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## **Trade and Environment in Indonesia: Case Study of EU-Indonesia Free Trade Agreement**

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**Abstract:** *This paper attempts to investigate whether environmental impacts, would increase or decrease with trade liberalization. Trade expansion, that is, Comprehensive Economic Partnership Agreement (CEPA) between Indonesia and EU (European Union) causes environmental damage in Indonesia. Trading activities between Indonesia and EU makes some negative externalities even though the vision of CEPA included the concrete measures to promote the sustainability of environment of EU-Indonesia. Using Estimated Pollution Intensity (EPI) which is developed by the World Bank in 1995, it has been found that the estimated amounts of pollution have been increasing in Indonesia after three years of Indonesian-EU CEPA FTA implementation from 2014 to 2016. Even though the share of export of most polluting sectors has been decreasing, its contribution on the pollution intensity remains the largest. Since chemicals become the most polluting sector with its rapid growing in export to EU countries, this sector needs to be considered in trade negotiations in order to lessen negative impacts of trade to the environment.*

**Keywords:** *trade and environment; liberalization; pollutions; Indonesia-EU CEPA FTA*

**JEL Classifications:** *F18; F10; F64; F02*

## 1. Introduction

In recent years, trade liberalization has brought the issue of the relationship between trade and environment whether it has positive or negative impact on the environment. The production of goods, either they are exported or imported, would have environmental impacts like other production. With expanded trade, it is generally believed that the trading nations would be beneficial through increasing efficiency and greater wealth. However, what if the expanded trade leads to environmental degradation? Since trade always involves two or more nations, the burden of environmental externalities can be transnational and it will cause significant problems when international trade agreements do not explicitly include any regulations for environmental protection.

There are many ways that expanded trade may encourage the entire world production which leads to increase the pollution intensity and environmental damage. Trade activities always involve energy use to transport goods overseas resulting on air pollution. For example, the Kenyan exporters of horticulture products deliver the flowers to Europe by jet in which the energy consumed in jet fuel causes environmental issue. On the other hand, displacing peasant with larger-scale export agriculture and growing crops focusing on export also will damage the environment. They will use their economic power to demand environmentally damaging input subsidies which lead to over irrigate, over mechanize, and overspray (Harris, 2004). Over spraying the crops through pesticides will cause harmful effects for health. The harvested products will contain the leftover of hazardous chemicals which are dangerous to consume.

Even though expanded trade seems to have negative impacts on the environment, it also has beneficial effects. Based on theory of comparative advantage, trade encourages the trading nations to be more efficient in exploiting their resources and avoiding the waste. Trade expansion can spread the environmentally friendly technology to many developing countries through replacing the high-polluting power plants with modern, highly efficient ones. Transnational companies also play important role by introducing efficient technologies to develop cleaner process for industrial sectors. Hence, the relationship between trade and environmental quality is somewhat complicated and needs to investigate further.

Previous studies have discussed about trade liberalization and environmental issues since 1970s, particularly after some trade negotiation rounds. Trade expansion is strongly related to rapid growth of the global economy which leads to gradual degradation in the environment. The relationship between economic growth and environmental damage was theoretically depicted through Environmental *Kuznets Curve* (Grossman and Krueger, 1991). This concept predicted three stages of environmental decay that it would rise at lower income levels, attain a maximum level at turning point income, and then decline. During the first stage, the nation is positioned at the early phase of industrialization and development, which is characterized by exploitation of natural resources and dirty technologies for production, causing the environmental decay. As time goes by, quality of life improves since people wealthier and they tend to demand for an environment-friendly society, making the government to pay attention on how to preserve environmental quality. Shafik and Bandopadhyay (1992) confirmed this proposition by finding a consistent and significant relationship between income and environmental quality indicators. An initial rise in income would be followed by an increase in pollution matter such as sulphur dioxide and then declined once the economy attained a given level of income. Grossman and Krueger (1995) predicted that the turning point of income would come before \$8,000 income per capita. Generally, this relationship has been established

only in some areas of environmental degradation with immediate and visible effects, such as air pollution.

