



UNIVERSITI PUTRA MALAYSIA

***COMPETITIVE AND COMPARATIVE ADVANTAGE OF RUMINANT MEAT
AND ITS IMPORT DETERMINANTS IN MALAYSIA***

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AND ITS IMPORT DETERMINANTS IN MALAYSIA**

By

HEBAT HISHAM BIN MOHD YUSOFF

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
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Philosophy**

February 2021

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

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Malaysia's self-sufficiency level for ruminant meat has never exceeded 30 percent for the past 10 years despite various intervention measures introduced by the government to overcome the issue. The increasing demand of ruminant meat in Malaysia triggered by the economic and socio factors has not been matched by the ability of domestic production. The situation has created over dependency on import as to cover the shortage. However, the sources of import are currently confined to Australia, New Zealand and India. This over-dependency on limited number of countries has put Malaysia in a vulnerable situation due to the exposition of supply disturbance. Malaysia's dependency on import in fulfilling its need for ruminant meat is not something that could be addressed instantly. Even in the situation that Malaysia is able to meet the targeted self-sufficiency levels of 30 percent, it will not entirely put a stop to the import dependency as the deficit will still be addressed through importation. In this regard, various intervention programs have been introduced by the government to boost up the domestic production. Despite the intervention programs which are specifically targeted to increase the availability of ruminant meat in the country, the issue of low self-sufficiency level still persist. The objective of this study is to examine the competitive advantage of the trading partners on the exportation of ruminant meat. Besides that, this study also identify factors that explain the import of ruminant meat and also determine the comparative advantage of local production of ruminant meat. This study employs Vollrath indices through the utilization of relative export advantage, relative import advantage and ultimately the overall relative trade advantage for the first objective. Analysis has been conducted on 26 countries and 15 product codes of ruminant meat. As for the second objective,

gravity model has been employed and panel data of 19 countries, 15 product codes of ruminant meat and import data of 10 years have been tested and estimated. Pooled Ordinary Least Square (POLS), Random Effect Model (REM) and Fixed Effect Model (FEM) were utilized as an estimator but focus of analysis was based on Pooled Ordinary Least Square. Policy Analysis Matrix (PAM) has been adopted for the third objective based on the survey conducted on 29 cattle farms operated under the program of Taman Kekal Pengeluaran Ruminan (TKPR). The findings of this study indicate that the possession of competitive advantage is not exclusively belonged to the traditional sources, but other countries as well particularly Pakistan and Netherland. Besides that, the findings for factors that explain Malaysia's import have found that halal certification play a significant role in influencing import. Its importance has outweighed other single economic factors that include geographical distance, memberships of free trade agreement (FTA), gross domestic product (GDP) as well as endowments. The results from Policy Analysis Matrix (PAM) have suggested that the comparative advantage of ruminant sector in Malaysia is largely dependent on the type of farms adopted by the farmers.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KELEBIHAN PERSAINGAN DAN KELEBIHAN BANDINGAN DAGING RUMINAN DAN FAKTOR PENENTU IMPORT DI MALAYSIA

Oleh

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Tahap sara diri Malaysia untuk daging ruminan tidak pernah melebihi 30 peratus sejak 10 tahun lalu walaupun pelbagai program telah diperkenalkan kerajaan bagi mengatasi isu itu. Permintaan daging ruminan yang semakin meningkat di Malaysia yang dicetuskan oleh faktor ekonomi dan sosioo belum tidak setara dengan keupayaan pengeluaran domestik. Ini telah menimbulkan kebergantungan kepada import untuk menampung permintaan. Bagaimanapun, sumber import kini hanya terhad kepada Australia, New Zealand dan India sahaja. Kebergantungan yang tinggi kepada negara yang terhad telah meletakkan Malaysia dalam keadaan terdedah kerana risiko gangguan bekalan. Kebergantungan Malaysia terhadap import dalam memenuhi permintaan bukanlah sesuatu yang boleh diberhentikan serta-merta. Malah dalam keadaan Malaysia mampu memenuhi sasaran tahap sara diri 30 peratus, ia tidak akan menghentikan kebergantungan kepada import kerana defisit masih perlu ditangani melalui import. Dalam hal ini, pelbagai program intervensi telah diperkenalkan oleh kerajaan untuk meningkatkan pengeluaran domestik. Walaupun begitu, isu tahap kemampuan diri yang rendah masih berterusan. Objektif kajian ini adalah untuk mengkaji kelebihan daya saing rakan dagang dalam pengeksporan daging ruminan. Selain itu, kajian ini juga adalah untuk mengenal pasti faktor-faktor yang menjelaskan import daging ruminan dan juga menentukan kelebihan perbandingan pengeluaran daging ruminan tempatan. Kajian ini menggunakan petunjuk Vollrath melalui penggunaan kelebihan eksport relatif, kelebihan import relatif dan akhirnya kelebihan perdagangan relatif keseluruhan untuk objektif pertama. Analisis telah dijalankan ke atas 26 negara dan 15 kod produk daging ruminan. Bagi objektif kedua, model graviti telah digunakan dan data panel 19 negara, 15 kod produk daging ruminan dan data import 10 tahun telah diuji dan dianggarkan. Pooled Ordinary Least Square (POLS), Model Kesan Rawak (REM) dan Model Kesan Tetap (FEM) digunakan sebagai anggaran tetapi tumpuan analisis adalah berdasarkan POLS. Matrik Analisis Dasar atau Policy Analysis Matrix (PAM) telah diguna pakai untuk

objektif ketiga berdasarkan kaji selidik yang dijalankan ke atas 29 ladang lembu yang dikendalikan di bawah program Taman Kekal Pengeluaran Ruminan (TKPR). Dapatan kajian ini menunjukkan bahawa pemilikan kelebihan daya saing bukan eksklusif milik negara sumber tradisional, tetapi negara-negara lain terutamanya Pakistan dan Belanda. Selain itu, dapatan berkenaan faktor-faktor yang menjelaskan import daging ruminan oleh Malaysia mendapati bahawa pensijilan halal memainkan peranan penting dalam mempengaruhi import. Kepentingannya telah melebihi factor-faktor ekonomi yang lain seperti jarak geografi, keahlian perjanjian perdagangan bebas, keluaran dalam negara kasar serta endowmen. Keputusan daripada Analisis Dasar Matrix (PAM) telah mencadangkan bahawa kelebihan perbandingan sektor ruminan di Malaysia sebahagian besarnya bergantung kepada jenis perternakan yang dipilih oleh penternak.



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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
4MP	Fourth Malaysia Plan
FTA	Free Trade Agreement
PAM	Policy Analysis Matrix
RMK	Rancangan Malaysia
NAP	National Agriculture Policy
DJBM	Dasar Jaminan Bekalan Makanan
DVS	Department of Veterinary Service
USDA	United State Department of Agriculture
US	United States
SDGs	Sustainable Development Goals
WHO	World Health Organization
DOSM	Department of Statistics Malaysia
B40	Bottom 40%
M40	Middle 40%
T20	Top 20%
UAE	United Arab Emirates
AFTA	ASEAN Free Trade Agreement
ASEAN	Association of South East Asian Nations
MAFTA	Malaysia-Australia Free Trade Agreement
AANZFTA	ASEAN, Australia and New Zealand Free Trade Area
MCFTA	Malaysia-Chile Free Trade Agreement
ACFTA	ASEAN-China Free Trade Area
AIFTA	ASEAN-India Free Trade Agreement

MICECA	Malaysia-India Comprehensive Economic Cooperation Agreement
MJEPA	Malaysia-Japan Economic Partnership Agreement
AJCEP	ASEAN-Japan Comprehensive Economic Partnership
AKFTA	ASEAN-Korea Free Trade Agreement
MPCEPA	Malaysia-Pakistan Closer Economic Partnership Agreement
ATIGA	ASEAN Trade In Goods Agreement
MNZFTA	Malaysia-New Zealand Free Trade Agreement
MTFTA	Malaysia-Turkey Free Trade Agreement
MITI	Ministry of International Trade and Industry
UN	United Nations
FAO	Food and Agriculture Organization
JAKIM	Department of Islamic Development
FHCB	Foreign Halal Certification Bodies
IFANCA	Islamic Foods and Nutrition Council of America
ISA	Islamic Services of America
HFCI	Halal Food Council International
MUI	Ulama Council of Indonesia
CICT	Central Islamic Committee of Thailand
MUIS	Islamic Religious Council of Singapore
HFCI	Halal Food Council International
DM	Dry Matters
KK	Kedah-Kelantan
GAP	Good Agriculture Practices
SALT	Skim Amalan Ladang Terbaik
HACCP	Hazard Analysis and Critical Control Points

FMD	Foot and Mouth Disease
MTM	Malaysia-Thailand-Myanmar
TKPR	Taman Kekal Pengeluaran Ruminan
TKPM	Taman Kekal Pengeluaran Makanan
TRUST	Program Transformasi Usahawan Ternakan
MoA	Ministry of Agriculture and Agro-based Industry
EPP5	Entry Point Project 5
NKEA	National Key Economic Areas
KPI	Key Performance Indicator
HO	Ricardian and Heckscher-Ohlin (H-O)

CHAPTER 1

INTRODUCTION

1.1 Background

The importance of agriculture has never diminished despite the fact that its contribution to world's GDP has steadily declined for the past 10 years. Its importance is rooted from the fact that it shoulder a big responsibility to feed the increasing world's population by ensuring the issue of food security particularly its core components-availability, accessibility, utilization and stability are well addressed. It is a tool for hunger avoidance and providing at least minimum nutritional value to the population. It has also been hailed as the biggest employer based on the fact that almost 40 percent of world's population are involved in the agriculture sector. Agriculture is also a frontline sector in exploiting, utilizing and managing the complex biodiversity. The elements of biodiversity such as land, water, soil, forestry and marine are woven and integrated in order to produce the intended results and outcomes. Due to this, it is common for agriculture to be associated with negative externalities such as emission of greenhouse gases, river pollution, ecosystem disruption and soil degradation.

