current Price	-2.386702	-2.804918	-0.436410	(1)
Log(GDP Japan Current Price)	-2.974653**	-3.138206	0.142025	I(1)
Indonesia Export Price	-3.755788***	-3.689772**	0.029947	I(0)
Log(Indonesia Export Price)	-3.755788***	-3.689772**	0.029947	I(0)
Japan Import to Indonesia	-1.898481	-1.974636	0.123313	(1)
Log(Japan Import to Indonesia)	-2.157398	-2.236964	0.966378	I(1)
GDP Indonesia Constant Price	-1.251313	-2.164375	0.377682	(1)
Log(GDP Indonesia Constant Price)	-2.814996*	-2.637428	1.327393	I(1)
GDP Indonesia Current Price	-0.256193	-1.953257	2.316291**	I(1)
Log(GDP Indonesia Current Price)	-2.529955*	-1.208303	3.852957***	I(1)
Indonesia Import Price	-1.729374	-1.374460	0.418861	I(1)
Log(Indonesia Import Price)	-2.529955	-1.208303	3.852957***	I(1)

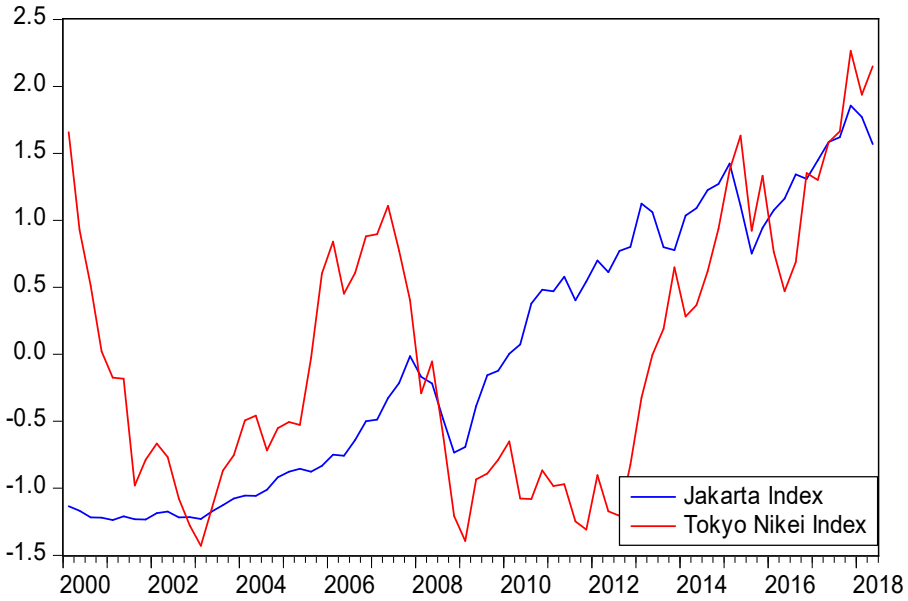
Notes:

(*) denotes rejection of the null hypothesis at the 10% MacKinnon critical values;
(**) denotes rejection of the null hypothesis at the 5% MacKinnon critical values;
(***) denotes rejection of the null hypothesis at the 1% MacKinnon critical values.

B. Correlation in the capital market between Indonesia and Japan:

Comparison between stock exchange index of Indonesia against Japan (using quarterly data between 2000 quarter 1 until 2018 quarter 2).

i. Graphical approach



Graph 1: Comparison between Jakarta Index and Tokyo Nikei 225 Index.

Virtual inspection is one way to find out whether there is close correlation between two series. The above graph shows that even though the Jakarta Stock Exchange Index and the Tokyo Nikei 225 Index are volatile within the period of observations, both are somewhat moving in the same direction. This particularly happened around 2014 after the introduction of "Abenomics" which might reflect the short-term impact of monetary expansion of Japan where there were short upward movement in the Tokyo Nikei 225 Index, followed by the similar increase in the upward movement of the Jakarta or Indonesia Stock Exchange Index. Note however, that this visual inspection approach is rather subjective. Thus the next part will try to do analysis using correlation coefficient which could be considered as somewhat more formal and more objective compared to the visual inspection approach.

ii. Correlation Coefficient

Table 2: Correlation between Jakarta Index and Tokyo Nikei 225 Index

	D(SAHAMINDEXIHSG)	D(SAHAMINDEXNIKEI225)
D(SAHAMINDEXIHSG)	1.000000	0.346813
D(SAHAMINDEXNIKEI225)	0.346813	1.000000

Unit root tests using Phillips-Perron indicates that the null hypotheses that both Jakarta Stock Exchange Index and Tokyo Nikei 225 index, are not stationary, could not be rejected. They are non-stationary. Since both are non stationary, a first difference process would be applied to both variables.