The net effect of trade liberalization on environmental quality can be decomposed into three components, such as composition effect, scale effect, and technique effect (Grossman and Krueger, 1991). The composition effect occurs when trade is more open, causing specialization which makes a country to export products with abundant resources and import products with relatively scarce resources. The magnitude of the composition effect is based on the comparative advantage of the country whether it is in pollution-intensive sectors or less polluting sectors. The positive impact on local environment would emerge if a country exports less polluting sectors after trade liberalization. The scale effect comes from enhanced economic activities which is hazardous to the environment since it produces additional emissions. The technique effect takes place when cleaner production techniques are introduced which lead to lower level pollution per unit of output. Then, the net effect for the environment is based on the combination of those components, not the individual component. It can be positive if the scale effect is less than the composition and technique effects, and negative if the opposite holds.

Some studies argued that trade liberalization has brought positive environmental consequences. Grossman and Krueger (1993) found that more liberal trade through easier access to US market has generated income growth in Mexico to the level that was powerful enough to encourage the government for environmental protection. Since Mexico was characterized by labor-intensive industry and agriculture sectors in their export, pollution reduction was inevitably to take place. Antweiler *et al.* (1998) supported the argument that freer trade leads to pollution reduction as shown by their estimation that a rise in GDP per capita by 1% from trade liberalization will decrease the sulphur dioxide concentration about 1%.

Meanwhile, opposite results have been found in other studies, particularly in the case of developing countries. Developing countries are likely to specialize and export pollution intensive sectors due to their characteristics of lack of environmental regulations with greater capacity to absorb pollution. In this case, trade liberalization could hamper environmental quality. Copeland and Taylor (1994) concluded that liberalized trade increases pollution levels in South countries with low level of human capital and decreases pollution levels in North countries with high level of human capital. Cole *et al.* (1998) estimated that the emissions in five pollutants (nitrogen dioxide, sulphur dioxide, carbon monoxide, suspended particular matter, and carbon dioxide) in most developing countries would increase after Uruguay Round of trade negotiations.

Based on the previous studies, trade liberalization may have positive or negative impacts on the environment depending on comparative advantage of the country. Policy coordination among trading partners is very limited and the environmental issues are generally neglected in trade agreements. Hence, linking better environmental management with trade negotiation is necessary to maintain the sustainability of the environment. This study will provide better understanding of the environmental consequences of Free Trade Agreements (FTAs) in the case of negotiation and implementation of Comprehensive Economic Partnership Agreement (CEPA) between EU (European Union) and Indonesia.

The relations between Indonesia and EU member states have been marked by strong economic relations: the EU remains the third largest destination of Indonesian exports, and certain EU member countries have consistently been the main sources of foreign investment in Indonesia. However, since EU has dynamic and larger economy with its growing demand for Indonesia products especially in furniture, vegetable oils and footwear products. Creating new export opportunities in the ASEAN markets is a priority under the EU's Global Europe trade

strategy. From China's perspective, China wanted to make ASEAN as its source of raw materials for industrialization (Bernardino, 2004).

As time goes by, negotiating directives obtained in 2014 by EU-Indonesia the scope of tariff reduction in an EU-Indonesia bilateral context is limited by the existing level of tariff liberalization especially within the framework of WTO and ASEAN. A simple comparative analysis of tariff lines shows that those already relative low. The simple average of MFN tariff applied, is 5,3% for the UE (2009) and Indonesia (2007) The Vision Group therefore recommends a move to zero tariffs for 95% of tariff lines (covering at least 95% of tariff line (covering at least 95% of trade value) . Moreover, the Vision Group recognizes that in asymmetrical relationship the speed of implementation of tariff reductions takes into account the different levels of development. Still, as 60% of the tariff lines of the two parties are between 0 and 5% and 20% are already at zero, gains from tariff measures would be expected to be small. Different speeds should apply to different products of different "sensitivities". The least sensitive ones should be liberalized faster with the greater parts of commitment implemented at the time of entry into force of the agreement. The most sensitive ones should be liberalized more slowly.

