

Research article

Indonesian Intra-Industrial Trade in ASEAN Region Countries

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Abstract: Through international trade, a country with other countries can interact and cooperate in the export and import of goods and services. Indonesia's export-import trade transactions with trading partner countries have undergone structural changes. This change was caused by the start of the industrialization process in the early 1990s. This study was conducted to find out how Indonesia's trade with its trading partners in ASEAN countries (Singapore, Malaysia, Thailand, Vietnam, and the Philippines). The data sources used in this study are United Nation Commodity Trade, World Bank, Statistics Indonesia from 2000 to 2018. Measuring the Grubel and Lloyd Index and using panel data regression. The findings indicate that the average GDP, real GDP per capita, and the exchange rate are positively related and have a significant effect on intra-industry trade. Meanwhile, the distance is not significant to intra industry trade.

Keywords: intra industry trade, international trade, Grubel and Lloyd index, panel data

JEL Classification: F02, F14, F15

Abstrak: Melalui perdagangan internasional suatu negara dengan negara lain dapat saling berinteraksi dan bekerjasama dalam kegiatan ekspor dan impor barang dan jasa. Transaksi perdagangan ekspor-impor Indonesia dengan negara mitra dagang telah mengalami perubahan struktural. Perubahan ini disebabkan oleh dimulainya proses industrialisasi pada awal 1990-an. Penelitian ini dilakukan untuk mengetahui bagaimana perdagangan Indonesia dengan mitra dagangnya di negara-negara ASEAN (Singapura, Malaysia, Thailand, Vietnam, dan Filipina). Sumber data yang digunakan dalam penelitian ini adalah United Nation Commodity Trade, World Bank, Badan Pusat Statistik Indonesia dari tahun 2000 hingga 2018. Mengukur Indeks Grubel dan Lloyd dan menggunakan regresi data panel. Hasil penelitian ini menunjukkan bahwa rata-rata PDB, rill PDB per kapita, dan nilai tukar berhubungan positif dan berpengaruh signifikan terhadap perdagangan intra industri. Sementara itu, jarak tidak signifikan terhadap Intra Industri Perdagangan.

Kata Kunci: intra industry trade, perdagangan internasional, Grubel dan Lloyd indeks, data panel.

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1. INTRODUCTION

Indonesia is one of the strategic countries when viewed in terms of geographical conditions, which is flanked by two oceans and two continents. This can allow Indonesia to become a strategic place to cooperate between countries (Adiyanti, 2016; and Arno, 2015). Cooperation conducted by Indonesia with member countries within ASEAN has destination among other to give opportunity for the country member in skeleton expand scope activities in the field of economy, anticipating gap social economy and reduce poverty, develop and repair facility business and trading as well as try for interesting interest as country destination for traveler and investors (Suhandi, 2018).

Through international trade one country with another country can interact with each other and cooperate in export and import activities of goods and services. According to Muryani & Pratiwi (2018) states that trade between countries is described as an exchange of products in different industries. This is evidenced by the Heckscher-Ohlin theory (H-O Theory) which explains that this type of trade is based on comparative advantages due to the limited resources in producing an item or service so that it is more effective when obtaining it from another country (Turkchan & Ates, 2010).

Indonesian Statistic (2018) reports that Indonesian export value and import value based on standard international trade classification (SITC) code is quite good in 2018. Standard international trade classification is a statistical classification of commodities entering external trade in exports and imports. The SITC code is used for economic analysis purposes as well as to enable comparing commodities traded by country or year. The SITC code is also a statistical classification of some commodities entering external trade in the form of exports and imports.

International trade which is growing rapidly nowadays indicates that international trade is not sufficiently explained by comparative advantage theory alone (Nisa, 2017). It is possible to use intra-industrial trade indices. The literature on international trade using Intra Industry Trade has been growing since 1960 until now, bringing up some new arguments as well as study conducted by Phan & Jeong (2014) on customs unions in Europe. The study explained that the positive impact of customs union resulting from the namely removing all forms of trade barriers and diversifying all trade policies between members.

Study conducted by Kurniawan & Setyari (2018) on Indonesia cosmetic commodity intra industry trade determinants with ASEAN-5 trading partners revealed that Indonesia's Intra Industry Trade integration level is in the moderate integration category with Intra Industry Trade index level between 25.00 - 49.99 percent. Meanwhile, study conducted by Bato (2014), shows that the results of the G-L index show a decrease in trade flow performance conditions. The downward trend is due to the composition of imports that are too large compared to exports.

