THE IMPACT OF WORLD CPO PRICE CHANGE TOWARDS PRICES, ECONOMIC ACTIVITIES, AND INCOME DISTRIBUTION IN INDONESIA

Dampak Perubahan Harga CPO Dunia Terhadap Harga, Aktivitas Ekonomi, dan Distribusi Pendapatan di Indonesia

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Abstrak

Paper ini menganalisis dampak perubahan harga CPO dunia terhadap harga-harga, aktivitas ekonomi, dan distribusi pendapatan rumah tangga di Indonesia dengan pendekatan model CGE. Model pertama mengasumsikan Indonesia tidak mampu memengaruhi harga, sedangkan model kedua mengasumsikan Indonesia mampu memengaruhi harga. Data utama yang digunakan bersumber dari Tabel Sistem Neraca Sosial Ekonomi Indonesia tahun 2008. Hasil simulasi menunjukkan bahwa apabila Indonesia berperan sebagai penerima harga, peningkatan harga CPO dunia diperkirakan akan berdampak pada penguatan nilai tukar, penurunan tingkat harga, dan meningkatkan aktivitas ekonomi, namun sedikit mengurangi kemerataan distribusi pendapatan. Di sisi lain, penurunan harga CPO dunia akan memberikan dampak yang sebaliknya. Apabila Indonesia dapat berperan memengaruhi harga, perubahan harga CPO dunia diperkirakan akan berdampak sama dengan bila Indonesia tidak dapat memengaruhi harga, namun dengan nilai perubahan yang relatif lebih kecil. Hasil ini mengindikasikan bahwa Indonesia sebaiknya dapat berperan sebagai penerima harga ketika harga CPO dunia bertendensi meningkat dan berperan memengahuhi harga ketika harga CPO dunia bertendensi turun.

Kata Kunci: Harga CPO dunia, Model CGE, Penerima harga, Penentu harga

Abstract

This paper analyzes the impact of world CPO change price towards prices, economic activities, and household income distribution using CGE Models. The first model assumes that Indonesia is a price taker, while the second model assumes that Indonesia could influence the price. The main data were taken from Indonesian Social Accounting Matrix 2008. The simulation results suggest that if Indonesia takes the role as a price taker, an increase in world CPO price will affect exchange rate, decrease prices, and improve economic activities, but it slightly worsened household income distribution. On the other hand, a decrease in world CPO price will bring about the opposite impacts respectively. Conversely, if Indonesia takes the role as a main price influencer, world CPO price change will lead to a similar result with less magnitude impacts. These findings suggest that Indonesia should be able to take the role as a price taker when world CPO price is increasing and as a main price influencer when world CPO price is decreasing.

Keywords: *CPO world price, CGE models, Price taker, Price influencer*

JEL Classification: D58, E31, F47

INTRODUCTION

In the period of 2011 to 2015, the Indonesian economy grew at the average of 5.51%. One factor that can explain the slowdown was the under performance of export. Weakness of global demand and declining prices were the underlying background coupled with the decreasing price of main export commodities in the international market. One of those commodities is CPO.

In the recent 6 years, world CPO price (Rotterdam market) is relatively fluctuated. From 2010 to 2015, there have been at least six times of uptrends and downtrends. It is noted that in this recent three years, after showing a promising uptrend from December 2012 to February 2014, the price started its plunging tendency until nowadays. The dynamics of world CPO price is strongly influenced by the price of other commodities, besides its global supply and demand (Rahman, 2017). The descending world CPO price in recent two years cannot be disassociated with price weakness on other commodities.

The movement of world CPO price would be transmitted to domestic CPO price. Figure 1 shows that the domestic CPO price (Belawan) is strongly integrated and move in line with the world CPO price.

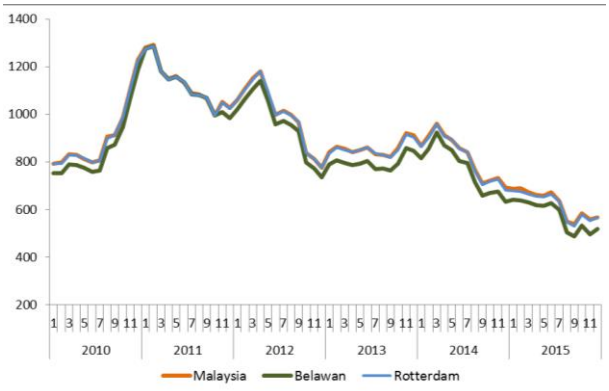

Figure 1. CPO Price at Rotterdam, Malaysia and Belawan, 2010-2015 (USD/MT)

