

ASEAN FREE TRADE AGREEMENT IMPLEMENTATION FOR INDONESIAN TRADING PERFORMANCE: A GRAVITY MODEL APPROACH

Implementasi ASEAN Free Trade Agreement terkait Kinerja Perdagangan Indonesia: Pendekatan Model Gravitasi

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Abstract

One objective of the AFTA implementation is to reduce trading constraints by reducing import tariffs among ASEAN's members with the assumption that if tariffs are lower or zero, there should be an increase in intra-trading value among ASEAN members. This study examines whether the implementation of the AFTA has had any impact on Indonesia's export performance and 'behind the border' constraints contribution in Indonesia's exports such as customs administrations. The study uses the gravity model approach with a stochastic frontier analysis which is different from previous research about Indonesia's trading performance that uses OLS estimation. The results show that, empirically, GDP, distance, population, exchange rate, and membership in ASEAN significantly affect Indonesia's trading with partner country. Furthermore, stochastic frontier analysis' results show that 'behind the border' constraints decrease overtime. However, Indonesia's exports is under trade with all ASEAN countries which indicates the low utilisation of AFTA. On the other hand, Indonesia's exports are over trade with China and almost at optimal level of exports with the US, Japan, and the Netherlands. The implication of this study is that the Indonesian government should promote more exports with ASEAN countries to accomplish the objectives of the AFTA declaration two decades ago

Keywords: *Indonesia, FTA, Trading Performance, Gravity Model, Stochastic Frontier Analysis*

Abstrak

Salah satu tujuan dari pelaksanaan AFTA adalah untuk mengurangi hambatan perdagangan dengan mengurangi tarif impor antar anggota ASEAN dengan asumsi bahwa jika tarif lebih rendah atau nol, seharusnya terdapat peningkatan nilai perdagangan antara anggota ASEAN. Penelitian ini menguji apakah pelaksanaan AFTA memiliki dampak pada kinerja ekspor Indonesia dan kontribusi kendala di belakang perbatasan (*behind the border constraints*) terhadap kinerja ekspor Indonesia seperti administrasi bea dan cukai. Penelitian ini menggunakan pendekatan model gravitasi dengan analisis *stochastic frontier* yang berbeda dari penelitian-penelitian sebelumnya tentang kinerja perdagangan Indonesia yang menggunakan estimasi OLS. Hasil penelitian menunjukkan bahwa, secara empiris, GDP, jarak, populasi, nilai tukar, tarif, dan keanggotaan di ASEAN signifikan mempengaruhi perdagangan Indonesia dengan negara partner. Lebih lanjut, hasil estimasi *stochastic frontier* menunjukkan bahwa kendala di belakang perbatasan menurun setiap tahunnya. Namun, ekspor Indonesia masih *under trade* dengan semua negara ASEAN yang mengindikasikan rendahnya pemanfaatan AFTA. Di sisi lain, ekspor Indonesia *over trade* dengan Cina dan hampir berada di tingkat yang optimal dengan Amerika Serikat, Jepang, dan Belanda. Implikasi dari penelitian ini adalah bahwa pemerintah Indonesia harus mempromosikan lebih banyak ekspor dengan negara-negara ASEAN untuk mencapai tujuan dari deklarasi AFTA dua dekade lalu.

Kata kunci: *Indonesia, FTA, Kinerja Perdagangan, Model Gravitasi, Analisis Stochastic Frontier*

JEL Classification : F14, F15, F18

INTRODUCTION

By 2015, ASEAN countries will implement the ASEAN Economic Community (AEC) of which main objective is to integrate market and production base in ASEAN. The single market and production base could be achieved through five fundamental elements which are free flow of goods; free flow of services; free flow of investment; free flow of capital; and free flow of skilled labour. To achieve free flow of goods and services objectives, Free Trade Agreements (FTA) was introduced.

In the last decade, the benefits of Free Trade Agreements (FTA) have become evident which is shown by the increasing number of FTA among countries and region. The number of Free Trade Agreements (FTA) globally and in the ASEAN region has almost doubled in one decade (ADB, 2013). Figure 1 shows that the number of FTA which have been signed and in effect, under negotiation, and proposed have increased considerably since the early 1990's, while FTA's signed but not yet in effect are quite constant.

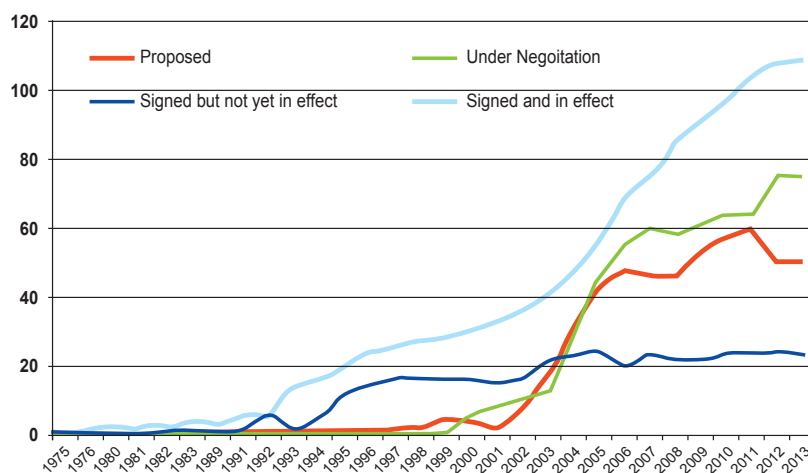


Figure 1. Trend of FTA's in the world, 1975-2013

Source: Asian Development Bank (2013)

There are four fundamental causes increasing FTA number in Asia: economic integration in Asia, economic integration in Europe and North America, Asian financial crisis in 1997-1998, and the WTO Doha negotiations stagnancy (Kawai and Mignaraja, 2010). It is rational that a country with a

membership in one of the economic integration will demand for better access among other member countries. on the other hand, the WTO with Doha rounds shows a slow progress in the last one decade.

