MEMBERSHIP FUNCTION OF POVERTY IN
MALAYSIA USING FUZZY SET THEORY

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk *Membership Function of Poverty in MalaysiaUsing Fuzzy Set Theory* oleh *Nor Aida Binti Mat Isa*. No. Matriks: *UK 13890* telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Matematik sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Matematik Kewangan, Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this final year project entitled **Membership Function of Poverty in Malaysia Using Fuzzy Set Theory** is the result of my own research except as cited in the references.

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"MEMBERSHIP FUNCTION OF POVERTY IN MALAYSIA USING FUZZY SET THEORY"

ABSTRACT

This research aims to find membership function of poverty in Malaysia which is applied Malaysia data from the year 2000 to 2005 employed using a mixture of decomposition analysis using fuzzy set theory. The model yields the relevant indicators of poverty for each group and the relevant sub-group (areas and state) in order to identify the main forces that contribute to the overall amount of the state of poverty in Malaysia. Finally, the indicator that contributes the most amount of poverty is obtained.

ABSTRAK

Penyelidikan ini bertujuan untuk mencari keanggotaan fungsi kemiskinan di Malaysia dengan mengaplikasikan data Malaysia daripada tahun 2000 hingga 2005 menggunakan satu campuran analisis penguraian menggunakan teori set kabur. Hasil model ini menunjukkan kadar kemiskinan untuk setiap satu kumpulan dan subkumpulan (kawasan-kawasan dan negeri) dengan tujuan mengenal pasti kuasa-kuasa utama yang menyumbang kepada jumlah keseluruhan kemiskinan di Malaysia. Di akhir kajian, penunjuk yang memberikan penyumbang terbanyak jumlah kemiskinan diperolehi.

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LIST OF TABLE

LIST OF ABBREVIATION

ABBREVIATION

UPI   Unidimensional Poverty Index

Indicators

X_1 Income Expenditure

X_2 Household items

X_3 Transportation

X_4 Education

CHAPTER 1

INTRODUCTION

1.1   Poverty in Malaysia

Nowadays, poverty especially poverty as it is experienced in the low-income parts of the world, has become central to a great deal of discussion among economists and policy makers, and Malaysia have various campaigns underway to eliminate poverty since independent in 1957. A reduction (or increase) in poverty will show up only if there is a change in the relative income distribution (Kakwani, 2001).

Increasingly, the concept of basic subsistence is measured by the availability of infrastructure services, such as safe water, sanitation, solid-waste collection and disposal, storm drainage, public transportation, access roads and footpaths, street lighting, and public telephones. In some countries, other neighborhood amenities such as safe play areas, community facilities, electrical connections, and social services become important in helping increase the standard of living so that the poor can break the cycle of poverty (World Bank 2001).

Sen (1999) argues that poverty should be viewed as the deprivation of basic capabilities rather than merely as lowness of income. The policymakers would want to know whether the identified poor based on income also suffer some form of deprivation

in other aspects of their lives, such as ill health, lack of education, vulnerability, social exclusion and others. He said that, the poor need to be identified and then measure the degree to which the poor are deprived of the basic capabilities compared to the non-poor.

1.2   Problem Statement

There are many studies doing to define the poverty. United Nations Development Programmed (UNDP), Malaysia (2007) has been done their research in defining and explains different measures of poverty and income inequality toward Malaysia experience. The methods used are the Atkinson Indices and Gini Coefficient. The indices of method of Alkinson tell that the income distribution has changed little over the period. While the Gini coefficient has been roughly constant, falling a little in the recession year 1999 and 2004.

Therefore I would like to measure the poverty by using fuzzy set theory. As we know, poverty is hard to define. By using the fuzzy set theory method the result soon will come up in the value of 0 until 1. With this value, it becomes easier to define people having poor with the value of 1 or 0 as stated in the chapter 3.

1.3   Objectives

The purposed of this study is to evaluate the poverty index in Malaysia. Therefore, there are three objectives which are:

i.   Measure the degree of membership of poverty for four component of attributes:

1) Income expenditure

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2) Household item

3) Transportation

4) Education

ii.   To compare the membership function of rural areas versus urban areas.

iii.   To compare the membership function by states.

These four components choose as an attributes because of their relation in poverty. All of this attribute contribute each other to the development in measuring poverty. For example, transportation is a fundamental, yet often overlooked, element in the struggle for equality of opportunity. Access to reliable means of transportation impacts quality of life, financial security and freedom of movement. Too often, poor and minority people find themselves unable to find or get to their jobs or to accomplish all the other daily tasks. These difficulties speak to symptoms of poverty and transportation in-equity.

While, students that come from higher income families may have access to more and better resources than students from lower income families. For example, students from high to middle class families probably have more access to good educational tools like computers and educational toys. Those students will also most likely have a better start for school by going to a preschool that will better ready them for their journey through school. On the other hand, having some basic facilities in their house meaning that the family had reach the comfortable life or material well-being of households.

1.4   Scope of Research

This study is for measure and analyzed the degree of membership of poverty by using several indicators in Malaysia. In this study needed the Malaysian income expenditure,

private households' transportation, level and achievement in education and private household's items. Therefore, the data has been taken from Department of Statistics, Unit Planning Economy and the Malaysian Household Income Survey (HIS). All the data are undertaken in the year 2000 until 2004.

1.5   Importance of Research

This paper will expose the degree of membership of poverty in different indicator selected. The degree of membership illustrated the insufficient incapability of the i-th household to reach the living standard of the society to which it belongs. From the, result, we can analyze the relation of each indicator and their relation with other or relation by group of people or by group of area. On the other hand, the result will show the structurally poverty in Malaysia for the year 2000 until 2005.

1.6   Thesis Organization

This chapter reviews the main approach that has been used to define poverty. Chapter 2 of this paper presents an overview of poverty and fuzzy set theory focusing on their meaning and features. There are also focusing on the literature review which is state of the art theoretical and applied the problem discuss in many ways. Chapter 3 provide an overview of methodology that been used in this study. It's dedicated the derivative of model used in application of fuzzy set elements. Chapter 4 showing the finding after applied the methodology and some analysis from the result. Chapter 5 provides the summary for the findings and concluded the aim of this paper to the result in chapter 4.

CHAPTER 2

LITERATURE REVIEW

2.1 What is Poverty

Generally, poverty is defined as the state of being poor or deficient in money or means of subsistence (Barker 1997). Poverty is the concept that is used to define a great deal of economic policy, and, insofar as economic policy has or fails to have real impacts on people's lives.

Poverty was cause and sustained by this particular life-style which was unique to the poor (Lewis 1955). Therefore, the poor are poor because their culture prevents them from adapting and getting out of poverty.

In addiction, according to Rowntree (1901), poverty is an economic situation which render and individual or family unit incapable of maintaining a minimum acceptable living standard. This doctrine is based on a "poverty line" based on consumption levels required to survive.

According to Mollie Orshansky (1960), who developed the poverty measurements used by the U.S. government, "to be poor is to be deprived of those goods and services and pleasures which others around us take for granted. Ongoing debates over causes,

effects and best ways to measure poverty, directly influence the design and implementation of poverty-reduction programs and are therefore relevant to the fields of international development and public administration.

Among some individuals, such as ascetics, poverty is considered a necessary or desirable condition, which must be embraced in order to reach certain spiritual, moral, or intellectual states. Poverty is often understood to be an essential element of renunciation in religions such as Buddhism and Jainism, whilst in Roman Catholicism it is one of the evangelical counsels. Certain religious orders also take a vow of poverty. For example the Franciscan orders have traditionally forgone all individual and corporate forms of ownership. However, while individual ownership of goods and wealth is forbidden for Benedictines, following the Rule of St. Benedict, the monastery itself may possess both goods and money, and throughout history some monasteries have become very rich indeed.

UN declaration (1995) that result from the World Summit on Social Development in Copenhagen define absolute poverty as " a condition characteristic by severe deprivation of basic human need, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services."

2.2   Fuzzy Set Theory

Lotfi A. Zadeh (1965) was the first one introduces the fuzzy set as an extension of the classical notion of set. Fuzzy sets are sets whose elements have degrees of membership. In classical set theory, the membership of elements in a set is assessed in binary terms according to a bivalent condition which is an element either belongs or does not belong to the set. By contrast, fuzzy set theory permits the gradual assessment of the membership of elements in a set; this is described with the aid of a membership function valued in the

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real unit interval [0, 1]. Fuzzy sets generalize classical sets, since the indicator functions of classical sets are special cases of the membership functions of fuzzy sets, if the latter only take values 0 or 1. For a crisp set A, its indicator function describes the binary membership of an individual element:

$$X_A(Z) = \begin{cases} 1 & Z \in A \\ 0, & Z \notin A \end{cases}$$

An element mapping to the value 0 means that the member is not included in the fuzzy set, 1 describes a fully included member. Values strictly between 0 and 1 characterize the fuzzy members.

Sometimes, a more general definition is used, where membership functions take values in an arbitrary fixed algebra or structure L; usually it is required that L be at least a poset or lattice. The usual membership functions with values in [0, 1] are then called [0, 1]-valued membership functions. This generalization was first considered in 1967 by Joseph Goguen, who was a student of Zadeh.

2.3   Several Studies of Poverty in Malaysia

Ishak Shari, and Ragayah (1990) proposed two alternative methods for defining a poverty line. The proportion of income (Engel coefficient) spent on food is an accepted indicator of economic well-being; declining proportion is associated with higher incomes and a rising percentage with lower income levels.

Visaria (1981) examined the economic and demographic characteristics of poor households. The study found that poor households mainly consisted of agricultural workers, self-employed and family helpers, paddy farmers, fishermen, and workers

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involved in traditional manufacturing activities. She pointed out that these economic activities were highly correlated with poor educational attainment. A multivariate analysis of per capita expenditure and income showed education to be the most important explanatory variable.

Anand (1983) explained that household income did not provide a good indication of inequality in the levels of living as no account was taken of the differences in household size and composition, and economies of scale in consumption. Finally, by focusing on private households, individuals who were living in "institutional households", such as those residing in police and military barracks, hotels, hospitals and welfare homes, were not included.

Bhalla and Kharas (1992) asserted that "the overwhelming result from cross-checks of the data is that these surveys have been extremely well conducted, and it is likely that they are among the most reliable of the surveys conducted in the developing world". Second, the income concept used in the various estimates was household income, not individual income. They found that absolute poverty was a predominantly rural phenomenon, with the incidence of poverty being 25% in rural areas compared to 7% in urban areas.

Economic Planning Unit (2004) Malaysia, a multiracial country, managed to drastically reduce the incidence of poverty and lessen income inequality while achieving rapid economic growth and maintaining racial harmony. What transpired in Malaysia during the 1970.2000 period was complex and challenging, requiring masterful management by the government of the varied demands of a heterogeneous population.

In the year 2007, Unit Planning Economy (EPU) and United Nation Development Programmed (UNDP) combine together doing research about different measures of poverty and income inequality, especially the rationale behind Malaysia's revised PLI beside of illustration the measures using the Malaysian experience over the decade since 1995, with data from the Malaysian Household Income Surveys (HIS) undertaken in the

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years 1995, 1997, 1999, 2002, and 2004. They also showing how the various measures used to inform policies aimed at reducing poverty and inequality.

Ragayah (2008), using the Gini ratio to examine the change in Malaysian income distribution the last three decades and the reason for the changes. She found the Gini ratio for Malaysia peaked in 1976 and fell thereafter to 1990.

CHAPTER 3

METHODOLOGY

This chapter will present the data that will be used, briefly discussion about the theories and the assumption that will guide this study, the hypotheses that are implied by term and the analytical framework by which this study is organized. The data that will be used is from the report of Department of Statistics Malaysia and Economic Unit Planning Malaysia. The data used for the year 2000, 03, 2004 and 2005 for the four indicators selected. In this study, use the method from the previous paper of Dagum and Costa (2004) which is summarizes the basic concepts related to the multidimensional analysis of poverty in the framework of the fuzzy set theory. The general formula used in this study proceeds in some steps:

3.1 A multidimensional approach using fuzzy sets theory

For the application of this method we must define: (*i*) the economic units, the household set in an economic space, $A = \{a_1,...,a_i,...,a_n\}$; and (*ii*) a *m*-dimension vector of socio-economic attributes to study the level of poverty in A, $X = \{X_1,...X_j,...,X_m\}$.

Let B be a fuzzy sub-set of households in A, where $a_i \in B$ stands for the degree of poverty in at least one attribute. The degree of membership of the *i*-th household

$(i = 1 \ldots n)$, with respect to the j-th attribute $(j = 1, \ldots, m)$, to the fuzzy sub-set B is defined as:

$$x_{ij} := \mu_B(X_j(a_j)), \quad 0 \leq x_{ij} \leq 1 \tag{1}$$

In particular:

- $x_{ij} = 1$, if the i-th household does not possess the j-th attribute;
- $x_{ij} = 0$, if the i-th household possesses the j-th attribute;
- $0 < x_{ij} < 1$, if the i-th household possesses the j-th attribute with an intensity belonging to the open interval $(0,1)$.

The degree of membership of the i-th household to the fuzzy sub-set B is defined as a poverty average of x_{ij}:

$$\mu_B(a_i) = \frac{\sum\limits_{j=1}^{m} x_{ij} w_j}{\sum\limits_{j=1}^{m} w_j} \tag{2}$$

The equation $\mu_B(a_i)$ measures the poverty index of the i-th household, where w_j is the weight attached to the j-th attribute. Following this definition, one obtains:

$$0 \leq \mu_B(a_i) \leq 1 \tag{3}$$

In particular:

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- $\mu_B(a_i) = 1$, if a_i i is completely non-poor in the m attributes;

- $\mu_B(a_i) = 0$, if a_i is totally poor in the m attributes;

- $0 < \mu_B(a_i) < 1$, if a_i is partially or totally deprived in some attributes but not fully deprived in all of them.