Malaysia's agriculture sector is basically driven by two major policy blueprints – The Five Year Malaysia Plan which is the 11th Malaysia Plan and The National Agriculture Policy (NAP) - a ten year plan (2011-2020) which replaced the Third National Agricultural Policy (1998-2010). This new NAP has two specific blueprints to cater for the different sectors of agriculture namely Plantation Commodities and Agro Food sector (Economic Planning Unit, 2015). The agro food sector contributed 38.8 per cent to the total agriculture value added while the bigger portion of 60.5 percent went to industrial commodity sector. The 11th Malaysia Plan (RMK11) has identified that agriculture sector need to be modernized and restructured in order to achieve the targeted growth of 3.5 per cent per annum with the total contribution to GDP around RM519 billion by 2020. During the period of 10th Malaysia Plan, agriculture sector growth rate was recorded at 2.4 percent per annum.

The measures stipulated in the NAP especially the Agro-Food Policy are intended to bolster the food supply to a satisfactory and sufficient level through the transformation of agro-food sector to become viable, sustainable and profitable industry. It is a continuation from and a strengthened form of the previous National Agriculture Policies (NAP1, NAP2 and NAP3) and also Dasar Jaminan Bekalan Makanan (DJBM). DJBM was introduced in 2008 when the world's price of food items trended upward and triggered the issue of food

security worldwide. The introduction of DJBM was specifically to emphasize the issue of food security in Malaysia by implementing specific programs in materializing the intended objectives. The high dependency of Malaysia on international market to meet its food needs has exposed the country to the vagaries of supply and price shocks of international market.

The issue of food security is still high on the priority list of the government especially in improving the aspect of availability through domestic production enhancement strategies. The core objectives of National Agro-food policy is to ensure Malaysia is food secured by making the agriculture sector a reliable and sustainable sector in producing food commodities to meet the demand of local population. The objectives will be generally materialized through the enhancement of value addition activities in the agro-food sector, the strengthening of food value chain and the improvement of skilled labour. The objectives in the NAP are further amplified in the RMK11 where various specific targets have been set for that purpose.

One of the important strategies stipulated in RMK11 for agro-food sector is to increase production to achieve the targeted self-sufficiency level. The increased in yield has the potential to increase the profitability of the sector as the domestic demand always outdo the domestic supply. This strategy will help Malaysia to reduce its import bill which continues to record hefty amount from RM34.45 billion in 2011 to RM42.60 billion in 2014. It is also important to note that Malaysia has been experiencing an upward trend of trade deficit as far as agro-food is concerned. In 2011, Malaysia's trade deficit was recorded at RM13.9 billion and it continued to move upward to RM17.01 billion in 2014 and further increased to reach RM19.5 billion in 2017. Figure 1.1 indicates the overall balance of trade of Malaysia's agro-food for the period of 1990 to 2014.

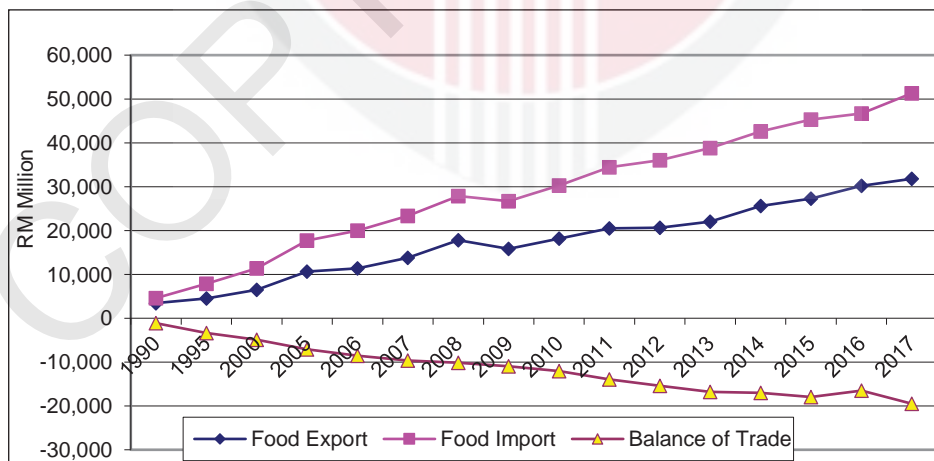


Figure 1.1: Malaysia Food Trade Balance, 1990-2017
(Source: Economic Planning Unit, 2018)

Ruminant meat and its preparations as well as feeds for livestock have been identified as the major contributors to the situation of trade deficit (EPU, 2018). In this regard, the trade statistic only refers to the meat derived from cattle, sheep, goat as well as buffalo. The importance of ruminant meat could be seen from the perspective of overwhelming demand which has yet to be matched with the ability of domestic production to meet the demand. The pattern of demand for the ruminant meat continues to register positive growth annually and its intake has superseded the intake of grain commodities. As a result, it has become one of the important diets for the majority of Malaysian largely due to the improvement in household income, urbanization and population growth (Sheng, Shamsudin, Mohamed, Abdullah and Radam, 2010).

Malaysia has recorded high population growth reaching 3.2 percent in 1963 while income per capita has recorded a significant improvement about 752 percent from USD\$1,354 in 1960 to USD\$11,528 in 2017. As for the urbanization, almost 76 percent of Malaysia's population residing in urban areas as of 2017, a stark increase from 27 percent in 1960 (Taffesse and Tsakok, 2019).

In general, meat for human consumption is sourced from two categories of animals which are ruminants and non-ruminants. Ruminants have the special characteristics of having four compartments of stomach comprising rumen, reticulum, omasum and abomasum. This uniqueness allows the ruminants to digest various kind of herbage and vegetative which could not be digested adequately by other animals. On the other hand, non-ruminants are animals with single stomach structure with a single compartment. Non-ruminants is also known as monogastrics (Bender, 1992). Ruminant animals are mostly herbivorous while non-ruminants are generally carnivores, omnivores and some herbivores.

Ruminant meats are sourced from ruminant animals which are normally domesticated animals such as cattle, sheep, goat and buffalo. In some regions particularly in North Africa and Middle East, camels are also considered as domesticated ruminants. Deer, giraffe and antelope are also in the family of ruminant but non-domesticated ones (Bender, 1992). However, the context of ruminant meat for the purpose of this study is strictly focused on meat derived from cattle, buffalo, sheep and goat.

Apart from being a good source of meat, ruminants such as cattle, sheep and goat are also reared for its milk. It is important to note that ruminants meant for meat and ruminants meant for dairy are sourced from different species. This is true particularly for commercial purposes involved in medium and large scale productions. However, the situation is different for small-scale production especially in the rural area where meat and milk are sourced from the same ruminant as it is more for self-sustenance and not commercially driven.

The significance of ruminant meat is clearly stated in the Eleventh Malaysia Plan as a sector that needs serious attention from the government. The core issue of ruminant meat sector is largely focused on the mismatched between the demand and the domestic supply. The consumption of ruminant meats has consistently outdone its domestic production despite positive increments recorded in the domestic production. This critical issue has pushed the government to formulate various policies with the objective to increase the self-sufficiency level and satisfy the growing demand of consumption (Economic Planning Unit, 2018). In addressing the issue of domestic production shortage, the supply of ruminant meat sourced from international markets has become a crucial lifeline to bridge the gap between the high domestic demand and the low domestic supply. The high dependency on international market has contributed to the trade deficit which has been continuously on the upward trend. As a consequence of the situation, the level of self-sufficiency has been relatively stagnant at the level lower than 30 percent since 1990 (Mohamed, 2012). In fact, it has been hovered around 25 to 27 percent since 2000 (Department of Veterinary Service, 2017). The latest self-sufficiency level recorded by Malaysia in 2020 was 28 percent (Department of Veterinary Service, 2021).

1.1.1 Global Ruminant Meat Consumption Trend

The shifts in diets from grain based to animal based such as ruminant meat, milk and dairy has become a new norm in today's world especially amongst developing countries. The trend is dominant amongst developing countries that have registered positive and significant economic growth (Ismail, Abdullah, and Hassanpour, 2013). The situation fits well with the findings by Gallet (2010) where the author has conducted a meta-analysis study on 393 studies and has regressed 3357 estimated income elasticity. The finding has suggested that the increased in household income will lead to bigger allocation of budget for ruminant meat. This particular trend is more prominent amongst the developing countries due to the high level of responsiveness to income changes.

The trend of bigger budget allocation for ruminant meat in response to the improvement of household income is also in conformity with the findings made by the USDA Economic Research Service. The study which has covered 114 countries based on 2005 data has indicated that low income countries like Kenya and Democratic Republic of Congo have a high degree of income elasticity ranging from 0.78 to 0.84 respectively. Mid income developing countries, on the other hand, have shown a moderate income elasticity at 0.69 for Brazil and South Africa while 0.66 for Argentina. This is contrary with high income countries as their income elasticity is relatively low only around 0.48 for Japan and 0.34 for US. This is due to the fact that economic growth has the potential to improve per capita income of a particular population which could further influence customers with better purchasing power to change their lifestyle including their dietary needs.

Ruminant meat has contributed to almost 30 percent of calorie intake in the developed countries while in the developing countries, the level is lower than 10 percent. Reardon and Timmer (2014) and Food and Agriculture Organization of the United Nations (2017) have explained that the change in consumption pattern that favour meat based diets over grain or starch based diets due to the increased in household incomes and purchasing power is in conformity with the Bennett's law.

The empirical evidence that demonstrates this pattern is obvious in Asia contributed by the positive economic growth registered by many countries in Asia's region. Zhang, Wang and Martin (2018) have reported that beef is highly consumed by the Guangzhou citizens as compared to other cities in China where pork is highly preferred. High income level has been identified as the causal factor that contribute to the situation based on the fact that Guangzhou is one of the wealthier cities in China. The same study has also noted that China's meat consumption pattern will change in the future to accommodate more ruminant meat particularly beef and mutton. The change will be fuelled by China's economic growth which correspondingly increase its citizens' household income.

It has been projected that the consumption of ruminant meat by the developing countries to grow at 2.9 percent per annum, which is second after poultry. The growth pattern is expected to continue until 2020 fuelled by undiminished demand from the developing countries particularly countries in East Asia, Southeast Asia and Latin America as a result of 'livestock revolution' (Delgado, 2003).

Apart from economic growth which lead to household income improvement, the increased in intake of ruminant meat is also contributed by the population growth (Delgado, Rosegrant, Steinfeld, and Ehui, 1999). Food and Agriculture Organization of the United Nations (2017) and Moon (2011) have projected that the world will have 9 to 10 billion as its population in 2050. Due to this fact, an additional of 70 to 100 percent of food is needed to feed the world population (Muir, Pretty, Robinson, Thomas, and Toulmin, 2010). The increased is contributed by the significant population growth of countries in the Asia and Africa regions.

