

The Impact of External Shocks on The Comparative Advantage of The Malaysian Food Processing Industry

Mohd Mansor Ismail¹, Shaufique Fahmi Sidique² and Alias Radam¹

¹*Institute of Agricultural and Food Policy Studies,
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor*

²*Department of Agribusiness and Information System,
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor*

Abstract: Scheduled liberalization of trade preferences under the World Trade Organisation and the Asean Free Trade Area has heightened the challenges faced by the Malaysian food producers. To penetrate a wider range of markets, Malaysian food processors have to identify food sub-sectors that are internationally competitive. These sub-sectors should not only withstand internal shocks but also external shocks such as the financial crisis in 1997. This article examines the levels of benefit-cost ratios for various productions of food products to analyze the comparative advantages before and after the 1997 financial crisis. The competitiveness of the food processing industry in Malaysia was determined using the Domestic Resource Cost (DRC) method. Twenty food sectors were assessed using the Malaysian food production and trade data from 1985 to 2001. Processed foods with a high comparative advantage sustained after the crisis can be considered as viable to compete with foreign products in domestic and overseas markets. Meat products in import substitutions, palm oil, kernel oil, sago and tapioca, and cocoa in traditional exports and fish products in emerging exports are examples of food sub-sectors that are gaining competitiveness in the post crisis period.

Keywords: Comparative advantage, food processing industry, benefit-cost ratios, Domestic Resource Cost Ratio

INTRODUCTION

Malaysia has been experiencing persistent food trade imbalance because the demand for food items has risen faster than its supply. The local food production is unable to meet the consumption demand due to several factors such as the increase in cost of production and rapid urbanization which has taken a huge portion of arable land. The shortages have led to rapid increases in food prices and unprecedented increases in the volume and value of food imports. Accordingly, the amount of food deficit in 2007 was estimated at almost RM20 billion. Following these developments, the government has given priority to increasing domestic food production in the Ninth Malaysia Plan. It is expected that the new agricultural strategy will increase food exports to about RM15.5 billion and will reduce food imports to about RM14.2 billion by the year 2010. (Government of Malaysia, 2006) In order to penetrate a wider range of export markets, Malaysian food processors have to identify food sub-sectors that are internationally competitive. These sub-sectors should not only withstand internal shocks, but also external shocks such as the 1997 financial crisis and the possible slowdown of the US economy in the near future.

The purpose of this article is to examine the level of social costs-benefit ratios for various

productions of processed food products before and after the external shock in 1997. If the results indicate that local food manufacturers can produce food products that are capable of competing with imported products, the country could then save foreign exchange through import substitution. If more products are exported, Malaysia will also earn additional foreign exchange. It is also possible for the country to reduce its food deficit by substituting imports and promoting exports. In this article, we examine the issue of comparative advantage in the food processing industry. The article covers the assessment of the comparative advantages of the food manufacturing industry in Malaysia at the production level, for 20 food processing sub-sectors. To capture the dynamic process in the competitiveness indicators, we employ time series and cross-sectional production and trade data on selected food processing sub-sectors over the period 1985 to 2001.

METHODOLOGY

There are several approaches available to empirically examine comparative advantage. One approach, which is adopted in this study, is the Domestic Resource Cost Ratio (DRC) that is used to examine the levels of benefit-cost ratios for various

productions of food products during different time periods. The implicit formula for the DRC is written as

$$DRC = \frac{\text{Value – added Domestically in term of Opportunity Cot}}{\text{Value – added on Border Price}} \quad (1)$$

The numerator is the opportunity cost of non-traded domestic resources while the denominator is the value-added to tradeable resources used in a particular activity valued at border prices. The explicit formula given by Tsakok (1990) is as follows;

$$DRC_i = \frac{\sum_{j=k+1}^n a_{ij} V_j}{P_i - \sum_{j=1}^k a_{ij} P_j} \quad (2)$$

where, a_{ij} are the coefficients for traded inputs j needed per unit of output i , for $j = (1, \dots, k)$, a_{ij} are the coefficients for domestic resources and non-traded intermediary inputs, for $j = (k + 1, \dots, n)$, V_j are the shadow prices of domestic resource and non-traded inputs, P_j are the border price of traded inputs, and P_i are the border price of traded output.

