An Integration of Indonesian Market for Gree Coffee: A Review from Exported and Imported Market Outlook on the Major Exported Countries

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Abstract

The purpose of this study is to analyze the relationship between price of Indonesian green coffee beanfrom three major exporters: Brazil, Columbia, and Vietnam as well as other six major importers: the United States, Germany, Italy, Japan, Malaysia, and Singapore in the world market. Data applied in this study are a time series from 1970 to 2012, extrapolated from Food Agricultural Organization (FAO) data set. To attain the target, all data are analyzed by applying cointegrated test and error correction model (ECM). The analyses show that 1). The exported price of Indonesian green coffee cointegrated with the prices on the market that is intended to the major importers and exporters; 2). The imported price of green coffee in the United States, Germany, Japan, Malaysia, and Singapore have a significant spin-off for the short-term, but only the United States and Singapore are considered to be significant for the exported price of Indonesian coffee beans; 3). The exported price of Brazil and Vietnam possess a significant effect on the exported price of Indonesian coffee beans in both, short-term and long-term period, while the exported price from Colombian coffee beans are not significantly correlated

Keywords: Coffee price, Cointegrated test, export, Import, Error correction model

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1. Introduction

Coffee is one of the important commodities traded across the world and produced more than one-third in the globe (Lewin et al. 2004; Topik 2004; Almeida et al. 2012; World Bank 2014; USDA 2016). It has been noting as an interdependent agricultural product in several countries in which statistically account for 50 percent of their export are emanating from it. In addition, coffee is also contributed significantly towards local economy and providing more incomes to the local and regional sectors for almost 125 million low-income farmers in the world. In some developing countries, coffee has been a value-laden commodity in trading-off regional economy, gaining national revenue, and functioning as a primary product for the local farmer communities (Baffes et al. 2004; bayer 2008; Cleland 2010). Currently, Indonesia is categorized as one of the largest coffee producers in the world after Brazil and Columbia with the highest rate production of robusta commodity (Siddiqui 2016). It turned out that in 2013, coffee became a national priority for exported commodity from plantation sector in Indonesia (Ditjenbun, 2012; Anwar 2014).

Statistical data point out that Indonesia's position in the international trade was in the fourth as an exporter country from the last five years (2007 to 2012) behinds Brazil, Columbia, and Vietnam in particular for robusta commodity despite a declining trend of global coffee trade about 0.3% between 2010-1012 (World Bank 2014). Brazil and Columbia encountered the decline about 17.2% and 16.3% respectively, while Vietnam showed an increase of 32.3% and Indonesia was 16.5%in the same period (Sethi 2008; AEKI, 2012). Interdependency towards exported markets haveled to a fluctuation of Indonesian coffee price in spite of the exported volume indicates an increased trend in years. Such a circumstance is mainly determined by changes in the global markets whether in export or import stand point. These changes are then transmitted into Indonesian exported market on account of an integrated system of global trade market (Beyer 2008).

The engagement of countries in coffee trade schema from the international market level either as a main consumer or producer have made a laborious circumstance of changes on coffee price to be unpredictable. A fluctuation of coffee price is non-inter change able with the changing of climate, political and economic issue of each country that will straight forwardly impact on the coffee price (FAO 2009; Abdi 2016). In general, coffee market globally raised about 36.63% from 1990 to 2011 with the average of 7.036 million tons. In 2011, Brazil produced 2.7 million tons or 32.4% from the total production in the world, while Vietnam generated 1.17 million tons (14%), followed by Indonesia around 634 thousand tons (7.65%) and Columbia with 468 thousand tons (5.56%). Another fundamental factor to be considered is the alteration of demands and internal changes of consumptive countries that lead to the price fluctuations (International coffee organization 2009; Dragusana et al. 2014). Fitter and Kaplinsky (2001) concluded that 60% from retailed coffee price in the international market

considers to become an additional value of imported countries and 40% comes from both production, right and additional value of exported countries.

Base on those explained information above, the objectives of this study are: 1) to analyze the trend of green coffee prices from major exported countries as well as the price of major imported countries, 2) to analyze the long-term relationship between Indonesian exported prices of green coffee and green coffee prices from the major exported countries (3) to analyze short-term relations between the export of Indonesian green coffee price and imported green coffee price and the major exported countries.

