



UNIVERSITI PUTRA MALAYSIA

***APPLICATION OF LINEAR APPROXIMATE ALMOST IDEAL DEMAND
SYSTEM MODEL TO STUDYING FOOD CONSUMPTION PATTERNS IN
MALAYSIA***

OOI BEE CHEN

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By

OOI BEE CHEN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfillment of the Requirements for the Degree of Doctor of Philosophy**

October 2016

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DEDICATION

To MY:

late father Mr Ooi Yam Chong,

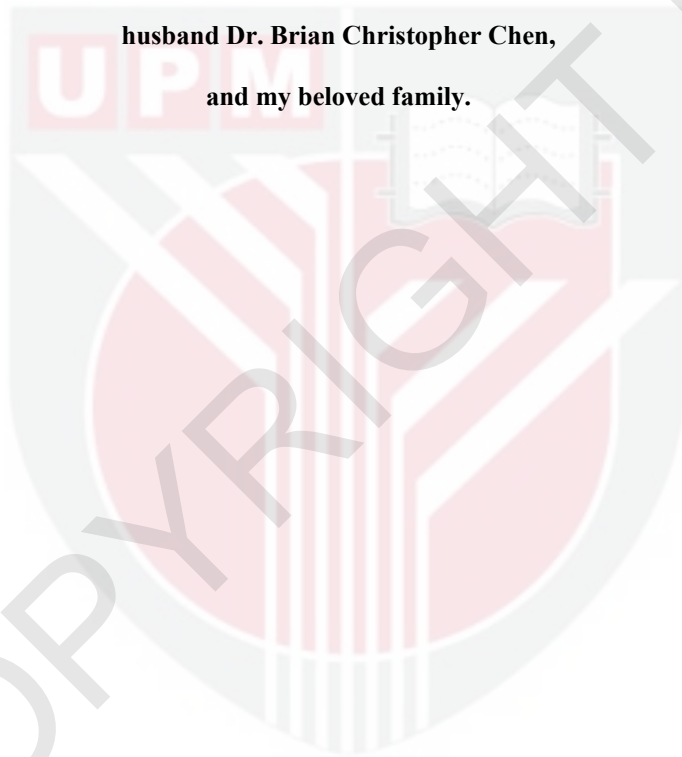
beloved mother Madam Law Meng Soo,

beloved parent in laws Dr. Stetphen Quinn Won Yean Chen

& Madam Ai Mei Chen,

husband Dr. Brian Christopher Chen,

and my beloved family.



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

APPLICATION OF LINEAR APPROXIMATE ALMOST IDEAL DEMAND SYSTEM MODEL TO STUDYING FOOD CONSUMPTION PATTERNS IN MALAYSIA

By

OOI BEE CHEN

October 2016

Chairman : Professor Khalid Abdul Rahim, PhD
Faculty : Economics and Management

With growing income, consumption of food in Malaysia has shifted from starchy staples towards livestock products, wheat, seafood, vegetables, and fruits. This has been powered by a rise in the populace of Malaysia and its purchasing power, which puts the focus on understanding the consumption patterns in this country. The food requirement is guided by the consumption patterns. This study aims to quantify the impact of a family's socio-demographic characteristics in terms of outlay on 11 food groups in Malaysia by employing LES model, and the projection in food consumption patterns in term of the income elasticity, compensated and uncompensated own-price elasticity by employing the LA/AIDS model. The results are utilised to estimate prospective consumption of food up to the year 2025. The study utilised data from the Household Expenditure Survey (HES) 2009/2010, conducted by the Department of Statistics, Malaysia. A total of 21077 samples were obtained. The study relies primarily on the descriptive as well as econometric analysis of the most recent. The projection is carried out by employing the Statistical Analysis System (SAS) program, and through the application of the Iterative Seemingly Unrelated Regression (ITSUR) process. The Full Information Maximum Likelihood (FIML) method was employed to project the demand model. More than 50 percent of the parameter estimates in every equation system in this study are statistically significant, and the model specification is appropriate. The projection outcomes signify that families exhibit a significantly rising food consumption with higher income at a 1% significance level. The sign and scale of the elasticities show that cereal, rice, fruits, oil, vegetables, sugar and other food are 'necessities to price change' among families in Malaysia. Likewise, fish, cereal, milk, vegetables and other foods tend to be 'luxurious to income change'. Notably, own-price elasticities for fish, meat, and other food are quite elastic with change in price. This signifies the behaviour of Malaysian customers correctly, and if fish, meat and other food products are imported, it could bring down the prices, benefitting sellers as well as consumers. The income elasticity is more pronounced in rural areas than urban regions. Usually, the income elasticities for 11 food items, with the exception of other foods, are comparatively high in the LA/AIDS model in comparison to the Tobit