As $\mu_B(a_i)$ measures the degree of poverty of the i-th household as a weighted function of the m attributes, it also measures the relative deprivation, the degree of social exclusion, and the insufficient capability of the i-th household to reach the living standard of the society to which it belongs.

The weight w_j attached to the j-th attribute stands for the intensity of deprivation of X_j. It is an inverse function of the degree of deprivation of this attribute by the population of households. The weight proposed by Cerioli and Zani (1990) represents this above poverty:

$$w_j = \log\left[\frac{\sum_{i=1}^{n} g(a_i)}{\sum_{i=1}^{n} x_{ij} g(a_i)}\right], \tag{4}$$

where $\left[\dfrac{\sum_{i=1}^{n} g(a_i)}{\sum_{i=1}^{n} x_{ij} g(a_i)}\right]$, is the relative frequency represented by the sample observation a_i in the total population. The denominator of the logarithm in (4) is always positive. Indeed, if $x_{ij} = 0$, i, this would be an irrelevant attribute because there is not any deprivation in X_j.

The fuzzy poverty index of the A set is a weighted average of $\mu_B(a_i)$:

$$\mu_B = \left[\frac{\sum\limits_{i=1}^{n} \mu_B(a_i)g(a_i)}{\sum\limits_{i=1}^{n} g(a_i)} \right], \tag{5}$$

Also, the fuzzy set theory allows one to measure a one-dimensional poverty index for each one of the m attributes:

$$\mu_B(X_j) = \left[\frac{\sum\limits_{i=1}^{n} x_{ij}g(a_i)}{\sum\limits_{i=1}^{n} g(a_i)} \right], \tag{6}$$

$\mu_B(X_j)$ measures the degree of deprivation of the j-th attribute for the entire population of n households.

We can also write the fuzzy wealth index as a weighted function of the unidimensional poverty indexes:

$$\mu_B = \frac{\sum\limits_{j=1}^{m} \mu_B(X_j)w_j}{\sum\limits_{j=1}^{m} w_j} \tag{7}$$

The analysis of the results obtained in (6), for $j = 1,\ldots, m$, enables the policy makers to identify monetary and non monetary aspects of poverty in order to contemplate structural interventions and to raise the poverty households to the state of non-poverty.

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3.3 Decomposition of Poverty

3.4 Group and sub-group Decomposition

A richer way to evaluate the structure of poverty is to provide decomposition by subpopulation groups. Let us divide the total economic surface into k groups, S_k, of size n_k $(k = 1,..., s)$. The intensity of poverty of the i-th household of S_k is given by:

$$\mu_B(a_i^k) = \frac{\sum\limits_{j=1}^{m} x_{ij}^k \, w_j}{\sum\limits_{j=1}^{m} w_j} \tag{8}$$

where x_{ij}^k is the degree of membership related to the fuzzy sub-set B of the i-th household of S_k $(i = 1,..., n_k)$ with respect to the j-th attribute $(j = 1,..., m)$. Then, the fuzzy poverty index associated with group S_k is:

$$\mu_\beta^k = \frac{\sum\limits_{i=1}^{n_k} \mu_B(a_i^k) g(a_i^k)}{\sum\limits_{i=1}^{m} g(a_i^k)} \tag{9}$$

Following (9), the overall fuzzy poverty index can be computed as a weighted average of the poverty level within each group:

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$$\frac{g(a_i^k)}{\sum_{i=1}^{S_k} g(a_i^k)}$$ is the relative frequency represented by the sample observation a_i^k of S_k.

$$\mu_B = \frac{\sum_{k=1}^{S}\sum_{i=1}^{n_k} \mu_B(a_i^k)g(a_i^k)}{\sum_{i=1}^{n} g(a_i^k)} \qquad (10)$$

Hence, it is possible to measure the contribution of the k-th group to the global index of poverty:

$$C_{\mu_B}^k = \frac{\sum_{i=1}^{n_k} \mu_B(a_i^k)g(a_i^k)}{\sum_{i=1}^{n} g(a_i^k)} \qquad (11)$$

This yields another possibility to decision makers to reduce the overall poverty focusing on the poor (region, educational group, etc.).

Now, let us divide each one of the k groups, S_k, ($k = 1,\dots, s$), into b sub-groups S_{bk} ($b = 1,\dots,p$) of size n_{bk}. The intensity of poverty of the i-th household of sub-group S_{bk} is:

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$$\mu_B(a_i^{bk}) = \frac{\sum_{j=1}^{m} x_{ij}^{bk} \, w_j}{\sum_{j=1}^{m} w_j} \tag{12}$$

where x_{ij}^{bk} is the degree of membership related to the fuzzy sub-set B of the i-th household of $(i = 1,\ldots, n_{bk})$ with respect of the j-th attribute $(j = 1,\ldots, m)$. Thus, we can measure the state of poverty within each sub-group:

$$\mu_B^{bk} = \frac{\sum_{i=1}^{n_{bk}} \mu_B(a_i^{bk}) g(a_i^{bk})}{\sum_{i=1}^{n_{bk}} g(a_i^{bk})} \tag{13}$$

Also, it is possible to calculate the contribution of the b-th sub-group to the k-th groups multidimensional poverty index:

$$C_{\mu_b^k}^{bk} = \frac{\sum_{i=1}^{n_{bk}} \mu_B(a_i^{bk}) g(a_i^{bk})}{\sum_{i=1}^{n} g(a_i^{bk})} \tag{14}$$

Hence, the overall fuzzy wealth index can be defined as a weighted average of the poverty intensity that exists within the groups of the second partition:

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$$\mu_B = \frac{\displaystyle\sum_{b=1}^{P}\sum_{k=1}^{S}\sum_{i=1}^{n_{bk}} \mu_B(a_i^{bk})g(a_i^{bk})}{\displaystyle\sum_{i=1}^{n} g(a)} \qquad (15)$$

Consequently, the contribution to the global poverty index of the b-th sub-group of the k-th group is:

$$C_{\mu_b^k}^{bk} = \frac{\displaystyle\sum_{i=1}^{n_{bk}} \mu_B(a_i^{bk})g(a_i^{bk})}{\displaystyle\sum_{i=1}^{n} g(a)} \qquad (16)$$

$\dfrac{g(a_i^{bk})}{\displaystyle\sum_{i=1}^{n_{bk}} g(a_i^{bk})}$ is the relative frequency represented by the sample observation a_i^{bk} of S_{bk}.

This multi-level decomposition allows us to compute precisely the group determinants (rural area, urban areas and states) that contribute to amplify the global poverty.

CHAPTER 4

RESULT AND ANALYSIS

This study focus on poverty indexes in Malaysia which is directly used the data collected by the Department of Statistic and Economic Unit Planning. After conducting through analysis, four parameters were selected as an attribute having affect on the poverty in Malaysia. The attribute selected is i) income expenditure, ii) household item, ii) transportation and iv) education. The data for these parameters were selected from the year 2000 to 2005. The result has been classified into two i) one-dimensional poverty indexes and ii) decomposition of poverty index by group and sub-group.

In measuring the degree of membership for each attributes, I use equation 2 to get the ratio of income expenditure level to the total expenditure and equation 4 to get the weight attached to the income expenditure.

Where,

X_{ij} = Ratio of income expenditures

w_j = Weight attached to income expenditure

$g(a_i)$ = Weight of income to income expenditure

For example:

HOUSEHOLD (i)	INCOME	INCOME EXPENDITURE
1	500	380
2	600	553
.	.	.
.	.	.
.	.	.
11	8000	7489
TOTAL		**23327**

$$X_{ij} = \frac{380}{23327} = 0.01629$$

$$g(a_i) = \frac{500}{380} = 1.31579$$

The weight value is calculate by using the equation 4 which is,

$$w_j = \log \left[\frac{\sum_{i=1}^{n} g(a_i)}{\sum_{i=1}^{n} x_{ij} g(a_i)} \right]$$

$$w_j = \log \left[\frac{1.31579}{(0.01629)(1.31579)} \right] = 1.78808$$

From equation 2 in the previous chapter

$$\mu_B(a_i) = \frac{\sum_{j=1}^{m} x_{ij} w_j}{\sum_{j=1}^{m} w_j}$$

$$\mu_B(a_i) = \frac{(0.01629)(1.78808)}{13.5335} = 0.02913$$

4.1 The Degree of Membership of the i-th household for the attributes

TABLE 4.1: Degree of membership of the i-household for the X_1 attribute

INCOME EXPENDITURE	$\mu_B(a_i)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
<500	0.0169	0.0028	61.3874
600	0.0237	0.0031	42.1941
700	0.0278	0.0035	35.9454
800	0.0322	0.0038	31.0560
900	0.0363	0.0041	27.5406
1000	0.0463	0.0044	24.6305
2000	0.0623	0.0076	16.0436
3000	0.1032	0.0094	9.6909
4000	0.1310	0.0106	6.8245
5000	0.1900	0.0114	5.2634
>5000	0.3012	0.0125	3.1149

Table 4.1 underlines two kinds of information: i) the degree of membership of first attribute (income expenditure); and ii) their absolute and relative contribution to the one-dimensional poverty indexes. From the table, we have 11 type of household income per month. The value of $\mu_B(a_i)$ represented the degree of poverty of the i-th household as a weight function of the first attribute. For instant, the degree of membership by income expenditure showed that the household income below RM 500 is the poorest one with 0.0169 of structurally poor households. This value reduces by adding of income per month earned by each household.

TABLE 4.2:   Degree of membership of the i-household for the X_2 attribute

HOUSEHOLD ITEMS	$\mu_B(a_i)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
AIR-CONDITIONER	0.0332	0.0004	30.1951
WASHING MACHINE	0.1254	0.0039	7.8092
REFRIGERATOR	0.1551	0.0052	6.4460
TELEVISION	0.1708	0.0060	5.8537
MICRWAVE OVEN	0.0286	0.0004	34.9809
RADIO/HI-FI	0.1594	0.0055	6.2741
VIDEO/VCD/DVD	0.1097	0.0031	9.1194
FIXED TELEPHONE LINE	0.1178	0.0035	8.4897
MOBILE PHONE	0.0554	0.0010	18.0668
PERSONAL COMPUTER	0.0279	0.0003	35.8551
INTERNET SUBSCRIPTION	0.0142	0.0001	70.5219

Table 4.2 showed the decomposition by household item. The value illustrates that an approximate measure of the material well-being of households in Malaysia. The degree of membership showed that only 0.0142 of private households in Malaysia having internet facility. In Malaysia, air conditioner and personal computer are still considered a luxury item among household with 0.0332 and 0.0279 of households owned it. While a little of households having mobile telephone with 0.0554. Nevertheless, the availability of television, refrigerator and radio was more commonplace in Malaysia with around 0.15 to 0.20.

TABLE 4.3: Degree of membership of the i-household for the X_3 attribute

TRANSPORTATION		$\mu_B(a_i)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
MOTORCAR	1 UNIT	0.1573	0.0267	3.2779
	2 UNIT	0.0769	0.0131	15.4747
	3 UNIT OR MORE	0.0272	0.0046	67.3176
MOTORCYCLE	1 UNIT	0.1580	0.0266	3.1859
	2 UNIT OR MORE	0.0871	0.0147	12.6527
BICYCLE		0.1452	0.0244	4.4937

Table 4.3 underlines the information of transportation belongs to each household. From the table, represent almost 0.15 of households able to have at least one car or one motorcycle for their transporting. Nevertheless, only a little group of household whose able to have more than one of car or motorcycle.

TABLE 4.4: Degree of membership of the i-household for the X_4 attribute

	EDUCATION	$\mu_B(a_i)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
PMR	7A TO 9A	0.0823	0.0013	13.8889
	COMBINATION OF GRADE A,B,C,D	0.0342	0.0066	1.0895
	ALL E	0.0202	0.0000	98.8150
SPM FULL PASSES IN	ABOVE 10 SUBJECTS	0.0465	0.0002	32.5076
	8 TO 10 SUBJECTS	0.1457	0.0114	1.8762
	5 TO 7 SUBJECTS	0.1479	0.0051	4.2474
	2 TO 4 SUBJECTS	0.1201	0.0025	7.0720
	1 SUBJECTS	0.0659	0.0005	19.6251
	ALL FAIL	0.0175	0.0000	118.2495

Education has chosen as parameter that also affects the poverty index because it explained the quality of education reach by each of households. Table 4.4 indicated that only a little of candidates got excellent result in their Lower Secondary Assessment examination with about 0.008 of number set. For the Malaysian Certificate of Education examination, most of them full passed in all subjects they take but still have a little amount of candidate fail all subject with 0.0175 of number set.

Table 4.5: UPI by attribute for entire population of attributes

ATTRIBUTE	$\mu_B(X_j)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
INCOME	0.8521	0.0054	10.2034
HOUSEHOLD ITEM	0.1267	0.0023	7.8922
TRANSPORTATION	0.1664	0.1102	6.0095
EDUCATION	0.5606	0.0198	2.7540

Table 4.5 illustrates the degree of membership of each attribute for the entire population of household. From the four attribute selected in the beginning, income gives the most contribution among others with 0.8521 of household. This followed by education with 0.56 and some 0.30 of household affected by household item and transportation.