Products used on activity trading moment this more many involve type varied products. Enhancement variation product conducted because consumer capable consuming various characteristics and quality product (Afriandini & Hastiadi, 2018). This means that international trade involves the exchange of differentiated products from the same industry (Dirisu, Iyiola, & Ibiidunni, 2013). International trade currently includes intra-industry trade on differentiated products. It is the opposite of inter-industry with completely different products (Mukhlis, 2020).

Trading international will superior if develop one type the resulting product because cost the production issued will also be more cheap (Aprita & Adhitya, 2020). That is, international competition forces every company or factory in industrial countries to produce only one, or at least one, type and model of the same product instead of many different types and models. This is very important in keeping unit costs low. Intra-industrial benefits will benefit consumers as more choices become (for example, more and more differentiated product types) and are available at lower prices which is possible due to economies of scale in production (Wishanesta & Setyari, 2017). The importance of intra-industrial trade becomes increasingly apparent as tariffs and other barriers to trade flows between members vary by country (Sari & Prastyani, 2021).

The development of trade in Indonesia is thought to be that most commodities traded for export still rely on natural resources, relatively cheap labor, and other production factors (Cheong & Yoo, 2020). So, the goods exported do not rely on the quality of export commodities and the use of advanced technology but rather utilize the potential production factors (Wahyuningsih, 2012). That is, the trade that occurs between Indonesia and the trading partner countries is still mostly in different commodities (Jati et.al., 2019). Thus, the increase in welfare of trade is only measured using price reduction and increased consumption. However, other measures of welfare improvement can be measured by the growing number of commodities that consumers can choose from because of international trade.

2. RESEARCH METHODS

2.1. Data

This study is a study using a quantitative data approach. The data in this study is secondary data. The dependent variables in this study were intra-industry trade measured by Grubel Lloyd Index, while independent variables namely average Gross Domestic Product (AVEGDP) measured by average GDP between Indonesia and trading partner countries; real Gross Domestic Product per capita (GDPC) measured by GDP difference between Indonesia and trading partner countries; exchange rate measured by exchange rate between Indonesia and trading partner countries; and distance between Indonesia and trading partner in ASEAN countries (Malaysia, Singapore, Thailand, Vietnam, and Philippines) for the last nineteen years (2000-2018). This code is created to classify and analyze the economy and can compare commodities traded between Countries. The following Table 1 presented lists the SITC code that will be used in this study:

Table 1. SITC Category List (Standards International Trade Classification)

SITC Code	Product Description
0	Food and live animals
1	Beverage and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants, and related materials
4	Animal and vegetable oils, fats, and waxes
5	Chemicals and related products, n.e.s
6	Manufactured goods classified chiefly by material
7	Machinery and transport equipment
8	Miscellaneous manufactured article
9	Commodities and transactions do not classify elsewhere in the SITC

Source: UNCOMTRADE (United Nation Commodity Trade), 2020

2.2. Model specification

The data analysis techniques used in this study use intra-industry trade index measurement / Grubel Lloyd Index and panel data analysis. Panel data analysis was carried out with the help of E-Views software, with the aim of knowing the influence of the independent variables (average GDP, GDP per capita, exchange rate and distance) on the dependent variable (Intra Industry Trade). In this study, the effective distance is used, namely the distance measured from the perspective of exporters and importers based on the Gross Domestic Product of partner countries. The following is the regression analysis equation that will be used:

$$IIT_{ijt} = \beta_0 + \beta_1 \ln(AVEGDP_{ijt}) + \beta_2 \ln(GDPC_{ijt}) + \beta_3 \ln(EXR_{ijt}) + \beta_4 \ln(DIST_{ijt}) + \varepsilon_{ijt} \quad (1)$$

Denotes IIT_{ijt} is intra-industry trade index between i and j countries in 2018; β_0 is Constants; $AVEGDP_{ijt}$ is average GDP value of countries i and j in 2018; $GDPC_{ijt}$ is the difference in the value of GDP per capita of countries i and j in year (t); EXR_{ijt} is country exchange rate i and j in year (t); $DIST_{ijt}$ is effective distance of state i and j in year (t); and ε_{ijt} is random error.