Despite the increasing number of FTAs ratified by Indonesia's government

with partner countries inside and outside ASEAN countries and eminent evidences of FTA's benefit for ASEAN as mentioned in the AEC blueprint (ASEAN, 2008a), this study attempts to answer three questions. First, is there any impact of FTA on Indonesia's trading performance, especially with the presence of AFTA? Second, is Indonesia's trading with current partner countries at an optimum level? Finally, is Indonesia successful in reducing 'behind the border' constraints?

LITERATURE REVIEW

Generally, there are two kinds of FTA benefits: 'static effect' and 'dynamic or second order effect' (Dent, 2006). Dynamic effects include increased competition and efficiency, economies of scale, incentives for business, and closer collaboration among countries in general. Efficiency can be achieved since losses due to tariffs and distortion on the producers and consumers side could be eliminated (Krugman & Obstfeld, 2000, and Dent 2006). Further-more, FTA is able to 'induce capital inflows from both within and outside the region. FTA could bring an outcome much more extensive than trade creation and diversion' (Park, Urata and Cheong, 2008).

One kind of regional FTA is the Association of Southeast Asian Nations Free Trade Agreement (AFTA). The AFTA was formed by ASEAN members in the early 1990's, to 'maintain strong

economic relationships with its major trading partners' (Tan, 1996) with 'the United States, the European Union and Japan continued to be ASEAN's largest export markets' (ASEAN, 2013b). The main objective of the AFTA is to maintain and improve good export performance with partner countries.

AFTA implementation is important since 'varying degrees of intensity of FTA activity across economies are related to economic size, per capita income, levels of protection, economic geography, and production network strategies of MNCs' (Kawai & Mignaraja 2013). The existence of AFTA should support trading activities intra and extra-ASEAN. Thus, the benefits from AFTA implementation for Indonesia's trading performance should be empirically evaluated.

Plummer, Cheong and Hamaka, (2010) argue that an evaluation of FTA's can be done by before and after FTA implementation. Computable General Equilibrium (CGE) can be used as the *ex-ante* analysis of FTA implementation while for the *ex-post* analysis of FTA can be measured by using the gravity model.

Several studies estimated Indonesia's exports in trading, using the gravity model with various time periods and observations in the late 2000's. Yuniarti (2008), using cross section observation from 110 countries with the augmented gravity model and OLS estimation, shows that the estimation result 'fits the

data and delivers precise and plausible income and distance elasticity' and the highest potential trading partner is with Asia-Pacific region. As dependent variable, she uses total trade in logarithm form among countries. Furthermore, she uses several control variables including total income, distance, membership in APEC, colonialization, country size, and differences in endowment factors which are significant statistically, while total population, membership in AFTA, regional border, and common language are not significant (p.125). She argues that this insignificance mainly because of the destination of AFTA countries' trading is not between AFTA countries but more with outside AFTA region. She also finds that regional border does not affect Indonesia trading due to a lack of infrastructure and common language and unpopularity of Indonesian language. For trading potential, she claims that the greatest potential trading partners are Asia-Pacific countries, followed by Latin America countries, Europe and Africa.

Bary (2009) who uses China and India as partner countries in his study claims that demand from China is the highest demand source for Indonesia's exports especially for raw commodities. However, there is 'a need for a significant reform in trade barriers and domestic economy to support this potency'. He uses a simple gravity model with Indonesian export value and

each country income. He omits the distance variable since the distance between Jakarta and Beijing is almost the same as Jakarta and New Delhi. By using fixed-effect OLS, Bary's empirical results show that an increase in income or production of China has a greater effect than India for Indonesia's export value (p. 38). Further, he claims that there are differences in a value of the gravity model intercept due to trade barriers in China and India.

Sebayang (2011) claims that AFTA membership affects Indonesia's exports in the vehicle sector. He uses the gravity model to examine four-wheel vehicle trading between Indonesia and partner countries. He claims that 'AFTA has a significant impact for Indonesia's four-wheeled vehicle trade'. He uses GDP for Indonesia and partner countries as control variables followed by distance between capital cities, and dummy variables for AFTA and ASEAN. He also uses a panel data regression with random-effects. He claims that the gravity model explains that the impact of AFTA on Indonesia's international trading especially for four wheeled vehicle is significant. He also finds that the GDP and dummy variables statistically significant.

All previous research about Indonesian trading performance has used Ordinary Least Square (OLS) as estimation tools. However, estimation using OLS estimation might result in bias and inconsistent estimators since

'the variance of the included independent variables will contain an upward bias' (Kalirajan 2008). Thus, Kalirajan (2008) suggests estimation of the gravity model by using the stochastic frontier approach (SFA) in order to 'provide a more meaningful estimate'.

Furthermore, previous research has not calculated 'behind the border' constraints as one of trading performance barriers. Kalirajan and Singh (2008) claim that three factors affect trade between countries. First, natural constraints such as geographical distance and transport cost. Second, 'behind the border' constraints which relate to exporting countries' institutional and infrastructure limita-

tions. Finally, 'beyond the border' constraints which relate to importing countries' limitations can be divided into explicit (tariff and exchange rate) and implicit boundaries.

RESEARCH METHODOLOGY

Method of Analysis

There are two significant differences between this paper and previous research. First, this study uses the stochastic frontier approach to estimate determinants of Indonesian trading while others use OLS estimation. Second, following Kalirajan and Singh (2008), this paper includes the 'behind the border' constraints in the estimation model by using time-varying inefficiency model.

The basic equation for the frontier approach is:

$$X_{ij} = f(Z_i; \beta) \exp(v_i - u_i) \dots\dots\dots (1)$$

where X_{ij} is the actual exports from country i to partner country j , $f(Z_i; \beta)$ represents a function consist of potential bilateral trade determinants (Z_i) and β as a vector of unknown parameters which is estimated, using the stochastic frontier approach. The term u_i is the error term that includes 'economic distance' bias as one of the 'behind the border' constraints and v_i is the implicit 'beyond the border' constraints (Kalirajan, 2008; Kalirajan & Singh, 2008). Armstrong (2007) argues that using the stochastic frontier

approach in the gravity model is 'an acceptable and appropriate way to estimate the unobservable resistance to trade'. According to him, this implicit barrier will be captured as inefficiency in trade.