Source: World Bank (2016) & PT. SMART Tbk. (2016), processed

Some studies have argued that the decline of world CPO price has significant share on the weakening of Indonesian Rupiah (IDR) towards foreign exchanges (Aprina, 2014; Aziz & Applanaidu, 2017; and Ashfahany & Priyatna, 2015). The level of world CPO price in November 2013 was 921$/MT, than declined gradually and in September 2015 touched 538$/MT. In that respective month IDR was recorded to hit its all-time low position in a decade with 14,653 IDR for 1 USD. This has something to do with large portion of CPO in the Indonesian export of goods as declining of its world price would push the export revenue down and reduce the supply

of foreign currency. The export of CPO on the period of 2008-2014 amounted 10.4-17.6 billion USD, or around 9% of total export of goods.

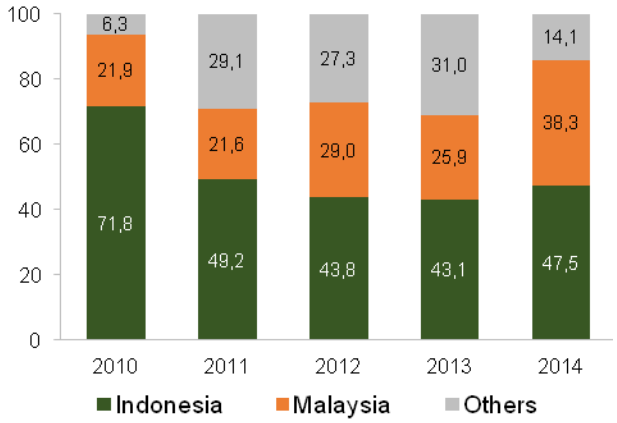

Figure 2. Contribution of Indonesia, Malaysia, and Other Countries in CPO Market, 2010-2014

Source: UN Comtrade (2015), processed

Universally, Indonesia lies at the top on the list of CPO producing countries. During the period of 2008-2014, contribution of Indonesia to the world CPO supply was 41.8-51.4%. Malaysia was in the subsequent position with 35.3-43.1% and other CPO producing countries contributed 11.6-15.2% (Figure 2). It has been several decades for Indonesia to become a main CPO producer.

By considering such position, Indonesia has the potential to take the role as a main influencing country in the world CPO price, which is commonly stated as a large country role (Appleyard et al., 2008). However such role has not been taken by Indonesia.

This situation has drawn a wide range of awareness among concerning figures. The government and business actors have followed up by trying to reverse the condition by suggesting andmaking some efforts to place Indonesia as not only price taker, but the price influencer. One of the efforts could be conducted by building CPO marketing pool for physical CPO and futures market in Jakarta (Agustira et al., 2010). By this pooled market, seller and buyer could make efficient, effective, fair, and transparent transactions. Besides, this physical market could be the reference for CPO world price. Another effort could also be conducted by strengthening domestic palm oil market (Office of Chief Economist, 2015). Strong domestic market is expectedly capable to absorb CPO production when global consumption is in decreasing tendency and to minimize its price fluctuation.

At national level, the government also has tried to determine CPO price reference for exporters to set the price and to comply with export tax (ICDX, 2015). By setting CPO export price,

Indonesia is expected to be able to influence CPO world price as Indonesia position as the largest supplier.

In recent time, awareness comes not only from national stakeholders but also from Malaysia. Malaysia's Federal Land Development Authority (FELDA) Chairman said that as Indonesia and Malaysia control more than 80% of the CPO market in the world, these countries have the potential to control its price too (Tempo, 2017). However, the idea of putting Indonesia as a price maker is still unreachable, the world CPO price has not recognized Indonesia CPO price as a reference.

The failure of Indonesia to influence world price of CPO may have incurred unnecessary opportunity costs due to the loss of potential to gain positive effects of being such country, particulary in determining the price, as in this position Indonesia could receive more profit. Regarding that, it is important to identify risks and benefits from being price taker and price influencer when the world price is either increasing or decreasing.