3. RESULTS AND DISCUSSION

3.1. Intra-industry trade Indonesia and ASEAN countries

International trade is growing rapidly today driven by globalization and technological advances. Trade that was previously only limited between certain regions has now expanded into the wider region. There are differences in the types of goods that can experience scarcity can be resolved by means of trade between countries. Trade stemming from different production factors in a country can enable comparative advantages and can lead to product differentiation (Lloyd &

Lee, 2002). Intra-industrial trading activities can benefit every country that does so because it can have different types of goods available. Figure 1 shows the average calculation of Indonesia's trade index with its trading partners based on SITC category 1-9.

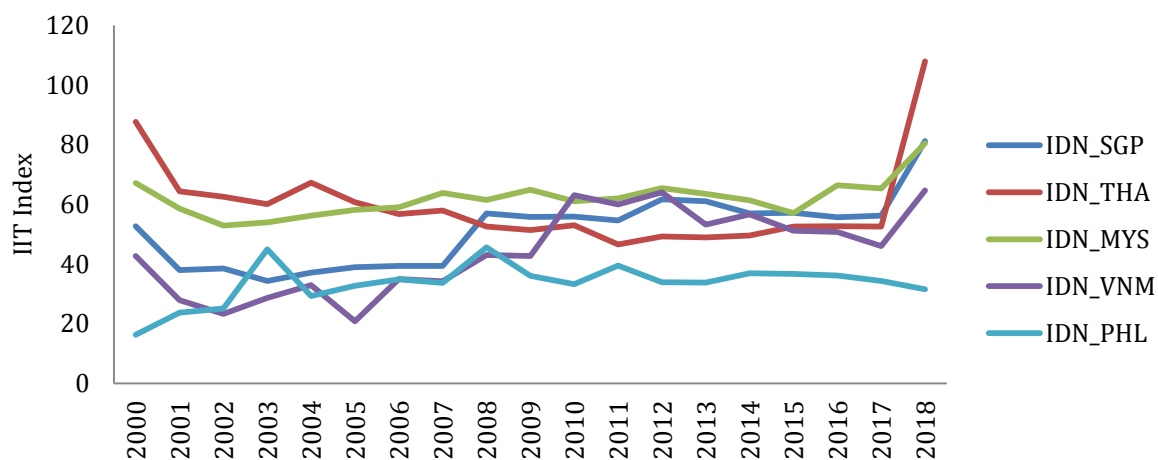


Figure 1. Average intra-industry trade index for SITC Category 1-9, 2000-2018

Source: Authors computation, 2020

Figure 1 reports that intra-industrial trade does not always increase the rise and fall of the level of intra-industrial trade is influenced by the export and import value of the reporter country to the partner country. The more different the difference between the export value and the import value, the lower the index value or it is one-way trade. The high average intra-industrial trade index in Thailand and Malaysia indicates that Indonesia's trade with the two countries is quite high compared to other countries. Table 2 will be presented the development of Indonesia's intra-industry index with trading partner countries in each industry for SITC 1-9 products.

Table 2 explains that some rather strong categories are category code SITC=2 (raw materials, not eaten, except fuel), SITC=6 (manufactured goods classified by raw materials), SITC=7 (machinery and transportation equipment) and SITC=8 (other manufactured goods). In this category, the average index number is more than 25 percent, where the highest average is at SITC=2 of 68.57 percent with SITC=7 which is 67.96 percent. Goods traded by Indonesia and Singapore are on average raw goods, machinery, and transport equipment. This is because Singapore is a developed country that exports a lot of machinery and transportation equipment.

Trade between Indonesia and Thailand is dominated by Mild Integration and Moderately Integration SITC=0 (Food and living animals), SITC=2 (raw materials, not eaten, except fuel, SITC=3 (mineral fuels, lubricants, and related materials, and SITC=4 (animals and vegetable oils, fats, and candles). SITC=1 products (beverages and tobacco) are products in the strong category, with an average index of 77.614 percent. This is because the trade between Indonesia and Thailand for these products is almost equal.

Trade between Indonesia and Malaysia can be categorized as Moderately Integration. Because overall it can be seen that almost the entire SITC product category is in a rather strong category. This is because the distance between Indonesia and Malaysia is as close as it is to Singapore. So, the transportation costs that will be incurred to trade will be lower. In trade the two countries were highest in SITC=3 products (mineral fuels, lubricants, and related materials) and SITC=5 (related chemicals and products) with an average index of 69.37 percent and 69.36 percent respectively. The following is a table of Indonesia's average intra-industrial trade categories with Malaysia. In 2001, 2003 to 2007 Indonesia only exported products in SITC category 9 so that it could be categorized as one way trade while for the following year the two countries traded with each other.

