

## The Impact of Timber Legality Verification System (SLVK) on Indonesian Plywood Export Market

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### Abstract

This paper tried to estimate the effect of regulation in the plywood export market, not only on the quantity export but also on the revenue earned from the product. Using panel data of this market from 2000 to 2014 and involving 58 countries as trading partner, gravity model which had been used in many studies of international trade will be adapted. Three models which were used in this study, such as pooled least square, fixed and random effect model, found an indication that quantity exported and revenue earned after the implementation of the regulation was less than before. In pooled regression model, the quantity and revenue from plywood export decreased more than 95 per cent. In addition, fixed and random effect model showed similar result with the pooled regression model.

**Keywords:** Timber Legality Verification System (SVLK), gravity model  
**JEL Classification:** F14; F23

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### INTRODUCTION

The Impact of Timber Legality Verification System (SVLK) on Indonesian Plywood Export Market. Rise and fall of export commodities either exported or revenue obtained by the government can be affected by changes in policy set by the government. In 1980's, Indonesia had become the largest exporter of plywood in the world, however in recent years, the export amount of plywood and revenues received by the government experienced a significant decline. Especially after Ministry of Forestry issued a regulation called Timber Legality Verification System (SVLK) in 2009. One of the regulation's objectives is to ensure the forestry stakeholders and industries use only legal wood and therefore increase the competitiveness of Indonesian forest products.

When people heard about forest, the first thing that comes to mind of the economic value is the wood. In the early stage of timber development until 1981, unprocessed logs were the mainstream of wood industry and exports in Indonesia. However, in early 1980's, Indonesian government issued a regulation to stop exporting raw logs to create more investment in wood processing. In addition, Wood Panel Producers Association (*Apkindo*) minimized direct competition on plywood producers resulting in domination on hardwood plywood exports with the approximate value of 70 per cent of the world (Barr, 1998). Furthermore, Indonesian forest products sector in 1980s was dominated by the hardwood plywood industry.

In fact, this industry employed more than 500 thousand people annually and it accounted for 15 per cent state income (Parthama & Vincent, 1992). In 1981, Indonesian government implemented two major instruments of the new policy in forestry sector which also affected the increase of the quantity of plywood exported. One of the instruments was the implementation of the increase of taxes and export quotas to logging concessionaries which had processing facilities in operation or under construction. Those without processing facilities in operation or plans for construction were immediately forbidden from exporting logs. As a result, plywood exports grew from a level of 760,000 cubic meters in 1981 to 4.6 million cubic meters in 1986 (Lindsay, 1989). Rapid growth of economic worldwide in late 1980s also resulted in strong demand for Indonesia's forest products; resulting in plywood became as the most popular Indonesian forest product.

Based on the data of Central Bureau of Statistics Indonesia (BPS), plywood was the largest source of export revenue among other forest products from 2000 until 2014. In average, plywood generated 58 per cent of the forest products exported total revenue in Indonesia, which equaled to 1.8 billion USD.