4.2 Decomposition of Poverty by group

The result for decomposition by group generate by the formula 8 as stated in the previous chapter. The formulas also used the basic equation as shown in the example above, but use the different according to the group it belong to.

For example by group of area separate by rural and urban:

HOUSEHOLD (i)	INCOME	INCOME EXPENDITURE	
		RURAL	URBAN
1	500	338	397
2	600	550	557
.	.	.	
.	.	.	
.	.	.	
11	8000	7113	7518
TOTAL		**22830**	**23422**

Rural area:

$$X_{ij} = \frac{373}{22830} = 0.01634$$

$$g(a_i) = \frac{500}{373} = 1.34048$$

The weighted value calculated by using the formula below,

$$w_j = \log \left[\frac{\sum_{i=1}^{n} g(a_i)}{\sum_{i=1}^{n} x_{ij} g(a_i)} \right]$$

$$w_j = \log \left[\frac{1.34048}{(0.01634)(1.34048)} \right] = 1.78679$$

For the decomposition of poverty by group of areas, I used the equation 8 from the previous chapter,

$$\mu_B(a_i^k) = \frac{\sum_{j=1}^{m} x_{ij}^k \, w_j}{\sum_{j=1}^{m} w_j}$$

$$\mu_B(a_i) = \frac{(0.01634)(1.78679)}{13.53679} = 0.02919$$

Table 4.6: Degree of membership of i-household for X_1 attribute by group of area

INCOME	$\mu_B^k(a_i)$	
	RURAL	URBAN
< 500	0.0292	0.0307
600	0.0390	0.0396
700	0.0438	0.0444
800	0.0487	0.0491
900	0.0532	0.0533
1000	0.0574	0.0576
2000	0.0742	0.0775
3000	0.1018	0.1037
4000	0.1242	0.1238
5000	0.1377	0.1386
> 5000	0.1578	0.1590

Table 4.6 and 4.7 expose the multidimensional decomposition by the first attribute (income) and their absolute and relative contributions. Incomes below RM 500 in rural area give smallest value compare to urban area with 0.0292 and 0.0307 of contribution. The pattern of proportion of income looks same while comparing rural area with urban area which is urban area still hold higher value than rural area.

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Table 4.7: Absolute and relative contributions by attribute and by area

INCOME	AREA	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
< 500	RURAL	0.0029	61.1995
	URBAN	0.0029	57.1429
600	RURAL	0.0032	41.4938
	URBAN	0.0032	40.6504
700	RURAL	0.0035	35.3357
	URBAN	0.0036	34.7222
800	RURAL	0.0039	30.4785
	URBAN	0.0039	30.1205
900	RURAL	0.0042	26.8889
	URBAN	0.0042	26.8096
1000	RURAL	0.0045	24.0964
	URBAN	0.0046	23.9234
2000	RURAL	0.0089	16.3666
	URBAN	0.0078	15.2672
3000	RURAL	0.0096	9.6899
	URBAN	0.0096	9.3721
4000	RURAL	0.0106	6.5963
	URBAN	0.0109	6.6401
5000	RURAL	0.0116	5.2002
	URBAN	0.0117	5.1099
> 5000	RURAL	0.0132	3.2092
	URBAN	0.0127	3.0157

Table 4.8: Degree of membership of i-household of X_2 attribute by group of area

HOUSEHOLD ITEM	$\mu_B^k(a_i)$	
	RURAL	URBAN
AIR CONDITIONER	0.0253	0.0565
WASHING MACHINE	0.1168	0.1133
REFRIGERATOR	0.1339	0.1219
TELEVISION	0.1431	0.1253
MICROWAVE OVEN	0.0271	0.0498
RADIO/ HI-FI	0.1391	0.1216
VIDEO/VCD/DVD	0.0966	0.1083
FIXED TELEPHONE LINE	0.1073	0.1102
MOBILE PHONE	0.0400	0.0787
PERSONAL COMPUTER	0.0228	0.0500
INTERNET SUBSCRIPTION	0.0092	0.0317

For the decomposition of household item, people in rural area are the most affected by poverty but the biggest contribution is air-conditioner that represents 0.7385 of the poor households. Second largest contribution is microwave oven gives 0.6757 of poor households. This means that the level of availability of household for having the item above is lower in rural area compare to urban.

Table 4.9: Absolute and relative contributions by attribute and by area

HOUSEHOLD ITEM	AREA	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
AIR CONDITIONER	RURAL	0.0017	73.8577
	URBAN	0.0044	24.6042
WASHING MACHINE	RURAL	0.0079	7.4801
	URBAN	0.0089	7.9435
REFRIGERATOR	RURAL	0.0090	5.5682
	URBAN	0.0094	6.8617
TELEVISION	RURAL	0.0094	4.6954

	URBAN	0.0096	6.4669
MICROWAVE OVEN	RURAL	0.0018	67.7934
	URBAN	0.0039	29.4934
RADIO/ HI-FI	RURAL	0.0091	5.0718
	URBAN	0.0093	6.9032
VIDEO/VCD/DVD	RURAL	0.0064	10.6158
	URBAN	0.0084	8.6507
FIXED TELEPHONE LINE	RURAL	0.0073	8.8084
	URBAN	0.0086	8.3735
MOBILE PHONE	RURAL	0.0027	40.0600
	URBAN	0.0061	14.9078
PERSONAL COMPUTER	RURAL	0.0015	84.5936
	URBAN	0.0039	29.3590
INTERNET SUBSCRIPTION	RURAL	0.0006	264.5498
	URBAN	0.0025	55.0319

Table 4.10: Degree of membership of i-household of X_3 attribute by group of area

	UNITS	$\mu_B^k(a_i)$	
		RURAL	URBAN
MOTORCAR	I UNIT	0.1456	0.1595
	2 UNIT	0.0413	0.0912
	3 UNIT OR MORE	0.0128	0.0337
MOTORCYCLE	1 UNIT	0.1598	0.1556
	2 UNIT OR MORE	0.1082	0.0729
BICYCLE		0.1528	0.1397

Table 4.10 and 4.11 underline two kinds of information i) decomposition of third attribute (transportation) and; ii) their absolute and relative contribution. Private households who have motorcars give higher degree of membership in urban area than rural area with 0.1595 of households. While, for those who have motorcycle explained that people in

rural contribute more than urban area. It is plausible because private household in urban contribute more in proportion of motorcar. People who have bicycle also explained more to rural area than urban with 0.1528 compare to 0.1397 in urban area.

Table 4.11: Absolute and relative contributions by attribute and by area

TRANSPOR-TATION	AREA		ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
MOTORCAR	RURAL	I UNIT	0.0224	4.4632
		2 UNIT	0.0063	38.3512
		3 UNIT OR MORE	0.0020	175.6882
	URBAN	I UNIT	0.0275	2.8687
		2 UNIT	0.0157	11.7202
		3 UNIT OR MORE	0.0058	50.5665
MOTORCYCLE	RURAL	I UNIT	0.0242	2.7459
		2 UNIT OR MORE	0.0165	8.6649
	URBAN	I UNIT	0.0267	3.4860
		2 UNIT OR MORE	0.0125	16.8066
BICYCLE	RURAL		0.0232	3.7795
	URBAN		0.0239	5.0013

Example of calculation for the attribute of education in group of

PMR Achievement in Johor

NUMBER SET		TOTAL
	7A TO 9A	1693
48529	COMBINATION OF GRADE A,B,C,D	28521
	ALL E	379
TOTAL		48529

For getting 7A to 9A:

$$X_{ij} = \frac{1693}{48529} = 0.05534$$

$$g(a_i) = \frac{1693}{48529} = 0.03489$$

$$w_J = log\left[\frac{0.03489}{(0.05534)(0.03489)}\right] = 1.25697$$

This calculation also use the same formula of decomposition of poverty by group of states,

$$\mu_B(a_i^k) = \frac{\sum_{j=1}^{m} x_{ij}^k \, w_j}{\sum_{j=1}^{m} w_j}$$

$$\mu_B(a_i) = \frac{(0.05534)(1.25697)}{3.194405} = 0.002427$$

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Table 4.12: Degree of membership of i-th household for states.

EDUCATION PMR	$\mu_B^k(a_i)$		
	7A TO 9A	COMBINATION OF A,B,C,D	ALL E
JOHOR	0.0696	0.0284	0.0236
KEDAH	0.0774	0.0312	0.0192
KELANTAN	0.0681	0.0253	0.0143
MELAKA	0.0873	0.0353	0.0130
NEGERI SEMBILAN	0.0999	0.0441	0.0163
PAHANG	0.0713	0.0277	0.0176
PERAK	0.0880	0.0378	0.0217
PERLIS	0.0914	0.0390	0.0181
PULAU PINANG	0.1001	0.0441	0.0159
SABAH	0.0449	0.0181	0.0250
SARAWAK	0.0693	0.0286	0.0248
SELANGOR	0.0980	0.0429	0.0168
TERENGGANU	0.0854	0.0358	0.0196

EDUCATION SPM	$\mu_B^k(a_i)$		
FULL PASSES IN	ABOVE 10 SUBJECTS	8 TO10 SUBJECTS	5 TO 7 SUBJECTS
JOHOR	0.0490	0.1503	0.1487
KEDAH	0.0519	0.1522	0.1404
KELANTAN	0.0447	0.1497	0.1493
MELAKA	0.0547	0.1403	0.1481
NEGERI SEMBILAN	0.0578	0.1447	0.1453
PAHANG	0.0356	0.1349	0.1467
PERAK	0.0448	0.1493	0.1467
PERLIS	0.0785	0.1519	0.1493

PULAU PINANG	0.0525	0.1445	0.1417
SABAH	0.0240	0.1545	0.1556
SARAWAK	0.0351	0.1453	0.1453
SELANGOR	0.0515	0.1406	0.1418
TERENGGANU	0.0587	0.1428	0.1541

EDUCATION SPM	$\mu_B^k(a_i)$		
FULL PASSES IN	2 TO 4 SUBJECTS	1 SUBJECTS	ALL FAIL
JOHOR	0.1268	0.0713	0.0188
KEDAH	0.1456	0.0581	0.0171
KELANTAN	0.1334	0.0537	0.0139
MELAKA	0.1107	0.0522	0.0095
NEGERI SEMBILAN	0.1173	0.0676	0.0179
PAHANG	0.1087	0.0507	0.0162
PERAK	0.1252	0.0782	0.0227
PERLIS	0.1233	0.0602	0.0154
PULAU PINANG	0.1200	0.0770	0.0206
SABAH	0.1331	0.0647	0.0154
SARAWAK	0.1225	0.0703	0.0153
SELANGOR	0.1165	0.0674	0.0179
TERENGGANU	0.1022	0.0384	0.0110

For the education attribute, explained by each state in Malaysia as shown in table 4.12. From the 13 state above, the higher contribution represent by Pulau Pinang with 10 % of Lower Secondary Assessment examination candidates got 7A to 9A in their result. While, candidates got all E give most contribution in Sabah with 0.025 of number set. For the Malaysian Certificate of Education examination, Kedah gives almost 0.1522 of candidate's full passes in almost subject taken. While Perlis contribute the higher proportion of candidates that passes at least 1 subject and fail the entire subject.

4.3   One-dimensional Poverty Indexes for the entire population of attributes

Table 4.13: UPI for entire population of attribute by group of area

ATTRIBUTE	$\mu_B^k(X_j)$	
	RURAL	URBAN
INCOME	0.0906	0.0940
HOUSEHOLD ITEM	0.1574	0.1184
TRANSPORTATION	0.1663	0.1664

Table 4.13 and table 4.14 represent the decomposition of poverty for the entire population of three attribute by group of area and their absolute and relative contribution. From the table, transportation contributes the largest contribution in urban area than in rural. This proportion followed by household item with 0.1574 in rural area and lastly by income explained most contribution in urban area than rural with 0.0940 of poor households.

Table 4.14: Absolute and relative contributions by attribute and by area

ATTRIBUTES	AREA	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
INCOME	RURAL	0.0091	10.6391
	URBAN	0.0940	11.0376
HOUSEHOLD ITEMS	RURAL	0.0094	6.3522
	URBAN	0.0251	8.4480
TRANSPORTATION	RURAL	0.0946	6.0146
	URBAN	0.1121	6.0081

Table 4.15: UPI for entire population of attributes X_4 by group of states and it absolute and relative contributions.

EDUCATION PMR	$\mu_B^k(X_j)$	ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
JOHOR	0.8723	0.0060	1.1463
KEDAH	0.8603	0.0066	1.1623
KELANTAN	0.8863	0.0048	1.1282
MELAKA	0.8434	0.0086	1.1857
NEGERI SEMBILAN	0.8065	0.0111	1.2400
PAHANG	0.8757	0.0060	1.1420
PERAK	0.8320	0.0091	1.2019
PERLIS	0.8275	0.0085	1.2085
PULAU PINANG	0.8064	0.0116	1.2401
SABAH	0.9176	0.0031	1.0898
SARAWAK	0.8716	0.0066	1.1474
SELANGOR	0.8113	0.0118	1.2327
TERENGGANU	0.8408	0.0076	1.1189

	$\mu_B^k(X_j)$		
EDUCATION SPM		ABSOLUTE CONTRIBUTIONS	RELATIVE CONTRIBUTIONS
JOHOR	0.3389	0.0205	2.9506
KEDAH	0.3316	0.0225	3.0154
KELANTAN	0.3491	0.0218	2.8649
MELAKA	0.3914	0.0183	2.5552
NEGERI SEMBILAN	0.3626	0.0199	2.7582
PAHANG	0.4175	0.0179	2.3951
PERAK	0.3410	0.0207	2.9329
PERLIS	0.3273	0.0210	3.0557
PULAU PINANG	0.3601	0.0199	2.7773
SABAH	0.3340	0.0199	2.9943

SARAWAK	0.3662	0.0191	2.7304
SELANGOR	0.3809	0.0192	2.6251
TERENGGANU	0.3913	0.0188	2.5553

While for the last attribute which is education, the decomposition of poverty by group of state showed in table 4.15. From the table, the biggest contribution exposes in Sabah for Lower Secondary Assessment examination candidates with almost 0.90 and Pahang gives higher contribution for the Malaysian Certificate of Education examination with 0.4175.