2. Method

2.1. Type and Source of Data

This study explores secondary information through time series data from 1970 to 2012 (43 years). Data resources applied in this study are extrapolated from Food and Agricultural Organization (FAO), COMTRADE. Data cover Indonesian exported coffee price, the main price of both imported and exported countries (Brazil, Columbia, and Vietnam), and the major imported countries (United States, Germany, Italy, Malaysia, and Singapore). The price used in this study is on an average of real price of coffee for each year and such prices are then determined through world consumer price index with a based standardization of 2015.

Models applied in this study consist of two equations: first, Indonesian exported coffee price is a function of imported coffee price from the United States, Germany, Italy, Malaysia, and Singapore; second, Indonesian exported coffee price is a function of Brazilian, Columbian, and Vietnamese exported coffee prices.

2.2. Econometrical Analysis

2.2.1. Stationery data test

Cointegrated test has two pre-requirements that have to be followed: (1) rooted unit test and integration, and (2) stationary data test. Gujarati (1995) points out that non stationery data estimation will lead to super-inconsistent and tends to become a spurious regression which is failed to implement classic inferential method. To be classified as stationery data, the average of its stationer $E(x_t)$ is equal to 0 (independent to t), and the value of σ_t^2 is constant (the change of variants are not in line with time changes).

Stationary test is applied by using Augmented Dickey-Fuller Test (ADF) (Engle and Granger, 1987). This test based on a scholastic null-variable hypothesis that has a rooted unit. By using such an ADF test, null hypothesis and other taking decision bases used in this study arebanked on MacKinnon critical value that functioned as t-test alternative t-ratio then compared to statistically critical value in ADF t-table to know whether there are rooted units or no. If the hypothesis is accepted, then the variable is not stationery and needed to take another test which is integrated degree test in the first class (first difference) or in the second class (second difference). Integrated degree test is intended to know in which degree or difference, the observed data will be stationery.

Interpreting autoregressive model from each variable used through Ordinary Least Square (OLS) method by calculating constanta time variable.

$$\Delta \ln PK_t = \alpha_0 + \alpha_1 \ln PK_{t-1} + \sum_{i=1}^{m} \alpha_2 \Delta \ln PK_{t-1} + \varepsilon_i (constant) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (1)$$

$$\Delta \ln PK_t = \alpha_0 + \alpha_1 \ln PK_{t-1} + \sum_{i=1}^{m} \alpha_2 \Delta \ln PK_{t-1} + \delta T + \varepsilon_i (constant \& trend) \dots \dots \dots \dots \dots \dots (2)$$

$$\Delta \ln PK_t = \ln PK_t - \ln PK_{t-1} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (3)$$

$$\Delta \ln PK_{t-1} = \ln PK_{t-1} - \ln PK_{t-2} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (4)$$

Where:

PK = Exported coffee price in Indonesia, Brazil, Colombia, as well as imported coffee price from Vietnam, United States, Germany, Italy, Japan, Malaysia, and Singapore.

T = Trend of time

m = Number of lag

Δ = Changes in each scale

ε_i = Residue

2.2.2. Cointegrated test

Cointegrated test can be done when data are stationery paired in the same degree or ordo. This test is carried out by looking at the equation of cointegrated regression as follow:

$$\ln PXKI_t = \delta_0 + \delta_1 \ln PIKUSA_t + \delta_2 \ln PIKGER_t + \delta_3 \ln PIKITY_t + \delta_4 \ln PIKJAP_t +$$
$$+ \delta_5 \ln PIKMLY_t + \delta_6 \ln PIKSGR_t + \varepsilon_{II_t} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (5)$$

$$\ln PXKI_t = \beta_0 + \beta_1 \ln PXKB_t + \beta_2 \ln PXKC_t + \beta_3 \ln PXKV_t + \varepsilon_{IE_t} \dots \dots \dots \dots \dots \dots \dots \dots \dots (6)$$

Where:

PXKI = Indonesian exported coffee price (US$/ton)

PXKB   = Brazilian exported coffee price (US$/ton)

PXKI   = Columbian exported coffee price (US$/ton)

PXKV   = Vietnamese exported coffee price(US$/ton)

PIKUSA   = United States imported coffee price (US$/ton)

PIKGER   = German imported coffee price (US$/ton)

PIKITY = Italian imported coffee price (US$/ton)

PIKJAP = Japanese imported coffee price (US$/ton)