Urbanization is also one of the forces that influence diets diversification which has caused the demand for ruminant meat to increase substantially. Urbanization which is synonym with the betterment of physical infrastructure and other type of facilities has the ability to improve the accessibility and availability of ruminant meat to consumers in general (Thornton, 2010). The importance of urbanization could be seen from the fact that more and more people are now living in urban setting compared to the rural areas. The urbanization process has further expedited the diversifications of diet which has reduced the intake of grains based diets (Delgado, 2003). Diversification of diets is made possible by urbanization since it normally comes together with improvement in infrastructure. For example, the availability of cold storage facility will prolong the shelf-life of

perishable goods including ruminant meat and the improvement in transportation mode will open more opportunities for trade to happen (Thornton, 2010).

The increased in ruminant meat intake is also shaped and determined by its nutritional values and health consideration. Its importance is derived from the fact that ruminant meats are nutritionally rich which make them an important source of a wide range of nutrients (Verbeke, Pérez-Cueto, Barcellos, Krystallis, and Grunert, 2010). Ruminant meats have been identified as a major source of protein and other essential nutrients particularly iron, zinc and vitamin B12. Stunted body growth and malnutrition are synonym with protein deficiency. Iron, richly found in ruminant meat is needed by the body as a medium in the form of haemoglobin to transport oxygen from the heart to the rest of the body. Lack of iron in the body can cause negative impacts on health particularly anaemia (McAfee et al., 2010). Therefore, the issue of micronutrient deficiencies which is synonym with the least developed countries could be addressed with the introduction of ruminant meat based food to their diets and this should be taken into consideration by those who provide the food aid to these countries. Its effectiveness in improving physical and mental health could be seen from the fact that the nutrients content in a small amounts of meat based food is almost equivalent with the large and diverse amount of vegetables and cereals could provide (Thornton, 2010).

The importance of having balanced diets and improved nutrition has been clearly stated in the Sustainable Development Goals (SDGs) of the United Nations. It has been declared as one of the objectives of the second pillar of SDGs-‘Zero Hunger’ that need to be achieved by member countries. In other words, food security agenda is not confined to the issue of hunger and staple per se, but the scope is wider than that to cover the presence of important micronutrients as a mean to achieve balanced diets and improved nutrition. Since ruminant meat is an important source of micronutrients which has been recommended by WHO to improve children cognitive ability, the availability of ruminant meat will directly contribute to the materialization of the SDGs objectives related to balanced diets and improved nutrition (Pulina et al., 2017).

Despite some setbacks which have associated ruminant meat with cardiovascular diseases, there are still large and significant number of consumers that still regard ruminant meat as a healthy and important dietary components (Verbeke et al., 2010). The chances of getting heart related problems resulted from ruminant meat intake could be reduced and minimized through right techniques of meat preparations and cooking preferences. Therefore, it is important to acknowledge that by strengthening the availability of ruminant meat, the state of malnutrition and food security are also being improved. The various nutritional values of ruminant meat is actually in conformity with the definition of food security that stresses on the importance of the availability and accessibility to safe, sufficient and nutritious food supply (Pinstrup-Andersen, 2009).

1.1.2 Domestic Production and Demand of Ruminant Meat in Malaysia

The population expansion together with positive economic growth and increased in household income have become a dominant force in boosting the intake of ruminant meat worldwide including in Malaysia. The same factors have also caused diet changes and diversification which have increased the preference for high value protein diets sourced from ruminant meat (Sheng et al., 2010). The positive growth of per capita consumption of ruminant meat as demonstrated in Figure 1.2 was part of the response to the increased of population experienced by Malaysia where the total number of population in 1990 was 18.03 million and continue to increase to 23.19 million in 2000 and reached 32.523 million in 2019 (DOSM, 2020).

Apart from the increased in the number of population, the positive pattern of consumption is expected to remain for the years to come fuelled by positive increments of household income. An increment of 13.3 percent from RM6141 in 2014 to RM6958 in 2016 has been recorded for the average household income of Malaysia based on the report issued by Department of Statistic Malaysia on 31 October 2017. All the three segments of population the T20, M40 as well as B40 have registered an increment in their median and mean household income. Food (18 percent) and 'food away from home'-restaurants (13.4 percent) are the two of four major sectors that Malaysian have spent their money most based on the same census. The other two sectors are housing and utilities (24 percent) and transportation (13.7 percent).

Physical development and improvement such as roads and highways will enable the process of transportation of agriculture produce to be transported from the production site to the consumer market in a more effective way. Better road network connectivity will reduce the transportation time and this is crucial for perishable goods like ruminant meat (D'Odorico, Carr, Laio, Ridolfi, and Vandoni, 2014). In fact, transportation sector is one of the sectors that have received a substantial amount of allocation from the government of Malaysia especially in road construction including interstate highway apart from other facilities such as electricity and telecommunication. The availability of other related facilities like dedicated vessel with cold storage to transport the perishable goods such as ruminant meat have also played a crucial factor in influencing customers to consume ruminant meat. This has been further strengthened by the fact that the ownership of private freezer has been a something common amongst Malaysian (Ismail and Yusop, 2014).

Lifestyle change which has also been fuelled by the globalization is one of the catalysts that have caused the changes in consumption trend especially the dietary pattern. Consumers have started to change their diets that favour more protein content as compared to the traditional Malaysian diets that emphasize carbohydrates (Sheng et al., 2010). It has been termed as 'westernization of diets' as consumption of ruminant meat has also become a symbol of status and part of modern lifestyle (Pingali, 2007).

As a result of the discussed factors, Malaysia's per capita consumption of ruminant meat has steadily increased as shown in Figure 1.2. Per capita consumption of beef has increased from 3.49 kg in 1990 to 5.49 kg in 2006 and continues to move upward to reach 7.05 kg in 2015. The similar pattern of positive growth was also shared by per capita consumption of mutton/lamb which has risen from 0.49 kg in 1990 to 0.67 kg in 2006 and reached 1.25 kg in 2015.

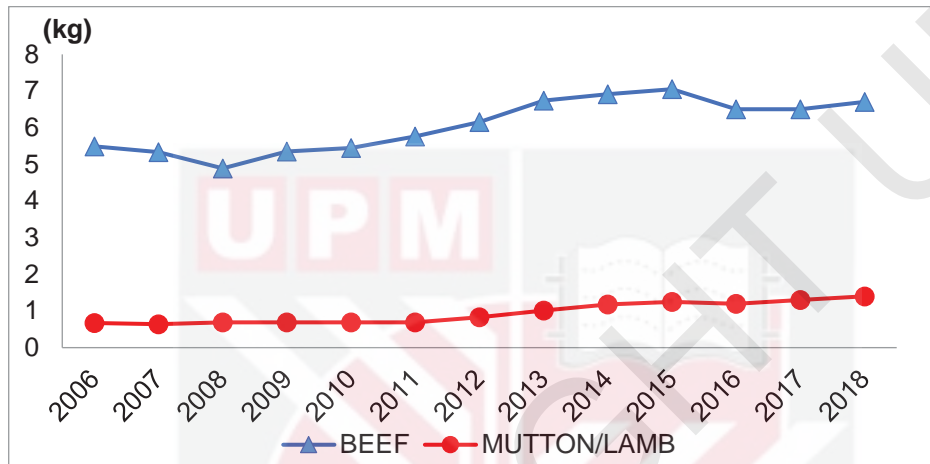


Figure 1.2: Malaysia's Per Capita Consumption of Beef and Mutton/ Lamb (kg), 2006 – 2018

(Source: Department of Veterinary Service, 2019)

The significance of ruminant meat particularly beef has led to the categorization of beef as a normal good even though it used to be categorised as luxury good in the 70s and 80s (Kabir, 2015). The betterment in household income which has led to the increased of purchasing power have pushed the demand to go upward and this has changed its status from the luxury to the normal good (Sheng et al., 2010). In general, all types of meat in Malaysia are inelastic when it comes to income elasticity. However, if comparison is made between ruminant and the non-ruminant meat, ruminant meat represented by beef and mutton have recorded the highest positive elasticity. It signifies the positive correlation between the level of household income and the pattern of ruminant meat intake (Tey, Mad Nasir, Alias, Zainalabidin, and Amin, 2008).

In term of price elasticity of ruminant meat, there is no conclusive finding due to mixed conclusions produced by various studies. Mohamed (2012) has indicated that price elasticity for beef is inelastic indicating that increased in price has a little impact on its level of consumption. The finding which has been supported by other studies such as Baharumshah and Mohamed (1993) and Abd. Latif, Mohamed, Ahmed, and Shamsudin (2013) is based on the premise that the availability of cheaper substitutes particularly poultry products have contributed to the inelasticity of beef. Contrary to that, research by Sheng et al. (2010) on

the other hand has demonstrated that beef is quite elastic where one percent increase in price will reduce the demand by 2.478.

The ununiformed findings are actually a proof that demand for ruminant meat is heterogeneous in nature. Mixed of various factors particularly the economic factors such as household income and urbanization combined with social factors such as religion, cultural, beliefs and festive seasons are the factors that shape the intake pattern (Tey et al., 2008 and Sheng et al., 2010). Apart from that, sensory indicators like freshness, marble fat, juiciness and type of cuts also play important role in determining the consumption level. It has also been complemented by non-sensory determinants such as animal welfare, green practises and nutrient content. The interconnectivity of various factors is actually a proof to confirm the complex relationship between intrinsic and extrinsic factors in determining the consumption level of ruminant meat (Grunert, 2006; Chamhuri and Batt, 2013).

However, the increased in demand is not parallel with the ability and capacity of domestic production to supply. This has adversely impacted the level of Malaysia's self-sufficiency as indicated by Figure 1.3. In order to address the issue of self –sufficiency and to boost up the domestic production of ruminant meats, various initiatives have been implemented by the government together with the private sectors to bolster its production.