The error term which is v_i assumed to be distributed normal with mean zero and variance σ_v^2 captures other random factors. The u_{ij} which assumed to be non-negative truncations of the normal distribution with mean μ and variance σ_u^2 captures technical inefficiency.

This paper tries to capture the presence of 'behind the border' constraints and uses the modified

model presented by Kalirajan and Singh (2008) as:

$$\ln X_{ijt} = \alpha + \beta \ln GDP_{jt} + \gamma \ln RelDist_{ij} + \delta_1 RelPop_{jt} + \delta_2 REER_{jt} + \delta_3 DPri_{jt} + \delta_4 DAll_{jt} + \delta_5 DASEAN + \delta_6 T + v_{ijt} - u_{ijt} \dots\dots\dots (2)$$

Where: X_{ijt} is the export value of country i to j in time t , GDP_{jt} is the national gross domestic product of country j in time t , $RelDist_{ij}$ is the distance between country i and j relative to the average distance between country i and all its trading partners, $RelPop_{jt}$ is the relative population of country j to Indonesia's population in time t , $REER_{jt}$ is real exchange rate country j to US\$ in time t , $DPri$ and $DAll$

are the dummy variables for the primary products and all product tariffs. $DASEAN$ is a dummy variable for memberships in ASEAN. T is a time trend variable which takes value from 1 to 10. The terms v_{ij} and u_{ij} are the error terms and the implicit 'beyond the border' constraints respectively. Term u_{ij} in this study represents 'behind the border' constraints as inefficiency in Indonesia's exports. The main assumption for u_{ij} is:

$$u_{ij} = \eta_{it} u_{ij} = \{\exp[-\eta (t - T)]\} u_{ij} \dots\dots\dots (3)$$

Equation (3) implies that behind the border constraints such as such as institutional and infrastructure quality have been varying over time (Kalirajan & Singh 2008). In addition, equation (3) is a time-varying inefficiency model (Battese & Coelli, 1992 cited in Coelli, Rao and Battese, 1998). In equation (3), η is 'an unknown scalar parameter to be estimated' (Coelli et al. 1998).

Furthermore, Coelli et al. (1998) argue that in a panel data estimation when the i observation is observed in time T then $t = T$ and $u_{iT} = u_i$. As a result, the value of $\{\exp[-\eta (t - T)]\}$ is equal to one. In addition, the value of

the exponential function depends on the value of η . If η is positive then $\{\exp[-\eta (t - T)]\}$ is not smaller than one which implies that $u_{iT} > u_i$ which implies that overtime the inefficiency term falls (Coelli, Rao and Battese, 1998). Furthermore, Kalirajan and Singh (2008) argue that η is 'the impact of country specific behind the border constraint'. If the η is positive then the impact of 'behind the border' constraints falls overtime and vice versa.

The value of the parameter in equation (2) is estimated using the maximum-likelihood (ML) method. Coelli, Rao and Battese (1998) argue

that using a ML method is more efficient (p.187). Furthermore, 'the ML estimates of β , σ_s^2 , and γ are obtained by finding the maximum of the likelihood function is consistent and asymptotically efficient (Aigner, Lovell and Schmidt, 1977 cited in Coelli, Rao and Battese, 1998, p.188) where $\sigma_s^2 = \sigma_v^2 + \sigma_u^2$ and $\gamma = \sigma_u^2 / \sigma_s^2$. The parameter γ represents 'a measure

of the total variation that is due to country specific behind the border constraints to exports' (Kalirajan & Singh, 2008).

Armstrong (2007) claims that calculation of potential trading is defined as 'the maximum possible trade that can be achieved'. Thus, potential trade can be defined as:

$$POTTTRADE_i = \frac{EFFTRADE_i}{FITTRADE_i} \dots\dots\dots(4)$$

where the term $EFFTRADE_i$ is the export value of country i and $FITTRADE_i$ is the export value generated from the gravity model estimation.

To estimate the stochastic frontier approach, this study uses software STATA version 10.

Data

This study uses various sources of data. Exports data are taken from two sources since the International Monetary Fund (Direction of Trade Statistics-DOTS) provides data from 2009 until 2011 only. Therefore, exports data from 2002 until 2008 are extracted from Indonesian Statistic which is published by the Indonesian Bureau of Statistics annually from 2003 to 2012. Similar to exports data, tariffs is taken from two different sources. Tariffs for the primary products and all products is taken from the World Bank database from 2002 until 2010, while for 2011 it is taken from the United Nations

Commodity Trade Statistics Database (UN-Comtrade). Distance data is taken from a 'great circle distance' database provided by Eden (2013) which basically measures distance from capital city each country to partner countries. Distance data is justified if the capital country is not the main trading city. Finally, variables for GDP, population, Real Effective Exchange Rate (REER) are taken from the World Bank database.

In addition, exports and GDP data are transformed into natural logarithm to generate $\ln X$ and $\ln GDP$ variables. A term $RelDist$ is transformed from relative distance of Jakarta to a major trading city of a country partner to average distance. A $RelPop$ variable is obtained by dividing the partner country's population by Indonesia's current population of approximately 240 million people. Variables $DPri$ and $DAll$ are from subtraction of partner country's tariff from Indonesia's average tariff for primary products and all products

respectively. If the value of the subtraction result is greater than zero then the dummy variable is equal to one, and vice versa. The *DASEAN* variable is a dummy variable equal to one if a partner country is an ASEAN member. The term *T* is a time trend variable to capture the 'behind the border' constraints overtime. Finally to obtain the value of estimated exports from equation 2, the value of a variable *lnX* is transformed using an exponential function. Observations in this paper

include 25 main partner countries for 10 years from 2002 to 2011. They cover Indonesia's partner countries in different regions including ASEAN, ASEAN+3, NAFTA, and the European Union. This study also covers trading with Australia. The main reason this study uses the period 2002-2011 is due to data availability. Data for Indonesia's export to China from 1999 to 2001 is not available in DOTS IMF, UNComtrade, and Indonesian Central Bureau of Statistics. The statistic summary as shown in Table 1.