By considering those conditions, this research aims at estimating the impact of CPO world price changing toward economic activities, prices, and income distribution in Indonesia. The research compares the impact occurred if Indonesia assumed as a small country (acts as a price taker) and Indonesia assumed as a large country (acts as a price influencer) in world CPO price forming. Understanding the impact of both roles in world CPO price forming hopefully could be used as an input for stakeholders in making policies.

To the best of our knowledge so far, unfortunately, there is no preceding research discussing impact of world price in small and large country, particularly in world CPO price. With this regard, this research hopefully could contribute to fill the gap of research availability on this topic.

The following paragraphs will discuss part by part of the paper which are data sources, method of analysis, result and discussion, conclusion and policy recommendations, and limitation of current research.

METHOD

The main data used in the model is the Indonesian Social Accounting Matrix (SAM) 2008 which was published by national statistics office of Indonesia (BPS, 2010).

Basically, this original SAM of Indonesia is designed as a satellite accounts for national accounts data, therefore should be adjusted for modeling purpose. For this research, adjustments on SAM data were done to fulfill analytical purpose and synchronize it with equations used in the model by keeping the consistency in accounts interconnection. Adjustments were done by:

1. changing the transaction from purchaser price to producer price and removing transportation and trade margin block to avoid double counting in commodity price noted in original SAM;
2. merging production sectors, domestic commodities, and imported commodities into sectors block;
3. merging construction sector into industry of chemicals, fertilizer, clay crafts, cement, electricity, gas and water supply;
4. disaggregating row and column of Food, Beverages and Tobacco Industry into CPO and non CPO. This disaggregation is done by using export data.

As the result of this adjustment, we have a 39x39 SAM matrix consists of 23 accounts on production activities, two accounts on production factors (labor and capital), two accounts on net taxes and tariffs, one capital account, and 11 institutional sector accounts (eigth household accounts, a corporation account, a government account, and rest of the world account). The simple form of this rearrangement result is figured on Table 1.

Other data used in the model are parameters to determine constant elasticity of substitution (CES) and constant elasticity of transformation (CET), which are assumed to be 0.5 for 22 sectors, except for food, beverages and tobacco industry. They are assumed to be 1.5. These parameters are adopted from research done by Teguh (2010).

Table 1. The Framework of SAM

			Production Factor		Institution			Prod. Activity	Capital Account	Net In-direct Taxes	Net Import Tariff	Rest of the World	Total
			Labor	Non Labor	HH	Corp.	Govt.						
			1	2	3	4	5	6	7	8	9	10	
Production Factor	Labor	1						T1 6				T1 10	T1 .
	Non Labor	2						T2 6				T2 10	T2 .
Institution	Household	3	T3 1	T3 2	T3 3	T3 4	T3 5					T3 10	T3 .
	Corporation	4		T4 2	T4 3	T4 4	T4 5					T4 10	T4 .
	Government	5		T5 2	T5 3	T5 4	T5 5			T5 8		T5 10	T5 .
Production Activity		6			T6 3	T6 4	T6 5	T6 6	T6 7		T6 9	T6 10	T6 .
Capital Account		7			T7 3	T7 4	T7 5					T7 10	T7 .
Net Indirect Taxes		8						T8 6					T8 .
Net Import Tariff		9					T9 5						T9 .
Rest of the World		10	T10 1	T10 2	T10 3	T10 4	T10 5	T10 6	T10 7				T10 .
Total			T. 1	T. 2	T. 3	T. 4	T. 5	T. 6	T. 7	T. 8	T. 9	T. 10	

Source: authors' rearrangement (2016)

Method of Analysis

Analytical tool used in this paper is CGE models. The model is a static CGE model based on the model used by Winardi (2013). The model is a modification of standard CGE model developed by Hosoe et al. (2010). The model described a situation characterized with such features as full employment of labor and capital, therefore the simulation result could be noted as having long run impacts.