Analysis of correlation coefficient between both series in first difference shows that they are positively correlated with a value of 0.35 or smaller than 0.50 or lower than 50 percent.

iii. Cointegration

Table 3: Cointegration between Jakarta Index and Tokyo Nikei 225 Index

Date: 09/12/18 Time: 13:59
Sample: 2000Q1 2018Q2
Included observations: 74
Trend assumption: Linear deterministic trend
Series: SAHAMINDEXIHSG SAHAMINDEXNIKEI225
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.092260	7.552552	15.49471	0.5144
At most 1	0.005250	0.389533	3.841466	0.5325

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.092260	7.163019	14.26460	0.4700
At most 1	0.005250	0.389533	3.841466	0.5325

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

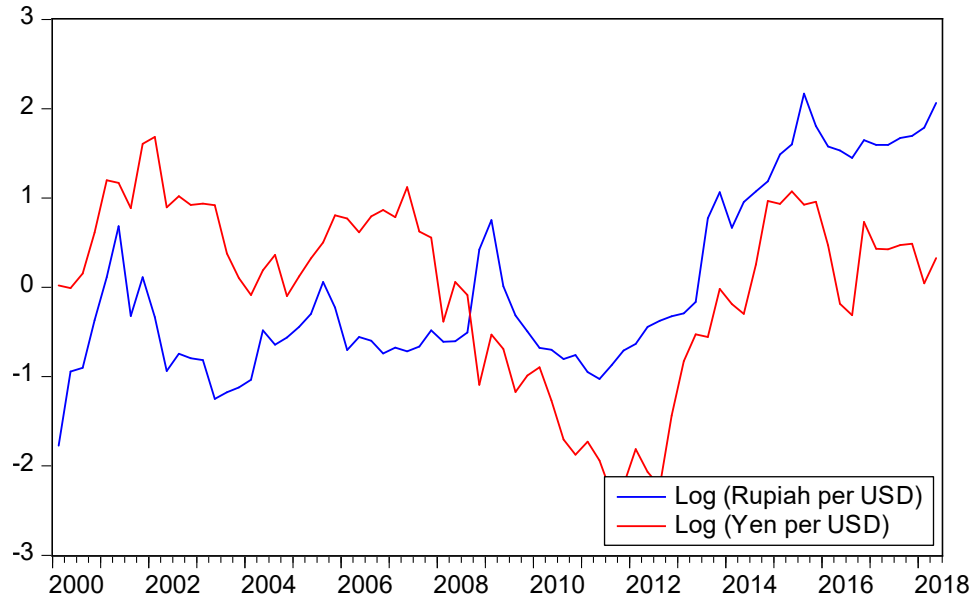
Visual inspection and correlation coefficient analysis shows that both series are somewhat correlated. Since Phillips-Perron unit root tests indicates that both variables are not stationary, there is a possibility that there exist a long-run relationship between both variables. To formalized the analysis, a Johansen Cointegration test would be run in this case.

Trace test indicates that there is no cointegration. Max eigentvalue test also indicates that there is no cointegration. Since both test reject cointegration, they are not cointegrated. Even though visual inspection and correlation coefficient show that both Indonesia and Japan Capital Market are somewhat correlated, more formal analysis using Johansen Cointegration shows that both series have no long-run relationship.

