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The Impact of the Trans Pacific Partnership Agreement on Maritime Transport of Maize, Palm Oil, Soybeans and Wheat

By

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Acknowledgements

To start, the completion of this master thesis marks an important milestone in my life. The decision to start the journey of acquiring this master title was tough. Moreover, the road to get it was even tougher but also knows many achievements and memorable moments that I got to share with my fellow students. This thesis reflects my interests through the topic and knowledge through the methodology applied and analysis of the results.

To continue, I would like to thank my family and friends for their support and believe in my strength. As time got very tight this year, I appreciate their understanding of my situation that did not allow me to see them often. Consequently, I learned to cherish the moments that I got to see them even more.

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Thank you!

Abstract

The Trans-Pacific Partnership, the biggest trade-deal in generations, has been signed by its 12 member states and is considered to lay down the modern principles of free trade. A critical discussion point, the reduction of tariffs on agricultural products, proved solvable through country specific reduction schemes. However, are therefore likely to affect the economic welfare and current trade flow volumes.

This research paper investigates the effect of the new trade agreement between the TPP member states, on the largest agricultural trade flows of maize, palm oil, soybean & wheat (MPS&W). In contrast to some other studies, the focus of this research paper is on the change in total economic value and maritime transport volumes per route, rather than the change in trade value per member state.

Through the use of a partial equilibrium model, the impact of the TPP on the global economic welfare has been assessed. The findings project a positive economic impact for the combined TPP countries of $ 922.5 million. On the contrary, the non-TPP regions have been projected to experience a negative economic impact of $ -664 million. Moreover, TPP producers in USA and Canada will profit from increased exports that cause lower prices to favor consumers within the TPP countries while TPP governments in Japan are negatively impacted by the loss of tariff revenues. Consequently, non-TPP consumers suffer from the increased trade between the TPP members through increased prices, whereas non-TPP producers and governments experience a rather neutral effect.

Additionally, a vessel capacity scheme is designed to transform the output of the first methodology into a transportation change per trade route for the first year of the TPP enactment. First, the two largest findings projected for maize: Japan expects a net extra import of 17.4 post-panamax vessels, and for Mexico additional import of 3.1 handymax vessels from USA. Second, the two largest findings projected for palm oil: Japan expects a increased import of 1 MR2 vessel originating from Malaysia, and for the USA a net increase of 0.2 MR2 vessels. Third, the two largest findings projected for soybean: Mexico expects an increased import of 2.3 handymax vessels originating from the USA, and Ro-Central East Asia decreased import of 1.2 post-panamax vessels from USA. Last, the two largest findings projected for wheat: the USA expects an increased import of 23.1 post-panamax vessels originating from Canada, and Mexico an increased import of 3.9 handymax vessels originating from the USA. Overall, more MPS&W trade is stimulated by the TPP agreement, whereas the economic impact shows significant differences between the TPP and non-TPP countries and regions. The framework of methodology used for this research paper can be used to continue the assessments of any tariff changes on economic welfare and trade flows volumes.

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List of Abbreviations

ASEAN	Association of South East Asian Nations
CGE	Computable General Equilibrium
DWT	Deadweight Tonnage
EEA	European Economic Area
GDP	Gross Domestic Product
GSIM	Global Simulation Model
GTAP	Global Trade Analysis Project
ISL	Institute of Shipping Economics and Logistics
LR 1/2	Long range
MPS&W	Maize, Palm oil, Soybean and Wheat
MR 1/2	Medium range
MV	Modern crop varieties
NAFTA	North American Free Trade Agreement
NTM	Non-Tariff Measure
PE	Partial Equilibrium
TPP	Trans-Pacific Partnership
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
WITS	World Integrated Trade Solutions

1. INTRODUCTION

Today's economies of scale have evolved from the trade principle of comparative advantage, where those whom are most efficient supply the global markets. Although this is the basic principle of international trade, the historical government intervention through political import restrictions and export subsidies have led to the imperfect markets we have today. According to Paul R. Krugman, new trade theorists believe that the principle of comparative advantage is an incomplete model and that free trade is nevertheless the right policy. "So free trade is not passé – but it is not what it once was." (Krugman, 1987)

On November 14, 2009, President Obama committed the United States of America (USA) to engage with the Trans-Pacific Partnership (TPP) countries, into the biggest trade deal in a generation that would gradually face out the former government intervention policies. Negotiations started "with the goal of shaping a regional agreement that will have broad-based membership and the high standards worthy of a 21st century trade agreement" (Fergusson & Vaughn, The Trans-Pacific Parthership Agreement, 2010). In reality TPP is negotiated to be a regional trade pact, but it would be the biggest agreement towards a new generation of free trade with the intention to expand economic growth, regional Gross Domestic Product (GDP) and employment.

Although the agreement should bring long-term positive effects, the negotiations came across several challenging topics where different governments expect short-term issues by removing trade protections. The most difficult protection issues consisted of the scope of tariffs and agricultural quota removal, but also market access of sensitive products, particularly agricultural goods (Fergusson, McMinimy, & Williams, The Trans-Pacific Partnership (TPP) Negotiations and Issues for Congress, 2015).

To illustrate the importance of agricultural products, 50% of the world plant-derived food energy originates from wheat, rice and maize during the first quarter of the 21st century. Most of those product flows are connected through the Pacific Ocean that also connects the TPP economies (Nayar, 2014). Respectfully, the TPP agricultural market represents ≈32% exports and ≈29% imports of the global trade in agriculture products (Schott, Kotschwar, & Muir, 2013). Therefore, due to its importance, the agricultural sector is not considered subject to any protection exemptions after the TPP negotiations.

Finally, on the 4th of February 2016, after seven years of negotiations, its twelve participating countries have signed the TPP without any major exemptions. Accordingly, these new developments result in scheme to gradually decrease current tariffs and non-tariff measures (NTM) that were historically agreed upon to protect the individual domestic economies. According to a study by Petri, Plummer and Zhai, the TPP will benefit global income with an estimate of $295 billion per year (Petri, Plummer, & Zhai, 2012). Of course this represents the global net effect of the TPP, it is very likely that for some countries the short-term effect of the TPP can be negative since they are not privileged with a natural comparative advantage that is closely related to todays economies of scale.

Correspondingly to the global trade and economic impact that is estimated to be significant, a large change in trade flow is likewise expected due to the highly opposed facing out of the agricultural protection measures. The agricultural issues that surfaced during the negotiations indicate that the comparative advantage will be centralized in some countries. Additionally, as the money value impact of the agricultural products might not be significant the change in volume traded can be. This study is not focused solely on the money value impact of TPP but also on the unique opportunities that might arise in the maritime transportation of the global MPS&W trade flows. Provided that the respective unit values are not high compared to the traded volumes.

1.1 Problem identification

When talking about the unique opportunities that might arise in the maritime transportation when TPP enters into force, we refer to the potential changes in trade volume as a result of the gradual reduction scheme of the protection tariffs. Moreover, the protection tariffs are active to favor domestic industry production over foreign competitor products. The reduction scheme will therefore allow more foreign competition that will lead to changing import and export figures for the TPP and non-TPP countries.

Since, the majority of these traded products are transported overseas by container, bulk or tanker vessel these industries will therefore be indirectly subject to the changes arising from the TPP. A study showed that the trade flows in maritime container transportation are estimated to increase between the participating TPP nations according to Drewry analyst Knowler, who researched the impact of TPP on the container market in 2015 before the treaty was officially signed (Knowler, 2015). Such research has not been conducted for the agricultural products transported by bulk or tanker vessel. Important to mention again, the agricultural products formed a critical discussion point during the negotiations. Hence, this indicates that the gradual reduction of protection tariffs is going to cause changes in the trade flow volumes of agricultural products.

As a result, the changing trade flow volumes will affect the supply and demand of its related source of maritime transportation. Therefore, TPP is expected to severely impact the relevant maritime transportation rates due to their specific market characteristics that consist of a delayed effect on economical changes due to contractual durations and geographical limitations. To further explain, contractual duration forms a barrier because vessels are more often than not contracted for a period of several months up to some years. Therefore, they cannot easily be deployed to different routes or customers. The geographical limitation forms a barrier because the vessels ability to carry the cargo might be withhold by the fact that the vessel and its cargo are several sailing days apart.

Provided that the maritime transportation of agricultural products is subject to those limitations, this study aims to research the estimated impact of TPP on the global trade flow volumes of MPS&W. Additionally these estimations will be used to project the expected changes of vessel demand on those routes. Finally, the projections of the estimated vessel demand per route can function as an advisory tool to prevent the problem of shortages or overcapacity of maritime transportation sources on these trade routes.

1.2 The Research Question

With reference to the above-identified problem, this study is guided by the following main research question that it aims to answer:

> “*What is the trade and economic impact of the Trans-Pacific Partnership (TPP) on the maritime trade and transport volumes of Maize, Palm Oil, Soybeans and Wheat globally and between the TPP countries in particular?”*

To clarify, this research question is built up out of two steps. First, it is necessary to research the economic impact as a result of the TPP, to provide us with the estimated changes in producer and consumer surplus and price changes. Additionally, the changes in trade flow values projected for each TPP country and non-TPP region are relevant. The results of the first step will form the input values of the second step of the main research question. That second step takes into consideration how the estimated price changes will affect the maritime trade values that are transformed into transportation volumes changes for MPS&W. Additionally, elements such as port infrastructure and real vessels dimensions will function as building blocks for the construction of the second model that allows us to analyse the change of vessels per route.
Additionally, as the tariff reductions are gradually changing through a predefined scheme, this study will consider the need of scenarios to simulate the changes. If required, step one and two will be applied for each scenario.

In order to sufficiently answer the main research question to following sub-research questions need to be answered:

1. *What are the current trade flows, transport volumes, trade locations and tariffs for Maize, Palm Oil, Soybean and Wheat globally and between the TPP countries?* ***(Chapter 2)***

2. *How to quantify the NTM’s for Maize, Palm Oil, Soybeans and Wheat?* ***(2.3)***

3. *What are the textual details agreed upon for Maize, Palm Oil, Soybeans and Wheat?* ***(3.1 and 3.2)***

4. How does the partial equilibrium model assess the impact of tariff changes? ***(4.1)***

The four sub-research questions together answer the two steps of the main research question. The first question is a focus on the macroeconomic trade indicators that form the input of the partial equilibrium model (PE) and the infrastructure details of the TPP ports involved in the trade routes. The second question is focused on the method to quantify the NTM that need to be taken into account for the PE model. The third question analysis the treaty text to build the scenarios in order to simulate the tariff reduction scheme. The fourth question focuses on the understanding of the PE model and how the input values are used. Together, these questions allow the first step of the main research question to be answered, and the second model to be built. Together with the result of the first step the second step will be calculated with the second model, resulting in the answering of the main research question.

1.3 Methodology & Structure of the paper

The methods used to answer the sub-research questions are a combination of quantitative and qualitative methods. The first quantitative model uses the results of the first qualitative analysis as input factor. The second is built on the results of the second qualitative analysis. Therefore the combination of the research methods will enable the answering of the sub-research questions. The use of the models will follow in a logical order throughout the document.

To begin with, chapter 2 will describe the qualitative analysis conducted for both quantitative models. The first part provides an introduction to the current trading volumes for MPS&W. The parameters resulting from this analysis will form the first input factors for the quantitative PE model (the GSIM model). The second part of chapter 2 will analyze the infrastructure of maritime transportation. Information on the vessel size and port depths for the limitations for the second quantitative model. The third part of chapter 2 describes the current tariffs and NTM's between the different countries. This data will form the second set of parameters that will finalize the input for the PE model.

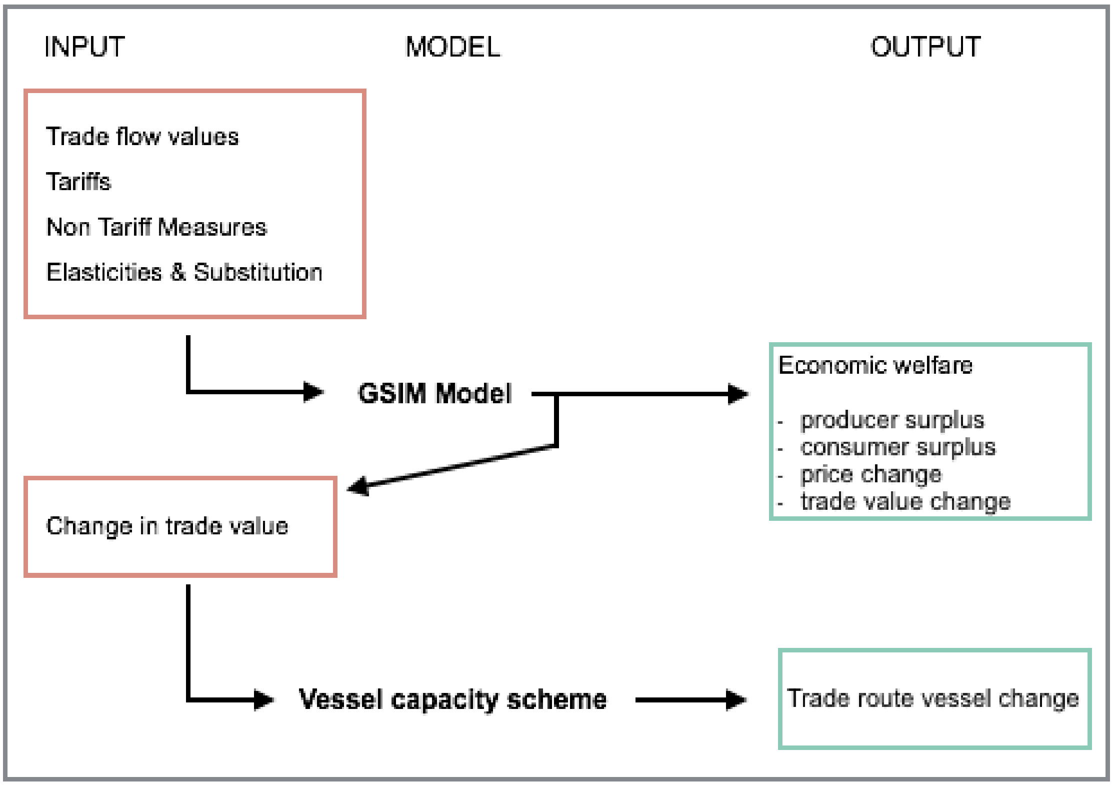
Next, chapter 3 will start by providing a qualitative analysis of the fundamental changes that will take place when the TPP enters into force. Based on the first analysis, the second part of the chapter will provide a theoretical explanation of the textual changes of the TPP agreement.

Than, chapter 4 will start with an explanation of the PE model used, in this study the Global Simulation model (GSIM) is used. The first part of the chapter is followed by a detailed elasticity description followed by a breakdown of the scenarios build for the GSIM model, which relates to the qualitative analysis described in chapter 3. The second part of this chapter will provide a detailed description of the second model that will transform the GSIM results into maritime transportation trade flows for the different scenarios and products.

Then, chapter 5 and 6 will project the changes of economic welfare and maritime transportation volumes, following the order of the scenarios that simulate the reduction scheme. A more detailed analysis of the changes will be provided, followed by a sensitivity analysis on the stability of the results. Additionally, some recommendations will be given based on the analysis of the results in chapter 6. These recommendations will focus on the deployment of vessels on the different routes as well as the potential investment opportunities for port infrastructures based on potential volume throughput changes.

Finally, chapter 7 will first describe the key findings of the research and the implications of TPP on the trade and maritime transport volumes. The second part will describe the limitations of the research that consist of a qualitative description to end with a discussion on areas for potential further research. Graph 1 shows the scheme that is used for this research, inputs used in the models will result in the output that is used to analyze and answer the research question.

Graph 1: Research scheme



Source: Author

2. CURRENT TPP MARKET AND PORT INFRASTRUCTURE

This chapter describes the fundamental elements that are required to carry out the analysis on the impact of the TPP. First, section 2.1 introduces per commodity type the global production and consumption patterns. Additionally, this section will describe the major trade flows as well as the most common modes of transportation for the different products. Second, once the global market per commodity type is clear, section 2.2 identifies for each TPP country its most important ports and analyses its maritime facilities and limitations of the infrastructure. Finally, section 2.3 turns to the political side and describes the current framework of tariffs and NTM's for each of the four commodities. Together section 2.1 and 2.3 identify the key input information that is required for the PE model. Section 2.2 is important for the second model that will be built to analyse the changes that occur due to the TPP. Identifying the limitations of the infrastructure allow potential bottlenecks to be found and later advised upon.

2.1 Current trade and maritime transport flows

Most of today's agricultural crops are part of the modern crop varieties (MV's) that have been developed between the 1960's and 1980's. These MV's triggered the so-called "Green Revolution" that took place between 1961 and 2000, because it increased the long-term trend of the growth rate and the regional productivity. A study on the impact of the green revolution states that it contributed to a 35% to 66% lower equilibrium price in 2000 for all crops combined (Evenson & Gollin, 2003). As a result of these on average lower crop prices, many countries introduced tariffs and NTM's to protect their agricultural markets against cheap imports. Consequently, to analyse the impact of the TPP the current global market place must be identified, with special focus to the TPP countries.

2.1.1 Maize

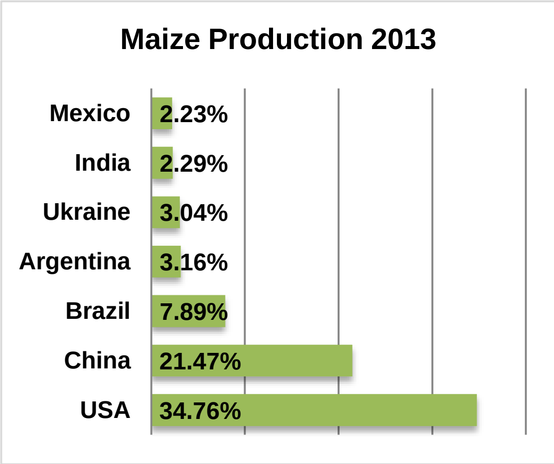
Production & Consumption

Maize, also known as corn, finds its roots in Central Mexico where its potential as major food crop was discovered. During several centuries, colonization and trade missions spread the maize cultivation to a global scale that triggered the evolution of diversified crops. Through its exceptional geographic adaptability, the maize crop developed into two main categories: yellow and white maize. Yellow maize, accounts for 65% for the total production and is used for animal feed that is mostly grown in the northern hemisphere countries. White maize, accounts for 15% of the total production and is considered a food crop that is only produced in US, Mexico and Southern Africa. The remaining 20% for the total production is destined for a variety of industrial uses.

Graph 2 shows the global top 7 maize production countries according to production year 2013. This figure proves that the majority of the maize production takes place in the northern hemisphere.

Graph 2: Global top-7 maize production 2013

After several centuries the US has become the number one maize producer in the world, being responsible for more than 1/3 of the global maize production. The importance of maize in the US is reflected in their culture through the celebration of Thanksgiving, where the Pilgrims and Native Americans gave thanks for the "corn harvest" (Abbassian, 2007).



Source: Author via FAO STAT (FAOSTAT, 2013)

The production area of the maize plays an important element affecting the global maize prices. Prices are affected due to the influence of weather conditions on the production cycle. Since the northern hemisphere produces the majority of maize it also forms the largest influencer of the price. Weather can influence the price both positive, when its timing favours growing conditions that boost production, or negative, when the production suffers from heavy floods or intense drought. The latter happens to occur more often.

Table 1 shows the crop cycles for both hemispheres and to what extent the weather conditions can influence the prices. Due to the cycle difference for the northern and southern hemisphere we can conclude that every 6 months of a year the prices can be critically influenced by the weather. During the other half the weather has a major effect on prices. During the years when the El Nino/La Nina phenomenon occurs, positive and negative influences are even more severe. The pacific region usually suffers most from the extreme rain or drought that occur during the phenomenon.

Table 1: Maize cycle and weather influence factor

Month	Northern Hemisphere		Southern Hemisphere	
	Crop stage	Weather influence	Crop stage	Weather influence
January			Silking	Critical
February			Filling	Critical
March			Maturing	Critical
April	Planting	Major	Harvesting	Major
May	Planting	Major	Harvesting	Major
June	Dormant	Major		
July	Silking	Critical		
August	Maturing	Critical		
September	Harvesting	Critical	Planting	Major
October	Harvesting	Major	Planting	Major
November	Harvesting	Major	Planting	Major
December			Dormant	Major

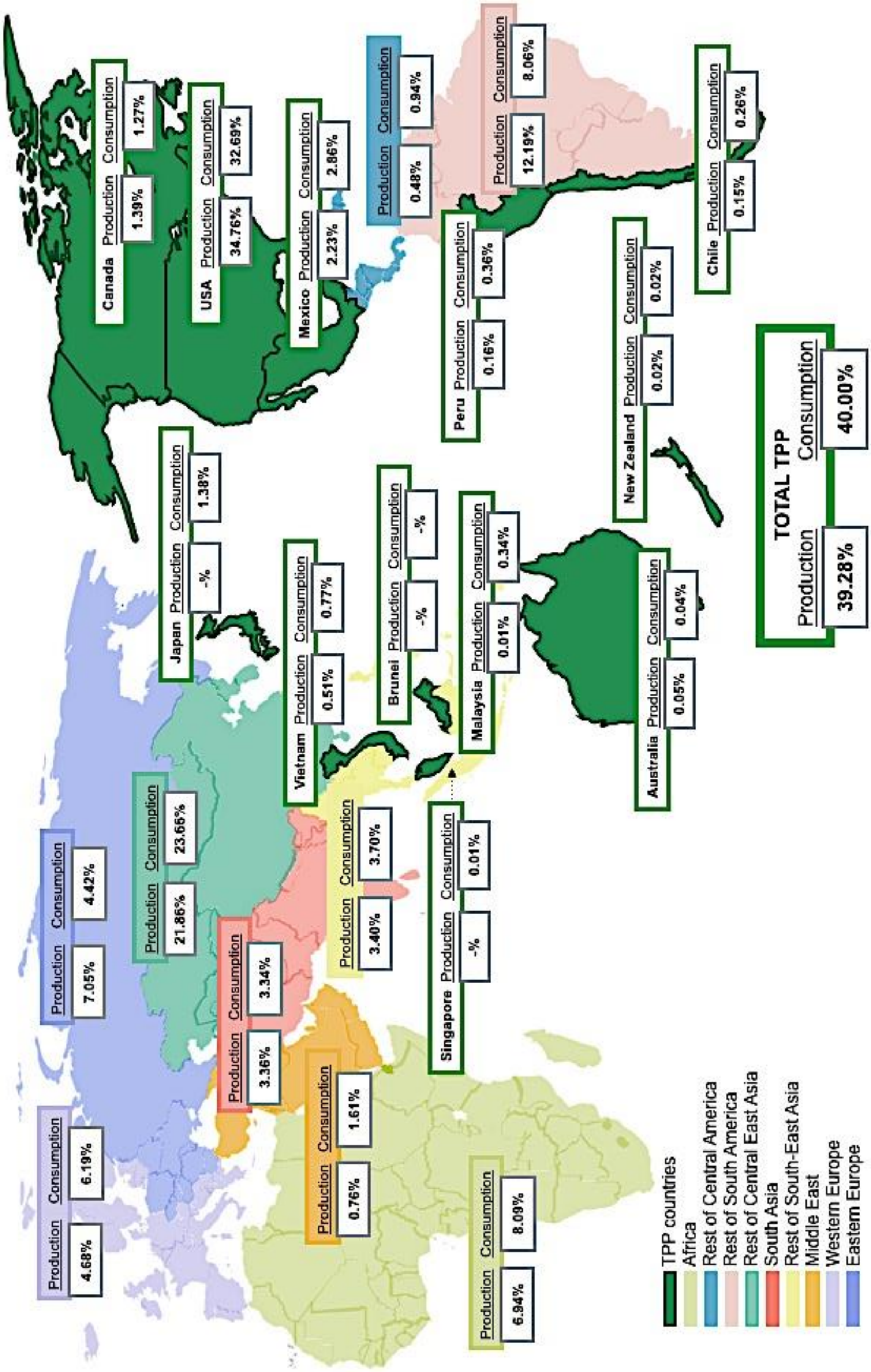
Source: Author via (Abbassian, 2007)

On the next page, Figure 1 shows the global maize production and consumption percentages. The regions that are used in the figure will be used throughout the whole document, as the global data forms the input for the PE model. The following other regions have been distinguished:

- Africa
- Rest of Central America
- Rest of South America
- Rest of Central East Asia
- South Asia
- Rest of South-East Asia
- Middle East
- Western Europe
- Eastern Europe

The TPP countries are marked with a dark green colour and are responsible for 39.28% of the global maize production. The total consumption of the TPP countries is with 40.00% slightly higher. USA is dominating both the production and consumption market of maize. Most of the USA maize consumption is used to feed livestock that in turn function as a major human food source.

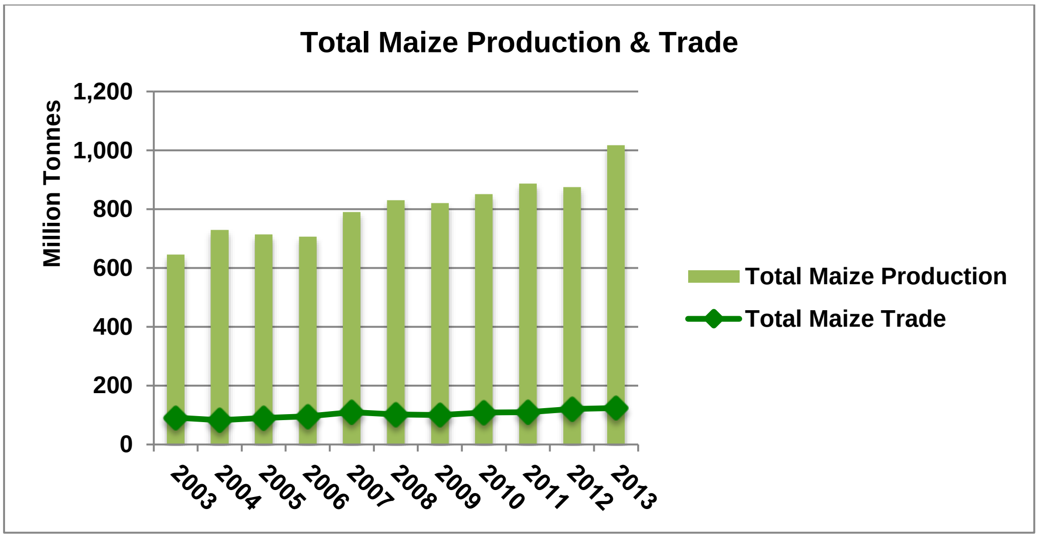
Figure 1: Global Maize production & consumption
Source: Author via FAO STAT maize production (FAOSTAT, 2013)



Trade

The international production and trade volumes of maize in 2013 are pictured in Graph 3. International maize trade accounts for only 12.14% of the global production volumes. This percentage is fairy stable throughout the period of 2003 until 2013, as it ranges between 11% and 14%. As a result, it shows that a lot of maize is consumed for feed and food purposes in the countries of production. Therefore it is likely that most of the maize will indirectly be exported in the form of processed food or frozen meat (feed). Based on the historical data in graph 3, a growth pattern is clearly visible for both production and the international trade volumes. Consequently, we can conclude that maize production and trade markets are still in a growth phase even though the growth is small compared to the green revolution of the 1960s to the 1980s.

Graph 3: Total Maize Production & Trade 2003-2013



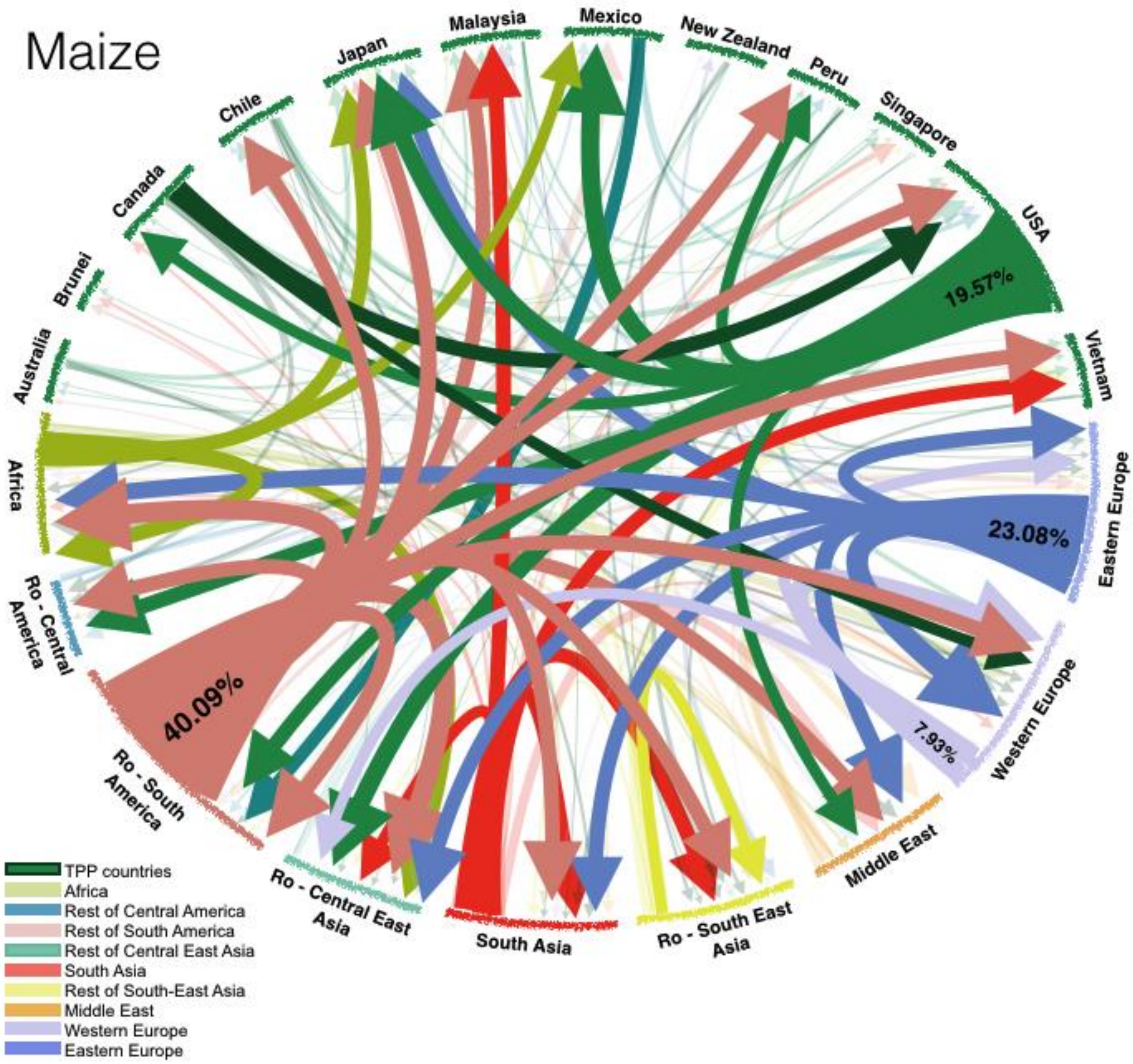
Source: Author via FAO STAT (FAOSTAT, 2013)

The global maize export flows in figure 2, on the next page, are shown through a circular diagram where the patterns of maize export and import for 2013 can be derived. Flows of 250.000 Tonnes are made visible, the smaller flows are faded but present on the background. The export quantity of maize shows a highly concentrated pattern, where 82% of the global export originates from: South America, East Europe and USA. The import quantity of maize shows a lower concentration pattern, where 58% of the import is destined West Europe, Central & East Asia, Africa and Japan. Although the export countries appear to be stable, the order has changed over the past decade. Until 2005 the USA was on average responsible for 61% of the global exports (Abbassian, 2007), whereas in 2013 its share has declined to only 19.57% of the global exports. Accordingly, the increased exports have mainly been realized by:

- Ukraine, who was responsible for 13.54% in 2013.
- Argentina, who was responsible for 16.25% in 2013.
- Brazil, who was responsible for 21.55% in 2013.

Therefore the USA is still the largest producer of maize, but Brazil has overtaken its leading position in the global maize export trade flows.

