# The Effect of Crude Palm Oil Export Tax on Export and Prices

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**Abstract.** *The government of Indonesia imposed export tax on crude palm oil (CPO) and its derivatives since September 1994. This policy has two objectives, first is to guarantee the availability of domestic CPO as the main raw material of cooking oil which is one of the staple products of Indonesia. Secondly, is to develop the downstream industry of the palm oil industry which has higher value added compare to CPO. With limiting CPO export, hopefully the CPO will be utilized to produce higher value added product.*

*This research has two main objectives, first is to calculate CPO export tax from September 1994 until the present and second to analyze the effect of the export tax on CPO export and domestic CPO price. The method utilized in the analysis is Vector Autoregression or Vector Error Correction depending on the characteristic of the data. In addition, Granger Causality will be calculated in order to identify the relation between the variables i.e export tax, CPO export and domestic price. This research will generate recommendations regarding CPO export tax in the future. The result indicates that CPO export tax do not affect CPO export and domestic prices during the implementation of progressive export tax*

***Keywords:*** *export tax, palm oil, Verror Error Correction, Granger Causality*

***JEL Codes:*** *Q1, Q23*

## Introduction

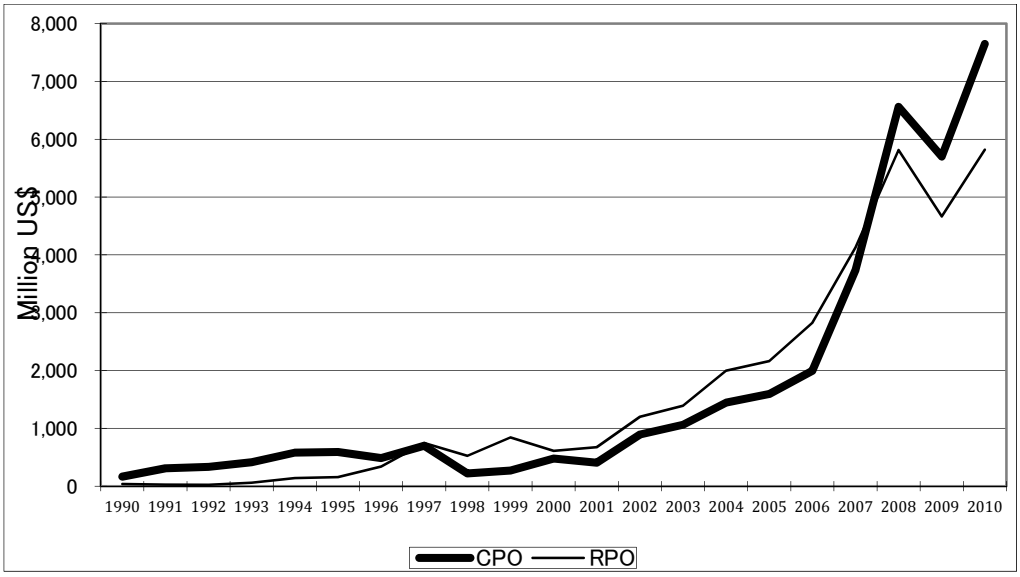
Palm oil is considered to be an important product in Indonesian economy. This commodity is also an important export commodity and in 2010, palm oil export valued at 13.4 billion US$. Palm oil export commodity can be classifieid into two products, crude palm oil (CPO) and refined palm oil (RPO). Refined palm oil consists of several products which utilized CPO as its raw material and these products has higher value added compare to CPO. In 2010, CPO export still dominates with 56 percent meanwhile the rest is refined palm oil export. In addition, during the period of 1990-2010 refined palm oil export grew in average of 38.7 percent while CPO export grew by 29.9 percent in the same period. (Figure 1).

Besides as an important export commodity, palm oil is also an important raw material for making cooking which is considered to be a staple commodity in Indonesia. In order to guarantee the availability of palm oil in domestic market, the government since September 1994 imposed an export tax policy. The other objective of the policy is to develop the downstream industry of palm oil which has higher value added.