model. This is because, given the economic scenario in Malaysia, several poor families are dealing with tight budgetary limits. Moreover, all chosen food commodity groups are termed as very essential items as they cater to the basic needs of people. Outlays on all commodities are considerably driven by the income of the household. Furthermore, size of the family, the reference person's age, and gender of the head of family are crucial variables which would affect the purchase decisions. In terms of estimated food consumption until the year 2025, self-sufficiency in food may unlikely be achieved for Malaysia. Over the period of estimation, the percentage of cereal consumption is likely to be higher compared to rice products in 2020 and 2025. There would be a downhill trend in the consumption of fish, rice, and vegetables, and an upward trend for meat, cereal, and fruits for the next 10 to 15 years, as against the base year 2010. Lastly, our findings imply that income-focused policies are vital for attaining better nutrition and diminish the issue of unbalanced diets in Malaysia. The country would have to raise its production of food and enhance its food distribution systems to ensure enough supply for its burgeoning populace.

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

**PERMOHONAN MODEL LINEAR APPROXIMATE ALMOST IDEAL
DEMAND SYSTEM DALAM CORAK PENGAMBILAN MAKANAN
DI MALAYSIA**

Oleh

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Oktober 2016

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Dengan pendapatan yang semakin meningkat, pengambilan makanan di Malaysia telah beralih daripada makanan ruji yang berkanji kepada produk ternakan, gandum, makanan laut, sayur-sayuran, dan buah-buahan. Peralihan ini, yang didorong oleh peningkatan penduduk di Malaysia dan kuasa membelinya, menunjukkan tumpuan terhadap memahami corak penggunaan di negara ini. Keperluan makanan dipandu oleh corak penggunaan. Kajian ini bertujuan meneliti kesan ciri-ciri sosio-demografi sesuatu keluarga dari segi perbelanjaan untuk 11 kumpulan makanan di Malaysia dengan menggunakan model LES, dan perubahan dalam corak pengambilan makanan dengan meramalkan keanjalan pendapatan, keanjalan harga sendiri yang berpampasan dan tidak berpampasan dengan menggunakan model LA/AIDS. Keputusan digunakan untuk menganggarkan bakal pengambilan makanan sehingga tahun 2025. Kajian ini menggunakan data daripada Penyiasatan Perbelanjaan Isi Rumah (HES) 2009/2010, yang dijalankan oleh Jabatan Perangkaan Malaysia. Sebanyak 21077 sampel diperolehi. Kajian ini bergantung terutamanya kepada analisis deskriptif serta ekonometrik yang terkini. Ramalan dibuat dengan menggunakan program Sistem Analisis Statistik (SAS), dan melalui penggunaan proses Iteratif Regresi Seakan-akan Tidak Berkaitan (ITSUR). Kaedah Maklumat Penuh Kemungkinan Maksimum (FIML) telah digunakan untuk menonjolkan model permintaan. Lebih 50% daripada anggaran parameter dalam setiap sistem persamaan dalam kajian ini adalah signifikan dari segi statistik, dan spesifikasi model adalah sesuai. Hasil ramalan menandakan bahawa keluarga mempamerkan pengambilan makanan yang meningkat dengan ketara dengan pendapatan yang lebih tinggi pada aras keertian 1%. Tanda dan skala keanjalan menunjukkan bahawa bijirin, beras, buah-buahan, minyak, sayur-sayuran, gula dan makanan lain adalah 'keperluan untuk perubahan harga' di kalangan keluarga di Malaysia. Begitu juga, ikan, bijirin, susu, sayur-sayuran dan makanan lain bercenderung menjadi 'mewah dengan perubahan pendapatan'. Yang jelas, keanjalan harga sendiri untuk ikan, daging, dan makanan lain adalah agak anjal dengan perubahan harga. Ini menunjukkan dengan betul tingkah laku pelanggan Malaysia, dan jika ikan, daging dan lain-lain produk makanan diimport, ia boleh menurunkan harga,