Conclusion and Finding

As a conclusion, household income represent the most contribution with 0.85 in measuring poverty between four attribute selected. While, education contributes a second larger proportion amongst the attribute with 0.56, since people realize the important of education from the independence in 1957. Transportation gives almost 0.16 contributions of household poor of having transportation. Nevertheless, from table 4.5 present the household items contribution of household poor with 0.06. This means that they able to buy common facility in their house. This mean that the poor communities not able to have the basic facility in their house. In comparing these attribute into group of area, the proportion of income expenditure in rural is lower 0.004 than urban areas with 0.094. It is same for transportation which is lower 0.001 in rural areas compare to urban areas with 0.1664. For the household item, the higher proportion is in rural areas with 0.1574. Nevertheless, in education we compared it with all state in this country. Therefore the most affect by poverty showed by the quality of their achievement in examination is Sabah with 0.9176.

CHAPTER 5

CONCLUSION AND DISCUSSION

5.1   Conclusion

This study presented in this research work focus on the application of fuzzy set theory in measuring the degree of membership of poverty in Malaysia by using four attribute selected.

The methodology proposed, by which the basic concept related to the multidimensional analysis of poverty in the framework of the fuzzy set theory. For the application of this method, four attribute were chosen to measure the poverty in Malaysia. The attribute selected is i) household income; ii) household item; iii) transportation; and iv) education. The decomposition by this attributes showing that it is possible to gauge the contribution of the each one attribute to the overall amount of poverty. The data used for each attributed collected from Department of Statistic, Malaysia and Economic Planning Unit, Malaysia. The data were taken for the year 2000 and above.

In general, fuzzy set are sets whose elements have degrees of membership. By contrast, fuzzy set theory permits the gradual assessment of the membership of elements in a set [0,1]. In particular, the result showed that the group affect the most contribution of poverty will equal to 0 if totally deprived and non-poor if the degree equal to 1.

From the findings in previous chapter, the most affected group by poverty is in rural area compare to the urban area. This is plausible since urban areas are created and further development by the process of urbanization compares to rural that having slowly of development.

The relation of four attribute used with the poverty framework is for instant, education credential leads to employment. Employment leads people out of poverty and is a form on economic inclusion that acts as a proxy for social inclusion.

5.2   Discussion

From the previous chapter we will see the condition of poverty in Malaysia showed by four attributes such as income expenditure, household item, transportation and education. The aim of this paper is to look at the degree of membership for each attribute that tell us the insufficient capability of each household to reach the living standard of the society to which it belong. On the other hand, we will compare the attributes contribution between rural area and urban area and between all states in this country.

From table 4.5 represent the largest contribution by income with 0.85 amongst other. This is plausible since the data from the Department of Statistic Malaysia showed the income expenditure for each household according to their level of income per month. The result illustrate that their income unable to support their live comfortable with their expenditure. While comparing this attribute in rural and urban area, table 4.13 illustrates that 0.094 contribution belongs to urban communities than rural with 0.091. The urban area contributes higher than rural because of their higher cost living. Therefore, make their expenditure more than rural even though with same income level.

For the second larger contribution is education represent in the same table. Since the data showed the achievement in their examination, we can see the quality of education

that affect by the poverty. For this attribute we measure the quality of education by two important examinations for all candidates in this country. Table 4.12 showed that Sabah contribute the lowers one with 0.045 in getting the quality of 7A and above in Lower Secondary Assessment examination (PMR). While, for Malaysian Certificate of Education examination (SPM), Sabah also contribute the lowers one with 0.024 of all candidates that passes all subjects. This cannot be deny because of this state so far in rural area that having slow development. The geographic condition makes them comfortable to go for school.

The third contribution is by transportation with 0.166. Transportation is a fundamental, yet often overlooked, element in the struggle for equality of opportunity. Access to reliable means of transportation impacts quality of life, financial security and freedom of movement. Too often, poor and minority people find themselves unable to find or get to their jobs or the grocery store, or to accomplish all the other daily tasks many of us take for granted. These difficulties speak to symptoms of poverty. The data used to measuring this attribute is by evaluate the numbers of vehicle by type for each household. As a conclusion, people have been able to have at least one vehicle for them to link somewhere. From the table 4.13 rural and urban areas contribute almost the same proportion with 0.1664 and 0.1663. This showed that the necessity of transportation is very important in anywhere.

The last attribute that contribute a little proportion of poverty index is household item with 0.1267. The value illustrates that an approximate measure of the material well-being of households in Malaysia. The small value among other attribute mean that each household has been able to buy a basic facility in their house for the entire population. Table 4.13 illustrate that people in rural area give the higher proportion than in urban area with 0.1574 than 0.1184 of poor household. This is plausible since people in rural more to work or do something in manual or traditionally to fulfill their free time. It is difference with people in urban area that always busy with their work and want everything faster because of not enough of time.

Therefore, for all attribute above depended on the data collected in that year. The fact cannot always true than the result that used the exact data. From the data selected, we can conclude that people in rural affect most of poverty than urban area.

5.3   Future Research

The methodology proposed in this paper for measuring poverty indexes in Malaysia can be expanded upon by different indicators and can be expanded to be more detail by group and sub-group of each indicator. In addiction, the poverty contribution can be related by each indicator but it has to have fully detail data in that year. The poverty index also can be measure by using many other method such as using poverty line, customer price index, aggregation and etc.

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TOTAL INCOME EXPENDITURE

INCOME	EXPENDITURE	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
500	380	0.0162901	1.315789	1.788075	0.029128	0.021434	0.038326
600	553	0.0237064	1.084991	1.625134	0.038526	0.025721	0.0418
700	649	0.0278218	1.078582	1.555614	0.04328	0.030008	0.046681
800	751	0.0321945	1.065246	1.492219	0.048041	0.034295	0.051176
900	847	0.0363099	1.062574	1.439975	0.052285	0.038582	0.055557
1000	947	0.0405967	1.055966	1.391509	0.056491	0.042869	0.059652
2000	1454	0.0623312	1.375516	1.205294	0.075127	0.085738	0.103339
3000	2407	0.1031852	1.246365	0.986383	0.10178	0.128606	0.126855
4000	3418	0.1465255	1.170275	0.834087	0.122215	0.171475	0.143025
5000	4432	0.1899944	1.128159	0.721259	0.137035	0.214344	0.154597
8000	7489	0.3210443	1.068233	0.493435	0.158415	0.34295	0.169224
	23327	1	12.6517	13.53298	0.862324	1.136023	0.990233

UB(Xj)	UB
0.089792	0.073172

INCOME EXPENDITURE IN RURAL AREA

INCOME	EXPENDITURE	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
500	373	0.016338	1.340483	1.786797	0.029193	0.021901	0.039133
600	550	0.024091	1.090909	1.618143	0.038983	0.026281	0.042527
700	646	0.028296	1.083591	1.548273	0.04381	0.030661	0.047472
800	749	0.032808	1.068091	1.484024	0.048687	0.035042	0.052003
900	849	0.037188	1.060071	1.429598	0.053164	0.039422	0.056357
1000	948	0.041524	1.054852	1.428081	0.0593	0.043802	0.062553
2000	1396	0.061148	1.432665	1.21362	0.07421	0.087604	0.106318
3000	2356	0.103198	1.273345	0.986331	0.101787	0.131406	0.12961
4000	3460	0.151555	1.156069	0.81943	0.124189	0.175208	0.143571
5000	4390	0.192291	1.138952	0.716041	0.137688	0.21901	0.15682
8000	7113	0.311564	1.124701	0.506453	0.157792	0.350416	0.177469
	22830	1	12.82373	13.53679	0.868803	1.160753	1.013833

UB(Xj)	UB
0.090516	0.074895

INCOME EXPENDITURE IN URBAN AREA

INCOME	EXPENDITURE	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
500	397	0.01695	1.259446	1.770833	0.030015	0.021347	0.037803
600	557	0.023781	1.077199	1.623769	0.038615	0.025617	0.041596
700	652	0.027837	1.07362	1.555376	0.043297	0.029886	0.046485
800	753	0.032149	1.062417	1.492829	0.047993	0.034156	0.050989
900	845	0.036077	1.065089	1.442767	0.052051	0.038425	0.055439
1000	947	0.040432	1.055966	1.393274	0.056333	0.042695	0.059486
2000	1485	0.063402	1.346801	1.197898	0.075949	0.08539	0.102288
3000	2419	0.103279	1.240182	0.985988	0.101832	0.128085	0.12629
4000	3413	0.145718	1.171989	0.836488	0.121891	0.17078	0.142855
5000	4436	0.189395	1.127142	0.722632	0.136863	0.213475	0.154264
8000	7518	0.32098	1.064113	0.493522	0.158411	0.341559	0.168567
	23422	1	12.54396	13.51538	0.86325	1.131415	0.986061

UB(Xj)	UB
0.090196	0.072958

APPENDIX B

TOTAL HOUSEHOLD ITEMS

HOUSEHOLD ITEM	TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
AIR-CONDITIONER	775358	752750	0.033117	0.970842	1.479943	0.049012	0.032152	0.047583
WASHING MACHINE	2968006	2910629	0.128054	0.980668	0.892607	0.114302	0.125578	0.112092
REFRIGERATOR	3617758	3526197	0.155136	0.974691	0.809287	0.12555	0.15121	0.122372
TELEVISION	4049748	3882970	0.170832	0.958818	0.76743	0.131102	0.163797	0.125703
MICRWAVE OVEN	666227	649776	0.028587	0.975307	1.54383	0.044134	0.027881	0.043044
RADIO/HI-FI	3783426	3622761	0.159384	0.957535	0.797554	0.127118	0.152616	0.12172
VIDEO/VCD/DVD	2567156	2492442	0.109656	0.970896	0.959969	0.105266	0.106464	0.102202
FIXED TELEPHONE LINE	2724547	2677264	0.117787	0.982646	0.928902	0.109413	0.115743	0.107514
MOBILE PHONE	1292728	1258874	0.055385	0.973812	1.256611	0.069597	0.053934	0.067774
PERSONAL COMPUTER	647869	633835	0.027886	0.978338	1.554617	0.043352	0.027282	0.042413
INTERNET SUBSCRIPTION	331738	322199	0.014175	0.971245	1.848469	0.026203	0.013768	0.025449
		22729697	1	10.6948	12.83922	0.945047	0.970425	0.917866

UB(Xj)	UB
0.090738	0.071489

HOUSEHOLD ITEMS IN RURAL AREA

HOUSEHOLD ITEM	TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
AIR-CONDITIONER	88190	85453	0.01354	0.968965	1.868396	0.025297	0.013119	0.024512
WASHING MACHINE	854141	843751	0.133688	0.987836	0.873909	0.116831	0.132061	0.11541
REFRIGERATOR	1153817	1133464	0.179591	0.98236	0.745715	0.133924	0.176423	0.131561
TELEVISION	1402512	1344152	0.212973	0.958389	0.671675	0.143049	0.204111	0.137096
MICRWAVE OVEN	94554	93097	0.014751	0.984591	1.831188	0.027011	0.014523	0.026595
RADIO/HI-FI	1306498	1244396	0.197168	0.952467	0.705165	0.139036	0.187796	0.132427
VIDEO/VCD/DVD	611779	594523	0.094199	0.971794	1.025955	0.096644	0.091542	0.093918
FIXED TELEPHONE LINE	722820	716514	0.113528	0.991276	0.944899	0.107272	0.112537	0.106336
MOBILE PHONE	160184	157549	0.024963	0.98355	1.602708	0.040008	0.024552	0.03935
PERSONAL COMPUTER	75104	74608	0.011821	0.993396	1.927338	0.022783	0.011743	0.022633
INTERNET SUBSCRIPTION	24099	23857	0.00378	0.989958	2.422507	0.009157	0.003742	0.009065
		6311364	1	10.76458	14.61945	0.861012	0.97215	0.838903

UB(Xj)	UB
0.09031	0.057383

HOUSEHOLD ITEMS IN URBAN AREA

HOUSEHOLD ITEM	TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
AIR-CONDITIONER	687168	667297	0.040643	0.971083	1.39101	0.056535	0.039468	0.054901
WASHING MACHINE	2113865	2066878	0.125888	0.977772	0.900014	0.113301	0.12309	0.110783
REFRIGERATOR	2463941	2392733	0.145735	0.9711	0.836435	0.121898	0.141524	0.118375
TELEVISION	2647236	2538818	0.154633	0.959045	0.810697	0.125361	0.1483	0.120227
MICRWAVE OVEN	571673	556679	0.033906	0.973772	1.469724	0.049832	0.033017	0.048525
RADIO/HI-FI	2476928	2378365	0.14486	0.960208	0.839051	0.121545	0.139096	0.116709
VIDEO/VCD/DVD	1955377	1897919	0.115598	0.970615	0.937051	0.108321	0.112201	0.105138
FIXED TELEPHONE LINE	2001727	1960750	0.119424	0.979529	0.922907	0.110218	0.11698	0.107961
MOBILE PHONE	1132544	1101325	0.067079	0.972435	1.173414	0.078711	0.06523	0.076542
PERSONAL COMPUTER	572765	559227	0.034061	0.976364	1.467741	0.049993	0.033256	0.048811
INTERNET SUBSCRIPTION	307639	298342	0.018171	0.96978	1.740615	0.031629	0.017622	0.030673
		16418333	1	10.6817	12.48866	0.967345	0.969783	0.938645