Theoretically the implementation of export tax will decrease the domestic price, while it will increase the export price. Figure 2 illustrates the effect of export tax at a rate of *t*. The domestic price of export falls to $p_t$, reducing the sum of

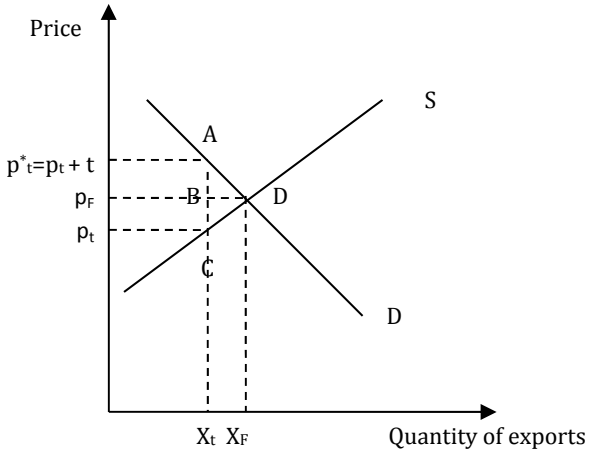
consumer and producer surplus by the area of $p_FDCp_t$. However, the tax yields revenue equal to after tax volume multiplied by the tax rate or the area of $p^*_tACp_t$. The loss of tax is equal to the area of BCD, while a terms of trade gain equal to the area of $p^*_tABp_F$ (Helpman and Krugman, 1989).

**Figure 1** Indonesia's Crude Palm Oil (CPO) and Refined Palm Oil Export, 1990-2010




Source: UN Comtrade (2012)

**Figure 2** The Imposition of Export Tax




Source: Helpman and Krugman (1989)

The objective of this paper is to analyze the effect of export tax on export and domestic prices. Two commodities will be considered on the analysis, crude palm oil (CPO) and refined palm oil. Meanwhile the domestic prices include CPO FOB price, domestic CPO price, domestic olein price and fresh fruit bunch (FFB) price.

## Literature Review

Many scholars have analyzed the effect of export tax on specific commodities, these article can be classified into two parts. The first is calculating the optimum export tax (Akiyama, 1982; Yilmaz, 1999; Burger, 2008; Permani, Vanzetti and Setyoko, 2011). Secondly analyze the effect of export tax on welfare and the economy (Marks, Larson and Pomeroy, 1998; Hasan, Reed and Marchant, 2001; Warr, 2003; Susila, 2004; Rifin, 2010). All of these studies indicate that export tax will have negative effect on the economy and also decrease the competitiveness.

Moreover, Piermartini (2004) indicates that the effect of export tax depends on the market power. The implementation of export tax by the country who owns market power can have more effect on international price, trade volume, income distribution and terms of trade than country without market power. Meanwhile, the impact of export tax at a country without market power on its economic growth and national welfare is more severe (Devarajan et. al, 1996). If a country with market power implements export tax, there will be an efficiency loss because of the distortion impact of export tax. However, there will be improvement in their terms of trade since export price increase (Piermartini, 2004).

In terms of palm oil several studies been conducted with various objectives such as Larson, 1996; Marks, Larson and Pomeroy, 1998; Hasan, Reed and Marchant, 2001; Susila, 2004; Putri et.al, 2008; Rifin, 2010 and Obado, 2010.

Larson (1996) argued that the export tax decreased the domestic price of CPO, hence the production cost of cooking oil also decrease. Export tax also transfers an amount of $99 million from palm oil growers, mainly located in outside Java, to the urban consumers mostly in Java. Therefore export tax only benefits urban population in Java which consumes cooking oil made from palm oil.

Marks, Larson and Pomeroy (1998) calculated the impact of export tax on the government, producers, distributors and consumers using static model. The study showed that the government loss 18.1 million US$, palm oil refiners loss 2.5 million US$; meanwhile distributor and consumers gain 220.5 million US$ from the implementation of export tax in 1995. The government loss is triggered by the loss of the government-owned estate which is higher than the revenue collected from the export tax. 18

Hasan, Reed and Marchant (2001) analyzed the dynamic effect of export tax on Indonesia's palm oil export performance. The authors utilize the vector autoregressive regression (VAR) with three dependent variables: net export share, export tax and relative export price (international price divided by Indonesian FOB price). The result indicates that export tax has negative relationship with net export share while relative export price have a positive relationship with the net export share. The research also showed that the effect of export tax is not immediate, it appears on the second month and peaks after four month the tax is imposed and it has a long period effect.

Meanwhile Susila, 2004; Putri et.al, 2008; Rifin, 2010 and Obado, 2010 basically analyze the effect of export tax on production, welfare and competitiveness. These articles conclude that export tax has negative effect on production, welfare and competitiveness.

## Research Methodology

In this study, econometric analyses were conducted through three steps. First, unit root test is performed on each series to assess the stationarity of each variables. Second, the Johansen methodology is conducted to test the cointegration relationships between the variables. If cointegration exists, vector error correction model (VECM) is utilized or else vector autogression (VAR) equation is constructed. Finally, Granger causality test is performed on possible causal relationships between each series.