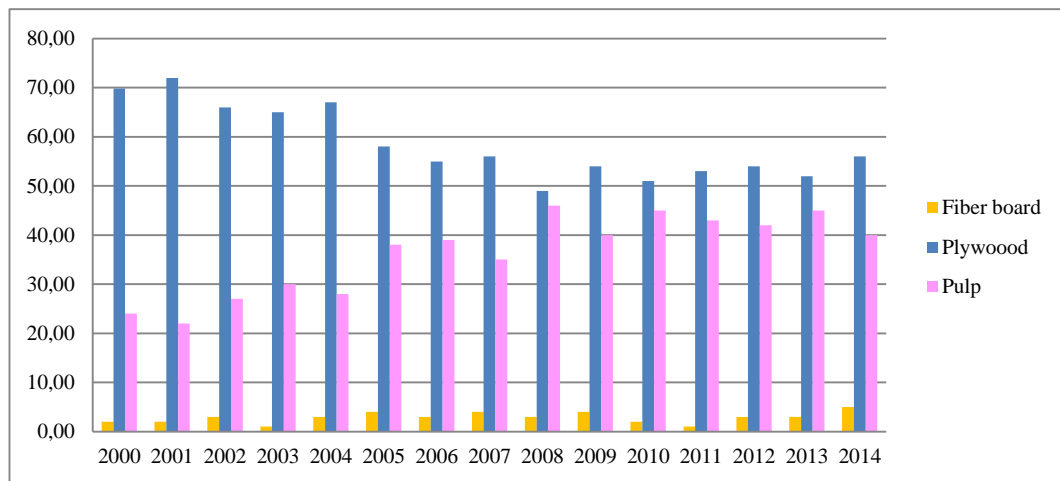


Figure 1. Percentage on revenue earned of forest products exported  
Source: BPS (2016)

There are some reasons why plywood becomes major commodity. According to Forest Products Laboratory & USDA Forest Service (2010), there are various functions of plywood, such as construction sheathing, furniture, and cabinet panels. These various purposes make plywood divided into several classes, thus also causing a variety of raw materials to be used. Moreover, plywood does not need any specific timber as its raw material, so the amounts of the raw materials are abundant, despite the fact that decorative plywood requires high quality materials.

There is a possibility of plywood exported comes from illegal raw materials sources. Based on the data of Ministry of Environment and Forestry, in their 2014 Statistic book, the number of deforestation in Indonesia reached more than 700.000 hectares per year in period of 2012-2013, which 95 per cent occurred in secondary forest (Ministry of Environment and Forestry, 2015). Since plywood does not need special timber for its raw materials, it can be assumed that

some of plywood using raw materials from secondary forest which most of them are illegal.

Before 2009, Indonesian government did not have powerful regulation regarding to the verification of legal wood, yet, Indonesia became the leader on fighting against illegal logging by hosted a regional conference which created Bali Declaration on Forest Law Enforcement and Governance in 2001. In 2007, Indonesia and European Union negotiated a program called Voluntary Partnership Agreement (VPA) to encourage trade using legal timber products and develop forest governance. By the end of 2009, in September, with the insistence to maintain Indonesian forest ecosystem and also to improve the competitiveness of Indonesian forest products in the importing countries, Indonesian government through Ministry of Forestry issued new regulation called Timber Legality Verification System (SVLK).

SVLK, which is the base of the VPA, has been strengthened and developed over time (EU and Indonesia, 2017). As regulated (Kementerian Perdagangan, 2016), a certification (V-Legal letter) from timber legality assurance agency (LVLK) is mandatory to export forestry industrial products. SVLK guarantees the timber that already has the certification is legal because this system verifies the legality of timber through several stages, which are: certification of assessment of sustainable production forest management, timber legality certification, and supplier conformity declarations. Exceeding these stages and also higher demand of legal timber from customer, it is expected that there will be no more production using illegal logging as the material so that the forest will be sustainable.

This paper investigates the impact of the implementation of SVLK regulation to the quantity and revenue earned for Indonesian government from plywood exported. Specifically, the impact of this regulation will be explored not only for all Indonesian trading partner but also the targeted countries such as European Union, USA, Japan, Norway and Australia. As the explanation above, SVLK regulation is expected to increase the quantity and revenue earned from the plywood trade because SVLK will make Indonesian forest products are considered conforming the legality timber standard.

There are limited information about these previous studies, however, Obidzinski et al. (2014) pointed out that there are significant movement among large and medium enterprises securing the SVLK verification, yet, insignificant on small sector. Another study by Ningrum, Harini, & Haqqi (2016) explained that timber exports to European Union declined in 2013 yet increased in 2014. Nevertheless, the increase in 2014 is less than 2010, the year before SVLK was implemented.

## **METHOD**

The data used in this study is panel data in which combines time series and cross section data. Main data of this research are quantity of plywood exported (in kilograms) and value (revenue) (in USD) obtained from 2000 to 2014. These two data become the dependent variables of the models which were obtained from Bureau Central of Statistics Indonesia (BPS). Furthermore, due to the completeness of the data, only 58 countries which become the partner of plywood trading will be included (a list of the countries are displayed in appendix). Since

there are zero values on quantity exported and revenue earned for some countries in particular year, a treatment will be applied for those data to avoid missing values on dependent variables by changing zero values to 1.