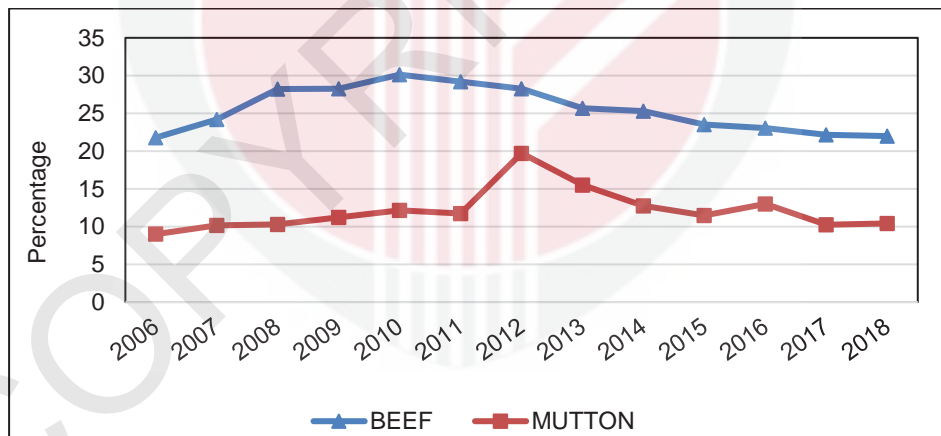


Figure 1.3: Malaysia's Self Sufficiency in Beef and Mutton (%), 2006 – 2018
(Source: Department of Veterinary Service, 2019)

The initiatives include integrated farming where ruminants are reared in oil palm plantation, adoption of R&D in producing high yield breeds, cross breeding program, artificial insemination, establishment of embryo bank, application of feedlot production system and utilization of local and abundant resources such as palm kernel cake, palm frond and agricultural waste for feed. (Mohamed, Hosseini, and Kamarulzaman, 2013).

The institutionalize of trade measures has also been put in place as an additional measure to ensure adequate supply of meat for domestic consumption (Mohamed, 2007). The supply of ruminant meat from the international markets into Malaysia has been made smoothen with the abolishment of import tariffs. Measures related to the importation of live ruminants has been made flexible by the government as to ensure Malaysia will get the needed breed for the purpose of breeding and cross-breeding. The exportation of live ruminants from Malaysia to the international markets has been restricted through the imposition of export tax. This is to ensure the availability of ruminant meat in the domestic market will not be jeopardized.

The various programs and initiatives introduced by the government have managed to register an upward trend in the beef production which has increased from 31,885 mt in 2006 to 50,493 mt in 2015. The same trend was shared by mutton and goat production which has increased from 1,600 mt in 2006 to 4,367.3 mt in 2015 (DVS, 2017). However, there is still a long way to go as far as ruminant meat production is concerned.

The increased in production has yet to match with the growing demand of domestic consumption. This has been proven by the pattern of consumption of ruminant meats which has recorded a substantial increase from 146,373 mt in 2006 to 214,866 mt in 2015 for beef. The consumption of mutton and goat has also shot up from 17,800 mt in 2006 to 38,107 mt in 2015. The pattern of production versus consumption is indicated in Figure 1.4. Per capita consumption of beef has grown from 5.49 kg in 2006 to 7.05 kg in 2015. The similar pattern has been recorded for mutton and goat which has increased from 0.67 kg in 2006 to 1.25 kg in 2014.

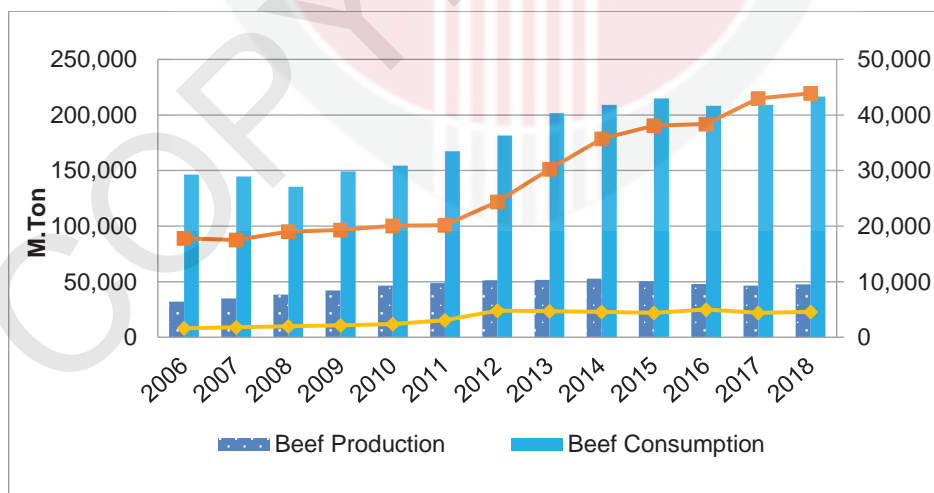


Figure 1.4: Malaysia's Production and Consumption of Beef and Mutton (2006-2018)

(Source: Department of Veterinary Service, 2019)

Despite the impressive record of production growth especially during the period of 1960 – 2006, the self-sufficiency level has dropped quite drastically from 82 percent in 1960 to 22 percent in 2006 (Mohamed et al., 2013). Although the self-sufficiency level has shown some improvement and increased to 27.2 percent in 2015, the gap between local production and consumption remains wide (Economic Planning Unit, 2015b). Since the local production could not cope up with the growing demand, sourcing the ruminant meat from the international markets in order to fulfil the need of domestic consumers has become an important and inevitable alternative. This has increased the level of import dependency as indicated by Figure 1.5.

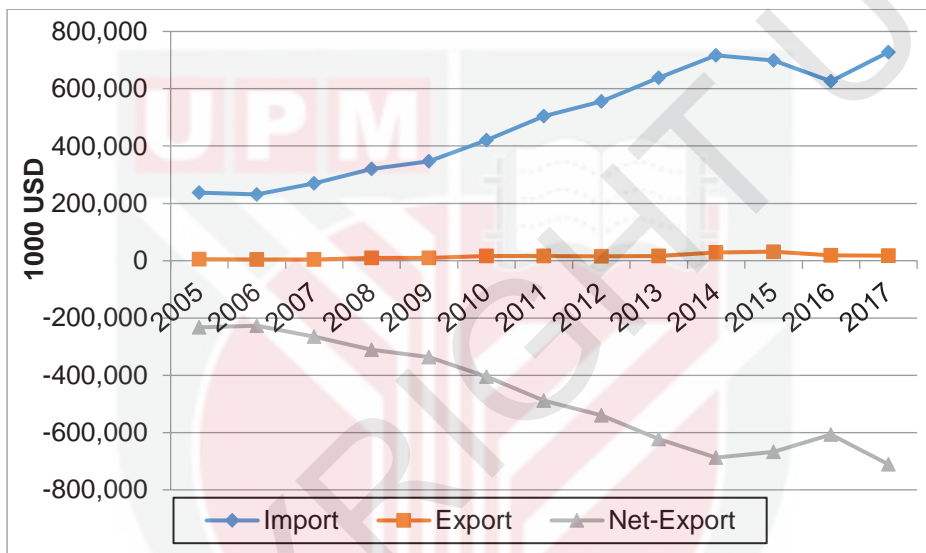


Figure 1.5: Trend of Imports and Exports of Ruminant Meat in Malaysia, 2005-2017
(Source: United Nations Comtrade Database)

1.1.3 Ruminant Production System in Malaysia

Ruminant production system in Malaysia could be categorized into three main categories- integrated farming, feedlot and traditional (Department of Veterinary Service Malaysia, 2019). The promotion of integrated farming as one of the options for the production system of ruminant started during the implementation of Fourth Malaysia Plan, 1981 – 1985 (4MP). Boosting the number of ruminants to serve as a feeder for ruminant meat production was the main objective that remains until today.

Integrated farming is executed through the capitalization of vast areas of oil palm plantation owned by government-linked companies both at the federal and state level. That is the reason why integrated operators are generally a commercial one with the number of cattle per farm is more than 250 heads. Farm type in

Malaysia is categorized based on the number of ruminant in a particular farm. Farm with ruminant from 50 and up to 250 are considered as medium farm. Farm with less than 50 ruminants are categorized as smallholders (Department of Veterinary Services, 2015). The involvement of land development agencies like Federal Land Development Authority (FELDA), Rubber Industry Smallholder Development Authority (RISDA) and the Federal Land Consolidation and Rehabilitation Authority (FELCRA) at the federal level as well as Pahang State Farmers Organization (PASFA) and the Johor State Farmers Organization (PPNJ) at the state level has further bolstered the domestic production. The fruits of the efforts were proven through the fact that by the year of 2000, these agencies have accounted for 15 percent of the country's cattle population. Its effectiveness was further sealed when the Ministry of Agriculture and Agro-based Industries (MOA) has aggressively promoted integrated farming as one of their anchor program to achieve the objective of 30 percent self-sufficiency level by 2020. This has been clearly stated in MOA's Policy Direction: Priorities and Strategies 2019-2020.

Mutual coexistence and symbiotic relationship between ruminant and oil palm plantation are the main principles associated with integrated farming method. Manure and other natural discharge from ruminant enrich and fertilize the soil without the use of harmful chemical fertilizer. The vegetative ground cover which compete directly with oil palm for nutrients would be naturally reduced as it would be utilized as ruminant feed. Therefore it could be said that the presence of ruminants in the oil palm has the ability to minimize the operational cost as the dependency on chemical fertilizer and weed killer application would be greatly severed. Not only that, soil aeration would also get better as the continuous pounding from the cattle's hooves improve air circulation which directly increase oxygen intensity. The situation would provide a conducive environment for oil palm to bear quality fruits that have high oil extraction rate.

Feedlot has been closely associated with high cost contributed by pricey feed price. Being the largest component of production cost, feeds have a big say in determining the profits (Economic Planning Unit, 2015). The root of this issue lies in the fact that feed for ruminant particularly grain is sourced from international market. The demand for grain is huge and the competition to secure the supply is stiff. Its wide range of suitability has caused this intense competition. Apart from ruminant sector where it is used as ruminant feed, grain is also needed in other sectors, particularly fuel and food. Grain has been extensively utilized in the fuel sector especially in producing bio-diesel. The global emphasis of sustainability agenda in accordance with Sustainable Development Goals (SDGs) of United Nations (UN) is one of the factors that has enticed people to switch from fossil fuel to bio-fuel. As an alternative to the imported grain, palm kernel cake could (PKC) also be utilized as feed for ruminant sector. However, the high demand for PKC from beef producing countries has contributed to the scarcity of PKC internally which consequently pushing the price to go upward.