dan memberi manfaat kepada penjual serta pengguna. Keanjalan pendapatan adalah lebih ketara di kawasan luar bandar daripada kawasan bandar. Biasanya, keanjalan pendapatan bagi 11 barangan makanan, kecuali makanan lain, adalah agak tinggi dalam model LA/AIDS berbanding dengan model Tobit. Ini adalah kerana memandangkan senario ekonomi di Malaysia, beberapa keluarga miskin sedang menghadapi had belanjawan yang ketat. Selain itu, semua kumpulan komoditi makanan terpilih disebut sebagai barangan yang amat penting kerana mereka memenuhi keperluan asas rakyat. Perbelanjaan untuk semua komoditi ketara didorong oleh pendapatan isi rumah. Tambahan pula, saiz keluarga, umur orang yang dirujukan, dan jantina ketua keluarga adalah pembolehubah penting yang akan memberi kesan kepada keputusan pembelian. Dari segi pengambilan makanan yang dianggarkan sehingga tahun 2025, Malaysia tidak mungkin mencapai kemampuan diri dalam makanan. Sepanjang tempoh anggaran, peratusan pengambilan bijirin mungkin lebih tinggi berbanding dengan produk beras pada tahun 2020 dan 2025. Akan terdapat trend menurun dalam pengambilan ikan, beras, dan sayur-sayuran, dan trend yang meningkat untuk daging, bijirin, dan buah-buahan untuk 10 hingga 15 tahun akan datang berbanding dengan tahun asas 2010. Akhir sekali, beberapa cadangan dikemukakan berdasarkan dapatan kajian. Pemerhatian menandakan bahawa dasar berfokuskan pendapatan adalah penting untuk mencapai pemakanan yang lebih baik dan mengurangkan isu pemakanan yang tidak seimbang di Malaysia. Negara ini perlu meningkatkan pengeluaran makanannya dan mengukuhkan sistem pengagihan makanannya untuk memastikan bekalan yang mencukupi untuk jumlah penduduknya yang semakin berkembang.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfillment 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

AIDS	Almost Ideal Demand System
BOT	Balance of Trade
CDS	Complete Demand System
CLR	Classical Linear Regression
CPI	Consumer Price Index
DAIDS	Dynamic Almost Ideal Demand System
DS	Demographic Scaling
DT	Demographic Translating
EB	Enumeration Block
EG	Extended Gorman
ERG	Extended Reverse Gorman
ES	Equivalence Scales
EQG	Extended Quadratic Gorman
FIML	Full Information Maximum Likelihood
GDP	Gross Domestic Product
GLES	Generalized Version of the Linear Expenditure System
HES	Household Expenditure Survey
IAD	Indirect Addilog Model
IMR	Inverse Mills Ratio
ITSUR	Iterative Seemingly Unrelated Regression
LES	Linear Expenditure System
LA/AIDS	Linear Approximate Almost Ideal Demand System
LQ	Living Quarters
OECD	Organisation for Economic Cooperation and Development

OLS	Ordinary Least Squares
PIGLOG	Price-independent Generalized Logarithmic
QES	Quadratic Expenditure System
SAS	Statistical Analysis System
8MP	Eighth Malaysian Plan
9MP	Ninth Malaysian Plan
10MP	Tenth Malaysian Plan