Most of the data of independent variables were obtained from the databank of the previous study by Rose (2004) such as distance, similarity of language, sharing land border, area, and the membership on World Trade Organization (WTO). Other data such as real GDP and number of population are taken from The World Bank's Development Indicators database (WDI). Although there are only 2 countries which included in ASEAN trade agreement, Free Trade Area will be put as one variable among the ASEAN countries to capture the effect of the trade agreement between these countries.

The main variable of this study is Reg in which the parameter explains whether regulation which was issued by Ministry of Forestry has an impact to the quantity exported or revenue obtained. Other dummy variables will be added for targeted countries of this regulation such as European countries, the United States of America, Japan, Australia and Norway. Dummy variable for Norway is made separately from other European countries because Norway is not the member of European Union and Norway has a special agreement with Indonesia in Reducing Emission from Deforestation and Forest Degradation (REDD) cooperation. Although the agreement does not exactly relate to trade, it can be assumed that country which concern to deforestation tends to import more plywood after the regulation was implemented.

### **Model Specification and Analysis Method**

In order to obtain the effect of the regulation issued by Indonesian government, standard gravity model will be applied in this paper. This model is one of the most robust since the model incorporates several important factors of trade such as the distance between countries and the size of countries that can be measured by GDP. Gravity equation involves two important variables of international trade which are economic growth of a country which can be measured by GDP and also the distance between two countries who involve in trading so we can obtain robust empirical findings in economics (Bergstrand, 1985). In addition, Anderson and Wincoop (2003) also have similar opinion but they add some variables for example customs unions, exchange-rate mechanisms, ethnic ties, linguistic identity, and international borders. The economics model of this study is specified as the following:

$$X = f(D, Y, P)$$

$$Z = f(D, Y, P)$$

where dependent variable, X and Z, are quantity exported and revenue earned from plywood export, respectively, and the independent variables are the controls which are consist of distance, GDP, and population.

Gravity model in this paper is adapted from the model that has been used by Rose (2004) in his previous study. In addition, year dummy variables will also be included to capture the aggregate effects that affect quantity exported and revenue obtained in particular year. Furthermore, several trade agreements will be put to evaluate whether these trade agreements have some effects on plywood trade. This method is adapted from Martínez-Zarzoso, Felicitas, & Horsewood

(2009) which evaluated economic blocs and trade agreements such as EU-15, NAFTA, CACM, and CARICOM have some effects on trade. The dependent variables of this research are the quantity of plywood exported and revenue obtained from the trade. The gravity model of this research is presented in the following logarithmic form:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln(Y_i Y_j)_t + \beta_3 \ln(Y_i Y_j / Pop_i Pop_j)_t + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 \ln(Area_i Area_j) + \beta_7 FTA_{ij} + \beta_8 WTO_{ij} + \beta_9 Reg_{ij} + \beta_{10} EU_{ij} + \beta_{11} USA_{ij} + \beta_{12} JPN_{ij} + \beta_{13} AUS_{ij} + \beta_{14} NOR_{ij} + \beta_{15} EUReg_{ij} + \beta_{16} USAREg_{ij} + \beta_{17} JPNReg_{ij} + \beta_{18} AUSReg_{ij} + \beta_{19} NORReg_{ij} + \varepsilon_{ijt} \dots\dots\dots(1)$$

$$\ln Z_{ijt} = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln(Y_i Y_j)_t + \beta_3 \ln(Y_i Y_j / Pop_i Pop_j)_t + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 \ln(Area_i Area_j) + \beta_7 FTA_{ij} + \beta_8 WTO_{ij} + \beta_9 Reg_{ij} + \beta_{10} EU_{ij} + \beta_{11} USA_{ij} + \beta_{12} JPN_{ij} + \beta_{13} AUS_{ij} + \beta_{14} NOR_{ij} + \beta_{15} EUREg_{ij} + \beta_{16} USAREg_{ij} + \beta_{17} JPNReg_{ij} + \beta_{18} AUSReg_{ij} + \beta_{19} NORReg_{ij} + \varepsilon_{ijt} \dots\dots\dots(2)$$

Where i and j indicates countries that involves trade, t indicates time in years from 2000 to 2014.