Figure 2: Global maize export flows 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

2.1.2. Palm Oil

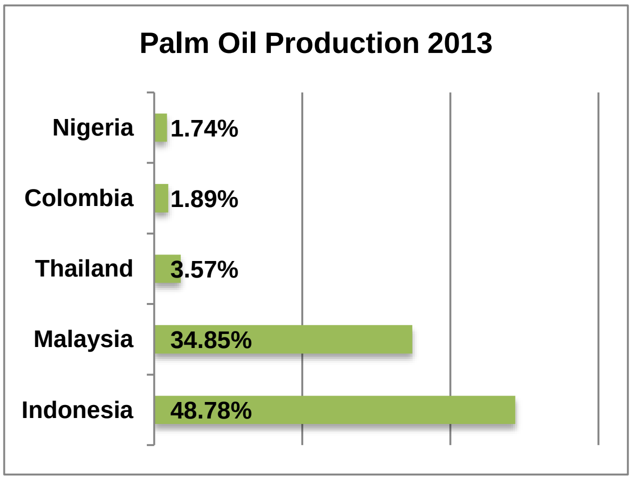
Production & Consumption

Palm oil is extracted from the pulp that surrounds the nut of the fruit from the oil palm. Roughly 80% of the palm oil is used for food products such as: frying oil, margarines, ice cream and whipping cream. The remaining 20%, significant for its high value added, is used for non-food products such as: soap, cosmetics, lubricants and fatty acids (Basiron & Weng, 2004). The nut of the oil palm fruit contains the palm kernel from which palm kernel oil is extracted. The remainder of the latter process is named palm kernel cake that is used for animal feed.

The oil palm originates from three main equatorial areas of: Africa, South-East Asia and Central & South America. There existed some controversy on the first origin of the oil palm. Eventually, the strongest evidence suggests that the real origin lies Africa. Additionally, the global distribution could be traced down that resulted in the early Portuguese explorations and trade missions on the West African coast in 1434. Only 150 years later the Dutch and English joined the undertaking of trade missions from the West African area (Corley & Tinker, 2016).

Even though the oil palm originates from the West African coast, the data production of 2013 in graph 4 shows that the current major global palm oil producers are Indonesia and Malaysia. These countries provide the most favourable climate circumstances that stimulate harvest based on their lower altitude compared to the other equatorial regions around the globe.

Graph 4: Global top-5 palm oil production 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

The oil palm flourishes in areas of forest where humans cut some trees, use the palm and enrich the soil. When humans cut some trees it allows the oil palm to flourish and more animals will help with the spreading of the seeds. Another dependent factor for the growth of the oil palm is the supply of fresh water. The oil palm is dependent on fresh sweet water recourses that fluctuate around 50cm below the surface area, as the trees don't tolerate high water levels or salty water. Therefore the rainfall plays a dependent role in the production cycle of the oil palm.

The harvest cycle of the oil palm is very different from the grains discussed within this paper, as the trees are harvested all year around. Therefore the production of palm oil can also be affected by changing weather conditions all year around. The usual life span of an oil palm is approximately 25 year in which it starts producing only after the first 2.5 to 3 years (Mattsson, Cederberg, & Blix, 1999). Table 2 shows the yield during the different stages of the trees life span.

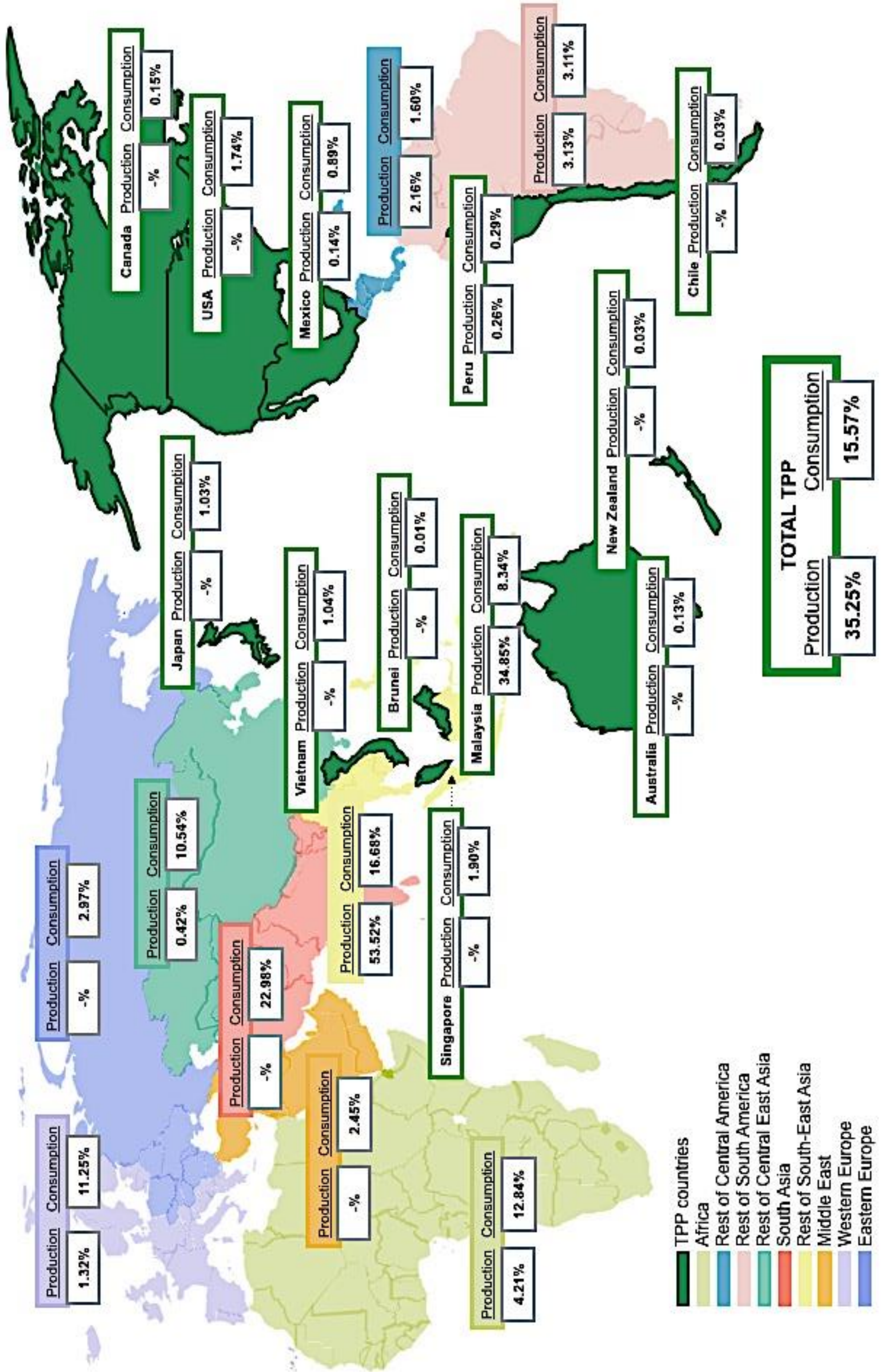
Table 2: Palm Oil harvest cycle

Life span	Yield
0 – 3 year	No production
3 – 7 year	Starting years
7 – 18 year	Peak production
18 – 25 year	Mature state, gradual decrease of production

Source: Author (Mattsson, Cederberg, & Blix, 1999)

On the next page, figure 3 displays the global production and consumption figures of palm oil for the year 2013. The TPP countries are marked with a dark green colour and are responsible for 35.25% of the global palm oil production. The total consumption of the TPP countries is with 15.57% significantly less and rather similar to some of the other regions. The Rest of South-East Asia, which is mainly Indonesia, is with more than 50% dominating the global production. The global consumption pattern is rather equally distributed throughout the African, European and Asian continents. Interesting to notice are the insignificant figures of both production and consumption on the northern and southern American continents.

Figure 3: Global Palm Oil production & consumption
Source: Author via FAO STAT palm oil production (FAOSTAT, 2013)



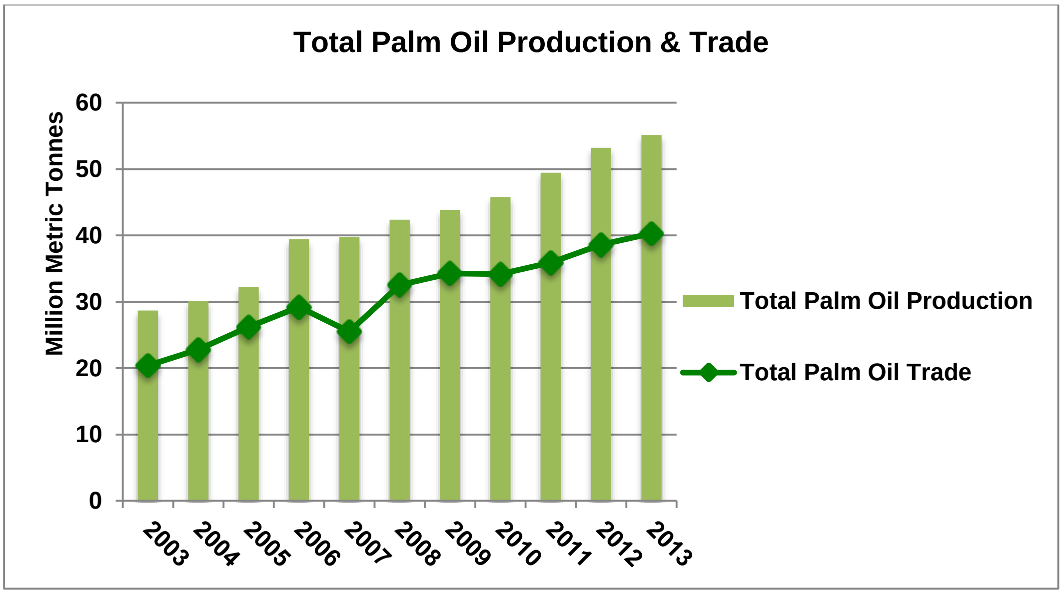
Trade

The International trade of palm oil in 2013 pictured in Graph 5, accounts for roughly 73% of the global production volumes. Even though this is a significant amount, we have seen from Figure 2 that a major quantity of the palm oil is not consumed where it is produced. Therefore it is not a surprising figure. Based on this we can conclude that most factories using palm oil as raw material are located outside the major production countries. Through these manufactured products the palm oil is often indirectly exported again within finished products.

Throughout the year 2003 till 2013 the trade percentage has been rather stable between 81% and 72%, with only a significant dip in 2007 of 64%. The exact cause of the latter remains unknown after research.

Based on the historical data in graph 5, there is a clear growth pattern visible for both production and trade volumes. Consequently, we can conclude that the palm oil production and trade markets are still in a growth phase.

Graph 5: Total Palm Oil Production & Trade 2003 - 2013

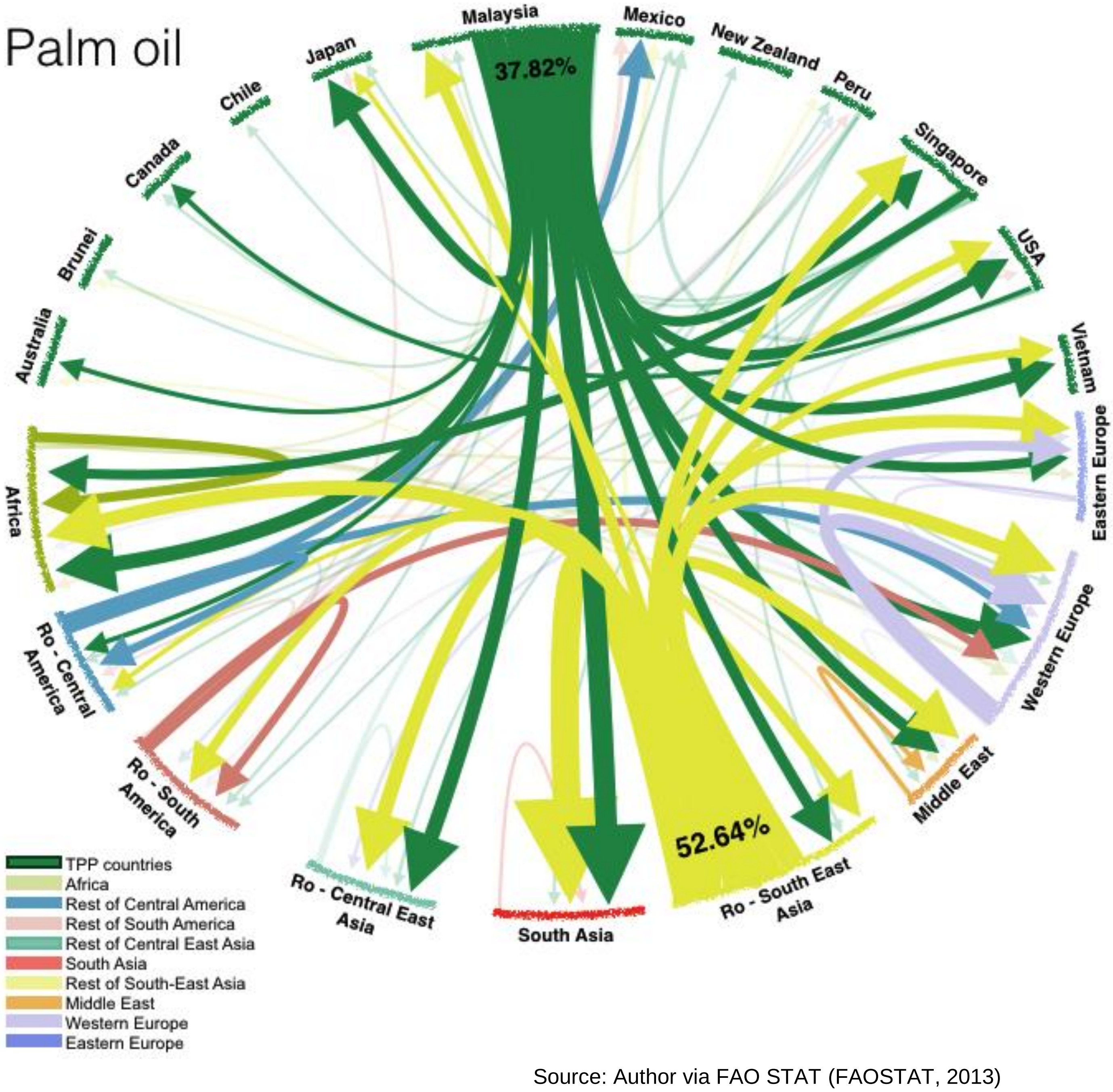


Source: Author via FAO STAT (FAOSTAT, 2013)

The global export flows in figure 4, on the next page, are shown through a circular diagram where the patterns of palm oil exports and imports for 2013 can be derived. The export flows show a highly concentrated pattern where 90% of the global export originates from Indonesia and Malaysia. The import flows show a lower concentration pattern, but as we have seen in the consumption figures it is mostly concentrated in the African, European and other Asian regions. Together these regions account for roughly 76% of the global imports of palm oil in 2013.

The Central & Southern American regions seem to produce and export roughly 50% of the palm oil within their own region. But the lower consumption figures of the total American continent could also indicate the use of substitutes.

Figure 4: Global palm oil export flows 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

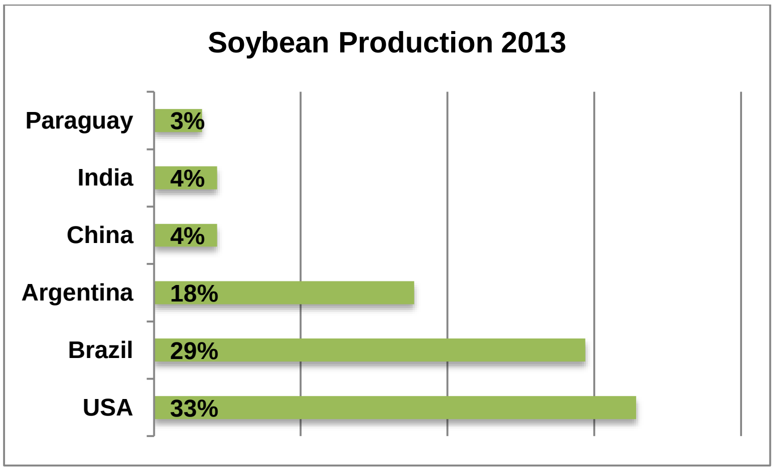
2.1.3. Soybeans

Production & Consumption

The soybean, or soya bean is a crop that finds its roots in East Asia before it appeared in America 1765 and in England 1790. The crop quickly became a major global trade crop that was mainly used as vegetable oil and manufactured foods. Only after 1917 the crop also became a popular input source for animal feed (UNCTAD, Soy Bean an INFOCOMM Commodity Profile, 2016). Soybean is a high value profitable crop that is used as oil and meal products. After Palm oil it is the second most important vegetable oil in the world even though the yield of the oil palm is much higher. Since the soybean grows in very different circumstances than the oil palm it functions as a substitute in those areas easily supplied by soy oil rather than palm oil (Thoenes, 2006).

Soybean production in 2013 was largely dominated by the USA, Brazil and Argentina. Therefore, it seems likely that the American regions use soya oil as a substitute for palm oil. Graph 6 shows that over time the soybean production have shifted away from its East Asian origin, and flourishes in the American regions. According to the UNCTAD, until 1956 Asia produced the majority of the global soybeans. By the 1970s the USA had taken over the position of largest soybean producer closely followed by the South American countries (UNCTAD, Soy Bean an INFOCOMM Commodity Profile, 2016).

Graph 6: Global top-6 soybean production 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

The soybean crop can grow in areas ranging from tropical, sub-tropical to temperature zones. Therefore only excluding the Arctic circles and the northern parts of Canada, Russia and Europe. In the temperature zone the winters are excluded from the growth season, but in the tropic and sub-tropical zones the crop can grow all year around depending on the availability of fresh/irrigation water. Dry weather is only essential during the ripening/maturity stage of the crop (UNCTAD, Soy Bean an INFOCOMM Commodity Profile, 2016). The total duration of the production cycle lasts between 4 and 7 months depending on the weather conditions and the latitude of the region.

Table 3 shows the different stages of the production cycle of the soybean crop. The column requirements/characteristics describes the special needs and impacts that can occur during the production cycle.

Table 3: Soybean growth cycle

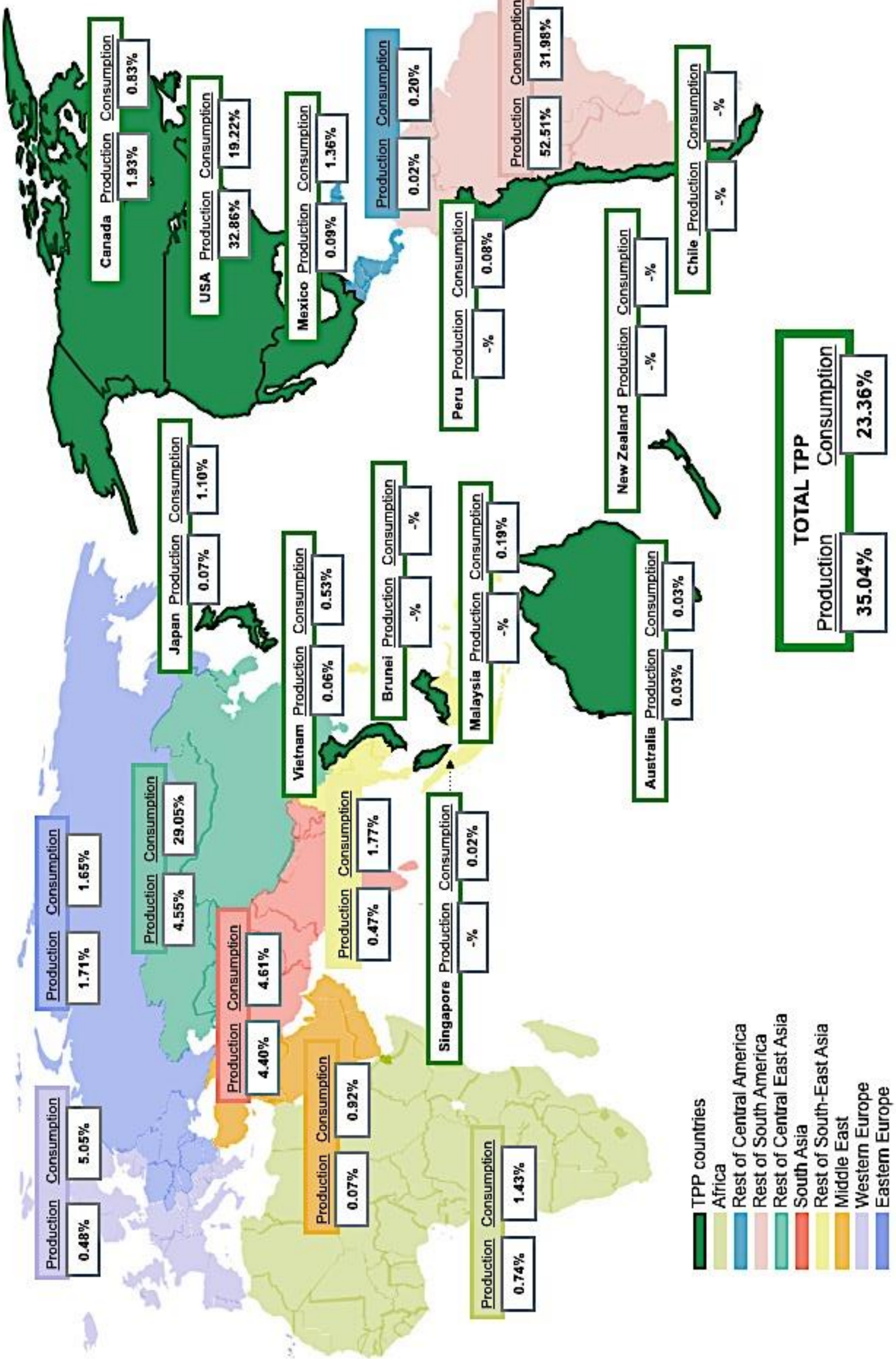
Crop stage	Duration	Requirement/characteristics
Vegetative growth stages		
VE – Emergence	5 – 10 days	- 50% of seeds weight in water required. - No fertilizer too near the seed.
VC – Leaves unrolling	7 – 10 days	- Diminish loss of “cotyledons” (leaves)
V(n) – Nodes per plant	1.5 - 2 month	- Duration 3 - 5 days per new node. - Growth until V6 stage. - 50% leave loss results in 3% yield loss.
Reproductive stages		
R1 + R2 – Bloom	15 - 20 days	- Flowering occurs - 50% leave loss results in 6% yield loss.
R3 + R4 – Pod	15 - 20 days	- Sensitive to temperature or drought stress. - High flower abortion numbers. - Crucial period for seed yield.
R5 + R6 – Seed	15 - 20 days	- Much water and nutrients required.
R7 + R8 – Maturity	15 - 20 days	- Weather stress has hardly any effect. - 5 - 10 days of good drying required.

Source: Author via UNCTAD (UNCTAD, Soy Bean an INFOCOMM Commodity Profile, 2016) & NDSU (Endres & Kandel, 2015)

Not only the production cycle but also the crop handling process taking places after the harvest cycle can influence the quality of the soybeans. The threshing processes, where the beans will be taken from their surrounding pods, require some care to prevent damage of the beans. Drying will be required to lower the moisture levels within the beans to favour their conditions during storage and further processing. Before the beans are sorted upon quality, also called grading, they will be cleaned several times followed by a packaging process. The grading of the soybeans depends on the number of defects, several shipment and storage factors and some user related factors such as: seed size, colour, level of protein or moisture (UNCTAD, Soy Bean an INFOCOMM Commodity Profile, 2016).

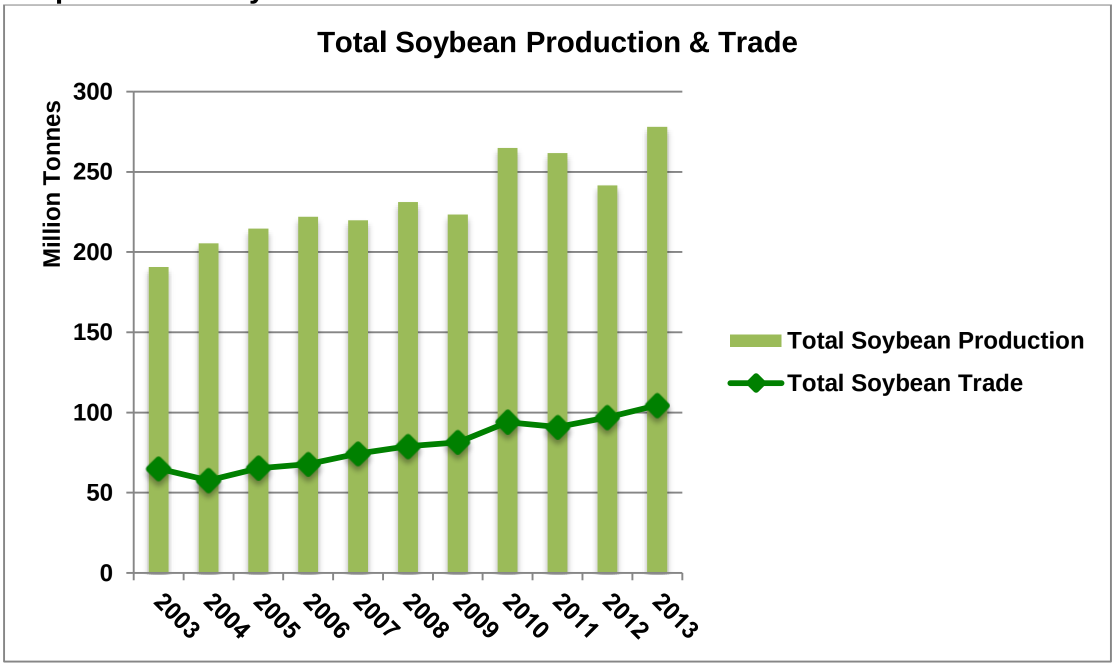
Figure 5, on the next page, displays the global production and consumption figures of soybeans for the year 2013. The TPP countries are marked with a dark green colour and are responsible for 35.04% of the global soybean production. The total consumption of the TPP countries adds up to 23.36%. Both figures are mainly driven by the contribution of the USA. Graph 6 already showed us the significant production figures of North and South America therefore it is not surprising to see the percentages in figure 5.

Figure 5: Global Soybean production & consumption
Source: Author via FAO STAT soybean production (FAOSTAT, 2013)



Trade
The international trade of soybeans in 2013 is pictured in graph 7, accounts for roughly 37% of the global production. This graph confirms the consumption pattern shown in figure 5, were the major producers also account for major consumption and leaving only 37% of production available for trade. We can see from figure 5 that the rest of Central East Asia is responsible for 4.5% of the global production. On the contrary, it is responsible for 29% of the global consumption and therefore a large importer of soybeans.
The production volumes between 2003 and 2013 in graph 7 show a fluctuating pattern. This pattern exists due to the sensitivity of the soybean crops especially during the last stages of the growth cycle.

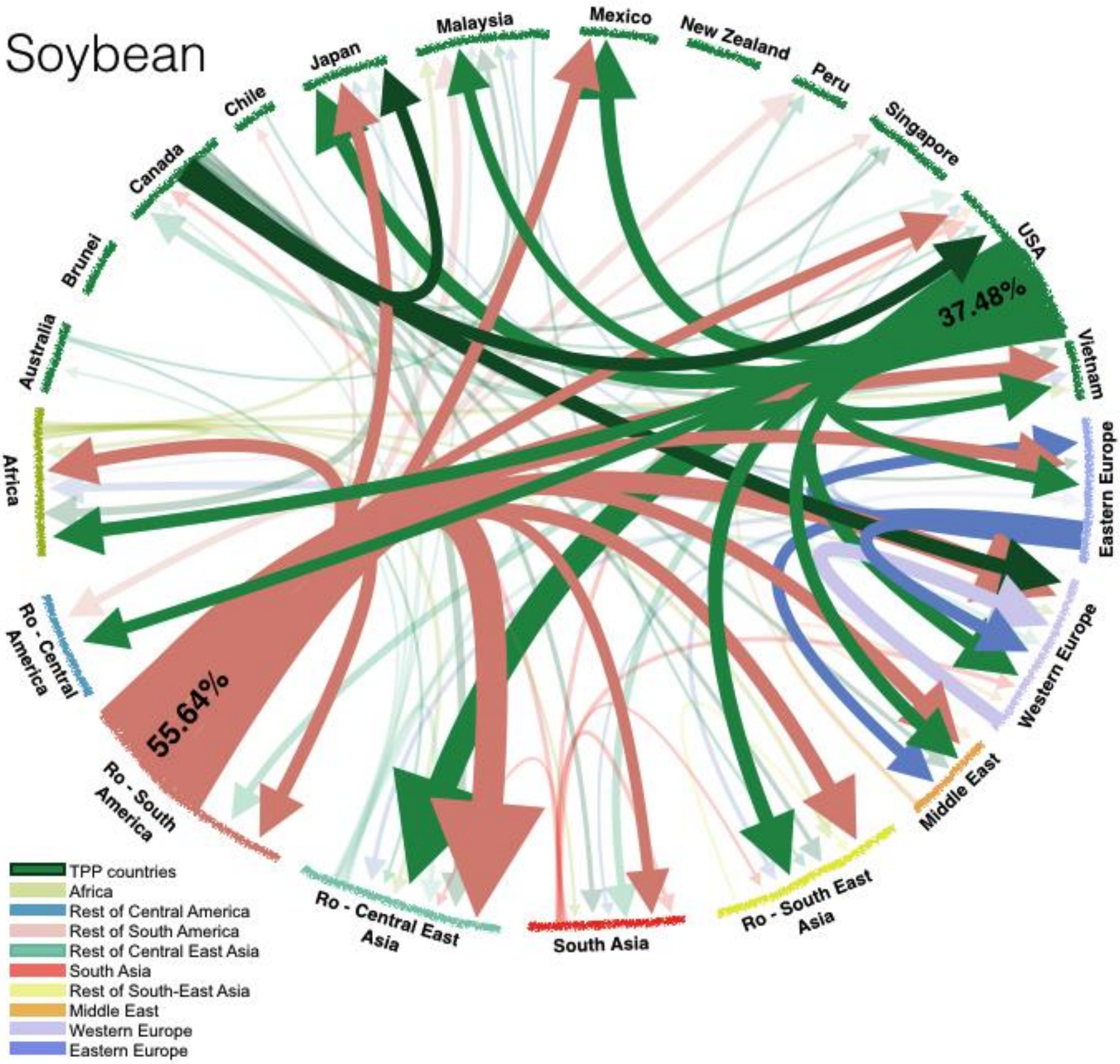
Graph 7: Total Soybean Production & Trade 2003 - 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

The international trade volumes in figure 6, on the next page, are shown through a circular diagram where the patterns of export and import for 2013 can be derived. The figure shows the same concentrated pattern, where 93% of the global export originates from the USA and the rest of South America. The import volumes show a significant pattern whereby 65% of the global import is destined for the rest of Central East Asia. The second largest importer of soybeans is Western Europe, who imports roughly 13% of the globally traded soybeans.

Figure 6: Global soybean export flows 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

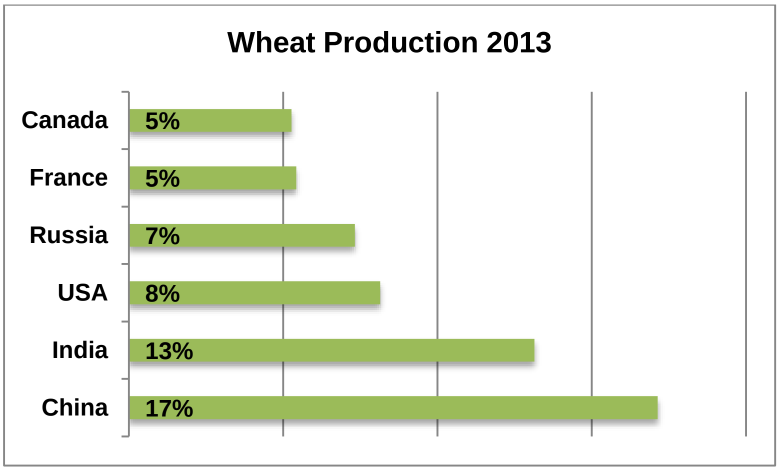
2.1.4. Wheat

Production & Consumption

The earliest evidence of wheat traces back to the years 16,000 – 15,000 BC at locations around the Nile according to J.R Harlan. Studies showed that wheat spread further through Europe and North Africa during 5,000 – 3,000BC and reached China before 1,300BC. In the first century BC wheat formed an important food source in Rome, and the trade of wheat started between different regions in order to sustain the growing populations (Evans & Peacock, 1981).
Over time, wheat developed into many different species that are growing at many different places around the world. Currently the majority of the production volumes are harvested in the northern hemisphere countries and Australia and Brazil.