PIKMLY   = Malaysian imported coffee price(US$/ton)

PIKSGR= Singapure imported coffee price (US$/ton)

ε_{II_t} = Indonesian residue–main Importir

ε_{IE_t} = Indonesian residue–main eksportir

To acknowledge the extended cointegration between residual data of ε_{II_t} and ε_{IE_t}, stationarities test are carried out by applying the same method as done in rooted unite test in the scale of null degree and lag null of length.

$$\Delta\varepsilon_{II/IE_t} = \lambda_i\varepsilon_{II/IE_{t-1}} + \sum_{i=1}^{m} \theta_i \, \Delta\varepsilon_{II/IE_{t-1}} \; + \; v_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$\Delta\varepsilon_{II/IE_t} = \varepsilon_{II/IE_t} - \varepsilon_{II/IE_{t-1}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$\Delta\varepsilon_{II/IE_t} = \varepsilon_{II/IE_{t-1}} - \varepsilon_{II/IE_{t-2}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

With the hypotesis of:

H$_0$: $\boldsymbol{\lambda} = 0$, cointegrated residual series of ε_{II/IE_t} are non stationeries

H$_1$: $\boldsymbol{\lambda} \neq 0$, cointegrated residual series of ε_{II/IE_t} are stationeries

2.2.3. Error correction model

Error correction model is carried out to understand a short-term integration. This method can be done if there is a long-term integrated relation in the cointegrated analysis. Model based on Granger's theory is that the existence of two parameters can be modified into error correction model which was introduced by Sargan (1964) cited by Hendry (1995). The model has a function of incorporating of both a short-term and long-term behavior. The analysis used to evaluate a short-term integration is that banked on error correction model approach which is formulated as follow:

$$\Delta lnPXKI_t = \theta_0 + \theta_1\Delta lnPXKB_t + \; \theta_2\Delta lnPXKC_t + \; \theta_3\Delta lnPXKV_t + \theta_4\varepsilon_{II_{t-1}} \; + \; v_t \ldots\ldots\ldots\ldots\ldots (10)$$

$$\Delta lnPXKI_t = \sigma_0 + \sigma\tau_1\Delta lnPIKUSA_t + \; \sigma_2\Delta lnPIKGER_t + \; \sigma_3\Delta lnPIKITY_t + \sigma_4\Delta lnPIKJAP_t$$
$$+ \; \sigma_5\Delta lnPIKMLY_t + \sigma_6\Delta lnPIKSGR_t + \sigma_7\varepsilon_{IE_{t-1}} \; + \; u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

Where:

$\varepsilon_{II_{t-1}}$ = Cointegrated residues from the equation of Indonesia – Importir countries

$\varepsilon_{IE_{t-1}}$ = Cointegrated residues from the equation of Indonesia – Eksportir countries

θ_4 and σ_7= parameter from error correction variable.

The fulfilled requirement in these approaches are:

H$_0$: θ_4 , $\sigma_7 = 0$,causality model with an ECM approach is classified to be valid

H$_1$: θ_4 , $\sigma_7 \neq 0$, causality model with an ECM approach is classified to be invalid

3. Result and Discussion

3.1. Trend of Green Coffee Prices

Table 1, in general indicates the trend of green coffee prices in average for mainly exported countries which are highest in Columbia, while the lowest is in Vietnam. Vietnamese exported price is 50% lower than Columbia (highest price). On the other side, Indonesian green coffee price is classified as moderate in which lying among exported prices, but little bit lower from the average global prices (Siddiqui 2016). The most prominent factor affecting Columbia's price to be highest is that the quality of coffee yielded and its type. As generally known that, Columbia is considered as both the major producer and exporter of arabica coffee in the world. This type tends to have a higher price in the global market compared to robusta. The growing price of exported coffee among four exported countries between 1970 and 2012 was around 3.08 to 4.43%. Such a value is relatively higher compared to the imported price and situated above global price. The average price of green coffee in the Unites States, Germany, Italy, and Japan possess a low value, however the average growth per year is considered to be higher compared to other imported countries (Diaz 2009; Domeisen and Wolf 2010).

Table 1. The average price of green coffee and its growing value in exported market and
the major imported countries.