Greenaway and Milner (1990) employ the above formula with slight modifications for analysing Madagascan manufacturing data. The numerator is the social opportunity cost of domestic resources employed directly and indirectly in a unit of commodity j , whilst the denominator is an international value added at border prices in activity j adjusted for returns to foreign owned factors of production. Thus, where migrant labour is employed, there is repatriated earning, and where foreign owned capital is used, repatriated profit should be deducted from the value added. However, due to data limitations on the amount of foreign repatriation and the quantity of inputs in non-traded inputs, the actual estimating equation becomes;

$$DRC_i = \frac{\sum_i v_{ij} s_i}{P_j - P_j \sum_i m_{ij}} \quad (3)$$

where, v_{ij} is the amount of primary factor i used in producing a unit of commodity j , s_i is social opportunity cost or shadow price of factor i , P_j is world price of commodity j , and m_{ij} are shares

of imported inputs in the final value of j at world prices.

Equation 3 differs from Equation 2 in two respects. First, the social opportunity cost of factors employed in the production of non-traded inputs into j , are excluded; second, the income repatriated by foreign-owned factors of production is also excluded. According to Greenaway and Milner (1990), both exclusions were necessitated by data constraints. Due to these limitations, dependency on only one analysis will inevitably distort the true comparative advantage. For this reason, a study by Masters and Winter-Nelson (1995), for example, clarified the advantage and disadvantage of using several analytical tools in measuring comparative advantage.

Another similar study of social profitability by Fatimah and Mad Nasir (1993) concluded that Malaysia possesses a comparative advantage in six out of eight different types of vegetables. DRC indices were computed for each crop using input and output data from the Malaysia Agriculture Research and Development Institute (MARDI) and import and export figures from the Department of Statistics (DOS). The allocations of costs into non-tradeable and tradeable components were based on the study done by Zainalabidin *et al.* (1992). They used Costs Insurance Freight (CIF) prices as border prices and the conversion ratios from market price to shadow price were based on a study made by Veitch (1986).

The analysis in this paper covers 20 food products for the period of 1985 to 2001. For ease of interpretation, the food items were grouped as import substitutes, traditional exports and emerging exports. This paper utilizes secondary data from the Department of Agriculture, the Department of Statistics of Malaysia, Bank Negara Malaysia, the Ministry of Finance, and Food and Agricultural Organisation (FAO). Any DRC value of between zero and one indicates a comparative advantage while a value of greater than one implies a comparative disadvantage. All of these sub-sectors were then ranked according to their level of comparative advantage and those with a high level of comparative advantage reflect highly competitive and potential industries.

RESULTS

Tables 1, 2, and 3 present the results of the DRC analysis before and after the financial crisis for the import substitutes, traditional exports, and emerging exports industries, respectively¹.

Detailed calculations of DRC ratios are listed in the appendix (Table 4).

Table 1: DRC Ratios of the Import Substitutes Industry in Malaysia 1985 – 2001

Food Sub-sectors	DRC (Average) 1985 – 1996	Rank	DRC (Average) 1997 - 2001	Rank
Meat	0.615	4	0.33	3
Other Oil	0.463	3	0.242	2
Rice Mill	1.233	6	1.036	6
Wheat Flour	0.699	5	0.676	5
Sugar	0.370	2	0.360	4
Other Grain Mill	0.326	1	0.232	1
Average	0.62		0.48	