Wheat production in 2013 is largely dominated by China and India. Additionally, several other countries produce large volumes. The widespread global wheat production is confirmed in graph 8 that shows how close these production figures are. Germany and Turkey are respectfully the 8th and 11th largest producers, therefore the majority of production is still locate around its European and Asian origin.

Graph 8: Global top-6 wheat production 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

As wheat is a very widely adapted crop, it grows under many different circumstances. However, the crop is sensitive to weather changes that affect the yield of the different types. The length of the growth period of the wheat crops is affected by the season when it is growing. Respectfully, the wheat's growing in springtime reach maturity after 4,5 months whereas those growing within the wintertime reach maturity after 5,5 months (Acevedo, Silva, & Silva). Accordingly, table 4 shows the time lengths for the crops growing in the two different seasons.

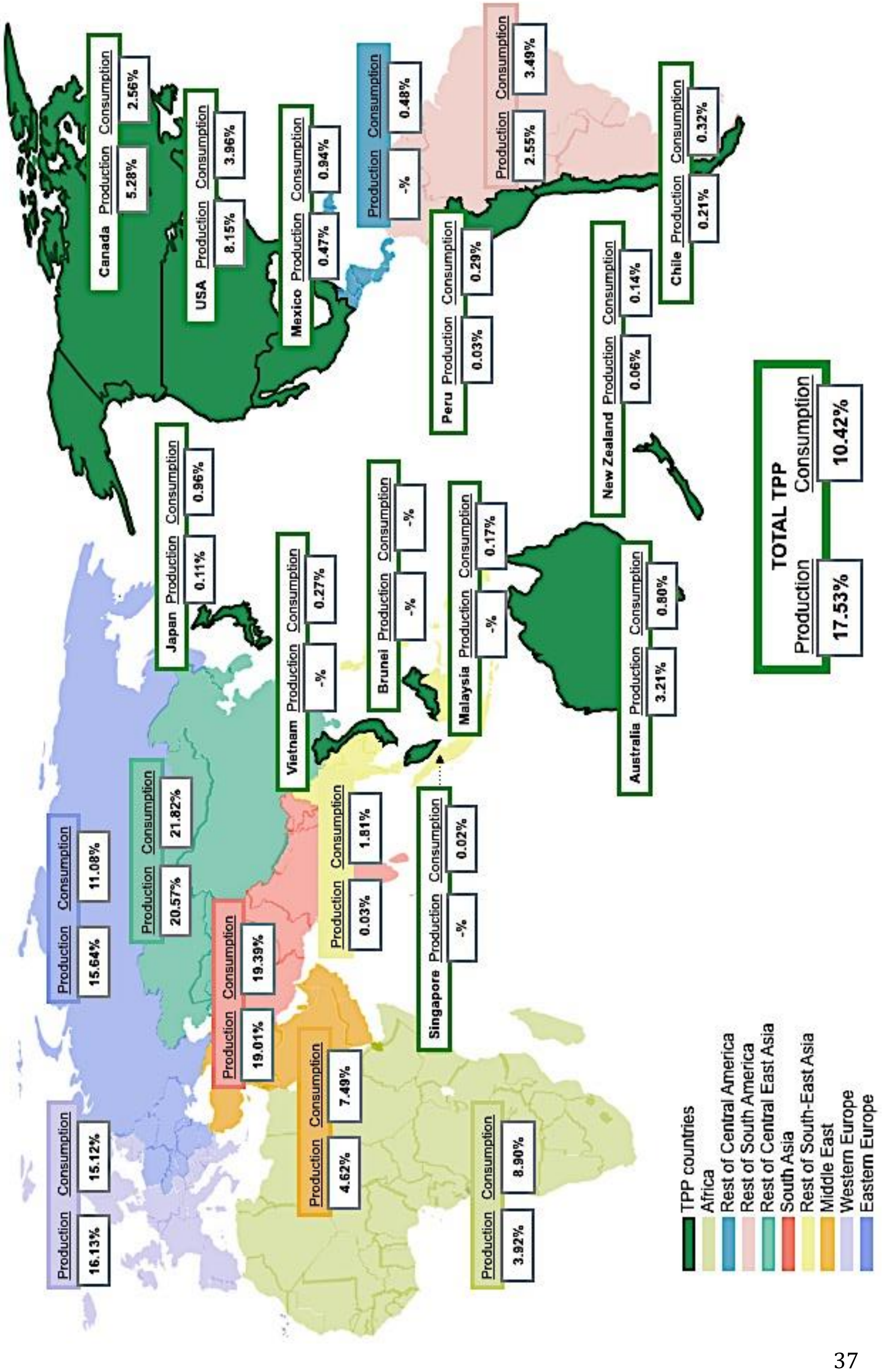
Table 4: Wheat growth length

Growth stage	Spring time (days)	Winter time (days)
Emergence	0	0
Floral initiation	20	35
Terminal spikelet	45	60
First node	60	80
Heading	90	120
Anthesis	100	130
Physiological maturity	140	170

Source: Author via (Acevedo, Silva, & Silva)

The global production and consumption volumes of 2013 are displayed in figure 7, on the next page. The TPP countries represent 17.53% of the total global wheat production. The total consumption of the TPP countries adds up to 10.42%. Australia, Canada and USA are the main wheat producers among the TPP countries. Since the two major producers, China and India are very close to the TPP countries they form a large competitor in the export of wheat. It is interesting to see that most countries and regions consume the wheat that they produce with the exception of a few. Japan seems to be a major importer as it consumes the eightfold of its own production volumes.

Figure 7: Global Wheat production & consumption
Source: Author via FAO STAT soybean production (FAOSTAT, 2013)

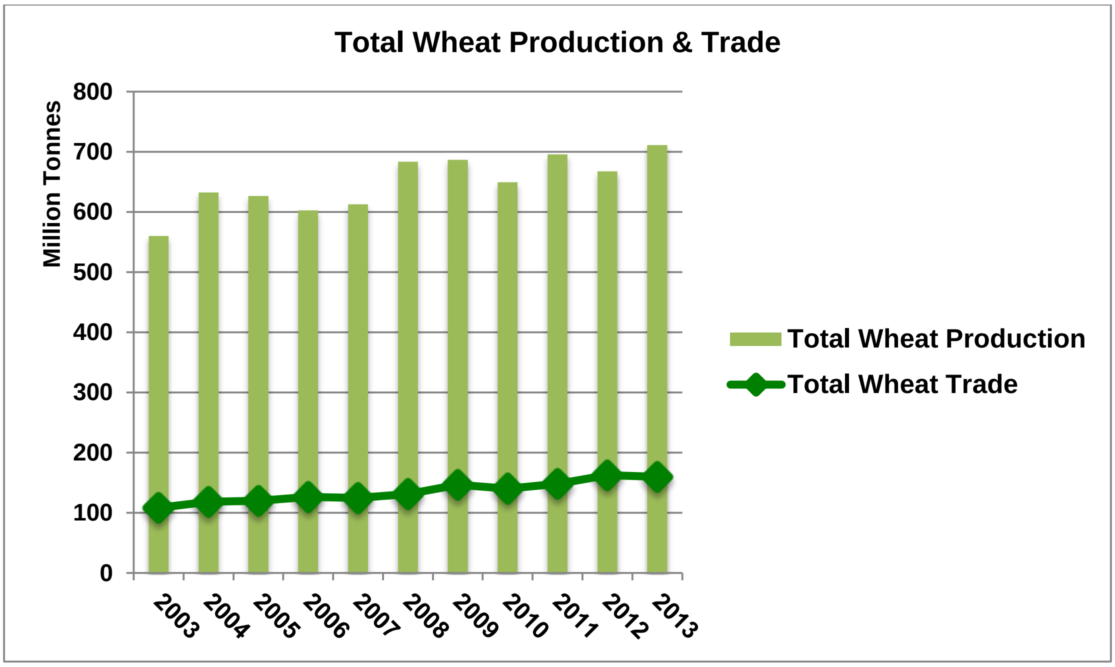


Trade

The international trade of wheat in 2013 is pictured in graph 9, and represents roughly 22% of the global production. We can therefore conclude that most of the wheat produced is consumed in that same country or used for manufacturing purposes and eventually traded as a different product.

Between 2003 and 2013 the production volumes have been fluctuating rather than only growing. This volatile pattern shows the sensitivity of the crops to the changes in weather. However, since the crop is harvested at many different places around the globe, it forms the largest market of the grain sorts. Even by volume traded it outperforms the global maize market.

Graph 9: Total Wheat Production & Trade 2003 - 2013

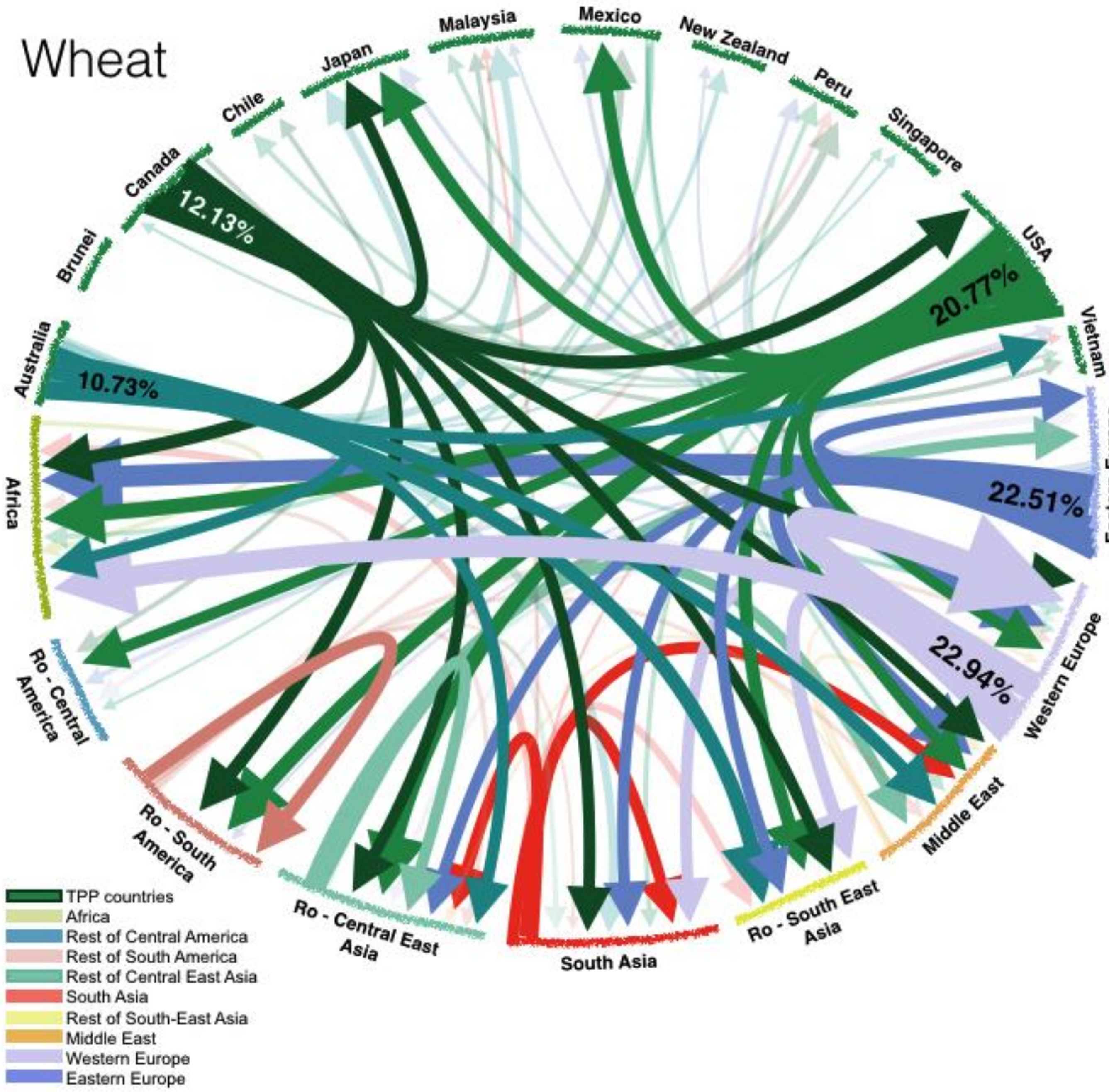


Source: Author via FAO STAT (FAOSTAT, 2013)

The global wheat export flows in figure 8, on the next page, are shown through a circular diagram where the patters of export flows for 2013 can be derived. The figure shows that only a few regions and countries dominate the export volumes, namely: Western Europe, Eastern Europe, USA, Canada and Australia. Import figures are mainly dominated by Africa, Western Europe and the Middle East.

Together the TPP countries are responsible for 44.10% of the global wheat exports and only import 12.46%. Therefore, they are a large exporting party mainly to non-TPP countries.

Figure 8: Global wheat export flows 2013



Source: Author via FAO STAT (FAOSTAT, 2013)

Now that the trade flows of the four different products have been analyzed, we can continue to the description of its global form of transportation. The following section will elaborate on the choices of transportation type and what the limiting factors are.

2.1.6 Maritime Transport

The four products and their trade flows that have been described in detail in the former sections are mostly transported aboard vessels via the ocean. In order to present the results of this research paper, we must understand the options of maritime transportation and the different limitations. In this section we will describe the different type of vessels used to transport the four products and their limiting factors. Section 2.2 will describe how the different ports in the TPP countries form a limitation to the different vessel types.

MPS&W can be divided into two different groups of products transported by different vessels. Maize, soybeans and wheat are called bulk products and are transported by several different vessels qualified to transport bulk products. Palm oil is a vegetable oil and is qualified as a liquid product, therefore transported by tankers.
Both bulk carriers and tankers come in different sizes that must be able to load the volume of product required and fit the limitations of global ports. Table 5 and 6 show the different vessels that are often used for transportation of the larger trade flows MPS&W.

Table 5: Bulk carriers

Vessel	DWT	Product load	Draft	Beam
Handysize	28,000	M: 26,000 MT S: 26,000 MT W: 26,000 MT	9.9 M	25 M
Handymax/Supramax	58,000	M: 55,000 MT S: 51,000 MT W: 55,000 MT	12.1 M	32 M
Panamax	74,000	M: 68,000 MT S: 64,000 MT W: 68,000 MT	13.4 M	32 M
Kamsarmax	82,000	M: 74,000 MT S: 70,000 MT W: 74,000 MT	13.7 M	37 M
Post-Panamax	93,000	M: 85,000 MT S: 80,000 MT W: 85,000 MT	13.7 M	37 M
Baby Capesize	115,000	M: 100,000 MT S: 95,000 MT W: 100,000 MT	16.6 M	43 M

Source: Author via Stropford (Stropford, 2009)

Table 6: Tankers

Vessel	DWT	Product load	Draft	Beam
Coasters	13,000	P: 12,000	8.6 M	21.7 M
MR1/Handysize	20,000	P: 18,500	11 M	28.8 M
MR2/Handymax	35,000	P: 33,500	12.1 M	31.8 M

Source: Author via Stropford (Stropford, 2009)

Both vessel types are flexible in the range of products they can carry. In several cases the vessels require some more extensive cleaning before loading a different type of product, which happens especially in the tanker business since liquids mix easily. The more extensive process of cleaning is often worth doing so if it allows a vessel to avoid a ballast voyage (empty voyage). For both bulk carriers and tankers, the handymax vessels easily switch between products since they transport suitable product volumes and often don't reach draft (depth) restrictions. The larger vessels that are used when transporting larger parcel sizes more often alternate loaded and ballast voyages on the routes that are equipped with ports that can accommodate their required draft.
Additionally to tables 5 and 6, we have interviewed freight specialist number 1 & 2, the interviews can be found under appendix D. According to freight specialist 1, the vessel size mostly used for the transportation of maize, soybeans and wheat are post-panamax vessels. These vessels can therefore enter the ports on the most important trade routes with the exception of East Europe that can accommodate up to panamax vessels and Africa that can accommodate up to handymax vessels.
According to freight specialist 2, the tankers used to transport palm oil range up to LR1 vessel size. Additionally, the vessel mostly used for palm oil transportation is the handymax tanker. The information of both freight specialists will be taken into consideration during the design of the second model that is further explained in section 4.2. Additionally, the next section will analyze the limitations of the ports mostly used for the MPS&W trade in the TPP countries.

2.2 Country port infrastructure analysis

In this section of the research paper we will analyze the ports of the TPP countries mostly used of MPS&W. Freight specialist 1 that we have interviewed has provided most of the port names, the additional ports have been found through research. Detailed information of each port was requested at the library of the Institute of Shipping Economics and Logistics (ISL) located in Bremen. This information is provided by the Ports & Terminal Guides 2015-2016 that contains accurate information of all global ports.
The information provided in table 7 is used to analyze the vessels sizes that can be used on the different routes to and from the different TPP countries. Therefore, it is useful information that functions as a basis for the second model that is explained in section 4.2. Together with the information provided in the former section, on the different vessel sizes, we are able to distinguish the maximum vessel size that can be used on the routes. Additionally, this information will allow us to advice on relevant port infrastructure investments based on the resulting trade flow changes.

Table 7 presents the most important ports of each TPP country and its important details. Maximum draught and DWT allow us to establish the largest vessels able to enter to port, it is important to realize that this is potentially lower for the relevant MPS&W berth places within the ports. Therefore, we will not choose a vessel for our model that reaches the exact limit of the port draught and DWT. The columns on annual throughput tonnage and annual vessels represent the importance of the port for each country. Several countries only have one or two relevant ports for MPS&W trades.

Table 7: TPP port details

Country	Port	Max draught	Max DWT	Annual throughput tonnage	Annual vessels
Australia	Albany	11,5m	67.000	3.501.077	126
	Esperance	18m	203.000	9.106.096	196
	Fremantle	13,6m	n/a	64.432.636	2.161
	Gerldton	12,8m	80.000	9.005.508	244
	Newcastle	16,2m	232.000	148.861.567	3.300
Brunei	Muara	8,5m	n/a	1.032.200	n/a
	Seria	16,8m	320.000	n/a	180
Canada	Prince Rupert	22m	250.000	23.002.215	465
	Thunder Bay	8,2m	n/a	7.085.899	375
	Triod Rivieres	11m	n/a	2.500.000	n/a
	Vancouver	18,3m	260.000	123.897.786	3.081
Chile	Antofagasta	11,25m	34.307	12.696.294	449
	San Antonio	10m	34.037	12.100.000	1.037
	San Vicente	12,5m	65.000	7.061.027	892
Japan	Chiba	17m	200.000	165.142.000	65.200
	Tokyo	12m	60.000	77.515.271	31.653
Malaysia	Johor	12m	104.000	25.234.000	5.121
	Port Klang	15m	150.000	197.907.084	17.721
	Sandakan	12m	50.000	n/a	1.200
Mexico	Ensenada	12,9m	n/a	2.839.512	n/a
	Guaymas	11,27m	60.000	n/a	360
New Zealand	Auckland	12,5m	n/a	13.300.000	1.620
	Tauranga	13m	n/a	12.241.000	1.244
Peru	Callao	13m	117.000	17.383.350	1.031
Singapore	Singapore	16,7m	n/a	557.500.000	186.106
USA	Houston	13,1m	n/a	228.000.000	8.395
	Louisiana	13,7m	n/a	278.900.938	4.152
	New Orleans	14,3m	n/a	31.700.000	197
	Portland	13,5m	124.000	22.124.278	n/a
	Seattle	15,8m	n/a	20.046.323	1.487
Vietnam	Cai Mep	14m	150.000	n/a	n/a

Source: Author via IHS Maritime (IHS Maritime, 2015-2016)

According to freight specialist 1, post-panamax vessels are mostly used for the trade in maize, soybean and wheat. For the TPP countries we can say the same with the exception of Chile, where the maximum vessel size is handymax/supramax since San Vicente has a draught maximum of 12.5m. Regarding the transportation of palm oil, each TPP port is able to accept the handysize tankers. All TPP ports, with the exception of Chile, Mexico, New Zealand and Peru, are able to accommodate the LR1 tankers, even tough MR2/handymax are usually the largest vessels used for the transportation of palm oil.

Now that we have analyzed the details on the transportation of MPS&W we can continue with the research on the current governmental barriers. The next section analyzes the barriers to trade in the form of tariffs and NTM's.

2.3 Current tariffs and Non-tariff measures

Tariffs and NTM’s are economic tools for governments to restrict or limit the import and export of certain goods or services. Some large trade agreements such as Association of South East Asian Nations (ASEAN), the European Economic Area (EEA) and the North American Free Trade Agreement (NAFTA) have already set many tariffs to zero. However, for many agricultural products governments still use these tools to protect their domestic markets from cheap foreign products. The tools used by the largest importers for each of the four products are discussed below, followed by a description of the tariffs between the TPP countries. Additionally, this section will end with a description of the NTM’s and the method by which they have been quantified.

Maize tariffs

The four major maize importers have been identified during the data collection in the former section. The largest importer of maize, Western Europe, is also responsible for 4.68% of the global production. According to the data collected from WITS, complete overview can be viewed in appendix – A, they have not activated any import tariffs to protect their domestic producers. The rest of Central East Asia on the other hand that is the second largest importer of maize, has activated a variety of different import tariffs for most of the global regions. Since they are also responsible for 21.86% of the global production, the tariffs function to protect their domestic production market. The third largest importer of maize, Africa, has also activated a variety of different import tariffs. Since the African region is responsible for 6.94% of the global maize production their tariffs also function as a protection tool for their domestic market. The fourth largest importer is Japan, who is not responsible for any production of maize. According to table 8, which shows all TPP import tariffs, Japan has activated several import tariffs for the different TPP countries. Moreover, Japan levies import tariffs for all other regions except for the South East Asian region. Therefore, we can see in table 8 that Brunei, Malaysia, Singapore and Vietnam, whom are part of South East Asia, are exempted from Japanese import tariffs on maize. Besides Japan, the only other country that currently levies import tariffs on maize within the TPP setting is Chile, who is only importing maize from the rest of South America.

Table 8: Ad Valorem tariffs maize

		Importer											
		Aus	Bru	Can	Chi	Jap	Mal	Mex	NeZ	Per	Sin	USA	Vie
Exporter	Australia		0%	0%	0%	24,67%	0%	0%	0%	0%	0%	0%	0%
	Brunei	0%		0%	6%	0%	0%	0%	0%	0%	0%	0%	0%
	Canada	0%	0%		0%	1,21%	0%	0%	0%	0%	0%	0%	0%
	Chile	0%	0%	0%		0,26%	0%	0%	0%	0%	0%	0%	0%
	Japan	0%	0%	0%	1,09%		0%	0%	0%	0%	0%	0%	0%
	Malaysia	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%
	Mexico	0%	0%	0%	0%	8,88%	0%		0%	0%	0%	0%	0%
	New Zealand	0%	0%	0%	6%	3,23%	0%	0%		0%	0%	0%	0%
	Peru	0%	0%	0%	0%	1,45%	0%	0%	0%		0%	0%	0%
	Singapore	0%	0%	0%	6%	0%	0%	0%	0%	0%		0%	0%
	USA	0%	0%	0%	0%	31,08%	0%	0%	0%	0%	0%		0%
	Vietnam	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Source: Author via WITS

Palm oil tariffs

The four major palm oil importers that have been identified all use import tariffs. The largest importer, South Asia, is not responsible for any palm oil production but levies import tariffs to South East Asia and the USA. The second largest importer, West Europe, does contribute with 1.32% to the global palm oil production. They have activated some low import tariffs to other countries of production to potentially protect their domestic palm oil producers. The third largest importer is the rest of Central East Asia who also produces 0.42% of the global palm oil. They activated some low import tariffs such as 1% to the largest producers located in South East Asia. The fourth largest importer of palm oil, Africa, is also responsible for 4.21% of the global production volume. They have activated a variety of different import tariffs that are rather high for the large producers. The palm oil market in general shows a large variety of import tariffs that are levied between countries and regions. This indicates that the tariffs are mainly levied for the protection of domestic markets, as that requires rates that are fit for each market. The active import tariffs on palm oil between the TPP countries are reflected in table 9, whereas all import tariffs for the TPP countries and non-TPP regions can be found in appendix – A. Interesting to see is that 6 countries activated import tariffs to other TPP countries, whereas the other 6 do not. Additionally, only 3 countries levy tariffs on palm oil originating from Malaysia, who is the second largest global producer of palm oil. Thereof, only Mexico and Peru produce 0.14% and 0.26% for the global palm oil and therefore use those import tariffs to protect their domestic producers. The reasons for the other tariffs remain undefined.

Table 9: Ad Valorem tariffs palm oil

Exporter \ Importer	Aus	Bru	Can	Chi	Jap	Mal	Mex	NeZ	Per	Sin	USA	Vie
Australia		0%	6%	0%	3,5%	0%	3%	0%	6%	0%	0%	5%
Brunei	0%		6%	6%	0%	0%	3%	0%	6%	0%	0%	0%
Canada	0%	0%		0%	3,5%	0%	0%	0%	6%	0%	0%	5%
Chile	0%	0%	0%		0%	0%	2,16%	0%	0%	0%	0%	3%
Japan	0%	0%	6%	0%		0%	3%	0%	6%	0%	0%	2%
Malaysia	0%	0%	6%	0%	0%		3%	0%	6%	0%	0%	0%
Mexico	0%	0%	0%	5,28%	3,5%	0%		0%	6%	0%	0%	5%
New Zealand	0%	0%	6%	6%	3,5%	0%	3%		6%	0%	0%	5%
Peru	0%	0%	0%	0%	0%	0%	3%	0%		0%	0%	5%
Singapore	0%	0%	6%	6%	0%	0%	3%	0%	6%		0%	0%
USA	0%	0%	0%	0%	3,5%	0%	0%	0%	6%	0%		5%
Vietnam	0%	0%	6%	0%	0%	0%	3%	0%	6%	0%	0%	

Source: Author via WITS

Soybean tariffs

The two major soybean importers are the rest of Central East Asia and Western Europe. The former has activated only a few import tariffs of which one is as high as 121% for soybeans coming from the second largest exporter, the USA. Therefore the largest export flow originates from the rest of South America to the rest of Central East Asia where no import tariff is active. It seems unlikely that this activated tariff only protects their own 4.55% of production volumes. Western Europe is only responsible for 0.48% of the global soybean production and has not activated any tariffs on soybean import volumes. From table 10 we can see that between the TPP countries, only Chile has active import tariffs on soybeans. Since Chile is only responsible for importing 0.01% of the global soybean imports from the rest of South America, its tariffs to other TPP countries are rather ineffective. The overview of all import tariffs between TPP countries and regions can be found in appendix – A.

Table 10: Ad Valorem tariffs soybean

		Importer											
		Aus	Bru	Can	Chi	Jap	Mal	Mex	NeZ	Per	Sin	USA	Vie
Exporter	Australia		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Brunei	0%		0%	6%	0%	0%	0%	0%	0%	0%	0%	0%
	Canada	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%
	Chile	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%
	Japan	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%
	Malaysia	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%
	Mexico	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%
	New Zealand	0%	0%	0%	6%	0%	0%	0%		0%	0%	0%	0%
	Peru	0%	0%	0%	6%	0%	0%	0%	0%		0%	0%	0%
	Singapore	0%	0%	0%	6%	0%	0%	0%	0%	0%		0%	0%
	USA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%
	Vietnam	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Source: Author via WITS

Wheat tariffs

From the three major wheat importers Africa, Western Europe and Middle East, only Africa has activated some low import tariffs. The African region levies import tariffs on wheat coming from other African countries. Therefore, the African countries protect their domestic producers from neighbouring competitors. Interesting to notice is that Western Europe is the largest wheat exporter and the second largest importer. However, not levying any import tariffs stimulates the wheat imports that result into export again within Western Europe and to Africa. The Middle East is the third largest importer of wheat and mainly exports within the Middle Eastern countries. This confirms their figure of 7.49% of global wheat consumption.

The current tariffs levied between the TPP countries are shown in table 11, the overview of all TPP countries and regions can be found in appendix – A. Both USA and Mexico levy some very high tariffs to wheat from certain countries, it is likely that these tariffs are levied to protect their own production market against cheap imports. On the contrary, Vietnam levies import tariffs to all countries outside South East Asia even though Vietnam is not responsible for any wheat production.

Table 11: Ad Valorem tariffs wheat

		Importer											
		Aus	Bru	Can	Chi	Jap	Mal	Mex	NeZ	Per	Sin	USA	Vie
Exporter	Australia		0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	5%
	Brunei	0%		0%	6%	0%	0%	45%	0%	0%	0%	65%	0%
	Canada	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	5%
	Chile	0%	0%	0%		0%	0%	45%	0%	0%	0%	0%	5%
	Japan	0%	0%	0%	0%		0%	45%	0%	0%	0%	65%	2%
	Malaysia	0%	0%	0%	0%	0%		45%	0%	0%	0%	65%	0%
	Mexico	0%	0%	0%	6%	0%	0%		0%	0%	0%	0%	5%
	New Zealand	0%	0%	0%	6%	0%	0%	45%		0%	0%	65%	5%
	Peru	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	5%
	Singapore	0%	0%	0%	6%	0%	0%	45%	0%	0%		0%	0%
	USA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		5%
	Vietnam	0%	0%	0%	4%	0%	0%	45%	0%	0%	0%	65%	

Source: Author via WITS

Non-tariff measures
The trade agreements mentioned above: ASEAN, EEA and NAFTA, all agreed to lower trade tariffs. However, many of the NTM's remain to exist and therefore have considerable effects on the benefits to trade. Moreover, the trade flows of MPS&W are also affected by NTM policies such as quantity control, sanitary restrictions and other technical barriers. An important technical barrier that we consider for MPS&W, are the costs of transportation via ship between the different markets, as the costs form a major limitation to trade.

The non-technical barriers, having a considerable impact on the market access, have also proven difficult to distinguish due to the lack of transparency. Detailed information about the use of NTM's is generally not available according to a study on the NTM's in ASEAN (Ing, de Cordoba, & Cabot, 2016). However, since that is not the focus of this research paper, we will quantify the number of NTM's used, together with the technical shipping barrier, since this information is made available by UNCTAD and marine traffic.
The method used to quantify the NTM's, excluding the shipping barrier, consisted of gathering the different number of measures per country/region according to UNCTAD. Each different measurement used, got assigned a 0,25% weight since they affect both import and export volumes. Additionally, the shipping barrier is quantified based on the distance of the shipping route per nautical mile between locations provided by Marine Traffic. The longest distance, between Chile and Malaysia, has been assigned a 25% NTM. The other distances have been quantified relative to that since we only take into consideration the variable costs, which we assume to be halved when the distance is halved. Together, the NTM and the shipping barrier form the total NTM per product, reflected between the TPP countries in table 12, 13, 14 & 15. The complete overview including the non-TPP global regions can be found in appendix – B. The Ad valorem tariffs and the NTM's, form the input data for the PE model that is further explained in chapter 4.