UB(Xj)	UB
0.090789	0.07516

APPENDIX C

TOTAL TRANSPORTATION

TRANSORTATION		TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
MOTORCAR	1 UNIT	1863024	1831441	0.305075	0.983047	0.515593	0.157295	0.299903	0.154628
	2 UNIT	394186	387940	0.064622	0.984155	1.189622	0.076875	0.063598	0.075657
	3 UNIT OR MORE	90581	89178	0.014855	0.984511	1.828129	0.027157	0.014625	0.026736
MOTORCYCLE	1 UNIT	1930924	1884305	0.313881	0.975857	0.503235	0.157956	0.306303	0.154142
	2 UNIT OR MORE	484446	474465	0.079035	0.979397	1.102182	0.087111	0.077406	0.085316
BICYCLE		1370792	1335920	0.222533	0.974561	0.652606	0.145226	0.216872	0.141532
			6003249	1	5.881528	5.791367	0.65162	0.978707	0.638011

UB(Xj)	UB
0.166403	0.110166

TRANSPORTATION IN RURAL AREA

TRANSORTATION			TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
MOTORCAR	1 UNIT		475107	469969	0.224057	0.989186	0.649641	0.145557	0.221634	0.143983
	2 UNIT		55327	54693	0.026075	0.988541	1.583779	0.041297	0.025776	0.040824
	3 UNIT OR MORE		12166	11939	0.005692	0.981341	2.244743	0.012777	0.005586	0.012538
MOTORCYCLE	1 UNIT		784686	763893	0.364185	0.973502	0.438678	0.15976	0.354534	0.155527
	2 UNIT OR MORE		247173	242074	0.115408	0.979371	0.937763	0.108226	0.113028	0.105993
BICYCLE			567762	554974	0.264583	0.977476	0.577438	0.15278	0.258624	0.149339
				2097542	1	5.889417	6.432042	0.620396	0.979181	0.608203

UB(Xj)	UB
0.166261	0.094558

TRANSPORTATION IN URBAN AREA

TRANSORTATION		TOTAL PRIVATE HOUSEHOLD	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
MOTORCAR	1 UNIT	1387917	1361472	0.348585	0.980946	0.457691	0.159544	0.341943	0.156504
	2 UNIT	338859	333247	0.085323	0.983439	1.068933	0.091205	0.08391	0.089694
	3 UNIT OR MORE	78415	77239	0.019776	0.985003	1.703863	0.033695	0.019479	0.03319
MOTORCYCLE	1 UNIT	1146238	1120412	0.286865	0.977469	0.542322	0.155573	0.280402	0.152068
	2 UNIT OR MORE	237273	232391	0.0595	0.979425	1.22548	0.072917	0.058276	0.071416
BICYCLE		803030	780946	0.19995	0.972499	0.699079	0.139781	0.194451	0.135937
			3905707	1	5.87878	5.697368	0.652715	0.978462	0.63881

UB(Xj)	UB
0.16644	0.112124

APPENDIX D

TOTAL EDUCATION

EDUCATION		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
PMR	7A TO 9A	441306	22506	0.075308	0.050999	1.123156	0.084583	0.003841	0.004314
	COMBINATION OF		273588	0.915466	0.619951	0.038358	0.035115	0.567544	0.02177
	GRADE A,B,C,D								
	ALL E		2757	0.009225	0.006247	2.035018	0.018774	5.76E-05	0.000117
			298851	1	0.677197	3.196532	0.138472	0.571442	0.026201

UB(Xj)	UB
0.843835	0.008197

SPM	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
FULL	386696							
ABOVE 10 SUBJECTS		11593	0.030762	0.02998	1.511985	0.046512	0.000922	0.001394
PASSES IN 10 SUBJECTS		55173	0.146401	0.142678	0.834455	0.122165	0.020888	0.01743
9 SUBJECTS		93798	0.248893	0.242563	0.603988	0.150328	0.060372	0.036464
8 SUBJECTS		51890	0.13769	0.134188	0.861098	0.118565	0.018476	0.01591
7 SUBJECTS		36802	0.097654	0.09517	1.01031	0.098661	0.009294	0.00939
6 SUBJECTS		28359	0.075251	0.073337	1.12349	0.084543	0.005519	0.0062
5 SUBJECTS		23567	0.062535	0.060945	1.203877	0.075284	0.003811	0.004588
4 SUBJECTS		19953	0.052945	0.051599	1.276173	0.067567	0.002732	0.003486
3 SUBJECTS		16980	0.045056	0.04391	1.346244	0.060657	0.001978	0.002663
2 SUBJECTS		16356	0.043401	0.042297	1.362504	0.059134	0.001836	0.002501
1 SUBJECTS		19203	0.050955	0.049659	1.292812	0.065875	0.00253	0.003271
ALL FAIL		3187	0.008457	0.008242	2.072799	0.017529	6.97E-05	0.000144
		376861	1	0.974567	14.49973	0.96682	0.128429	0.103443

UB(Xj)	UB
0.13178	0.007134

PMR

EDUCATION

JOHOR	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	48529	1693	0.055339	0.034886	1.256965	0.06956	0.001931	0.002427
COMBINATION OF		28521	0.932272	0.58771	0.030457	0.028395	0.547906	0.016688
GRADE A,B,C,D								
ALL E		379	0.012388	0.00781	1.906983	0.023625	9.68E-05	0.000185
		30593	1	0.630407	3.194405	0.121579	0.549933	0.019299

KEDAH	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	32234	1310	0.06533	0.04064	1.184886	0.077409	0.002655	0.003146
COMBINATION OF		18552	0.925194	0.575541	0.033767	0.031241	0.532488	0.01798
GRADE A,B,C,D								
ALL E		190	0.009475	0.005894	2.023404	0.019172	5.59E-05	0.000113
		20052	1	0.622076	3.242057	0.127822	0.535199	0.021239

KELANTAN	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	29449	948	0.053541	0.032191	1.271312	0.068068	0.001724	0.002191
COMBINATION OF		16642	0.939907	0.565113	0.026915	0.025298	0.531153	0.014296
GRADE A,B,C,D								
ALL E		116	0.006551	0.003939	2.183662	0.014306	2.58E-05	5.64E-05
		17706	1	0.601243	3.48189	0.107671	0.532903	0.016543

MELAKA	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	13770	806	0.079284	0.058533	1.100815	0.087277	0.004641	0.005109
COMBINATION OF		9301	0.914912	0.675454	0.03862	0.035334	0.617981	0.023867
GRADE A,B,C,D								
ALL E		59	0.005804	0.004285	2.236298	0.012979	2.49E-05	5.56E-05
		10166	1	0.738272	3.375734	0.13559	0.622647	0.029031

NEGERI SEMBILAN	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	18461	1303	0.099831	0.070581	1.000733	0.099905	0.007046	0.007051
COMBINATION OF		11648	0.89243	0.630952	0.049426	0.044109	0.56308	0.027831
GRADE A,B,C,D								
ALL E		101	0.007738	0.005471	2.111356	0.016338	4.23E-05	8.94E-05
		13052	1	0.707004	3.161514	0.160352	0.570169	0.034971

PAHANG	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	27146	1041	0.057514	0.038348	1.240228	0.07133	0.002206	0.002735
COMBINATION OF		16905	0.933978	0.622744	0.029663	0.027705	0.581629	0.017253
GRADE A,B,C,D								
ALL E		154	0.008508	0.005673	2.070158	0.017613	4.83E-05	9.99E-05
		18100	1	0.666765	3.340049	0.116649	0.583883	0.020088

PERAK	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	45132	2437	0.080373	0.053997	1.094888	0.088	0.00434	0.004752
COMBINATION OF		27548	0.908545	0.610387	0.041653	0.037844	0.554564	0.0231
GRADE A,B,C,D								
ALL E		336	0.011081	0.007445	1.955404	0.021669	8.25E-05	0.000161
		30321	1	0.671829	3.091946	0.147513	0.558987	0.028013

PERLIS	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	4953	263	0.08564	0.053099	1.067324	0.091405	0.004547	0.004854
COMBINATION OF		2781	0.905568	0.561478	0.043079	0.039011	0.508457	0.021904
GRADE A,B,C,D								
ALL E		27	0.008792	0.005451	2.055916	0.018075	4.79E-05	9.85E-05
		3071	1	0.620028	3.166319	0.148492	0.513052	0.026856

PULAU PINANG

	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
	22433							
7A TO 9A		1668	0.100192	0.074355	0.999166	0.100109	0.00745	0.007444
COMBINATION OF		14856	0.892359	0.662239	0.04946	0.044136	0.590955	0.029229
GRADE A,B,C,D								
ALL E		124	0.007448	0.005528	2.12794	0.01585	4.12E-05	8.76E-05
		16648	1	0.742121	3.176567	0.160095	0.598446	0.03676

SABAH

	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
	35542							
7A TO 9A		576	0.029261	0.016206	1.533713	0.044878	0.000474	0.000727
COMBINATION OF		18846	0.957379	0.530246	0.018916	0.01811	0.507646	0.009603
GRADE A,B,C,D								
ALL E		263	0.01336	0.0074	1.87418	0.02504	9.89E-05	0.000185
		19685	1	0.553852	3.426809	0.088028	0.508219	0.010515

SARAWAK

	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
	37789							
7A TO 9A		1403	0.05497	0.037127	1.259874	0.069255	0.002041	0.002571
COMBINATION OF		23784	0.931865	0.62939	0.030647	0.028559	0.586506	0.017975
GRADE A,B,C,D								
ALL E		336	0.013165	0.0008891	1.880592	0.024757	0.000117	0.00022
		25523	1	0.675408	3.171113	0.122571	0.588664	0.020766

SELANGOR

	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
	62760							
7A TO 9A		4703	0.0965	0.074936	1.015475	0.097993	0.007231	0.007343
COMBINATION OF		43642	0.895478	0.695379	0.047945	0.042934	0.622697	0.029855
GRADE A,B,C,D								
ALL E		391	0.008023	0.00623	2.095673	0.016813	5E-05	0.000105
		48736	1	0.776546	3.159093	0.15774	0.629978	0.037303

TERRENGGANU	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
7A TO 9A	22885	1074	0.076534	0.04693	1.116146	0.085423	0.003592	0.004009
COMBINATION OF		12822	0.913703	0.56028	0.039195	0.035812	0.511929	0.020065
GRADE A,B,C,D								
ALL E		137	0.009763	0.005986	2.01043	0.019627	5.84E-05	0.000117
		14033	1	0.613196	3.165771	0.140863	0.51558	0.024191

JOHOR

SPM		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
(FULL PASSES IN)		46767							
JOHOR	ABOVE 10 SUBJECTS		1500	0.033139	0.032074	1.479662	0.049034	0.001063	0.001573
	8 TO 10 SUBJECTS		22711	0.501745	0.48562	0.299517	0.150281	0.243658	0.07298
	5 TO 7 SUBJECT		10860	0.239926	0.232215	0.619923	0.148736	0.055714	0.034539
	2 TO 4 SUBJECTS		7174	0.158492	0.153399	0.799992	0.126793	0.024313	0.01945
	1 SUBJECTS		2601	0.057463	0.055616	1.240613	0.071289	0.003196	0.003965
	ALL FAIL		418	0.009235	0.008938	2.034577	0.018789	8.25E-05	0.000168
			45264	1	0.967862	6.474282	0.564921	0.328026	0.132673

KEDAH

SPM		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
(FULL PASSES IN)		30827							
KEDAH	ABOVE 10 SUBJECTS		1167	0.035882	0.037856	1.44512	0.051854	0.001358	0.001963
	8 TO 10 SUBJECTS		15842	0.487101	0.5139	0.312381	0.152161	0.250322	0.078196
	5 TO 7 SUBJECTS		6583	0.202411	0.213547	0.693767	0.140426	0.043224	0.029987
	2 TO 4 SUBJECTS		7291	0.22418	0.236513	0.649404	0.145583	0.053022	0.034432
	1 SUBJECTS		1374	0.042247	0.044571	1.374204	0.058056	0.001883	0.002588
	ALL FAIL		266	0.008179	0.008629	2.087309	0.017072	7.06E-05	0.000147
			32523	1	1.055017	6.562183	0.565152	0.349879	0.147313

KELANTAN

SPM		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
(FULL PASSES IN)		27765							
KELANTAN	ABOVE 10 SUBJECTS		862	0.029087	0.031046	1.536298	0.044687	0.000903	0.001387
	8 TO 10 SUBJECTS		14998	0.506091	0.540176	0.295772	0.149687	0.273378	0.080858
	5 TO 7 SUBJECTS		7194	0.242754	0.259103	0.614834	0.149253	0.062898	0.038672
	2 TO 4 SUBJECTS		5275	0.177999	0.189987	0.749582	0.133425	0.033818	0.025349
	1 SUBJECTS		1118	0.037726	0.040267	1.423363	0.053697	0.001519	0.002162
	ALL FAIL		188	0.006344	0.006771	2.197647	0.013942	4.3E-05	9.44E-05
			29635	1	1.067351	6.817496	0.544691	0.372559	0.148523