Table 1. Statistic Summary

Description	<i>lnX</i>	<i>lnGDP</i>	<i>RelDist</i>	<i>RelPop</i>	<i>REER</i>	<i>Dpri</i>	<i>Dall</i>
Mean	6.791	26.492	1.000	0.412	76.320	0.216	0.224
Standard Deviation	2.052	2.018	0.608	1.053	43.443	0.412	0.418
Minimum	(0.693)	21.272	0.121	0.001	-	-	-
Maximum	10.426	30.286	2.198	5.547	126.134	1.000	1.000
Number of country	25	25	25	25	25	25	25
Number of year	10	10	10	10	10	10	10

Source : Author's calculation.

RESULT AND DISCUSSION

The estimation result of equation 2 as presented in Table 2 shows that all

variables are statistically significant with level of confidence 1 per cent or 5 per cent.

Table 2. Estimation Results

Code	Coefficient (Std Error)	P> Z
Constant	-8.550* (3.045)	0.005
LnGDP	0.678* (0.112)	0.000
RelDist	-0.700* (0.154)	0.000
RelPop	-0.170* (0.048)	0.000
REER	-0.009* (0.003)	0.008
Dpri	0.326* (0.083)	0.000
Dall	-0.181** (0.079)	0.022
DASEAN	2.412** (1.158)	0.037
T	0.025** (0.012)	0.035
Sigma square	11.918 (15.562)	
Gamma	0.994 (0.007)	
Eta	0.015* (0.003)	
Mu	-2.647 (7.322)	
Loglikelihood	-87.177	

Source : Author's estimation.

Note: Values in parentheses () are standard errors.

* Significant at the 1 per cent level;

** Significant at 5 per cent level;

*** Significant at 10 per cent level

The estimated parameter signs for *lnGDP* and *DASEAN* are positive and significant as expected. Furthermore, the negative sign for *RelDist* and *Dall* is also as expected. Even variables *RelPop* and *DPri* are statistically significant, the signs for those variables

are unexpectedly in reverse value which are negative coefficients.

The variable *lnGDP* of partner countries significantly affects the export with a positive sign which means that a higher level of GDP in partner countries results in a higher export value from

Indonesia. For example, if the GDP of the USA increases significantly, the citizen of the USA will expect more goods and services hence implies an increase in the domestic demand. If the domestic demand exceeds the domestic supply, the USA should import more from their partner countries, in this case from Indonesia. Similarly to the level of GDP, the positive value of *DASEAN* means that if one country is an ASEAN member, the export value should increase. Since ASEAN already implemented AFTA which implies that lower tariffs among ASEAN members, joining ASEAN should bring benefits such as lower transaction costs for importers and higher exports value for the partner countries. The *RelDist* variable is negatively significant implying that the more distance between two cities results in a lower export value. For instance, countries tend to trading intensively with closest neighbor in the region. In this case, trading among ASEAN countries should be higher since they geographically locate in the same region. The parameter value of the *REER* variable which means captures an external competitiveness (Wang *et al.*, 2008) is negative as expected, means that higher *REER* will result in a fall in export value. For example, when the domestic currency is depreciated, it implies that importing becomes more expensive.

Therefore the partner countries will reduce their importing activities due to higher costs.

For the unexpected signed variables such as *RelPop* with a negative value implies that an increase in population of a partner country results in a fall in export value. In addition, the variable *DPri* is positive in sign which captures the differences between Indonesia's average primary product tariff with partner countries is expected to be negative. This implies that when tariffs are higher in partner countries, exports increase. On the other hand, the variable *DAll* is negative in sign as expected which implies that when tariffs barriers are higher in partner countries, exports decrease.

The parameter gamma is almost equal to one, which means that there is a variation in efficiency for each partner country. Kalirajan and Singh (2008) argue that if the gamma parameter is large it means that 'the decomposition of the error term into *u* and *v* is valid for the present data set and the deviations of actual exports from potential exports is due to 'behind the border' constraints

The time trend variable *T* is positive and significant thus it can be used for this model to capture the 'behind the border' constraints. In addition, the eta is also greater than zero and significant, which means that there is a decrease in the 'behind the border' constraints.

DISCUSSION

Determinants of Indonesia's trading performance

This study first examines any impact of FTAs especially AFTA for Indonesia's trading performance. Empirically, the paper finds that ASEAN memberships and GDP significantly influence trade among ASEAN countries. ASEAN membership which is represented by the *DASEAN* variable is the most significant variable in Indonesia's trading performance since it has the highest value of the estimated parameter and it is significant at 5 per cent level. The significance of this dummy variable implies that Indonesia's membership in ASEAN considerably increases the export value to other ASEAN countries. This finding is similar to Ekanayake, Mukherjee and Veeramacheni (2010) who claim that the estimated coefficient that 'measures the degree of trade-creation effects of the regional trade agreement between members' is positive and statistically significant.

The variable *lnGDP* as expected is positive and the highest estimated parameter value after the ASEAN dummy variable. This means that when the partner country's GDP which captures the economy level of partner countries is higher, there is more demand for importing goods from Indonesia. This result is consistent to Kalirajan and Singh (2008) and Yuniarti (2008).

On the other hand, relative distance, relative population, and REER are negative in sign. The negative sign in distance is negative and as expected. This implies that if the distance between Jakarta and major trading or capital cities is greater, the higher the transportation cost. This leads to trading volume between countries reducing. This result is similar to Kalirajan and Singh (2008) and Yuniarti (2008).

REER, which indicates the external competitiveness of Indonesia to the partner countries, is also negative and significant. This implies that when REER is high then the export value falls since Indonesia's currency is less competitive and partner countries are importing from other sources. Since the variable REER is significant at 1%, it also implies that the Indonesia's exports are significantly affected by volatility of the exchange rate. This finding is similar to Scheepers, Jooste and Alemu, (2007). The main difference is that Scheepers, Jooste and Alemu (2007) report that the sign for the REER variable is negative but insignificant.

However, the population sign is negative which implies that even though there is an increase in partner country's population, the demand for Indonesia's imported goods has fallen. One explanation for this result is when the population of partner countries increases, there is an increase in the labor force. As a result, there is an increase in total domestic product

produced, thus the demand for imported goods decreases. Another possibility is that there is an alteration change of preference of goods in partner countries. This finding is similar to the finding of Ekanayake, Mukherjee and Veeramacheneni (2010).