CHAPTER 1

INTRODUCTION

An increase in economic growth, industrialisation, globalisation, urbanisation, and trade liberalisation has contributed in transforming the food marketing industry in Malaysia, like the other countries in Asia (Arshad et al., 2006). It is noted that the food consumption pattern in Malaysia is very similar to Asian emerging economies; especially the Republic of Korea, China, and Thailand (Ishida et al., 2003; Warr et al., 2008). Also, Malaysia shows a lower livestock consumption (including dairy) per capita income in comparison to the Organisation for Economic Cooperation and Development (OECD), which includes Australia, USA, and Japan; however, it is higher than that in the Republic of Korea, China and Thailand. For instance, in the year 2005, Malaysia showed a consumption of 44 kg (kilogramme) of milk for every person annually, in comparison to 25 kg in 2004 (Warr et al., 2008). The consumption of fresh milk per capita showed an increase of 33%, from 32.9 to 43.5 kg in a 15-year period ranging between 1990 and 2005. In their reports, Dong (2006) and Beghin (2006) had forecasted that the Malaysia would show an increase in the dairy consumption in the next 10 years because of increasing population and higher income. Also, the food industries can now be featured for market structure, market conduct, studying marketing strategies, cooperation, conflict and innovation (Michman and Mazze, 1998).

1.1 Background of this Study

Malaysia is a country with a diverse culture, where a majority of the population belongs to the upper-middle-income bracket. There has been a rapid increase in the Malaysian population since 1957. Also, since the year 2000, Malaysia has shown a rapid increase in the economic growth, with an average of 4.64 % growth per year (Department of Statistics, Malaysia, 2013), which has led to an increase in the economic income of the families. It was seen that in 2006, the per capita income in Malaysia ranked third amongst the South East Asian countries (the others being, Brunei and Singapore), which was approximate US\$5800. Also, the Malaysians are seen to assign a huge percentage of their household expenses on the food consumption. In recent studies, researchers showed that this food consumption has shown a gradual shift from the starchy products like rice to seafood, wheat, livestock products, fruits and vegetables, with an increase in the per capita income (Mitchell et al., 1997; Lee and Kennedy 2006).

1.1.1 Population in Malaysia

A study of the Malaysian population and the purchasing power of the people helps in understanding the consumption process. This consumption process can significantly affect the requirement for many goods and services that are provided by the Malaysian industries. For instance, it was seen that in 2011, the Malaysian beef industries showed

an increase in their imports, and also, the milk consumption in the country increased by 3%.

In Table 1.1, shows the distribution of the general and the urban population within the different Malaysian states. Out of the 13 states, Selangor showed the largest population size, followed by Johor and Perak. All the Malaysian states showed an increase in the population of the urban areas except Kelantan, on the eastern coast of Peninsular Malaysia, due to natural growth or immigration. In general, there has been a 1.1 % increase in the population growth in 2012, as compared to that in 2010 (9th Malaysia Plan, 2006).

Table 1.1, also shows the change in the urbanisation trend, where an increase in the urban population brought many lifestyle changes in the people, irrespective of their educational status. These changes included an increase in the working women population (full time or part time), which was due to a higher cost of living seen in the urban areas.

Table 1.1 : Population and Urbanisation Distribution in Malaysia, 2000, 2005 and 2010.