Table 1. Variables Description

| Variable   | Description  | Expected sign |
|------------|--|---------------|
| ln X       | Logarithmic form of the quantity of plywood exported   |               |
| ln Z       | Logarithmic form of the value obtained of plywood exported   |               |
| Ln D       | Logarithmic form of distance between exporting and imported countries  | Positive      |
| Ln Y       | Logarithmic form of GDP between exporting and imported countries   | Positive      |
| Ln (Y/Pop) | Logarithmic form of GDP per capita between exporting and imported countries  | Positive      |
| Lang       | Dummy variable of language, which is 1 if i and j have a common language and 0 otherwise   | Positive      |
| Cont       | Dummy variable of land border, which is 1 if i and j share a land border and 0 otherwise   | Positive      |
| Ln Area    | Logarithmic form of the area between exporting and imported countries (in kilometers square)   | Positive      |
| FTA        | Dummy variable of regional trade agreement (for ASEAN countries), which is 1 if i and j have regional trade agreement and 0 otherwise  | Positive      |
| WTO        | Dummy variable of membership in World Trade Organization (WTO), which is 1 if both i and j are GATT/WTO members and 0 otherwise        | Positive      |
| REG        | Dummy variable of SVLK, which is 0 from 2000 to 2009 (before regulation was issued) and 1 from 2010-2014 (after regulation was issued) | Positive      |
| EU         | Dummy variable for targeted countries for SVLK regulation which is 1 for EU countries and 0 otherwise                                  | Positive      |
| USA        | Dummy variable for targeted countries for SVLK regulation which is 1 for the United States of America and 0 otherwise                  | Positive      |
| JPN        | Dummy variable for targeted countries for SVLK regulation  | Positive      |

| Variable | Description   | Expected sign |
|----------|---|---------------|
|          | which is 1 for Japan and 0 otherwise  |               |
| AUS      | Dummy variable for targeted countries for SVLK regulation which is 1 for Australia and 0 otherwise    | Positive      |
| NOR      | Dummy variable for targeted countries for SVLK regulation which is 1 for Norway and 0 otherwise       | Positive      |
| EUReg    | Dummy interaction variable for targeted countries for SVLK regulation to EU countries                 | Positive      |
| USAREg   | Dummy interaction variable for targeted countries for SVLK regulation to the United States of America | Positive      |
| JPNReg   | Dummy interaction variable for targeted countries for SVLK regulation to Japan                        | Positive      |
| AUSReg   | Dummy interaction variable for targeted countries for SVLK regulation to Australia                    | Positive      |
| NORReg   | Dummy interaction variable for targeted countries for SVLK regulation to Norway                       | Positive      |

Source: Author (2018)

This study adapts Rose (2004)’s gravity model by including additional dummy variables such as regulation (Reg), targeted countries, and dummy interaction variables. Three regression analysis which are pooled OLS, fixed effect and random effect will be applied to the data sets to achieve these study objectives.

## RESULTS AND DISCUSSION

### Model Authentication

There are some model possibilities for this study so it is necessary to develop an accurate model by doing a test to the model. The Hausman test will be applied to test whether random effect model is more consistent and efficient than fixed effect by looking at the value of Hausman test statistic.

Table 2. Result of Hausman test.

| Dependent variable | Chi square statistics | Probability |
|--------------------|-----------------------|-------------|
| Ln ( <i>Quan</i> ) | 5.47                  | 0.999       |
| Ln ( <i>Val</i> )  | 1357.94               | 0.0000      |

Source: Author (2018)

The result of Hausman test is interesting because both of fixed effect and random effect model can be used depending on the dependent variable. Fixed effect is more appropriate when Ln (*Val*) is used as the dependent variable; on the other hand, random effect is more appropriate when Ln (*Quan*) is used as the dependent variable. Thus, both models will be employed for two dependent variables; furthermore, pooled regression model will also be applied to capture the effect of other parameters and variables which are omitted due to collinearity when a fixed effect model is employed.