### *Unit Root Tests*

Unit root test, applying the Augmented Dickey Fuller (ADF), was used to test whether the variables were stationary or not. The test is performed by "augmenting" the preceding three equations by adding the lagged values of the dependent variable $\Delta Y_t$ (Gujarati, 2003). The ADF test consists of estimating the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t \quad \text{.....(1)}$$

where $\varepsilon_t$ is a pure white noise error term and where $\Delta Y_{t-1} = (Y_{t-1}-Y_{t-2})$. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms in order for the error term in the equation is serially uncorrelated. In ADF, $\delta=0$ is tested and the ADF test follows the same asymptotic distribution as the DF statistic, so the same critical values can be used (Gujarati, 2003).

### *Cointegration Tests*

If the variables are considered to be a non stationary variables, the next step is to check whether the variables are cointegrated. When variables are cointegrated it means that the variables have long term relationship between them. One of the methods to test cointegration is the Johansen method (Enders, 1995). Consider a vector autoregression (VAR) of order p

$$Y_t = A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + B X_t + \varepsilon_t \quad \text{..... (2)}$$

where $Y_t$ is a k vector of non-stationary I(1) variables, $X_t$ is a d vector of deterministic
variables, and $\varepsilon_t$ is a vector of innovations. The VAR equation above can be written as,

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + B X_t + \varepsilon_t \quad \text{..... (3)}$$

where

$$\Pi = \sum_{i=1}^{p} A_i - I \qquad \Gamma_i = -\sum_{j=i+1}^{p} A_j$$

Granger's representation theorem states that if the coefficient matrix $\Pi$ has a reduced rank $r < k$, then there exist k x r matrices $\alpha$ and $\beta$ each with rank r such that $\Pi = \alpha\beta'$and $\beta' Y_t$ is I(0). r is the number of cointegrating relations (the *cointegrating rank*) and each column of $\beta$ is the cointegrating vector. Johansen's method is to estimate the $\Pi$ matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of $\Pi$ (Eviews 5 Users Guide, 2004).

In calculating the number of cointegrating relations (r), it can be calculated using the following two test statistics (Enders, 1995):

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n}\ln(1-\hat{\lambda}_i) \quad \text{.....(4)}$$

$$\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1}) \quad \text{.....(5)}$$

where

$\hat{\lambda}_i$ = the estimated values of the characteristics roots obtained from the estimated π matrix

T = the number of observations

The $\lambda_{trace}$ tests the null hypothesis that the number of distinct cointegration vector is less than or equal to r against a general alternative, meanwhile $\lambda_{\max}$ tests the null hypothesis that the number of cointegrating vestors is r against the alternative of r+1 cointegrating vectors (Enders, 1995).

***Vector Autoregression (VAR)***

The vector autoregression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. The VAR approach treats every variable as endogenous variables and the exogenous variables are the lagged values of all endogenous variables in the system (Pindyck and Rubinfeld, 1998). Then the system is estimated using the OLS.

Letting $x_1$, $x_2$, ....., $x_n$ be the endogenous variables and $z_1$, ....., $z_m$ be the exogenous variables, a VAR is given by the following set of n linear equations:

$$x_{1,t} = a_{10} + \sum_{j=1}^{p} a_{11j}x_{1,t-j} + \sum_{j=1}^{p} a_{12j}x_{2,t-j} + \ldots + \sum_{j=1}^{p} a_{1nj}x_{n,t-j} + \sum_{j=0}^{r} b_{11j}z_{1,t-1} + \ldots + \sum_{j=0}^{r} b_{1mj}z_{m,t-j} + \varepsilon_{1t}$$

$$x_{n,t} = a_{n0} + \sum_{j=1}^{p} a_{n1j}x_{1,t-j} + \sum_{j=1}^{p} a_{n2j}x_{2,t-j} + \ldots + \sum_{j=1}^{p} a_{nnj}x_{n,t-j} + \sum_{j=0}^{r} b_{n1j}z_{1,t-1} + \ldots + \sum_{j=0}^{r} b_{nmj}z_{m,t-j} + \varepsilon_{nt}$$

***Vector Error Correction (VECM)***

Vector error correction (VECM) is a vector autoregression (VAR) model adding the error correction equation. The error correction equation is added when there is a cointegration in the model. If there are two variables, X and Y, and both variables are cointegrated the first difference of $X_t$ and $Y_t$ can be modeled using a VAR, augmented by including $Y_{t-1} - \theta X_{t-1}$ as an additional regressor (Stock and Watson):

$$\Delta Y_t = \beta_{10} + \beta_{11}\Delta Y_{t-1} + \ldots + \beta_{1p}\Delta Y_{t-p} + \gamma_{11}\Delta X_{t-1} + \ldots + \gamma_{1p}\Delta X_{t-p} + \alpha_1(Y_{t-1} - \theta X_{t-1}) + u_{1t} \quad \text{..... (6)}$$

$$\Delta X_t = \beta_{20} + \beta_{21}\Delta Y_{t-1} + \ldots + \beta_{2p}\Delta Y_{t-p} + \gamma_{21}\Delta X_{t-1} + \ldots + \gamma_{2p}\Delta X_{t-p} + \alpha_2(Y_{t-1} - \theta X_{t-1}) + u_{2t} \quad \text{..... (7)}$$

