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# Price and Trade Mechanism for Palm and Soybean Oils: A Comparative Analysis of Economic Development between Asia and Contemporary World

[1]Abul Quasem Al-Amin, [2]Gazi Mahabubul Alam, [3]Yap Su Fei, [4]Mohammad Nurul Azam and [5]Yousif Osman Karim

[1]International Business School, Universiti Teknologi Malaysia, Jalan Semarak, Kuala Lumpur, 54100, Malaysia

[2]Academic Performance Enhancement Unit, University Malaya, Kuala Lumpur, 59990, Malaysia

[3]Faculty of Economics and Administration, University of Malaya, Kuala Lumpur, 50603, Malaysia

[4]Department of Quantitative Analysis, College of Business Administration, King Saud University, Riyadh, 11451, Saudi Arabia

[5]Faculty of Economics and Management, Alzaiem Alazhari University, Khartoum North, 1432, Sudan

*Corresponding Author: Gazi Mahabubul Alam, Academic Performance Enhancement Unit, University Malaya, Kuala Lumpur, 59990, Malaysia Tel: +603 2246 3451*

## ABSTRACT

This study investigates the price mechanism of demand function to structure the liberalized tariff system on vegetable oil market and documents the impact on quantity, revenue and welfare gains of the world economy in a monopolistic setting. We shed light on close trading partners between palm and soybean oil markets among the exporting and importing countries and explore the effects by utilizing spatial equilibrium modeling approach to see the major beneficiaries in the price mechanism game. Our assessment provides quantitative measures of the economic effects which helps to weigh the benefits and impacts by comparing liberalized tariff and non-reform system. Findings from this study indicate that price and trade mechanism improve the welfare gains and highlight the importance of moving toward an effective price mechanism and liberated tariff system in the global vegetable oil market. The findings of this analysis resolve the debate on the benefits of a liberated tariff system on vegetable oil markets neglecting beneficiaries' trade barriers dispute.

**Key words:** Agriculture, price mechanism, tariff policy, trade pattern, economic impact, welfare issue

## INTRODUCTION

The debate on the benefits and effects of trade liberalization on agriculture continues until this day, but in reality there is an emerging consensus amongst signatory countries on the benefits of a liberated tariff system. The debate on the advantages and disadvantages of trade liberalization in the agricultural sector in both the developing and the developed world not only continues but has also gained momentum in 70s (Meilke *et al*., 2001). In addition, the domestic policy reform still remains a disputable feature of world agriculture and food market subject, because national policy makers consider that the effects of agricultural liberated tariff system may begin to trickle down

and start to affect the farmers unless effective pricing mechanism. Hence, many governments realize that they may have to go through a painful adjustment process (Tengku and Ariffin, 2005). Therefore, the governments in developed countries and more so in developing countries are grappling with acceptable plans to restructure the sub-sectors which is still affected by liberalized tariff systems. Here, one of the most important distinctions between domestic and trade policies is the effect on prices. We realize that importers try to place the world commodity prices at depressed levels and producers in low-cost exporting nations intensify their efforts to open markets by grappling an effective plan. This raises the question of whether there are ways to continue making progress in reducing trade barriers by pricing mechanism without having to negotiate a complete package of reforms (Furtan *et al*., 1979; Paarlberg and Thompson, 1980; Griffith and Meilke, 1983; Meilke and Griffith, 1983; Houck, 1986; Josling *et al*., 1996; Meilke and Jay, 1997; Meilke *et al*., 2001). However, we still do not know exactly when the game of the mechanism will be settle down and will be over.

When a trade policy is implemented nationally, such as a tariff or a liberated tariff system, a price wedge is driven between the domestic price and the foreign price of the good. Here, the import price elasticity plays a crucial actor for implementing and monitoring of trade-related policies (Stone, 1979; Marquez, 1990, 1994; Ceglowski, 1997). Developing countries, in particular, estimates of secular elasticities following on the practical importance for examining the effects of trade on employment, debt rescheduling and trade gains. This is the decisive part of any national trade policy for analyzing the pricing mechanism and welfare implications on cross-sectional structure of trade protection and reforms (Hoekman *et al*., 2002; World Bank, 2002). Till today many techniques have been utilized in the relative price to find the link of effective volume of imports and exports and exploited to the level of activity over the last two-three decades or so, but the success of the standard trade models does not, however, rule out the existence of a lot of disagreements. To some extents, such arguments have focused more on the size and centered the importance of specific parameters and variables rather than underlying empirical applicability. However, the value of parameters (i.e., elasticities) is questionable among researchers, based on the degree and relative magnitudes on a country specific justification (Marquez, 1994). Here, we need to understand that the import demand and export supply functions traditionally include a relative price and real income to account for the unusual periods, when devaluation or policy changes take place; but what about other economic matters? Therefore, country specific price mechanism and relative magnitudes need to quantify.