Apart from the integrated and feedlot, the other production system is the traditional production system which largely controlled by the smallholders. In term of representation in domestic ruminant sector, smallholders control around 70 to 80 percent of Malaysia's total production due to the large number of smallholders. However, the impressive representation does not translated into higher output as far as individual productivity is concerned (Economic Planning Unit, 2015). This could be understood from the perspective that these small-farmers especially the non-organized smallholders are not industrious unlike their partners from integrated and feedlot. Their involvement is basically part of their safety net measure or investment in facing bad days since ruminant is easily cashable and transferable. The breed favoured by the smallholders is generally the Kedah-Kelantan (KK) due to its low maintenance aspect which means low operational cost. It is because it only requires a simple feeding requirements such as the utilization of surrounding vegetative ground cover as their source of feed. KK breed is also known for its hardiness which is badly needed to withstand the weather conditions as well as having high resistance to diseases (Department of Veterinary Service, 2020).

In term of farm efficiency, integrated farm is relatively better than the other two production systems. One of the key factors that determine farm efficiency is its ability to maximize the available resources without incurring unnecessary additional cost (Gold and Gold, 2019). The utilization of herbage available in plantation as a feed source has brought a positive impact on its operational cost. It's efficiency is also strengthened as the feeder for the integrated farms come from their own breeding program. This is important taking into consideration that feeder and feed are the two major factors that determine the overall operational cost of a particular production system. As for the feedlot, its efficiency is largely hindered by the high price of feed and feeder. Feed particularly concentrated is needed as to expedite the fattening process to achieve marketable weight. Imported grain would be mixed with forage and other ingredients to improve its nutrient content especially crude protein which is badly needed by the weaning steers (Karatzia et al., 2012). The price of those tradeable inputs is highly volatile as its dependency on international market in getting the supply is high. The situation has been made worsened by the stiff competition with other importers or in other words, demand has outdone the scarce supply.

Organized smallholders has been found to be more efficient as compared to non-organized smallholders (Economic Planning Unit, 2015). Organized smallholders are the ones who are involved in various government schemes such as Transformasi Usahawa Ternakan (TRUST) and Ladang Satelit. These smallholders received guidance particularly from Department of Veterinary Services on the aspect of good animal husbandry practises usually at the start of its operation (Nazli M.H et al., 2018). The improved efficiency experienced by the organized smallholders is basically a result of quality breeding stock or feeder received by the farmers from the government as well as quality feed at a subsidized price. The other advantage enjoyed by these farmers also include wider network to market either beef or cattle as a feeder to other feedlot farm (Ariff, Sharifah, and Hafidz, 2015). As for the non-organized smallholders, cattle are generally reared in fallowed fields, road reserves, irrigation bunds and river

banks. Their involvement in the ruminant sector is generally as income supplement activity apart from being a tradition amongst villagers in the Malay-heartland states such as Kelantan, Terengganu, Pahang, Kedah, Perlis and Johor. Its present operation is basically based on traditional practises which has led to low efficiency (Ariff, Sharifah, and Hafidz, 2015).

1.1.4 International Trade of Ruminant Meat

It is important to note that expansion of food production and the growth in human population occur at the different pace and intensity in different parts of the world. Therefore, international trade through its demand and supply mechanism has the ability to balance the situation of surplus and deficit (Muir et. al., 2010). International trade as a an important source of food availability especially in providing a safety net for countries that their domestic productions could not meet their overall food needs is not something new. The borderless world has increased the level of interrelatedness and interconnectedness in all aspects including food sourcing (Gillson and Fouad, 2014). In the case of ruminant meat, not all countries have the endowment factors and comparative advantage to become the producers and exporters of ruminant meat. Some countries have to rely on international markets to fulfil the need for ruminant meat either as an input for its processing industries or food materials to feed its own population. In other words, international trade has become a reliable alternative source for countries to meet any supply shortfalls.

The global ruminant meat supply is largely contributed by New Zealand, Australia, Brazil and India (Jamaludin, Hassan, Amin, and Zulhisyam, 2014). The importance of those countries could be seen from the percentage of their contribution to the total world's ruminant meat trade. Even though New Zealand only produce 1percent of the total world's production of beef but their share of world's trade is around 8percent with the specialization in niche and high quality premium beef (Jamaludin et al., 2014). This is contrary with India since the focus of India is more on providing cheaper beef which has transformed them into one of the most competitive exporters of ruminant meat. India's market share is expected to continue to expand through this initiative as the demand for cheap beef is on the upward trend particularly from its major markets. Southeast Asia and West Asia are the two regions where Indian's beef is largely being exported to with Saudi Arabia, UAE, Malaysia, Egypt and Vietnam are at the top of the list (Bojnec, Ferto and Fogarasi, 2014). The economic stability enjoyed by the majority of Southeast Asia coupled with the lavish cash of West Asia are the fuel that continue to generate the demand.

Australia on the other hand, is a well-known world's major producer of beef with the capacity to produce around 11.52percent of world's total beef production followed by US at 7.4percent and Brazil at 6.23percent (Kabir, 2015). The major taker of Australia's ruminant production for both beef and mutton is China which has steadily increased its import with substantial quantum of increment year by

year. The pattern is expected to remain for the years to come with the expansion of Chinese middle income group with high purchasing power fuelled by healthy economic condition. China's clout as meat importer particularly ruminant meat could be seen from the fact that China has been recognized as world's biggest market for meat accounting for 11 percent of world's total import of beef and 48 percent for mutton (Zhang, Hwang and Martin, 2018). The consumption which has been consistently on the upward trends with significant increment recorded each year has offered a lucrative business and trade opportunities to ruminant meat producing countries. The pattern is expected to remain bullish in the years to come as China's middle income population who have sound purchasing power would continue to consume nutritious and healthy food including ruminant meat. Imported ruminant meat in China is highly considered as high quality food product which are safer for consumption (Hovhannisyan and Gould, 2014).

However, the situation has somehow pushed the price to goes up and this has created a detrimental effect to the smaller countries which have traditionally depended on Australia in meeting their demand for ruminant meat. Malaysia is one of the countries that have a significant level of dependency on Australia for the said commodity. The stiff competition posed by other importers which has been made worse with the involvement of China in getting the supply of ruminant meat has pushed the countries to find means and ways to secure the availability of ruminant meat in their domestic market. As a matter of survival, these smaller markets have no choice but to diversify its source from the other exporting countries as well as cutting its dependency on import by strengthening its domestic production (Smith, Gotoh and Greenwood, 2018).

Apart from being the major exporter of ruminant meat, India and Australia together with other producers like Brazil and some European countries are also taking the halal ruminant meat market seriously. Australia is the leading exporter of chilled beef and chilled mutton while India is the top producer of halal frozen beef. New Zealand, Brazil and US are also ranked in the list of top 10 exporters of halal meat for the categories of chilled beef, frozen beef and frozen mutton (Farouk, 2013).

The increase in world's population which will reach 9 billion in 2050 coupled with rapid growth of urbanization is expected to further stimulate the demand for more diversified food basket particularly ruminant meat (Reardon and Timmer, 2014). Economic booming experienced by Asia countries especially China has enlarged the middle income population with increased purchasing power. The betterment in purchasing power has been identified as one of the potent factors that influence the westernization of diets which give more focus on the intake of protein sourced from ruminant meat as compared to normal Asian diets that place high importance on carbohydrate. In other words, the preferability of ruminant meat will increase as part of overall changes in lifestyle to reflect and flaunt their current economic stature (FAO, 2016). This situation is actually a fertile ground that stimulates the demand of ruminant meat globally since countries will turn to international trade to make up for the deficit as not all

countries have the comparative advantage and the resources to produce the needed ruminant meat (Gillson and Fouad, 2014).

The conclusions of various FTAs has been agreed as one of the factors that facilitate the trade of ruminant meat globally. The current numbers of FTAs that already entered into force have reached 350 agreements. The importance and significance of FTAs could be seen from the number of FTAs signed by each WTO member country where the number of FTAs signed by an average individual member country of WTO is between 13 to 20 FTAs per country (Fulponi, 2015). FTA has become a significant medium to liberalize the agriculture and agro-food sectors since WTO's member countries are facing various hurdles in concluding the agriculture negotiations through multilateralism. FTA has been identified as a key driver in contributing to the betterment of global trade of agro-food which has increased from 20 percent in 1998 to almost 40 percent in 2010 where ruminant meat is part of the statistic (Bureau and Jean, 2013). The effectiveness of FTA in boosting the export of ruminant meat has been demonstrated as true in the case of ruminant meat trade between EU and US, Canada and Mexico. The elimination of tariff on ruminant meat by the EU has increased the probability to export of its trading partners particularly US, Canada and Mexico from the level of 58.6percent, 13.4percent and 4.4percent to 69.8percent, 36.1percent and 18.8percent respectively (Ghazalian, Larue, and Gervais, 2009).

Malaysia is quite active in pursuing trade liberalization through Free Trade Agreements (FTAs). Although committed to the multilateralism of World Trade Organization (WTO), the stalemate and deadlock in agriculture negotiations have given Malaysia little choice but to continue with FTAs as part of strategies to secure, maintain and expand market access in both traditional and non-traditional trade partners. Moreover, the stalemate of the Doha round is far from being solved taking into consideration the hard stance adopted by the developed countries on the issue of domestic support and export subsidies as well as the non-compromise position of developing countries on certain issues such as 'special products' and 'less than full reciprocity' (Anderson and Martin, 2005).

Malaysia's involvement in FTA is expected to increase the intensive as well as the extensive margin of Malaysia's trade based on market efficiency and comparative advantage. As of 2016, Malaysia has finalized 14 trade agreements with 18 countries covering both bilateral and regional arrangements as listed in Table 1.1. Malaysia has established bilateral FTAs with Japan, Pakistan, New Zealand, India, Chile, Turkey and Australia. At the regional level, apart from ASEAN Free Trade Agreement (AFTA) with the ASEAN member countries, Malaysia together with its ASEAN counterparts have concluded FTAs with China, Japan, Korea, India, Australia and New Zealand.