Table 12: NTM Maize before TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	11%	22%	39%	39%	28%	25%	37%	20%	38%	24%	42%	31%
Brunei	22%	1%	25%	32%	8%	5%	20%	12%	28%	5%	25%	12%
Canada	39%	25%	9%	29%	21%	28%	18%	30%	26%	27%	22%	34%
Chile	39%	32%	29%	6%	28%	35%	18%	29%	14%	33%	24%	38%
Japan	28%	8%	21%	28%	2%	10%	16%	20%	25%	9%	21%	15%
Malaysia	25%	5%	28%	35%	10%	2%	23%	15%	32%	5%	26%	14%
Mexico	37%	20%	18%	18%	16%	23%	3%	28%	15%	21%	14%	27%
New Zealand	20%	12%	30%	29%	20%	15%	28%	2%	25%	14%	32%	22%
Peru	38%	28%	26%	14%	25%	32%	15%	25%	5%	30%	22%	36%
Singapore	24%	5%	27%	33%	9%	5%	21%	14%	30%	1%	27%	13%
USA	42%	25%	22%	24%	21%	26%	14%	32%	22%	27%	8%	34%
Vietnam	31%	12%	34%	38%	15%	14%	27%	22%	36%	13%	34%	7%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 13: NTM Palm oil before TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	16%	30%	39%	42%	37%	34%	39%	30%	38%	31%	47%	41%
Brunei	30%	3%	21%	32%	14%	11%	19%	19%	25%	8%	28%	19%
Canada	39%	21%	4%	20%	18%	24%	8%	28%	14%	21%	16%	32%
Chile	42%	32%	20%	3%	29%	35%	12%	31%	5%	32%	22%	40%
Japan	37%	14%	18%	29%	4%	17%	16%	28%	23%	14%	25%	22%
Malaysia	34%	11%	24%	35%	17%	4%	22%	23%	29%	9%	30%	21%
Mexico	39%	19%	8%	12%	16%	22%	0%	29%	7%	19%	12%	28%
New Zealand	30%	19%	28%	31%	28%	23%	29%	6%	24%	20%	37%	31%
Peru	38%	25%	14%	5%	23%	29%	7%	24%	0%	25%	16%	35%
Singapore	31%	8%	21%	32%	14%	9%	19%	20%	25%	2%	27%	18%
USA	47%	28%	16%	22%	25%	30%	12%	37%	16%	27%	9%	38%
Vietnam	41%	19%	32%	40%	22%	21%	28%	31%	35%	18%	38%	10%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 14: NTM Soybean before TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	12%	23%	39%	38%	30%	26%	37%	21%	38%	26%	39%	32%
Brunei	23%	1%	24%	30%	10%	6%	19%	12%	27%	5%	22%	13%
Canada	39%	24%	8%	26%	21%	27%	16%	29%	24%	26%	17%	33%
Chile	38%	30%	26%	4%	28%	34%	15%	27%	11%	32%	19%	36%
Japan	30%	10%	21%	28%	2%	11%	17%	20%	24%	10%	19%	16%
Malaysia	26%	6%	27%	34%	11%	2%	22%	15%	31%	5%	23%	14%
Mexico	37%	19%	16%	15%	17%	22%	2%	27%	13%	21%	10%	26%
New Zealand	21%	12%	29%	27%	20%	15%	27%	2%	23%	15%	30%	22%
Peru	38%	27%	24%	11%	24%	31%	13%	23%	4%	28%	17%	34%
Singapore	26%	5%	26%	32%	10%	5%	21%	15%	28%	1%	23%	13%
USA	39%	22%	17%	19%	19%	23%	10%	30%	17%	23%	6%	31%
Vietnam	32%	13%	33%	36%	16%	14%	26%	22%	34%	13%	31%	7%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 15: NTM Wheat before TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	12%	23%	41%	40%	29%	26%	40%	20%	38%	26%	40%	35%
Brunei	23%	1%	25%	32%	14%	6%	22%	12%	27%	5%	23%	16%
Canada	41%	25%	9%	30%	22%	28%	20%	30%	26%	27%	20%	38%
Chile	40%	32%	30%	5%	28%	35%	19%	29%	14%	33%	22%	41%
Japan	29%	14%	22%	28%	2%	11%	19%	22%	25%	10%	20%	19%
Malaysia	26%	6%	28%	35%	11%	2%	24%	15%	30%	5%	24%	17%
Mexico	40%	22%	20%	19%	19%	24%	4%	30%	15%	23%	15%	31%
New Zealand	20%	12%	30%	29%	22%	15%	30%	2%	23%	14%	31%	25%
Peru	38%	27%	26%	14%	25%	30%	15%	23%	4%	28%	19%	37%
Singapore	26%	5%	27%	33%	10%	5%	23%	14%	28%	1%	24%	16%
USA	40%	23%	20%	22%	20%	24%	15%	31%	19%	24%	7%	35%
Vietnam	35%	16%	38%	41%	19%	17%	31%	25%	37%	16%	35%	9%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

From the above tables we can conclude that the NTM patterns of all four products show similar weights. First, Australia is responsible for the highest NTM's on the import and export of all four products. Second, Vietnam is responsible for the second highest NTM's and closely followed by Chile, who is responsible for the third highest NTM's. All three not only use many different NTM policies, but the shipping distance also plays a vital component in the quantification of the total NTM.

Both USA and Canada have activated many different NTM policies, but the component of their shipping routes is rather favorable. Therefore, both are not responsible for the highest total NTM's.

Herewith, we have analyzed how barriers to trade are not always obvious, but have the ability to heavily influence a countries participation in global trade. In the following section, an analysis is made about the port infrastructure of the different TPP countries. Accordingly, it will allow us to analyze any limitations to trade formed by the port infrastructure.

3. TPP TEXTUAL ANALYSIS

Origins of this ambitious trade agreement date back to 2005 where the P4, consisting of New Zealand, Chile, Singapore and Brunei, started negotiations. Australia and Peru had joined by 2008 and Vietnam was in the process of doing so as well. The USA joined negotiations under the Bush administration and later it became the main trade policy initiative during the Obama administration (Horlick, 2016).

Before the 12 participating countries signed the agreement on February 4th 2016, the USA and others made efforts to changing excising policies and barriers. Unlike the Doha Round that crashed on this topic for agriculture, the TPP negotiations were able to proceed (Schott, Kotschwar, & Muir, 2013). But regardless of the proceedings and signing of the agreement, it is of interest to know how the TPP will change the tariffs and NTM's of certain products.

This chapter will analyse the changes that occur with the signing of the TPP agreement. First, an analysis of the changes in tariffs and NTM's is made regarding the MPS&W markets. Second, a theoretical translation is provided of the legal text into an economic perspective of the agreed terms.

3.1 TPP tariff and NTM changes: Maize, Palm oil, Soybean and Wheat

Tariffs and NTM's have previously been introduced in section 2.3 as economic tools for governments to restrict or limit imports of certain goods and services. These tools will be minimized when the TPP enters into force, as according to the TPP text preamble "The parties to this agreement, resolving to: Facilitate regional trade by promoting efficient and transparent customs procedures that reduce costs and ensure predictability for their importers and exporters." (USTR, 2016). The current tariff structure between the TPP countries is reflected in tables 8, 9, 10 and 11 presented in the former section. Additionally, the current NTM structure is reflected in tables 12, 13, 14 and 15 presented in the former section. Therefore in this section of the research paper we will analyse the changes in those tariffs and NTM's that have been agreed upon in the official TPP legal text frame.

To start the TPP legal framework, an authority is setup that will examine and protect the details agreed upon within the TPP, the parties would together establish several committees that exist of a one representative from each party per committee. The committees shall function to promote trade between parties, address the excising barriers, review future amendments and resolve any difference that may arise. Each committee shall meet at least once a year during the first 5 years of enforcement. The committees shall be authorized to examine the compliance of parties to the details they have agreed upon in the treaty. Some of those terms agreed to that are relevant, such as national treatment, market access and agriculture, are provided in this section.

According to the national treatment and market access the parties have agreed that, existing custom duties shall not be increased nor shall any new ones be adopted unless agreed otherwise. The last part of the former sentence refers to the tariff elimination schedules that are discussed below. Parties may accelerate the elimination of tariffs but must inform the other parties on their proceedings. Parties are restricted by the TPP agreement, unless agreed upon, to prohibit or restrict the import or export of any goods from another party. The TPP promotes transparency in the NTM's where a party requires import or export licenses. According to the agreement, that party must provide transparent information on the procedures of acquiring those licenses to the other parties. The same holds for any other procedures that might be required for the import or export of goods.

Several requirements have specifically been agreed upon for the trade in agricultural goods and are therefore relevant to be provided. Parties have agreed to eliminate and prevent any reintroduction of export subsidies for goods destined for member parties. The only circumstance when a restriction or prohibition of export or import is allowed is to prevent or relieve a critical shortage. This is an exception to the overall rule that prohibits restrictions on trade between parties. The party that applies the restriction shall however inform the other parties at least 30 days before the measures take effect. The measures are limited to a time frame of 12 months after which they shall immediately be discontinued. The agriculture committee, that shall monitor the compliance of the above agreed terms, shall also monitor the cooperation and transparency of trade in products of modern biotechnology. When genetically modified goods are present in a load, the exporter is required to provide a risk assessment.

Following the description of the general terms agreed to by the TPP parties, a specific analysis will follow concerning the details agreed upon for MPS&W. Under the TPP textual agreements, the tariff reduction agreements are found under Annex 2-D: Tariff Commitments. For each country two sections can be found containing general notes to tariff schedule and a tariff elimination schedule. Some countries have agreed on special arrangements that are added as special notes or appendixes. In this section of the research paper we will analyse and summarize the changes for MPS&W that are stated in the tariff elimination schedules of each country. Table 16 reflects a summary of all the tariff changes for MPS&W, reflecting the current base tariff and the changes in year 1 and further if applicable.

From this overview we can conclude that most of the tariffs are eliminated in year 1 when the TPP agreement enters into force. Only palm oil is subject to longer reduction periods of 6 years for Vietnam and 11 years for Peru, before the imports reach a 0% tariff. Another exception is Mexico, who reduces the import tariffs on palm oil from 3% to 0% within the first year with the exception of Malaysia. For Malaysia they use a duty-free quantity that increases over 3 years time, the quantity of imports surpassing the quota will be subject to a 3% import tariff. Since Mexico is responsible for 1.03% of the global palm oil import of 2013, this special reduction schedule aims to protect its main import origins that are Central, South and North America.

Moreover, when we look at the column of soybeans, most of the import tariffs are already eliminated. Therefore, only Chile will be eliminating its import tariffs on soybeans. Consequently, we can expect little change from the elimination of import tariffs on the trade of soybeans between the TPP countries.

Table 16: Summary Annex 2-D: Tariff Commitments

Country	Product Nomenclature	Maize (corn) 100510	Palm Oil 151110	Soyabean 120110	Wheat 100111
Australia	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	Free (EIF)
Brunei	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	Free (EIF)
Canada	Within access commitment	Free (EIF)	6% (EIF)	Free (EIF)	$1,90/tonne
	Over access commitment				49%
	Year 1		0%		0%
Chile	Base Rate	6% (EIF)	6% (EIF)	6% (EIF)	6% (EIF)
	Year 1	0%	0%	0%	0%
Japan	Base Rate	9 Yen/kg	3,5% (EIF)	Free (EIF)	Free (EIF)
	Year 1	0%	0%		
Malaysia	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	Free (EIF)
Mexico	Base Rate	Free (EIF)	3% (EIF)	Free (EIF)	67%
	Year 1		0%		0%
	Special case Malaysia				
	Duty-free quantity Year 1		10.000 MT		
	Duty-free quantity Year 2		11.000 MT		
	Duty-free quantity Year 3		12.000 MT		
New Zealand	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	Free (EIF)
Peru	Base Rate	9% + SPFP	9% (B11)	Free (EIF)	Free (EIF)
	Year 1	0% + SPFP	8,10%		
	Year 2		7,30%		
	Year 3		6,50%		
	Year 4		5,70%		
	Year 5		4,90%		
	Year 6		4,00%		
	Year 7		3,20%		
	Year 8		2,40%		
	Year 9		1,60%		
	Year 10		0,80%		
	Year 11		0%		
Singapore	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	Free (EIF)
USA	Base Rate	Free (EIF)	Free (EIF)	Free (EIF)	0,65 cent/kg (EIF)
					0%
Vietnam	Base Rate	Free (EIF)	5%	Free (EIF)	5% (EIF)
	Year 1		4,10%		0%
	Year 2		3,30%		
	Year 3		2,50%		
	Year 4		1,60%		
	Year 5		0,80%		
	Year 6		0%		

Source: Author via TPP legal text (USTR, 2016)

The TPP's ambition on the reduction of the NTM's seems rather low compared to the tariff reductions. The expected changes in the NTM's reflect more transparency regarding the different procedures required for trade between the different countries. Therefore, we quantify the number of NTM policies again with a 0,20% weight instead of the former 0,25%. Additionally, shipping remains unchanged, as routes are not affected. The new total NTM schedules for the TPP countries are reflected in tables 17, 18, 19 and 20. Additionally, the overview of changes for all countries and regions can be found under appendix – C. Depending on the number of NTM policies and the distance of the shipping route, the total NTM's have decreased between 0% and 6%.

Table 17: NTM Maize after TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	9%	19%	34%	35%	24%	22%	33%	16%	34%	21%	37%	27%
Brunei	19%	0%	22%	30%	7%	5%	19%	11%	27%	4%	23%	11%
Canada	34%	22%	7%	26%	19%	25%	15%	27%	23%	24%	17%	30%
Chile	35%	30%	26%	4%	26%	33%	16%	27%	11%	32%	21%	35%
Japan	24%	7%	19%	26%	1%	10%	15%	19%	24%	9%	19%	13%
Malaysia	22%	5%	25%	33%	10%	2%	21%	14%	30%	4%	23%	12%
Mexico	33%	19%	15%	16%	15%	21%	2%	27%	13%	20%	11%	24%
New Zealand	16%	11%	27%	27%	19%	14%	27%	2%	23%	13%	30%	20%
Peru	34%	27%	23%	11%	24%	30%	13%	23%	4%	28%	19%	33%
Singapore	21%	4%	24%	32%	9%	4%	20%	13%	28%	1%	24%	11%
USA	37%	23%	17%	21%	19%	23%	11%	30%	19%	24%	7%	31%
Vietnam	27%	11%	30%	35%	13%	12%	24%	20%	33%	11%	31%	5%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 18: NTM Palm oil after TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	13%	26%	34%	37%	32%	29%	35%	24%	34%	27%	41%	35%
Brunei	26%	2%	20%	30%	12%	9%	18%	16%	25%	7%	25%	16%
Canada	34%	20%	4%	18%	16%	22%	7%	25%	13%	20%	13%	28%
Chile	37%	30%	18%	3%	27%	33%	11%	28%	4%	30%	19%	36%
Japan	32%	12%	16%	27%	4%	15%	15%	25%	22%	12%	21%	19%
Malaysia	29%	9%	22%	33%	15%	4%	20%	20%	27%	7%	27%	18%
Mexico	35%	18%	7%	11%	15%	20%	0%	28%	6%	19%	9%	25%
New Zealand	24%	16%	25%	28%	25%	20%	28%	5%	22%	18%	34%	27%
Peru	34%	25%	13%	4%	22%	27%	6%	22%	0%	25%	14%	32%
Singapore	27%	7%	20%	30%	12%	7%	19%	18%	25%	2%	25%	15%
USA	41%	25%	13%	19%	21%	27%	9%	34%	14%	25%	7%	34%
Vietnam	35%	16%	28%	36%	19%	18%	25%	27%	32%	15%	34%	8%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 19: NTM Soybean after TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	10%	20%	34%	34%	26%	22%	33%	17%	34%	22%	35%	28%
Brunei	20%	0%	22%	29%	9%	5%	18%	11%	26%	4%	20%	11%
Canada	34%	22%	6%	23%	19%	24%	13%	26%	21%	24%	14%	30%
Chile	34%	29%	23%	3%	26%	32%	14%	26%	9%	30%	17%	33%
Japan	26%	9%	19%	26%	2%	10%	15%	19%	23%	9%	17%	14%
Malaysia	22%	5%	24%	32%	10%	2%	21%	14%	29%	4%	21%	12%
Mexico	33%	18%	13%	14%	15%	21%	2%	26%	12%	20%	8%	24%
New Zealand	17%	11%	26%	26%	19%	14%	26%	2%	22%	14%	28%	20%
Peru	34%	26%	21%	9%	23%	29%	12%	22%	3%	27%	15%	32%
Singapore	22%	4%	24%	30%	9%	4%	20%	14%	27%	1%	21%	11%
USA	35%	20%	14%	17%	17%	21%	8%	28%	15%	21%	5%	28%
Vietnam	28%	11%	30%	33%	14%	12%	24%	20%	32%	11%	28%	5%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

Table 20: NTM Wheat after TPP

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam
Australia	10%	20%	36%	35%	26%	22%	35%	17%	34%	22%	36%	30%
Brunei	20%	0%	23%	30%	12%	5%	20%	11%	26%	4%	21%	13%
Canada	36%	23%	7%	26%	19%	25%	16%	27%	22%	25%	16%	33%
Chile	35%	30%	26%	4%	26%	33%	17%	27%	11%	31%	19%	37%
Japan	26%	12%	19%	26%	2%	10%	17%	20%	24%	9%	17%	16%
Malaysia	22%	5%	25%	33%	10%	2%	22%	14%	29%	4%	22%	14%
Mexico	35%	20%	16%	17%	17%	22%	3%	28%	13%	21%	12%	28%
New Zealand	17%	11%	27%	27%	20%	14%	28%	2%	22%	13%	28%	22%
Peru	34%	26%	22%	11%	24%	29%	13%	22%	3%	27%	16%	34%
Singapore	22%	4%	25%	31%	9%	4%	21%	13%	27%	1%	22%	13%
USA	36%	21%	16%	19%	17%	22%	12%	28%	16%	22%	5%	31%
Vietnam	30%	13%	33%	37%	16%	14%	28%	22%	34%	13%	31%	7%

Source: Author via WITS & Marine Traffic (UNCTAD, WITS , 2016) (MarineTraffic, 2016)

The NTM's after TPP weights are used later on as data input in the PE model that will be explained in detail in chapter 4. The following section of this chapter explains the theoretical impact on the economies that occur due to the tariff, quota and NTM changes.

3.2 Economic changes of the treaty

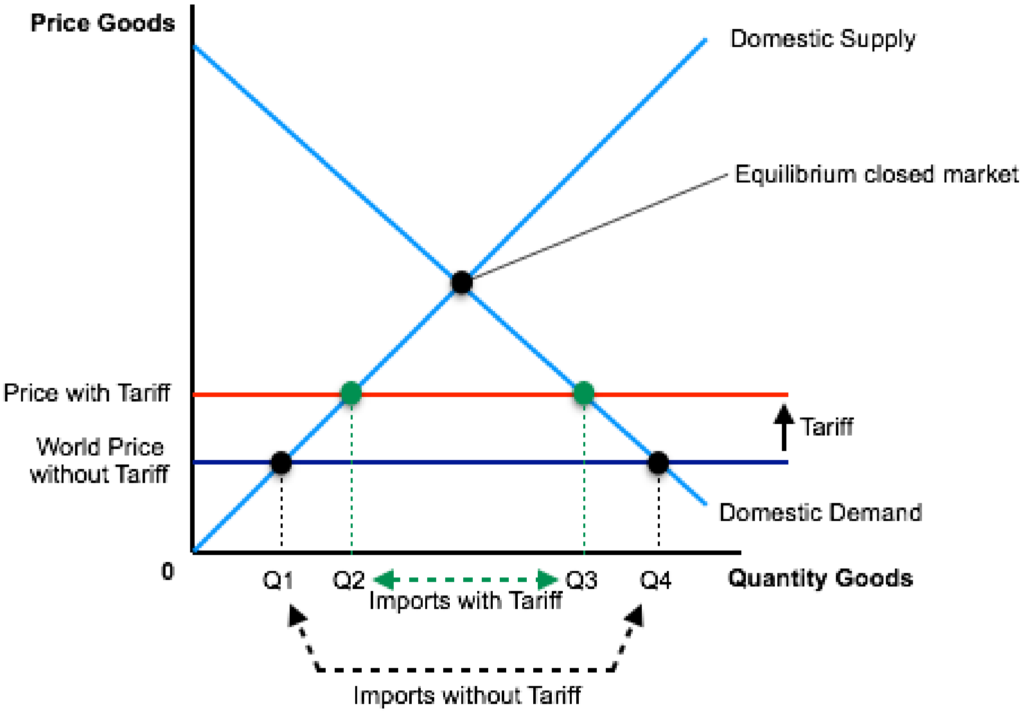
In this section we will provide a theoretical description of the consequences that could result from the TPP agreement. Therefore, this section explains the effects of import tariff reductions, NTM's and import quota on the quantity and prices of the traded goods.

According to Mankiw & Taylor (2014), trade knows winners and losers depending on a countries domestic market and the world prices (Mankiw & Taylor, Economics, 2014). When a countries closed market price is lower than the world price of a specific good, the country will become a net exporter of the good when the market is open for trade. The other way around, a country will become a net importer in an open market when the domestic price of a good is higher than the world price in a closed market. Tariffs, quota's and NTM's are the tools used to protect the domestic market from the world prices in an open market.

In this section we begin to explain the theoretical impact of the reduction schedules on import tariff that have been agreed upon in the TPP treaty. The equilibrium of closed market represents the price and quantity of a good in a market that is not participating in world trade. Since the domestic price is higher than the world price, the country will be a net importer once it participates in world trade. In case of world trade participation, the domestic supply to the market will decrease from the equilibrium to point Q1, the domestic demand will increase from the equilibrium to point Q4 due to the decreased price of the good. In this scenario the domestic market losses its ability to supply more to its market due to the competitive import goods. Consequently, this scenario has a negative effect for the domestic producers of the good but a positive effect for the domestic consumers of the good.

In many of the current markets for MPS&W, according to table 16, the TPP governments have imposed import tariffs. Figure 9, shows how imposed imports tariff increases the price of the good. Therefore, domestic producers can supply more goods to the market, as their supply level increases again from Q1 to Q2. Domestic consumers demand fewer goods due to the increased price, as their demand level decreases from Q4 to Q3. Hence, current import tariffs in the TPP countries favour domestic producers but hurt domestic consumers that demand less at a higher price.

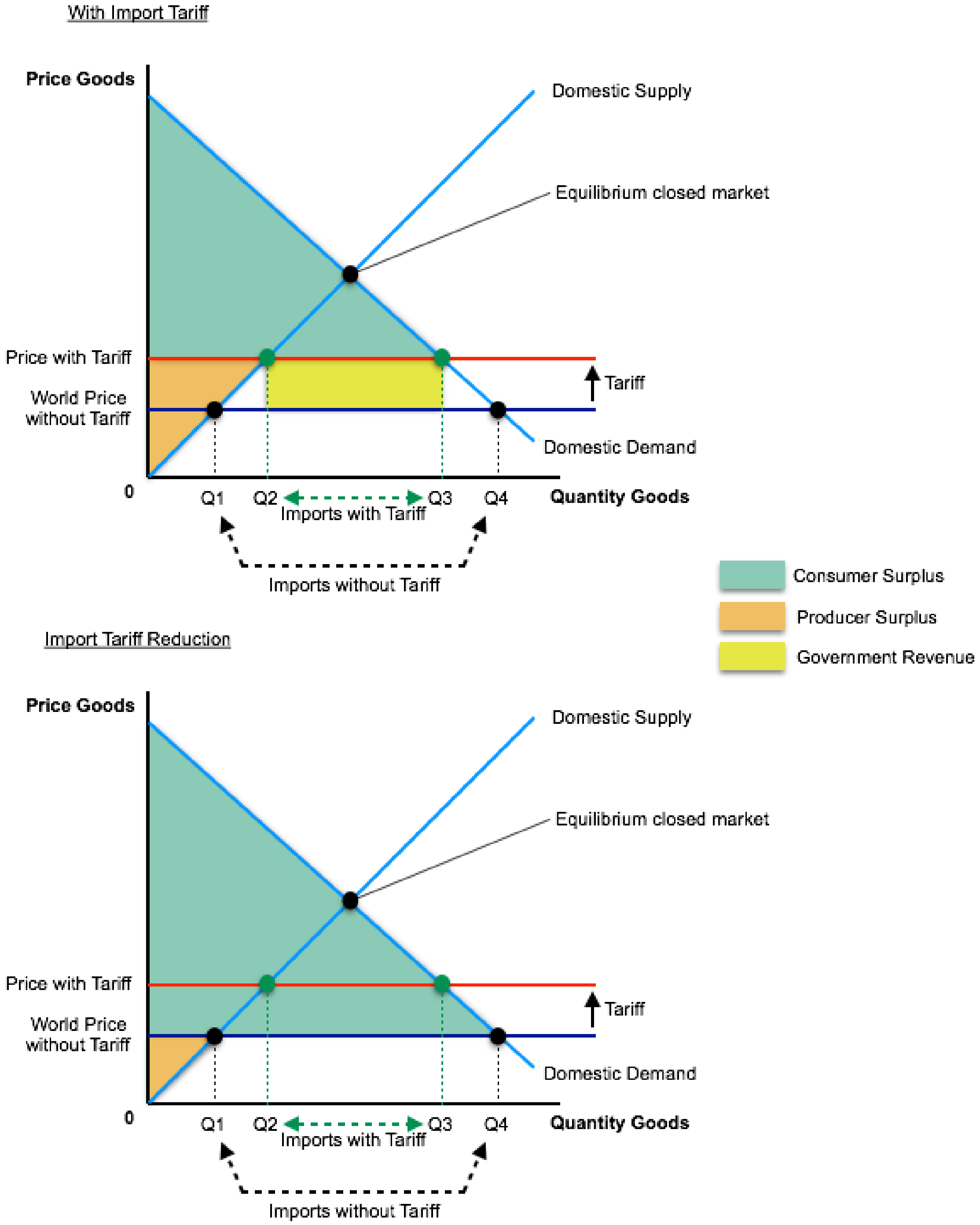
Figure 9: Effect of an import tariff



Source: Author via Mankiw & Taylor (Mankiw & Taylor, Economics, 2014)

The effect of the TPP agreement will result in the opposite, as the currently imposed tariffs will be reduced to zero. Therefore, domestic producers, of import tariff imposing parties, are expected to experience a negative effect, as they will be able to supply fewer goods to the domestic markets as a result of the prices decrease. The domestic consumers, of import tariff imposing parties, are expected to experience a favorable effect, as they will be able to consume more products at the reduced price level. The positive effect described is reflected in figure 10 through the consumer surplus that shows an increase when the import tariffs are reduced. “The consumer surplus measures the benefit to buyers of participating in a market, as it reflects the buyers willingness to pay minus the amount the buyer actually pays” (Mankiw & Taylor, Economics, 2014). The negative effect for the domestic producers is also reflected in figure 10 through the producer surplus. “ The producer surplus is the amount a seller is paid for a good minus the sellers costs” (Mankiw & Taylor, Economics, 2014). Consequently, the producer surplus decreases when the import tariffs are reduced.

Figure 10: Tariff reduction effect on producer & consumer surplus

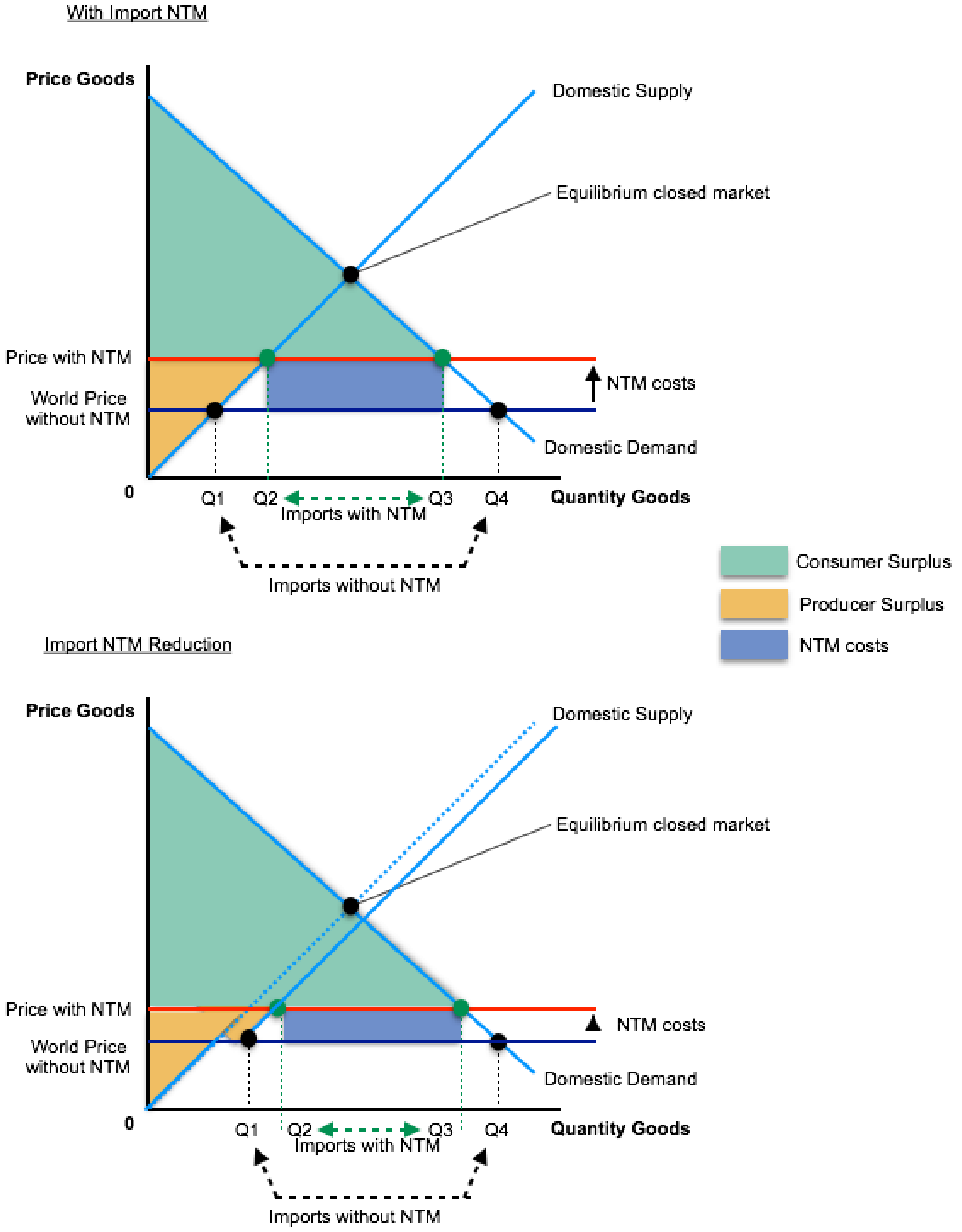


Source: Author via Mankiw & Taylor (Mankiw & Taylor, Economics, 2014)

Following the explanation of the reduction of import tariffs, we will explain how the market is affected when NTM's are reduced because it has been explained in the former section that we assume the NTM's between the TPP countries to slightly reduce in costs due to more transparency. The initial market situation will remain the same as presented in figure 9, only the word tariff should be changed to NTM. Figure 11 presents the change that takes place when the NTM is reduced. Since the NTM is a costs component and is paid by producers that import and export the product.

Therefore, we see a shift in the supply curve of the goods since the reduced NTM allows more trade at lower prices. Hence, consumer surplus increases and producer surplus remains the same because they gain trade and pay less NTM costs.

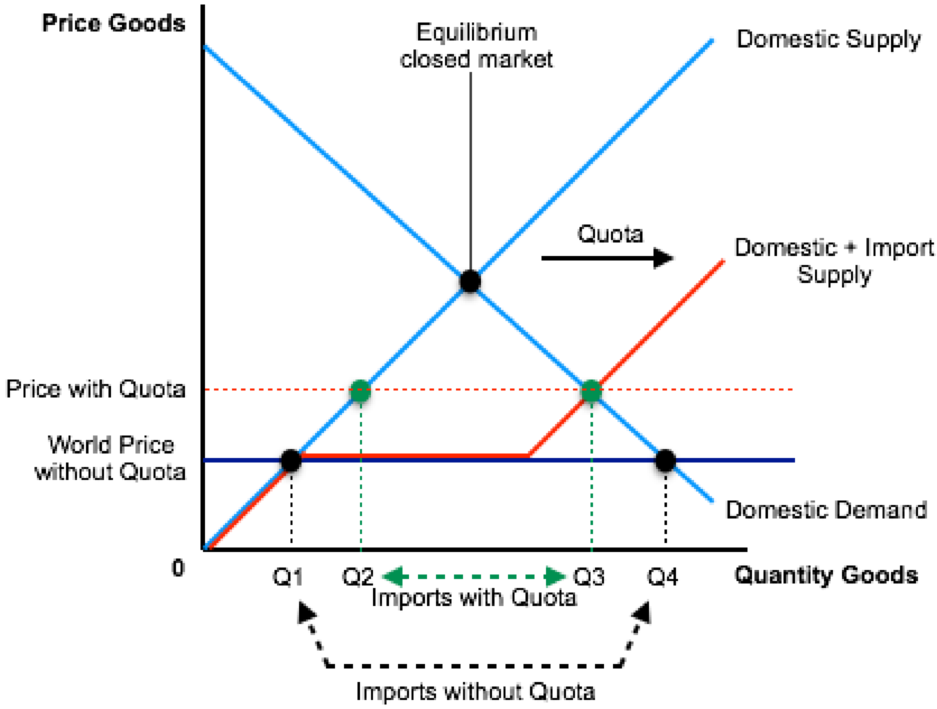
Figure 11: NTM reduction effect on producer & consumer surplus



Source: Author via Mankiw & Taylor (Mankiw & Taylor, Economics, 2014)

Following the explanation of the reduction of NTM reductions, we will explain the theoretical impact of import quota. According to table 16, Mexico has decided upon special agreements regarding the reduction of import quota on palm oil originating from Malaysia. Figure 12 displays again the price level of the equilibrium at closed market and the price decrease to world price at Q1 and Q4 when they participate in world trade. When an import quota is activated the domestic supply quantity increases from point Q1 to Q2 because the quota increases the domestic price above the world price. Resulting in a decreased domestic demand that shifts from point Q4 to Q3. Therefore, an import quota reduces the quantity of imported goods and shifts the market closer to the original equilibrium that excised without world trade. Consequently, the domestic producers are positively impacted whereas the domestic consumers are negatively impacted. Additionally, the government imposing the quota profits from the price difference between the import and the sale of the foreign good.