To capture the degree and relative magnitudes for a country specific justification, some researchers analyzed quantitative techniques to model liberalization impacts on agriculture. For example, Guajardo and Elizondo (2003) employed a Spatial Equilibrium Model (SEM) to study the North American tomato market in a world market perspective. Stennes and Wilson (2005) also used a SEM to examine the world forestry market. Gomez-Plana and Devadoss (2004) analyzed the implications of trade liberalization on the world wheat market (Devadoss and Aguiar, 2006). However, those researches did not fully utilize the rationality of dispute on the price mechanism and welfare issues by the monopolistic competitive markets. In this study, we value the welfare issues, disbarments over trade policy and its rationality based on the price mechanism by the monopolistic competitive markets. Here, we understand that price mechanism on export supply and import demand is useful in understanding the structure of trade policy. However, the relative price estimation used by earlier researchers for the import demand and export supply, in the vegetable oil trade in particular, remains a debatable issue which should be resolved. The extent of welfare

issue and the impacts of vegetable oil trade over monopolistic competitive markets has not been yet a comprehensively researched subject; as such, the full economic gains and social implications are still not well obvious.

We, therefore, examine the extents of losses and benefit to be gained by the world economy and assess the impacts of tariff reduction by considering the monopolistic competitive markets. We consider palm oil and soybean to utilize revenue impacts and welfare issues on the regional and international economy. The contribution of this study is very straight forward because here utilizing SEM approach and monopolistic condition; regional economies can distinguish their economic benefit by a liberated tariff system on vegetable oil market complex[1]. This study sheds light on the close trading relationship between palm and soybean oil among the exporting and importing countries and investigates to see the major beneficiaries in the price mechanism game. The study assessment provides quantitative measures of the economic effects which will help to weigh the benefits and impacts. The key question is sufficiently addressed in the vegetable oil markets with an effective price mechanism and considering disputable issues. The SEM we utilize as simple as possible for understanding the technique and assessing the applicability of issues[2].

## BACKGROUND OF VEGETABLE OIL MARKETS

Vegetable oils are the most heavily traded agricultural commodities in the world. Major vegetable oils produced in the world are soybean oil, palm oil, rapeseed oil and coconut oil. The trade patterns in the vegetable oil industry are primarily dominated by the global import and export of palm and soybean oil. Countries such as Malaysia, Indonesia and Nigeria have been playing major roles in palm oil markets. Prior to 1964, Nigeria was the largest producer of palm oil with a share of 44.3%, Indonesia was second with a share of 13.0% and Malaysia was third with the share of 12.5% (FAS., 2007). In the early sixties, particularly in the period of prolonged depression in the price of rubber, the government of Malaysia diversified palm oil as the promising crop. As a starting point, Malaysia introduced incentive schemes for oil palm plantations and within six years, Malaysia overtook Indonesia and Nigeria in terms of palm oil production and in 1970, the country became the largest producer of this particular vegetable oil (palm oil).

Following the government initiatives Malaysia accounted for 55% of the world's palm oil production in 1980. On the contrary, the production of the same oil in Nigeria declined steadily and for the last 10 years, it has been a net importer of palm oil. In the year 2006 Indonesia was the largest producer with more than 45% of the world's production while Malaysian production was about 41%. The production of palm oil in 2006 in Malaysia was 37.02 million tones, one of the highest among the world's vegetable oil and fat production, followed by soybean oil at 36.25 million tones. The four major largest producers of soybean are the United States, Argentina, China and Brazil with 25.6, 17.7, 17.5 and 16.2% of the total production of soybean oil, respectively. Argentina exports 56% of the world's total export of soybean oil. In the international trade, soybean generally accounts for at least 22% of the total vegetable oil export (FAS., 2007). However, who are the beneficiaries in actual price and trade mechanism Issue? Therefore we have taken an initiative to observe the game based on a further essence from palm and soybean oil market. The following section will help to quantify the rational matter by modeling techniques.