Finally, safeguards and provisions on sensitive sectors may be incorporated. At the same time, credibility and ambition would be negatively affected if such provisions and their application would not remain truly exceptional and subject to objective criteria. In relation to this, little research has been carried out in the context of environmental consequences of free trade in a specific country. This study aims to fill this knowledge gap by assessing the possible implications of trade on the environment from the perspective of a specific country, which is Indonesia in this case. Then, Indonesia-EU CEPA was selected as a case study to estimate the possible impacts of FTA on any change in the trade flows and the environment through the use of trade-environment matrix.

## 2. Method

To evaluate whether freer trade will lead to environmental degradation, the method has to be able to measure the environmental consequences of production activities caused by trade, and consider the interaction between trade, income, and environmental quality (Vutha and Jalilian, 2008). In this study, we employed an adjusted method to estimate the effects of trade on pollution levels based on industrial pollution projection system from Hettige et al. (1995) in World Bank. This method classified trade sectors into three categories based on the amount of pollution emitted by their production and developed trade-environment matrices to estimate pollution intensity. Through this method, we can indicate the impact of trade on one feature of environmental deterioration which is pollution. Even though this study realizes the shortcomings of using only pollution data to indicate the impact on the environment, this can be an initial point for further research.

The adjusted method in this study estimated industrial emission to the air, water and land and also the sum of emissions to all mediums using value of output, value added, and employment. To measure the impacts of trade on pollution levels, we use estimated pollution intensity (EPI) levels for all media emitted by physical volume of output valued at one million € (Euro). Meanwhile, **polluting sectors** are based on Harmonized System (HS) for product classification. Then, polluting sectors are classified into three categories based on pollution emission, such as: **the most polluting sectors** or *pollution-intensive sectors*, referring to those with total toxic pollution of more than 1,500 million € per million US\$ of production; **moderate**

**polluting sectors**, referring to those with total toxic pollution level of 500 to 1,500 million € per million US\$ of production; and **the least polluting sectors**, referring to those with toxic pollution of less than 500 million € per million US\$ of production.

Then, this study will construct a trade-environment matrix using data from the export trade matrices from Indonesia to EU by assuming that increasing exports will lead to increase production and a simultaneous change in pollution levels. In the trade-environment matrix, the rows classified traded sectors based on their level of pollution emission. The first column records time frames in the trade relationship between Indonesia and EU CEPA (2014). The second column depicts the relative share of the product to total trade, while the third column presents estimated pollution intensity (EPI), which is calculated from the World Bank study by Hettige *et al.* (1995) to measure the pollution level generated by the value of final products in million €.

### 3. Results

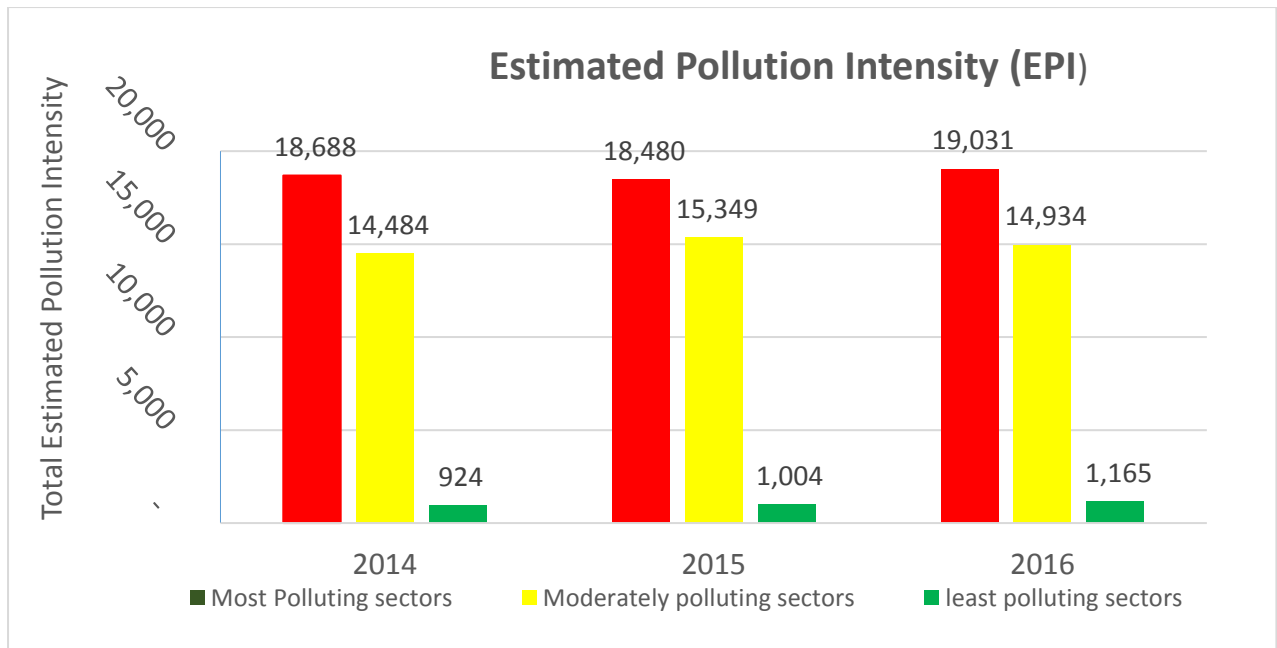
Table 4. Trade-environment Matrix for Indonesia's Exports to EU