### Pooled Regression Model

The main findings of pooled regression analysis are presented in Table 3 and 4. Table 3 presents the data which natural logarithm of quantity of plywood exported becomes the dependent variable; while in table 4, natural logarithm of revenue obtained becomes its dependent variable. As Table 3 shows, most of the

parameters of independent variables are statistically significant. Based on the calculation, quantities of plywood exported are statistically affected by the real GDP, the GDP per capita, and some of dummy variables which are both of trade agreements and the regulation. The model of pooled regression in which the quantity becomes the dependent variable can be seen as follows:

$$\begin{aligned} \ln Q = & -53.772 + 1.151 \ln (Y_i Y_j) + 1.031 \ln (Y_i Y_j / Pop_i Pop_j) \\ & + 1.425 FTA + 1.173 WTO - 3.541 Reg - 4.725 EU \\ & - 4.722 NOR - 6.027 NORReg \end{aligned}$$

Table 3. Result of pooled regression with Ln (*Quan*) as dependent variable

| <b>Dependent variable: Ln (<i>Quan</i>)</b> |                    |               |
|---|--------------------|---------------|
| <b>Independent variable</b>                 | <b>Coefficient</b> | <b>t-stat</b> |
| Constant (C)                                | -53.772 ***        | -7.45         |
| Ln (D)                                      | -0.286             | -0.57         |
| Ln ( $Y_i Y_j$ )                            | 1.151***           | 6.81          |
| Ln ( $Y_i Y_j / Pop_i Pop_j$ )              | 1.031***           | 5.26          |
| <i>Lang</i>                                 | -1.598             | -0.94         |
| <i>Cont</i>                                 | 1.781              | 1.29          |
| Ln ( $Area_i Area_j$ )                      | -0.184             | -1.58         |
| <i>FTA</i>                                  | 1.425**            | 1.69          |
| <i>WTO</i>                                  | 1.173***           | 2.62          |
| <i>Reg</i>                                  | -3.541***          | -4.16         |
| <i>EU</i>                                   | -4.725***          | -9.14         |
| <i>USA</i>                                  | -2.080             | -1.39         |
| <i>JPN</i>                                  | 0.047              | 0.03          |
| <i>AUS</i>                                  | -1.129             | -0.75         |
| <i>NOR</i>                                  | -4.722***          | -3.32         |
| <i>EUReg</i>                                | 0.479              | 0.69          |
| <i>USAREg</i>                               | 0.534              | 0.23          |
| <i>JPNReg</i>                               | 0.699              | 0.30          |
| <i>AUSReg</i>                               | 1.086              | 0.46          |
| <i>NORReg</i>                               | -6.027**           | -2.58         |
| R-squared                                   | 0.3176             |               |
| F-statistic                                 | 12.01              |               |
| Prob (F-statistic)                          | 0.0000             |               |
| Number of observations                      | 859                |               |

Source: Author (2018)

Note: \*, \*\*, \*\*\*, significant at 10%, 5%, 1% level respectively

There is no surprise when the parameter of real GDP illustrates that it has positive impact to the quantity exported. The parameter of real GDP shows that given other variables are constant, a 10 per cent increase in GDP will increase the quantity exported by approximately 11 per cent. Many studies revealed that GDP has a positive correlation with export such as Eita (2008) who turned out that the increase in Namibia's GDP raise its export. Another paper which explained the positive relationship between GDP and export is Tomar & Tomar (2014) who investigated the impact of selected macro-economic variables on Chinese and Indian exports. In addition, Aurangzeb (2012) also stated that GDP has positive correlation on export in his study on Pakistan's export.

