

Ranking the Competitiveness of the Ruminant Meat and Meat Preparation Sub-sector amongst Asean Countries

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ABSTRACT

The paper investigates the trade competitive positions of ASEAN countries for the meat and meat preparation sub-sector, specifically the ruminant category. The sub-sector has been chosen as it remains one of the main contributors to the food trade deficits in Malaysia despite the government's promotion towards its production and consumption. This study, first examines the competitiveness of 20 food commodities in the meat and meat preparation sub-sector, namely the ruminant category (division 01) in Malaysia vis-à-vis selected ASEAN countries. We assess the competitiveness level by evaluating the Relative Trade Advantage (RTA). The indices are then used in pair wise comparisons to determine the countries' competitiveness ranking. The data cover commodities in the HS 6 digits group over the period of 1998 to 2007. Thailand was ranked the highest in the sub-sector of meat and meat preparation for the ruminant category and Malaysia was ranked fifth.

Keywords: ASEAN, competitiveness, meat and meat preparation, RTA, pair wise and Analytic Hierarchy Process

INTRODUCTION

Generating a trade surplus has always been a policy goal for most nations. To achieve it, nations have to attain a certain level of competitiveness for a given commodity or product. Competitiveness can either be achieved by efficient resource allocation or appropriate business strategies. Every ASEAN country has the potential to become a competitive exporter of food products. Their 'comparative advantage'

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as exporters of meat is based on the use of low cost labour in their labour intensive livestock production and meat processing industries (Thorpe *et al.*, 2007a and, Ismail and Radam, 2010).

Foods of animal origin – meat, milk and eggs – are good sources of protein, fat, minerals and trace elements, which are vital for human health. In this context, ASEAN countries comprise one of the significant subregions in Asia and the Pacific. The region is home to 2.6 billion chickens, 225 million ducks, 15 million head of buffalo, 47 million head of cattle, 71 million head of pigs, 26 million head of sheep and 12 million head of goats to feed over 620 million ASEAN inhabitants (Ahuja, 2012).

ASEAN meat production has increased by 4.6 per cent a year over the past twenty-five years. Domestic production has largely kept pace with the strong local growth in domestic meat consumption that has been driven by rapid income growth of 7 percent a year (in real terms) in the region (Thorpe *et al.*, 2007b).

Livestock production plays an important role in the livelihood of farmers in ASEAN countries. Besides, it provides food, employment and many other contributions to both regional and national development. Today, this sector has become the target for potential export growth since it is one of the new products in the *Halal* foods arena. Malaysia, Indonesia and Thailand have invested considerably in making their countries one of the leading *Halal* Hubs in the world, and competition is becoming more vigorous.

Vietnam has a large and quite fragmented meat and poultry processing industry. This industry has been in existence for many years and has its roots in the French colonial era (fresh processed meats) and the era of the state-owned businesses and export trade with the former Soviet Bloc via canned processed meats (Embassy of Canada in Vietnam, 2010). When compared to other more developed countries in ASEAN, e.g. Malaysia and Singapore, there are significant challenges to be dealt with in the area of distribution quality for meats and poultry (Embassy of Canada in Vietnam, 2010).

In Malaysia, the livestock sector is dominated by the poultry industry. However, the ruminant industry is gaining importance in terms of production and consumption growth. Despite an increasing contribution from domestic livestock production, it has yet to achieve the level needed to provide sufficient meat for the growing population. Hence, additional consumption demand has to be fulfilled by imports. Subsequently, over the last decade, Malaysia has recorded a substantial trade deficit in meat and meat preparations (Figure 1).

The peculiarity of meat consumption in Malaysia is that, it is strongly influenced by the religious background of the population. For example, beef is commonly consumed by Muslims but not by Hindus. However, poultry and mutton are mostly

consumed by all regardless of the consumers' religious or ethnic group. Government statistics show that Malaysian meat and meat preparation consumption was about 1190 thousand tonnes in 2006, of which, 70% came from poultry, 12% from cattle and buffalo, 17% from swine, and 1% from mutton.