Table 2. Intra-Industry Indonesia with trading partner in ASEAN countries

IIT index	Category	SITC				
		Singapore	Thailand	Malaysia	Vietnam	Philippines
0,00	One way trade	9	9	9	9	9
0.01 > 24.99	Weak integration	4,9	9	4,9	4,9	2,3,4,6,9
25,0 - 49,99	Mild integration	0,1,3,5	0,2,3,4	-	1,3,5,6,7,8	0,1,5,7
50,0 - 74,99	Moderately integration	2,6,7,8	5,6,7,8	0,1,2,3,5,6,7,8	0,2	-
75,0 - 99,99	Strong integration	-	1	-	-	8

Source: Authors computation, 2020

Indonesian trade and Vietnam are categorized mild integration. This is due to the balance of transactions made in both categories based on SITC products. Table 2 shows that SITC=9 is categorized as one way trade because in 2000 to 2004 Indonesia only exported while from 2005 to 2009 there was no trade between the countries. Indonesia's trade with Vietnam is dominated by the category of manufacturing products as well as advanced technology. The highest average was in the SITC product category 2 (raw materials, not eaten, except related materials) of 63.53 percent subsequent SITC=8 (other manufactured goods) of 62.26 percent. The trade that occurs in Indonesia with the Philippines is classified in the category of weak integration. The following can be seen in the table below Indonesia intra-industrial average trade with Philippines.

The highest trade in Indonesia's intra-industrial average with The Philippines occurred in the SITC=8 product category (other goods) of 75.48 percent, while other SITC category products were zoned in the Weak Integration category of SITC 2,3,4,6 and 9. Industrial sectors with high Intra Industry Trade levels will be focused on manufacturing commodities such as chemical products, electronics, machinery, and others. The commodity is likely to be exported by developed countries allowing for economies of scale. In contrast, industries that have relatively small IIT value are classified in labor-intensive commodities such as commodities and clothing (Krugman, Obstfeld, & Melitz, 2012; and Krugman et al., 2012).

3.2. Empirical results

The results of Chow test in Table 3 report that the probability value of chi-square is 0.00 smaller than 0.05 at significant level, so reject null hypothesis. From these results, it can be concluded that in the Chow test, the selected method is the fixed effect. Furthermore, Hausman test is used to know which model should be used, namely fixed effect or random effect. From Table 3 the probability value of cross-section random is 0.00 smaller than 0.05 at significant level, this implies that H_0 is accepted. So based on Hausman test, the selected method in this study is fixed effect method.

The summary results show that adjusted R^2 is 0.5859, this implies that the variation of the average GDP, real GDP per capita, distance, and exchange rate variables can explain the variation of intra-industry trade variables by 58.59 percent. Meanwhile, The F statistical test obtained is 17,627 with a probability of 0.000 at a significance level of 1 percent, this implies that jointly average GDP, real GDP per capita, distance, and exchange rate have a significant effect on intra-industry trade between Indonesia and trading partners in ASEAN countries. Table 3 reports that the regression coefficient value is 4.518, this implies that intra-industry trade will automatically increase by 4.51 percent assuming other factors are ceteris paribus.

Referring to the value of the regression parameter coefficients of each independent variable in the estimation equations reported in Table 3. Our findings show that the relationship between GDP average and intra-industry trade index is positive and significant. This implies that an increase in the average GDP of 1 percent will increase the intra-industry trade index by 0.239 percent with the assumption of ceteris paribus. The average GDP of a country and its partner countries is related to the achievement of economies of scale in its production because the greater the GDP of a country and its trading partner countries, the greater its market potential. In other words, the high average GDP of a country will lead to a high standard of living as well so that the demand for various types of goods will also increase (Alfarisi & Falianty, 2022). The results of this study confirm

the findings of a study conducted by Cahyaningtyas & Aminata (2020); Sawyer et al., (2010); and Muryani & Pratiwi (2018) that increase in GDP used as proxy from growth economy will increase Genre trading between countries good export nor import. The results of this study are in line with the results of study conducted by Bato (2014), namely the GDP average variable has a positive relationship with the Intra Industry Trade variable of each SITC. In addition, the research of Saparamadu & Weerasinghe (2021) specifically, the average GDP between Sri Lanka and its partner countries is also positively correlated with intra-industrial trade.