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[1]Besides analyzing the vegetable oil market, our approach can be used on other agricultural non-competitive markets

[2]To demonstrate the impacts of free trade on vegetable oil markets, two scenarios have been performed: The first scenario incorporates 50% of the import tariffs' reduction by the importers and the second scenario is a free trade scenario where major beneficiaries have been identified. In these two scenarios, we virtually analyzed the price mechanism, revenue and finally, welfare effects in the regional and international economy. However, the scenarios can be modified and can be extended with more options in other situation based the researcher or policy makers' needs

## MATERIALS AND METHODS

Towards the achievement of the stated objective, the employed methodology of this study is based on Spatial Equilibrium Model (SEM) following the study of Devadoss and Aguiar (2006)[3]. The behavioral relations of producers and consumers are modeled while simultaneously taking transaction costs and regional government policies. To fulfill our purpose we utilized import demand and export supply functions for palm oil and soybean oil in the SEM. Two approaches are considered to estimate the import demand and export supply function as follows:

$$QI^{i}_{p,s} = f(IP^{i}_{p,s}, I^{i}, X^{i}) \tag{1}$$

$$QX^{j}_{p,s} = f(XP^{j}_{p,s}, T^{j}, X^{j}) \tag{2}$$

where, $QI^{i}_{p,s}$ is the quantity import demanded of palm oil and soybean oil, $QX^{j}_{p,s}$ is the quantity export supplied of palm oil and soybean oil, $IP^{i}_{p,s}$ is the import demand price of palm oil and soybean oil, $XP^{j}_{p,s}$ is the export supply price of palm oil and soybean oil, $I^{i}$ is the personal income, $T^{j}$ is the technology, $X^{i}$ is the exchange rate of importing countries and $X^{j}$ is the exchange rate of exporting countries, I is importing countries, j is exporting countries. Covering export supply and import demand functions, non-price variables are collapsed into the intercepts and quasi-welfare function used in our analysis:

$$\max W_{PI_{p,s}PX_{p,s}Q_{p,s}} \sum_{i}\sum_{p,s}(\beta^{i}_{p,s} IP^{i}_{p,s} - \sum_{p,s}\alpha^{i}_{p,s} IP^{i}_{p,s}) - \sum_{j}\sum_{p,s}(\delta^{j}_{p,s}XP^{j}_{p,s} + \sum_{p,s}\lambda^{j}_{p,s}XP^{j}_{p,s}) \tag{3}$$

where, $\beta$, $\alpha$, $\delta$ and $\lambda$ parameters in SEM. The Eq. 3 subject to:

$$IP^{i}_{p,s} - XP^{j}_{p,s} \leq TC^{ji}_{p,s} \tag{4}$$

Our model states that the price of the export demand region (j) plus the transportation cost from j to i $(TC^{ji}_{p,s})$ is less than or equal to the import demand price in the importing region (i):

$$QX^{j}_{p,s} = \beta^{i}_{p,s} + \alpha^{i}_{p,s}IP^{i}_{p,s} \tag{5}$$

In our model we made a ceiling on the SEM in Eq. 5 which clearly indicates that the export quantity of palm oil/soybean oil $(QX^{j}_{p,s})$ equal to the import quantity of palm oil $QI^{i}_{p}$ or soybean oil $QI^{i}_{s}$. Whereas, Eq. 6 shows that the imported quantity of palm oil or soybean oil $(QI^{i}_{p,s})$ equals to the exported quantity of palm oil $QX^{j}_{p}$ or soybean oil $QX^{j}_{s}$ and that the non-negativity constraints are defined as:

$$QI^{i}_{p,s} = \delta^{j}_{p,s} + \alpha^{j}_{p,s}XP^{j}_{p,s} \tag{6}$$

$$IP_{p,s}, XP_{p,s}, QI_{p,s}, QX_{p,s} \geq 0 \tag{7}$$

[3]As Devadoss and Aguiar (2006) discussed the method in details in their analyses, therefore, we just noted some important equations such as import demand and export supply functions with a ceiling on the SEM in equations. As our target is an application to investigate trade pattern of vegetable oil market following on the price mechanism on monopolistic competitive markets rather than modelling exercise, therefore, we recommend to the interested readers to go through Devadoss and Aguiar's study for full modelling aspects