Coffee Price	Minimum (US$/ton)	Maximum (US$/ton)	Average (US$/ton)	Averaging growths (%)
Main exported countries				
Indonesia	738	12 597	3 182	4.43
Brazil	839	15 124	4 143	4.66
Colombia	1 469	16 466	5 043	3.34
Vietnam	468	8 026	2 531	3.08
Main imported countries				
United States	1 282	14 649	4 568	2.23
German	1 143	16 343	4 890	1.07
Italy	1 106	13 566	4 409	1.72
Japan	1 432	16 652	4 721	3.14
Malaysia	672	9 397	2 587	3.95
Singapure	644	11 975	3 350	5.45
The world	1 008	14 227	4 133	2.18

Source : extrapolated data

The average growth of world coffee prices from 1970 to 2012 was about 2.18 percent/year. This value is relatively lower compared to the exported price and a couple of imported price from imported countries (Dragusanu et al. 2010). Table 1, basically explains the exported price that has a higher growth compared to imported price growth. It shows that changes in the bid side are correlatively higher compared to the demand side (Mitchell et al. 2001).

In general, the trend of prices indicated the condition of both, demanded and supplied sides. The after math of globalization effect leads to the economic situation of each country being opened onto the international trade system. The fluctuation price of coffee that occurs in the global is linked to the production, weather and economic environments from the internal side (FAO 2009; Gullman 2015; Abdi 2016). The likelihood of coffee prices among markets and countries in the world are interrelated among others. The power of supplied side (export) and demanded side (import) possess an influence towards change and fluctuation of the world market price ether exported and imported countries. The effected relationship that occurs among coffee markets are delineated from the movement of prices which have a pattern that is likely be the same from 1970 to 2012 (Schubler 2009; Lewin 2004).
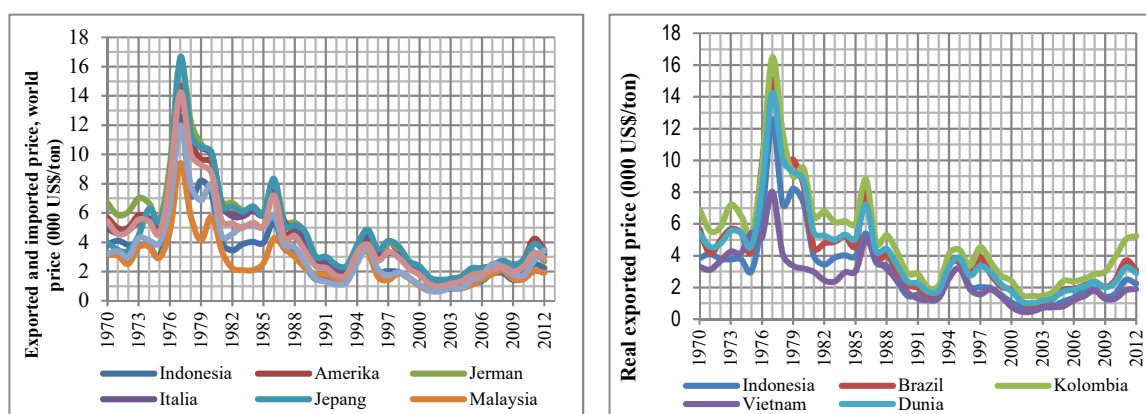

Figure 1. The trend of imported price from real exported countries (1a) and real export (1b)
of coffee from 1970 to 2012.
(Source : Extrapolated data)

In the period of 1970 to 1012, trend of exported price in the market, imported market as well as in the world are fluctuated in line with same pattern. Figure 1, points out that in the period of 1975 to 1977, coffee price was soared compared to the previous years or after. The culminated price occurred in 1978 and after that encountered a long trend of declining (SSI Review 2014).

Imported price of green coffee in the Japanese market every year is higher compared to the world price and other imported countries' price. Otherwise, Malaysia possesses the lowest imported price. In addition, Indonesian exported coffee price is classified to be low compared to the main imported green coffee producers and the world price. The similar condition can be seen also in the exported market. Indonesian exported coffee price lays below

exported price of Brazil and Columbia. Columbia has the highest exported price compared to other three exported countries (Brazil, Indonesia and Vietnam) as well as the world price (World Bank, 2014).