C. Correlation in the foreign exchange market between Indonesia and Japan.

Comparison between exchange rate of Rupiah per USD against Yen per USD in logarithm (using quarterly data from 2000 q1 until 2018 q2)

i. Graphical approach:



Graph 2: Comparison between Rupiah per USD and Yen per USD

Virtual inspection shows that both logarithm of exchange rate Rupiah per USD and logarithm of Yen per USD are volatile. Nevertheless, subjectively both are somewhat moving in the same direction. Note that this approach is rather subjective. Thus, similar with the comparison between Indonesia and Japan capital market, the next part will try to do analysis using correlation coefficient which could be considered as somewhat more formal and more objective compared to the visual inspection approach.

ii. Correlation Coefficient

Table 4: Correlation between Rupiah per USD and Yen per USD

	D(LRPPERUS)	D(LYENPERUS)
D(LRPPERUS)	1.000000	0.196375
D(LYENPERUS)	0.196375	1.000000

Unit root tests using Phillips-Perron indicates that at null hypothesis that both variables are not stationary, could not be rejected. They are non-stationary. A correlation coefficient analysis of first difference of both series show that they are somewhat correlated with positive sign but the value is only 0.20, less than 0.5 or smaller than 50%.

iii. Cointegration.

Table 5: Cointegration between Rupiah per USD and Yen per USD

Date: 09/12/18 Time: 13:46
Sample: 2000Q1 2018Q2
Included observations: 74
Trend assumption: Linear deterministic trend
Series: LRPPERUS LYENPERUS
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.041570	5.043229	15.49471	0.8042
At most 1	0.025366	1.901320	3.841466	0.1679

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.041570	3.141909	14.26460	0.9368
At most 1	0.025366	1.901320	3.841466	0.1679

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Since Phillips-Perron unit root tests indicates that both variables are not

stationary, there is a possibility that there exist a long-run relationship between both variables. A Johansen Cointegration test would be run in this case. The result of the Trace test and Max-eigenvalue test show that the logarithm of the Rupiah per USD is not cointegrated with the logarithm of the Yen per USD.

D. Correlation in the goods market between Indonesia and Japan:

i. Export market

a. The Model:

A model will be run here.

The model is based on the demand function for export goods, from Japan's point of view.

Export from Indonesia to Japan, or demand of Japanese consumer for Indonesia's good, depend on the price of Indonesia's exported goods or the exchange rate, and the income of Japanese consumer.

Demand (of Japan to Indonesia) is a function of price and income (Varian, 2010):

$Dx_t = f(Px_t, Ex_t, Y_t, e)$ (1)

Where:

Dx_t = Demand for Indonesia's goods by Japan, or, export from Indonesia to Japan

Px_t = Price of Indonesia goods, or, price of exported goods, with negative sign (-). When Price goes up, demand for export goes down.

Ex_t = Exchange Rate of Indonesia versus USD or Japanese Yen with positive sign (+). When exchange rate goes up or depreciated, Rupiah is cheaper, demand for export goes up.

Y_t = Income of Japan, proxied by Japan's Gross Domestic Product with positive sign (+). When income goes up, demand for export goes up.

Since the data of Japan's Gross Domestic Product is quarterly data, all variables will be using quarterly data.

b. Unit root tests

Using Phillip-Perron's unit root test, it is found that from the series which would be used in the above model, price of Indonesia goods or price of export goods is the only series which is stationary. The rest are not stationary. Thus the regression should be run in first difference.

c. Regression analysis

Table 6: Regression between Demand for Export, Price of Export, Rp/USD, Rp/Yen, Japan GDP.

Dependent Variable: D(EXPORTTOJAPANMNUS)
Method: Least Squares
Date: 09/03/18 Time: 16:20
Sample (adjusted): 2000Q2 2018Q2
Included observations: 73 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.86338	25.87118	0.458556	0.6480
D(EXPORTPRICEAVERAGEKGUS)	0.590586	0.353395	1.671176	0.0994
D(RPPERUSD)	0.194667	0.090874	2.142159	0.0358
D(RPPERYEN)	-33.68133	9.027845	-3.730827	0.0004
D(GDPJAPANCURRENTMNUSD)	-0.000107	0.000640	-0.167283	0.8677
D(GDPJAPANCONSTANTMNUSD)	0.001848	0.000989	1.868635	0.0660

R-squared	0.242521	Mean dependent var	5.990701
Adjusted R-squared	0.185993	S.D. dependent var	241.1068
S.E. of regression	217.5322	Akaike info criterion	13.68119
Sum squared resid	3170458.	Schwarz criterion	13.86944
Log likelihood	-493.3634	Hannan-Quinn criter.	13.75621
F-statistic	4.290264	Durbin-Watson stat	2.384875
Prob(F-statistic)	0.001911		

A regression analysis is done using first difference of all series. The result is as above where depreciation of Rupiah per USD and GDP of Japan in Constant Price, are significant and have the correct signs. The rest are either have the wrong sign or not significant, for example Price of Export is not significant and have the wrong sign (positive instead of negative), exchange rate of Rupiah per Yen significant but give the wrong sign (negative instead of positive), and Japan GDP in Current Price not significant and gave the wrong sign (negative instead of positive).