***Granger Causality Test***

Granger Causality test is a procedure for testing whether current and lagged values of one time series help predict future values of another time series (Stock and Watson). For example there is a VAR model for X and Y as follows:

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j=1}^{n} \beta_j Y_{t-j} + u_{1t} \quad \text{..... (8)}$$

$$X_t = \sum_{i=1}^{n} \lambda_i X_{t-i} + \sum_{j=1}^{n} \delta_j Y_{t-j} + u_{2t} \quad \text{..... (9)}$$

Basically the Granger test is the the F-statistic testing the hypothesis that the coefficients on all the values of one of the variables in Equation 8 and 9 are zero which means that these regressors have no predictive for the left hand variable beyond that contained in the other regressors (Stock and Watson, 2007). In this test, there are four possible cases (Gujarati, 2003):

1. Undirectional causality from X to Y is indicated if the estimated coefficients on the lagged X in Equation 8 are statistically different from zero as a group and the set of estimated coefficients on the the Y in Equation 9 is not statistically different from zero.
2. Undirectional causality from Y to X is indicated if the estimated coefficients on the lagged Y in Equation 9 are statistically different from zero as a group and the set of estimated coefficients on the the X in Equation 8 is not statistically different from zero.
3. Feedback or bilateral causality exists when the sets of Y and X coefficients are statistically significant different from zero in both regressions.
4. Independence occurs when the sets of Y and X coefficients are not statistically significant in both regressions.

**Export Tax Policy**

The trade liberalization policy in 1991 resulted in an increase in both domestic price of cooking oil and volume of palm oil export. Concerned with the increase of cooking oil price, the government issued a new policy by imposing export taxes on palm oil products. The export tax policy was first implemented in September 1994. The implementation of export tax policy on palm oil products can be divided into three periods.

***Period I: September 1994 – June 1997***

The government issued Decree of Ministry of Finance No 439/KMK.017/1994 to tax on CPO, refined bleached deodorized palm oil (RBD PO), crude olein and refined bleached deodorized oil (RBD olein) beginning on September 1994.

The formula to calculate the export tax was as follows:

| Export Tax = Export volume x Export tariff x (Base Price – FOB Price) x Exchange rate |
|---|

The Free on Board (FOB) price is determined by the Ministry of Finance every month based on average prices of the world market during the previous two weeks; meanwhile the base price is the maximum export price which was free from

export tax. The tax rate is getting smaller as the difference between base price and export price is bigger. The complete export duty can be seen at Table 1.

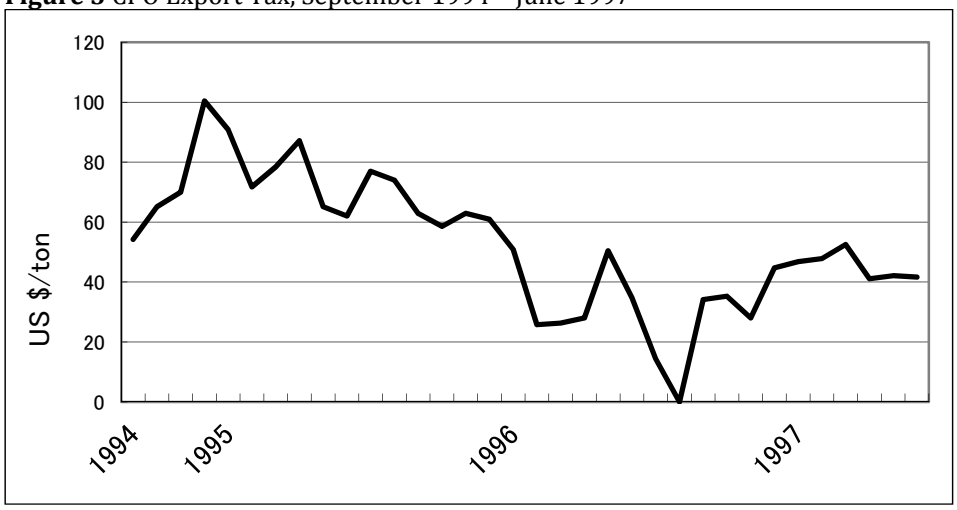
**Table 1** Export Tax Structure of Indonesian Palm Oil According to Ministry of Finance Decree No 439/KMK.017/1994