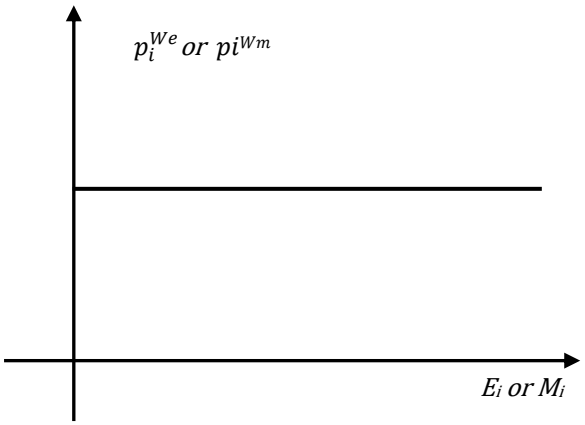

Figure 3. Export Demand and Import Supply for Small Country

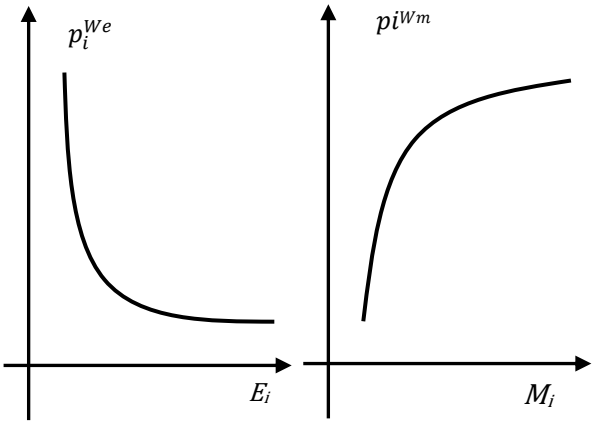

Figure 4. Export Demand and Import Supply for Large Country

Equations used in this model refer to the same research, particulary for small country model, while in large country model, it requires some adjustments. These adjustments are needed to depict the different condition between small and large country.

Within the small country, export and import curves are assumed to be flat and straight lines at the level of international price (Figure 3). This could come into view because as a small country, Indonesia would be considered insignificant to affect either world export price (p_i^{We}) or world import price (p_i^{Wm}).

Conversely, within the large country, export curve are assumed to be convex to the origin (Figure 4, left hand side). This means that the higher export will drive the world price down, because as a large country, Indonesia could affect world price significantly. Meanwhile, the import curve (Figure 4, right hand side) that has an upright concave means the higher import of large country will increase the world price (Hosoe et al., 2010).

Adjustments of the model are done by adding and modifying equations related to export, import, and Armington function (Hosoe et al., 2010). Some of the additional equations are as follows:

$$\frac{E_i}{E_i^0} = \left(\frac{p_i^{We}}{p_i^{We0}}\right)^{-\sigma_i} \quad \forall i \text{.....(1)}$$

$$\frac{M_i}{M_i^0} = \left(\frac{p_i^{Wm}}{p_i^{Wm0}}\right)^{\psi_i} \quad \forall i \text{.....(2)}$$

where:

E_i and M_i : Indonesian export and import of the i-th goods (variable)

E_i^0 and M_i^0 : initial equilibrium value of Indonesian export and import of the i-th goods (variable)

p_i^{We} and p_i^{Wm} : export price and import price of the i-th goods in term of the foreign currency (variable)

p_i^{We0} and p_i^{Wm0} : initial equilibrium value of export price and import price of the i-th goods in term of the foreign currency (variable)

σ_i	:	elasticity of substitution coefficient of the i-th goods (parameter)	ψ_i	:	elasticity of transformation coefficient of the i-th goods (parameter)

Whereas, some of the modified equation are as follows:

$$Arm_{i,rr} = \gamma_{i,rr}\left(\delta m_{i,rr} M_{i,rr}^{\eta_i} + \delta d_{i,rr} D_{i,rr}^{\eta_i}\right)^{1/\eta_i} Arm_{i,rr} = \gamma_{i,rr}\left(\delta m_{i,rr} M_{i,rr}^{\eta_i} + \delta d_{i,rr} D_{i,rr}^{\eta_i}\right)^{1/\eta_i}$$

$\forall i, rr$ .....(3)

$$M_{i,rr} = \left(\frac{\gamma_{i,rr}^{\eta_i} \delta m_{i,rr} p_{i,rr}^{q}}{p_{i,rr}^{m}}\right)^{\frac{1}{1-\eta_i}} \quad \forall i, rr \text{ .....(4)}$$

$$Arm_{i,rr} = \left(\frac{\gamma_{i,rr}^{\frac{\sigma_i - 1}{\sigma_i}} \delta m_{i,rr} p_{i,rr}^{q}}{p_{i,rr}^{m}}\right)^{\sigma_i} \quad \forall i, rr \text{ .....(5)}$$

where:

$\mathrm{Arm_{i,rr}}$	:	the i-th Armington composite goods (variable)	η_i	:	parameter defined by the elasticity of substitution
$\gamma_{i,rr}$	:	scaling coefficient in the Armington composite good production function (variable)	$p_{i,rr}^{q}$	:	price of the i-th Armington composite goods (variable)
$\delta m_{i,rr}$ and $\delta d_{i,rr}$	:	input share coefficient in the Armington composite good production function (parameter)	$p_{i,rr}^{m}$	:	price of the i-th imported goods in terms of domestic currency (variable)
$M_{i,rr}$	:	the i-th imported goods (variable)	σ_i	:	elasticity of substitution in the Armington composite good production function (parameter).
$D_{i,rr}$	:	the i-th domestic goods (variable)			

The variables above are endogenous, i.e their values should be equal to benchmark values in baseline position and would change accordance with the change (shock) in either parameter or exogenous variables in the system. Meanwhile, the parameters are exogenous, where detemination of their values are based on SAM data and previous research.

The models belong to the category of neoclassical class with characteristics as follows:

1. following Walras theorem, where equilibrium of quantum and prices is determined by the interaction of producers and consumers in a perfect competition;
2. staged model scheme is applied with following functions:
   - Cobb-Douglas function is applied to optimize the use of labor production factor;
   - Leontief function is used to depict intermediate input and production factor to describe output production;
   - Constant Elasticity of Transformation (CET) function is used in allocating output into domestic product and export;
   - Constant Elasticity of Substitution (CES) function is used to optimize the creation of composite goods originated from domestic and import;
   - market equilibrium is used to allocate composite goods into final demand; and
   - model solution is obtained by maximizing the sum of utilities of households as objective function.
3. using saving driven as the closure; and
4. small country setting is assumed to represent existing condition whereas large country setting is used to depict ideal and expected condition.

The decision to use CGE as an analytical tool is based on the consideration that the model is suitable to solve what-if analysis. In this case, we use the model to analyze what if world CPO price change would bring impact in case Indonesia takes roles as price taker and as price maker. Besides, regarding economic policy making, this model is more suitable for developing countries compared to other economic models such as: simultaneous equation and other econometric models in analyzing macroeconomic shocks (Oktaviani, 2008). It has something to do with the nature of CGE model that does not necessarily require abundant long series of well presented data, which are commonly unavailable in developing countries. CGE model also provides a good framework to analyze

matters related to structural adjustment: impact of a shock that works through a price change and market incentive in influencing allocation and structure of demand, production, and trade (Robinson, 2006).

Despite those advantages, CGE simulations also have limitations that they are not unconditional predictions but rather work as thought experiments relied on the assumed circumstances and time reference. CGE models strongly rely on calibrated benchmark parameters and there are not validity test for the result of simulation. Besides, CGE models are quantitative yet theoretical and not empirical in the sense of econometric modeling (GTAP, 2017).

Simulations are done with an objective to estimate the impact on the economic activities[1], prices, and income distribution due to various level of simulating shocks. Economic activity is indicated by some variables, such as export, factor income, output, composite goods, and household consumption. Prices are indicated by price variables, such as export price, import price, domestic price, composite goods price, and exchange rate index. Income distribution is indicated by income received by each household groups and Williamson index with which its calculation is based on households' income and population data from SAM and simulation result.

In general, the simulation scenario consists of two categories, where each category comprises six simulations. At first category, simulations are done by changing world CPO price as much as 10, 25, and 50 percent as external shocks, where other world prices and other parameters are unchanged and Indonesia is considered as a small country. On the other category, every other thing the same with first category but Indonesia is put as a large country.

The variability of shocks is based on the reality that the world CPO price sometimes could go up and down dramatically as ever happened in January 2007-February 2008 and June 2008-November 2008 or move moderately as in other periods.

The impact is stated as percentage (except stated differently) and the calculation is based on

[1] An activity is a process, i.e. the combination of actions that result in a certain set of products (OECD, 2013).

comparison between simulation results and base line values.

RESULT AND DISCUSSION

Based on the simulation result, under the large country assumption, any increase in the world CPO price will drag up real CPO export. The increase in world CPO price could be the representation of increase in external demand. From the view point of producers or exporters, this is a good incentive to boost export. The rise of world CPO price of 10, 25, and 50 percent would likely increase CPO real export as much as 40.74, 128.84, and 269.89 percent consecutively. In this context, the result resembles research conducted by Iskandar (2015), which stated that increase of international CPO price would increase the volume of CPO export of Indonesia.