Figure 12: Effect of an import quota

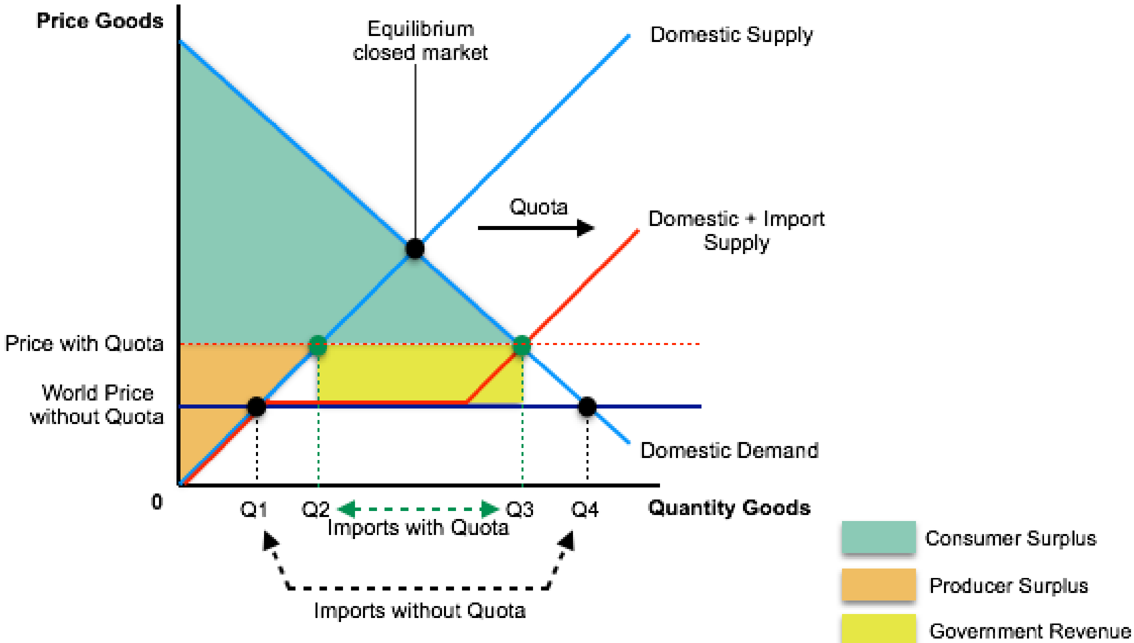


Source: Author via Mankiw & Taylor (Mankiw & Taylor, Economics, 2014)

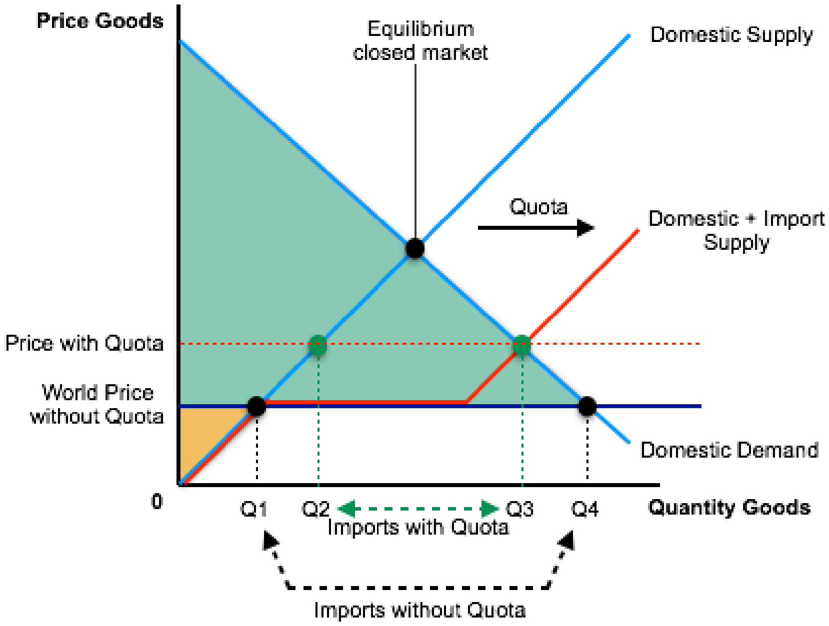
The effect of the TPP agreement will result in the opposite for Mexico and Malaysia, who is the exporter of the palm oil. Within the TPP agreement, Mexico has agreed to lift the tariffs changed upon the allowable quota of palm oil from Malaysia. Therefore, the imports within the quota reflect the world price, causing a negative effect to domestic producers, as they will supply less to the domestic markets due to the lower prices. The domestic consumers experience a positive effect since they demand more products for the lower prices. Additionally, the exporting party also experiences a positive effect since the tariff will be reduced on duty-free quota, and the quantity of the quota increases during the first 3 years. The effects of these changes on the producer and consumer surplus are reflected in Figure 13. Additionally, the revenue made by the government through the tariff charges on the quota will disappear after the introduction of the duty-free quota.

Figure 13: Duty-free quota effect on producer & consumer surplus

Tariff on quota



Duty-free quota



Source: Author via Mankiw & Taylor (Mankiw & Taylor, Economics, 2014)

Unlike the tariff and quota changes, the changes in the NTM cannot be illustrated by graphs. Therefore, a theoretical explanation on the expected changes in NTM's is provided.

According to Mankiw & Taylor (2014), the main NTM's consist of quality control regulations, sanitary or phyto sanitary condition requirements and administrative regulations (Mankiw & Taylor, Economics, 2014). Quality control consists of strict regulations relating to technical specifications, health and safety of the product

production standard. Hence, countries require precise details about the products before allowed for imported or exported. These conditions are not expected to change due to the TPP. However, the process and requirements must be more transparent according to the TPP, which could save countries some time.
The sanitary and phyto sanitary condition requirement are also not expected to change. These conditions require exporters to provide details on the health of the products, considering MPS&W are food products, these requirements are expected to have very high standards that remain the same. Meeting those requirements is expensive and those cost will remain the same. Therefore, little change can be expected for regarding the sanitary and phyto sanitary requirements.
The administrative regulations will experience changes due to the TPP, since increased transparency makes the process easier and quicker. Many countries requirement certain paper works to be finalized before goods can enter the country, which can be a costly process. The increased transparency requirements that TPP imposes therefore lead to decreased costs since the process is transparent in its requirements. Considering these changes, the TPP has less ambitious goals regarding the NTM's since transparency only decrease costs by a small percentage. The conditions and requirements remain the same and therefore still add many costs to the import and export process of products.

The next chapter of this research paper will explain the methodology used to calculate the value of the changes that occur in the producer & consumer surplus of each country and region, as a result of the TPP agreement.

4. RESEARCH METHODOLOGY AND DATA

With the intention to assess the macroeconomic impact of the TPP agreement a PE model is used to simulate the expected changes. The aim of this chapter is to introduce the quantitative models and provide an explanation on how they analyze the expected changes.

The use of the PE models dates back to 1960 where the first model was that of Johansen. The analytical approach of the PE models refers to the economy as a complete system of independent components such as markets, industries and households. Through the use and interaction of the different components it is possible to analyze the affect of economic shocks or other disruptions for each component separately (Rumler, 1999). As the output of a PE model is numerical it can be used again in a different model, as we will do in this thesis.

Both models that are used in this thesis focus on the bilateral trade flows between the TPP countries and left over global regions. The first model, the GSIM model, is the sort of PE model used to calculate how the trade flows are affected by the changes of the tariffs. Section 4.1, first explains why the GSIM model is chosen for this research and continues with a detailed explanation of the model and therewith also answer the fourth sub-research question. Section 4.1.1 will describe the different scenarios that will be used for the different runs of the GSIM model. The second model will transform the output of the GSIM model into maritime trade flows.

4.1. The Global Simulation model (GSIM)

The GSIM model is the PE model chosen for the purpose of this research paper, as it is specially designed for the analysis of global trade policy changes (Francois & Hall, 2003). Unlike the GTAP model, it is a lighter model that can be run in excel. However, the GTAP model is more accurate due to the increased number of input variables. Since both models are only able to tackle the effects between domestic and imported prices we have chosen the lighter GSIM model that requires less variables (Fugazza & Maur, 2007).

Since the changes that result from the TPP agreement have been analyzed in chapter 3.1, we will determine how the trade flows change according to the GSIM model that has been developed by Francois & Hall (2003). Because it is a partial equilibrium model and therefore requires less input variables, it implies some practical limitations. On the contrary, because little variables are required it does provide a transparent analysis that rapidly shows useful insight of a changing environment with the limitations kept in mind (Francois & Hall, 2003). The GSIM model provides numerical results on the changes in trade flows as well as welfare effects that are expressed in producer surplus, consumer surplus and tariff revenue.

The different calculations of the GSIM model are constructed into a few larger systems of equations. Frist, the import market is determined using the following equation:

Equation 1

$$\widehat{\mathrm{M}}_{(i,v),r} = \sum_{v} \mathrm{N}_{(i,v),(r,r)}\left[\mathrm{P}_r^{\ *} + \widehat{\mathrm{T}}_{(i,v),r}\right] + \sum_{v}\sum_{s\neq r} \mathrm{N}_{(i,v),(r,s)}\left[\mathrm{P}_s^{\ *} + \widehat{\mathrm{T}}_{(i,v),s}\right]$$

Where:

$\mathrm{N}_{(i,v),(r,r)}$ = Own price demand elasticity

$\mathrm{N}_{(i,v),(r,s)}$ = Cross-price elasticity

$\mathrm{P}_r^{\ *}$ | $\mathrm{P}_s^{\ *}$ = Export price received by exporter r | s

$\widehat{\mathrm{T}}_{(i,v),r}$ = The power of the tariff, T=(1+t)

From equation 1 the sum over import markets can easily be made. Once the world prices and import quantities have been solved the following equation can be solved backwards to result in the export quantities:

Equation 2

$$\widehat{\mathrm{M}}_{(i,v),r} = \mathrm{N}_{(i,v),(r,r)}\widehat{\mathrm{P}}_{(i,v),r} + \sum_{s\neq r} \mathrm{N}_{(i,v),(r,s)}\widehat{\mathrm{P}}_{(i,v),s}$$

Equation 1 and 2 from the basis of the GSIM model and allow the welfare effects to be calculated accordingly. We will describe the calculation of the producer surplus in equation 3, and the consumer surplus in equation 4:

Equation 3

$$\Delta PS_{(i,r)} = \left(R^0{}_{(i,r)} \cdot \hat{P}_{i,r}{}^{*}\right) \cdot \left(1 + \frac{E_{X,(i,r)} \cdot \hat{P}_{i,r}{}^{*}}{2}\right)$$

Equation 4

$$\Delta CS_{(i,v)} = \left(\sum_{r} R^0{}_{(i,v),r} \cdot T^0{}_{(i,v),r}\right) \cdot \left({}^{1}\!/_{2}\ E_{M,(i,v)}\, \hat{P}_{(i,v)}{}^{2} \cdot sign\left(\hat{P}_{(i,v)}\right) - \hat{P}_{(i,v)}\right)$$

Where:

$R^0{}_{(i,r)}$ = Benchmark export revenues

$\hat{P}_{i,r}{}^{*}$ = World price

$E_{X,(i,r)}$ = Elasticity of export supply

$\widehat{\mathrm{T}}_{(i,v),r}$ = The power of the tariff, T=(1+t)

$E_{M,(i,v)}$ = Aggregate import demand elasticity

Within the system that has been developed through equations 1,2,3 and 4 the effect can be distinguished between trade creation and trade diversion. Trade creation is the effect generated by the tariff reductions of the country it self. Trade diversion is the effect generated by the tariff reduction of imports from third countries. Both creation and diversion add to the import demand in equation 1 and 2. Equation 5 and 6 show how the two values can be derived:

Equation 5

$$Trade\ creation\colon\ TC_{(i,v),r} = M_{(i,v),r}\ x\ (N_{(i,v),(r,r)}\ \hat{T}_{(i,v),r})$$

Equation 6

$$Trade\ Diversion\colon\ TD_{(i,v),r} = M_{(i,v),r}\ x \sum_{s \neq r} N_{(i,v),(r,s)}\ \hat{T}_{(i,v),s}$$

Where:

$M_{(i,v),r}$ = Import market

$N_{(i,v),(r,r)}$ = Own price demand elasticity

$N_{(i,v),(r,s)}$ = Cross-price elasticity

$\hat{T}_{(i,v),r}$ = The power of the tariff, T=(1+t)

Some limitations of the model arise by the assumptions. A first assumption forming a limitation is that products from different sources are held constant as imperfect substitutes. In principal this is considered useful as MPS&W coming from different regions have different specifications. However, we would rather let the distance of transportation make the difference between product substitutions. The second assumption that forms a limitation of the model is that both demand and supply elasticity's are held at a constant rate. Meaning that re-occurring price changes lead to the same result, as the elasticity curve remains unchanged. This limitation should be kept in mind when looking at the results of the model, as the real-world elasticity curves are usually affected by many different market factors. The following section explains how the values of elasticity's and substitution have been acquired.

4.1.1 Product elasticity and substitution

This section of the chapter explains how the elasticity and substitution numbers have been acquired for the different products. This data forms an important input for the GSIM model that has been explained in the former section.

The required data exists of demand elasticity, supply elasticity and the substitution value. The GSIM model requires this information in order to calculate the effect of price changes on the demand and supply within the different countries. The data on demand elasticity's have been acquired from a study on import demand elasticities and trade distortions (Kee, Nicita, & Olarreaga, 2008). Table 21 shows the demand elasticities (D / E) in green that have been calculated through this study. The other

numbers are estimates based on the outcome of similar countries since the study had not presented these figures for all relevant countries.
The data for supply elasticity has been estimated based on figures found for Australian wheat that would range between 0.47 and 1.66 (Griffith, I'Anson, Hill, & Vere, 2001). Additionally, we have rated the different countries and regions according to three elasticity facts. Each question would score 3 letters: H for high elasticity, M for medium elasticity and L for low elasticity. Considering Australia's score, we have assigned them a high 1.66 supply elasticity. Therefore, H scored a 1, M scored a 0.33 and L scored a 0.11, for all countries and regions the total score of the three questions forms their supply elasticity. Column S / E in table 21 shows the total scores per country and region, the details of the questions and the ratings can be found in appendix – E.
The substitution values are not easily found since only a few studies have quantified them. At the website of the Australia productivity commission we have found a paper that has quantified substitution values for New Zealand. We have found that according to this study wheat, grain and forestry present a 2.2 and 2.8 elasticity of substitution value between imported and domestic products. On the other hand, a 4.4 and 5.6 elasticity of substitution value is found among imports from different sources (Zeitsch, et al., 1991). Therefore, in our model we will use the 4.4 and 5.6 elasticity of substitution values since trade takes place everywhere around the globe. Additionally, these values will represent the substitution elasticity of the other TPP countries and regions since the products are constantly traded on a global basis.

Table 21: Demand elasticity, supply elasticity & substitution

	Maize			Palm Oil			Soybean			Wheat		
	D / E	S / E	Sub	D / E	S / E	Sub	D / E	S / E	Sub	D / E	S / E	Sub
Australia	-0,60	1,22	4,4	-0,35	1,22	5,8	-0,83	0,33	4,4	-3,24	1,66	4,4
Brunei	-0,87	1,44	4,4	-0,39	2,11	5,8	-0,98	0,33	4,4	-119,39	1,22	4,4
Canada	-0,32	1,44	4,4	-0,63	0,33	5,8	-0,42	2,33	4,4	-166,07	1,44	4,4
Chile	-0,74	1,44	4,4	-0,24	0,55	5,8	-0,51	2,11	4,4	-0,67	1,44	4,4
Japan	-0,97	2,11	4,4	-0,55	0,33	5,8	-0,87	1,44	4,4	-6,90	2,11	4,4
Malaysia	-0,99	1,44	4,4	-0,94	3,00	5,8	-0,98	0,33	4,4	-1,61	1,22	4,4
Mexico	-0,52	2,33	4,4	-0,50	1,44	5,8	-0,97	0,33	4,4	-3,82	1,22	4,4
New Zealand	-0,60	1,22	4,4	-0,30	1,22	5,8	-0,83	0,33	4,4	-3,24	1,44	4,4
Peru	-0,74	2,33	4,4	-0,24	0,55	5,8	-0,40	2,11	4,4	-0,97	1,44	4,4
Singapore	-0,65	1,44	4,4	-0,86	2,11	5,8	-0,79	0,33	4,4	-3,86	1,22	4,4
USA	-0,32	2,11	4,4	-0,63	0,33	5,8	-0,42	3,00	4,4	-72,33	2,11	4,4
Vietnam	-0,92	1,66	4,4	-0,52	2,11	5,8	-0,95	0,33	4,4	-0,44	1,22	4,4
Africa	-0,82	0,77	4,4	-0,87	1,66	5,8	-0,66	0,33	4,4	-0,74	0,77	4,4
Ro - Central America	-0,63	1,66	4,4	-0,62	1,66	5,8	-0,91	0,33	4,4	-0,96	1,22	4,4
Ro - South America	-0,72	2,11	4,4	-0,63	0,77	5,8	-0,75	3,00	4,4	-0,86	0,77	4,4
Ro - Central & East Asia	-0,97	2,11	4,4	-0,55	0,33	5,8	-0,94	1,66	4,4	-0,75	2,11	4,4
South Asia	-0,66	0,77	4,4	-0,74	0,33	5,8	-0,75	1,66	4,4	-0,98	2,11	4,4
Ro - South-East Asia	-0,92	1,66	4,4	-0,52	3,00	5,8	-0,95	0,33	4,4	-0,44	1,22	4,4
Middle East	-0,55	0,77	4,4	-0,81	1,22	5,8	-0,71	0,33	4,4	-0,74	0,77	4,4
Western Europe	-0,60	0,77	4,4	-0,42	1,66	5,8	-0,83	0,33	4,4	-0,60	2,11	4,4
Eastern Europe	-0,72	0,77	4,4	-0,66	0,33	5,8	-0,60	1,66	4,4	-0,46	2,11	4,4

Source: Author via (Griffith, I'Anson, Hill, & Vere, 2001), (Kee, Nicita, & Olarreaga, 2008) & (Zeitsch, et al., 1991)

The values of table 21 form the last input data for the GSIM model. Therefore, the next section will explain the scenarios according to the tariff reduction scheme in table 16.

4.1.2 GSIM scenarios per commodity

Now that the method of calculation and the changes occurring by the TPP are clear, we can define the scenarios for which we are going to run the GSIM model. As we have seen from section 3.1, most of the excising MPS&W tariffs have been agreed to reduce to 0% in the first year. The three exceptions being Mexico, Peru and Vietnam, all setup a different reduction scheme regarding the imports of palm oil. Therefore we will run only one scenario for the tariff reduction for maize, soybean and wheat. For palm oil we will run several scenarios where we will implement the different tariff reductions to simulate what the effect is on a yearly basis. Since the longest reduction schedule is that of Peru, when the 9% import tariff is reduced to 0% in 11 years, we will run 11 scenarios. However, when the change between year 2 and 11 is insignificant we will only decide to present the changes of year 1.

Since the output of the GSIM model is reflected as change in trade value, we will before hand determine the value per tonnage based on the 2013 trade value and trade volume. For each scenario that we run, we will use the value per ton to calculate the trade flow volume in tons. Additionally, we will use a second model to translate the trade flow from volumes in tons to volumes in vessels. The next section explains the details of the second model that assigns vessel sizes to the global trade routes.

4.2. Vessel type and carrying capacity scheme

The second model that we will use, transforms the output of the first model. The output of the GSIM model results in the change in trade flow value. Since we have calculated the initial value per tonnage, we will adjust these figures for the price change that is reflected in the GSIM. With the adjusted value per tonnage we will calculate the new trade flow value to volume in tonnage. The new volume in tonnage per trade route is used in the second model to reflect the flow in number vessels on an annual basis.

According to the literature that we have gathered in section 2.1.5 and 2.2, we will assign vessels to the different trade routes per product type. Through the use of this model, it will be easier to distinguish the changes that potentially occur due to the TPP. Additionally, it allows us to design more accurate advices for the deployment of certain vessels on routes, and on the requirement of port infrastructures.

For each of the TPP ports we have analyzed to different details such as maximum draught, maximum DWT, annual throughput tonnage and annual vessel visits. Therefore, we will assign a vessel type that is mostly used according to the opinions of freight specialist 1 and 2 and that fits to the limitations of the relevant ports. The vessels assigned to the regions other than the TPP countries will be solely based on the advice of freight specialist 1 and 2 since we have not analyzed the details of all those ports.

For the purpose of this research we have chosen several vessels with a pre-determined size to create the model. The bulk products maize, soybean and wheat are transported in: post-panamax 93,000 DWT, panama 74,000 DWT or handymax

58,000 DWT. The amount of product loaded for maize and wheat per vessel per trip is: post-panamax 85,000 MT, panamax 68,000 MT and handymax 55,000 MT. For soybean the product loaded per vessel per trip is: post-panamax 80,000 MT, panamax 64,000 MT and handymax 51,000 MT. The liquid product of palm oil is transported in tankers: MR2 35,000 DWT, MR1 20,000 DWT and coaster 13,000 DWT. The amount of palm oil product loaded per vessel per trip is: MR1 33,500 MT, MR2 18,500 MT and coaster 12,000 MT.

Table 22: Maximum and most used vessel size per port

Port to & from	**Maize**	**Palm oil**	**Soybeans**	**Wheat**
Australia	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Brunei	Post-Panamax	Coaster	Post-Panamax	Post-Panamax
Canada	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Chile	Handymax	Coaster	Handymax	Handymax
Japan	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Malaysia	Post-Panamax	MR2	Post-Panamax	Post-Panamax
Mexico	Handymax	MR2	Handymax	Handymax
New Zealand	Handymax	Coaster	Handymax	Handymax
Peru	Handymax	Coaster	Handymax	Handymax
Singapore	Post-Panamax	MR2	Post-Panamax	Post-Panamax
USA	Post-Panamax	MR2	Post-Panamax	Post-Panamax
Vietnam	Post-Panamax	MR2	Post-Panamax	Post-Panamax
Africa	Handymax	MR2	Handymax	Handymax
Ro – Central America	Handymax	MR1	Handymax	Handymax
Ro – South America	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Ro – Central East Asia	Post-Panamax	MR1	Post-Panamax	Post-Panamax
South Asia	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Ro – South East Asia	Post-Panamax	MR1	Post-Panamax	Post-Panamax
Middle East	Post-Panamax	MR2	Post-Panamax	Post-Panamax
Western Europe	Post-Panamax	MR2	Post-Panamax	Post-Panamax
Eastern Europe	Panamax	MR2	Panamax	Panamax

Source: Author via advice of Freight specialist 1 & 2

For each of the products, vessels have been assigned per trade route in excel that we called the vessel capacity scheme. The maximum vessel size is chosen based on the limitation of the import and export ports. The new trade flow values that result from the GSIM model, are transformed into volume tonnage according to the price adjustments. The difference between the pre-TPP and post-TPP volumes is calculated and filtered by the vessel capacity scheme. The results present the annual change in number of vessels due to the changes occurring from the TPP agreement. Now that the data sets are complete and the models have been explained we can run the models and analyze the results. The next chapter presents the results of the different products and scenarios.

5. RESULTS AND ANALYSIS

This chapter presents the results of the GSIM model that is focused on the economic impact, and the vessel capacity scheme that is focused on the changing trade flow volume. The GSIM model is focused on showing the macro economic changes in price, trade value and welfare effect. Therefore, it allows us to analyze the effects it has for producers and consumers in the different countries and regions, according to the theoretical explanation provided in section 3.2. The vessel capacity scheme allows us to analyze the expected changes in number of vessels deployment on the different trade routes.

5.1. Economic and trade results

As has been discussed in chapter 4, the GSIM model calculates the change in prices, trade value and welfare based on the changes in tariff and NTM's, steered by the demand, supply and substitution elasticity's. For each of the products MPS&W, we will first discuss the economic welfare results of the GSIM model followed by the results of the trade flow volume changes that are projected by the vessel capacity scheme. Since we have not speculated about any results we will analyze the details of the changes rather than confirming an expectation.

5.1.1. Result market 1: Maize

After the reduction of ad valorem tariffs and lowering the NTM's between the TPP countries, the economic and trade projections have been generated for the TPP countries and the remaining global regions. GSIM simulated the expected economic impact of the TPP agreement on the maize market. Results of the GSIM model are projected in table 23.
The results show that with the elimination of the tariff and reduction of the NTM's for maize between the TPP countries, the effect reaches all countries/regions participating in the global trade thereof. Observations of the net welfare effect show that the USA and Japan are subject to the largest economic changes. The elimination of the high ad valorem tariff of 31% (see appendix A) that Japan levies on USA maize causes maize prices in Japan to decrease, and import quantities to increase. Consequently, increasing the value of the Japanese consumer surplus, as has been explained in section 3.2. However, since the Japanese governments loss on the ad valorem tariff revenue is larger than the consumer surplus gain, the net welfare effect for Japan is negative. The fact that the government loss on tariff revenue is bigger than the consumer surplus gain indicates that the Japanese markets have not reached world price levels. On the other hand, the USA is projected to experience a positive net welfare effect partially by the increased producer surplus as a result of the increased exports to Japan. The net welfare effect of all TPP countries together, results in a positive value of **$ 141,128,000**.

When observing the results for the remaining global regions that have not enter into the TPP agreement, we see a difference between the two largest importers of maize. Western Europe, the largest importer of maize, can expect a small price decrease resulting in a positive net welfare effect. On the contrary, the second largest importer of maize, the rest of Central East Asia, can expect a though price increase due to lower imports from USA that lead to a negative net welfare effect for the region. The total net welfare effect of all non-TPP regions combined, result in a negative value of **$ -281,054,000**. Therefore, the economic impact of the TPP agreement is significantly different for the TPP countries and the non-TPP regions.

Table 23: Maize GSIM output summary (in $1,000)

	Producer analysis		Consumer analysis					
	A	B	C	D	E	F		
Country/Region	Producer surplus	Export value change ($)	Consumer surplus	Import value change ($)	Consumer prices change	Government tariff revenue	Net welfare effect (A+C+F)	
Australia	$ 2.400	5.312	$ 18	25	-1,2%	$ -	$ 2.418	
Brunei	$ 0	0	$ 18	- 3	-0,5%	$ -	$ 18	
Canada	$ 8.977	19.878	$ -5.152	13.841	1,7%	$ -	$ 3.825	
Chile	$ 4.020	8.908	$ 18.906	- 4.402	-0,4%	$ -2	$ 22.924	
Japan	$ -	-	$ 534.005	547.435	-10,3%	$ -786.157	$ -252.152	
Malaysia	$ -278	- 622	$ 1.815	18	-0,2%	$ -	$ 1.537	
Mexico	$ 2.303	5.086	$ -50.563	68.426	2,5%	$ -	$ -48.260	
New Zealand	$ -32	- 70	$ -17	23	0,5%	$ -	$ -48	
Peru	$ -67	- 149	$ 538	1.328	-0,1%	$ -	$ 472	
Singapore	$ 0	0	$ 4	6	0,0%	$ -	$ 5	
USA	$ 392.537	848.944	$ 16.777	13.867	-1,2%	$ -	$ 409.314	**TPP Total**
Vietnam	$ -	-	$ 1.077	- 52	-0,2%	$ -	$ 1.077	**$ 141.128**
Africa	$ -10.468	- 23.197	$ 14.081	- 3.076	-0,4%	$ -335	$ 3.278	
Ro-Central America	$ 267	590	$ -28.003	5.480	2,2%	$ -	$ -27.736	
Ro-South America	$ -64.620	- 143.725	$ -26.421	724	1,2%	$ 617	$ -90.424	
Ro-Central East Asia	$ 386	852	$ -106.069	33.447	1,9%	$ -51.270	$ -156.953	
South Asia	$ 255	566	$ 1.166	- 869	-0,1%	$ -18	$ 1.402	
Ro-South-East Asia	$ -236	- 523	$ 875	- 343	-0,1%	$ 9	$ 648	
Middle East	$ -41	- 91	$ 636	- 1.793	0,0%	$ 36	$ 632	
Western Europe	$ -4.896	- 10.867	$ 10.596	- 5.287	-0,1%	$ -	$ 5.700	**Non-TPP total**
Eastern Europe	$ -19.322	- 42.875	$ 1.617	- 776	-0,1%	$ 104	$ -17.600	**$ -281.054**

Source: Author

In addition to the economic analysis, the GSIM model also generated a projection of the expected change in bilateral trade flow values. These projected values formed the input data for the vessel capacity scheme that calculates it back to trade flow volumes in tones by adjusting the price per tonnage for is percentage change reflected in table 23, column E. Additionally, the volume change is transformed into a number of vessels per trade route. The results of the second model are summarized in table 24 that only shows the changes per route with a minimum of 1 full vessel. The complete overview of the changes can be found under appendix-F.

Table 24: Maize vessel change per route

Origin	Destination	Vessels pre-TPP	Vessels post-TPP	Vessel type
USA	Japan	72.8	+54.4	Post-Panamax
USA	Mexico	119.6	+3.1	Handymax
USA	Ro-Central America	37.1	-3.9	Handymax
USA	Ro-South America	22.4	-3.3	Post-Panamax
USA	Ro-Central & East Asia	71.3	-9.0	Post-Panamax
Africa	Japan	13.5	-4.7	Handymax

Ro-South America	Japan	65.1	-24.5	Post-Panamax
Ro-South America	Ro-Central America	45.7	+4.3	Handymax
Ro-South America	Ro-South America	59.5	+3.4	Post-Panamax
Ro-South America	Ro-Central & East Asia	105.2	+8.0	Post-Panamax
Eastern Europe	Japan	20.5	-7.8	Panamax
Eastern Europe	Ro-Central & East Asia	31.4	+2.3	Panamax

Source: Author

When observing the results that are presented in table 24, we see how strong the TPP effect is on the USA exports to Japan at the cost of exports from Ro-South America to Japan. For simplicity we have provided a net vessel change for the importing countries/regions in table 25. Accordingly, we see that the TPP leads to a changing vessel deployment per route and an overall increase of maize exports transported by ocean carriers.

Table 25: Net vessel change maize import

Destination	**Net vessel change**	**Vessel type**
Japan	+17.4	Post-Panamax
Mexico	+3.1	Handymax
Ro-Central America	+0.4	Handymax
Ro-Central East Asia	+1.3	Post-Panamax
Ro-South America	+0.1	Post-Panamax

Source: Author

5.1.2. Result market 2: Palm oil

The expected economic impact simulated by the GSIM model for the trade in palm oil, is projected in table 26. The results show that the positive or negative effect is divided between the TPP and non-TPP countries. Observations of the net welfare effect show that Malaysia is subject to the largest economic change as a result of the increased exports. Consequently, the Malaysian producer surplus increases in value since the increased exports outweigh the decrease in prices. The consumer surpluses of the other TPP countries increase in value due to the effect of lower prices stimulating more imports. The loss in governmental revenue for the TPP countries is mostly outweighed by the increased consumer surplus value. Therefore, the combined net welfare effect for the TPP countries results in a positive value of **$ 58,995,000**.

When observing the results for the remaining global regions that did not enter into the TPP agreement, we see that the largest palm oil exporter is affected by the Malaysian export gain. The Ro-South-East Asia can expect a decrease in exports, and is also negatively impacted by the price decrease within the TPP countries. The consumer surpluses for the non-TPP regions mostly shows a negative value mainly due to slight increases in the imported volumes since the TPP agreement caused an increase in total exports. Therefore, the combined net welfare effect for the non-TPP regions results in a negative value of **$ -15,519,000**.