The fluctuation of green coffee prices in the world market (both imported and exported countries) experience a dramatically change that occurred in 1975 in which encountered growing period with the peak in 1977 and then declined gradually until 1985.The green coffee prices were increased in 1986 and for the next period experienced a decline to touch the lowest point in 2001. It has been affected by unbalanced between supplied sides that tend to be higher than the demanded sides which are relatively stable. In addition, growing new coffee plantations in Vietnam, increasing export from Brazil coincide with the extended plantation programs to the free frost, and increasing number of production and real devaluation in the beginning of 1999 were additionally accumulated to the decline of global coffee prices in 2001 (Hallam, 2003).

3.2. Resulted test of stationary data

Stationary test that carried out shows at the level I (0), there are nine of ten variables used are not stationery at the confident level of 1 percent, 5 percent, and 10 percent. It indicated by Augmented Dickey-Fuller (ADF) t-statistic value which is lower than critical value of McKinnon. The consequence of not being fulfilled towards the stationary assumption at the level of I (0), will allow the whole variables tested by integrated degree test. The variables are categorized as stationers at the first difference if ADF value tests are less than the critical value of McKinnon after once differential step tested. Stationary resulted test of each variable that used in model showed in Table 2.

Table 2. Tested results of rooted unit on exported prices (Indonesia, Brazil, Columbia, and Vietnam) and imported countries of coffee (United States, German, Italy, Japan, Malaysia, and Singapore) at the level and the first difference from 1970 to 2012.

Variables	Level			$1^{st}Difference$		
	ADF Value	Prob*	Information	ADF value	Prob*	Information
PXKI	-2.1863	0.4845	Not Stationer	-5.5731	0.0002	Stationer
PXKB	-2.2308	0.4609	Not Stationer	-6.4012	0.0000	Stationer
PXKC	-1.6935	0.7365	Not Stationer	6.1759	0.0000	Stationer
PXKV	-2.8867	0.1771	Not Stationer	-4.3774	0.0064	Stationer
PIKUSA	-1.9082	0.6326	Not Stationer	-5.7407	0.0001	Stationer
PIKGER	-2.0645	0.5499	Not Stationer	-5.7002	0.0002	Stationer
PIKITY	-1.7136	0.7275	Not Stationer	-4.9092	0.0015	Stationer
PIKJAP	-2.2329	0.4598	Not Stationer	-6.1318	0.0000	Stationer
PIKMLY	-3.2228	0.0949	Stationer	-6.3794	0.0000	Stationer
PIKSGR	-1.6369	0.7610	Not Stationer	-5.0127	0.0011	Stationer
Critical value of Mckinnon	*1%*		*5%*		*10%*	
	-2.6212		-1.9489		-1.6119	

The whole variables used in this study are stationary by using intercept and tested trend which is based on Akaike information criterion (AIC), Schwarz Infomation Criterion (SIC), and Hannan Quinn Criterion (HQC). All tangible stationary variables of ADF value that always lower in number than the critical value of McKinnon, whether at the significant level of 1 percent, 5 percent, and 10 percent. Therefore can be concluded that all those ten variables possess an integrated degrees which are similar to I (1), then cointegrated analysis method can be continued.

3.3. Indonesian cointegration with main imported countries

There are two phases that should be undertaken by applying cointegrated test of Engle-Granger: first, by regressing equations of OLS and then gaining residue from these equations. Second, by applying an ADF method that tested through rooted unit towards residues with the same hypothesis tested to ADF rooted unit test with previous variables.

Table 3. Testing results of cointegrated residual values from rooted unit of Indonesian exported coffee price towards the main exported and imported market.

Variables	ADF value	Prob*	Information
$\varepsilon_{II}(-1)$	-5.4150	0.0000	Stationer
Critical value of Mckinnon	*1%*	*5%*	*10%*
	-2,6212	-1,9489	-1,6119

Based on the testing results of rooted unit, there is an integration between Indonesian coffee export and imported coffee price among the main imported countries. It means that there is a likelihood of long-term trade off among variables on that model. Pricing integration between the markets show an extended relation of trading

cooperation of coffee in both, export and import between Indonesia and the main imported countries.