Table 1.1: Malaysia's bilateral and regional FTA partners

Bil.	Countries	Platform of FTA	
		Bilateral	Regional
1	Australia	Malaysia-Australia Free Trade Agreement (MAFTA)	ASEAN, Australia and New Zealand Free Trade Area (AANZFTA)
2	Chile	Malaysia-Chile Free Trade Agreement (MCFTA)	
3	China		ASEAN-China Free Trade Area (ACFTA)
4	India	Malaysia-India Comprehensive Economic Cooperation Agreement (MICECA)	ASEAN-India Free Trade Agreement (AIFTA)
5	Japan	Malaysia-Japan Economic Partnership Agreement (MJEPA)	ASEAN-Japan Comprehensive Economic Partnership (AJCEP)
6	Korea		ASEAN-Korea Free Trade Agreement (AKFTA)
7	New Zealand	Malaysia-New Zealand Free Trade Agreement (MNZFTA)	ASEAN, Australia and New Zealand Free Trade Area (AANZFTA)
8	Pakistan	Malaysia-Pakistan Closer Economic Partnership Agreement (MPCEPA)	
9	Turkey	Malaysia-Turkey Free Trade Agreement (MTFTA)	
10	Brunei		ASEAN Trade In Goods Agreement (ATIGA)
11	Cambodia		ASEAN Trade In Goods Agreement (ATIGA)
12	Indonesia		ASEAN Trade In Goods Agreement (ATIGA)
13	Laos		ASEAN Trade In Goods Agreement (ATIGA)
14	Myanmar		ASEAN Trade In Goods Agreement (ATIGA)
15	Philippines		ASEAN Trade In Goods Agreement (ATIGA)
16	Singapore		ASEAN Trade In Goods Agreement (ATIGA)
17	Thailand		ASEAN Trade In Goods Agreement (ATIGA)
18	Vietnam		ASEAN Trade In Goods Agreement (ATIGA)

(Source: MITI, 2017)

Those FTAs are expected to assist Malaysia in diversifying its source for the ruminant meats apart from its traditional trading partners. As of now, Malaysia has a high level of dependency on traditional import markets particularly India, Australia and New Zealand to fill up the deficit gap experienced by the Malaysia's domestic production. Those countries control almost 80 percent of Malaysia's ruminant meat market. Figure 1.6 clearly shows the dominance of these countries and the upward pattern of import for the period of 2005 to 2015.

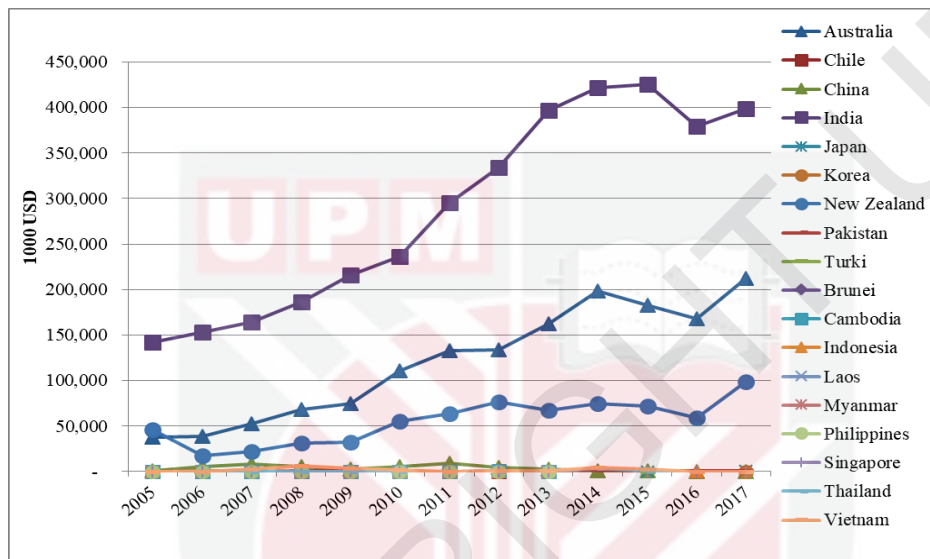


Figure 1.6: Malaysia's Importation of Ruminant Meat from FTA Partners, 2005-2017

(Source: UN Comtrade Database)

FTAs provide opportunities for Malaysia to explore and utilize the untapped potential of ruminant meat trade particularly with the non-traditional import partners. The expectation is drawn based on the fact that some of the FTAs partners have the potential to emerge as a promising import market for Malaysia. In fact, countries like Pakistan and China that are not an important source of ruminant meat for Malaysia have been recognized as one of the top halal ruminant meat exporters for the category of chilled beef and chilled mutton (Farouk, 2013).

Neighbouring ASEAN's countries could become another alternatives for Malaysia to fulfil its needs for ruminant meat (Ismail et al., 2013). Even though the volume produced by those countries are not impressive and their surpluses are not significant, the familiarity and geographical proximity coupled with trade and economic integration initiatives propagated under ASEAN could be a plus factor in reducing the trade cost and greasing the trade. Moreover, countries like Thailand, Vietnam and Cambodia have strong competitiveness in exporting live animals which can be used an input in Malaysia's supply chain of ruminant meat

production. Beyond the circle of FTA, countries like Brazil, South Africa, USA and Netherland have also emerged as a prominent exporters and producers of ruminant meat. The other plus point possessed by these countries is that they are also a major producer of halal ruminant meat (Farouk, 2013). These producers have the possibilities to increase Malaysia's ability to diversify its suppliers even though the volume is yet to be significant as compared to the traditional partners.

Import is one of the effective measures to address the issue of ruminant meat deficit faced by Malaysia. Exploration for the new import partners and diversification of suppliers could be part of the overall strategies that could be undertaken by Malaysia to increase the availability of ruminant meat. However, the execution of the strategy should be implemented without neglecting the need to strengthen and improve the domestic capacity. Over reliance on selected import markets in meeting the food need has the tendency to produce unhealthy consequences particularly the disruption of supply which can trigger food security issue. Supply disruption could happen any time ignited by various unexpected situations and conditions that are basically negative and detrimental to production supply chain. The consequence from this is the spike in price due to the overwhelmed demand unmatched by the limited supply. The unexpected and unfavourable situations were largely caused by calamities and catastrophes such as disease outbreak that has a detrimental effect to the livestock such as Foot and Mouth Disease and Bovine Spongiform Encephalopathy which are popularly known as FMD and BSE respectively (Webb, Gibson and Strutt, 2018). China has learnt a bitter lesson during the period of 2000 to 2003 where they used to have high dependency on US for the supply of ruminant meat. China was forced to find alternative import sources when US was seriously affected by BSE. As a result, China has started to diversify and the focus has now shifted to Brazil and Australia (Luo and Tian, 2018).

Therefore, it is important for Malaysia to diversify its import sources based on the specialization factors possessed by its trading partners. This is in conformity with the aspiration of Ministry of Agriculture and Agro-based Industries as highlighted by its Minister during a parliament session on May 17th 2016.

1.1.5 The Demand of Halal Ruminant Meat

Meeting the halal requirements as is actually in line with the definition of food security issued by the FAO. FAO has defined the food security concept as 'a situation where all people at all-time have physical and economic access to safe, sufficient and nutritious food to meet their dietary needs and food preference needed for healthy and active lifestyle'. The inclusion of the word 'preference' in the definition of food security implies that food security is not just an availability of any food but food of preference that suits social, cultural and religious values (Pinstrup-Andersen, 2009). Apart from that, the word 'safe' in the definition of food security indicates the importance of food safety aspect which is also an integral elements in halal certification.

Halal certification is actually a guarantee that tells the customers that particular products have undergone a rigour and stricter safety and quality standards. It encompasses not only the principle of good hygiene practises but also fair business, animal welfare, social justice as well as sustainable environment (Nasir and Chiew, 2010). In this regard, the component of availability of food security deals directly with the ability of agricultural system to meet food demand. The agricultural system which is actually the enabler of availability component that include domestic production and importation must take into consideration the socio economic and cultural factors in responding to the market demand including halal requirement.

The lucrative market of halal food including halal ruminant meat has enticed many countries to become the producers and exporters. Total value of halal food market is estimated to reach USD 2.1trillion per year (Kabir, 2015). The value of halal meat consumed by Muslim countries alone in 2008 was around USD57.2 billion (Farouk, 2013). Halal ruminant meat market is largely dominated by the non-Muslim countries. The majority of Muslim countries do not have comparative advantage in producing and exporting ruminant meat. Therefore, it is economically efficient to rely on the other competitive producers and exporters to meet their needs.

Apart from reasonably healthy economic conditions enjoyed by Muslim countries in Southeast Asia and Persian Gulf, Muslim population of nearly 2 billion globally or 25 percent of world's population have provided a good market base for this lucrative business. In addition, the consumption of halal ruminant meat by the non-Muslim communities is also on the increasing trend where halal ruminant meat is increasingly available in supermarket chains and fast food restaurant across the Europe (Lever and Miele, 2012). Health reasons such as hygiene, quality and safety assurance of halal meat are the main plus points that shape the trend (Kabir, 2015). The combination of the mentioned factors have served as a push and pull effects which has increased the attractiveness of halal ruminant meat market.

India and Brazil are the two major dominant players as far as halal ruminant meat market is concerned. Those two countries control almost 70 to 80 percent of the world's halal market. Individually, India controls around 40 to 50 percent world's market share which has made them the world's biggest producer. The second place goes to Brazil which controls around 30 to 40 percent of world's halal market share. 40 percent of India's total export meant for halal market while Brazil has allocated 30 percent of their export for the same purpose. Australia, USA, Germany, Netherlands and New Zealand are also the major exporters of halal ruminant meat with smaller market share compared to India and Brazil. World's major exporters of halal ruminant meat are indicated in Table 1.2, while Table 1.3 highlights the list of major exporting countries of halal ruminant meat and their FTA's membership with Malaysia. Figure 1.7 on the other hand demonstrate the import between Malaysia and countries outside the circle of FTA. It is an indication that trade do happen between those countries and Malaysia despite its small values as compared to the import values between

Malaysia and its major suppliers which are also its FTA partners as indicated earlier in Figure 1.6.