The estimation also shows that the parameter of GDP per capita has positive impact on the quantity of plywood exported. In this case, a 10 per cent increase of this variable will raise the quantity exported by approximately 10 per cent. In

addition, countries that have agreement on regional and multilateral trade agreement, as shown in the *FTA* and *WTO* variables, respectively, tend to export more than the countries that do not have these kinds of agreement. As revealed in table 4, the findings support the result in Table 3. Two independent variables, namely real GDP of trading partner and the GDP per capita have positive relationship on revenue obtained and statistically significant in 1 per cent level. The model of pooled regression with log of revenue earned as the dependent variable can be seen as follows:

$$\text{Ln } V = -54.481 + 1.110 \text{Ln}(Y_i Y_j) + 1.065 \text{Ln}(Y_i Y_j / \text{Pop}_i \text{Pop}_j) + 1.392 \text{FTA} + 1.186 \text{WTO} - 2.795 \text{Reg} - 4.458 \text{EU} - 4.509 \text{NOR} - 5.979 \text{NORReg}$$

As for real GDP, a 10 per cent increase will improve the revenue obtained by approximately 11 per cent. Similar to the increase on real GDP, 10 per cent increase on GDP per capita will increase revenue obtained by approximately 10 per cent. Another result which is also supporting the previous result, countries that have regional or multilateral trade agreement have a better trade performance than other countries who do not have these agreements.

These models also revealed that distance between the countries which involved in plywood trade do not affect the quantity of plywood exported and its revenue earned. Moreover, two conditioning variables that could be the additional factors to affect trade which are common language and geographical location indicate that these two variables are insignificant for the trade.

Table 4. Result of pooled regression with Ln (*Val*) as dependent variable

| <b>Dependent variable: Ln (<i>Val</i>)</b>   |                    |               |
|--|--------------------|---------------|
| <b>Independent variable</b>                  | <b>Coefficient</b> | <b>t-stat</b> |
| Constant ( <i>C</i> )                        | -54.481***         | -7.70         |
| Ln ( <i>D</i> )                              | -0.159             | -0.32         |
| Ln ( $Y_i Y_j$ )                             | 1.110***           | 6.70          |
| Ln ( $Y_i Y_j / \text{Pop}_i \text{Pop}_j$ ) | 1.065***           | 5.54          |
| <i>Lang</i>                                  | -1.741             | -1.04         |
| <i>Cont</i>                                  | 2.003              | 1.48          |
| Ln ( $\text{Area}_i \text{Area}_j$ )         | -0.168             | -1.47         |
| <i>FTA</i>                                   | 1.392*             | 1.69          |
| <i>WTO</i>                                   | 1.186***           | 2.69          |
| <i>Reg</i>                                   | -2.795***          | -3.35         |
| <i>EU</i>                                    | -4.458***          | -8.80         |
| <i>USA</i>                                   | -2.039             | -1.39         |
| <i>JPN</i>                                   | 0.196              | 0.14          |
| <i>AUS</i>                                   | -0.795             | -0.54         |
| <i>NOR</i>                                   | -4.509***          | -3.23         |
| <i>EUReg</i>                                 | 0.466              | 0.69          |
| <i>USAREg</i>                                | 0.493              | 0.22          |
| <i>JPNReg</i>                                | 0.720              | 0.31          |
| <i>AUSReg</i>                                | 0.996              | 0.43          |
| <i>NORReg</i>                                | -5.979***          | -2.61         |
| R-squared                                    | 0.313              |               |
| F-statistic                                  | 11.81              |               |
| Prob (F-statistic)                           | 0.0000             |               |
| Number of observations                       | 859                |               |

Source: Author (2018)

Note: \*, \*\*, \*\*\*, significant at 10%, 5%, 1% level respectively.

### Random Effect Model

Using Ln (*Quan*) as dependent variable for random effect model, the quantity of plywood exported is statistically influenced by the real GDP and GDP per capita. It turns out that regulation decrease the quantity exported. In addition, European countries import plywood less than other countries. Real GDP and GDP per capita have positive impact and its parameter has 1 per cent significance level. The parameters in this variable can be interpreted as 10 per cent increase in real GDP will increase the plywood quantity exported roughly by 12 per cent. As same as real GDP, a 10 per cent increase in GDP per capita will increase the quantity exported approximately by 12 per cent.