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
MELAKA ABOVE 10 SUBJECTS	12643	480	0.038763	0.037966	1.411585	0.054717	0.001472	0.002077
8 TO 10 SUBJECTS		6983	0.563918	0.552321	0.248784	0.140294	0.311464	0.077487
5 TO 7 SUBJECTS		2931	0.236695	0.231828	0.62581	0.148126	0.054873	0.03434
2 TO 4 SUBJECTS		1491	0.120407	0.117931	0.919348	0.110696	0.0142	0.013054
1 SUBJECTS		449	0.036259	0.035514	1.44058	0.052235	0.001288	0.001855
ALL FAIL		49	0.003957	0.003876	2.40263	0.009507	1.53E-05	3.68E-05
		12383	1	0.979435	7.048736	0.515575	0.383311	0.128851

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
NEGERI SEMBILAN ABOVE 10 SUBJECTS	17883	737	0.042187	0.041212	1.374825	0.057999	0.001739	0.00239
8 TO 10 SUBJECTS		9410	0.538638	0.526198	0.268703	0.144734	0.28343	0.076159
5 TO 7 SUBJECTS		3891	0.222725	0.217581	0.652232	0.145268	0.048461	0.031608
2 TO 4 SUBJECTS		2354	0.134745	0.131633	0.870486	0.117294	0.017737	0.01544
1 SUBJECTS		926	0.053005	0.051781	1.275682	0.067618	0.002745	0.003501
ALL FAIL		152	0.008701	0.0085	2.060449	0.017927	7.4E-05	0.000152
		17470	1	0.976905	6.502378	0.55084	0.354185	0.12925

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
PAHANG ABOVE 10 SUBJECTS	24215	487	0.020455	0.020112	1.689194	0.034553	0.000411	0.000695
8 TO 10 SUBJECTS		14078	0.591314	0.581375	0.228182	0.134927	0.343775	0.078443
5 TO 7 SUBJECTS		5462	0.229419	0.225563	0.639371	0.146684	0.051748	0.033086
2 TO 4 SUBJECTS		2771	0.116389	0.114433	0.934086	0.108718	0.013319	0.012441
1 SUBJECTS		827	0.034736	0.034152	1.459217	0.050688	0.001186	0.001731
ALL FAIL		183	0.007686	0.007557	2.114272	0.016251	5.81E-05	0.000123
		23808	1	0.983192	7.064323	0.491821	0.410498	0.126519

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
ABOVE 10 SUBJECTS	42832	1220	0.029185	0.028483	1.534837	0.044795	0.000831	0.001276
8 TO 10 SUBJECTS (PERAK)		21280	0.509067	0.496825	0.293225	0.149271	0.252917	0.074162
5 TO 7 SUBJECTS		9594	0.229511	0.223991	0.639197	0.146703	0.051408	0.03286
2 TO 4 SUBJECTS		6441	0.154084	0.150378	0.812244	0.125153	0.023171	0.01882
1 SUBJECTS		2775	0.066384	0.064788	1.177934	0.078196	0.004301	0.005066
ALL FAIL		492	0.01177	0.011487	1.929232	0.022707	0.000135	0.000261
		41802	1	0.975953	6.38667	0.566825	0.332763	0.132445

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
ABOVE 10 SUBJECTS	4958	325	0.066749	0.065551	1.175556	0.078467	0.004375	0.005144
8 TO 10 SUBJECTS (PERLIS)		2383	0.489423	0.480637	0.310316	0.151876	0.235235	0.072997
5 TO 7 SUBJECTS		1182	0.24276	0.238403	0.614822	0.149254	0.057875	0.035583
2 TO 4 SUBJECTS		727	0.149312	0.146632	0.825905	0.123318	0.021894	0.018082
1 SUBJECTS		217	0.044568	0.043768	1.35098	0.06021	0.001951	0.002635
ALL FAIL		35	0.007188	0.007059	2.143372	0.015407	5.07E-05	0.000109
		4869	1	0.982049	6.420952	0.578532	0.32138	0.13455

SPM (FULL PASSES IN)	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
ABOVE 10 SUBJECTS	20221	717	0.036524	0.035458	1.437423	0.0525	0.001295	0.001862
8 TO 10 SUBJECTS (PULAU PINANG)		10600	0.539962	0.524208	0.267637	0.144514	0.283052	0.075755
5 TO 7 SUBJECTS		4069	0.207274	0.201226	0.683455	0.141663	0.041709	0.028506
2 TO 4 SUBJECTS		2770	0.141103	0.136986	0.850463	0.120003	0.019329	0.016439
1 SUBJECTS		1271	0.064745	0.062855	1.188797	0.076968	0.00407	0.004838
ALL FAIL		204	0.010392	0.010089	1.983312	0.02061	0.000105	0.000208
		19631	1	0.970822	6.411086	0.556258	0.34956	0.127608

SPM (FULL PASSES IN)		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
SABAH	ABOVE 10 SUBJECTS	33310	406	0.012665	0.012189	1.897383	0.024031	0.000154	0.000293
	8 TO 10 SUBJECTS		14948	0.466309	0.448754	0.331326	0.1545	0.209258	0.069333
	5 TO 7 SUBJECTS		9208	0.287247	0.276434	0.541744	0.155615	0.079405	0.043017
	2 TO 4 SUBJECTS		5675	0.177034	0.170369	0.751943	0.13312	0.030161	0.022679
	1 SUBJECTS		1588	0.049538	0.047673	1.305059	0.06465	0.002362	0.003082
	ALL FAIL		231	0.007206	0.006935	2.142297	0.015438	5E-05	0.000107
			32056	1	0.962354	6.969753	0.547354	0.32139	0.138511

SPM (FULL PASSES IN)		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
SARAWAK	ABOVE 10 SUBJECTS	32513	657	0.02093	0.020207	1.67924	0.035146	0.000423	0.00071
	8 TO 10 SUBJECTS		16802	0.535249	0.516778	0.271444	0.14529	0.276605	0.075083
	5 TO 7 SUBJECTS		7326	0.233379	0.225325	0.631938	0.147481	0.052586	0.033231
	2 TO 4 SUBJECTS		4618	0.147112	0.142035	0.832351	0.122449	0.020895	0.017392
	1 SUBJECTS		1765	0.056226	0.054286	1.25006	0.070286	0.003052	0.003816
	ALL FAIL		223	0.007104	0.006859	2.1485	0.015263	4.87E-05	0.000105
			31391	1	0.965491	6.813534	0.535915	0.35361	0.130337

SPM (FULL PASSES IN)		NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
SELANGOR	ABOVE 10 SUBJECTS	50820	1761	0.035511	0.034652	1.449635	0.051478	0.001231	0.001784
	8 TO 10 SUBJECTS		27871	0.562029	0.548426	0.250242	0.140643	0.308231	0.077132
	5 TO 7 SUBJECTS		10315	0.208006	0.202971	0.681925	0.141844	0.042219	0.02879
	2 TO 4 SUBJECTS		6593	0.13295	0.129732	0.876311	0.116506	0.017248	0.015115
	1 SUBJECTS		2618	0.052793	0.051515	1.277424	0.067439	0.00272	0.003474
	ALL FAIL		432	0.008711	0.008501	2.05991	0.017945	7.41E-05	0.000153
			49590	1	0.975797	6.595447	0.535855	0.371722	0.126448

SPM	NUMBER SET	TOTAL	Xij	g(ai)	wj	UB(ai)	UB(Xj)	UB
(FULL PASSES IN)	19686							
ABOVE 10 SUBJECTS		840	0.042962	0.04267	1.366912	0.058726	0.001833	0.002506
TERENGGANU 8 TO 10 SUBJECTS		10759	0.550276	0.546531	0.259419	0.142752	0.300743	0.078018
5 TO 7 SUBJECTS		5365	0.274396	0.272529	0.561621	0.154107	0.074781	0.041999
2 TO 4 SUBJECTS		2034	0.10403	0.103322	0.98284	0.102245	0.010749	0.010564
1 SUBJECTS		461	0.023578	0.023418	1.62749	0.038373	0.000552	0.000899
ALL FAIL		93	0.004757	0.004724	2.322708	0.011048	2.25E-05	5.22E-05
		19552	1	0.993193	7.120991	0.507251	0.38868	0.134038

Kumpulan Perbelanjaan *Expenditure Group*	Kelas Perbelanjaan Isi Rumah *Household Expenditure Class* (RM)									
	Kurang daripada RM 500 *Below RM 500*	RM 500-RM 599	RM 600-RM 699	RM 700-RM 799	RM 800-RM 899	RM 900-RM 999	RM 1,000-RM 1,999	RM 2,000-RM 2,999	RM 3,000-RM 3,999	RM 4,000-RM 4,999
01 Makanan dan Minuman Bukan Alkohol *Food and Non-Alcoholic Beverages*	147	189	227	248	267	278	370	487	574	621
Beras *Rice*	25	30	33	33	36	35	36	37	39	48
Roti dan bijirin lain *Bread and other cereals*	17	24	26	28	28	31	42	54	66	71
Daging *Meat*	11	17	22	28	33	32	50	73	88	98
Ikan dan makanan laut *Fish and seafood*	31	39	46	53	59	64	80	102	117	112
Susu, keju dan telur *Milk, cheese and eggs*	9	14	18	16	18	20	29	40	48	58
Minyak dan lemak *Oils and fats*	5	6	7	7	8	8	11	15	15	17
Buah-buahan *Fruits*	7	9	13	16	14	15	23	34	45	51
Sayur-sayuran *Vegetables*	20	23	29	31	33	34	43	53	62	61
Gula, jem, madu, coklat dan manisan *Sugar, jam, honey, chocolate and confectionery*	6	8	8	9	10	10	12	15	19	21
Keluaran makanan yang tidak dikelaskan di mana-mana *Food products N. E. C*	7	9	11	12	13	15	22	33	33	39
Kopi, Teh, Koko dan Minuman Bukan Alkohol *Coffee, tea, Cocoa and Non-Alcoholic Beverages*	9	12	13	15	14	14	22	32	42	45
02 Minuman Alkohol dan Tembakau *Alcoholic Beverages and Tobacco*	10	17	19	19	27	22	33	46	49	57
03 Pakaian dan Kasut *Clothing and Footwear*	12	19	23	27	32	35	50	75	91	125
04 Perumahan, Air, Elektrik, Gas dan Bahan Api Lain *Housing, Water, Electricity, Gas and Other Fuels*	105	150	166	191	221	234	338	534	735	913
05 Hiasan, Perkakasan dan Penyelenggaraan Isi Rumah *Furnishings, Household Equipment and Routine Household Maintenance*	10	15	22	22	31	34	55	106	147	235
06 Kesihatan *Health*	4	5	7	8	8	8	17	32	55	71
07 Pengangkutan *Transport*	16	33	40	56	64	91	179	330	601	823
08 Komunikasi *Communication*	10	16	18	29	30	38	72	135	212	267
09 Perkhidmatan Rekreasi dan Kebudayaan *Recreation Services and Culture*	4	10	16	18	21	28	53	118	194	280
10 Pendidikan *Education*	1	3	5	5	12	10	20	52	85	104
11 Restoran dan Hotel *Restaurants and Hotels*	48	70	74	89	79	106	161	283	376	540
Perbelanjaan makanan di luar rumah *Expenditure on food away from home*	40	56	59	71	71	84	129	224	306	432
Perbelanjaan minuman di luar rumah *Expenditure on beverages away from home*	8	13	15	17	15	22	29	46	60	82
Perkhidmatan Penginapan dan Lain-lain *Accommodation Services and Others*	0	0	0	1	0	1	3	14	9	26
12 Pelbagai Barang dan Perkhidmatan *Miscellaneous Goods and Services*	12	25	33	39	54	64	106	211	298	395
Perbelanjaan Bulanan Purata Setiap Isi Rumah (01 - 12) *Average Monthly Expenditure Per Household (01 - 12)*	380	553	649	751	847	947	1,454	2,407	3,418	4,432

$\le = 23\ 327$

...elanjaan / ...up	Kelas Perbelanjaan Isi Rumah / Household Expenditure Class										
	Kurang daripada RM 500 / Below RM 500	RM 500-RM 599	RM 600-RM 699	RM 700-RM 799	RM 800-RM 899	RM 900-RM 999	RM 1,000-RM 1,999	RM 2,000-RM 2,999	RM 3,000-RM 3,999	RM 4,000-RM 4,999	RM 5,000 dan lebih / RM 5,000 and above
	(RM)										
...man Bukan Alkohol / ...holic Beverages	108	148	196	203	238	239	350	472	565	609	703
	15	19	25	25	29	26	31	35	37	46	39
...in / ...ereals	16	22	25	25	25	28	40	53	67	71	81
	8	14	19	22	28	28	47	71	86	94	97
...n laut	20	29	39	42	55	55	76	98	113	110	130
...lur / ...eggs	7	10	17	15	18	19	29	39	47	58	60
...k	3	5	6	6	7	7	11	15	15	17	18
	6	7	11	14	14	12	22	32	46	51	61
	14	18	25	25	30	29	41	52	62	61	67
...coklat dan manisan / ...chocolate and	4	6	8	7	8	8	11	14	18	20	25
...an yang tidak dikelaskan / ...E. C	5	6	10	8	11	14	21	33	33	35	72
...dan Minuman Bukan / ...a and Non-Alcoholic	9	12	11	13	12	13	22	31	41	46	52
...an Tembakau / ...and Tobacco	7	20	23	15	25	22	32	44	48	57	68
...ar	15	20	23	26	30	36	49	71	88	123	160
...ektrik, Gas dan Bahan / ...ctricity, Gas and Other	112	160	173	222	247	256	373	561	764	948	1,462
...dan Penyelenggaraan / ...old Equipment and Maintenance	9	13	22	17	30	29	53	106	140	229	373
	6	6	7	10	7	7	17	31	55	70	144
	16	32	35	51	53	85	179	321	566	789	1,974
	18	24	22	35	35	43	77	139	218	276	405
...easi dan Kebudayaan / ...and Culture	7	11	16	23	22	31	54	120	191	284	474
	1	4	4	4	15	8	21	55	89	109	211
...els	84	98	98	109	90	124	176	292	394	555	665
...kanan di luar rumah / ...d away from home	71	81	80	89	73	99	143	233	321	445	509
...uman di luar rumah / ...verages away from home	14	17	19	20	16	25	30	47	63	84	82
...nginapan dan Lain-lain / ...ervices and Others	0	0	0	0	0	0	3	13	10	25	74
...n Perkhidmatan / ...and Services	14	22	32	38	53	66	106	208	295	386	880
...an Purata Setiap / ...enditure (...12)	397	557	652	753	845	947	1,485	2,419	3,413	4,436	7,518