HS 2016 Section	Export in Million €			Share (%)			EPI in Million €		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
<b>Total</b>	<b>14.436</b>	<b>15.317</b>	<b>14.626</b>						
28-38 Products of the chemical or allied industries	912	887	1.012	6,3	5,8	6,9	11.400	11.088	12.650
40 Plastics, rubber and articles thereof	1.146	1.099	903	7,9	7,2	6,2	1.375	1.319	1.084
39-43 Raw hides and skins, and saddlery	117	133	136	0,8	0,9	0,9	585	665	680
71-83 Pearls, precious metals and articles thereof	54	53	41	0,4	0,3	0,3	486	477	369
71-83 Base metals and articles thereof	538	548	472	3,7	3,6	3,2	4.842	4.932	4.248
71-83 Arms and ammunition	-	-	-	-	-	-	-	-	-
<b>Most Polluting sectors</b>	<b>2.767</b>	<b>2.720</b>	<b>2.564</b>	<b>19</b>	<b>18</b>	<b>18</b>	<b>18.688</b>	<b>18.480</b>	<b>19.031</b>
25-27 Mineral products	684	742	392	4,7	4,8	2,7	547,2	593,6	313,6
84-85 Machinery and appliances	1.772	1.933	2.028	12,3	12,6	13,9	886	967	1.014
50-63 Textiles and textile articles	1.663	1.722	1.701	11,5	11,2	11,6	11.641	12.054	11.907
86-89 Transport equipment	202	297	307	1,4	1,9	2,1	141,4	207,9	214,9
93-96 Miscellaneous manufactured articles	603	664	620	4,2	4,3	4,2	482,4	531,2	496
97-99 Works of art and antiques	1	1	5	0,0	0,0	0,0	0,6	0,6	3,0
90-92 Optical and photographic instruments, etc.	345	444	456	2,4	2,9	3,1	138,0	177,6	182,4
64-67 Footwear, hats and other headgear	1.294	1.635	1.606	9,0	10,7	11	647	818	803
<b>Moderately polluting sectors</b>	<b>6.564</b>	<b>7.438</b>	<b>7.115</b>	<b>46</b>	<b>49</b>	<b>49</b>	<b>14.484</b>	<b>15.349</b>	<b>14.934</b>
1-5/ Live animals; animal products	209	218	230	1,4	1,4	1,6	41,8	43,6	46
6-14/ Vegetable products	451	583	507	3,1	3,8	3,5	9,0	11,7	10,1
1-5/ Animal or vegetable fats and oils	2.935	2.675	2.507	20,3	17,5	17,1	58,7	53,5	50,1
15-24 Foodstuffs, beverages, tobacco	792	785	849	5,5	5,1	5,8	15,8	15,7	17,0
44-46 Wood, charcoal and cork and articles thereof	419	518	512	2,9	3,4	3,5	167,6	207,2	204,8
47-49 Pulp of wood, paper and paperboard	166	179	227	1,1	1,2	1,6	581,0	626,5	794,5
68-70 Articles of stone, glass and ceramics	84	77	70	0,6	0,5	0,5	50,4	46,2	42
<b>least polluting sectors</b>	<b>5.056</b>	<b>5.035</b>	<b>4.902</b>	<b>35</b>	<b>33</b>	<b>34</b>	<b>924</b>	<b>1.004</b>	<b>1.165</b>
TOTAL	14.387	15.193	14.581	100	100	100	34.096	34.834	35.129
share									