States	Population (mil)			Urban population (%)		
	2000	2005	2010	2000	2005	2010
North:						
Kedah	1.67	1.85	1.95	39.1	39.8	40.3
Perlis	0.21	0.23	0.23	34	35.1	35.9
Pulau Pinang	1.33	1.5	1.56	79.7	79.8	80
Perak	2.09	2.28	2.35	59.1	59.3	59.3
Central States:						
Melaka	0.65	0.79	0.82	67.5	70.6	73.4
N. Sembilan	0.87	1.03	1.02	54.9	56.3	57.4
Selangor	4.19	4.87	5.46	87.7	88.4	89.1
Kuala Lumpur	1.42	1.62	1.67	100	100	100
Southern:						
Johor	2.76	3.17	3.35	64.8	66.5	67.7
East Coast:						
Kelantan	1.36	1.51	1.54	33.5	33.4	33.3
Pahang	1.3	1.45	1.5	42	43.5	44.6
Terengganu	0.9	1.02	1.04	49.4	49.8	50.3
East Malaysia:						
Labuan	0.08	0.09	0.09	76.3	77.6	78.6
Sabah	2.6	3.13	3.21	48.1	49.8	51.6
Sarawak	2.07	2.34	2.47	48.1	49.5	50.6
Total	23..50	26.88	28.26	-	-	-

Source: 9th Malaysian Plan, 2006-2010.

1.1.2 Income Growth in Malaysia

Malaysia is a multi-cultural country with an upper-middle-income in the South-Eastern Asian region. Over 60% of Malaysians belong to the middle-income population level. However, approximately 40% of Malaysians earn lesser than RM2,300 every month. The income disparity and an economic difference is seen in rural and the urban areas, and also between the Peninsular and the East Malaysian regions (Sabah and Sarawak). 79.9% of the Malaysian population dwells in the peninsular areas, while 1.3% and 8.8% of the population dwells in the Sabah and the Sarawak regions (CIA World Factbook, 2012).

According to a survey, in the year 2010, the Malaysian population comprised of: 50.4 % Malays, Chinese (23.7 %), Indians (7.1 %), Indigenous groups (Other Bumiputeras) (11 %) and non-citizens, 7.8 %. All these people are fairly distributed across Malaysia, however, the Bumiputera population is predominantly seen to exist on the eastern coast, and a majority of the Indigenous groups live in the Sabah-Sarawak regions, on the island of Borneo. It is seen that more than a 2/3rd of the Malaysian population lives in the urban areas, whereas the urbanisation ranges between 35-90% (Department of Statistics Malaysia, 2010).

Table 1.2, shows the average gross household monthly income for the Malaysian income groups. This has shown an increasing trend between 1992 and 2012. Also, the average gross household monthly income of all the major ethnic groups has shown a 1-2% increase. An increase in the income leads to many changes in the consumption pattern. An increase in the income since the past two decades has brought about a massive shift in the food consumption, with an increase in the consumption of meat. According to Kumar (2007), the food consumption pattern along with its evolution depends on the expenditure level of the people. For example, the higher income group households show a lower consumption of cereals and tend to buy a higher amount of non-food items in comparison to the poorer households (absolutely or relatively).

Table 1.2 : Mean Monthly Gross Household Income Distributed by the Ethnicity in Malaysia for the years 1992, 1999, 2007, 2009 and 2012.

Ethnicity	1992	1999	2007	2009	2012	Annual Growth Rate (%)
Malay	3,100	4,855	7,666	3,624	4,457	1.83
Chinese	5,348	8,470	11,878	5,011	6,366	0.88
Indians	3,743	6,456	9,119	3,999	5,233	1.68

Source: Department of Statistics, Malaysia, 2012

1.1.3 Food Consumption Patterns in Malaysia

In their reports, Blandford (1984), Garnaut and Ma (1992), Mitchell, et al., (1997) and Wu and Wu (1997), showed that increase in per capita income significantly affected the change in the diet of the people. The Malaysian government wishes to convert the country into a higher-income economy by 2020 using The Economic Transformation Program. A higher per capita income would result in a change in the diet pattern of the people.

Statistically, Table 1.3, shows the average monthly expenditure for every Malaysian household from 1993/94 to 2009/10. It can be seen that generally, there has been a diversification in the food consumption pattern amongst the Malaysian people as the per capita increased. During 1993/94, due to an increase in the economic development in the country, there was an increase in the disposable income, with changes in the

price ratios and levels changing the population structure, altering the taste and habits, thus, resulting in more import of new food products in the country by the multinational food companies.