Table 1.2: Major exporting countries in value of halal red meat

Chilled beef	Frozen beef	Frozen mutton/goat
Australia	India	Australia
Brazil	Brazil	India
India	Australia	Ethiopia
USA	Paraguay	Pakistan
New Zealand	South Africa	New Zealand
Pakistan	New Zealand	Somalia
China	Netherlands	Brazil
South Africa	China	China
Netherlands	Germany	USA
Kenya	Kenya	Kenya

(Source: Farouk, 2013)

Table 1.3: The Major Exporters of Halal from Malaysia's FTA Partners and Non FTA Members

FRESH/ CHILLED BEEF		FROZEN BEEF		LAMB AND CHEVON	
FTA	NON FTA	FTA	NON FTA	FTA	NON FTA
Australia	Brazil	India	Brazil	Australia	Ethiopia
India	USA	Australia	Paraguay	India	Somalia
New Zealand	South Africa	New Zealand	South Africa	New Zealand	Brazil
Pakistan	Netherland	China	Netherland	Pakistan	USA
China	Kenya		Germany	China	Kenya
			Kenya		

(Source: Farouk, 2013)

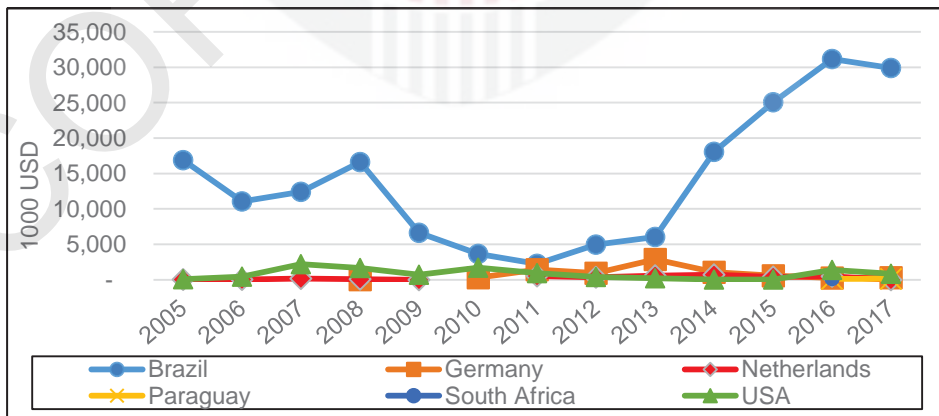


Figure 1.7: Malaysia's Importation of Ruminant Meat from Non-FTA Partners

(Source: UN Comtrade Database)

Ruminant meat that has been sourced from international market must be mutually certified as halal by the relevant Islamic authorities in importing and exporting countries. Producers and exporters of halal ruminant meat need to go extra miles in comparison with the non-halal producers and exporters, particularly in getting endorsement and validation from relevant halal authorities of the importing countries. This is to ensure the issue of halal is mutually harmonized and recognized in order to smoothen the trade flows. Even though countries share the same core principles of halal such as the animal to be slaughtered must be from the categories permitted for Muslims and the name of Allah must be recited at the time of slaughtering, the harmonization of practises for mutual recognition is very much needed.

1.1.6 The Significance of Halal in Malaysia

Malaysia is a multi-ethnic country that consists of Malay (69.6 percent), Chinese (22.6 percent), Indian (6.9 percent), and others (1.0 percent) (DOSM, 2020). The last census conducted in 2010 has indicated that Muslim constitute the largest religious group in Malaysia. There were an estimated 17.3 million Muslim in country or 61.3 percent of the total population. Buddhist made up 19.8 percent of the population while Christian and Hindus faiths each represent 9.2 percent and 6.3 percent respectively. The remaining 3.4 percent of total population belongs to groups of other faiths such as Confucianism, Taoism, traditional Chinese religion, animism and also those who don't profess any religion (DOSM, 2020).

The population of Malays in Malaysia is predicted to grow at 3.1 percent, exceeding the national average at 2.5 percent. Malay's population growth is connected to the domestic ruminant meat production since it is predominantly consumed by the Malays- the largest ethnic group in Malaysia. The fact that ruminant meat is free from any religious constraints has contributed to this situation (Tey et al., 2008). In this regard, Malays, who are Muslim based on the definition of Federal Constitution only consume halal ruminant meat (Nagata, 1974).

Halal is the word derived from Arabic which carries the meaning of 'allowed' or 'lawful' according to Quran. 'Allowed' and 'lawful' here refer not only to the type of animal to be slaughtered but also the slaughtering process. There are some specific requirements that need to be mandatorily followed in halal slaughtering process. For instance, the main objective of halal slaughtering process is to cleanse meat from blood by draining it as completely as possible. It is done by cutting the throat, trachea, jugular veins as well as carotid artery. The bacteria and other impurities contained in blood, if consumed would be harmful to the body whereas the objective of food consumption in Islam is to contribute to a healthy body and mind (Nakyinsige, Man, and Sazili, 2012).

Halal is comprehensive in nature as it does not confined to slaughtering alone but all activities involved in production processes which include type of animal to be slaughtered, slaughtering, storing, packaging and transportation. In other words, halal is a comprehensive concept that integrates the elements of food safety, cleanliness, hygiene as well as religious (Farouk, 2013). Since the concept of halal is inseparable from the Muslim and taking into account the population growth of Malays which moves at a faster rate compared to the others combined with the fact that Malays are the biggest ethnic group in Malaysia, the demand for halal ruminant meat is obviously significant.

In general, ruminant meat is essential in Malay culture and social life in Malaysia. In fact, the slaughtering of ruminant animals for its meat during Eid al-Adha has positive religious connotations for the Malays. During the Eid al-Adha, Muslims are encouraged to choose the best ruminant animal to be slaughtered as a sign of thankfulness and gratitude to Allah s.w.t where the meat is required to be shared and distributed to others. The Islamic welcoming celebration for a new baby or 'aqiqah' is also done with ruminant animals. In this celebration, the baby's family slaughters one or two sheep or goats. The chosen ruminant must be healthy and free from any defects. One-third of the meat is given away to the poor as charity, and the rest is served in a large community meal with relatives, friends, and neighbours. Other festive seasons like Eid al Fitr are also normally celebrated with ruminant meat based dishes.

As for the other main ethnics, beef is strictly prohibited for the Hindus professed by the majority of Indian in Malaysia while Chinese populations are showered with other alternatives that come from poultry and swine (Sheng et al., 2010). However it is important to note that the level of acceptance by the non-Muslim in consuming halal ruminant meat has positively improved as it has been perceived as more hygiene and safe due to the stricter requirements of halal certification (Nasir and Chiew, 2010).

In countries where the Muslim population forms a simple majority as in Malaysia, halal certification is a crucial quality characteristic. Its importance derived from the fact that a significant proportions of the food consumed by the Muslim population is produced by non-Muslims locally as well as imported from non-Muslim countries (Latif, Mohamed, Sharifuddin, Abdullah, and Ismail, 2014). Consumability of food by the Muslim communities is largely determined by its halal status and the level of meticulousness for halal food is higher on meat compared to the other food commodities (Nakyinsige et al., 2012). In view of this, the element of halal has become one of the crucial factors in determining the suppliers from the international markets (Kabir, 2015). Halal certification is actually a crucial credence cues that give extrinsic and non-sensory assurance to the consumers regarding its sharia compliance status, food safety and also quality (Chamhuri and Batt, 2013).

In Malaysia, halal is under the purview of Department of Islamic Development (JAKIM) and Department of Veterinary Services (DVS). As for the importation of

meats and its products to Malaysia, import clearance need to be obtained from these two authorities. The parties that wish to export to Malaysia are subjected to joint inspection by both JAKIM and DVS. JAKIM and DVS will conduct on-site inspection at the abattoirs and also the processing plants. Apart from ensuring that all halal procedures and requirements are fulfilled by the exporters, the inspections are also meant to ensure the safety and health aspects are not compromised. The inspections will be based on Malaysian Standard, Halal Food Production, Preparation and Storage-General Guidelines (MS1500:2009) and Sanitary and Phyto-Sanitary protocols.

In countries that have their own halal authorities, mutual understanding and arrangements have been developed between JAKIM and the foreign halal certification bodies (FHCB). FHCB have the responsibility to assume the supervisory and monitoring roles in ensuring halal procedures and requirements are observed at all times. The validity of FHCB's endorsement and certification is contingent upon the acceptance and consent from JAKIM and DVS.

Difference in halal interpretation, implementation and practices between the exporting and the importing countries due to the requirements of the domestic laws could result in denial of market access. There are some practises in the exporting countries which are not in harmony with the practise of the importing countries. This has been proven true in the case of Malaysia which has initially rejected the method of stunning and thoracic sticking in halal slaughtering procedures. Malaysia's concern is based on the possibility that the death of animals is not caused by the slaughtering but stunning and sticking. Stunning is widely practised and accepted as a normal procedure in Australia, New Zealand and some European countries as required by their domestic laws for the purpose of animal welfare (Farouk, 2013).

The fulfilment of Malaysia's halal procedures and standards as stipulated in Malaysian Standard, Halal Food Production, Preparation and Storage-General Guidelines (MS1500:2009) is mandatory for the exporters to comply. Malaysia's standard on halal is one of the strictest halal standard in the world compared to the other halal certification bodies from other countries such as Islamic Foods and Nutrition Council of America (IFANCA), the Islamic Services of America (ISA), and Halal Food Council International (HFCl) in the US; the Australian Federation of Islamic Councils (AFIC); the Federation of the Islamic Association of New Zealand (FIANZ); the Islamic Development Department of Malaysia (JAKIM), Ulama Council of Indonesia (MUI), the Central Islamic Committee of Thailand (CICT) in Southeast Asia, Islamic Religious Council of Singapore (MUIS); and Halal Food Council International (HFCl) in China (Latif et al., 2014). Some countries have seen those strict requirements as part of Malaysia's non-tariff barriers which discriminate their export. Due to this fact, Malaysia's halal standard has been objected by countries like Argentina, Brazil, European Union and United States at WTO Committee on Technical Barriers to Trade (WTO, 2014).