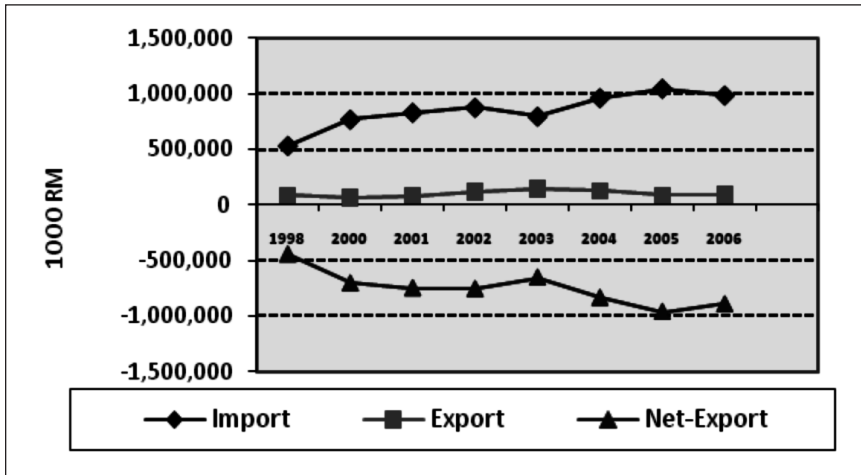


Figure 1 Trend of imports and exports of meat and meat preparations in Malaysia, 1998-2006 (000RM)

Malaysia has one of the highest rates of per capita consumption in the world for chicken, which comes to about 36 kg. Fortunately, Malaysia is self-sufficient in meeting the country's demand for broiler meat. According to government statistics, its current self-sufficiency level is 121%. This indicates that the Malaysian poultry industry is far ahead in popularity in terms of production and consumption compared to other meat products. For its efficient production, broiler meat offers lower prices relative to other meats. This explains why poultry is chosen as an important protein source in the Malaysian diet. On the contrary, mutton, which has no religious constraint, recorded only 1% of the total meat consumption. Self-sufficiency levels regarding other meats namely beef, mutton, and pork were 23%, 8% and 107%, respectively (MOA, 2008). Furthermore, income elasticity calculations suggest that most meat, except for mutton, are normal goods, that is, as income increases their consumption tend to increase. Income elasticity for mutton indicates that it is a luxury good (Abdullahi, 2006).

As the trend of meat and meat preparations' imports have gradually increased in Malaysia, the potential impacts of the trade deficit spate in Malaysia are explored in this paper, particularly on Malaysia's competitiveness level among selected ASEAN

countries. The regional trade competitiveness ranking is determined to provide platforms for appropriate policies and strategy development. In order to enhance the country's competitiveness, Malaysian food processors must identify food sub-sectors that are internationally competitive and viable. This study explores the trade competitiveness of Malaysian livestock products vis-à-vis selected countries in the ASEAN region (Indonesia, the Philippines, Singapore and Thailand) and ranks their competitiveness positions. The scope of the study is to examine the competitiveness of 20 food commodities in the meat and meat preparations sub-sector in the ruminant category (Table 1).

Table 1 Product codes and names in the meat and meat preparation sector

HS Code (6 digits)	Commodity
HS 020110	Bovine Carcasses And Half Carcasses, Fresh Or Chilled
HS 020120	Bovine Cuts Bone In, Fresh Or Chilled
HS 020130	Bovine Cuts Boneless, Fresh Or Chilled
HS 020210	Bovine Carcasses And Half Carcasses, Frozen
HS 020220	Bovine Cuts Bone In, Frozen
HS 020230	Bovine Cuts Boneless, Frozen
HS 020410	Lamb Carcasses And Half Carcasses, Fresh Or Chilled
HS 020421	Sheep Carcasses And Half Carcasses, Fresh Or Chilled
HS 020422	Sheep Cuts, Bone In, Fresh Or Chilled
HS 020423	Sheep Cuts, Boneless, Fresh Or Chilled
HS 020430	Lamb Carcasses And Half Carcasses, Frozen
HS 020441	Sheep Carcasses And Half Carcasses, Excl Lamb, Frozen
HS 020442	Sheep Cuts, Bone In, Frozen
HS 020443	Sheep Cuts, Boneless, Frozen
HS 020450	Goat Meat, Fresh, Chilled Or Frozen
HS 020610	Bovine Edible Offal, Fresh Or Chilled
HS 020621	Bovine Tongues, Edible Offal, Frozen
HS 020629	Bovine Edible Offal, Frozen Not Elsewhere Stated
HS 021020	Bovine Meat Cured
HS 160250	Corned Beef, Prepared Or Preserved