Perbelanjaan bulanan purata setiap isi rumah luar bandar mengikut kelas perbelanjaan isi rumah, Malaysia, 2004/05
Average monthly expenditure per rural household by household expenditure class, Malaysia, 2004/05

Kumpulan Perbelanjaan *Expenditure Group*	Kelas Perbelanjaan Isi Rumah *Household Expenditure Class*										
	Kurang daripada RM 500 *Below RM 500*	RM 500- RM 599	RM 600- RM 699	RM 700- RM 799	RM 800- RM 899	RM 900- RM 999	RM 1,000- RM 1,999	RM 2,000- RM 2,999	RM 3,000- RM 3,999	RM 4,000- RM 4,999	RM 5,000 dan lebih *and above*
	(RM)										
01 Makanan dan Minuman Bukan Alkohol *Food and Non-Alcoholic Beverages*	164	217	252	287	297	319	408	556	648	744	739
Beras *Rice*	29	37	40	40	44	44	45	50	56	63	51
Roti dan bijirin lain *Bread and other cereals*	18	25	28	31	31	35	47	60	58	72	56
Daging *Meat*	12	18	24	33	38	37	55	79	105	136	174
Ikan dan makanan laut *Fish and seafood*	35	46	52	62	63	73	89	121	148	132	136
Susu, keju dan telur *Milk, cheese and eggs*	10	17	19	17	19	21	28	47	57	60	48
Minyak dan lemak *Oils and fats*	5	6	8	9	9	10	12	16	15	14	13
Buah-buahan *Fruits*	7	11	14	17	15	18	26	41	44	55	47
Sayur-sayuran *Vegetables*	22	26	32	36	36	38	45	55	57	64	62
Gula, jem, madu, coklat dan manisan *Sugar, jam, honey, chocolate and confectionery*	7	9	9	10	12	12	14	18	23	26	26
Keluaran makanan yang tidak dikelaskan di mana-mana *Food products N. E. C*	8	10	11	15	15	15	23	35	29	81	42
Kopi, Teh, Koko dan Minuman Bukan Alkohol *Coffee, tea, Cocoa and Non-Alcoholic Beverages*	9	12	14	16	15	15	24	34	58	41	84
02 Minuman Alkohol dan Tembakau *Alcoholic Beverages and Tobacco*	11	16	16	22	29	21	34	55	57	56	62
03 Pakaian dan Kasut *Clothing and Footwear*	11	19	23	28	34	35	53	92	121	144	186
04 Perumahan, Air, Elektrik, Gas dan Bahan Api Lain *Housing, Water, Electricity, Gas and Other Fuels*	102	143	160	164	196	212	273	411	489	561	620
05 Hiasan, Perkakasan dan Penyelenggaraan Isi Rumah *Furnishings, Household Equipment and Routine Household Maintenance*	10	17	21	26	32	39	60	108	212	291	247
06 Kesihatan *Health*	4	5	6	7	9	9	17	35	53	81	59
07 Pengangkutan *Transport*	16	34	44	60	76	97	179	369	896	1,173	3,423
08 Komunikasi *Communication*	6	11	15	23	25	32	62	120	165	174	226
09 Perkhidmatan Rekreasi dan Kebudayaan *Recreation Services and Culture*	4	10	15	14	20	25	50	109	219	231	295
10 Pendidikan *Education*	1	3	5	6	8	11	19	38	55	57	76
11 Restoran dan Hotel *Restaurants and Hotels*	33	50	54	72	69	87	135	241	224	391	478
Perbelanjaan makanan di luar rumah *Expenditure on food away from home*	28	39	43	56	54	68	104	183	186	299	273
Perbelanjaan minuman di luar rumah *Expenditure on beverages away from home*	5	11	11	15	14	18	28	40	36	56	161
Perkhidmatan Penginapan dan Lain-lain *Accommodation Services and Others*	0	-	0	2	0	1	3	18	3	36	44
12 Pelbagai Barang dan Perkhidmatan *Miscellaneous Goods and Services*	11	26	34	40	55	62	108	221	322	487	702
Perbelanjaan Bulanan Purata Setiap Isi Rumah (01 - 12) *Average Monthly Expenditure Per Household (01 - 12)*	373	550	646	749	849	948	1,396	2,356	3,460	4,390	7,113

7.1 : Jumlah isi rumah persendirian mengikut peralatan isi rumah, kumpulan etnik ketua isi rumah, strata dan negeri, Malaysia, 2000 (samb.)
7.1 : Total private households by household items, ethnic group of head of household, stratum and state, Malaysia, 2000 (cont'd.)

h : Malaysia

Strata : Bandar
Stratum : Urban

Peralatan isi rumah *Household items*	Jumlah isi rumah persendirian *Total private households*	Kumpulan etnik ketua isi rumah *Ethnic group of head of household*							
		Warganegara Malaysia *Malaysian citizens*							Bukan warganegara Malaysia * *Non-Malaysian citizens **
		Jumlah *Total*	Bumiputera			Cina *Chinese*	India *Indians*	Lain-lain *Others*	
			Jumlah *Total*	Melayu *Malays*	Bumiputera lain *Other Bumiputera*				
Jumlah *Total*	**3,014,514**	**2,851,592**	**1,445,178**	**1,290,886**	**154,292**	**1,100,896**	**280,570**	**24,948**	**162,922**
Kereta bermotor *Motorcar*	1,805,191	1,771,958	807,064	756,963	50,101	809,752	145,247	9,895	33,233
1 unit *1 unit*	1,387,917	1,361,472	670,718	630,651	40,067	562,745	120,749	7,260	26,445
2 unit *2 units*	338,859	333,247	112,833	104,894	7,939	197,363	20,905	2,146	5,612
3 unit atau lebih *3 units or more*	78,415	77,239	23,513	21,418	2,095	49,644	3,593	489	1,176
Motosikal / Skuter *Motorcycle / Scooter*	1,383,511	1,352,803	753,384	718,803	34,581	447,639	146,804	4,976	30,708
1 unit *1 unit*	1,146,238	1,120,412	647,207	617,248	29,959	342,584	126,328	4,293	25,826
2 unit atau lebih *2 units or more*	237,273	232,391	106,177	101,555	4,622	105,055	20,476	683	4,882
Basikal *Bicycle*	803,030	780,946	427,798	411,210	16,588	276,590	72,886	3,672	22,084
Alat hawa dingin *Air-conditioner*	687,168	667,297	142,239	127,307	14,932	478,816	41,584	4,658	19,871
Mesin basuh *Washing machine*	2,113,865	2,066,878	1,048,956	990,880	58,076	825,770	180,298	11,854	46,987
Peti sejuk *Refrigerator*	2,463,941	2,392,733	1,191,478	1,097,902	93,576	948,177	236,329	16,749	71,208
Ketuhar gelombang mikro *Microwave oven*	571,673	556,679	221,031	203,327	17,704	282,824	48,593	4,231	14,994
Radio / hi-fi	2,476,928	2,378,365	1,198,581	1,087,064	111,517	922,538	239,019	18,227	98,563
Televisyen *Television*	2,647,236	2,538,818	1,287,899	1,168,439	119,460	980,029	250,454	20,436	108,418
Video / VCD / DVD	1,955,377	1,897,919	855,973	781,530	74,443	833,399	195,549	12,998	57,458
Talian telefon tetap *Fixed telephone line*	2,001,727	1,960,750	896,218	837,182	59,036	866,206	186,634	11,692	40,977
Telefon bimbit *Mobile phone*	1,132,544	1,101,325	451,159	417,335	33,824	553,895	89,524	6,747	31,219
Komputer peribadi *Personal computer*	572,765	559,227	233,442	219,811	13,631	278,454	43,785	3,546	13,538
Langganan internet *Internet subscription*	307,639	298,342	103,983	97,142	6,841	167,629	24,467	2,263	9,297
Tiada peralatan yang tersebut di atas *None of the above items*	43,753	26,499	19,620	11,355	8,265	4,645	1,368	866	17,254
Tidak diketahui *Unknown*	207,037	184,489	78,888	61,679	17,209	83,096	19,896	2,609	22,548

Nota 1 : Angka-angka di atas tidak disesuaikan untuk kurang penghitungan.
Note 1 : The above figures have not been adjusted for under-enumeration.
Nota 2 : Angka-angka adalah kiraan berulang dan tidak memberikan jumlah lajur bagi bilangan isi rumah persendirian.
Note 2 : Figures are multiple counts and do not add up to column totals showing the number of private households.
* Sila lihat nota penerangan di perenggan 5.3 b(ii) dan 5.3 b(iii), muka surat xxii dalam laporan ini.
Please refer to the explanatory notes in paragraph 5.3 b(ii) and 5.3 b(iii), page xxxi in this report.

Jumlah : Malaysia
Total

Strata : Luar bandar
Stratum : Rural

Peralatan isi rumah *Household items*	Jumlah isi rumah persendirian *Total private households*	Kumpulan etnik ketua isi rumah *Ethnic group of head of household*							
		Jumlah *Total*	Warganegara Malaysia *Malaysian citizens*						Bukan warganegara Malaysia * *Non-Malaysian citizens ***
			Bumiputera			Cina *Chinese*	India *Indians*	Lain-lain *Others*	
			Jumlah *Total*	Melayu *Malays*	Bumiputera lain *Other Bumiputera*				
Jumlah *Total*	1,763,062	1,627,275	1,376,880	1,064,754	312,126	170,329	63,829	16,237	135,787
Kereta bermotor *Motorcar*	542,600	536,601	418,985	377,395	41,590	94,876	19,418	3,322	5,999
1 unit *1 unit*	475,107	469,969	373,611	337,847	35,764	75,931	17,572	2,855	5,138
2 unit *2 units*	55,327	54,693	38,224	33,540	4,684	14,583	1,521	365	634
3 unit atau lebih *3 units or more*	12,166	11,939	7,150	6,008	1,142	4,362	325	102	227
Motosikal / Skuter *Motorcycle / Scooter*	1,031,859	1,005,967	838,230	770,840	67,390	115,268	44,440	8,029	25,892
1 unit *1 unit*	784,686	763,893	649,342	590,069	59,273	73,796	35,573	5,182	20,793
2 unit atau lebih *2 units or more*	247,173	242,074	188,888	180,771	8,117	41,472	8,867	2,847	5,099
Basikal *Bicycle*	567,762	554,974	464,020	429,714	34,306	66,974	19,333	4,647	12,788
Alat hawa dingin *Air-conditioner*	88,190	85,453	46,294	37,714	8,580	35,959	2,300	900	2,737
Mesin basuh *Washing machine*	854,141	843,751	702,968	665,123	37,845	110,921	25,073	4,789	10,390
Peti sejuk *Refrigerator*	1,153,817	1,133,464	930,872	819,763	111,109	143,492	50,098	9,002	20,353
Ketuhar gelombang mikro *Microwave oven*	94,554	93,097	72,118	60,699	11,419	16,579	3,821	579	1,457
Radio / hi-fi	1,306,498	1,244,396	1,036,616	846,740	189,876	142,047	55,053	10,680	62,102
Televisyen *Television*	1,402,512	1,344,152	1,120,502	938,253	182,249	153,300	57,646	12,704	58,360
Video / VCD / DVD	611,779	594,523	435,880	359,427	76,453	115,722	38,657	4,264	17,256
Talian telefon tetap *Fixed telephone line*	722,820	716,514	554,846	518,674	36,172	125,264	32,090	4,314	6,306
Telefon bimbit *Mobile phone*	160,184	157,549	109,095	95,360	13,735	40,538	6,986	930	2,635
Komputer peribadi *Personal computer*	75,104	74,608	56,530	51,298	5,232	15,024	2,770	284	496
Langganan internet *Internet subscription*	24,099	23,857	16,337	14,561	1,776	6,349	1,094	77	242
Tiada peralatan yang tersebut di atas *None of the above items*	122,286	84,462	80,451	24,719	55,732	2,050	766	1,195	37,824
Tidak diketahui *Unknown*	90,235	75,610	63,356	35,848	27,508	8,430	2,961	863	14,625

Nota 1 : Angka-angka di atas tidak disesuaikan untuk kurang penghitungan.
Note 1 : The above figures have not been adjusted for under-enumeration.
Nota 2 : Angka-angka adalah kiraan berulang dan tidak memberikan jumlah lajur bagi bilangan isi rumah persendirian.
Note 2 : Figures are multiple counts and do not add up to column totals showing the number of private households.
* Sila lihat nota penerangan di perenggan 5.3 b(ii) dan 5.3 b(iii), muka surat xxii dalam laporan ini.
Please refer to the explanatory notes in paragraph 5.3 b(ii) and 5.3 b(iii), page xxxi in this report.