In general, the United States, Germany, Italy, and Japan are among those who have become a main exported market of Indonesian coffee and within the last a couple of years, Malaysia and Singapore are also considered to be a potential market of Indonesia in particular Asian region. Since 1970 through 2012, 46 percent of Indonesian coffee export was intended for United States, Germany, and Italy's market (Neilson 2014). While, for the long-term is also can be known the magnitude of the main import of coffee price on Indonesian export of coffee price as follow:

PXKI = -1,154 + 0.593 PIKUSA + 0.038 PIKGER+ 0.107 PIKITY-0.139 PIKJAP +0.344 PIKMLY + 0.178PIKSGR

Base on the equation of imported prices from the United States and Malaysia, there is a highly significance of Indonesian exported coffee price. With the increase of about one percent of the United States and Malaysia, it will step up Indonesian exported coffee price about 0.593 percent and 0.344 percent respectively for the long-term period.

3.4. Estimation of Error correction model between Indonesia – main imported countries.

On the short-term equation, diagnostic test is tested to understand whether classic assumption of deviationis occurred. Linearity test is carried out by applying Ramsey's RESET test in which the result reveals that estimation for both models are stable or restrict non-linear hypotheses. In addition, other diagnostic resulted test indicate that the short-term estimated result has not provide an auto-correlated indication, hetero-scedasticity at its residual test is normally distributed. Therefore, based on stationary and diagnostic tests with a classic assumption, then the equation used is classified as moderately good. Statistically, Error Correction Term (ECT) or ε_{II} (-1) values are significant and negative which in turn indicate the ECM specified model which applied is valid. Such an indication portrays a transitional change of imported coffee prices in United States, Germany, Italy, Japan, Malaysia, and Singapore which straight forwardly will responded by Indonesia. The ECT value determines how fast equilibrium is fulfilled or readjusted mechanism at the balanced level. ECM estimated mechanism gained from ε_{II}(-1) value which is about -0.8733 that indicates the likelihood of a short-term change, will lead to a long-term gained value of 87.33 percent in the first year and 12.67 percent occurs for the coming years. In the short term, the significant variables that will affect Indonesian exported coffee price are prices from United States, Malaysia, and Singapore.

Table 4. Estimated results of the long-term relationship between Indonesia and the main imported countries (1970 – 2012).

Variables	Coefficient	Std. Error	t-Statistic	Prob.	Information
C	-0.0008	0.0160	-0.0514	0.9593	
D(PIKUSA)	0.7698	0.2229	3.4534	0.0015	Significant
D(PIKGER)	-0.0974	0.2833	-0.3438	0.7331	Not significant
D(PIKITY)	0.2077	0.2434	0.8534	0.3994	Not significant
D(PIKJAP)	-0.2074	0.2188	-0.9477	0.3500	Not significant
D(PIKMLY)	0.2689	0.1000	2.6881	0.0110	Significant
D(PIKSGR)	0.2653	0.1214	2.1845	0.0359	Significant
ε_{II}(-1)/ECT	-0.8733	0.1764	-4.9497	0.0000	Significant
R-squared	0.9222	F-statistic			57.5527
Adjusted R-squared	0.9062	Prob(F-statistic)			0.0000
Durbin-Watson stat	1.8991				
Breusch-Godfrey Serial Correlation LM Test :					
F-statistic	0.1794	Prob. F			0.8366
Obs*R-squared	0.4656	Prob. Chi-Square			0.7923
White Heteroskedasticity Test:					
F-statistic	3.3279	Prob. F			0.0676
Obs*R-squared	39.9425	Prob. Chi-Square			0.2598
Ramsey RESET Test:					
F-statistic	1.8909	Prob. F			0.1784
Log likelihood ratio	2.3402	Prob. Chi-Square			0.1261
Normality test					
Jargue-Bera	2.5341	Prob			0.2817

Based on table 4, glaringly seen that some significantly influenced variables towards Indonesian exported coffee price from the imported coffee price perspectiveare emanating from United States, Malaysia, and Singapore at the confident level of 5%. It turns out that there is a positive correlation between those imported coffee prices and Indonesia exported price in the short-term period. It is portrayed by ameaningful increase of each coefficient about 1% on the exported side's countries (United States, Malaysia, and Singapore) that inevitably will step up

Indonesian exported coffee price about 0.7698%, 0.2689%, and 0.2653% respectively.