| Product | Price Levels | Duty/ton |
|---|---|---|
| CPO | Base Price: US$ 435 | 0% |
| | Additional : | |
| | First 35 (435-470) | 60% |
| | Next 35 (470-505) | 56% x (EP – BP) |
| | Next 35 (505-540) | 52% x (EP – BP) |
| | Next 35 (540-575) | 48% x (EP – BP) |
| | Next 35 (575-610) | 44% x (EP – BP) |
| | Balance (P>610) | 40% x (EP – BP) |
| Refined bleached deodorized palm oil (RBD PO) | Base Price: US$ 460 | 0% |
| | Additional : | |
| | First 40 (460-500) | 60% |
| | Next 40 (500-540) | 56% x (EP – BP) |
| | Next 40 (540-580) | 52% x (EP – BP) |
| | Next 40 (580-620) | 48% x (EP – BP) |
| | Next 40 (620-660) | 44% x (EP – BP) |
| | Balance (P>660) | 40% x (EP – BP) |
| Crude olein (CRD olein) | Base Price: US$ 465 | 0% |
| | Additional : | |
| | First 45 (465-510) | 60% |
| | Next 45 (510-555) | 56% x (EP – BP) |
| | Next 45 (555-600) | 52% x (EP – BP) |
| | Next 45 (600-645) | 48% x (EP – BP) |
| | Next 45 (645-690) | 44% x (EP – BP) |
| | Balance (P>690) | 40% x (EP – BP) |
| Refined bleached deodorized Olein (RBD olein) | Base Price: US$ 500 | 0% |
| | Additional : | |
| | First 50 (500-550) | 60% |
| | Next 50 (550-600) | 56% x (EP – BP) |
| | Next 50 (600-650) | 52% x (EP – BP) |
| | Next 50 (650-700) | 48% x (EP – BP) |
| | Next 50 (700-750) | 44% x (EP – BP) |
| | Balance (P>750) | 40% x (EP – BP) |

Note: EP : export price, BP : base price

One of the palm oil products taxed is CPO. The magnitude of export tax on CPO is shown in Figure 3. During this period the export tax ranges from US$ 0 – 100.4. The highest occurred on December 1994 when the FOB price reached US$ 684 per ton, meanwhile the lowest occurred in August 1996 when the FOB price was US$ 434 per ton which lower than the CPO base price of US$ 435.

**Figure 3** CPO Export Tax, September 1994 – June 1997




Source: Author's Calculation

***Period II: July 1997 – August 2007***

In July 1997, base on the Decree of Ministry of Finance No 300/KMK.01/1997 the calculation method of export tax has changed. According to the new method the export tax is calculated as follows:

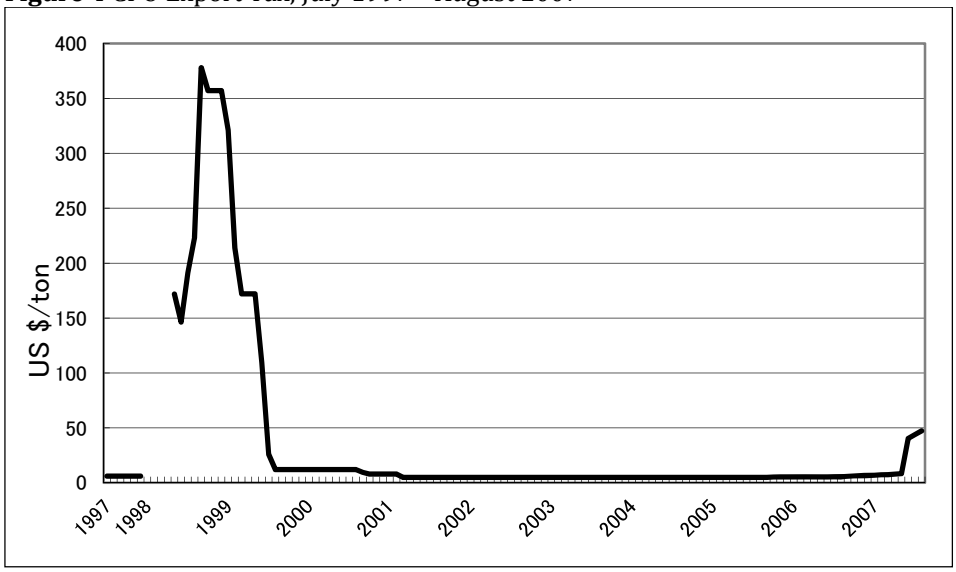
| Export Tax = Export tax tariff x Check price x Export volume x exchange rate |
|---|

However, when the check price has not been determined yet, the calculation of the export tax is as follows:

| Export Tax = Export tax tariff x FOB value x exchange rate |
|---|

The FOB value is the total export value stated on the Commodity Export Report or on the Certain Commodity Export Report.