There has been a significant decrease in the rice consumption (50 %) per person as compared to the bread or other cereals between 1993 and 2009. This resulted in the increase of the cereal consumption from 28 kg (1993) to 42 kg (2009). However, despite this fact, rice is the main staple food of the Malaysians and provides 1/3rd of the daily calorie intake on an average. Also, the diversification has led to an increase in the consumption of more expensive food items like meat, fish, fruits and vegetables. Statistics have shown that people consumed more fish products as compared to meat items, which was surprising.

The meat consumption showed a massive increase from 1993 to 2009. Generally, chicken is the most preferred meat in Malaysia and it accounts for 50 % or more of the overall meat consumption. Also, there has been an increase in the consumption of other types of meat, especially pork, during this period. The fish consumption per person also increased from 53 kg in 1993 to 64 kg in 2009. The other food items which showed an increase in consumption during this time period included oil, sugars and milk.

Table 1.3 : Consumption of Different Food Items Per Household in Malaysia (kg/month), 1993-2010

	Food and non- alcoholic beverages	Rice	Cereals	Meat	Fish and seafood	Milk, Cheese and eggs	Oils and fats	Fruits	Vegetables	Sugar	Food products	Coffee and non-alcoholic beverages
1993/94	276	28	28	41	53	24	8	25	33	10	13	13
1998/99	368	39	42	50	74	30	12	30	45	13	14	19
2004/05	393	36	44	54	82	31	12	27	44	13	25	25
2009/10	444	42	53	64	98	38	13	26	47	13	20	29

Source: Department of Statistics, Malaysia, 2011.

1.1.4 Urbanisation of Food Consumption

Malaysia is multi-racial with several races, out of which Malays, Indians and Chinese are prominent. The other races in the Malaysian population are the Dusuns, Kadazans, Ibans, Muruts, Melanau, Orang Ulu, Penans, Bidayuhs etc., in Malaysia, all festivals for Buddhists, Hindus, Muslims and Christians are celebrated with equal fervour, which involves crowds of several thousand people each year. A large amount is spent on food consumption amongst the urban population due to rise in economic growth. Additionally, a higher degree and convenience in accessing the different food locations in the urban population also encourages the people to eat outside often (Department of Statistics, Malaysia, 2012).

It was seen that the rural population spends a lot of their income on the food outlay as compared to an urban household. Also, it is seen that the income along with the education level of the people can positively affect the household spending pattern (Maitra et al., 2006). The substantial increase in the Malaysian population and an increase in the purchasing power has led to a growing market for the food items. The market condition is seen to be very interesting for the growth of the food industries.

In many Asian countries, rice is a staple food; wherein it is essentially consumed in similar quantities within all villages. Besides rice, wheat is also consumed, however its consumption quantity varies depending upon the location. Also, sugar consumption was seen to be variable amongst the Malaysian households (Department of Statistics, Malaysia, 2013).

1.2 Problem Statement

Malaysia is a diverse country with a multi-cultural, multi-ethnic, and multi-linguistic population, of about 30.6 million. Malaysia is becoming gradually more dependent on the food aids and food imports. As a result, the government is carrying out many experiments regarding the agricultural sector reconstruction for improving the self-sufficiency levels. A vast majority of the food in Malaysia is imported, which includes cereals, fish, fruits and vegetables, meat, sugar, dairy products, rice and sugar. The balance in the food trade has been slowly increasing over the past decade from the deficit of RM8,486.40 million (2006) to a deficit of RM16,770.00 million in the year 2013 (MOA, 2014). It was reported that Malaysia imported vegetables to the tune of approximately RM1.17 billion in 2003. This value is 5-times higher than the overall exports value, which was RM0.2 billion.

It becomes very important to have a thorough knowledge regarding the different determinants of the food demand for designing a detailed and comprehensive policy for the agricultural, food and a social option plan which could improve the access to different foods within the country. Other than the preferences, according to the demand theory, various economic variables like income and the price are the essential factors which determine food consumption. Therefore, the prediction of the changes in the consumer expenditure caused due to the changes in their income and the price,

forms the important information in this regards, and the econometric analysis is needed for their empirical estimation.