According to section 3.1 and 4.1.2, we planned to run 11 scenarios for the palm oil tariff elimination since (see table 16) Peru planned to lower the tariffs from 9% to 0%

within 11 years. Additionally, Vietnam planned to reduce the tariffs from 5% to 0% within 6 years, and Mexico kept a duty-free quota of 12,000 MT. Since the Mexican import quota doesn't reach its limits, and the changes caused by the Peruvian and Vietnamese reductions are so little within these 11 years, we have decided to only present the overall change after 11 years. Herewith, the overall welfare effect within the TPP countries is expected to experience a positive effect of **$243,000** within year 2 to year 11. The non-TPP regions are expected to experience a negative effect of **$-356,000** within year 2 to year 11. Therefore, we have chosen to present the results of the first year when most tariffs are eliminated and the impact is biggest.

Table 26: Palm oil GSIM output summary (in $1,000)

YEAR 1

	Producer analysis		Consumer analysis					
	A	B	D	E	F	G		
Country/Region	**Producer surplus**	**Export value change ($)**	**Consumer surplus**	**Import value change ($)**	**Consumer prices change**	**Government tariff revenue**	**Net welfare effect (A+D+G)**	
Australia	$ 2	5	$ 2.327	899	-3,5%	$ -	$ 2.329	
Brunei	$ 0	0	$ 79	39	-1,1%	$ -	$ 79	
Canada	$ 16	36	$ 2.927	1.806	-3,2%	$ -996	$ 1.947	
Chile	$ 0	0	$ 41	6	-0,3%	$ -0	$ 41	
Japan	$ 0	1	$ 6.934	4.375	-1,5%	$ -12	$ 6.923	
Malaysia	$ 17.228	38.196	$ 347	296	-0,1%	$ -	$ 17.575	
Mexico	$ 6	14	$ 1.155	255	-0,3%	$ -215	$ 946	
New Zealand	$ 0	1	$ 231	88	-1,9%	$ -	$ 232	
Peru	$ 2	4	$ 264	71	-0,9%	$ -131	$ 135	
Singapore	$ 283	628	$ 4.676	4.351	-0,5%	$ -	$ 4.959	
USA	$ 263	585	$ 12.534	8.570	-1,5%	$ -	$ 12.797	**Total TPP**
Vietnam	$ -	-	$ 11.033	6.210	-2,4%	$ -0	$ 11.033	**$ 58.995**
Africa	$ 135	301	$ -2.716	585	0,1%	$ -251	$ -2.832	
Ro-Central America	$ -697	-1.548	$ 109	-56	0,0%	$ 13	$ -575	
Ro-South America	$ -296	-656	$ 153	-68	0,0%	$ 11	$ -131	
Ro-Central East Asia	$ 3	6	$ -3.124	1.493	0,1%	$ -116	$ -3.238	
South Asia	$ 0	1	$ -3.703	62	0,0%	$ 857	$ -2.845	
Ro-South-East Asia	$ -3.675	-8.160	$ -467	222	0,1%	$ 0	$ -4.142	
Middle East	$ 25	56	$ -424	54	0,0%	$ 21	$ -378	
Western Europe	$ 310	689	$ -1.427	832	0,0%	$ -16	$ -1.133	**Total Non-TPP**
Eastern Europe	$ 5	12	$ -251	83	0,0%	$ -	$ -246	**$ -15.519**

Source: Author

The projection of expected bilateral trade value changes by the GSIM model have resulted in expected change of vessels per route that are presented in table 27. Only changes that reached up to 1 full vessel are presented, the complete overview can be found under appendix-F. From the results in table 27 and 28 we can see that the changes in vessels deployed on the different trade routes is rather small. The results show that the vessels change routes, where Malaysia exports more to USA and less to South Asia, the Ro-South-East Asia exports more to South Asia and less to USA. Accordingly, we see that TPP leads to small route changes for palm oil.

Table 27: Palm oil vessel change per route

Origin	Destination	Vessels pre-TPP	Vessels post-TPP	Vessel type
Malaysia	Japan	25.9	+1.0	MR1
Malaysia	USA	19.5	+1.5	MR2
Malaysia	South Asia	253.3	-1.3	MR1
Ro-South East Asia	USA	11.8	-1.3	MR2
Ro-South East Asia	South Asia	432.5	+1.1	MR1

Source: Author

Table 28: Net vessel change palm oil import

Destination	Net vessel change	Vessel type
Japan	+1.0	MR2
South Asia	-0.4	MR1
USA	+0.2	MR2

Source: Author

5.1.3. Result market 3: Soybean

The expected economic impact of the TPP agreement simulated by the GSIM model for soybean trade is projected in table 29. The results show that impact is rather different between the producers and consumers of soybeans. Observations of the net welfare effect shows that the effect is positive for the two largest soybean producers, Ro-South America and USA, but the effect is negative for the second largest consumer Ro-Central East Asia. Since only Chile eliminated ad valorem tariffs, it is interesting to notice that the changes mostly result from the reduction in NTM's. Consequently, the USA, Ro-South America and Canada are expected to increase export figures. As a result, the other TPP countries experience a positive effect from the price decrease due to which they import more soybeans. Therefore, the combined net welfare effect for the TPP countries results in a positive value of **$ 126,775,000**.

When observing the results of the remaining global regions that did not enter into the TPP agreement, we see that Ro-Central East Asia experiences the highest negative impact. Their imports are expected to increase while the price is expected to slightly increase as well. Therefore, their consumer surplus experiences a negative effect, and their governmental tariff revenues as well. The Ro-South America on the other hand, largest soybean producer and consumer, can expect their exports to increase which positively impacts their producer surplus. Therefore, their net welfare effect is positive. The combined net welfare effect of the non-TPP regions results in a negative value of **$ -122,923,000**.

Therefore, the TPP agreement is significantly more negative for the Non-TPP countries than it is for the TPP countries.

Table 29: Soybean GSIM output summary (in $1,000)

	Producer analysis		Consumer analysis					
	A	B	C	D	E	F		
Country/Region	Producer surplus	Export value change ($)	Consumer surplus	Import value change ($)	Consumer prices change	Government tariff revenue	Net welfare effect (A+D+G)	
Australia	$ 29	39	$ 4	- 1	-0,2%	$ -	$ 33	
Brunei	$ -	-	$ 6	9	-1,1%	$ -	$ 6	
Canada	$ 11.790	15.592	$ 2.938	1.377	-2,2%	$ -	$ 14.728	
Chile	$ 136	180	$ -0	2	0,0%	$ -	$ 136	
Japan	$ 1	2	$ 20.198	21.782	-1,2%	$ -	$ 20.199	
Malaysia	$ 15	19	$ 2.426	3.089	-0,7%	$ -	$ 2.440	
Mexico	$ 2	2	$ 24.435	27.577	-1,2%	$ -	$ 24.436	
New Zealand	$ 0	0	$ 14	17	-1,4%	$ -	$ 14	
Peru	$ 0	0	$ 61	101	-0,1%	$ -	$ 61	
Singapore	$ 2	3	$ 174	222	-0,7%	$ -	$ 176	
USA	$ 49.198	65.247	$ 7.952	5.301	-1,1%	$ -	$ 57.150	**Total TPP**
Vietnam	$ -	-	$ 7.395	8.176	-1,0%	$ -	$ 7.395	**$ 126.775**
Africa	$ -89	- 118	$ -1.768	560	0,2%	$ 34	$ -1.824	
Ro-Central America	$ 0	0	$ -424	38	0,2%	$ -	$ -424	
Ro-South America	$ 22.039	29.285	$ -582	135	0,1%	$ 9	$ 21.466	
Ro-Central East Asia	$ -907	- 1.209	$ -89.928	39.223	0,2%	$ -34.430	$ -125.265	
South Asia	$ -693	- 925	$ -436	93	0,1%	$ 11	$ -1.118	
Ro-South-East Asia	$ -10	- 13	$ -3.697	264	0,2%	$ -97	$ -3.804	
Middle East	$ -42	- 55	$ -1.551	439	0,1%	$ -	$ -1.592	
Western Europe	$ 1.141	1.518	$ -11.391	1.823	0,1%	$ -	$ -10.251	**Total non-TPP**
Eastern Europe	$ 754	1.002	$ -864	343	0,1%	$ -	$ -110	**$ -122.923**

Source: Author

The projection of the expected bilateral trade value changes generated by the GSIM model, have resulted in expected vessel changes that are presented in table 30. Only changes that reached up to 1 full vessel have been presented, the complete overview can be found under appendix-F. From table 30, we can see that the expected vessel changes are far less exciting than the economic changes. Mexico imports more soybeans from USA since prices decreased. And Ro-Central East Asia imports more soybeans from Ro-South America since they import less from USA and Canada (see appendix-F). Accordingly, we see that the TPP agreement causes some small changes in the global transportation of soybeans.

Table 30: Soybean vessel change per route

Origin	Destination	Vessels pre-TPP	Vessels post-TPP	Vessel type
USA	Mexico	53.8	+2.3	Handymax
USA	Ro-Central East Asia	514.4	-1.2	Post-Panamax

Source: Author

5.1.4. Result market 4: Wheat

The expected economic impact of the TPP agreement simulated by the GSIM model for wheat trade is projected in table 31. The results show that the impact is different between the exporters and importers. Observations of the net welfare effect show that the USA and Canada can expect to experience a large positive impact. With the elimination of ad valorem tariffs and reduction of NTM's the USA, Canada and several other countries and regions are expected to increase their exports. As a result, this leads to lower prices and increased import volumes in the TPP countries, which leads to a positive consumer surplus effect. Consequently, the expected combined welfare effect of the TPP countries results in a positive value of **$ 595,425,000**.

When observing the results of the remaining global regions that did not enter into the TPP agreement, we see that only Eastern Europe can expect a positive net welfare effect, as it is expected to increase exports and only slightly increase imports. Africa on the other hand, the largest importer of wheat is expected to experience a high negative net welfare effect. As it loses part of its imports to TPP competition, the prices increase and therefore cause the consumer surplus to experience a negative effect. Additionally, we see from the results that the regions lose exports originating from the TPP countries. Therefore, they must import from other regions that results in price increases and negative consumer surplus effects. The combined net welfare effect of the non-TPP regions results in a negative value of **$ -244,166,000**.

Therefore, the TPP agreement is expected to significantly favor its parties at the cost of other non-TPP regions in the maize market.

Table 31: Wheat GSIM output summary (in $1,000)

	Producer analysis		Consumer analysis					
	A	B	C	D	E	F	G	
Country/Region	**Producer surplus**	**Export value change ($)**	**Consumer surplus**	**Import value change ($)**	**Consumer prices change**	**Government tariff revenue**	**Net welfare effect (A+C+F)**	
Australia	$ 49.443	131.284	$ -0	- 0	0,4%	$ -	$ 49.443	
Brunei	$ -	-	$ 0	2	-0,1%	$ -	$ 0	
Canada	$ 163.461	433.782	$ 796	55.500	-1,7%	$ -	$ 164.257	
Chile	$ 12	31	$ 2.455	5.320	-1,0%	$ -0	$ 2.467	
Japan	$ -	-	$ 72.273	641.911	-0,6%	$ -	$ 72.273	
Malaysia	$ 7	18	$ 4.457	11.060	-1,2%	$ -	$ 4.464	
Mexico	$ 1.315	3.499	$ 12.768	68.618	-1,0%	$ -469	$ 13.615	
New Zealand	$ 7	18	$ 3.315	11.897	-1,9%	$ -	$ 3.322	
Peru	$ 13	35	$ 2.102	11.521	-0,4%	$ -	$ 2.115	
Singapore	$ 0	0	$ 599	2.738	-1,2%	$ -	$ 599	
USA	$ 255.081	674.847	$ 10.096	614.596	-0,7%	$ 3.823	$ 269.001	**Total TPP**
Vietnam	$ -	-	$ 41.262	23.357	-6,4%	$ -27.392	$ 13.870	**$ 595.425**
Africa	$ 442	1.176	$ -83.453	19.191	0,8%	$ 14	$ -82.998	
Ro-Central America	$ 6	16	$ -13.789	237	1,2%	$ -	$ -13.783	
Ro-South America	$ 9.506	25.329	$ -50.571	5.897	1,4%	$ -	$ -41.064	
Ro-Central East Asia	$ 6.014	15.974	$ -45.277	10.122	1,1%	$ 35	$ -39.227	
South Asia	$ 8.335	22.130	$ -20.856	- 544	0,8%	$ 211	$ -12.309	
Ro-South-East Asia	$ 2	6	$ -43.613	23.321	1,1%	$ 22	$ -43.589	
Middle East	$ 677	1.804	$ -41.983	10.063	0,7%	$ -	$ -41.306	
Western Europe	$ 46.549	122.985	$ -52.151	19.524	0,6%	$ -	$ -5.602	**Total non-TPP**
Eastern Europe	$ 38.525	101.397	$ -2.812	1.511	0,4%	$ -	$ 35.713	**$ -244.166**

Source: Author

The projection of the expected bilateral trade value changes generated by the GSIM model have resulted in expected vessel changes that are presented in table 32. Only changes that reach up to 1 full vessel are presented, the complete overview of results can be found under appendix-F. From table 32 and 33 we can see that many small changes are expected and that overall more vessels are expected to transport the wheat trade flow. A large increase is expected for export from Canada to USA as a result of the reduction in NTM's. To conclude, the expectation in vessel changes due to the TPP results in many small increases per country or region, and a big increase in vessel transportation from Canada to USA specifically.

Table 32: Wheat vessel change per route

Origin	Destination	Vessels pre-TPP	Vessels post-TPP	Vessel type
Australia	Vietnam	15.8	+2.7	Post-Panamax
Canada	USA	39.7	+23.1	Post-Panamax
Canada	Africa	54.2	-3.6	Handymax
Canada	Ro-South America	30.7	-1.5	Post-Panamax
Canada	Ro-South East Asia	19.7	-1.0	Post-Panamax
Canada	Western Europe	16.0	-1.1	Post-Panamax
USA	Canada	0.4	+1.4	Post-Panamax
USA	Japan	36.7	+2.3	Post-Panamax
USA	Mexico	52.6	+3.9	Handymax
USA	Africa	96.6	-2.2	Handymax
USA	Ro-Central East Asia	76.6	-1.1	Post-Panamax
Western Europe	Africa	209.7	+1.5	Handymax
Eastern Europe	Africa	215.2	+1.4	Handymax

Source: Author

Table 33: Net vessel change wheat import

Destination	Net vessel change	Vessel type
Africa	-2.9	Handymax
Canada	+1.4	Post-Panamax
Japan	+2.3	Post-Panamax
Mexico	+3.9	Handymax
Ro-Central East Asia	-1.1	Post-Panamax
Ro-South America	-1.5	Post-Panamax
Ro-South East Asia	-1.0	Post-Panamax
USA	+23.1	Post-Panamax
Vietnam	+2.7	Post-Panamax
Western Europe	-1.0	Post-Panamax

Source: Author

5.1.5. Combined result: Maize, Palm oil, Soybean & Wheat

Now that we have analysed the economic and trade impact of the TPP for each of the individual products, we will combine the figures to analyse the overall impact. The combined results have been added together and are presented in table 34. Observation of the results shows us that the TPP consumers can expect a high positive effect, closely followed by the TPP producers. Moreover, USA producers and Japanese consumers experience the largest positive effect. On the contrary, the Japanese government can expect the highest negative impact through the loss of tariff revenues on maize. Combining the net welfare effect of the TPP countries the result leads to a positive expected value of **$ 922,566,000**.
When observing the results of the non-TPP regions, we see that only Eastern Europe can expect a positive net welfare effect due to increased exports. Non-TPP consumers rather than the producers can expect a negative effect due to the

increase of prices. The Ro-Central East Asia government can expect a decrease in their tariff revenues due to decreased imports and change of origin, where lower tariffs are changed. Moreover, the Ro-Central East Asia consumers experience the largest negative effect mainly caused by the changes in maize and soybean markets. To conclude, the combined net welfare effect of the non-TPP regions results in a negative value of **$ -664,019,000**.

Therefore, we can say that the TPP agreement brings a larger positive effect to the TPP countries, than it brings a negative effect to the non-TPP regions. The USA is by far the TPP country that can expect the highest positive net welfare effect of the trade agreement, followed by Canada who can expect only 1/4th of the USA results. On the contrary, Japan and Ro-Central East Asia can expect a negative net welfare effect, which is mainly caused by the loss of government tariff revenue and the loss in consumer surplus due to price increases.

Table 34: Combined GSIM output summary (in $1,000)

	Producer analysis	Consumer analysis			
	A	D	G		
Country/Region	**Producer surplus**	**Consumer surplus**	**Government tariff revenue**	**Net welfare effect (A+D+G)**	
Australia	$ 51.875	$ 2.347	$ -	$ 54.222	
Brunei	$ 0	$ 103	$ -	$ 103	
Canada	$ 184.245	$ 1.513	$ -996	$ 184.761	
Chile	$ 4.169	$ 21.404	$ -2	$ 25.571	
Japan	$ 2	$ 633.399	$ -786.169	$ -152.767	
Malaysia	$ 17.320	$ 9.046	$ -	$ 26.366	
Mexico	$ 3.627	$ -12.148	$ -684	$ -9.205	
New Zealand	$ -25	$ 3.544	$ -	$ 3.519	
Peru	$ -53	$ 3.715	$ -1.006	$ 2.656	
Singapore	$ 286	$ 5.447	$ -	$ 5.733	
USA	$ 697.072	$ 47.348	$ 3.823	$ 748.244	**Total TPP**
Vietnam	$ -	$ 60.756	$ -27.393	$ 33.364	**$ 922.566**
Africa	$ -9.977	$ -73.908	$ -545	$ -84.430	
Ro-Central America	$ -514	$ -42.084	$ 14	$ -42.584	
Ro-South America	$ -33.474	$ -77.371	$ 641	$ -110.204	
Ro-Central East Asia	$ 5.496	$ -244.461	$ -85.783	$ -324.749	
South Asia	$ 7.898	$ -23.905	$ 1.078	$ -14.929	
Ro-South-East Asia	$ -3.990	$ -46.912	$ -67	$ -50.969	
Middle East	$ 621	$ -43.330	$ 58	$ -42.652	
Western Europe	$ 43.091	$ -54.330	$ -18	$ -11.257	**Total non-TPP**
Eastern Europe	$ 19.963	$ -2.312	$ 104	$ 17.755	**$ -664.019**

Source: Author

In addition to the economic results, an analysis of the results for the trade flow volume changes is provided. The results will present the combined changes for the bulk carriers and product tankers.

Since the bulk carriers can be used of the transportation of maize, soybeans and wheat the combined expected changes are presented in table 35. Observation of the results shows that the biggest changes happen on the routes to USA, Japan and Mexico. A combined total increase of 6.8 handymax and 48.1 post-panamax bulk carriers are expected take part in the trade of maize, soybean and wheat within the first year after the TPP agreement enters into force. The palm oil transportation flow can expect and increase of 1.2 MR2 tankers and a decrease of 1.0 MR1 tanker.

Therefore, a general observation is that the TPP agreement is expected to stimulate trade flows volumes of maize, soybean and wheat, whereas palm oil stays rather unaffected.

Table 35: Combined net vessel change import

Bulk Carriers: Maize, Soybean & Wheat		
Destination	**Net vessel change**	**Vessel type**
Africa	-2.9	Handymax
Canada	+1.4	Post-Panamax
Japan	+19.7	Post-Panamax
Mexico	+9.3	Handymax
Ro- Central America	+0.4	Handymax
Ro-Central East Asia	+3.6	Post-Panamax
Ro-South America	-1.4	Post-Panamax
USA	+23.1	Post-Panamax
Vietnam	+2.7	Post-Panamax
Western Europe	-1.0	Post-Panamax
Tankers: Palm oil		
Destination	**Net vessel change**	**Vessel type**
Japan	+1.0	MR2
South Asia	-1.0	MR1
USA	+0.2	MR2

Source: Author

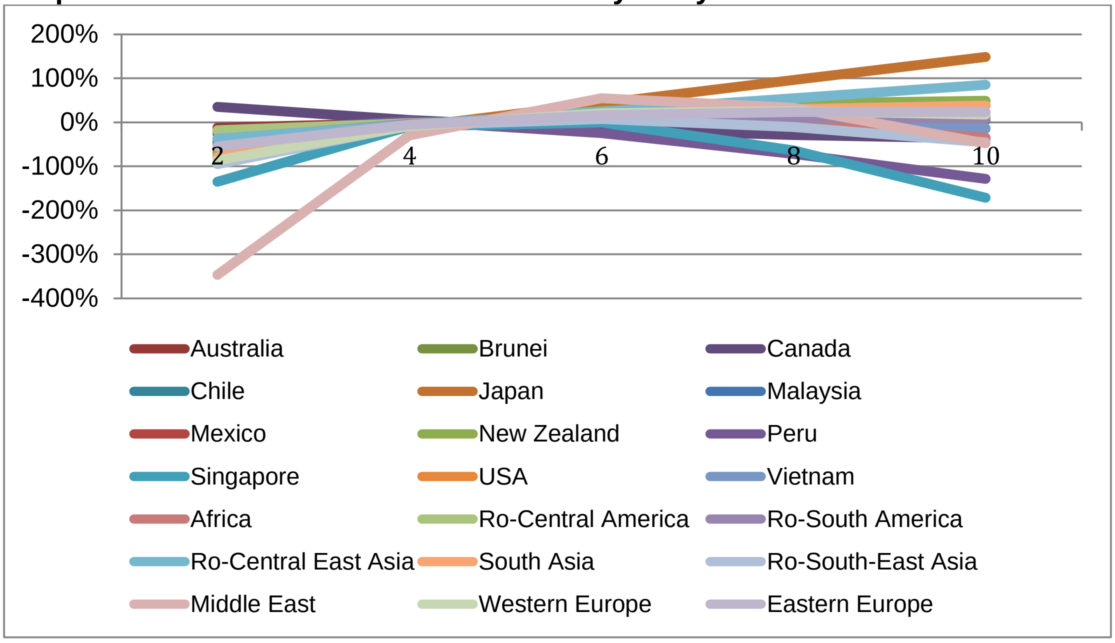
5.2. Sensitivity analysis

The results that have been projected by the GSIM model gave raise to some questions regarding the assumption that has been made about the substitution values. As has been discussed in section 4.1.1, the substitution values have been acquired from the Australian productivity commission who published a research paper regarding elasticity's as substitution elasticity's for New Zealand. Since it is impossible to know the actual substitution values, we have assumed them to be equal to the New Zealand substitution value. This gave rise to some uncertainties regarding the effect of the substitution value in the GSIM results.
Therefore, it is relevant to investigate how the net welfare effect responds to changes in the substitution values. For the purpose of the investigation we will test the model for the substitution values: 2,4,6,8 & 10, where 2 represents a low level of substitution and 10 a high level of substitution. A high level of substitution means an increased flexibility of consumers to switch to relatively cheaper products. Important to know is that the graphs represent the percentage change towards the initial substitution value. For maize, soybeans and wheat the initial value was 4.4, and the palm oil the initial value was 5.6.

Graph 10 projects the percentage change in net welfare effect for maize. Here, it is visible that most countries/regions are a highly sensitive to the change in substitution value. However, it seems to effect both exporters and importers of the maize. The Middle East shows decrease when the substitution value is assumed to be 2.

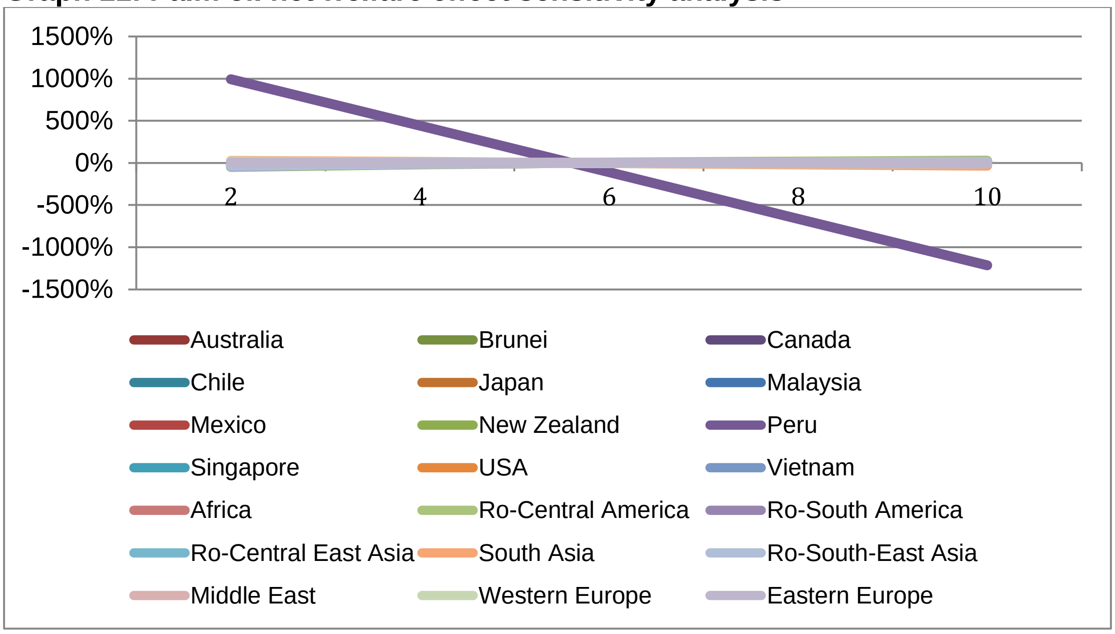
Therefore, the value 4.4 seems to be a rather stable value. For Japan and the rest of Central East Asia an increased substitution value results in a negative impact. Considering that their contribution to the net welfare effect is significant it is a determining factor. Therefor, we can conclude that the substitution value is critically important for the results of the TPP in the maize market.

Graph 10: Maize net welfare effect sensitivity analysis



Source: Author

Graph 11: Palm oil net welfare effect sensitivity analysis



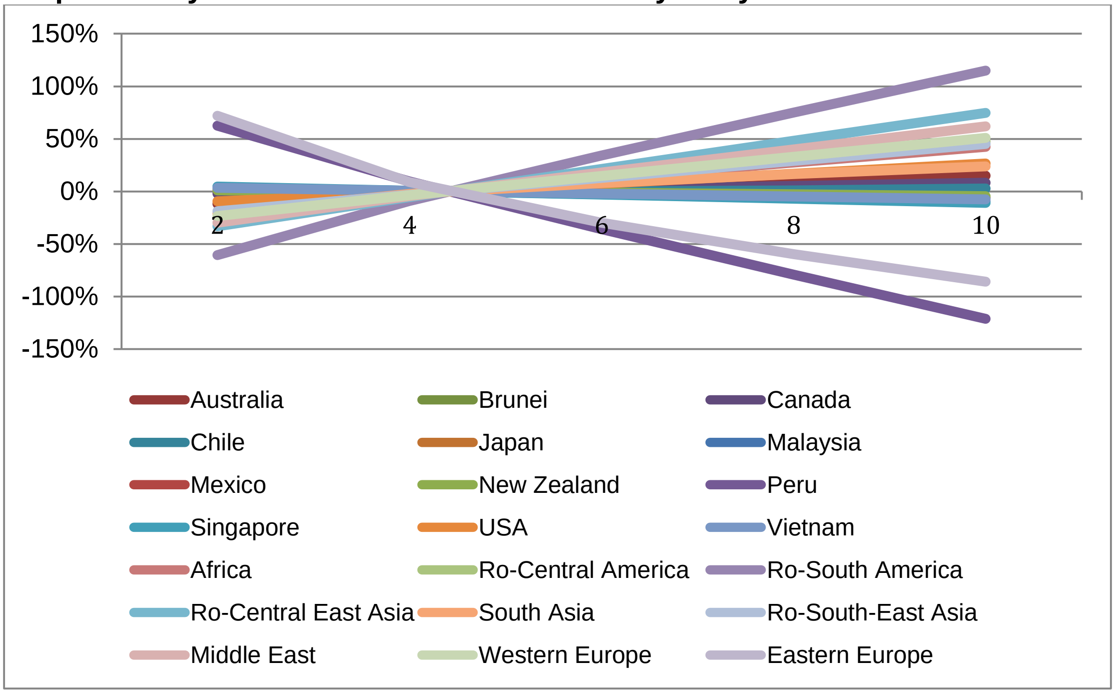
Source: Author

Graph 11 projects the percentage change in net welfare effect for palm oil. Here, it clearly shows that the Peru is significantly more sensitive to the change in substitution values than the other countries and regions. The more flexible the consumers are to make the switch to cheaper products the more value is lost for the

Peru. However, the total difference for Peru between substitution values 2 and 10 is $ -181.710, which is insignificant for the total TPP net welfare effect. Consequently, we can conclude that the substitution values do not have a significant impact on the total net welfare effect of the TPP and non-TPP countries and regions.

Graph 12 projects the percentage change in net welfare effect for soybeans. Here, it is clearly visible that most countries and regions are rather sensitive to the change of substitution value. Where the total TPP net welfare effect remains rather stable throughout the value change from 2 till 10, the non-TPP regions can experience a -100% change in the total welfare if the value changes from 2 to 10. Therefore, the substitution value is rather important for the result of the combined non-TPP regions. However, their net welfare effect is projected to be negative for all substitution values.

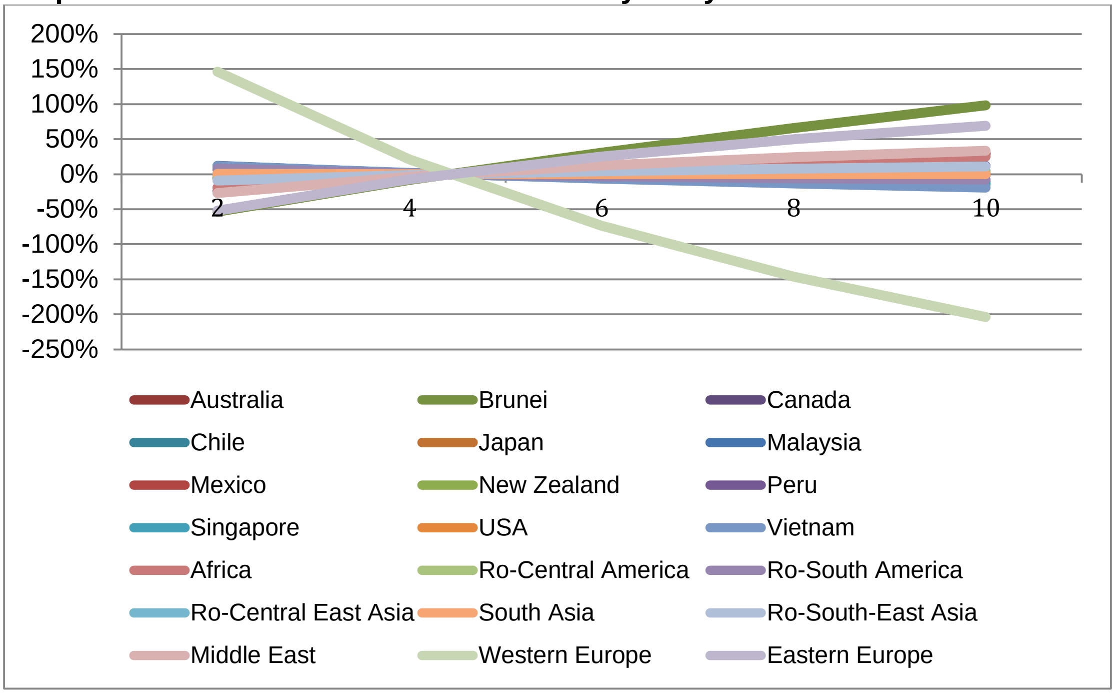
Graph 12: Soybean net welfare effect sensitivity analysis



Source: Author

Graph 13 projects the percentage change in net welfare effect for wheat. Here, it is visible that Western Europe is very sensitive to the changes in substitution value. The more flexible the consumers are in switching products the more value is lost for Western Europe. Most other countries, with the exception of Brunei and Eastern Europe are rather stable during the changes of substitution value. When looking at the total welfare effect for the TPP and non-TPP countries and regions, the results remain practically unchanged. Therefore, we can conclude that the change in substitution value is not am important determination factor for the total net welfare results on the wheat market. Only on a national level, for Western Europe, it makes a difference of $ -19.264.090 between the values 2 and 10.

Graph 13: Wheat net welfare effect sensitivity analysis



Source: Author

To conclude, we can say that the substitution values are critical for the total maize market, and in the soybean for only for the non-TPP regions. For both markets the total net welfare effect can change with -100% when the substitution value changes from 2 to 10. However, since substitution value 10 is very high the value we have chosen based on the study of New Zealand seems rather realistic. Therefore, it must be understood that the markets are sensitive, even though we are confident to have chosen a value that represents real life. The remaining markets, palm oil and wheat project stable results that remain unaffected by the changes in substitution value. Therefore, the values project realistic results. We can conclude that the choice of substitution value is important for some markets. However, we are confident to have chosen realistic values that present a correct overall result.