**Figure 4** CPO Export Tax, July 1997 – August 2007




Source: Author's Calculation

The new calculation differs from the previous one. In the previous calculation, the export tax depends only at the difference between the FOB price and the base price and only the base price is determined by the government; meanwhile the other variable, such as base price and export tariff, is fixed. The new calculation of export tax depends on the export tariff and the check price determined by the government, therefore the government can determine the magnitude of the export tax depending on the price of domestic cooking oil. When the domestic price of cooking oil is high, the government imposed high check price and export tariff.

The export tax tariff is determined by the Minister of Finance, while the check price is determined by the Ministry of Trade and Industry in a monthly basis. During this period the number of products being taxed increase from four into ten palm oil and palm kernel oil derivatives including CPO. In addition, from January - April 1998 the government banned the export of palm oil product since the domestic scarcity at that time.

During this period, the magnitude of the CPO export tax ranges from US$ 4.8 until US$ 378 per ton (Figure 4). The highest occurred during the financial crisis in September 1998 when the export tax tariff reached 60 percent and the check price was US$ 630 per ton CPO. During this period the country was in the mid of the Asian financial crisis which saw a tremendous increase in the domestic cooking oil price. In an attempt to lower the cooking oil price, the government set high export tax on CPO or even banned the CPO export in January-April 1998 in order to guarantee the availability of domestic CPO in an affordable price. After the crisis is over, the government gradually decreased the export tax tariff (Table 2).

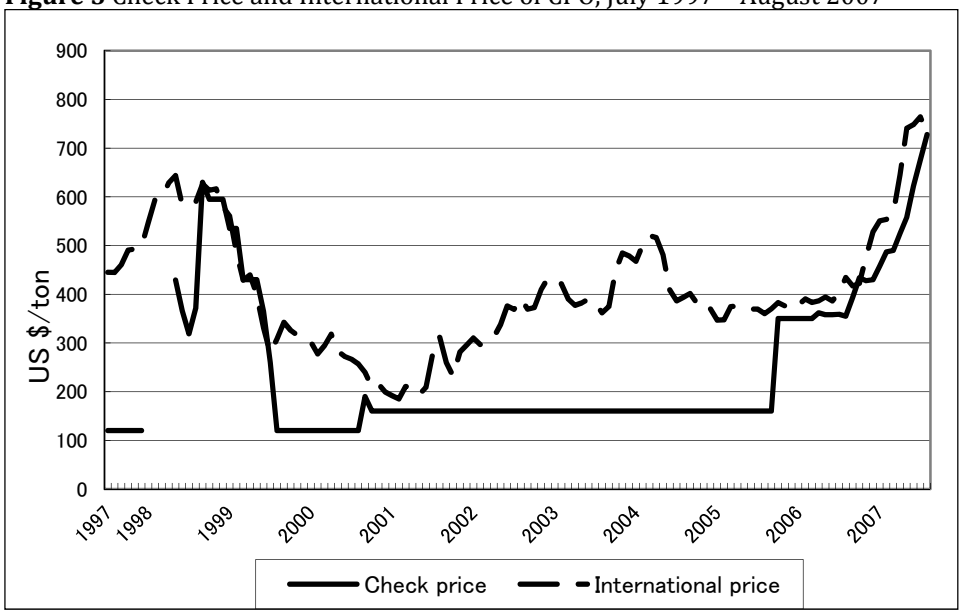
The magnitude of the export tax during this period depends on two variables, export tax tariff and the check price. The check price is supposed to follow the fluctuation of international price, but during the period of August 1999 until August 2000 the check price of CPO is constant at US$ 120 and during October 2000 – September 2005 when the check price is constant at US$ 160 (Figure 5). Therefore during these two periods the CPO export tax is constant (Figure 4). Beginning from April 2006, the government updates the check price every month. Meanwhile, for the export tax tariff, the magnitude fluctuated over this period (Table 2).

**Table 2** CPO Export Tax Tariff

| Period | Export Tax Tariff (%) |
|---|---|
| July – December 1997 | 5 |
| January – April 1998 | Export ban |
| May – June 1998 | 40 |
| June 1998 – January 1999 | 60 |
| February – May 1999 | 40 |
| June 1999 | 30 |
| July 1999 – August 2000 | 10 |
| September 2000 – February 2001 | 5 |
| March 2001 – August 2005 | 3 |
| September 2005 – May 2007 | 1.5 |
| June 2007 – August 2007 | 6.5 |

Source: Ministry of Finance (various years)