Tariffs also contributes significantly to Indonesia's exports. The all product tariffs variable is negative in sign which is as expected while for the primary tariffs is a positive sign. The negative sign in the all product tariffs dummy variable means that when the tariffs fall, Indonesia's exports should rise. In general, this variable shows that Indonesia's increase in exports is due to the fall in all of the product tariffs. However, for the primary product tariffs dummy variable, the sign is positive which might be caused by a shift of

demand for Indonesia's primary product such as from agriculture into manufactured products. Figure 2 shows that there has been an increase in manufactured commodities such as machinery and transport equipment, manufactured goods, and manufactured articles since late 2008. This finding is similar to Igusa and Shimada (1996) who claim that there is a change in the export composition from ASEAN countries which shifts from 'the raw material or primary commodities to manufactured product'. They argue that the causes of this change are industrial policy and promotion of manufacturing investment, increasing FDI from Japan and the Asian Newly Industrializing Economies (NIE's), and increase in basic machinery imports by ASEAN.

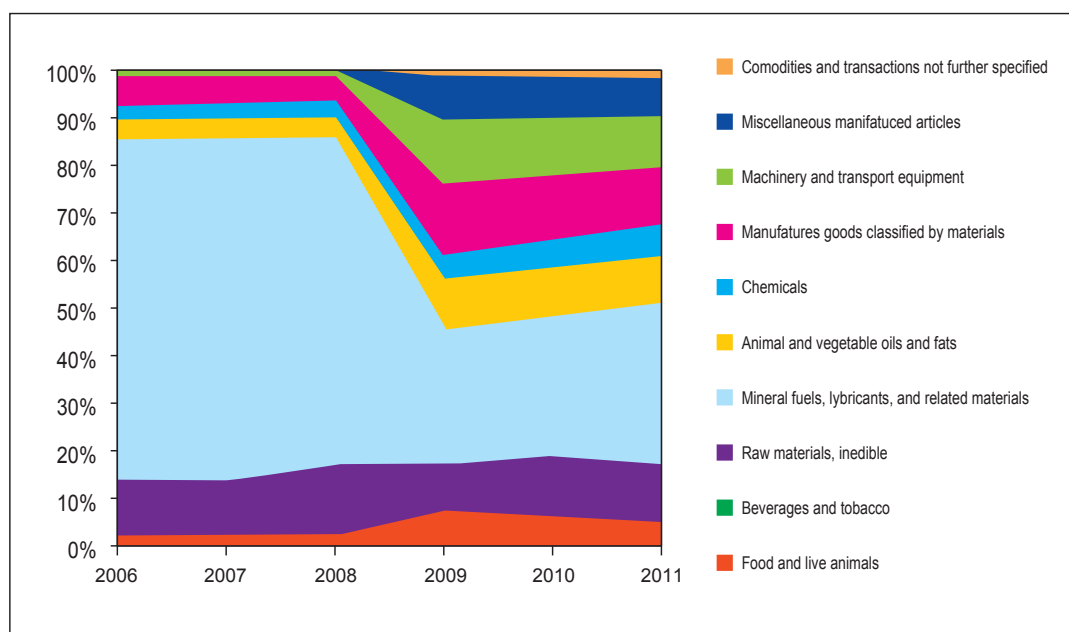


Figure 2. Proportion of Indonesia's export based on SITC, 2006-2011

Source : Indonesian Central Bureau of Statistic (2009, 2012)

Optimality in Indonesia's trading performance

The second question relates to the optimal level of trading between Indonesia and current partner countries. This study measures Indonesia's trade potential with partner countries using equation (4) which is solved by taking a percentage of actual exports with estimated exports. To obtain the estimated value of exports, this paper uses the estimated parameters Table 1, then calculates it with the value of each variable. After the estimated $\ln X$ is found, it is transformed into the value of exports. Trade performance can be defined as over-trade if the comparison value is greater than 100 per cent or under-trade if it is below 100% .

In general, the actual export value of Indonesia with partner countries has increased significantly in the last decade. The value of exports gradually increases with a slight dip in 2009 due to the financial crisis in Europe and the United States as shown in Figure 3. In general, Indonesia's trading with current partner countries is under-trade except for China which is over-trade. This shows that among ASEAN countries, Indonesia is still under-trade even though the value of the estimated ASEAN dummy in equation (2) is positive and significant. However, Figure 3 also reveals that in the last decade, Indonesia's top trading partners are dominated by outside AFTA.

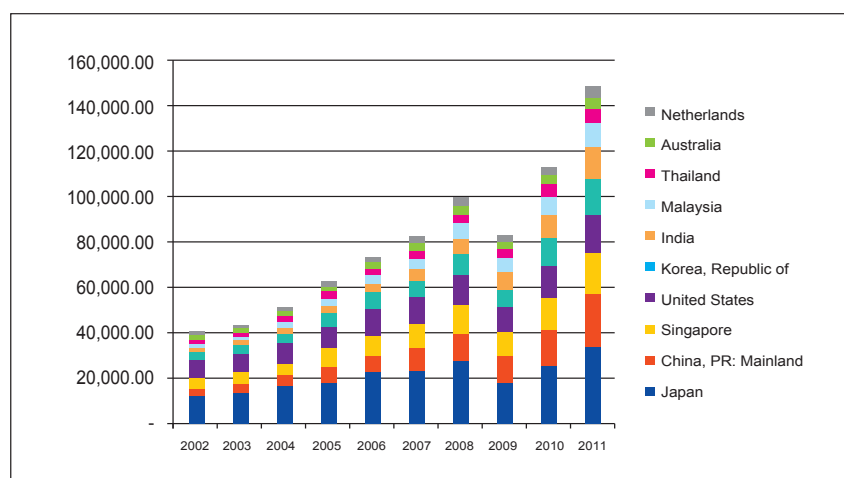


Figure 3 Indonesia top trading partners, 2011 (million USD)

Source : Direction of Trade statistics (2013)

Table 3a shows that the estimated Indonesia's potential trade using the ratio of actual and estimated export value in equation (4) vary for each year between 2002 and 2011. It is sorted based on higher average potential trade for each region: EU, ASEAN, ASEAN+3,

Australia, NAFTA. Table 3b reveals that for some partner countries except Singapore and Malaysia, the trade is relatively very insignificant. Indonesia's export performance with EU countries is also under-trade for all EU countries except with Netherlands and Belgium

which are above 50 per cent. This performance is similar with Australia's at around 53 per cent. In addition, exports with the United States and ASEAN +3 show good performance which has almost achieved its potential trade except for South Korea which is still around half of its potential. Results in Table 3b show that Indonesia is under-trade with all ASEAN countries corroborated by the data plot in Figure 3 which shows that most of Indonesia's trading partners are from outside ASEAN and similar to Yuniarti's (2008) finding that variable membership in AFTA is not significant due to Indonesia's trading destinations being with outside ASEAN countries.