Thus, when Rupiah per USD went up or depreciated by 1 percent, export to Japan goes up by 0.19 percent. Also, when Japan GDP in Constant Price goes up by 1 percent, export to Japan goes up as well by 0.0018 percent.

Meanwhile, Price of Export is not significant, and the exchange rate of Rupiah per Yen is significant but give the wrong sign.

This anomaly in the exchange rate of Rupiah per Yen probably could partly be explained by the expansionary monetary policy implemented by Japan. Even though Rupiah per USD depreciated which boost export from Indonesia to Japan, the reduction in Japan interest rate, lower than Indonesia interest rate, would push capital outflow of Japan and inflow into

Indonesia, which would appreciate the Indonesia exchange rate vis-à-vis Japan exchange rate, or appreciate Rupiah per Yen. Thus, while the depreciation of the Rupiah versus USD increase export to Japan, at the same time the Rupiah appreciated versus the Yen.

Table 7: Regression between log(Demand for Export), log Rp/Yen, log Yen/USD, log Japan GDP, Dummy crisis.

Dependent Variable: D(LINDEXPORTTOJAPMNUS)
Method: Least Squares
Date: 09/12/18 Time: 12:42
Sample (adjusted): 1994Q2 2018Q2
Included observations: 97 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000743	0.001698	0.437451	0.6628
D(LRPPERUS)	0.215275	0.060317	3.569051	0.0006
D(LRPPERYEN)	-0.219259	0.058680	-3.736484	0.0003
D(LGDPJAPANCONSTANTMNUS)	0.210248	0.081071	2.593397	0.0111
D(LGDPJAPANCURRENTMNUS)	0.011333	0.052340	0.216526	0.8291
DUMMYCRISIS1997	-0.013366	0.010387	-1.286789	0.2014

R-squared	0.211309	Mean dependent var	0.000753
Adjusted R-squared	0.167975	S.D. dependent var	0.017834
S.E. of regression	0.016268	Akaike info criterion	-5.339432
Sum squared resid	0.024082	Schwarz criterion	-5.180172
Log likelihood	264.9625	Hannan-Quinn criter.	-5.275035
F-statistic	4.876225	Durbin-Watson stat	2.320622
Prob(F-statistic)	0.000536		

When all data are multiply by logarithm, the data coverage are extended backward to 1994 before the Asian crisis, and a dummy variable (which represented the crisis) is added where one or 1 represented the period of crisis in quarter 1 until 3 of the year of 1998, and zero or 0 otherwise, the regression gave a better result.

The exchange rate of Rupiah versus USD is positive and significant. When Rupiah per USD depreciated, export to Japan goes up. Japan GDP in Constant Price give positive sign and significant. So when Japan's income goes up, their demand for Indonesia's good or export from Indonesia to Japan increases. Japan GDP in Current Price give positive sign (but not significant), so when Japan's income goes up in current price, export from Indonesia to Japan goes up as well. The Dummy for Asian Crisis in 1997/1998 is negative (with a low significant value). When crisis hit, export from Indonesia to Japan goes down.

Again there is an anomaly in the exchange rate of Rupiah per Yen. As explained above, this probably could partly be explained by the expansionary monetary policy implemented by Japan. Even though Rupiah per USD depreciated which boost export from Indonesia to Japan, the

reduction in Japan interest rate, would appreciate the Indonesia exchange rate vis-à-vis Japan exchange rate, or appreciate Rupiah per Yen.

Note that in this regression, the Price of Export is omitted due to the lack of data in the period before the Asian crisis.

ii. Import Market:

a. The Model:

Another model will be run here.

The model is based on the demand function, with regard of Indonesia's demand for Japanese' goods.

Indonesia's demand for Japanese goods depend on the price of import, or, the exchange rate, and the income of Indonesia's consumer.

Demand is a function of price and income (Varian, 2010):

$Dx_t = f(Px_t, Y_t, e)$ (2)

Where:

Dx_t = Demand for Japanese's good by Indonesian, or, Indonesia's import from Japan, or Japan's export to Indonesia.