However, the increase of CPO real export would not equivalent with total of real export. The impact of the world CPO price rise of 25 percent would be smaller than the one of 10 percent. Even at the increase of 50 percent of world CPO price, total of real export would be smaller than the base line (Table 2). This result confirms the research results conducted by Bergmann et al. (2016), which stated that world commodity price shock would further spillover to other price commodities.

The increase of world CPO price would endorse an increase of CPO real export and some other commodities as well as reduction of production factor cost. Increase of export would therefore increase foreign exchange reserve. Additionally, the reduction of production factor cost would hold up the foreign exchange outflow for compensating foreign production factors. As the result, Indonesian Rupiah gains its strength. The rise of world CPO price of 10, 25, and 50 percent would - in the long term - strengthen IDR as much as much as 3.30, 10.70, and 24.60 percent (Table 3). Rupiah strength as a domestic currency is in line with Bodart et al. (2012) and Al-mulali and Sab (2012) research, which they found out that increases in oil price have caused appreciation of real exchange rate in 12 oil exporting countries.

Table 2. The Impacts of World CPO Price Changes on Economic Activities in Small and Large Country (Percent)

Description	Decrease of World CPO Price			Increase of World CPO Price		
	50	25	10	10	25	50
Impact on small country						
▪ CPO export	-78.51	-53.39	-27.27	40.74	128.84	269.89
▪ Total export	-0.65	-0.31	-0.12	0.10	0.09	-1.05
▪ Factor income	0.10	0.07	0.04	-0.06	-0.19	-0.44
▪ Output	-0.35	-0.25	-0.13	0.20	0.62	1.27
▪ Composite goods	-0.45	-0.32	-0.17	0.25	0.81	1.77
▪ Composite goods price	0.99	0.75	0.39	-0.57	-1.77	-3.87
▪ Household consumption	-0.65	-0.50	-0.25	0.34	1.01	2.31
Impact on large country						
▪ CPO export	-48.86	-25.09	-10.20	10.40	26.33	53.55
▪ Total export	-0.24	-0.09	-0.03	0.03	0.06	0.09
▪ Factor income	0.06	0.03	0.01	-0.01	-0.04	-0.07
▪ Output	-0.23	-0.12	-0.05	0.05	0.13	0.26
▪ Composite goods	-0.30	-0.16	-0.06	0.07	0.16	0.33
▪ Composite goods price	0.64	0.33	0.14	-0.15	-0.34	-0.72
▪ Household consumption	-0.41	-0.21	-0.08	0.08	0.21	0.41

Source: simulation results (2016)

However, an extra strong currency would create negative impact in the form of weaker competitiveness at international market, which therefore would diminish real export.

The strengthening of currency brings effect on the decrease of goods and services composite price. This would in turn bolster household purchasing power on domestic and imported products, which is resulted in an increase of household consumption. The increasing household demand would be responded by production sectors by increasing output. On the other hand, the increase of output is also supported by the decrease of production factor cost. Although the decrease of production factor cost would reduce household income originated from production factor compensation. However, this negative impact would be smaller than the positive impact caused by the decrease of composite price, which therefore the purchasing power of household would remain safe.

Table 3. The Impacts of World CPO Price Changes on Prices in Small Country and Large Country (Percent)

Description	Decrease of World CPO Price			Increase of World CPO Price		
	50	25	10	10	25	50
Impact on small country						
▪ Exchange rate	5.60	4.10	2.10	-3.30	-10.70	-24.60
▪ CPO export price	-47.20	-21.90	-8.10	6.40	11.60	13.10
▪ Export price	4.90	3.35	1.64	-2.46	-7.57	-15.95
▪ Import price	4.80	3.87	2.03	-3.24	-10.57	-24.36
▪ Domestic price	0.70	0.54	0.28	-0.38	-1.18	-3.80
▪ Composite goods price	0.99	0.75	0.39	-0.57	-1.77	-3.87
Impact on large country						
▪ Exchange rate	3.70	2.00	0.80	-0.80	-2.10	-4.30
▪ CPO export price	-18.90	-7.30	-2.50	2.10	4.70	7.80
▪ Export price	2.99	1.57	0.62	-0.60	-1.57	-3.16
▪ Import price	3.36	1.88	0.76	-0.78	-2.02	-4.17
▪ Domestic price	0.45	0.23	0.11	-0.11	-0.24	-0.49
▪ Composite goods price	0.64	0.33	0.14	-0.15	-0.34	-0.72

Source: simulation results (2016)

The decrease of composite price would be caused by the decrease of two constructing factors, which are domestic output and import (in IDR), where the price of imported goods would fall deeper compared to domestic output price. The decrease of import is caused by the strengthening of IDR compared to most of foreign currencies.