Source: Author estimation based on UN COMTRADE data.

Table 4 presents a trade-environment matrix for Indonesia’s exports to EU. It suggests that Indonesia exported about € 2.5 million for the most polluting sectors to EU in 2016, or about 18% of total exports, with pollution intensity generated by the production estimated at € 19 million. Even though its portion of total exports has been decreasing, its pollution intensity has been increasing after three years of Indonesia-EU CEPA implementation and its contribution to pollution intensity still remained the largest. This significant increase is mostly due to the dramatic acceleration of export growth in chemicals sector in response to greater demands from EU.

Figure 1. Diagram of Estimated Pollution Intensity (EPI)



Moreover, for the moderate polluting sectors, the total amount of Indonesia’s exports to EU was € 7.1 million in 2016, or about 49% of total exports. Since the production activities in these sectors generate less pollution than the pollution intensive sectors, the pollution effects of these exports were less significant, as shown by the EPI level of € 15 million. Nevertheless, the amount of pollution emitted by these exports was larger after Indonesia-EU CEPA. This is mainly due to the improving export performance of animal and vegetables fats oil from rising prices with its peak in 2014, particularly coal as the major contributor in the mineral sector representing around 49% of the total export to EU.

The trade-environment matrix also demonstrates that Indonesia generated about one-third of its total exports to EU from the least polluting sectors. Even though the share of the least polluting sectors has been increasing after three years of the Indonesia-EU CEPA implementation, the future effect of these trade sectors on pollution levels is likely to be infinite decimal concerning that the estimated EPI of just around 1 million €.

#### 4. Discussion and Conclusion

Based on previous research of Azizurrohman and Hartarto (2017), they found that in ASEAN-China Free Trade Agreement (ACFTA), the pollution levels of Indonesia has been increasing because there is no environmental regulation about the sustainability of

environment. Therefore, in this case, found that the pollution level in Indonesia has been increasing even CEPA has the sustainability of environment regulations.

This study has exposed the general relationship between FTA, trade and the environment through a case study of Indonesia-EU CEPA by examining the impact of Indonesia-EU CEPA from the perspective of Indonesia as the largest economies in ASEAN. It has been found that after three years implementation of Indonesia-EU CEPA, the share of the most polluting sectors in total export from 2014 to 2016 has been declining from 19% to 18%, the share of the moderate polluting sectors has been increasing from 46% to 49%, while the share of least polluting sectors in total export has been decreasing from 35% to 34%. However, the estimated pollution is still high from 34,096 million € to 35,129 million € over fifteen years. The significant rise in the estimated pollution mostly came from higher demand of the moderately polluting sectors especially on animal and vegetables products by EU particularly after the implementation of Indonesia-EU CEPA. It has been recorded that the export value of chemicals to EU has been gradually increasing, leaving the estimated pollution growing quickly. Even, the contribution of pollution generated by chemical sector toward total estimated pollution reached 45.8%. Since Indonesia-EU CEPA already contained agreement for cooperation on environmental problems due to trade liberalization, chemical sector is necessary to be considered in trade negotiations in order to mitigate negative impact of freer trade to the environment since it is categorized as most polluting sector with significant increase in the export production.

In conclusion, this study asserts that trade could be a source of environmental issues, particularly in countries without strong regulatory frameworks or management system. Hence, this study recommends that environmental issues need to be more considered in trade negotiations between Indonesia and EU in order to lessen any negative impact of trade to the environment.

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