In the past 20 odd years, the Malaysian market has shown a very exponential growth in terms of population and the purchasing power, which has brought about unprecedented opportunities in the food sector, especially for the rice and cereal food products that form the major components of the people's diet. Malaysia is an example of a populous and rapidly developing country, which has undergone several changes in the food consumption in the past few years. For instance, the cereal consumption was seen to increase marginally to 1.3 million tonnes (2010), and its consumption has been predicted to remain high. Besides, according to a study (Norimah Jr. 2008), it was observed that Malaysians consumed on an average 2.5 rice plates daily, and it was forecast that the rice consumption pattern would grow steadily till 2050 (Abdullah et al., 2006). An improvement in the living standard and an increase in the middle-class income would lead to an increasing growth in the demand for bread, pork and other poultry food products. This was seen to contribute marginally to the increase in the demand for cereals.

Meanwhile, the per capita consumption of poultry was doubled, whereas the fish consumption increased 3-fold. However, the meat consumption did not show any variation during this time period. With regards to the average monthly budget share, the data showed that people spent 20% of their monthly budget on fish, which was the highest amongst the commodity products studied. The fish consumption was also seen to be increased worldwide, because of the growing awareness among the people regarding the relationship between the saturated fats and human health. Malaysia showed a good positive relationship with regards to its income levels and consumption of the animal proteinaceous products, where milk, meat and eggs consumption was seen to increase at the expense of the other staple food products.

The food preference and elasticities are most likely to change with a change in the population, acculturation and income growth within the Malaysian population. The information regarding the food consumption pattern in the country and the elasticities for food, specifically cereals and rice should be regularly updated so that it can be helpful to the Malaysian food industries.

The majority of the studies published with regards to the food consumption in Malaysia have not considered the interdependent nature of the demand. Some of the reports have not included the food elasticities, and are only descriptive. How has the food expenditure pattern in the country changed? Which of the food products are the best substitutes and complementary to the meat products? How do the people react while consuming the 11 food items, when there is a change in the prices? What is the impact of the changes in income on the expenditure for the 11 food items? Are the different parameters for the food consumption significant and sensitive? What are the statistical differences noted with regards to the change in the price, income, and the socio-economic variables amongst the different ethnic groups within the country? In our study, we have aimed to answer these questions.

One main challenge that the government of any developing country faces is balancing the food and the nutrition requirements of the people along with the developmental needs of the agricultural sector. The issue of proper nutrition is considered to be a main strategic problem, which has attracted a lot of attention from every level, and its importance is seen to stem from the socio-economic and political areas. For instance, consider an agricultural policy which supports higher prices to encourage the increase in the food and agricultural production could greatly affect the low-income population, specifically the urban poor and the rural landless population. On the other hand, a low-price policy would be a disincentive to the producers, though it would help meet the nutritional and food demands of the population.

1.3 Objectives of this Study

Based on the above information, the major objective of our study includes seeking information regarding the food consumption preferences of the Malaysian households, based on the household survey carried out between 2009 and 2013. This can be achieved by estimating the demand parameters using the approach of the demand analysis across various income groups. Based on these demand parameters, the specific objectives of our study include:

1. To examine the effect of the socio-demographic characteristics for the income of a household for the 11 food commodities in the urban and rural populations.
2. To study the variations in the food consumption patterns by determining the income elasticity, the compensated and the uncompensated own-price elasticity for the chosen 11 food commodities.
3. To forecast the future consumption pattern of the main food commodities, and outline policy recommendations for improving the dietary consumption pattern within the country.
4. To provide recommendations regarding the designs and advertise the foods which meet the requirements for the specific socio-demographic market segment (Darlin, 1996).

1.4 Significance of this Study

In this study, we consider the different microeconomic variables which can significantly affect the overall monthly food expenditure within the urban and the rural areas equally. Unlike the previously published studies, in this study, we have explicitly tested the food consumption patterns in the urban and the rural regions of Peninsular Malaysia, Sabah and Sarawak.