As one of the results, the decrease of import price would bring incentive to an increase in import volume. The increase of domestic output coupled by rising import would increase the availability of composite goods, which in turn would increase household consumption, which would give hint on a better welfare. In general, a 10, 25, and 50 percent of world CPO price would increase household consumption as much as 0.34, 1.01, and 2.31 percent consecutively. This result confirms the research of Rahardja et al. (2010) that stated the benefit for Indonesia if the global commodity prices are high due to the position of Indonesia as a net commodity producer and exporter.

The result is also in line with research conducted by Quero-Virla (2016) in Colombia. He studied the

effects of oil price changes on the Colombian economy (as an oil exporting country) during 2001:Q1 to 2016:Q2 using a structural vector auto-regression model. The result showed that increase in the oil price generates a contemporaneous increase in GDP growth, decrease in unemployment, and decrease in inflation.

Table 4. The Impacts of World CPO Price Changes on Household Income Distribution in Small Country and Large Country

Description	Decrease of World CPO Price			Increase of World CPO Price		
	50	25	10	10	25	50
Impact on small country						
▪ Household income (Percent)						
1. Category 1	-0.56	-0.45	-0.23	0.35	1.11	2.60
2. Category 2	-0.57	-0.45	-0.24	0.35	1.11	2.57
3. Category 3	-0.50	-0.41	-0.21	0.32	0.99	2.32
4. Category 4	-0.46	-0.38	-0.20	0.29	0.93	2.18
5. Category 5	-0.55	-0.45	-0.23	0.35	1.12	2.66
6. Category 6	-0.59	-0.47	-0.25	0.37	1.16	2.68
7. Category 7	-0.61	-0.49	-0.25	0.38	1.21	2.84
8. Category 8	-0.68	-0.54	-0.28	0.42	1.33	3.10
▪ Diff. of Williamson index (Point)	-0.0006	-0.0004	-0.0002	0.0003	0.0011	0.0026
Impact on large country						
▪ Household income (Percent)						
1. Category 1	-0.37	-0.19	-0.08	0.09	0.20	0.43
2. Category 2	-0.37	-0.19	-0.08	0.09	0.20	0.43
3. Category 3	-0.33	-0.17	-0.07	0.08	0.18	0.38
4. Category 4	-0.31	-0.15	-0.07	0.08	0.16	0.36
5. Category 5	-0.37	-0.19	-0.08	0.09	0.20	0.43
6. Category 6	-0.39	-0.20	-0.09	0.09	0.21	0.45
7. Category 7	-0.40	-0.21	-0.09	0.10	0.22	0.47
8. Category 8	-0.45	-0.23	-0.10	0.11	0.24	0.52
▪ Diff. of Williamson index (Point)	-0.0004	-0.0002	-0.0001	0.0001	0.0002	0.0004

Notes:
1. Agricultural labor
2. Agricultural employer
3. Non-agricultural rural low category
4. Rural non labor
5. Non-agricultural rural high category
6. Non-agricultural urban low category
7. Urban non labor
8. Non-agricultural urban high category

The increase of world CPO price also has an effect on the household income distribution. By considering the industrial sectors, a rising world CPO price would affect more on non-agriculture household than non-

agriculture household. Although palm oil as raw material to produce CPO is produced by agriculture sector, the increase of world CPO price would not necessarily enjoyed more by agriculture household. The increase of world CPO price of 10, 25, and 50 percent would increase agriculture household as much as 0.35, 1.11, and 2.58 percent, whereas non agriculture household would seem to be more benefitted by having an increase of 0.37, 1.16, and 2.72 percent consecutively (Table 4).

By distinguishing household into rural and urban classification, the impact of rising world CPO price would benefit more on urban household, while according to income classification, the increase of world CPO price would mostly benefit high income household. This has something to do with the ownership of production factors (especially capital and high skilled labor), which is mostly belong to high income household who live at urban area.