Table 3. Model estimation results of fixed effect method

Dependent variable: IIT index				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
<i>Constant</i>	4.518	4.387	1.029	0.305
<i>AVEGDP</i>	0.239	0.057	4.129	0.000
<i>GDPC</i>	0.342	0.141	2.425	0.017
<i>DIST</i>	-0.296	0.631	-0.472	0.637
<i>EXR</i>	0.204	0.085	2.407	0.018
Summary				
<i>R²</i>	0.6213			
<i>Adj. R²</i>	0.5859			
<i>F-statistic</i>	17.627 (0.000)			
<i>Chow test</i>	10.262 (0.000)			
<i>Hausman test</i>	41.050 (0.000)			

Source: Authors computation, 2020

Table 3 reports that the relationship between the difference in GDP and the intra-industry trade index shows that there is a positive and significant relationship. This implies that an increase in the difference in GDP by 1 percent will increase the intra-industry trade index by 0.342 percent with the assumption of *ceteris paribus*. These conditions indicate that the high level of GDP of trading partner countries will affect the strength of integration between countries conducting trade. This means that the larger the size of the economy in terms of the difference in GDP of a country, the greater the intra-industry trade area (Nguyen *et al.*, 2020). The results of this study confirm the findings of a study conducted by Bato (2014); Sawyer et al., (2010); Esquivias et al. (2017); and Muryani & Pratiwi (2018) found that the difference in GDP has a positive sign and a significant effect on the intra-industry trade index. On the other hand, contradictory results were found in the study conducted by Andresen (2003) that the difference in the value of GDP has a negative and significant relationship to intra-industry trade carried out in 18 developed countries and 20 developing countries. This condition is not in accordance with the expected positive parameter values between variables.

The relationship between the difference in distance and the intra-industry trade index is negative and insignificant. This implies that the difference in distance insignificant effect on the intra-industry trade index with the assumption of *ceteris paribus*. The opposite relationship between distance to intra-industry trade is in accordance with the view that distance between countries can increase transportation costs which can be a consideration for countries in conducting trade so that this condition can reduce intra-industry trade between countries (Sen et al., 2009). This study confirm the findings of a study conducted by Astriana & Rahman (2015) that distance has a negative and significant effect on IIT from each SITC index (33 commodities). If linked with theory, addition distance will lower level activity of export or import against something commodities (Anwar, 2012). The farther the distance between trading partners, the more impact it will cost. In addition, in the study of Josic & Zmuk (2020) that the determining factor of intra-industrial trade, namely the geographical distance between Croatia and its 24 trading partner countries in 2001-2017 has a significant negative relationship to the level of intra-industry trade.

The relationship between exchange rates between countries and the intra-industry trade index is positive and significant. This implies that an increase in the exchange rate between

countries by 1 percent will increase the intra-industry trade index by 0.204 percent with the assumption of *ceteris paribus*. Currency exchange rates between countries are highly considered in international trade. The positive relationship between the exchange rate and intra-industry trade shows that the exchange rate is an important component in influencing trade activities, especially between countries because increasing exchange rate conditions will also have an impact on countries to carry out trade activities (Jaya & Kartika, 2019). The results of this study are the same as the results of study conducted by Putri et al. (2021) who discovered that variable Mark swap take effect positive and significant to intra industry trade regulations. On the other hand, contradictory results were found in the study conducted by Oguro (2008) that the exchange rate has an inverse relationship with intra-industry trade. The role of the exchange rate will decrease along with the increasing conditions of intra-industry trade in cross-border industry for bilateral trade in eight East Asian countries from 1974 to 2004.

4. CONCLUSIONS

The Grubel and Lloyd Index concluded that Malaysia is a trading partner country that has a consistent number of SITC. Almost all types of SITC have a moderately Integration value or have strong integration with Indonesia. Singapore and Thailand have an average index of moderately integration and middle integration. Vietnam and the Philippines have mild integration and weak integration. This indicates that the conditions between countries are interdependent in trade. Jointly, the average GDP variable, the difference in GDP per capita, distance, and exchange rate have a significant effect on the Intra Industry Trade variable. Partially, the average GDP, GDP per capita, and exchange rate variables have a positive and significant effect on the Intra Industry Trade variable. The variable distance has a negative and insignificant effect on the Intra Industry Trade variable.

Indonesia's potential in various industries is still considered not strong enough to drive the country's economy. The difference in the demand structure indicates that the possibility of Indonesia's trade with trading partners leads to vertical intra-industry and trade activities that are dominated by import activities. The policy that must be carried out by Indonesia is that it must pay attention to the pattern of trade with trading partner countries, there are several potential commodities that need to be maintained with certain trading partner countries, besides the government needs to pay attention to domestic demand.

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