The unexpected results in Table 3a and 3b are also found in Figure 4. Figure 4 shows that the utilization of AFTA by Indonesia is quite low and constant over time. On average during the period 2002-2011, there has been no significant increase in export value with ASEAN countries as destination. However, trading with the USA and ASEAN+3 is increased significantly even before the FTA was signed in 2005, 2007, and 2008. The exports value to the EU and the USA increase significantly during the period 1999 to 2011 with a slight decrease in 2009 due to the financial crisis in the USA and the debt crisis in the southern countries of EU.

Table 3a. Estimated Indonesia's potential trade with partner countries, 1999-2011 (ratio of actual and estimated export value)

No.	Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	AVG
1	Netherlands	0.74	0.62	0.75	0.83	0.84	0.87	1.15	0.76	0.89	1.29	0.87
2	Belgium	0.52	0.58	0.55	0.53	0.54	0.60	0.57	0.39	0.42	0.50	0.52
3	Spain	0.38	0.37	0.28	0.34	0.41	0.45	0.37	0.36	0.43	0.46	0.38
4	Germany	0.21	0.22	0.25	0.24	0.25	0.27	0.27	0.23	0.27	0.31	0.25
5	Italy	0.16	0.18	0.19	0.18	0.20	0.21	0.27	0.22	0.29	0.40	0.23
6	UK	0.27	0.23	0.25	0.21	0.21	0.21	0.21	0.18	0.19	0.19	0.21
7	France	0.14	0.14	0.13	0.11	0.11	0.12	0.13	0.11	0.13	0.15	0.13
8	Finland	0.14	0.12	0.12	0.14	0.12	0.08	0.06	0.03	0.06	0.11	0.10
9	Poland	0.08	0.07	0.07	0.07	0.07	0.09	0.12	0.10	0.11	0.13	0.09
10	Denmark	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.08	0.11	0.08
11	Greece	0.07	0.08	0.07	0.07	0.07	0.12	0.10	0.07	0.06	0.07	0.08
12	Sweden	0.08	0.07	0.07	0.05	0.06	0.05	0.05	0.05	0.05	0.06	0.06
13	Singapore	0.24	0.25	0.27	0.32	0.32	0.33	0.37	0.25	0.35	0.44	0.31
14	Malaysia	0.11	0.14	0.13	0.16	0.14	0.15	0.18	0.14	0.20	0.24	0.16
15	Philippines	0.04	0.04	0.05	0.06	0.05	0.06	0.08	0.08	0.10	0.13	0.07
16	Thailand	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.03	0.04	0.05	0.04
17	Vietnam	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.03	0.04	0.03
18	Cambodia	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01
19	Brunei D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
20	Lao PDR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	China	0.91	0.98	1.07	1.32	1.42	1.44	2.11	0.33	0.35	0.42	1.03
22	Japan	0.76	0.81	0.75	0.79	0.89	0.90	0.98	0.84	1.12	1.53	0.94
23	Korea	0.35	0.43	0.37	0.57	0.48	0.42	0.52	0.37	0.60	0.95	0.51
24	Australia	0.45	0.42	0.43	0.48	0.52	0.58	0.65	0.58	0.52	0.72	0.54
25	US	0.86	0.84	0.96	0.96	0.98	0.94	0.98	0.75	0.92	1.09	0.93

Source : Author's calculation.

Figure 4 corroborates this finding that AFTA is not significant for Indonesia's export performance even though the estimated parameter is the highest and most significant. For example, when the ASEAN-Japan Comprehensive Economic Partnership was being effective on 01 December 2008 and the Japan-Indonesia Economic

Partnership Agreement was effective on 01 July 2008, the aggregate trading with ASEAN +3 members was decrease significantly in 2008. This finding is different to Sudsawasd and Mongsawad (2010) who claim that 'the effects of free trade within ASEAN members significantly boost intra-trade to be approximately 182 percent'.

Table 3b. Percentage of Indonesia's potential trade, average (%)

Region/ Country	Average Potential Trade	Region/ Country	Average Potential Trade
EU		ASEAN	
Netherlands	87.27%	Singapore	31.39%
Belgium	51.96%	Malaysia	15.89%
Spain	38.48%	Philippines	6.86%
Germany	25.06%	Thailand	3.76%
Italy	22.98%	Vietnam	2.70%
United Kingdom	21.43%	Cambodia	1.38%
France	12.66%	Brunei Darussalam	0.39%
Finland	9.72%	Lao PDR	0.06%
Poland	9.11%	ASEAN+3	
Denmark	8.45%	China	103.45%
Greece	7.82%	Japan	93.77%
Sweden	5.84%	Korea, Rep.	50.74%
NAFTA		AUSTRALIA	
United States	92.61%	Australia	53.52%

Source : Author's calculation.