Px_t = Price of imported goods with negative (-) sign. When price goes up, demand for import goes down.

Ex_t = Exchange rate of Rupiah per USD or Rupiah per Yen with negative (-) sign. When exchange rate goes up or depreciated, demand for import goes down.

Y_t = Income of Indonesia, proxied by Indonesia's Gross Domestic Product with positive sign (+). When Indonesia's income goes up, import goes up.

Since the data of Indonesia's Gross Domestic Product is quarterly data, all variables will be using quarterly data.

b. Unit root tests

Using Phillip-Perron's unit root test, it is found all variables are not stationary. Thus a Johansen Cointegration would be run for all variables which would give long-run relationship between all variables. The analysis will be using two different sets of data. The first one is between 1st quarter of 2002 until 2nd quarter of 2018. The second one is between 1st quarter of 1994 until 2nd quarter of 2018

c. Johansen Cointegration (1st set of data)

Table 8: Cointegration between log Demand for Import, log Price of Import, log Rp/USD, log Yen/USD, log Indonesia GDP.

Date: 09/14/18 Time: 10:05
Sample (adjusted): 2002Q4 2018Q1
Included observations: 62 after adjustments
Trend assumption: Linear deterministic trend
Series: LJAPIMPORTTOINDMNUS LINDIMPORTPRICEAVERAGE LRPPERUS LRPPERYEN LGDPINDCONSTANTPRICEMNUS LGDPINDCURRENTPRICEMNUS
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.438405	97.85455	95.75366	0.0356
At most 1	0.372110	62.08214	69.81889	0.1771
At most 2	0.224400	33.22794	47.85613	0.5443
At most 3	0.168168	17.47259	29.79707	0.6051
At most 4	0.069438	6.056840	15.49471	0.6888
At most 5	0.025397	1.594932	3.841466	0.2066

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.438405	35.77241	40.07757	0.1412
At most 1	0.372110	28.85420	33.87687	0.1768
At most 2	0.224400	15.75535	27.58434	0.6864
At most 3	0.168168	11.41575	21.13162	0.6058
At most 4	0.069438	4.461908	14.26460	0.8077
At most 5	0.025397	1.594932	3.841466	0.2066

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Johansen Cointegration with data between 1st quarter of 2002 until 2nd quarter of 2018 using Trace test indicates 1 (one) cointegrating equations at 0.05 level. Those variables are cointegrated. There exist a long-run relationship between those variables.

d. Johansen Cointegration (2nd set of data)

Table 9: Cointegration between log Demand for Import, log Rp/US, log Yen/US, log Indonesia GDP.

Date: 09/14/18 Time: 09:50
Sample (adjusted): 1994Q4 2018Q2
Included observations: 95 after adjustments
Trend assumption: Linear deterministic trend
Series: LJAPIMPORTTOINDMNUS LRPPERUS LRPPERYEN LGDPINDCONSTANTPRICEMNUS LGDPINDCURRENTPRICEMNUS
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.353890	85.96928	69.81889	0.0015
At most 1	0.156016	44.47464	47.85613	0.1004
At most 2	0.153219	28.36061	29.79707	0.0725
At most 3	0.067157	12.56080	15.49471	0.1319
At most 4 *	0.060775	5.956510	3.841466	0.0147

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.353890	41.49464	33.87687	0.0051
At most 1	0.156016	16.11403	27.58434	0.6561
At most 2	0.153219	15.79980	21.13162	0.2368
At most 3	0.067157	6.604294	14.26460	0.5369
At most 4 *	0.060775	5.956510	3.841466	0.0147

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Johansen Cointegration with data between 1st quarter of 1994 until 2nd quarter of 2018 using Trace test and Max-eigenvalue tests indicates 1 (one) cointegrating equations at 0.05 level. Those variables are cointegrated. There exist a long-run relationship between those variables.

III. CONCLUSION

Indonesia has a very close economic relationship with Japan. This paper has tried to analyze this relationship from 3 (three) point of views, which are capital market, foreign exchange market, and goods market.

From capital market point of view, even though visual inspection and correlation coefficient shows that both Indonesia capital market proxied by Jakarta Stock Exchange Index and Japan capital market proxied by Tokyo Nikei 225 Index are somewhat correlated, more formal analysis using Johansen cointegration shows that Indonesia and Japan capital market are not cointegrated. There is no long-run relationship between both of them.