Table 1: Regions and countries included in the model

| Regions | Exports | Imports | Port of entry |
|---|---|---|---|
| Malaysia | Palm oil | - | Penang |
| Indonesia | Palm oil | - | Jakarta |
| Region 1[4] | Palm oil | - | Bangkok (Thailand) |
| Argentina | Soybean oil | - | La plata |
| Brazil | Soybean oil | - | Paranagua, Natal |
| US | Soybean oil | - | New orleans |
| Region 2[5] | Soybean oil | - | Rotterdam (Netherland) |
| China | - | Palm and soybean oil | Dalian |
| India | - | Palm and soybean oil | Mumbai |
| EU 25 | - | Palm and soybean oil | Rotterdam |
| Pakistan | - | Palm and soybean oil | Anzali |
| Bangladesh | - | Palm and soybean oil | Dhaka |
| Japan | - | Palm oil | Kobe |
| Region 3[6] | - | Palm and soybean oil | Port said (Egypt) |
| Region 4[7] | - | Palm and soybean oil | Rotterdam (Netherland) |

Source: Authors

Table 2: Ad-Valorem tariff rates for importing countries/regions, 2007

| Regions | Palm oil (%) | Soybean oil (%) |
|---|---|---|
| China | 30 | 160 |
| India | 45 | 30 |
| EU25 | 14 | 4 |
| Pakistan | 55 | 30 |
| Bangladesh | 35 | 35 |
| Japan | 7 | - |
| Region 3 | 25 | - |
| Region 4 | - | 17 |

Sources: USDA (2008) and World Bank (2007)

To reduce the complexity of the model the world economy has been grouped into fifteen sections and regions in our study. Countries with low trade participation in both palm oil and soybean oil have been aggregated. Major countries which are included in the model are Malaysia, Indonesia, Argentina, Brazil and USA (Table 1). We applied transportation cost between two ports; which is computed by multiplying the distance between ports and per unit cost using the Free-on-Board (FOB) and Cost-Insurance-Freight (CIF).

**Data sources:** The basic data sources of our SEM analysis, USDA (2008) and World Bank (2007). For simplicity, we use the Free-on-Board (FOB) and Cost-Insurance-Freight (CIF) values for estimating the transportation cost between distant markets and the necessary data of World Bank (2007) are taken from the year 1975 to 2007. The information of imposing of trade barriers on palm and soybean oil imports are also outlined in Table 2. The import demand statistics and export supply data were obtained from the special report on palm and soybean oil production and trade

[4]Region 1 are: Papua New Guinean, Colombia, Thailand, Ecuador, Kenya, Ghana and Cote d'Ioire

[5]Region 2 are: EU25, Paraguay, Iran, UAE, Canada and China

[6]Region 3 are: Russian Federation, Egypt, Turkey, Nigeria, UAE, Myanmar, Saudi Arabia and Vietnam

[7]Region 4, EU25, Iran, Morocco, Republic of Korea, Peru, South Africa, Ecuador, Venezuela, Mexico and Canada

from FAS. The import tariff data are directly taken from World Bank (2007) and USDA (2008). To fulfill of our study objectives; the estimated export supply and import demand equations have been simplified by adding the coefficients and mean values of explanatory variables to the intercept and inverted to express at price form.

## RESULTS

The SEM model was first used to signal out the global trade liberalization in the palm and soybean oil markets and the virtual impacts on price, quantity and revenue in every single region following on the monopolistic competition. This study first investigates the outcome of palm oil related variables to capture the degree and relative magnitude on a country specific percentage change in simulated values which is presented in Table 3. The consequences of the changes in tariff on the export price were found to affect the export supply of palm oil and export quantity in Malaysia, Indonesia and Region-1. A reduction in the import tariff by 50% (i.e., as a demonstration) for all countries increases the quantity exports by 8, 9 and 5% for Malaysia, Indonesia and Region-1, respectively. Based on the modeling results in the first scenario, the price increase restore the equilibrium price that is 6% for the Malaysian palm oil, 8% for the Indonesian palm oil and 4% for Region-1 palm oil while the average increase in the prices of palm oil is 6%. As for the importing countries for palm oil, with a reduction in the import tariff by the said percentage, the price decreases by 8% China, 10% for India, 5% for Pakistan, 7% for Bangladesh, 4% for Region-3 and by 3% for EU-25 during the study period. In addition, the quantity of import rises by 4% for China, 5% for India, 2% for EU-25, 3% for Pakistan, 5% for Bangladesh and 3% for Region-3. Here, the revenue gains are 7, 8 and 1%, respectively for Malaysia, Indonesia and Region-1. Under this scenario, Indonesia experiences a superior position in terms of revenue in palm oil markets and taking the full advantage of monopolistic competitive return.