Table 5. Result of random effect regression

| Dependent variable: Ln ( <i>Quan</i> ) |             |        |
|--|-------------|--------|
| Independent variable                   | Coefficient | t-stat |
| Constant (C)                           | -61.184***  | 2.90   |
| Ln ( <i>D</i> )                        | -0.552      | -0.37  |
| Ln ( $Y_i Y_j$ )                       | 1.293***    | 2.66   |
| Ln ( $Y_i Y_j / Pop_i Pop_j$ )         | 1.244**     | 2.26   |
| <i>Lang</i>                            | -2.427      | -0.47  |
| <i>Contig</i>                          | 2.491       | 0.59   |
| Ln ( $Area_i Area_j$ )                 | -0.199      | -0.59  |
| <i>FTA</i>                             | 1.117       | 0.43   |
| <i>WTO</i>                             | 0.640       | 0.62   |
| <i>Reg</i>                             | -3.832***   | -4.83  |
| <i>EU</i>                              | -5.067***   | -3.66  |
| <i>USA</i>                             | -2.851      | -0.73  |
| <i>JPN</i>                             | -0.857      | -0.23  |
| <i>AUS</i>                             | -1.730      | -0.44  |
| <i>NOR</i>                             | -5.194      | -1.41  |
| <i>EUReg</i>                           | 0.458       | -0.44  |
| <i>USAREg</i>                          | 0.514       | 0.40   |
| <i>JPNReg</i>                          | 0.687       | 0.30   |
| <i>AUSReg</i>                          | 1.040       | 0.60   |
| <i>NORReg</i>                          | -6.039***   | -3.50  |
| R-squared                              | 0.450       |        |
| Chi <sup>2</sup>                       | 102.43      |        |
| Prob (F-statistic)                     | 0.0000      |        |
| Number of observations                 | 859         |        |

Source: Author (2018)

Note: \*, \*\*, \*\*\*, significant at 10%, 5%, 1% level respectively.

### Fixed Effect Model

The estimation of fixed effect model shows that only several variables can be estimated while the rest are omitted due to collinearity. As can be seen in table 6, the results are corroborating the previous results. Real GDP and GDP per capita have positive correlation to the revenue obtained by Indonesian government. The parameter shows that 10% increase in GDP and GDP per capita will increase the revenue obtained by Indonesian government approximately by 24 per cent and 22 per cent respectively.

Table 6. Result of fixed effect regression

| Dependent variable: Ln (Val)   |             |        |
|--------------------------------|-------------|--------|
| Independent variable           | Coefficient | t-stat |
| Constant (C)                   | -147.416**  | -2.48  |
| Ln ( $Y_i Y_j$ )               | 2.407*      | 1.75   |
| Ln ( $Y_i Y_j / Pop_i Pop_j$ ) | 2.296*      | 1.73   |
| WTO                            | .004        | 0.00   |
| Reg                            | -5.439***   | -3.67  |
| EUReg                          | .825        | 1.44   |
| USAREg                         | .853        | 0.49   |
| JPNReg                         | 1.160       | 0.66   |
| AUSReg                         | 1.152       | 0.67   |
| NORReg                         | -5.567***   | -3.20  |
| R-squared                      | 0.225       |        |
| F-statistic                    | 2.58        |        |
| Prob (F-statistic)             | 0.0000      |        |
| Number of observations         | 859         |        |

Source: Author (2018)

Note: \*, \*\*, \*\*\*, significant at 10%, 5%, 1% level respectively.