Table 2: DRC Ratios of the Traditional Exports Industry in Malaysia 1985 – 2001

Food Sub-sectors	DRC (Average) 1985 – 1996	Rank	DRC (Average) 1997 - 2001	Rank
Canned Pineapple	0.621	4	0.58	6
Coconut	0.698	5	0.688	7
Palm Oil	0.461	1	0.346	1
Kernel	0.522	3	0.404	2
Sago & Tapioca	0.703	7	0.542	4
Cocoa	0.699	6	0.55	5
Spices	0.462	2	0.504	3
Average	0.59		0.51	

Table 2: DRC Ratios of the Emerging Exports Industry in Malaysia 1985 – 2001

Food Sub-sectors	DRC (Average) 1985 – 1996	Rank	DRC (Average) 1997 - 2001	Rank
Ice Cream	0.888	7	0.908	6
Milk	0.522	1	0.548	2
Canned Fruits & Veg.	8.584	2	0.614	5
Fish	0.684	4	0.48	1
Biscuits	0.835	6	0.966	7
Bakery Products	0.628	3	0.608	3
Noodles	0.664	5	0.612	4
Average	0.65		0.64	

In Table 1 above, the sub-sector of “other grain mill” was found to have the highest level of comparative advantage in this industrial group for both periods as revealed by its lowest DRC ratio which improved from 0.326 to 0.232. The sugar industry, ranked second in the first period with an average DRC ratio of 0.370 fell to fourth place

in the post crisis period although its DRC ratio improved to 0.360 on average. The “other oil” and meat industries went up to the second and third place respectively. Overall, all sub-sectors improved their DRC score in the second period and they were comparatively advantageous with the exception of the “rice mill” industry.

Table 2 shows that all sub-sectors were comparatively advantageous and that all DRC ratios improved in the second period except for the “spices” industry. The most competitive industry was found to be the palm oil industry while the “sago and tapioca” industry recorded the biggest improvement in DRC score in the post crisis period. The former industry was ranked first in both periods while the latter jumped from the seventh place to the fourth spot.

Table 3 shows that the fish industry was found to have the highest improvement in comparative advantage as its average DRC ratio improved from 0.648 to 0.480. Meanwhile, among the decliners (ice cream, canned fruit & vegetable and biscuits), the “canned fruit & vegetable” industry experienced the most dramatic drop in the ranking of the emerging exports industry.

CONCLUSIONS

In this article, we have attempted to evaluate comparative advantage in the Malaysian food processing industry using the DRC measure. We use shadow prices for inputs and outputs to better reflect the social opportunity costs. We completed the calculations for 20 different food sub-sectors during seventeen different years. The results show that processed foods with a high level of comparative advantage which sustained after the crisis might be considered viable to compete with the foreign products in the domestic and overseas market. However, the production of food commodities that rely on foreign raw materials suffers the most since the devaluation of the ringgit makes imported inputs expensive. That is why the sugar sub-sector recorded a declining DRC ratio. Meat products

(import substitution), palm oil, kernel oil, sago & tapioca, as well as cocoa (traditional exports) and fish products (emerging exports) are the examples of the food sub-sectors that are gaining competitiveness in the post crisis period.

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Table 4. Domestic Resource Costs in the Food Processing Industry (using official exchange rate), 1985-2001