The results gathered in Table 4 from the simulation on prices and quantities of soybean oil export and import and their virtual impacts all over the world. In addition, the findings also indicate how monopolistic mechanism works in the vegetable oil market. The simulation results indicate that the prices of soybean oil for the exporter countries increase when all countries reduce a tariff by fifty percent. Brazil experiences an increase in the soybean oil prices by 4% and quantity of exports by 7% while Argentina experiences an increase in the soybean oil prices by 4% and quantity of exports by 5%. For the US and Region-2, the prices were found to increase by about 3%

Table 3: Import tariff reduction by 50% for all country for palm oil: predicted (%) values

| Region | Prices | Quantity | Revenue |
|---|---|---|---|
| **Exporting region** | | | |
| Malaysia | 5.982 | 8.115 | 7.337 |
| Indonesia | 8.075 | 9.056 | 7.782 |
| Region 1 | 4.164 | 5.126 | 5.694 |
| **Importing region** | | | |
| China | -8.327 | 4.131 | 3.735 |
| India | -9.881 | 4.955 | 4.988 |
| EU 25 | -3.424 | 1.613 | 2.325 |
| Pakistan | -4.787 | 3.268 | 4.954 |
| Bangladesh | -6.969 | 4.537 | 5.473 |
| Japan | -1.433 | 1.255 | 2.206 |
| Region 3 | -4.265 | 2.539 | 3.458 |

Source: Authors' estimation

Table 4: Import tariff reduction by 50% for all countries for soybean oil: predicted (%) values

| Region | Prices | Quantity | Revenue |
|---|---|---|---|
| **Exporting region** | | | |
| Argentina | 3.671 | 5.272 | 4.757 |
| Brazil | 4.134 | 6.823 | 4.083 |
| US | 2.935 | 4.509 | 3.418 |
| Region 2 | 3.054 | 3.142 | 3.105 |
| **Importing region** | | | |
| China | -5.245 | 4.317 | 3.753 |
| India | -6.171 | 4.758 | 4.539 |
| Pakistan | -6.505 | 3.598 | 4.183 |
| Bangladesh | -8.363 | 3.758 | 3.571 |
| Region 4 | -5.629 | 3.315 | 2.973 |

Source: Authors' estimation

Table 5: Free trade scenarios for palm oil: Predicted % values

| Region | Prices | Quantity | Revenue |
|---|---|---|---|
| **Exporting region** | | | |
| Malaysia | 4.471 | 5.473 | 8.959 |
| Indonesia | 9.670 | 3.309 | 4.924 |
| Region 1 | 2.087 | 4.025 | 5.038 |
| **Importing region** | | | |
| China | -4.014 | 5.936 | 4.221 |
| India | -9.225 | 5.153 | 3.375 |
| EU 25 | -8.602 | 1.735 | 3.567 |
| Pakistan | -5.007 | 3.486 | 1.638 |
| Bangladesh | -13.011 | 4.049 | 2.545 |
| Japan | -1.792 | 0.325 | 0.794 |
| Region 3 | -1.782 | 5.157 | 3.552 |

Source: Authors' estimation

and the quantity of exports by 5 and 3%, respectively. Our results indicate by monopolistic mechanism that soybean oil has a significant increase in the total import quantity (4%) or decrease in the price (6%). In addition, the soybean oil exports of China and India were found to increase by 4 and 5% while the price found to decrease by 5 and 6%, respectively. Under the liberated tariff system (i.e., import tariff reduction by fifty percent), the quantities of imports by Pakistan, Bangladesh and Region-4 were also found to increase by 4, 4 and 3% and the prices of soybean oil were found to decrease by 7, 8 and 6%, respectively. Therefore, our first scenario indicates that for the soybean market Argentina experiences a superior position as a revenue collector by the monopolistic competition.