Source: Ministry of Agriculture and Agro-Based Industry (MOA) Malaysia

LITERATURE REVIEW

The concept of revealed comparative advantage (RCA) is grounded in conventional trade theory, and it is a useful indicator of competitiveness (Bojnec and Ferto, 2006 and 2009). In other words, RCA is based on observed trade patterns; it measures a country's export of a commodity in relation to its total exports and

to the corresponding export performance of a set of countries. The original RCA index was formulated by Balassa (1965). The study on OECD export specialization patterns by Laursen (2000) as well as the study on the comparative advantage of Iran's chicken meat exports in the Middle East market by Mirzaei *et al.*, (2006) employed the Balassa index in their analyses. Hassanpour and Ismail (2010) assessed the competitiveness of Malaysian industrial plantation products using both, asymmetric and symmetric indices. They suggest that Malaysia has a competitive advantage in a number of plantation commodities such as pepper, palm oil, coconut, palm kernel, cocoa paste, cocoa butter and cocoa powder among selected ASEAN countries (Indonesia, the Philippines, Singapore and Thailand) and China. Another study by Ismail and Hassanpour (2009) measured the competitiveness of Malaysian fish products among selected ASEAN countries using the Balassa's RCA index. The results of their study indicated that Malaysia has a competitive advantage in three commodities namely live fish, crustaceans and molluscs.

The measure of RCA was improved by Vollrath (1991). It corrects three problems associated with the traditional Balassa index of RCA. First, it eliminates any double counting problems by excluding the sector, and country trade values in the aggregates that are used as benchmarks to compare a country/sector RCA. Second, it is based on a measure of net exports, which allows the RCA to capture the growing importance of intra-industry trade. Third, Balassa's index is asymmetric as it varies between zero and infinity, with values between zero and one indicating that the country does not have a comparative advantage and values between one and infinity signalling that the country has a comparative advantage in that sector.

Ferto and Hubbard (2003) examined the comparative advantage and competitiveness of the Hungarian agri-food sectors using different measures of RCA, which in this paper is referred to as the Vollrath indices. The results of their study indicated that the pattern of comparative advantage has remained fairly stable during the period of transition. Hungary is shown to have a comparative advantage in a wide range of agri-food products, including livestock and meat.

A study by Utkulu and Seymen (2004) analysed the competitiveness and pattern of trade specialisation from Turkey to the EU on sectoral levels using Vollrath indices for the period, 1990 to 2003. They revealed that Turkey has competitive advantages in seven out of the 63 product groups: clothing and clothing accessories; vegetables and fruit; sugar, sugar preparations, honey; tobacco; oil seeds and oleaginous fruits; rubber manufactures; textile yarn, fabrics and related products. In light of the evidence, some policy implications are drawn.

The application of the Analytic Hierarchy Process (AHP) in trade competitiveness is rather limited but is widely used in other disciplines such as engineering, management and sports, to mention a few. An AHP is basically a multiple

criteria decision tool. It was developed in the late 1970s by Saaty (1980). The applications include the fields of planning, selecting the of best alternatives, optimization, prioritizing and ranking, etc. Some applications of AHP in ranking are done by Lalib *et al.*(1998) who proposed a model to help take a maintenance decision using AHP and the fuzzy integrated approach. They suggested a two step methodology; first was to prioritize the different maintenance criteria and second was formulating a perspective model by using fuzzy logic. Babic and Plazibat (1998) ranked enterprises according to the achieved level of business efficiency using a combination of the PROMETHEE method and AHP. Badri (2001) combined AHP and GP to model quality control systems. His work can be utilized in addressing the issues of steps to incorporate and decide on quality control measures in the service industry using AHP. Bayazit and Karpak (2005) utilized AHP to determine the best lime supplier for a construction company with respect to three levels of criteria hierarchy. Levary (2008) used AHP to rank foreign suppliers based on supply risks. His main aim was to establish a reliable supplier as described in a reliable chain.