In this study, we provide essential consumer data which can be further applied for designing marketing and business plans for new and the established industries. The Malaysian market is mainly composed of a young population which is constantly growing. It is also characterised by a diversity of different levels of the geographic concentrations and households which have a higher number of members as compared to other ethnicities. Furthermore, the Malaysian markets also show a higher variation

with regards to the acculturation level and the educational attainment. This has made the market more heterogeneous and requires a more comprehensive understanding.

Our study would be very helpful to researchers, corporate sector, farmers, agribusinesses, government agencies, marketers, policy makers and general businesses. Our study also offers a potential for the determination of the effect of the domestic policies for allocation of expenditures on the food consumption.

There are very few nation-wide survey reports, especially for the Eastern Malaysian regions, which have surveyed the urban and the rural areas, though the empirical reports on the food consumption pattern are fairly common. Many researchers have carried out a survey of the food consumption patterns of particular population groups in different regions of Malaysia. However, these reports had surveyed a small population. We use large sample data in our study to provide a better idea regarding the food consumption pattern in the country.

In this study, we can get a better understanding of the manner in which the socio-demographic factors could affect the food demand in the country. This would help the markets which wish to target their marketing campaigns against certain specific population groups. Additionally, a better understanding of the variables would also help the Malaysian governmental authorities to make and formulate better public policies for improving the food sector of Malaysia.

1.5 Organisation of this Study

In this study, we have aimed to identify the food consumption pattern in the different Malaysian households by investigating different aspects of the food consumption. We have restricted the scope of our study to the food expenditure. We do not study other household expenditures like housing or clothing.

Chapter 2 presents an outline of the neoclassical theory of the consumer demand. It has summarised 2 commonly used techniques for presenting the problem of consumer decision which includes the utility maximisation and the cost minimisation. Also, it has presented the different properties of the demand system which act as guidelines for selecting an appropriate functional form for the particular empirical study. Then, we have compared the partial and the complete demand system, discussed the particular functional forms of the demand and finally select a particular model for the empirical portion of our study.

Chapter 3 presents the methodology used in our study. In this chapter, we aimed to present an empirical model and estimation method for collecting data. Finally, we discussed the data generation and its characteristics based on the household budget survey of 2009/10.

In Chapter 4, we have presented the estimation results, our corresponding interpretation of the results and discussion. We have also forecasted the future food consumption pattern in the chapter.

Finally, in Chapter 5, we have presented the summary, conclusions, and the recommendations for achieving a better food consumption pattern by the implementation of several developmental and fiscal policies.



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LIST OF PUBLICATIONS

Journal Articles

Ooi, Bee Chen, Abdul Rahim, Khalid, Radam, Alias , "The Effects of Expenditure and Price Changes on Demand of Rice", International Journal of Business, Management & Social Sciences (ISSN2249:7463), The Global Open University, Nagaland International Association of Academicians and Researchers (INAAR), May 2014

Ooi Bee Chen, Khalid Abdul Rahim, Alias Radam, Norashidah Mohamed Nor, "Own Price and Income Elasticities of Food in Malaysia", International Journal of Economics and Financial Issues (Indexed by Elsevier: SCOPUS) (ISSN no: 2164-4138 in Scopus journal title list) (Accepted 2016).

Conference Proceedings

Ooi, Bee Chen, Abdul Rahim, Khalid, Radam, Alias , The Effects of Expenditure and Price Changes on Demand of Rice, International Conference on Innovative Challenges and Strategies in Commerce, Trade and Social Sciences, Hotel Delmon, Panjim, Goa, 1-29 May 2014

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Ooi Bee Chen, Khalid Abdul Rahim, Alias Radam, Norashidah Mohamed Nor, Own Price and Income Elasticities of Food in Malaysia, Advances in Economics and Business Issues Research International Conference (AEBIRIC 2016), Park Royal Hotel, Kuala Lumpur, Malaysia, 10th -11st May 2016.



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