6. RECOMMENDATIONS

The results presented and the information gathered in chapter two, can now be combined to formulate an advice based on the expected changes. The information gathered in section 2.2 not only helped to build the second model of this research paper, but also allows us to make recommendations regarding the expected change of vessel volumes. Considering the results, we will only make recommendations to those countries expecting a large change. Therefore, we will make recommendation for USA, Japan and Mexico.

First, according to our results the USA can expect a yearly increase of 23.1 Post-Panamax bulk carriers, carrying wheat. This is a 58% increase for the total USA wheat imports. However, since this increase originates from Canada, its neighbouring country, a fair share can potentially be transported by rail instead of ocean. Unfortunately the rail transportation is out of scope for this research paper. Therefore, it is difficult to design good recommendation for this change regarding ports since the mode of transportation must first be distinguished. However, we are able to advise on the expansion of storage capacity for the wheat products as the expected 58% annual increase must be stored.

Second, according to our results Japan can expect an increase of 19.7 Post-Panamax bulk carriers mostly carrying maize and some wheat. This is a 7.7% increase of total combined maize and wheat imports to Japan. Since the two Japanese ports Chiba and Tokyo together already count 96,853 vessel visits on an annual basis, the extra 19.7 will not make any difference. Considering their grain terminals, we can recommend them to research whether their installed capacity can handle the expected increase in throughput of maize and wheat.

Third, according to our results Mexico can expect an increase of 9.3 Handymax bulk carriers carrying a combination of maize, soybeans and wheat. This represents a 3.5% increase of total combined maize, soybean and wheat imports to Mexico. Since the Mexican port Guaymas already handles 360 vessels on an annual basis the increase is rather small. Therefore, the recommendation for Mexico would be to research the capacity of its grain terminals to make sure the increased throughput can be handled and stored.

Finally, after the recommendations for the ports it is also useful for shipping companies to be aware of the expected change in trade flow. In order to avoid ballast voyages or tight markets, the shipping companies can plan their voyages better based on the expected change of vessel deployment per route.

7. CONCLUSION

This research paper has been conducted with the aim to find the trade and economic impact of the TPP agreement and the change in maritime trade and transport volumes of MPS&W, globally and between the TPP countries in particular. This question came to the surface when the 12 participating countries signed the TPP agreement on the 4th of February 2016, seven years after negotiations started. The choice of products was the result of a research on the largest agricultural trade flow volume between the TPP countries. The idea behind these selection criteria is not only to analyze the economic impact of the TPP agreement, but also its impact on the maritime transportation volume of the products.

To formulate the answer to the main research question, four sub-research questions have been formulated. The first sub-research question was relevant for the assessment of the current macro economic aspects of the different products. Since the TPP agreement aims to lower tariffs and stimulate trade, a model would be needed to simulate the effect of the changes. Due to its focus on import and export tariff changes, the GSIM model was chosen as methodology to assess the economic impact. Additionally, the data gathered to answer the first sub-research question also functioned as input data for the GSIM model.

The second sub-research question was relevant to determine the method of quantifying the NTM's in order to be used for the GSIM model. It was found that the NTM's consist of different numbers of measures per country regarding the import and export of the products. Therefore, each measure received a weight in order to quantify and distinguish between strict and tolerant countries. Additionally, the distance of transportation per route forms a barrier to trade, the distance has been quantified per nautical mile and added to the total NTM per trade route used in the GSIM model.

The third sub-research question is relevant to assess the textual details agreed upon for MPS&W. It was found that the tariffs between the TPP countries for maize, soybeans and wheat would be fully eliminated to 0% within the first year. For palm oil the tariffs will also be fully eliminated within the first year, with the exception of Mexico, Peru and Vietnam. Mexico will use a duty-free import quota whereas Peru and Vietnam will use a gradual reduction scheme that takes 11 and 6 years respectfully. Furthermore, the TPP agreement strives for increased transparency for the requirements regarding the different NTM's. Therefore, the NTM's will not be eliminated but for the purpose of this research slightly reduced in their weight during the quantification procedure.

The fourth sub-research question was relevant for the understanding of the GSIM model that was chosen. It was found that the model not only generates its results based on the trade flow values and the adjustment of the tariffs and NTM's. Moreover, the model steers the changes based on the demand, supply and substitution elasticity values. The values for the demand and supply elasticity's had been found through former studies, the substitution values had been estimated based on the value found for New Zealand. Therefore, testing the effect of different substitution values has been done in a sensitivity analysis. Consequently, it was found that the different substitution values hardly affect the economic impact of the palm oil and wheat markets. However, in the maize market Japan and the rest of Central East Asia proved to be very sensitive to the change in substitution value, in the soybean market the non-TPP regions proved sensitive to changes. Consequently, it could be concluded that the some substitution values affect the overall combined net welfare effect for maize and soybean markets. However, we are confident that the values as well as the results represent realistic figures.

Keeping the sensitivity in mind, the economic impact reflected in the GSIM results project a positive net welfare effect of $ 922.566.000 for the TPP countries combined in the first year of the enactment. Moreover, the USA and Canadian producers and Japanese consumers gain the largest share that is mainly caused by the changes in the maize and wheat market. On the contrary, the Japanese government losses a lot of tariff revenues caused by the elimination of the tariffs on maize imports. Additionally, the economic impact for the remaining non-TPP regions resulted in a combined projected negative net welfare effect of $ -664.019.000. This negative economic impact mainly affects the non-TPP consumers with the Ro-Central East Asia in particular.

Once the GSIM model had generated the results of the economic impact, the results of the changing prices and trade flow values could be plugged into the second model. The second model confirmed the positive economic impact for the TPP countries combined through a net vessel change of +9.3 handymax and +68.9 post-panamax bulk carriers and +1.2 MR2 tankers. On the contrary, it does not show the opposite effect for the non-TPP regions that expect a net vessel change of -2.5 handymax and +1.2 post-panamax bulk carriers and -1.0 MR1 tanker. Therefore, it shows that the economic impact is rather different from the actual trade flow impact.

To conclude, the TPP agreement is expected to have a positive economic impact on the net welfare of the TPP countries combined. Specifically Japanese consumers as well as Canadian and USA producers can expect to increase their surpluses within the first year. Considering the trade impact, the USA can expect an increase of 58% in wheat imports with 23.1 extra post-panamax vessels. Japan can expect a 7.7% increase in maize and same wheat imports with 19.7 extra post-panamax vessels. And Mexico can expect a 3.5% increase in import for maize, soybean and wheat with 9.3 extra handymax vessels on an annual basis. The non-TPP regions are expected to experience a negative economic impact that specifically hits their consumers due to price increases. They should not expect any major changes of vessel deployment on their routes. Therefore, it is found that the economic impact is positive for the TPP countries and negative for the non-TPP regions. Moreover, the impact of trade flow volume change is positive for the TPP countries but remains rather neutral for the non-TPP regions. Overall it was found that the TPP agreement stimulates trade in maize and wheat, whereas for palm oil and soybean it mainly causes some route changes.

7.1 Limitations of the research

Although the results are clear, the research has been subject to several limitations that must be kept in mind when interpreting the results. To start, the GSIM model is a partial equilibrium model that requires less variables than a CGE model, causing it to reflect a very simplified projection of the real world. Moreover, the GSIM model assumes that products from different sources are held constant as imperfect substitutes whereas MPS&W do have some perfect substitutes. Additionally, the GSIM model holds the elasticity values a constant whereas these curves are usually affected by many different factors. These form the limitations of the GSIM model.
To continue, the data collected for the projection of the trade flows before TPP, represent the registered trade flows from 2013. Therefore, the data does not reflect any changes that occurred during 2014 and 2015.
To finish, the assignment of vessel size per route is based on the interviews with freight experts and research on port draughts. Accordingly, only one vessel size is assigned per route in the vessel capacity scheme, which does not reflect the real life situation. Therefore, it forms a limitation since vessel and parcel sizes are subject to diversification on each trade route.

7.2 Areas for further research

Considering that this research paper focused on the economic and trade flow impact of the TPP agreement on the selected four agricultural products, the impact on many other products is worthwhile to be investigated. Additionally, since MPS&W can be considered basic commodities, the tariffs were already rather low or even zero. Therefore, it could be very interesting to research the effect for manufactured products that are in many cases subject to higher tariff changes.

Aside from researching other products, the negative effect for the non-TPP regions that has been projected as a result of this study, raises a question on the argumentation of their decision not to join the agreement. Another question arising from the results of this study is regarding the logistic processes of wheat transportation from Canada to the USA, driven by the projected 58% increase of this research paper.

This paper combined the methodology to project economic impact with the methodology to project trade transportation changes. Therewith, presenting that economic impact analyses not necessarily allows clear assumption to be made regarding trade flow impacts. Consequently, the combination of these research methodologies could provide very useful insight for other research papers that aim to analyze the effects of tariff and NTM changes on trade flows transportation.

To conclude, since the global tariff regimes keep changing according to country development and political ties, countries might join the TPP or create other agreements in the near future. Therefore, this method of research remains useful for a large variety of products and other trade agreements that will be subject to change.

Bibliography

Abbassian, A. (2007). *Maize International Market Profile.* Food and Agriculture Organization of the United Nations.

Acevedo, E., Silva, P., & Silva, H. (n.d.). *Food and Agriculture Organization of the United Nations.* Retrieved July 4, 2016, from Wheat growth and physiology: http://www.fao.org/docrep/006/y4011e/y4011e06.htm

Basiron, Y., & Weng, C. K. (2004, June). The Oil Palm And Its Sustainability. *Journal of Oil Palm Research Vol. 16 No. 1* , 1-10.

Corley, R. H., & Tinker, P. (2016). *The Oil Palm* (5th ed.). Oxford: Wiley Blackwell.

Endres, G., & Kandel, H. (2015). *Soybean Growth and Management quick guide.* Fargo: NDSU extension service.

Evans, L. T., & Peacock, W. J. (1981). *Wheat Science - Today and Tomorrow.* Cambridge: Cambridge University.

Evenson, R. E., & Gollin, D. (2003). *Assessing the Impact of the Green Revolution, 1966 to 2000.* Science.

FAOSTAT. (2013). *FAOSTAT download data*. Retrieved May 14, 2016, from

FAOSTAT: http://faostat3.fao.org/download/T/TM/E

Fergusson, I. F., & Vaughn, B. (2010). *The Trans-Pacific Parthership Agreement.* Congressional Research Services.

Fergusson, I. F., McMinimy, M. A., & Williams, B. R. (2015). *The Trans-Pacific Partnership (TPP) Negotiations and Issues for Congress.* Washington: Congressional Research Services.

Francois, J., & Hall, H. K. (2003). *Global Simulation Analysis of Industry-Level Trade Policy.* US International Trade Commission.

Fugazza, M., & Maur, J.-C. (2007). Non-tariff barriers in PE models: How useful for policy? *Journal of policy modeling* , 475-490.

Griffith, G., I'Anson, K., Hill, D., & Vere, D. (2001). *Pervious supply elasticity estimates for Australian broadacre agriculture.* Armidale: NWM Agriculture.

Harley, C. K. (1980). Transportation, the World Wheat Trade, and the Kuznets Cycle, 1850-1913. *Explorations in Economic History* , 218-250.

Horlick, G. N. (2016). Trans-Pacific Partnership. *Global Trade and Customs Journal , 11*, 149-152.

Hummels, D. (2007). Transportation Costs and International Trade in the Second Era of Globalization. *Journal of Economic Perspectives , 21* (3), 131-154.

IHS Maritime. (2015-2016). *Ports & Terminals Guide.* Bracknell Berkshire: IHS Global Limited.

IMF. (2007). *Financial Globalization.* Washington: IMF.

Ing, L. Y., de Cordoba, S. F., & Cabot, O. (2016). *Non-Tariff Measures in ASEAN.* UNCTAD.

Kee, H. L., Nicita, A., & Olarreaga, M. (2008). Import demand elasticities and trade distortions. *Review of economics and statistics* , 666 - 682.

Knowler, G. (2015, October 12). TPP deal is bad for China, good for containershipping, analysts say. *Journal of Commerce* .

Koo, W. W., & Karemera, D. (1991). Determinants of World Wheat Trade Flows and Policy Analysis. *Canadian Journal of Agricultural Economics , 39*, 439-455.

Krugman, P. R. (1987). Is Free Trade Passe? *The Journal of Economic Perspectives* , 131-144.

Lynn, M. (1997). *Commerce and Economic change in West Africa: The palm oil trade in the nineteenth century.* Belfast: Queen's University.

Mankiw, N. G., & Taylor, M. P. (2014). *Economics.* Hampshire: Andrew Ashwin.

Mankiw, N. G., & Taylor, M. P. (2014). *Economics.* Hampshire: Andrew Ashwin.

MarineTraffic. (2016, July 30).

Mattsson, B., Cederberg, C., & Blix, L. (1999). Agricultural land use in life cycle assessment (LCA): case studies of three vegetable oil crops. *Journal of Cleaner Production* , 283-292.

Nayar, N. M. (2014). *Origins & Phylogen of Rices.* Oxford: Elsevier Inc.

Petri, P. A., Plummer, M. G., & Zhai, F. (2012). *The Trans-Pacific Partnership and Asia-Pacific Integration: A Quantitative Assessment.* Peter G. Peterson Institute of International Economics.

Rousslang, D. J., & To, T. (1993). Domestic Trade and Transportation Costs as Barriers to International Trade. *Canadian Journal of Economics* , 208-221.

Rumler, F. (1999). *Computable General Equilibrium Modeling.* Vienna: Vienna University of Economics and Business Administration.

Schott, J. J., Kotschwar, B., & Muir, J. (2013). *Understanding the Trans-Pacific Partnership.* Washington: Peter G. Peterson Institute for International Economics.

Schott, J. J., Kotschwar, B., & Muir, J. (2013). *Understanding the Trans-Pacific Partnership.* Washinton: Peterson Institute for International Economics.

Sobolevsky, A., Moschini, G., & Lapan, H. (2005). Genetically Modified Crops and Product Differentiation: Trade and Welfare Effects in the Soybean Complex. *American Agriculture Economics Association , 87* (3), 621-644.

Stropford, M. (2009). *Maritime Economics.* New York: Routledge.

Thoenes, P. (2006). *Soybean International Commodity Profile.* Food and Agriculture Organization of the United Nations.

UNCTAD. (2016). *Soy Bean an INFOCOMM Commodity Profile.* Geneva: United Nations Conference on Trade And Development.

UNCTAD. (2016, August 1). WITS . *- NTM - View and Export Raw Data* .

USTR. (2016). *USTR TPP Full Text*. Retrieved June 2016, from Office of the United States Trade Representative: https://ustr.gov/trade-agreements/free-trade-agreements/trans-pacific-partnership/tpp-full-text

Wu, F., & Guclu, H. (2012). Aflatoxin Regulations in a Network of Global Maize Trade. *Plos One , 7* (9).

Zeitsch, J., McDougall, R., Jomini, P., Welsh, A., Hambley, J., Brown, S., et al. (1991). *SLATER: A General Equilibrium Model of the World Economy.*

Appendix - A
Maize – Ad valorem tariffs before TPP

MAIZE Tariffs - Ad Valorem (WITS)

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia		0%	0%	0%	24,67%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	0%	0%	4,6%
Brunei	0%		0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Canada	0%	0%		0%	1,21%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4,6%
Chile	0%	0%	0%		0,26%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	42%	0%	0%	0%	0%	5%
Japan	0%	0%	0%	1,09%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	42%	0%	0%	0%	0%	0%
Malaysia	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mexico	0%	0%	0%	0%	8,88%	0%		0%	0%	0%	0%	0%	25%	0%	0%	65,6%	0%	0%	0%	0%	0%
New Zealand	0%	0%	0%	6%	3,23%	0%	0%		0%	0%	0%	0%	0%	0%	0%	1,5%	0%	0%	0%	0%	5%
Peru	0%	0%	0%	0%	1,45%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Singapore	0%	0%	0%	6%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	31,08%	0%	0%	0%	0%	0%		0%	15%	0%	0%	37,6%	0%	0,39%	0%	0%	0%
Vietnam	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	0%	54,11%	0%	0%	0%	0%	0%
Africa	0%	0%	0%	6%	40,0%	0%	0%	0%	0%	0%	0%	0%	9,5%	0%	0%	2,17%	0,17%	3,07%	0,63%	0%	4,6%
Ro - Central America	0%	0%	0%	0%	8,9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,44%	0%	0%	0%	0%	0%	0%
Ro - South America	0%	0%	0%	0%	44,3%	0%	0%	0%	0%	0%	0%	0%	2,8%	0%	0,8%	1,5%	0,2%	0,25%	0%	0%	4,6%
Ro - Central & East Asia	0%	0%	0%	6%	48,2%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	1,65%	1,2%	0%	0%	0%	0%
South Asia	0%	0%	0%	6%	49,0%	0%	0%	0%	0%	0%	0%	0%	3,8%	0%	0%	30%	3,35%	0,55%	0%	0%	0%
Ro - South-East Asia	0%	0%	0%	6%	0,0%	0%	0%	0%	0%	0%	0%	0%	2,11%	0%	1%	13,8%	0,3%	1%	0%	0%	0%
Middle East	0%	0%	0%	6%	8,9%	0%	0%	0%	0%	0%	0%	0%	1,6%	0%	0%	18,6%	1%	0%	0%	0%	0%
Western Europe	0%	0%	0%	0%	51,5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	90,5%	1%	0%	0,43%	0%	4,6%
Eastern Europe	0%	0%	0%	6%	52,0%	0%	0%	0%	0%	0%	0%	0%	0,6%	0%	0%	38%	0%	3,07%	0,4%	0%	4,6%

Palm oil – Ad valorem tariffs before TPP

PALM OIL Tariffs - Ad Valorem (WITS)

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia		0%	6%	0%	3,5%	0%	3%	0%	6%	0%	0%	5%	4%	0%	0%	0%	0%	0%	0%	0%	0%
Brunei	0%		6%	6%	0%	0%	3%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Canada	0%	0%		0%	3,5%	0%	0%	0%	6%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chile	0%	0%	0%		0%	0%	2,16%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	6%	0%		0%	3%	0%	6%	0%	0%	2%	5%	0%	0%	0,42%	0%	0%	0%	0%	0%
Malaysia	0%	0%	6%	0%	0%		3%	0%	6%	0%	0%	0%	9,72%	0%	0%	2,85%	0%	0%	0%	1,9%	0%
Mexico	0%	0%	0%	5,28%	3,5%	0%		0%	6%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New Zealand	0%	0%	6%	6%	3,5%	0%	3%		6%	0%	0%	5%	2,5%	0%	0%	0%	0%	0%	0%	0%	0%
Peru	0%	0%	0%	0%	0%	0%	3%	0%		0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Singapore	0%	0%	6%	6%	0%	0%	3%	0%	6%		0%	0%	0%	0%	0%	0%	0%	0%	0%	1,9%	0%
USA	0%	0%	0%	0%	3,5%	0%	0%	0%	6%	0%		5%	21,25%	0%	0%	0%	0,78%	0%	0%	2%	0%
Vietnam	0%	0%	6%	0%	0%	0%	3%	0%	6%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%
Africa	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	3,97%	0%	0%	0,42%	0%	0%	0,63%	0,42%	0%
Ro - Central America	0%	0%	0%	6%	3,5%	0%	0,62%	0%	6%	0%	0%	5%	0%	2,5%	11,87%	0%	0%	0%	0%	0%	0%
Ro - South America	0%	0%	6%	0%	3,5%	0%	2,03%	0%	4,16%	0%	0%	5%	1%	5%	3,8%	0%	0%	0%	0%	1,9%	0%
Ro - Central & East Asia	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	4%	0%	0%	0,19%	0%	0,6%	0%	1,9%	0%
South Asia	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	0,6%	0%	0%	0,38%	0%	1,1%	1,4%	1,9%	0%
Ro - South-East Asia	0%	0%	6%	6%	0%	0%	3%	0%	6%	0%	0%	0%	5,25%	0%	0%	1%	5%	0%	1,1%	1,9%	0%
Middle East	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	0%	0%	0%	0,4%	0%	0%	0%	0%	0%
Western Europe	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	0,8%	0%	2,3%	0,3%	0%	0%	0,63%	0%	0%
Eastern Europe	0%	0%	6%	6%	3,5%	0%	3%	0%	6%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Soybean – Ad valorem tariffs before TPP

SOYBEAN Tariffs - Ad Valorem (WITS)

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Brunei	0%		0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Canada	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chile	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	8%	0%	0%	0%	0%	0%
Malaysia	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mexico	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0,67%	0%	0%	0%	0%	0%	0%	0%	0%
New Zealand	0%	0%	0%	6%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peru	0%	0%	0%	6%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Singapore	0%	0%	0%	6%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	121%	0%	5%	0%	0%	0%
Vietnam	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	0%	0%	0%	0,39%	0%	0%	0%
Africa	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	5,2%	0%	0%	0%	0%	0%	0%	0%	0%
Ro - Central America	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4,44%	0%	0%	0%	0%	0%	0%
Ro - South America	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1,36%	0%	1,5%	0%	0%	0%	0%	0%	0%
Ro - Central & East Asia	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	1,6%	0%	0%	0%	0,2%	10,6%	0%	0%	0%
South Asia	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0,8%	0%	0%	0%	3,9%	1,7%	0%	0%	0%
Ro - South-East Asia	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1,4%	0%	0%	0%
Middle East	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Western Europe	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	22%	0%	0%	0%	0%	0%
Eastern Europe	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0,4%	0%	0%	0%	0%	0%

Wheat – Ad valorem tariffs before TPP

WHEAT Tariffs - Ad Valorem (WITS)

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia		0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	5%	0,71%	0%	0%	0%	0%	0%	0%	0%	0%
Brunei	0%		0%	6%	0%	0%	45%	0%	0%	0%	65%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Canada	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chile	0%	0%	0%		0%	0%	45%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	0%	0%		0%	45%	0%	0%	0%	65%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Malaysia	0%	0%	0%	0%	0%		45%	0%	0%	0%	65%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mexico	0%	0%	0%	6%	0%	0%		0%	0%	0%	0%	5%	0%	0%	0%	6,6%	0%	0%	0%	0%	0%
New Zealand	0%	0%	0%	6%	0%	0%	45%		0%	0%	65%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peru	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Singapore	0%	0%	0%	6%	0%	0%	45%	0%	0%		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Vietnam	0%	0%	0%	4%	0%	0%	45%	0%	0%	0%	65%		0%	0%	0%	0%	0%	0%	0%	0%	0%
Africa	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	0%	5%	1,7%	0%	0%	0%	0%	0%	0%	0%	0%
Ro - Central America	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0,44%	0%	0%	0%	0%	0%	0%
Ro - South America	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	152,3%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ro - Central & East Asia	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	162,5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
South Asia	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	186,3%	5%	0%	0%	0%	0%	2,8%	0,33%	0%	0%	0%
Ro - South-East Asia	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	65,0%	0%	0%	0%	0%	3,3%	0%	0%	0%	0%	0%
Middle East	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	54,2%	5%	0%	0%	0%	1,8%	0%	0%	0%	0%	0%
Western Europe	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	23,3%	5%	0%	0%	0%	0,3%	0%	0%	0%	0%	0%
Eastern Europe	0%	0%	0%	6%	0%	0%	45%	0%	0%	0%	47,7%	5%	0%	0%	0%	0,4%	0%	0%	0%	0%	0%

Appendix – B

Maize – NTM before TPP

MAIZE NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	11%	22%	39%	39%	28%	25%	37%	20%	38%	24%	42%	31%	34%	39%	39%	24%	27%	28%	32%	40%	34%
Brunei	22%	1%	25%	32%	8%	5%	20%	12%	28%	5%	25%	12%	19%	22%	24%	6%	8%	9%	12%	21%	16%
Canada	39%	25%	9%	29%	21%	28%	18%	30%	26%	27%	22%	34%	32%	19%	26%	21%	29%	34%	21%	19%	21%
Chile	39%	32%	29%	6%	28%	35%	18%	29%	14%	33%	24%	38%	27%	13%	25%	28%	29%	37%	24%	23%	24%
Japan	28%	8%	21%	28%	2%	10%	16%	20%	25%	9%	21%	15%	25%	19%	30%	5%	12%	12%	17%	26%	20%
Malaysia	25%	5%	28%	35%	10%	2%	23%	15%	32%	5%	26%	14%	20%	25%	25%	8%	7%	9%	12%	20%	15%
Mexico	37%	20%	18%	18%	16%	23%	3%	28%	15%	21%	14%	27%	26%	11%	23%	16%	24%	25%	22%	21%	22%
New Zealand	20%	12%	30%	29%	20%	15%	28%	2%	25%	14%	32%	22%	25%	17%	22%	14%	17%	18%	22%	27%	25%
Peru	38%	28%	26%	14%	25%	32%	15%	25%	5%	30%	22%	36%	31%	10%	22%	25%	26%	35%	21%	20%	21%
Singapore	24%	5%	27%	33%	9%	5%	21%	14%	30%	1%	27%	13%	20%	24%	25%	7%	7%	9%	12%	20%	15%
USA	42%	25%	22%	24%	21%	26%	14%	32%	22%	27%	8%	34%	32%	15%	26%	21%	29%	40%	24%	22%	24%
Vietnam	31%	12%	34%	38%	15%	14%	27%	22%	36%	13%	34%	7%	28%	30%	33%	12%	16%	16%	21%	29%	24%
Africa	34%	19%	32%	27%	25%	20%	26%	25%	31%	20%	32%	28%	14%	23%	19%	23%	16%	24%	17%	18%	17%
Ro - Central America	39%	22%	19%	13%	19%	25%	11%	17%	10%	24%	15%	30%	23%	9%	16%	24%	20%	31%	15%	13%	15%
Ro - South America	39%	24%	26%	25%	30%	25%	23%	22%	22%	25%	26%	33%	19%	16%	22%	23%	21%	29%	18%	18%	18%
Ro - Central & East Asia	24%	6%	21%	28%	5%	8%	16%	14%	25%	7%	21%	12%	23%	24%	23%	4%	10%	10%	15%	23%	18%
South Asia	27%	8%	29%	29%	12%	7%	24%	17%	26%	7%	29%	16%	16%	20%	21%	10%	4%	11%	8%	14%	9%
Ro - South-East Asia	28%	9%	34%	37%	12%	9%	25%	18%	35%	9%	40%	16%	24%	31%	29%	10%	11%	12%	16%	25%	19%
Middle East	32%	12%	21%	24%	17%	12%	22%	22%	21%	12%	24%	21%	17%	15%	18%	14%	8%	16%	5%	14%	8%
Western Europe	40%	21%	19%	23%	26%	20%	21%	27%	20%	20%	22%	29%	18%	13%	18%	23%	14%	25%	14%	9%	8%
Eastern Europe	34%	16%	21%	24%	20%	15%	22%	25%	21%	15%	24%	24%	17%	15%	18%	18%	9%	19%	8%	8%	5%

Palm oil – NTM before TPP

PALM OIL NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	16%	30%	39%	42%	37%	34%	39%	30%	38%	31%	47%	41%	41%	46%	42%	30%	33%	30%	37%	53%	40%
Brunei	30%	3%	21%	32%	14%	11%	19%	19%	25%	8%	28%	19%	23%	25%	23%	8%	11%	8%	15%	31%	19%
Canada	39%	21%	4%	20%	18%	24%	8%	28%	14%	21%	16%	32%	26%	13%	17%	15%	24%	23%	15%	19%	14%
Chile	42%	32%	20%	3%	29%	35%	12%	31%	5%	32%	22%	40%	25%	11%	19%	26%	27%	30%	21%	27%	21%
Japan	37%	14%	18%	29%	4%	17%	16%	28%	23%	14%	25%	22%	30%	23%	31%	9%	17%	12%	21%	37%	24%
Malaysia	34%	11%	24%	35%	17%	4%	22%	23%	29%	9%	30%	21%	24%	29%	25%	11%	11%	8%	15%	31%	18%
Mexico	39%	19%	8%	12%	16%	22%	0%	29%	7%	19%	12%	28%	24%	8%	17%	13%	22%	18%	19%	25%	19%
New Zealand	30%	19%	28%	31%	28%	23%	29%	6%	24%	20%	37%	31%	30%	22%	24%	18%	22%	19%	26%	39%	29%
Peru	38%	25%	14%	5%	23%	29%	7%	24%	0%	25%	16%	35%	26%	5%	14%	19%	22%	26%	16%	21%	16%
Singapore	31%	8%	21%	32%	14%	9%	19%	20%	25%	2%	27%	18%	22%	26%	23%	8%	9%	6%	13%	29%	16%
USA	47%	28%	16%	22%	25%	30%	12%	37%	16%	27%	9%	38%	34%	16%	23%	22%	30%	36%	24%	29%	25%
Vietnam	41%	19%	32%	40%	22%	21%	28%	31%	35%	18%	38%	10%	34%	34%	35%	16%	21%	16%	25%	41%	28%
Africa	41%	23%	26%	25%	30%	24%	24%	30%	26%	22%	34%	34%	17%	25%	17%	25%	18%	21%	18%	26%	18%
Ro - Central America	46%	25%	13%	11%	23%	29%	8%	22%	5%	26%	16%	34%	25%	9%	13%	24%	21%	27%	15%	21%	15%
Ro - South America	42%	23%	17%	19%	31%	25%	17%	24%	14%	23%	23%	35%	17%	13%	15%	20%	19%	22%	15%	22%	15%
Ro - Central & East Asia	30%	8%	15%	26%	9%	11%	13%	18%	19%	8%	22%	16%	25%	24%	20%	4%	11%	6%	15%	31%	18%
South Asia	33%	11%	24%	27%	17%	11%	22%	22%	22%	9%	30%	21%	18%	21%	19%	11%	6%	8%	9%	23%	10%
Ro - South-East Asia	30%	8%	23%	30%	12%	8%	18%	19%	26%	6%	36%	16%	21%	27%	22%	6%	8%	4%	12%	28%	15%
Middle East	37%	15%	15%	21%	21%	15%	19%	26%	16%	13%	24%	25%	18%	15%	15%	15%	9%	12%	5%	21%	8%
Western Europe	53%	31%	19%	27%	37%	31%	25%	39%	21%	29%	29%	41%	26%	21%	22%	31%	23%	28%	21%	23%	15%
Eastern Europe	40%	19%	14%	21%	24%	18%	19%	29%	16%	16%	25%	28%	18%	15%	15%	18%	10%	15%	8%	15%	5%

Soybean – NTM before TPP

SOYBEAN NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	12%	23%	39%	38%	30%	26%	37%	21%	38%	26%	39%	32%	35%	41%	40%	25%	28%	25%	33%	44%	35%
Brunei	23%	1%	24%	30%	10%	6%	19%	12%	27%	5%	22%	13%	20%	23%	25%	6%	8%	6%	13%	24%	16%
Canada	39%	24%	8%	26%	21%	27%	16%	29%	24%	26%	17%	33%	31%	18%	26%	21%	28%	30%	21%	21%	21%
Chile	38%	30%	26%	4%	28%	34%	15%	27%	11%	32%	19%	36%	25%	11%	23%	27%	27%	31%	22%	23%	22%
Japan	30%	10%	21%	28%	2%	11%	17%	20%	24%	10%	19%	16%	27%	20%	32%	6%	13%	10%	18%	30%	21%
Malaysia	26%	6%	27%	34%	11%	2%	22%	15%	31%	5%	23%	14%	20%	26%	25%	8%	7%	6%	12%	23%	15%
Mexico	37%	19%	16%	15%	17%	22%	2%	27%	13%	21%	10%	26%	25%	10%	23%	15%	23%	21%	21%	23%	22%
New Zealand	21%	12%	29%	27%	20%	15%	27%	2%	23%	15%	30%	22%	25%	18%	23%	14%	17%	15%	22%	30%	25%
Peru	38%	27%	24%	11%	24%	31%	13%	23%	4%	28%	17%	34%	30%	9%	21%	23%	25%	30%	20%	21%	20%
Singapore	26%	5%	26%	32%	10%	5%	21%	15%	28%	1%	23%	13%	20%	24%	25%	7%	7%	5%	12%	23%	15%
USA	39%	22%	17%	19%	19%	23%	10%	30%	17%	23%	6%	31%	30%	12%	24%	18%	26%	33%	21%	22%	21%
Vietnam	32%	13%	33%	36%	16%	14%	26%	22%	34%	13%	31%	7%	29%	30%	34%	12%	16%	12%	21%	32%	24%
Africa	35%	20%	31%	25%	27%	20%	25%	25%	30%	20%	30%	29%	15%	24%	20%	24%	16%	21%	17%	21%	18%
Ro - Central America	41%	23%	18%	11%	20%	26%	10%	18%	9%	24%	12%	30%	24%	9%	16%	24%	20%	27%	15%	16%	15%
Ro - South America	40%	25%	26%	23%	32%	25%	23%	23%	21%	25%	24%	34%	20%	16%	22%	24%	21%	26%	19%	21%	19%
Ro - Central & East Asia	25%	6%	21%	27%	6%	8%	15%	14%	23%	7%	18%	12%	24%	24%	24%	4%	10%	7%	15%	26%	18%
South Asia	28%	8%	28%	27%	13%	7%	23%	17%	25%	7%	26%	16%	16%	20%	21%	10%	4%	8%	8%	17%	9%
Ro - South-East Asia	25%	6%	30%	31%	10%	6%	21%	15%	30%	5%	33%	12%	21%	27%	26%	7%	8%	5%	13%	24%	16%
Middle East	33%	13%	21%	22%	18%	12%	21%	22%	20%	12%	21%	21%	17%	15%	19%	15%	8%	13%	5%	17%	8%
Western Europe	44%	24%	21%	23%	30%	23%	23%	30%	21%	23%	22%	32%	21%	16%	21%	26%	17%	24%	17%	15%	11%
Eastern Europe	35%	16%	21%	22%	21%	15%	22%	25%	20%	15%	21%	24%	18%	15%	19%	18%	9%	16%	8%	11%	5%