Whereas, the full reduction in the import tariff decreases the price of palm oil by 4% for China, 9% for India, 8% for EU-15, 5% for Pakistan, 13% for Bangladesh, 2% for Region-3 and Japan as an importing country (Table 5). In addition, the quantity of imports rises by 6% for China, 5% for India, 2% for EU-25 and 4% for Pakistan, 4% for Bangladesh, 0.3% for Japan and 5% for Region-3. Furthermore, a reduction of import tariff for the importing countries causes the revenue to increase by 4% for China, 3% for India, 4% for EU-25, 2% for Pakistan, 3% for Bangladesh, 1% for Japan and 4% for Region-3. Under this scenario, Malaysia experiences a better position in terms of

Table 6: Free trade scenarios for soybean oil: predicted % values

| Region | Prices | Quantity | Revenue |
|---|---|---|---|
| **Exporting region** | | | |
| Argentina | 5.420 | 3.63 | 3.25 |
| Brazil | 2.287 | 5.65 | 2.50 |
| US | 3.304 | 4.805 | 3.23 |
| Region 2 | 3.410 | 3.091 | 2.81 |
| **Importing region** | | | |
| China | -5.912 | 6.28 | 3.67 |
| India | -7.106 | 4.15 | 2.65 |
| Pakistan | -3.110 | 3.046 | 4.89 |
| Bangladesh | -2.848 | 3.236 | 5.37 |
| Region 4 | -4.938 | 5.689 | 3.40 |

Source: Authors' estimation

revenue for palm oil markets and getting the monopolistic effects. Our results indicate that Argentina experiences an increase in the soybean oil price by 5% and quantity of exports by 4% while Brazil experiences an increase in the soybean oil price by 2% and quantity of exports by 6% following the free trade scenario. For the US and Region-2, the prices were found to increase by 3% and the quantity by 5 and 3%, respectively (Table 6). Here, Bangladesh has the better position as an importing country for soybean oil markets. The results indicate that soybean oil has a significant increase in the total import quantity by about 5% and decrease in the price is about by 6%. In addition, the soybean oil exports of China and India were found to increase by 6 and 4% while the prices decrease by 6 and 7%. After the reduction of the import tariff, imports by Pakistan, Bangladesh and Region-4 were found to increase by 3, 3 and 6% and the prices of soybean oil were found to decrease by 3, 3 and 5%, respectively.

## DISCUSSION

Trade and domestic policy reforms of the world agriculture have done a lot since 1970s but the impact on monopolist cases are rather scarce. In this study, we have taken that initiatives; namely monopolist competitive markets where the major share of vegetable oil markets belong to Malaysia, Indonesia, United States, Argentina, China and Brazil. The core mechanism here is price dynamics and ceiling on the SEM which are export quantity of palm oil/soybean oil ($QX^{j}_{p,s}$) and the import quantity of palm oil $QI^{i}_{p}$ or soybean oil $QI^{i}_{s}$. This study provides a quantitative measure of the economic impacts which help to weigh the benefits and impacts. As we utilize the total gains of world economy in the monopolist competitive position; therefore, terms-of-trade effects or intra-country income distributions are affected directly like price dynamics in the efficiency gains from oil liberated tariff system. Our findings indicate that once prices in all importing countries decline, the quantities of palm and soybean oil import increase and export prices and quantities increase for all exporting regions. Here, terms-of-trade effect is important to understand whether the liberated tariff system is effective or not based on the country specific overall revenue so called balance of payment condition. However, in this study analysis, quasi-welfare in all scenarios is above the baseline, thus proving the overall efficiency of palm and soybean oil liberated tariff system under monopolist competitive system. This implies the importance of moving toward free trade in the global palm and soybean oil markets.

Table 7: Estimated consumers and producer surpluses gain from the reduction of import tariff on the palm oil market

| Region | Quasi welfare* | Region | Quasi welfare |
|---|---|---|---|
| Malaysia | 36,972.81 | China | 16,913.26 |
| Indonesia | 21,497.52 | India | 11,453.29 |
| Region 1 | 10,306.43 | EU25 | 2,895.77 |
| Total exporting | 68,776.76 | Pakistan | 9,689.35 |
| | | Bangladesh | 8,121.68 |
| | | Japan | 2,157.83 |
| | | Region 3 | 10,556.32 |
| | | Total importing | 61,787.50 |
| Total | | | 155,691.14 |