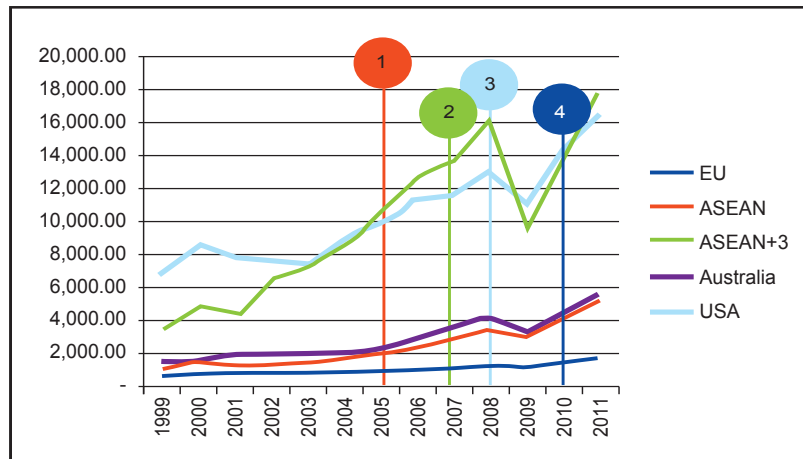


Figure 4 Export Value per Region of Partner Countries

Source: Asian Development Bank (2013), World Bank (2013).

Note : 1. ASEAN-People's Republic of China Comprehensive Economic Cooperation Agreement is effective since 01 July 2005;
 2. ASEAN-Korea Comprehensive Economic Cooperation Agreement is effective since 01 June 2007;
 3. ASEAN-Japan Comprehensive Economic Partnership is effective since 01 December 2008 and Japan-Indonesia Economic Partnership Agreement is effective since 01 July 2008;
 4. ASEAN-Australia and New Zealand Free Trade Agreement is effective since 01 January 2010; and ASEAN-India Comprehensive Economic Cooperation Agreement is effective since 01 January 2010;

Fall in 'behind the border' constraints

Finally, 'behind the border' constraints which covers customs procedures, the ASEAN Single Window, the Common Effective Preferential Tariffs (CEPT), Rules of Origin, and harmonising standards and conformance procedures (ASEAN, 2008a) can be captured by value of η (eta) variable. The value of η is positive and significant at 1 per cent level. This means that overtime, there is a decrease in 'behind the border' constraint in Indonesia as exporting country in unobservable variables such as institution and infrastructure. 'Behind the border' constraints fall also in line with one of FTA's objective which is to reduce barriers in trade between

countries. Unfortunately, this improvement in 'behind the border' constraint does not accompanied by increase in export value among ASEAN which empirically presented in Table 2. This finding is possibly because of the bureaucracy reform in Indonesia's government especially in the Customs and Excise Directorate under the Ministry of Finance which has been in progress since 2004 (Kompas 2009). Furthermore, Schwab (2011) reports that overall, Indonesia's infrastructure rank is better off in 2011.

Policy Implications

Table 3 and Figure 4 reveal that Indonesia should improve trading performance within ASEAN countries under AFTA region for several reasons. First, it is two decades since AFTA was

signed and in effect. However, empirical results in Table 2 and the graphical approach in Figure 4 show that in the period 2002-2011, Indonesia's export performance has been under-trade with all ASEAN members. This is not in line with AFTA objectives which is 'to increase the ASEAN region's competitive advantage as a production base geared for the world market' (ASEAN 2013c). Second, FTAs with outside ASEAN such as China and Japan (ASEAN+3) and the USA (NAFTA) which was ratified around a decade ago is almost at potential value. This suggests that Indonesia has still not utilized the ASEAN market optimally for several reasons. First, there is a low demand for Indonesian goods among ASEAN countries. Second, there is 'beyond the border' such as institutional and infrastructure constraints that prohibit Indonesia from exporting more within ASEAN. However, these possibilities should be further explored empirically.

CONCLUSION AND POLICY RECOMMENDATION

There are three main finding from this study. First, there is a positive impact of FTAs for Indonesian trading performance with partner countries in various regions including ASEAN, ASEAN+3, the European Union, the US, and Australia. Second, the frontier estimation reveals that Indonesia's trading performance with its partners

varies. Trading with AFTA members is under trade while trading with China is over trading. Third, it confirms that overtime 'behind the border' constraints have fallen.

The main finding of this study is that AFTA implementation should increase Indonesia's trading performance with partner countries empirically. However, the destination of exports is dominated by outside ASEAN region and Indonesia's trading performance is under trade with all ASEAN members. Compared to trading performance with China, Japan, and the USA, the average value of potential trade shows that trading with these countries is over trade or has more potential than with ASEAN members. Finally, this paper finds that overtime Indonesia has been successful in reducing 'behind the border' constraints.

One implication of this study is that the Indonesian government should put more emphasis on trading between ASEAN countries in order to fulfill the objectives of AFTA which was signed two decades ago. The Indonesian government should also increase exports with ASEAN countries and decrease 'behind the border' constraints to stimulate higher export activity.

There are several limitations of this study. First, it does not calculate differences in each country's technical efficiency (due to some data limitations). Technical efficiency calculated for each partner country is possible using

software Frontier 4.1. In addition, this paper does not examine in detail each partner country. This paper tries to overcome this problem by using average value of potential trade for each country. Thus, a recommendation for future research is to use Frontier 4.1 to capture more specific issue relates to export efficiency in the country level. Second, further research should consider more comprehensive analysis such as the breakdown of technical inefficiency to obtain more solid results and discussion. This issue is important as it is mentioned clearly in the AEC blueprint. Even though AFTA could boost trading among ASEAN countries, the achievement of AEC success in 2015 is not only determined by removal of tariffs but also non-tariffs as well as customs procedures, harmonized standards, and rules of origin (ASEAN, 2008a).