METHODOLOGY

The Vollrath Indices

A different interpretation of comparative advantage is furnished by Vollrath indices, which offer three alternative specifications of revealed comparative advantage. They are the relative export advantage (RXA), relative import advantage (RMA), and relative trade advantage (RTA), expressed as,

$$RXA_{ij} = \frac{(X_{ij} / X_{nj})}{(X_{ir} / X_{nr})} \quad (1)$$

$$RMA_{ij} = \frac{(M_{ij} / M_{nj})}{(M_{ir} / M_{nr})} \quad (2)$$

$$RTA_{ij} = RXA_{ij} - RMA_{ij} \quad (3)$$

Where X are the exports and M are the imports of sector (or product) i of country j, n is the rest of the products and r is the rest of the world. This formula is different from Balassa's RCA in that, the value of exports and imports, total exports and total imports of product i from country j were deducted accordingly to avoid double counting. According to Vollrath, positive values of the RTA index indicate comparative advantage, whereas negative values indicate otherwise.

Vollrath (1991) pointed out that the appraising of comparative advantage at the aggregate and dis-aggregated levels can ‘identify the overall direction and drive in which a country’s investment and trade should take in order to exploit international differences in product and factor supply and demand’ as well as ‘to evaluate socially desirable specialisation patterns along narrow product lines’. He further argued that the estimation of comparative advantage may be particularly beneficial when considering trade between countries with different factor endowments.

In an AHP problem, a structure of hierarchy has to be constructed to determine the priority and relative importance of elements in each level. The prioritization procedure involves eliciting judgements about the dominance of one element over another with respect to a criterion. The scale used in the comparison enables a decision maker or researcher to measure how many times an element dominates another. The comparisons of elements are done in a pair wise approach which is a part of the AHP procedure. In this study, competitiveness indices, specifically the RTA indices, were used instead of judgement, to measure the dominance or degree of importance of elements in question. Since RTA indices are comprised of both positive and negative values they were added with a constant to convert to positive values. Thus, the measure of dominance could be determined.

The pair wise comparison matrix is shown in Table 2 below to illustrate the comparison scale used by AHP. The criteria in this case are represented by products and the alternatives are the five countries in the ASEAN region. In the first stage, criteria were pair wise compared and followed by pair wise comparisons of the alternatives (countries) subjected to each criterion (product). For example if criterion 1 (product 1) is 2 times more competitive than criterion 2, then $C_{12} = 2$, and $C_{21} = \frac{1}{2}$. The results of these comparisons are the cells in a pair wise comparison matrix. The goal is to determine the most competitive country for the meat and meat preparation sub-sector in ASEAN. Pair wise analysis was done using Expert Choice 11.

Table 2 Pair wise comparison matrix for the criteria to achieve objective

	Criteria 1		Criteria i		Criteria N
Criteria 1	1	..	C_{1j}	...	C_{1N}
...	...				
Criteria i	C_{i1}	...	1	...	C_{iN}
...
Criteria N	C_{N1}	...	C_{Ni}	...	1

FINDINGS

Relative Export Advantage (RXA) and Relative Import Advantage (RMA)

The analysis of the Vollrath indices (RXA, RMA and RTA) outlined the trading specialization of selected ASEAN countries in the meat and meat preparation sector. From this analysis, the results that we obtained are somewhat ambiguous. In the relative export advantage index (RXA), as presented in Table 3, we can see the most specialized country is Singapore, achieving the highest number of values which are more than 1 (13 of the 25 analyzed commodities). It is then followed by Indonesia, which has 11 commodities with values of more than 1. The rest can be considered as having a comparative disadvantage.

The relative import advantage (RMA) shows that Indonesia, Malaysia and Singapore have RMA values of more than 1. The highest value is observed in Malaysia (16 of the 25 analyzed commodities) which represents the major importing country in this sector. The results are somewhat ambiguous as Indonesia, which is seen as one of the most specialized countries, appears to be one of the major importers when considering its RMA values.