1.2 Scope of Study

It is understood that the term ruminant meat is indeed huge in definition and scope as it covers all meat derived from animals that have four compartment of stomachs (ruminantia). However, the focus of this study for objective 1 and 2, is totally on meat derived from cattle, buffalo, sheep and goat. In term of trade coding based on Harmonized System (HS) code, it has the total of 15 tariff lines covering the cattle, buffalo, sheep and goat meat but differentiated according to processing stages. The tariff lines include:

No.	HS Code (6 digits)	Commodity
1	HS020110	Bovine Carcasses And Half Carcasses, Fresh Or Chilled
2	HS 020120	Bovine Cuts Bone In, Fresh Or Chilled
3	HS 020130	Bovine Cuts Boneless, Fresh Or Chilled
4	HS 020210	Bovine Carcasses And Half Carcasses, Frozen
5	HS 020220	Bovine Cuts Bone In, Frozen
6	HS 020230	Bovine Cuts Boneless, Frozen
7	HS 020410	Lamb Carcasses And Half Carcasses, Fresh Or Chilled
8	HS 020421	Sheep Carcasses And Half Carcasses, Fresh Or Chilled
9	HS 020422	Sheep Cuts, Bone In, Fresh Or Chilled
10	HS 020423	Sheep Cuts, Boneless, Fresh Or Chilled
11	HS 020430	Lamb Carcasses And Half Carcasses, Frozen
12	HS 020441	Sheep Carcasses And Half Carcasses, Excl. Lamb, Frozen
13	HS 020442	Sheep Cuts, Bone In, Frozen
14	HS 020443	Sheep Cuts, Boneless, Frozen
15	HS 020450	Goat Meat, Fresh, Chilled Or Frozen

As for the objective 3, the scope of this research is within the boundary of feedlot and integrated farms with a specific focus on cattle but not the other type of ruminants.

1.3 Problem Statement

The over-reliance of Malaysia on selected few import markets in addressing the issue of ruminant meat deficit would put Malaysia's food security condition in vulnerable situation in the event of supply disturbance experienced by the exporting countries. As of now, the sources of import of Malaysia is highly concentrated on India, Australia and New Zealand. Those countries account for almost 80 percent of Malaysia's total import. This over-reliance situation has exposed Malaysia to the risk of shocks such as disruption of supply. The disturbance of supply which could be contributed by various factors has the tendency to seriously jeopardize food security situation in Malaysia. Apart from the usual economic shocks caused by currency fluctuation, price crisis and production shortage, supply disruption is also contributed by diseases outbreak and stiff competition from the other importing countries that have bigger and more attractive market as compared to Malaysia. Based on this scenario, it is

important for Malaysia to examine the trade competitiveness and comparative advantage of its FTA partners as well as evaluating the capabilities of other ruminant meat major exporters beyond the circle of FTAs as part of import diversification strategies. Evaluation of trade competitiveness of its traditional suppliers particularly India, Australia and New Zealand as well as its potential suppliers which could possibly come from countries that have possessed halal certifications endorsed by Department of Islamic Development Malaysia (JAKIM) apart from other countries that have low trade cost factors contributed by amongst others short physical distance and similarities in trade conduct, will serve as an invaluable inputs for Malaysia to chart its policies and strategy in import diversification. The evaluation will provide clear indicators from the perspective of trade competitiveness and this is critical to materialize the ultimate objective of stabilizing and securing the supply of ruminant meat as to increase its availability in the country.

Malaysia's dependency on import in fulfilling its need for ruminant meat is not something that could be erased instantly. It is a gradual process which requires certain period of time to be materialized. Moreover, even in the situation that Malaysia is able to meet the targeted self-sufficiency levels of 30 percent for beef and 15 percent for mutton; it does not put a stop to Malaysia dependency on import. This is because the remaining 70 percent of beef and 85 percent of mutton still need to be sourced from import post 2020.

In connection with the issue, measures to strengthen the availability of ruminant meat should not only be confined to self-capacity enhancement alone and should take into consideration the contributions that would be made by international trade. Therefore, it is crucial for Malaysia to determine the determinants that are capable in influencing positively the trade of ruminant meat. This will shed some lights on whether FTA and other determinants have a role or not in attracting more imports of ruminant meat into Malaysia.

In addressing the issue of high reliance on import, the government has initiated various initiatives and programs related to production enhancement in order to positively reduce the over-dependency. The situation of over dependency has created an adverse effect on domestic ruminant sector since the imported ruminant meat is in direct competition with the ruminant meat produced domestically. In this regard, the imported ruminant meat is in better position due to its price competitiveness. The scarcity factor experienced by the domestic ruminant meat due to its limited availability has consistently pushed the price upward making it unattractive to the consumers. In other words, imported meat has become a substitute to the ruminant meat produced locally. The remedy to the situation is to increase the capacity of domestic production through the implementation of various production intervention programs. The programs are specifically targeted the production system and high priority has been given to the aspects of feeding, breeding, housing and also marketing. It has been put in place to boost up the availability of this commodity and at the same time serve as import substitution strategy. As of 2020, the major programs that have already been executed include Taman Kekal Pengeluaran Ruminan (TKPR) an offshoot

from Taman Kekal Pengeluaran Makanan (TKPM), National Feedlot Center (NFC), Satellite Farm, Entry Point Project under National Key Economic Areas and Transformasi Usahawan Ternak (TRUST).

The success of those program is measured based on the national self-sufficiency level. What intrigues the policy makers most is the persistency of the issue of low self-sufficiency level despite various intervention programs initiated by the government. In fact, for the past 10 years, Malaysia's self-sufficiency level for ruminant meat has never exceeded 30 percent despite various efforts that have been put in place. This issue has been on the government's radar since the Fourth Malaysia Plan (4MP, 1981-1985). Since then, the issue of low level self-sufficiency has become a permanent issue highlighted in every edition of Malaysia Plan including the latest edition, the Eleventh Malaysia Plan. Based on this evidence, it is important to determine whether Malaysia's ruminant meat sector has the comparative advantage or not. The findings are expected to assist the policy makers to chart the future of ruminant meat whether to continue to strengthen the domestic production or to continue the dependency on the international market in addressing the deficit experienced by the domestic production.

1.4 Research Questions

There are several research questions that may arise from the issues that have been highlighted in the section of problem statement. These questions are as follows:

- I. What is the competitiveness level of Malaysia's trading partners on the exportation of ruminant meat?
- II. What are the factors to explain the import of ruminant meat?
- III. What are the comparative advantages of the local production of ruminant meat?

1.5 Research Objectives

The general objective of this study is to examine the role of import in assisting Malaysia to increase the availability of ruminant meat. The specific objectives of this proposed study are as follows:

- I. To examine the competitive advantage of the trading partners on the exportation of ruminant meat
- II. To identify factors that explain the import of ruminant meat
- III. To determine the comparative advantage of local production of ruminant meat

1.6 Significant of the Study

The first objective of this research is to examine the competitive advantage of Malaysia's trading partners on the exportation of ruminant meat. Even though there are many researches that have given focus on Malaysia's trade performance, very few researches have looked at the issue from the perspective of import. Not only that, the issue examined by this research is also specific as it only focus on a single commodity which is ruminant meat. This commodity has been identified as one of the main contributors that have consistently contributed to Malaysia's trade imbalance apart from having high significance level as far as socio-cultural is concerned. The results would be able to assist the government in formulating the strategy of import diversification as outlined in National Agro-food Policy and RMK-11 as a cushion for any adverse effects caused by economic and non-economic shocks. The introduction of 'halal' as a variable in an augmented gravity models would enrich the literatures on gravity models which have largely focussed on the economic factors particularly GDP, distance and income per-capita. This research also demonstrates the flexibility of gravity model in forecasting trade flow based on non-economic factors such as halal. Its uniqueness has been further strengthened as it has introduced the combination of halal and FTA as a single variable with the purpose of examining its impact on the import made by Malaysia. It would test the interaction between countries that are in possession of the factors. Its relevancy is based on the fact that there are some countries that are in possession of these two factors –Malaysia's FTA partners and at the same time having halal certification recognized by Malaysia. This would provide some cues to the policy makers in understanding the factors that drive the importation of ruminant meat by Malaysia- whether the factors are economic or non-economic or the combination of both.

The examination of policy initiative which in the case of this study is National Agriculture Policy executed through Taman Kekal Pengeluaran Ruminan (TKPR), would provide some empirical-based evidence on TKPR's competitiveness and efficiency. It is in line with government directive that policy formulation as well as its reassessments should be based on evidence based approach. Its significance could be seen from the objectives of Eleventh Malaysian Plan (11MP) and National Agrofood Policy (NAP) to address the issue of food security through self-sufficiency level. The materialization of the objectives is highly dependent on correct production method.

The possibility of supply disturbance due to emergence of big markets that import and consume ruminant meat in a big scale must be taken seriously. Taking into consideration the shocks that can be caused by the gigantic and unprecedented demand from powerful market like China, the availability of ruminant meat should be dominantly sourced from the local production. The self-sufficiency measures will ensure the sustainability of supply which will further strengthen the availability of ruminant meat in the domestic market. In other words, self-sufficiency measures will cushion Malaysia from the adverse effects of supply hiccups resulted from market shocks. However, the role of international market in

supplementing and covering the deficit should not be denied and continued to be explored based on the basis of comparative advantage and market efficiency.

The increased in the availability of ruminant meat, to some degree, has the ability to contribute to the betterment of food security level in Malaysia. Food security agenda is not only confined to the issue of hunger and staple per se, but its scope is wider than that. Food security also covers the presence of important micronutrients as a means to achieve balanced diets and improved nutrition in line with the objectives of SDGs. The main target of SDGs is to eradicate all forms of malnutrition and stunting growth especially amongst children under 5 years old. In this regard, ruminant meat is one of the major sources of protein and other important micronutrients such as amino acid, vitamin B complex-thiamin, riboflavin, niacin, biotin, vitamins B6, vitamin B12, panthothenic acid as well as folacin (Bender, 1992). It is also an excellent source of minerals which include iron, copper, zinc and manganese. A modest addition of ruminant based protein into daily diet will address the issue of malnutrition and stunted growth. Moreover, meat based protein has been acknowledged as more effective compared to plant-based protein as growth and cognitive booster in children (Pulina et al., 2017).

In the context of Malaysia, the availability of ruminant meat has far reaching effects. The consumption of ruminant meat is closely associated with social and religious obligation especially for the Malay Muslim who happen to be the biggest takers of ruminant meat. Malays represent 60percent of the overall population in Malaysia. Ruminant meat is central in the life of this community and they have recorded the highest consumption level compared to the other communities. The centrality of ruminant meat in Malay Muslim communities could be seen from the fact that they celebrate their festive seasons and other big days such as wedding receptions with the ruminant meat based dishes. Apart from that, Malay Muslim are obliged to slaughter only ruminant animals that have reached certain age and met certain criteria as part of their religious obligation during Eid-ul Adha.

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