References

- Aigner, D.J., C.A.K. Lovell and and P. Schmidt. (1977). Formulation and Estimation of Stochastic Frontier Production Function Models. *Journal of Econometrics*, vol. 6, 21-37.
- Armstrong, S. (2007). Measuring Trade And Trade Potential: A Survey. *Asia Pacific Economic Paper*, 368, 1-19.
- Asian Development Bank. (2013). Free Trade Agreements, Asian Development Bank. Accessed on May 7, 2013 from <http://www.aric.adb.org/ftatrends.php>.
- Association of Southeast Asia Nations. (2008a). ASEAN Economic Community Blueprint. Association of Southeast Asia Nations. Accessed on March 4, 2014 from www.asean.org/archive/5187-10.pdf.
- Association of Southeast Asia Nations. (2013b). ASEAN Free Trade Area (AFTA Council). Association of Southeast Asia Nations. Accessed on May 7, 2013 from <http://www.asean.org/communities/asean-economic-community/category/asean-free-trade-area-afta-council>.
- Association of Southeast Asia Nations. (2013c). ASEAN Free Trade Area (AFTA): An Update. Association of Southeast Asia Nations. Accessed on May 14, 2013 from <http://www.asean.org/communities/asean-economic-community/item/asean-free-trade-area-afta-an-update>.
- Bary, P. (2009). Prospek perdagangan Indonesia, Cina, dan India: analisis gravity model. *Jurnal Ekonomi dan Pembangunan*, vol.17 (2), 31-40.
- Battese, G.E. and T.J. Coelli. (1992). Frontier Production Functions, Technical Efficiency and Panel Data: With Application to Paddy Farmers in India. Journal of Productivity Analysis, vol. 3 (1-2), 153-169
- Coelli, T., D.S.P. Rao and G.E. Battese. (1998). *An Introduction To Efficiency And Productivity Analysis*. Massachusetts: Kluwer Academic Publishers.
- Dent, C.M. (2006). *New Free Trade Agreement In The Asia-Pacific*. New York: Palgrave Macmillan.
- Direction of Trade Statistics. (2013). Indonesia. the International Monetary Fund. Accessed on 2 May, 2013 from <http://elibrarydata.imf.org.virtual.anu.edu.au/DataReport.aspx?c=1449337&d=33060&e=161919>
- Eden, L. (2013). Great Circle Distances Between Capital Cities. Texas A&M University. Accessed on May 2, 2013 from <http://www.chemical-ecology.net/java/capitals.htm>.

- Ekanayake, E.M., A. Mukherjee and B. Veeramacheneni. (2010). Trade Blocks And The Gravity Model: A Study Of Economic Integration Among Asian Developing Countries. *Journal of Economic Integration*, vol.25 (4), 627-643.
- Igusa, K., and H. Shimada. (1996). AFTA and Japan. In J. Tan (ed.), *AFTA In The Changing International Economy*. Singapore: Institute of Southeast Asia Studies, 139-163.
- Indonesian Central Bureau of Statistic. (2009). *Statistical Yearbook of Indonesia 2009*. Jakarta: Indonesian Central Bureau of Statistic.
- Indonesian Central Bureau of Statistic. (2012). *Statistical Yearbook of Indonesia 2012*. Jakarta: Indonesian Central Bureau of Statistic.
- Kalirajan, K. (2008). Gravity Model Specification And Estimation: Revisited. *Applied Economic Letters*, vol.15, 1037-1039.
- Kalirajan, K., and K. Singh. (2008). A Comparative Analysis Of China's And India's Recent Export Performances. *Asian Economic Papers*, vol.7 (1), 1-28.
- Kawai, M., and Wignaraja, G. (2010). *Asian FTA: Trends, Prospects, and Challenges*. Asian Development Bank Economics Working Paper Series No.226. Asian Development Bank.
- Kawai, M., and Wignaraja, G. (2013). *Patterns of Free Trade Areas in Asia*. Singapore: Institute of Southeast Asian Studies.
- Krugman, PR., & Obstfeld, M. (2000). *International Economics: Theory And Policy (5th ed.)*. Massachusetts: Addison-Wesley.
- Kompas. (2009, June 24). Reformasi Bea Cukai, Layanan Makin Cepat. Accessed on May 14, 2013 from <http://bisniskeuangan.kompas.com/read/2009/06/24/11150529/Reformasi.Bea.Cukai.Layanan.Makin.Cepat>.
- Park, Y.C., S. Urata and I. Cheong. (2007). The Political Economy Of The Proliferation of FTAs. In P.A.Petri and S.J. La Croix (eds). *Challenges to the Global Trading System: Adjustment to Globalization in the Asia-Pacific Region*. Oxon: Routledge.
- Plummer, M.G., D. Cheong and S. Hamanaka. (2010). *Methodology For Impact Assessment Of Free Trade Agreement*. Manila: Asian Development Bank.
- Scheepers, S., A. Jooste and Z.G. Alemu. (2007). Quantifying The Impact Of Phytosanitary Standards With Specific Reference to MRLs on The Trade Flow Of South African Avocados to The EU. *Agrekon*, vol. 46 (2).
- Schwab, K. (2011). *The Global Competitiveness Report 2011-2012*. World Economic Forum, Switzerland.
- Sebayang, K.D.A. (2011). Dampak Integrasi Ekonomi ASEAN Terhadap Perdagangan Indonesia Pada Sektor Roda Empat. *Econosains*, vol 9 (2), 119-131. Accessed on May 7, 2013 from http://www.academia.edu/1492571/dampak_integrasi_ekonomi_asean_terhadap_perdagangan_indonesia_pada_sektor_kendaraan_roda_empat.
- Sudsawasd, S., and P. Mongsawad. (2010). Gains From Intra- And Inter-Regional Trade And Economic Co-Operation. in A.Chongvilaivan (ed.), *Economic downturn: southeast asian macroeconomic policy editor*. Singapore: Institute of Southeast Asian Studies.
- Tan, J.L.H. (1996). Introductory Overview: AFTA in The Changing International Economy. in AFTA in Tan, J.L.H (ed). *The Changing International Economy*. Singapore: Institute of Southeast Asian Studies.

- United Nations Commodity Trade Statistics Database. (2013). *Data query*, the United Nations Commodity Trade. Accessed on April 29, 2013 from <http://comtrade.un.org.virtual.anu.edu.au/db/ce/ceSearch.aspx>.
- Wang, J., M. Ronci, N. Farhan, M. Takebe, and A. Shanghavi. (2008). The Choice Of Monetary And Exchange Rate For A Small, Open, Low-Income Economy: The Case Of Sao Tome And Principe. IMF Working Paper WP/08/118, International Monetary Fund.
- World Bank. (2013). Exports Of Goods And Services. World Bank. Accessed on May 9, 2013 from <http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS>.
- Yuniarti, D. (2008). Potensi Perdagangan Global Indonesia: Pendekatan Gravity Model. Jurnal Ekonomi, vol. 13 (2) 119-130. Accessed on May 7, 2013 from <http://journal.tarumanagara.ac.id/index.php/FE/article/viewArticle/553>.