The United States is considered to be the world's primary export target (Fig. 2) in which most of the Indonesian coffees (91%) are traded to that country. The magnitude of Indonesian exported volumes and integrated prices indicate an interdependence of both sides (Wahyudi and Jati 2012). Hutabarat (2006) points out green coffee price from Indonesia (West Java and Lampung) possess an intertwined retailed price in the United States market compared to Japanese and European markets (FAO 2009).Such a condition could be seen in which almost 76.98% of changes in Indonesian exported price owing to United States imported price. The high rate of coffee trade to the US is in line with the magnitude of their demand on the world coffee markets. From the past twelve years, the average of the US total consumptions was about 1.170.028 ton/year that claimed to be highest among other imported countries (Lewin 2004; Diaz 2009).

The high total rate of the US consumption is likely affected by their income and the demand of the industrial coffee sectors. One of the well-known coffee industries in the US is Starbucks which has a long reputation in the global coffee trade (Marcone 2004; Schubler 2009). Since established in the 90's as a global brand, it has been much influencing the global coffee market and its distributionacross the globe. The influenced trend of Starbucks was seenin 2007 through the acquisition of 5% of the total world coffee export. Such a dynamic then bring up an alteration in either the consumptive pattern of demanded side of the US coffee that eventually influences the world market price in general and Indonesia as an exported country.

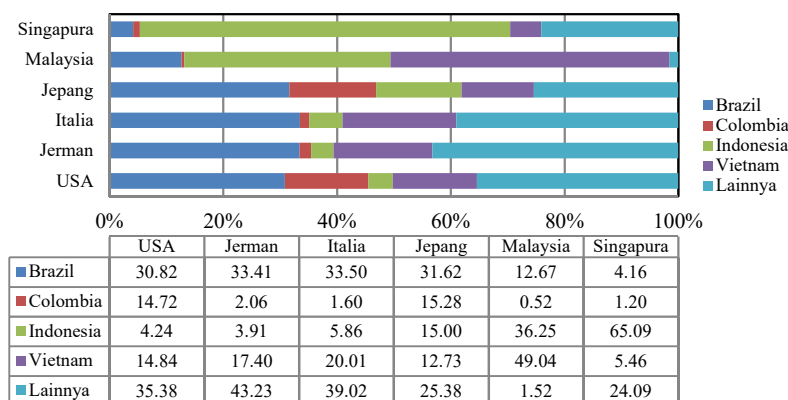|	USA	Jerman	Italia	Jepang	Malaysia	Singapura
Brazil	30.82	33.41	33.50	31.62	12.67	4.16
Colombia	14.72	2.06	1.60	15.28	0.52	1.20
Indonesia	4.24	3.91	5.86	15.00	36.25	65.09
Vietnam	14.84	17.40	20.01	12.73	49.04	5.46
Lainnya	35.38	43.23	39.02	25.38	1.52	24.09

Figure 2. The major imported demand of exported markets.
(Source : Extrapolated data)

Demand of Indonesian green coffee in some main imported countries (Fig. 2) is strong particularly in Singapore and Malaysia compared to Brazil, Columbia, and Vietnam. It is likely that on account of a geographical situation, both Singapore and Malaysia are imported more in volume than others from Indonesia (Jim 2014). In addition, other closed regional agreements are also boosted the intensity of coffee trade with the ASEAN countries (Singapore and Malaysia).

3.5. Indonesian cointegration with the main exported countries

Cointegrated test results between Indonesian exported coffee price and the main exported markets (Brazil, Columbia, and Vietnam) reveal that ADF coefficient value is negative and significant either at the confident level of 1%, 5%, and 10%. It means the residues are stationary (Table 5). Such a condition indicates the existence of a long-term integration between Indonesian exported coffee price and the prices from Brazil, Columbia, and Vietnam as the same main exported coffee.

Table 5. Rooted unit result test (ADF test) of the cointegrated residual equations from the relationship between Indonesia and the main exported coffee.

Variables	ADF Value	Prob*	Information
$\varepsilon_{IE}(-1)$	-4.4587	0.0000	Stasioner
Critical value of Mckinnon	*1%*	*5%*	*10%*
	-2,6212	-1,9489	-1,6119

Estimated result between Indonesian exported coffee and the main exported price in the long run reveal that Indonesian exported coffee price is significantly influenced by both Brazilian and Vietnamese's coffee prices (Yin 2014). The magnitude can be seen from the coefficients of Brazil and Vietnam which are about 0.782 and 0.221 that means by each increase of 1% price from Brazil and Vietnam's import, it will step up exported prices of Indonesian coffee of 0.782% and 0.221% in the long-term period.