Previous research conducted by Harjanti (2012) indicated similar result. She examined the consequences of international palm oil price fluctuation on domestic palm oil price and assessed price impact on welfare in Indonesia using econometrics model. One of her finding was increase of international price will be followed by increase of domestic price which would lead to welfare inequality between the poor and the rich.

Another research conducted by Bhattacharyya and Williamson (2016) also indicated the similar result. The research studied the distributional impact of commodity price shocks in Australia using GARCH model and found that commodity price shocks increase the income share of the high income groups in the short run.

This simulation result indicates bigger gaps between industrial sectors, area (urban and rural) and income group of household for any change of world CPO price. Williamson index shows that for an increase of world CPO price of 10, 25, and 50 percent would worsen income inequality as much as 0.0003, 0.0011, and 0.0026 point. Regardless its small numbers, still it requires proper attention and anticipation to avoid the negative impact.

According to simulation result, the rising world CPO price is estimated to bring generally similar impact with posing Indonesia either as a small country or as a large country. The

difference lies in the magnitude of the impact. As an example, the impact on export for Indonesia as a price influencer, the rising world CPO price would increase real export appropriately. It could happen because the currency strengthening of a large country would not be as big as the small country, therefore the export price at international market would be kept competitive.

The simulation result on the decrease of world CPO price shows an opposing impact compared to the impact of increasing world CPO price. In general, the decreasing world CPO price would bring adverse effect on the Indonesian economy. Income equality among household would become the only good result (Table 4). However, the improved income equality does not deserve applause since the reason behind it is mostly by the income contraction of all groups of households. The income of agricultural households drops deeper than the income of non-agricultural households. The income of urban households declines deeper than the income of rural households. The higher level households have more severe income contraction than lower level households.

This result is in line with research done by Kitous et al. (2016) which almost similar with report released by International Monetary Fund. The Fund analyzed the declining commodity price toward counties' economy. The report stated that the recent drop in commodity prices has been accompanied by pronounced declines in real GDP growth rates, much more so in commodity-exporting countries than in other emerging market and developing economies (IMF, 2015).

The decreasing world CPO price would bring more stable impact if Indonesia is posing as a large country. The role as large country would be ideal to be taken at the time of decreasing trend of all commodities to mitigate the adverse impact. By taking the role as a large country, Indonesia would have capacities to influence world price significantly. So then the world CPO price could be set to expected price. With this privilege to influence the price, the world CPO price would be more predictable, with which the impact of world CPO price toward the domestic economy could be more manageable.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Based on the above description, world CPO price changing would affect economic activity, price level and income distribution in Indonesia. Magnitude of the impact depends on the role taken in price forming and the price shock scale. In the forming where Indonesia takes the role as a price taker, the rising world CPO price is estimated not only to increase economic activity, to strengthen the currency, to lower prices, but also to enlarge income gap. The bigger shock given to the model, the impact would also get bigger.

If posing as a price influencer, the rising world CPO price would bring similar direction of the effect but with smaller scale. One of the differences happens on the value of real export, where bigger shock on world CPO price would bring an increase on real export. On the other hand, by posing as a price taker, the bigger price shock would weaken real export or even cut it down. It is caused by high currency strengthening at price taker position.

The decrease of world CPO price is estimated to have opposing impacts compared to its increase, where the impact as a price influencer is smaller than the impact as a price taker.

Based on this finding, Indonesia would be able to get more benefit at the world CPO market by optimizing its role on the price forming, by being able to play the role either as a price taker or price influencer on the right time. In which Indonesia should take role as a price taker when world CPO price is increasing and as a price influencer when world CPO price is decreasing.

At the bullish commodity market, being a price taker would bring benefit in terms of economic activity, currency strength, domestic price and household income. The policy in deciding to take the role as a price taker should be accompanied by supporting policies intended to mitigate the widening income gap as the consequence of being a price taker.

Besides, it would be also important to wisely manage the extra income from increased world CPO price. Therefore Indonesia would be able to manage currencies, especially at the hard times.

On the other way around, if the world CPO price tends to decline, being price influencer would bring a lot of benefits due to ability to manage the price. In such position, Indonesia

would be able to minimize following adverse effects that would probably occur, such as economic activity declining, currency weakening, prices increase and contraction of household income. Therefore this choice of price forming should be accompanied by policies with "pro-growth" characteristics, where part of budget could originate from financial profit received when world CPO price is high.

This conclusion should also be supported by detail information and proper strategies before it is brought into implementation. Therefore further related researches are strongly encouraged.

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