Table 3 Average relative export and relative import advantage for selected ASEAN countries

HS Code	Commodity	Indonesia		Malaysia		Philippines		Singapore		Thailand	
		RXA	RMA	RXA	RMA	RXA	RMA	RXA	RMA	RXA	RMA
HS 020110	Bovine Carcasses And Half Carcasses, Fresh Or Chilled	3.09	2.561	1.636	0.714	0.000	1.340	0.000	0.867	0.916	0.386
HS 020120	Bovine Cuts Bone In, Fresh Or Chilled	1.934	1.057	0.319	1.523	0.000	0.000	1.378	1.347	0.229	0.235
HS 020130	Bovine Cuts Boneless, Fresh Or Chilled	1.146	1.106	1.095	1.378	0.000	0.070	1.577	1.481	0.047	0.095
HS 020210	Bovine Carcasses And Half Carcasses, Frozen	4.246	1.976	0.872	2.538	0.744	2.109	0.009	0.017	0.583	0.031
HS 020220	Bovine Cuts Bone In, Frozen	0.180	1.313	0.520	2.736	0.000	0.534	2.130	0.367	0.583	0.262
HS 020230	Bovine Cuts Boneless, Frozen	0.010	1.479	2.438	1.868	0.015	3.178	1.160	0.224	0.031	0.044
HS 020410	Lamb Carcasses And Half Carcasses, Fresh Or Chilled	1.853	1.248	0.422	1.716	0.000	0.067	0.000	1.180	1.266	0.154
HS 020421	Sheep Carcasses And Half Carcasses, Fresh Or Chilled	2.541	0.782	0.000	0.980	0.000	0.000	0.000	1.913	0.112	0.000
HS 020422	Sheep Cuts, Bone In, Fresh Or Chilled	1.344	1.201	0.414	1.234	0.000	0.035	0.000	1.421	0.552	0.321
HS 020423	Sheep Cuts, Boneless, Fresh Or Chilled	0.038	0.881	0.480	1.819	0.000	0.002	2.179	1.310	0.016	0.106
HS 020430	Lamb Carcasses And Half Carcasses, Frozen	0.997	0.799	0.345	2.583	0.000	1.069	1.574	0.524	0.531	0.180
HS 020441	Sheep Carcasses And Half Carcasses, Excl Lamb, Frozen	0.000	0.886	0.431	2.799	0.000	0.009	0.000	0.764	0.521	0.000
HS 020442	Sheep Cuts, Bone In, Frozen	0.685	0.989	0.172	2.711	0.000	0.338	2.109	0.631	0.009	0.113
HS 020443	Sheep Cuts, Boneless, Frozen	0.756	0.779	0.012	2.640	0.000	0.033	2.495	0.887	0.000	0.017
HS 020450	Goat Meat, Fresh, Chilled Or Frozen	0.059	1.243	0.422	3.597	0.000	0.000	1.964	0.145	0.000	0.001
HS 020610	Bovine Edible Offal, Fresh Or Chilled	2.350	1.606	0.000	0.486	0.000	0.000	0.977	1.725	0.462	0.339
HS 020621	Bovine Tongues, Edible Offal, Frozen	1.274	1.939	0.000	0.762	0.000	2.793	1.680	0.860	0.000	0.030
HS 020629	Bovine Edible Offal, Frozen Nes	0.483	3.880	0.286	1.761	0.000	0.194	1.922	0.275	0.973	0.056
HS 021020	Bovine Meat Cured	0.133	1.800	2.578	0.286	1.718	0.089	0.304	0.834	0.772	0.035
HS 160250	Corned Beef, Prepared Or Preserved	0.025	0.299	0.076	0.098	2.853	0.017	0.399	0.208	3.592	0.010

Source: Author's calculation

Revealed Trade Advantage (RTA)

As indicated in Table 4, negative (positive) values present a competitive trade disadvantage (advantage). Thus, from the table it is apparent that Malaysia is highly uncompetitive in the production of meat and meat preparation, in fact the most uncompetitive for this category. Of 20 products in meat and meat preparation, 17 commodities show negative values, and all the positive values are less than 1 except bovine meat cured. The same goes with the Philippines, 14 products recorded negative values. Whereas, for Indonesia, 11 products recorded negative values, and the rest are positive with 2 products reaching a value of greater than 1.