From foreign exchange market point of view, similar with the capital market, even though visual inspection and correlation coefficient shows that both Indonesia foreign exchange or Rupiah per USD and Japan foreign exchange or Yen per USD are somewhat correlated, more formal analysis using Johansen cointegration shows that Indonesia and Japan foreign exchange are not cointegrated. There is no long-run relationship between both of them.

For the goods market, the analysis is divided into two. They are the analysis for the export of goods, and the analysis for the import of goods.

First the analysis for export. For export, based on model (1), Indonesia's export to Japan depend on the price of export, the exchange rate of Rupiah per USD, the exchange rate of Rupiah per Yen, and Japan's GDP Constant Price and Current Price. First all data are differenced once since most are non stationary while other (the price of export) are stationary. Thus the analysis is in short-run. Using data coverage from 2000 2nd quarter until 2018 2nd quarter, the model is then being run using regression method. The result shows that the exchange rate of Rupiah per USD is positive and significant. Thus every time exchange rate goes up or depreciated by 1 percent, export to Japan increased by 0.19 percent. Also, Japan GDP in Constant Price is positive and significant. So when Japan GDP in Constant Price goes up by 1 percent, export to Japan will increased by 0,0018 percent. The rest of the variables are either have the wrong sign or not significant.

When all data are multiply by logarithm, the data coverage are extended backward to 1994 before the Asian crisis, and a dummy variable (which represented the crisis) is added where one or 1 represented the period of crisis in quarter 1 until 3 of the year of 1998, and zero or 0 otherwise, the regression gave a better result. The exchange rate of Rupiah versus USD is positive and significant. When Rupiah per USD depreciated by 1 percent, export to Japan goes up by 0.21 percent. Japan GDP in Constant Price give positive sign and significant. So when Japan's income goes up by 1 percent, their demand for Indonesia's good or export from Indonesia to Japan increases by 0.21 percent. The Dummy for Asian crisis is negative, so when crisis hit, export from Indonesia to Japan goes down. The rest are either give the wrong sign or not significant. Note that in this regression, the Price of Export is omitted due to the lack of data in the period before the Asian crisis.

Second the analysis for import. For import, the analysis is based on model (2). Indonesia's import from Japan depend on the price of import, exchange rate of Rupiah per US, the exchange rate of Rupiah per Yen, Indonesia's GDP Constant Price, and Indonesia's GDP Current Price. Using logarithm, all series are non stationary. Data coverage will be divided

into two. The first data set is between 2002 1st quarter and 2018 2nd quarter. The second data set is between 1994 4th quarter and 2018 2nd quarter. For both set of data, Johansen Cointegration using Trace test and Max-eiqenvalue test indicates that there is one cointegrating equations. There exist a long-run relationship between all variables. Note that the price of import is not used due to the lack of data.

In general, it could be concluded that the hypotheses that Indonesia's capital market is related to Japan's capital market, is rejected. Meanwhile, the hypotheses that Indonesia's foreign exchange market is related to Japan's foreign exchange market, is rejected as well. However, the hypotheses that Indonesia's goods market is related to Japan's good market, could not be rejected. Both market is related through export market and import market.

A close economic relationship with Japan is highly beneficial for Indonesia. Outside goods market, foreign exchange market, and capital market, there are other sectors which might be explored by Indonesia. One example is services trade. As stated in Ministry of Economy, Trade and Industry (2016), to be able to expand its economy from services trade, Japan's challenge is improving the investment in the neighboring emerging countries. This is one of many opportunities which should be utilized by Indonesia for the benefit of both countries, if Japan decides to enhance its investment in Indonesia, particularly in this era of technology and digitalization. Also, from Ministry of Economy, Trade and Industry (2016) also, Japan has recognized that Japan was not as popular as other developed countries as a destination for IT skilled people due to job and working condition in Japan compare to the United States for example. Salary is also another factor behind the low attractiveness of working in Japan compare to the United Stated. However, the report found out that Indonesia's IT people desirability to work in Japan is still high, compare to India and China. This could be one advantage for Indonesia. Assuming that the Japan's government decides to do something i.e. improving the job, working condition, and salary paid to the worker, there would be higher opportunity for more IT Indonesian people to work in Japan. This is in line with the goal of establishment of Japan-Indonesia Economic Partnership Agreement or JIEPA.

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