Wheat – NTM before TPP

WHEAT NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	12%	23%	41%	40%	29%	26%	40%	20%	38%	26%	40%	35%	35%	41%	40%	25%	28%	28%	33%	44%	35%
Brunei	23%	1%	25%	32%	14%	6%	22%	12%	27%	5%	23%	16%	20%	23%	25%	6%	8%	9%	13%	24%	16%
Canada	41%	25%	9%	30%	22%	28%	20%	30%	26%	27%	20%	38%	32%	19%	27%	21%	29%	34%	22%	22%	22%
Chile	40%	32%	30%	5%	28%	35%	19%	29%	14%	33%	22%	41%	27%	12%	25%	28%	29%	36%	24%	26%	24%
Japan	29%	14%	22%	28%	2%	11%	19%	22%	25%	10%	20%	19%	26%	19%	32%	6%	13%	12%	18%	30%	21%
Malaysia	26%	6%	28%	35%	11%	2%	24%	15%	30%	5%	24%	17%	20%	25%	26%	8%	7%	8%	12%	23%	15%
Mexico	40%	22%	20%	19%	19%	24%	4%	30%	15%	23%	15%	31%	28%	12%	25%	17%	25%	26%	24%	25%	24%
New Zealand	20%	12%	30%	29%	22%	15%	30%	2%	23%	14%	31%	25%	25%	17%	23%	14%	17%	18%	22%	30%	25%
Peru	38%	27%	26%	14%	25%	30%	15%	23%	4%	28%	19%	37%	30%	9%	21%	23%	25%	33%	20%	21%	20%
Singapore	26%	5%	27%	33%	10%	5%	23%	14%	28%	1%	24%	16%	20%	24%	25%	7%	6%	8%	11%	23%	14%
USA	40%	23%	20%	22%	20%	24%	15%	31%	19%	24%	7%	35%	30%	13%	25%	19%	27%	37%	22%	23%	22%
Vietnam	35%	16%	38%	41%	19%	17%	31%	25%	37%	16%	35%	9%	32%	32%	37%	15%	19%	18%	24%	35%	27%
Africa	35%	20%	32%	27%	26%	20%	28%	25%	30%	20%	30%	32%	15%	24%	20%	24%	16%	24%	17%	21%	18%
Ro - Central America	41%	23%	19%	12%	19%	25%	12%	17%	9%	24%	13%	32%	24%	9%	16%	24%	20%	30%	15%	16%	15%
Ro - South America	40%	25%	27%	25%	32%	26%	25%	23%	21%	25%	25%	37%	20%	16%	24%	24%	21%	29%	19%	21%	19%
Ro - Central & East Asia	25%	6%	21%	28%	6%	8%	17%	14%	23%	7%	19%	15%	24%	24%	24%	4%	10%	10%	15%	26%	18%
South Asia	28%	8%	29%	29%	13%	7%	25%	17%	25%	6%	27%	19%	16%	20%	21%	10%	4%	11%	8%	17%	9%
Ro - South-East Asia	28%	9%	34%	36%	12%	8%	26%	18%	33%	8%	37%	18%	24%	30%	29%	10%	11%	11%	16%	27%	19%
Middle East	33%	13%	22%	24%	18%	12%	24%	22%	20%	11%	22%	24%	17%	15%	19%	14%	8%	16%	5%	17%	8%
Western Europe	44%	24%	22%	26%	30%	23%	25%	30%	21%	23%	23%	35%	21%	16%	21%	26%	17%	27%	17%	15%	11%
Eastern Europe	35%	16%	22%	24%	21%	15%	24%	25%	20%	14%	22%	27%	18%	15%	19%	18%	9%	19%	8%	11%	5%

Appendix – C

Maize – NTM after TPP

MAIZE NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	9%	19%	34%	35%	24%	22%	33%	16%	34%	21%	37%	27%	34%	39%	39%	24%	27%	28%	32%	40%	34%
Brunei	19%	0%	22%	30%	7%	5%	19%	11%	27%	4%	23%	11%	19%	22%	24%	6%	8%	9%	12%	21%	16%
Canada	34%	22%	7%	26%	19%	25%	15%	27%	23%	24%	17%	30%	32%	19%	26%	21%	29%	34%	21%	19%	21%
Chile	35%	30%	26%	4%	26%	33%	16%	27%	11%	32%	21%	35%	27%	13%	25%	28%	29%	37%	24%	23%	24%
Japan	24%	7%	19%	26%	1%	10%	15%	19%	24%	9%	19%	13%	25%	19%	30%	5%	12%	12%	17%	26%	20%
Malaysia	22%	5%	25%	33%	10%	2%	21%	14%	30%	4%	23%	12%	20%	25%	25%	8%	7%	9%	12%	20%	15%
Mexico	33%	19%	15%	16%	15%	21%	2%	27%	13%	20%	11%	24%	26%	11%	23%	16%	24%	25%	22%	21%	22%
New Zealand	16%	11%	27%	27%	19%	14%	27%	2%	23%	13%	30%	20%	25%	17%	22%	14%	17%	18%	22%	27%	25%
Peru	34%	27%	23%	11%	24%	30%	13%	23%	4%	28%	19%	33%	31%	10%	22%	25%	26%	35%	21%	20%	21%
Singapore	21%	4%	24%	32%	9%	4%	20%	13%	28%	1%	24%	11%	20%	24%	25%	7%	7%	9%	12%	20%	15%
USA	37%	23%	17%	21%	19%	23%	11%	30%	19%	24%	7%	31%	32%	15%	26%	21%	29%	40%	24%	22%	24%
Vietnam	27%	11%	30%	35%	13%	12%	24%	20%	33%	11%	31%	5%	28%	30%	33%	12%	16%	16%	21%	29%	24%
Africa	34%	19%	32%	27%	25%	20%	26%	25%	31%	20%	32%	28%	14%	23%	19%	23%	16%	24%	17%	18%	17%
Ro - Central America	39%	22%	19%	13%	19%	25%	11%	17%	10%	24%	15%	30%	23%	9%	16%	24%	20%	31%	15%	13%	15%
Ro - South America	39%	24%	26%	25%	30%	25%	23%	22%	22%	25%	26%	33%	19%	16%	22%	23%	21%	29%	18%	18%	18%
Ro - Central & East Asia	24%	6%	21%	28%	5%	8%	16%	14%	25%	7%	21%	12%	23%	24%	23%	4%	10%	10%	15%	23%	18%
South Asia	27%	8%	29%	29%	12%	7%	24%	17%	26%	7%	29%	16%	16%	20%	21%	10%	4%	11%	8%	14%	9%
Ro - South-East Asia	28%	9%	34%	37%	12%	9%	25%	18%	35%	9%	40%	16%	24%	31%	29%	10%	11%	12%	16%	25%	19%
Middle East	32%	12%	21%	24%	17%	12%	22%	22%	21%	12%	24%	21%	17%	15%	18%	14%	8%	16%	5%	14%	8%
Western Europe	40%	21%	19%	23%	26%	20%	21%	27%	20%	20%	22%	29%	18%	13%	18%	23%	14%	25%	14%	9%	8%
Eastern Europe	34%	16%	21%	24%	20%	15%	22%	25%	21%	15%	24%	24%	17%	15%	18%	18%	9%	19%	8%	8%	5%

Palm oil – NTM after TPP

PALM OIL NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	13%	26%	34%	37%	32%	29%	35%	24%	34%	27%	41%	35%	41%	46%	42%	30%	33%	30%	37%	53%	40%
Brunei	26%	2%	20%	30%	12%	9%	18%	16%	25%	7%	25%	16%	23%	25%	23%	8%	11%	8%	15%	31%	19%
Canada	34%	20%	4%	18%	16%	22%	7%	25%	13%	20%	13%	28%	26%	13%	17%	15%	24%	23%	15%	19%	14%
Chile	37%	30%	18%	3%	27%	33%	11%	28%	4%	30%	19%	36%	25%	11%	19%	26%	27%	30%	21%	27%	21%
Japan	32%	12%	16%	27%	4%	15%	15%	25%	22%	12%	21%	19%	30%	23%	31%	9%	17%	12%	21%	37%	24%
Malaysia	29%	9%	22%	33%	15%	4%	20%	20%	27%	7%	27%	18%	24%	29%	25%	11%	11%	8%	15%	31%	18%
Mexico	35%	18%	7%	11%	15%	20%	0%	28%	6%	19%	9%	25%	24%	8%	17%	13%	22%	18%	19%	25%	19%
New Zealand	24%	16%	25%	28%	25%	20%	28%	5%	22%	18%	34%	27%	30%	22%	24%	18%	22%	19%	26%	39%	29%
Peru	34%	25%	13%	4%	22%	27%	6%	22%	0%	25%	14%	32%	26%	5%	14%	19%	22%	26%	16%	21%	16%
Singapore	27%	7%	20%	30%	12%	7%	19%	18%	25%	2%	25%	15%	22%	26%	23%	8%	9%	6%	13%	29%	16%
USA	41%	25%	13%	19%	21%	27%	9%	34%	14%	25%	7%	34%	34%	16%	23%	22%	30%	36%	24%	29%	25%
Vietnam	35%	16%	28%	36%	19%	18%	25%	27%	32%	15%	34%	8%	34%	34%	35%	16%	21%	16%	25%	41%	28%
Africa	41%	23%	26%	25%	30%	24%	24%	30%	26%	22%	34%	34%	17%	25%	17%	25%	18%	21%	18%	26%	18%
Ro - Central America	46%	25%	13%	11%	23%	29%	8%	22%	5%	26%	16%	34%	25%	9%	13%	24%	21%	27%	15%	21%	15%
Ro - South America	42%	23%	17%	19%	31%	25%	17%	24%	14%	23%	23%	35%	17%	13%	15%	20%	19%	22%	15%	22%	15%
Ro - Central & East Asia	30%	8%	15%	26%	9%	11%	13%	18%	19%	8%	22%	16%	25%	24%	20%	4%	11%	6%	15%	31%	18%
South Asia	33%	11%	24%	27%	17%	11%	22%	22%	22%	9%	30%	21%	18%	21%	19%	11%	6%	8%	9%	23%	10%
Ro - South-East Asia	30%	8%	23%	30%	12%	8%	18%	19%	26%	6%	36%	16%	21%	27%	22%	6%	8%	4%	12%	28%	15%
Middle East	37%	15%	15%	21%	21%	15%	19%	26%	16%	13%	24%	25%	18%	15%	15%	15%	9%	12%	5%	21%	8%
Western Europe	53%	31%	19%	27%	37%	31%	25%	39%	21%	29%	29%	41%	26%	21%	22%	31%	23%	28%	21%	23%	15%
Eastern Europe	40%	19%	14%	21%	24%	18%	19%	29%	16%	16%	25%	28%	18%	15%	15%	18%	10%	15%	8%	15%	5%

Soybean – NTM after TPP

SOYBEAN NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	10%	20%	34%	34%	26%	22%	33%	17%	34%	22%	35%	28%	35%	41%	40%	25%	28%	25%	33%	44%	35%
Brunei	20%	0%	22%	29%	9%	5%	18%	11%	26%	4%	20%	11%	20%	23%	25%	6%	8%	6%	13%	24%	16%
Canada	34%	22%	6%	23%	19%	24%	13%	26%	21%	24%	14%	30%	31%	18%	26%	21%	28%	30%	21%	21%	21%
Chile	34%	29%	23%	3%	26%	32%	14%	26%	9%	30%	17%	33%	25%	11%	23%	27%	27%	31%	22%	23%	22%
Japan	26%	9%	19%	26%	2%	10%	15%	19%	23%	9%	17%	14%	27%	20%	32%	6%	13%	10%	18%	30%	21%
Malaysia	22%	5%	24%	32%	10%	2%	21%	14%	29%	4%	21%	12%	20%	26%	25%	8%	7%	6%	12%	23%	15%
Mexico	33%	18%	13%	14%	15%	21%	2%	26%	12%	20%	8%	24%	25%	10%	23%	15%	23%	21%	21%	23%	22%
New Zealand	17%	11%	26%	26%	19%	14%	26%	2%	22%	14%	28%	20%	25%	18%	23%	14%	17%	15%	22%	30%	25%
Peru	34%	26%	21%	9%	23%	29%	12%	22%	3%	27%	15%	32%	30%	9%	21%	23%	25%	30%	20%	21%	20%
Singapore	22%	4%	24%	30%	9%	4%	20%	14%	27%	1%	21%	11%	20%	24%	25%	7%	7%	5%	12%	23%	15%
USA	35%	20%	14%	17%	17%	21%	8%	28%	15%	21%	5%	28%	30%	12%	24%	18%	26%	33%	21%	22%	21%
Vietnam	28%	11%	30%	33%	14%	12%	24%	20%	32%	11%	28%	5%	29%	30%	34%	12%	16%	12%	21%	32%	24%
Africa	35%	20%	31%	25%	27%	20%	25%	25%	30%	20%	30%	29%	15%	24%	20%	24%	16%	21%	17%	21%	18%
Ro - Central America	41%	23%	18%	11%	20%	26%	10%	18%	9%	24%	12%	30%	24%	9%	16%	24%	20%	27%	15%	16%	15%
Ro - South America	40%	25%	26%	23%	32%	25%	23%	23%	21%	25%	24%	34%	20%	16%	22%	24%	21%	26%	19%	21%	19%
Ro - Central & East Asia	25%	6%	21%	27%	6%	8%	15%	14%	23%	7%	18%	12%	24%	24%	24%	4%	10%	7%	15%	26%	18%
South Asia	28%	8%	28%	27%	13%	7%	23%	17%	25%	7%	26%	16%	16%	20%	21%	10%	4%	8%	8%	17%	9%
Ro - South-East Asia	25%	6%	30%	31%	10%	6%	21%	15%	30%	5%	33%	12%	21%	27%	26%	7%	8%	5%	13%	24%	16%
Middle East	33%	13%	21%	22%	18%	12%	21%	22%	20%	12%	21%	21%	17%	15%	19%	15%	8%	13%	5%	17%	8%
Western Europe	44%	24%	21%	23%	30%	23%	23%	30%	21%	23%	22%	32%	21%	16%	21%	26%	17%	24%	17%	15%	11%
Eastern Europe	35%	16%	21%	22%	21%	15%	22%	25%	20%	15%	21%	24%	18%	15%	19%	18%	9%	16%	8%	11%	5%

Wheat – NTM after TPP

WHEAT NTM

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	South Asia	Ro - South-East Asia	Middle East	Western Europe	Eastern Europe
Australia	10%	20%	36%	35%	26%	22%	35%	17%	34%	22%	36%	30%	35%	41%	40%	25%	28%	28%	33%	44%	35%
Brunei	20%	0%	23%	30%	12%	5%	20%	11%	26%	4%	21%	13%	20%	23%	25%	6%	8%	9%	13%	24%	16%
Canada	36%	23%	7%	26%	19%	25%	16%	27%	22%	25%	16%	33%	32%	19%	27%	21%	29%	34%	22%	22%	22%
Chile	35%	30%	26%	4%	26%	33%	17%	27%	11%	31%	19%	37%	27%	12%	25%	28%	29%	36%	24%	26%	24%
Japan	26%	12%	19%	26%	2%	10%	17%	20%	24%	9%	17%	16%	26%	19%	32%	6%	13%	12%	18%	30%	21%
Malaysia	22%	5%	25%	33%	10%	2%	22%	14%	29%	4%	22%	14%	20%	25%	26%	8%	7%	8%	12%	23%	15%
Mexico	35%	20%	16%	17%	17%	22%	3%	28%	13%	21%	12%	28%	28%	12%	25%	17%	25%	26%	24%	25%	24%
New Zealand	17%	11%	27%	27%	20%	14%	28%	2%	22%	13%	28%	22%	25%	17%	23%	14%	17%	18%	22%	30%	25%
Peru	34%	26%	22%	11%	24%	29%	13%	22%	3%	27%	16%	34%	30%	9%	21%	23%	25%	33%	20%	21%	20%
Singapore	22%	4%	25%	31%	9%	4%	21%	13%	27%	1%	22%	13%	20%	24%	25%	7%	6%	8%	11%	23%	14%
USA	36%	21%	16%	19%	17%	22%	12%	28%	16%	22%	5%	31%	30%	13%	25%	19%	27%	37%	22%	23%	22%
Vietnam	30%	13%	33%	37%	16%	14%	28%	22%	34%	13%	31%	7%	32%	32%	37%	15%	19%	18%	24%	35%	27%
Africa	35%	20%	32%	27%	26%	20%	28%	25%	30%	20%	30%	32%	15%	24%	20%	24%	16%	24%	17%	21%	18%
Ro - Central America	41%	23%	19%	12%	19%	25%	12%	17%	9%	24%	13%	32%	24%	9%	16%	24%	20%	30%	15%	16%	15%
Ro - South America	40%	25%	27%	25%	32%	26%	25%	23%	21%	25%	25%	37%	20%	16%	24%	24%	21%	29%	19%	21%	19%
Ro - Central & East Asia	25%	6%	21%	28%	6%	8%	17%	14%	23%	7%	19%	15%	24%	24%	24%	4%	10%	10%	15%	26%	18%
South Asia	28%	8%	29%	29%	13%	7%	25%	17%	25%	6%	27%	19%	16%	20%	21%	10%	4%	11%	8%	17%	9%
Ro - South-East Asia	28%	9%	34%	36%	12%	8%	26%	18%	33%	8%	37%	18%	24%	30%	29%	10%	11%	11%	16%	27%	19%
Middle East	33%	13%	22%	24%	18%	12%	24%	22%	20%	11%	22%	24%	17%	15%	19%	14%	8%	16%	5%	17%	8%
Western Europe	44%	24%	22%	26%	30%	23%	25%	30%	21%	23%	23%	35%	21%	16%	21%	26%	17%	27%	17%	15%	11%
Eastern Europe	35%	16%	22%	24%	21%	15%	24%	25%	20%	14%	22%	27%	18%	15%	19%	18%	9%	19%	8%	11%	5%

Appendix – D

Interview Freight Specialist 1

Please note the following: that the information could be found for maize, soybeans and wheat. Unfortunately we do not do the Palm oil logistics, so I cannot help on that.

What are the important ports for Maize, Soybeans and Wheat?:
Australia: Newcastle / Haypoint / Dalrymple Bay / Adelaide / Brisbane / Kwinana / Port Kembla / Gladstone / Esperance / Albany / Brisbane
Brunei: N/A
Canada: Vancouver BC / Prince Rupert BC / Trois rivieres QC
Chile: N/A
Japan: Taniyama / Hakata / Nagoya / Kawasaki
Malaysia: Port Klang / Sandakan / Lahad Datu
Mexico: Ensenada / Guaymas
New Zealand: N/A
Peru: N/A
Singapore: Singapore
USA: Porlant (OR) / New Orleans (Mississippi River) / Gramercy LA / Galveston TX / Houston TX / Mobile AL /
Vietnam: N/A

What ships are used?:
Maize: barges up to post-panamaxes
Soybean: barges up to post-panamaxes
Wheat: barges up to post-panamaxes

Which ships are mostly used on route to and from:
Africa: barges up to supramaxes
West-Europe: barges up to post-panamaxes
East-Europe: barges up to panamaxes
North America: barges up to post-panamaxes
Central America: n/a
South America: barges up to post-panamaxes
Middle East: barges up to post-panamaxes
South Asia(India & Pakistan):
South-East Asia: barges up to post-panamaxes
Central Asia: barges up to post-panamaxes

Usually in all ports of asia/europe/usa/south america, all of the vessels can go.
We also use sometimes baby capes, but it is very exceptional.

Interview Freight Specialist 2

Which tankers are used for Palm oil and how much product is carried?:
Coasters: 13,000 DWT transports 12,000 tons
Handysize: 20,000 DWT transports 18,500 tons
MR2/Handymax: 35,000 DWT transports 33,500 tons (mostly used)
LR1: 55 – 65,000 DWT (never used for palm oil)

Appendix – E
Supply elasticity estimation

Supply elasticity agri products

			Values	
f1	elastic long(H) or short(L) term		H	1
f2	storage available (little = L or a lot = H)		M	0,33
f3	size domestic industry (large = H or small = L)		L	0,11

Maize

	f1	f2	f3		f1	f2	f3	Total
Australia	H	L	L	LLL	1	0,11	0,11	1,22
Brunei	H	M	L	HML	1	0,33	0,11	1,44
Canada	L	H	M	LHM	0,11	1	0,33	1,44
Chile	L	H	M	LHM	0,11	1	0,33	1,44
Japan	H	H	L	HHL	1	1	0,11	2,11
Malaysia	H	M	L	HML	1	0,33	0,11	1,44
Mexico	H	H	M	HHM	1	1	0,33	2,33
New Zealand	H	L	L	HLL	1	0,11	0,11	1,22
Peru	H	H	M	HHM	1	1	0,33	2,33
Singapore	H	M	L	HML	1	0,33	0,11	1,44
USA	L	H	H	LHH	0,11	1	1	2,11
Vietnam	H	M	M	HMM	1	0,33	0,33	1,66
Ro - Africa	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Central America	H	M	M	HMM	1	0,33	0,33	1,66
Ro - South America	L	H	H	LHH	0,11	1	1	2,11
Ro - Central & East Asia	L	H	H	LHH	0,11	1	1	2,11
Ro - South Asia	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - South-East Asia	H	M	M	HMM	1	0,33	0,33	1,66
Ro - Middle East	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Western Europe	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Eastern Europe	L	M	M	LMM	0,11	0,33	0,33	0,77

Palm Oil

	f1	f2	f3		f1	f2	f3	Total
Australia	H	L	L	HLL	1	0,11	0,11	1,22
Brunei	H	H	L	HHL	1	1	0,11	2,11
Canada	L	L	L	LLL	0,11	0,11	0,11	0,33
Chile	L	M	L	LML	0,11	0,33	0,11	0,55
Japan	L	L	L	LLL	0,11	0,11	0,11	0,33
Malaysia	H	H	H	HHH	1	1	1	3
Mexico	H	M	L	HML	1	0,33	0,11	1,44
New Zealand	H	L	L	HLL	1	0,11	0,11	1,22
Peru	L	M	L	LML	0,11	0,33	0,11	0,55
Singapore	H	H	L	HHL	1	1	0,11	2,11
USA	L	L	L	LLL	0,11	0,11	0,11	0,33
Vietnam	H	H	L	HHL	1	1	0,11	2,11
Ro - Africa	H	M	M	HMM	1	0,33	0,33	1,66
Ro - Central America	H	M	M	HMM	1	0,33	0,33	1,66
Ro - South America	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Central & East Asia	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - South Asia	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - South-East Asia	H	H	H	HHH	1	1	1	3
Ro - Middle East	H	L	L	HLL	1	0,11	0,11	1,22
Ro - Western Europe	H	M	M	HMM	1	0,33	0,33	1,66
Ro - Eastern Europe	L	L	L	LLL	0,11	0,11	0,11	0,33

Soybean

	f1	f2	f3		f1	f2	f3	Total
Australia	L	L	L	LLL	0,11	0,11	0,11	0,33
Brunei	L	L	L	LLL	0,11	0,11	0,11	0,33
Canada	H	H	M	HHM	1	1	0,33	2,33
Chile	H	H	L	HHL	1	1	0,11	2,11
Japan	H	M	L	HML	1	0,33	0,11	1,44
Malaysia	L	L	L	LLL	0,11	0,11	0,11	0,33
Mexico	L	L	L	LLL	0,11	0,11	0,11	0,33
New Zealand	L	L	L	LLL	0,11	0,11	0,11	0,33
Peru	H	H	L	HHL	1	1	0,11	2,11
Singapore	L	L	L	LLL	0,11	0,11	0,11	0,33
USA	H	H	H	HHH	1	1	1	3
Vietnam	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - Africa	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - Central America	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - South America	H	H	H	HHH	1	1	1	3
Ro - Central & East Asia	H	M	M	HMM	1	0,33	0,33	1,66
Ro - South Asia	H	M	M	HMM	1	0,33	0,33	1,66
Ro - South-East Asia	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - Middle East	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - Western Europe	L	L	L	LLL	0,11	0,11	0,11	0,33
Ro - Eastern Europe	H	M	M	HMM	1	0,33	0,33	1,66

Wheat

	f1	f2	f3		f1	f2	f3	Total
Australia	H	M	M	HMM	1	0,33	0,33	1,66
Brunei	H	L	L	HLL	1	0,11	0,11	1,22
Canada	L	H	M	LHM	0,11	1	0,33	1,44
Chile	H	M	L	HML	1	0,33	0,11	1,44
Japan	H	H	L	HHL	1	1	0,11	2,11
Malaysia	H	L	L	HLL	1	0,11	0,11	1,22
Mexico	H	L	L	HLL	1	0,11	0,11	1,22
New Zealand	H	M	L	HML	1	0,33	0,11	1,44
Peru	H	M	L	HML	1	0,33	0,11	1,44
Singapore	H	L	L	HLL	1	0,11	0,11	1,22
USA	L	H	H	LHH	0,11	1	1	2,11
Vietnam	H	L	L	HLL	1	0,11	0,11	1,22
Ro - Africa	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Central America	H	L	L	HLL	1	0,11	0,11	1,22
Ro - South America	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Central & East Asia	L	H	H	LHH	0,11	1	1	2,11
Ro - South Asia	L	H	H	LHH	0,11	1	1	2,11
Ro - South-East Asia	H	L	L	HLL	1	0,11	0,11	1,22
Ro - Middle East	L	M	M	LMM	0,11	0,33	0,33	0,77
Ro - Western Europe	L	H	H	LHH	0,11	1	1	2,11
Ro - Eastern Europe	L	H	H	LHH	0,11	1	1	2,11

Appendix – F

Vessel capacity scheme – Maize result

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Ro - Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	Ro - South Asia	Ro - South-East Asia	Ro - Middle East	Ro - Western Europe	Ro - Eastern Europe
Australia	-	-	-	-	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brunei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canada	-	-	-	-	-	-	-	-	-	-	0,8	-	-0,1	-	-	-	-	-	-0,1	-0,2	-
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,1	-	-	-	-	-	-
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USA	-	-	0,3	-0,1	**54,4**	-	**3,1**	-	-0,3	-	-	-	-0,6	**-3,9**	**-3,3**	**-9,0**	-	-0,1	-0,8	-0,1	-0,1
Vietnam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Africa	-	-	-	-	**-4,7**	-	0,6	-	-	-	-	-	0,6	-	-	0,8	-	-	-	0,1	-
Ro - Central America	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South America	-	-	-	-	**-24,5**	0,1	0,4	-	0,3	-	-0,7	0,1	-0,1	**4,3**	**3,4**	**8,0**	0,2	0,3	0,5	0,2	-
Ro - Central & East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South Asia	-	-	0,1	-	-	-0,1	-	-	-	-	-	-0,1	-	-	-	0,4	-	-0,1	-	-	-
Ro - South-East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Middle East	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Western Europe	-	-	-	-	-0,4	-	-	-	-	-	-	-	-0,1	-	-	0,2	-	-	-	-0,1	-
Ro - Eastern Europe	-	-	-	-	**-7,8**	-	-	-	-	-	-	-	-0,3	0,1	-	**2,3**	0,2	-	0,5	0,7	0,1

Vessel capacity scheme – Palm Oil result (year 1)

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Ro - Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	Ro - South Asia	Ro - South-East Asia	Ro - Middle East	Ro - Western Europe	Ro - Eastern Europe
Australia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brunei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	0,2	-	0,2	-	**1,0**	-	-	-	0,3	0,7	**1,5**	0,9	- 0,3	-	-	- 0,6	**- 1,3**	- 0,1	- 0,1	- 0,3	- 0,1
Mexico	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USA	-	-	-	-	-	-	0,1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vietnam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Central America	-	-	-	-	-	-	- 0,1	-	-	-	-	-	-	-	-	-	-	-	-	0,1	-
Ro - South America	-	-	-	-	-	-	-	-	- 0,1	-	-	-	-	-	-	-	-	-	-	0,1	-
Ro - Central & East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South-East Asia	-	-	-	-	- 0,3	- 0,1	-	-	- 0,1	- 0,8	**- 1,3**	- 0,5	0,4	-	-	-	**1,1**	0,1	-	-	0,1
Ro - Middle East	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Western Europe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Eastern Europe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Vessel capacity scheme – Soybean result

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Ro - Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	Ro - South Asia	Ro - South-East Asia	Ro - Middle East	Ro - Western Europe	Ro - Eastern Europe
Australia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brunei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canada	-	-	-	-	0,2	-	-	-	-	-	0,5	-	-	-	-	- 0,2	-	-	-	- 0,2	-
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USA	-	-	0,1	-	0,9	0,1	**2,3**	-	0,1	-	-	0,5	-	-	-	**-1,2**	-	- 0,1	-	- 0,1	-
Vietnam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Central America	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South America	-	-	-	-	- 0,3	-	- 0,5	-	-	-	- 0,2	- 0,2	-	-	-	0,9	-	-	-	0,1	-
Ro - Central & East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South-East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Middle East	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Western Europe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Eastern Europe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Vessel capacity scheme – Wheat result

Exporter | Importer	Australia	Brunei	Canada	Chile	Japan	Malaysia	Mexico	New Zealand	Peru	Singapore	USA	Vietnam	Ro - Africa	Ro - Central America	Ro - South America	Ro - Central & East Asia	Ro - South Asia	Ro - South-East Asia	Ro - Middle East	Ro - Western Europe	Ro - Eastern Europe
Australia	-	-	-	-	-	0,6	-	0,8	-	0,1	-	**2,7**	- 0,3	-	-	-	- 0,1	0,2	- 0,5	-	-
Brunei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canada	-	-	-	-	0,8	-	0,8	-	0,3	-	**23,1**	0,2	**- 3,6**	- 0,4	**- 1,5**	- 0,7	- 0,9	**- 1,0**	- 0,9	**- 1,1**	-
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	-	-	-	-	-	-	-	-	-	-	0,1	-	-	-	-	-	-	-	-	-	-
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USA	-	-	**1,4**	0,4	**2,3**	-	**3,9**	-	0,6	-	-	0,1	**- 2,2**	- 0,5	- 0,5	**- 1,1**	- 0,1	- 0,4	- 0,3	- 0,4	-
Vietnam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Central America	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - South America	-	-	-	-	-	-	-	-	- 0,1	-	0,1	- 0,1	-	-	0,4	-	-	-	-	-	-
Ro - Central & East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,3	-	-	-	-	- 0,1
Ro - South Asia	-	-	-	-	-	-	-	-	-	-	-	- 0,2	0,1	-	-	0,2	0,1	0,2	0,1	-	-
Ro - South-East Asia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Middle East	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ro - Western Europe	-	-	-	-	-	-	-	-	-	-	-	-	**1,5**	-	-	-	0,1	-	0,2	0,4	-
Ro - Eastern Europe	-	-	0,2	-	-	-	-	-	- 0,1	-	-	- 0,6	**1,4**	-	-	0,2	0,1	0,6	0,6	0,2	-