Indonesia is the most competitive for Bovine Carcasses and Half Carcasses, Frozen as compared to the other countries. Thailand can be considered to be competitive in the meat and meat preparation sector. Of the 20 products, Thailand recorded 12 products with positive values and 2 of them are greater than 1. Based on the number of competitive trade products, Singapore is the most competitive as 12 commodities indicate positive values and it is the most competitive for several products, among others are: Bovine Cuts Bone In, Frozen; Lamb carcasses and half carcasses, frozen; Sheep Cuts, Bone In, Frozen; Sheep Cuts, Boneless, Frozen; Goat Meat, Fresh, Chilled Or Frozen; and Bovine edible offal, Frozen not elsewhere stated. However, in order to ascertain the overall competitiveness ranking for the whole sector in each country, the following session will use a pair wise analysis in determining competitive products and then, synthesising the results to identify the ranking of each country.

Ranking of Countries' Competitiveness by Product

The results of the pair wise analyses with respect to each product are depicted in Table 5. A larger priority figure indicates a more dominant or higher ranked alternative or country. The inconsistencies are mostly less than 10% and hence represent an acceptable pair wise analysis. According to the table, all countries except the Philippines are ranked first for certain commodities. Singapore ranked first for eight products, namely HS 020220, HS 020230, HS 020423, HS 020442, HS 020443, HS 020450, HS 020621 and HS 020629; Indonesia ranked first for HS 020120, HS 020210, HS 020421 and HS 020610; Thailand ranked first for HS 020410, HS 020441 and HS 020250; and Malaysia ranked first for two products which are HS 020110 and HS 021020. Considering the number of products, Singapore is seemingly the most competitive ASEAN country for meat and meat preparation under the ruminant category. This is followed by Indonesia, Thailand and Malaysia.

Table 4 Average Relative Trade Advantage for selected ASEAN countries

HS Code (6 digits)	Commodity	RTA AVERAGE 1998-2007				
		Indonesia	Malaysia	Philippines	Singapore	Thailand
HS 020110	Bovine Carcasses And Half Carcasses, Fresh Or Chilled	0.531	0.921	-1.340	-0.867	0.530
HS 020120	Bovine Cuts Bone In, Fresh Or Chilled	0.877	-1.204	0.000	0.031	-0.005
HS 020130	Bovine Cuts Boneless, Fresh Or Chilled	0.040	-0.283	-0.070	0.096	-0.048
HS 020210	Bovine Carcasses And Half Carcasses, Frozen	2.270	-1.666	-1.365	-0.007	0.552
HS 020220	Bovine Cuts Bone In, Frozen	-1.133	-2.216	-0.534	1.763	0.321
HS 020230	Bovine Cuts Boneless, Frozen	-1.469	0.570	-3.164	0.936	-0.012
HS 020410	Lamb Carcasses And Half Carcasses, Fresh Or Chilled	0.605	-1.293	-0.067	-1.180	1.113
HS 020421	Sheep Carcasses And Half Carcasses, Fresh Or Chilled	1.760	-0.980	0.000	-1.913	0.112
HS 020422	Sheep Cuts, Bone In, Fresh Or Chilled	0.143	-0.819	-0.035	-1.421	0.231
HS 020423	Sheep Cuts, Boneless, Fresh Or Chilled	-0.843	-1.339	-0.002	0.869	-0.090
HS 020430	Lamb Carcasses And Half Carcasses, Frozen	0.197	-2.238	-1.069	1.050	0.351
HS 020441	Sheep Carcasses And Half Carcasses, Excl Lamb, Frozen	-0.886	-2.367	-0.009	-0.764	0.520
HS 020442	Sheep Cuts, Bone In, Frozen	-0.303	-2.539	-0.338	1.478	-0.105
HS 020443	Sheep Cuts, Boneless, Frozen	-0.024	-2.628	-0.033	1.609	-0.017
HS 020450	Goat Meat, Fresh, Chilled Or Frozen	-1.184	-3.174	0.000	1.820	-0.001
HS 020610	Bovine Edible Offal, Fresh Or Chilled	0.744	-0.486	0.000	-0.748	0.123
HS 020621	Bovine Tongues, Edible Offal, Frozen	-0.665	-0.762	-2.793	0.821	-0.030
HS 020629	Bovine Edible Offal, Frozen Nes	-3.397	-1.475	-0.194	1.646	0.917
HS 021020	Bovine Meat Cured	-1.667	2.292	1.629	-0.530	0.737
HS 160250	Corned Beef, Prepared Or Preserved	-0.274	-0.022	2.836	0.191	3.582