**Figure 5** Check Price and International Price of CPO, July 1997 – August 2007

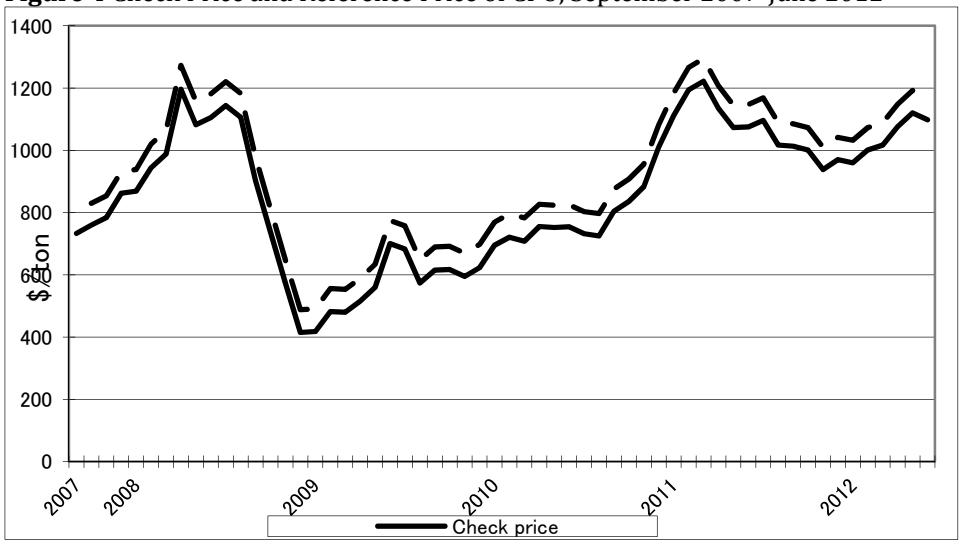



Source: Ministry of Trade and IMF (2009)

***Period III: September 2007 - now***

Beginning in September 2007 based on the Ministry of Finance Decree No 94/PMK.011/2007, the export tax tariff determination is changed. According to the decree, the export tax tariff is determined base on the reference price set by the Ministry of Trade according to the previous month average international CPO price in Rotterdam. This regulation was imposed because of the increase in the international price of CPO causing palm oil producer to export its product rather than selling in domestic market.

**Figure 4** Check Price and Reference Price of CPO, September 2007-June 2012

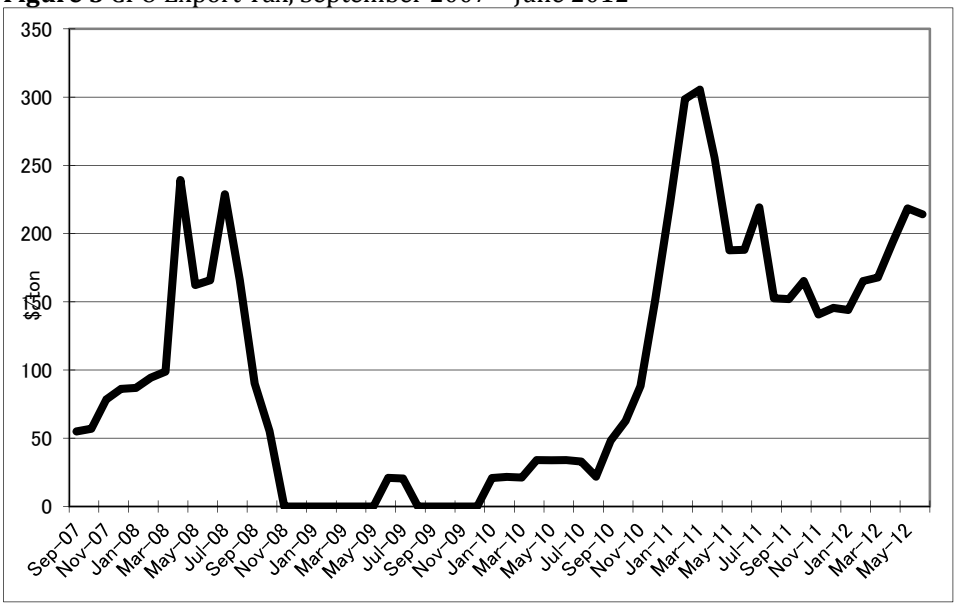



Source: Ministry of Trade (2012)

This decree also set the minimum reference price when the palm oil product is taxed. From September 2007 until October 2008 the minimum reference price is US$ 550. Therefore when the reference price is under US$ 550, the export tax tariff is zero. Meanwhile, the higher the reference price the higher export tax tariff is imposed. Beginning on November 2008, the minimum reference price was increased to US$ 700.