Food Category	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	1985-2001	
Import Substitutes																			
Meat	0.46	0.63	0.6	0.69	0.76	0.77	0.78	0.7	0.72	0.68	0.29	0.3	0.31	0.3	0.39	0.33	0.32	0.53	
Other Oil	0.77	0.69	0.52	0.47	0.38	0.37	0.45	0.37	0.43	0.49	0.28	0.34	0.25	0.33	0.2	0.22	0.21	0.4	
Rice Mill	1.38	1.32	1.21	1.14	0.76	1.03	1.26	1.13	0.84	1.12	1.7	1.91	1.23	1.12	0.86	0.99	0.98	1.18	
Wheat-flour	0.9	0.82	0.8	0.77	0.56	0.76	0.85	0.57	0.19	0.69	0.71	0.77	0.65	0.81	0.73	0.58	0.61	0.69	
Sugar	0.45	0.37	0.37	0.31	0.36	0.35	0.42	0.36	0.37	0.37	0.38	0.33	0.35	0.42	0.39	0.33	0.31	0.37	
Other grain mill	0.41	0.37	0.34	0.31	0.28	0.29	0.31	0.33	0.35	0.33	0.31	0.28	0.33	0.22	0.21	0.2	0.2	0.3	
Average	0.73	0.7	0.64	0.62	0.52	0.6	0.68	0.58	0.48	0.61	0.61	0.66	0.52	0.53	0.46	0.44	0.44	0.58	
Traditional Exports																			
Canned Pineapple	0.77	0.84	0.58	0.6	0.63	0.5	0.42	0.64	0.74	0.64	0.54	0.55	0.57	0.64	0.51	0.6	0.58	0.61	
Coconut	0.76	0.8	0.76	0.74	0.64	0.74	0.81	0.61	0.32	0.69	0.76	0.74	0.66	0.8	0.69	0.7	0.59	0.69	
Palm Oil	0.53	0.64	0.61	0.46	0.44	0.49	0.52	0.32	0.37	0.49	0.32	0.34	0.37	0.33	0.32	0.4	0.31	0.43	
Kernel	0.54	0.7	0.59	0.48	0.42	0.51	0.57	0.51	0.35	0.52	0.52	0.55	0.42	0.43	0.51	0.34	0.32	0.49	
Sago & Tapioca	0.79	0.61	0.67	0.72	0.71	0.94	0.89	0.57	0.63	0.72	0.58	0.6	0.49	0.45	0.64	0.56	0.57	0.66	
Cocoa	0.95	0.78	0.65	0.6	0.47	0.68	0.72	0.94	0.83	0.73	0.44	0.6	0.61	0.55	0.66	0.47	0.46	0.67	
Spices	0.53	0.47	0.53	0.5	0.44	0.41	0.45	0.52	0.47	0.48	0.35	0.39	0.46	0.44	0.51	0.51	0.6	0.47	
Average	0.7	0.69	0.63	0.59	0.54	0.61	0.63	0.59	0.53	0.61	0.5	0.54	0.51	0.52	0.55	0.51	0.49	0.57	
Emerging Exports																			
Ice Cream	0.64	0.96	0.85	0.81	1.44	1.01	0.89	0.71	0.89	0.91	0.66	0.88	0.89	1.12	0.96	0.89	0.68	0.89	
Milk	0.6	0.56	0.51	0.49	0.47	0.55	0.49	0.49	0.47	0.51	0.54	0.58	0.61	0.59	0.54	0.51	0.49	0.53	
Canned Fruit & Vegetable	0.53	0.59	0.57	0.6	0.63	0.62	0.63	0.64	0.56	0.59	0.52	0.53	0.61	0.66	0.64	0.58	0.58	0.59	
Fish	0.68	0.61	0.66	0.66	0.59	0.81	0.68	0.73	0.37	0.64	0.68	0.66	0.71	0.33	0.38	0.44	0.54	0.6	
Biscuits	1.83	1.08	0.72	0.66	0.54	0.58	0.63	0.66	0.57	0.81	0.98	0.96	0.87	0.88	1.13	0.98	0.97	0.87	
Bakery Products	0.68	0.68	0.63	0.59	0.62	0.67	0.63	0.62	0.52	0.62	0.61	0.66	0.67	0.56	0.59	0.61	0.61	0.62	
Noodles	0.72	0.65	0.64	0.65	0.53	0.73	0.63	0.7	0.57	0.65	0.77	0.73	0.67	0.59	0.53	0.64	0.63	0.65	
Average	0.81	0.73	0.65	0.64	0.69	0.71	0.65	0.65	0.56	0.68	0.68	0.71	0.72	0.68	0.68	0.66	0.64	0.68	

Data Source: Department of Statistics 1985 - 2001