Source: Author's calculation

Table 5 Criteria priorities with respect to goal: Ranking the most competitive country

	HS 020110	HS 020120	HS 020130	HS 020210	HS 020220	HS 020230	HS 020410	HS 020421	HS 020422	HS 020423
Indonesia	0.229	0.247	0.205	0.317	0.158	0.15	0.24	0.269	0.229	0.17
Malaysia	0.249	0.142	0.188	0.118	0.098	0.271	0.141	0.159	0.176	0.148
Philippines	0.135	0.203	0.199	0.133	0.19	0.05	0.205	0.21	0.219	0.208
Singapore	0.158	0.205	0.207	0.202	0.316	0.293	0.147	0.11	0.142	0.263
Thailand	0.229	0.203	0.2	0.23	0.238	0.236	0.267	0.253	0.234	0.211
Inconsistency	0	0	0	0	0	0	0	0.01	0	0.00077
	HS 020430	HS 020441	HS 020442	HS 020443	HS 020450	HS 020610	HS 020621	HS 020629	HS 021020	HS 160250
Indonesia	0.229	0.191	0.203	0.21	0.16	0.242	0.201	0.035	0.104	0.142
Malaysia	0.096	0.111	0.08	0.073	0.067	0.179	0.195	0.142	0.28	0.149
Philippines	0.16	0.245	0.201	0.21	0.19	0.204	0.073	0.216	0.25	0.263
Singapore	0.276	0.199	0.301	0.296	0.305	0.166	0.291	0.327	0.155	0.159
Thailand	0.238	0.255	0.214	0.21	0.278	0.21	0.24	0.28	0.211	0.288
Inconsistency	0	0.00543	0	0	0.06	0	0	0.00017	0	0.00012

Synthesing the Results

After deriving the priorities for the products (criteria) and the alternatives (countries) via pair wise comparisons, the priorities of the criteria are synthesized to obtain the overall priorities for the decision alternatives. In this case, we are interested in indentifying the most competitive ASEAN country for ruminant trade under the meat and meat preparation sub-sector. The distributive mode of this is used to synthesize the result as it is regarded as appropriate for this case. Thailand turns out to be the most competitive ASEAN country with a priority score of 0.236, followed by Singapore with a priority score of 0.222, and Indonesia, the Philippines and Malaysia with priority scores of 0.196, 0.191 and 0.155 respectively. Figure 2 shows normalized priority scores to show the magnitude of competitiveness between the countries under study. Singapore, although in second place, is almost 94% as competitive as Thailand. Indonesia and the Philippines respectively are 83% and 81% as competitive as compared to Thailand. Malaysia is only 35% less competitive in comparison to Thailand.

Figure 3 shows the overall performance of all the countries. The left hand side axis represents the levels of importance or dominance of criteria and the right hand side axis represents the level of dominance of the alternatives. This figure explains why Thailand is ranked first instead of Singapore. It also illustrates that Thailand, Singapore and Indonesia are 24%, 22% and 20% important or dominant respectively. While the Philippines and Malaysia are 19% and 16% dominant in ruminant trade competitiveness, Singapore has emerged as the major re-export centre for the entire ASEAN region. This country has been ranked second without ruminant production because Singapore is a large trading country and therefore imports and re-exports of ruminant products take place every year. Certainly, exports of value added products are reflected in higher export value.