*Values are estimated utilizing Eq. 3, Source: Authors' estimation

Table 8: Estimated consumer and producer surplus gains from the reduction of import tariff on the soybean oil market

| Region | Quasi welfare | Region | Quasi welfare |
|---|---|---|---|
| Argentina | 22,677.32 | China | 11,285.19 |
| Brazil | 16,117.56 | India | 9,125.57 |
| U.S. | 14,646.72 | Pakistan | 13,958.73 |
| Region 2 | 15,389.04 | Bangladesh | 8,757.84 |
| Total export | 68,830.64 | Region4 | 14,157.36 |
| | | Total Import | 57,284.69 |
| Total | | | 147,847.08 |

Source: Authors' estimation

This study presents the change in quasi welfare (together with producer surplus, consumer surplus) of each region in addition to perceive the effect of liberated tariff system (Table 7 and 8). According to the findings, liberated tariff systems enhance the world's quasi welfare for palm oil gains by $ 155,691.14 million (U.S. dollars). However, the quasi welfare reflects the participants' share and the findings are more appealing in the regional level. As such Malaysia, Indonesia and Region-1 led the palm oil exports by US$ 36,972 million, US$ 21,497 million and US$ 10,306 million, respectively and the figures reflect the welfare gains from trade policy. On the other hand, findings indicate that China, India, Pakistan, Bangladesh, Japan and Region-3 led the palm oil imports by US$ 16,913.26 million, US$ 11,453 million, US$ 9,689 million, US$ 8,121 million, US$ 2,158 million and US$10,556 million, respectively. Under the full liberated tariff systems (reduction of import tariff), the exporters of the traditional soybean oil obtain high welfare gains. At this point, Argentina led all the exporters with a gain of US$ 22,677 million. In addition, Brazil, Region-2 and United States followed with the gains of about US$ 16,117 million, US$ 15,389 million and US$ 14,646 million respectively. According to the study findings, the estimated quasi welfare for the imported regions is US$ 79,016 million and combined world gained US$ 147,847 million.

We have observed that Republic of Korea, South Africa and Peru are very distant markets in region-4 and on the other hand, Paraguay, UAE, Canada and Chine are also remote markets in the trade analysis[8]. Therefore, we reasonably use Free-on-Board (FOB) and Cost-Insurance-Freight (CIF) values in the SEM price mechanism. Similarly, as we analyze monopolist competitive markets rather than perfect competitive markets; therefore, we principally more focus on tariff revenue rather than other alternatives on welfare issues such as deadweight-loss, intra-country income

[8]In this study we applied transportation cost between two ports; which is computed by multiplying the distance between ports and per unit cost using the free-on-board (FOB) and cost-insurance-freight (CIF) values

distributions, stock changes on inventories or terms-of-trade effects. It is noticeable that impacts on welfare issues are more affected by monopolist competitive markets rather than competitive markets. Moreover, tariffs or export subsidies affect additionally on the internal price for a given commodity, relative to the external price.

And finally, unlike the zero-for zero approach and border trade agreements which is suggested by Meilke *et al.* (2001), our analysis successfully compares the gains and benefits of oil liberated tariff system examined for regional and the world economy. In this study we raise the question of free trade on alternative ways to continue making progress in reducing trade barriers without having to negotiate a complex package of reforms. As a demonstration, we explored a 50% reduction and full trade liberalization on the debate of benefits on the package of reforms and provide an insight on welfare issues and disbarments over trade policy on oil markets.

## CONCLUSION

In this study, we investigate the welfare and disbarment over trade policy following oil market trading complex issues. We also seek to investigate the price mechanism without having complex package of reforms on export supply and import demand to construct trade policy and impacts on price, quantity and revenue with welfare gains. We demonstrate the extent of benefits and losses to be gained by the world economy and assess of impact to utilize spatial equilibrium modeling comprising the major importing and exporting countries (regions) with the monopolistic competitive markets. The quantitative analysis focuses and sheds light on the close trading relationship in palm and soybean oil among the exporting and importing countries to investigate the major beneficiaries of liberated tariff system rather than having to negotiate a complex trade reforms. Until today, there are lots of disagreements on the package of reforms and lots of disputes in the conflict of interests. Therefore, this study has overlooked those issues on the complex trade agreements and debatable packages of reforms and shown how a useful liberated tariff system can progress as an alternative of reforms by related countries.

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