During this period, for CPO, the highest export tax paid occurred in March 2011 when the export tax tariff was 25 percent and the check price was US$ 1222 therefore the export tax was US$ 305.5 per ton. Meanwhile the lowest of 0 percent occurred from November 2008 – May 2009 and August 2009 – December 2009 when the reference price was lower than US$ 700 (Figure 7).

**Figure 5** CPO Export Tax, September 2007 – June 2012




Source: Author's Calculation

**Results and Discussion**

In this article, six equations are constructed, two for each period, one for CPO and the other for refined palm oil. The first step is to identify the unit root of every variables and classified between three periods: whole period (January 1999-December 2011), first half period (January 1999-August 2007) and the period when the government imposed progressif export tax policy (September 2007-December 2011). The results indicate that all variables are stationer in the first difference and several variables are stationer in the level form.

Several variables differ the stationarity form when the period changes. The refined palm oil export (RPO) variable is not stationer in the level form in the whole period but when it is divided into two periods is stationer in the level form. The CPO FOB price (FOB) is stationer in the level form during the whole period and during the period of September 2007 until December 2011. Meanwhile export tax is stationer in the level form during the whole period and during the period of January 1999 until August 2007 meanwhile during the latest period export tax is not stationer in the level form. This indicates that progressive export tax has made the value not stationer or the mean is not constant over the period.

**Table 3** Unit Root Test

| Variable | Period | | | | | |
|---|---|---|---|---|---|---|
| | Jan 1999 – Dec 2011 | | Jan 1999 – Ags 2007 | | Sep 2007 – Dec 2011 | |
| | DF t-sat | Prob | DF t-sat | Prob | DF t-sat | Prob |
| CPO | -8.70 | 0.00 | -6.46 | 0.00 | -7.47 | 0.00 |
| D(CPO) | -6.71 | 0.00 | -6.77 | 0.00 | -5.83 | 0.00 |
| RPO | -1.89 | 0.66 | -8.25 | 0.00 | -8.22 | 0.00 |
| D(RPO) | -7.97 | 0.00 | -5.47 | 0.00 | -4.64 | 0.00 |
| FOB | -3.87 | 0.01 | -2.50 | 0.33 | -3.24 | 0.09 |
| D(FOB) | -5.76 | 0.00 | -9.49 | 0.00 | -6.03 | 0.00 |
| OLE | -3.06 | 0.12 | -1.32 | 0.88 | -2.95 | 0.16 |
| D(OLE) | -6.86 | 0.00 | -4.14 | 0.01 | -5.21 | 0.00 |
| FFB | -4.56 | 0.00 | -2.41 | 0.37 | -3.77 | 0.03 |
| D(FFB) | -3.99 | 0.01 | -4.66 | 0.00 | -4.44 | 0.00 |
| ET | -4.07 | 0.01 | -11.20 | 0.00 | -1.86 | 0.66 |
| D(ET) | -5.40 | 0.00 | -9.46 | 0.00 | -6.14 | 0.00 |

The second step is identifying the existence of cointegration. Cointegration only occurs when the variables are not stationer in the level form and stationer after first difference. Therefore if all of the variables in the equation are stationer in the level form, vector autogression (VAR) is directly calculated else cointegration is identified followed by calculating the vector error correction (VEC).

On the whole period, all the variables in the CPO equations are stationer in the level form therefore VAR is calculated. The result of the VAR and Granger Causality is shown in Appendix 1 and 2. The results indicate that export tax only affect CPO export not the domestic prices during the period of January 1999 until December 2011.

The other five equations, at least one variable is stationer after first difference therefore cointegration is identified and VEC is constructed. During the whole period of the RPO equation, export tax only affects RPO export meanwhile olein domestic price (OLEIN) do not affected by the CPO export tax (Appendix 3-5). When the analysis is divided between the implementation of progressive export tax and after, the effect of export tax differs. Before the implementation of progressive export tax, export tax affected all the variables (CPO export, RPO export, olein price, CPO FOB price, CPO domestic price and fresh fruit bunch price) (Appendix 6-11).

On the other hand, the implementation of progressive export tax make the export tax have no affect any more on CPO export and other domestic prices. Export tax only affects RPO export during this period (Appendix 12-17). This can be explained by two things, first that the CPO producer has become indifferent of the export tax that even progressive export tax can not decrease CPO export or affect domestic price and second during this period international price of CPO is relatively high therefore even progressive export tax can not be a disinsentive for the producer to sell the CPO in the domestic market.

## Conclusion

The calculation of CPO export tax has changed over the years with the latest of progressive export tax. During the implementation of prograssive export tax, export tax do not have any affect on CPO export or domestic prices only on RPO

export. Meanwhile before the implementation of progressive export tax, export tax is more effective in decreasing CPO export and affecting the domestic prices.

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