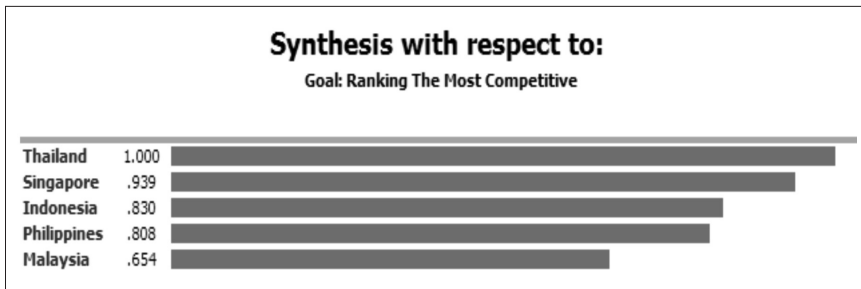


Figure 2 Competitiveness ranking with respect to RTA indices

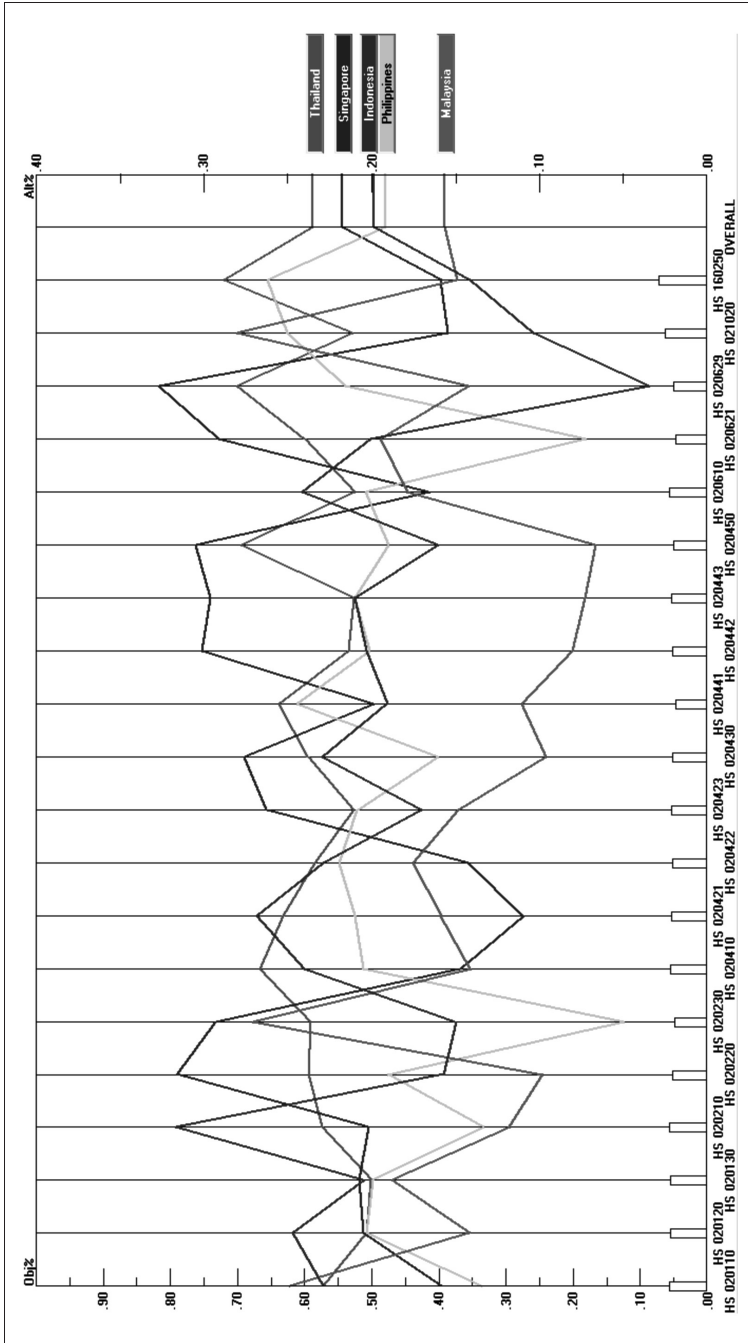


Figure 3 Overall performance of priority rankings

CONCLUSIONS

The analysis provided here revealed that Thailand, Singapore, Indonesia, and the Philippines are more competitive in the meat and meat preparation sector, for the ruminant category, as compared to Malaysia. Better competitive performances observed in Indonesia and Singapore are confirmed by both the relative export advantage (RXA) and relative trade advantage (RTA) indices, whereas the RTA index shows Thailand to be the most competitive country. The competitiveness ranking demonstrates that Malaysia is at the bottom of the group, which enforces the need for the country to improve its competitiveness in this food sub-sector. The competitiveness of the industry could be improved through aggressive research and development of new products and production techniques efficiency, feed cost as well as government assistance in terms of infrastructure to support the initial development of the ruminant value chain.

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