### Policy Analysis

Focusing on main variable in this study which is *Reg*, it can be seen that this variable has negative sign in each models. This sign is unexpected since the variable is assumed to be positive as shown in table 1. This sign means that SVLK decreased the export quantities and also decreased the revenue. Take a closer look in each model, in the pooled regression model with log of quantity as the dependent variable, the parameter of this variable shows -3.541. It means that, given the same amount of other independent variables, quantity of plywood exported after SVLK was implemented, decreased more than 97 per cent. Studies on the effect of SVLK are hardly to find, however, there is an interesting point on Putri (2013) study. In smallholding timbers, the SVLK is believed create more negative effects on the fairness of smallholding forest trading agents. Moreover, using the same model with revenue as the dependent variable, it illustrates similar result. In this model, the parameter of this variable is -2.795, therefore, it can be stated that SVLK reduce the revenue by 93 per cent.

In regards of the other two models which are obtained from Hausman test result, random effect and fixed effect model, these models are also confirming the result on pooled regression model. In random effect model, SVLK decreases the export quantities by 98 per cent. In addition, in fixed effect model, revenue obtained from plywood exports are reduced by more than 100 per cent.

Considering the targeted countries, only two country variables are statistically significant with an unexpected sign in pooled regression model. The number of plywood exports to European countries which are incorporated in European Union (EU) and Norway are reduced compared to exports to other countries. As same as the export quantities, the revenue of plywood exports from EU and Norway are also declining. Furthermore, it is revealed that the issuance of SVLK has little effect on the amount of exports and receipts of plywood export to Norway. This can be seen from the linking variables between Norway and SVLK (*NORReg*) which parameter show a negative sign.

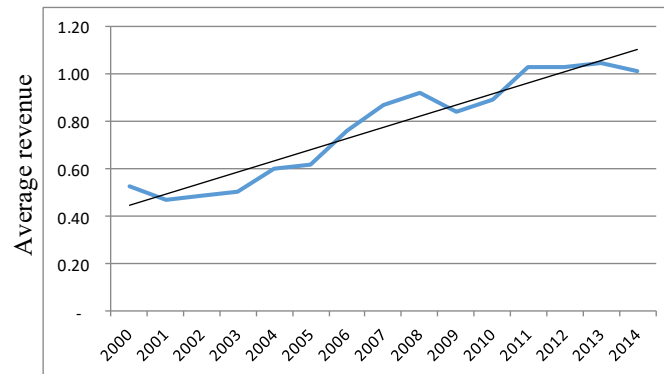


Figure 2. Price of plywood exported over years.  
Source: BPS (2016)

One of the intentions of SVLK regulations as stated in Ministry of Forestry (2009) is assuring that all timber products which are available and traded in Indonesia are legal thus it can increase the Indonesian forest products demand and competitiveness especially for European Union, USA, and Australia. On the other hand, small industries assume that SVLK might reduce their revenue due to complicated processes to obtain the certification. A little evidence in figure 2 can be brought to the small industries to convince them to participate in SVLK. By dividing the total revenue earned over quantity from 2010 to 2014, roughly, it represents the price of plywood exported. The trend of plywood's price increase gradually from 0.89 in 2010 to 1.01 in 2014. Through this sight, it can be expected that this exported commodity has been sufficiently capable of increasing revenue so that it will be able to encourage other industries who do not have SVLK to participate in this program. However, this evidence need further research to conclude that SVLK can raise the price of export commodities of plywood.

## CONCLUSION

SVLK regulation has a negative correlation with the quantity and revenue earned of plywood exported. The reduction in the number of export and revenue earned is quite big that nearly twice comparing to the condition before the regulation was implemented. Based on the policy analysis, Indonesian government should find a way to organize the regulation for better export performance. It seems that there are problems on the process of the implementation of SVLK thus making exporters dissuade for exporting the products. In addition, as already stated earlier in this paper, most of the results are similar to previous study either quantity exported or revenue obtained to exporting country has positive relationship with the economic growth, while in this case real GDP. It also turns out those countries which share land borders with Indonesia have a tendency to export more than the countries those are not sharing land border. It should be noted that this study only focused on Indonesian plywood trade, while SVLK is implemented to all Indonesian forest products. Further research will be needed in the future by incorporating all forest products to obtain more precise estimation.

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