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$$PXKI = -0.229 + 0.782\ PXKB + 0.013\ PXKC + 0.221\ PXKV$$

3.6. Indonesian Error Correction Model Estimation and the main exported countries

Classical assumption test on the short-term estimated result relationship used ECM shows that the whole resulted equations are not auto-correlated which are indicated by the value of DW and LM. In addition, equation residues are normally distributed and the data are linear and there is no indication of heteroscedasticity. For the integrated short-term result tests between Indonesia and the main exported coffee, can been seen in the table 6.

Tabel 6. Estimated results of the short-term relationship between Indonesia and the main imported counties (1970 – 2012).

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001716	0.019086	0.089884	0.9289
D(PXKB)	0.598030	0.158517	3.772659	0.0006
D(PXKC)	0.032543	0.196512	0.165601	0.8694
D(PXKV)	0.370433	0.081790	4.529087	0.0001
$\varepsilon_{IE}(-1)$/ECT	-0.653252	0.141664	-4.611272	0.0000
R-squared	0.871042	F-statistic		62.47895
Adjusted R-squared	0.857101	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.619339			
Breusch-Godfrey Serial Correlation LM Test :				
F-statistic	2.577761	Prob. F		0.0903
Obs*R-squared	5.392332	Prob. Chi-Square		0.0675
White Heteroskedasticity Test:				
F-statistic	1.574480	Prob. F		0.1512
Obs*R-squared	18.87730	Prob. Chi-Square		0.1697
Ramsey RESET Test:				
F-statistic	2.626862	Prob. F		0.1138
Log likelihood ratio	2.958018	Prob. Chi-Square		0.0855
Normality test				
Jargue-Bera	0.447212	Prob		0.799630

Statistically, ECT value is significant which means ECM model specification that used is valid. Therefore, changes on the exported coffee from Brazil, Columbia, and Vietnam will concurrently be fully responded by Indonesia. The $\varepsilon_{IE}(-1)$ value about -0.6532 literally points out that the short-term fluctuations of balance will be subsequently corrected for the long-term balance. Such a continuation will yield about 65.32% from its adjusted process which occurs in the first year and 34.68% for the subsequent years.

The influenced relations identified in the short-term equation are in line with the long-term trend of its relations. Analytical results show that Brazil and Vietnam have a significant influence towards Indonesian exported coffee price compared to Columbia at the significant level of 1%. Both countries have a relatively huge influence on the changes of Indonesian exported coffee price. The increasing price from Brazil and Columbia will eventually raise the Indonesian exported coffee price about 0.5980% and 0.3704% respectively.

Such a magnified influence is likely inter twined with the potential market of both countries which are moderately dominant in the world market. Therefore, the fluctuation of prices in both will subsequently have an effect on the coffee price in Indonesia and the world markets (Wahyudi and Jati 2012; Anwar 2014). On the other hand, due to Indonesia along with Vietnam, and Brazil are grouped into a producer of Robusta coffee, then the price in Indonesia will be ineluctably influenced by other both countries (Brazil and Vietnam).

The existence of Vietnam in the international market is supported by their strong merit either in the comparative and competitive sides. Such a condition is related to the availability of natural resources, workers, and production costs which are relatively lower (Neilson 2013; Yin 2014). In addition, the promising support from the government is tangibly seen by way of dispensing fresh grants for almost 50 years in conjunction with promoting not only coffee plantations but also for the long run, it is intended to develop an extended coffee industry in the local and international bases (Gonzalez-Perez, M.A. &Gutierrez-Viana, S. 2012). The increasing potential of exported market in Vietnam as well as the lower price of coffee over the course of decades have been prominent in strengthening Vietnam in the international market. This condition has positioned Vietnam over Columbia and Indonesia as well as influenced the international market lead by Brazil.

Columbia's influence towards less significance of Indonesian exported price is allegedly owing to the differences of coffee types which are yielded and exported. Columbia is considered as both producer and exporter

or Arabica type in which its segment and market orientation are relatively expensive for the arabica type (Gonzalez-Perez, M.A.&Gutierrez-Viana, S. 2012). Besides, Columbia for the past decades was more oriented in developing processed coffee that was intended for export rather than green coffee. Such a circumstance are eventually lead to changes in exported prices of Columbian coffee in which less effective in providing significant spin-off to Indonesia.

Acknowledgments

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