Jadual 3.17   Keputusan peperiksaan Sijil Pelajaran Malaysia bagi calon persendirian mengikut negeri, Malaysia, 2003

Table 3.17   Results of the Malaysian Certificate of Education examination for private candidates by state, Malaysia, 2003

Negeri *State*	Lebih 10 mata pelajaran *Above 10* *subjects*	10 mata pelajaran *10 subjects*	Kelulusan penuh dalam *Full passes in*				
			9 mata pelajaran *9 subjects*	8 mata pelajaran *8 subjects*	7 mata pelajaran *7 subjects*	6 mata pelajaran *6 subjects*	5 mata pelajaran *5 subjects*
Malaysia	28	203	544	829	1,115	1,314	1,534
Johor	2	69	115	174	171	133	169
Kedah	4	18	69	123	162	156	147
Kelantan	6	18	36	48	60	84	91
Melaka	1	8	28	39	39	33	40
Negeri Sembilan	-	1	11	15	30	40	59
Pahang	-	1	19	23	29	30	23
Perak	13	20	64	79	103	134	140
Perlis	-	1	3	9	11	13	20
Pulau Pinang	-	2	14	16	22	44	44
Sabah	1	10	56	111	214	311	404
Sarawak	-	2	14	23	55	81	117
Selangor	-	13	30	55	90	104	126
Terengganu	1	23	29	41	42	53	52
Wilayah Persekutuan Kuala Lumpur	-	-	-	2	2	2	5
Wilayah Persekutuan Labuan	-	17	56	71	85	96	97

Punca : Kementerian Pelajaran Malaysia

Source : Ministry of Education, Malaysia

Jadual 3.17 **Keputusan peperiksaan Sijil Pelajaran Malaysia bagi calon persendirian mengikut negeri, Malaysia, 2003(samb.)**
Table 3.17 *Results of the Malaysian Certificate of Education examination for private candidates by state, Malaysia, 2003(cont'd)*

Negeri *State*	Kelulusan penuh dalam *Full passes in*							
	4 mata pelajaran *4 subjects*	3 mata pelajaran *3 subjects*	2 mata pelajaran *2 subjects*	1 mata pelajaran *1 subjects*	Semua gagal *All fail*	Lain-lain *Others*	Bilangan menduduki *Number sat*	% Lulus *% Pass*
Malaysia	1,925	2,385	3,617	7,018	896	6,990	28,398	96.8
Johor	244	321	521	923	111	926	3,879	97.1
Kedah	122	136	210	450	64	437	2,098	96.9
Kelantan	90	106	194	458	92	412	1,695	94.6
Melaka	39	51	76	162	15	167	698	97.9
Negeri Sembilan	84	98	172	358	34	286	1,188	97.1
Pahang	55	60	81	281	68	235	905	92.5
Perak	194	285	429	810	93	778	3,142	97.0
Perlis	21	22	23	49	9	43	224	96.0
Pulau Pinang	61	91	181	508	46	459	1,488	96.9
Sabah	518	607	732	892	106	1,004	4,966	97.9
Sarawak	181	242	422	903	97	799	2,936	96.7
Selangor	146	190	343	673	76	806	2,652	97.1
Terengganu	42	26	43	82	19	86	539	96.5
Wilayah Persekutuan Kuala Lumpur	5	10	17	20	2	13	78	96.6
Wilayah Persekutuan Labuan	123	140	173	449	64	539	1,910	97.4

Punca : **Kementerian Pelajaran Malaysia**
Source : *Ministry of Education, Malaysia*

Jadual 3.14 Keputusan peperiksaan Penilaian Menengah Rendah bagi calon sekolah bantuan kerajaan
mengikut negeri, Malaysia, 2003

*Table 3.14 Results of the Lower Secondary Assessment examination for candidates in government assisted schools
by state, Malaysia, 2003*

Negeri *State*	7A Hingga 9A *7A to 9A*	%	Gabungan gred A,B,C,D *Combination of grades A,B,C,D.*	%	Semua E *All E*	%	Bilangan menduduki *Number sat*
Malaysia	19,608	4.8	249,970	61.5	2,756	0.7	406,293
Johor	1,693	3.5	28,521	58.8	379	0.8	48,529
Kedah	1,310	4.1	18,552	57.6	190	0.6	32,234
Kelantan	948	3.2	16,642	56.5	116	0.4	29,449
Melaka	669	5.2	8,610	66.8	59	0.5	12,883
Negeri Sembilan	1,062	6.3	10,490	62.3	101	0.6	16,827
Pahang	851	3.4	15,298	61.6	154	0.6	24,846
Perak	2,172	5.1	26,074	61.3	336	0.8	42,569
Perlis	242	5.2	2,579	55.1	26	0.6	4,677
Pulau Pinang	1,660	7.6	14,503	66.8	124	0.5	21,713
Sabah	495	1.5	17,460	52.0	263	0.8	33,574
Sarawak	1,291	3.5	23,084	62.5	336	0.9	36,913
Selangor	4,277	7.4	39,655	68.7	391	0.7	57,742
Terengganu	931	4.4	11,630	54.6	137	0.6	21,289
Wilayah Persekutuan Kuala Lumpur	1,941	8.8	16,124	73.3	141	0.6	21,988
Wilayah Persekutuan Labuan	66	6.2	748	70.6	3	0.3	1,060

Punca : Kementerian Pelajaran Malaysia
Source : Ministry of Education, Malaysia

Jadual 3.16 Keputusan peperiksaan Sijil Pelajaran Malaysia bagi calon sekolah bantuan kerajaan mengikut
negeri, Malaysia, 2003

Table 3.16 Results of the Malaysian Certificate of Education examination for candidates in government assisted
schools by state, Malaysia, 2003

Negeri State	Lebih 10 mata pelajaran Above 10 subjects	10 mata pelajaran 10 subjects	Kelulusan penuh dalam Full passes in 9 mata pelajaran 9 subjects	8 mata pelajaran 8 subjects	7 mata pelajaran 7 subjects	6 mata pelajaran 6 subjects	5 mata pelajaran 5 subjects
Malaysia	11,565	54,970	93,254	51,061	35,687	27,045	22,033
Johor	1,498	7,081	9,654	5,618	4,228	3,308	2,851
Kedah	1,163	4,977	6,514	4,141	2,921	2,256	1,776
Kelantan	856	3,872	7,158	3,866	2,635	2,040	1,649
Melaka	479	2,282	3,112	1,514	1,201	937	681
Negeri Sembilan	737	3,176	4,113	2,094	1,605	1,137	1,020
Pahang	487	4,054	6,250	3,731	2,353	1,710	1,317
Perak	1,207	6,651	9,177	5,289	3,927	2,859	2,431
Perlis	325	483	1,219	668	463	370	305
Pulau Pinang	717	4,300	4,080	2,188	1,659	1,229	1,071
Sabah	405	2,168	7,426	5,177	3,588	2,643	2,046
Sarawak	657	3,567	8,545	4,651	2,997	2,265	1,791
Selangor	1,761	6,716	14,614	6,443	4,192	3,159	2,644
Terengganu	839	2,839	4,863	2,964	2,082	1,690	1,356
Wilayah Persekutuan Kuala Lumpur	3	53	390	158	113	67	54
Wilayah Persekutuan Labuan	431	2,751	6,139	2,559	1,723	1,375	1,041

Punca : Kementerian Pelajaran Malaysia
Source : Ministry of Education, Malaysia

Jadual 3.16   Keputusan peperiksaan Sijil Pelajaran Malaysia bagi calon sekolah bantuan kerajaan mengikut
negeri, Malaysia, 2003 (samb.)

*Table 3.16   Results of the Malaysian Certificate of Education examination for candidates in government assisted
schools by state, Malaysia, 2003 (cont'd)*

Negeri *State*	Kelulusan penuh dalam *Full passes in*							
	4 mata pelajaran *4 subjects*	3 mata pelajaran *3 subjects*	2 mata pelajaran *2 subjects*	1 mata pelajaran *1 subjects*	Semua gagal *All fail*	Lain-lain *Others*	Bilangan menduduki *Number sat*	% Lulus *% Pass*
Malaysia	18,028	14,595	12,739	12,185	2,291	2,845	358,298	99.4
Johor	2,438	2,084	1,828	1,678	307	315	42,888	99.3
Kedah	1,511	1,172	981	924	202	191	28,729	99.3
Kelantan	1,321	950	804	660	96	163	26,070	99.6
Melaka	564	442	319	287	34	93	11,945	99.7
Negeri Sembilan	829	617	554	568	118	127	16,695	99.3
Pahang	1,028	872	675	546	115	172	23,310	99.5
Perak	1,998	1,696	1,840	1,945	399	271	39,690	99.0
Perlis	251	222	188	168	26	46	4,734	99.5
Pulau Pinang	922	734	782	763	158	130	18,733	99.2
Sabah	1,587	1,282	949	696	125	252	28,344	99.6
Sarawak	1,513	1,299	961	862	126	343	29,577	99.6
Selangor	2,240	1,899	1,775	1,945	356	424	48,168	99.3
Terengganu	906	592	425	379	74	138	19,147	98.6
Wilayah Persekutuan Kuala Lumpur	64	40	35	24	6	4	1,011	99.4
Wilayah Persekutuan Labuan	856	694	623	740	149	176	19,257	99.2

Punca : Kementerian Pelajaran Malaysia
Source : Ministry of Education, Malaysia

Jadual 3.13 Keputusan peperiksaan Penilaian Menengah Rendah bagi calon sekolah bantuan kerajaan dan calon persendirian, Malaysia, 1999 - 2003

Table 3.13 Results of the Lower Secondary Assessment examination for candidates in government assisted schools and private candidates, Malaysia, 1999 - 2003

Calon / *Candidates*		7A Hingga 9A / *7A to 9A*	%	Gabungan gred A,B,C,D / *Combination of grades A,B,C,D*	%	Semua E / *All E*	%	Bilangan menduduki / *Number sat*
Jumlah / *Total*	1999	12,638	3.2	221,578	54.6	260	0.1	405,500
	2000	12,602	2.9	227,993	53.2	613	0.1	428,558
	2001	15,207	3.5	241,199	55.9	205	0.0	431,722
	2002	20,349	4.8	267,403	62.9	160	0.0	424,952
	2003	22,506	5.1	273,588	62.0	2,757	0.6	441,306
Calon bagi sekolah bantuan kerajaan / *Government assisted school candidates*	1999	11,642	3.1	203,574	54.8	247	0.1	371,508
	2000	11,575	2.9	209,228	53.2	301	0.1	392,962
	2001	14,363	3.6	222,051	55.9	195	0.0	397,156
	2002	19,037	4.9	245,335	62.9	156	0.0	390,345
	2003	19,608	4.8	249,970	61.5	2,756	0.7	406,293
Calon persendirian / *Private candidates*	1999	996	2.9	18,004	53.0	13	0.0	33,992
	2000	1,027	2.9	18,765	52.7	312	0.9	35,596
	2001	844	2.4	19,148	55.4	10	0.0	34,566
	2002	1,312	3.8	22,068	63.8	4	0.0	34,607
	2003	2,898	8.3	23,618	67.5	1	0.0	35,013

Punca : Kementerian Pelajaran Malaysia
Source : Ministry of Education, Malaysia

Pelaporan dalam peperiksaan Penilaian Menengah Rendah
Reporting in Lower Secondary Assessment examination

Pangkat / *Grade*	Takrif / *Definition*	Pangkat / *Grade*	Takrif / *Definition*
A	Cemerlang / *Distinction*	D	Mencapai tahap penguasaan minimum / *Attained minimum level of Achievement*
B	Kepujian / *Credit*	E	Tidak mencapai tahap penguasaan minimum / *Did not attain minimum level of achievement*
C	Baik / *Good*		

Jadual 3.15 **Keputusan peperiksaan Penilaian Menengah Rendah bagi calon persendirian mengikut negeri, Malaysia, 2003**

Table 3.15 *Results of the Lower Secondary Assessment examination for private candidates by state, Malaysia, 2003*

Negeri *State*	7A Hingga 9A *7A to 9A*	%	Gabungan gred A,B,C,D *Combination of* *grades A,B,C,D*	%	Semua E *All E*	%	Bilangan menduduki *Number* *sat*
Malaysia	2,898	8.3	23,618	67.5	1	0.003	35,013
Johor	160	4.0	2,707	67.3	-	-	4,025
Kedah	344	8.6	1,892	47.2	-	-	4,008
Kelantan	434	6.7	3,914	60.2	-	-	6,497
Melaka	137	15.4	691	77.9	-	-	887
Negeri Sembilan	241	14.7	1,156	70.7	-	-	1,634
Pahang	190	8.3	1,607	69.9	-	-	2,300
Perak	265	10.3	1,474	57.5	-	-	2,563
Perlis	21	7.6	202	73.2	1	0.4	276
Pulau Pinang	8	1.1	353	49.0	-	-	720
Sabah	81	4.1	1,386	70.4	-	-	1,968
Sarawak	112	12.8	700	79.9	-	-	876
Selangor	426	8.5	3,987	79.5	-	-	5,018
Terengganu	143	9.0	1,192	74.7	-	-	1,596
Wilayah Persekutuan Kuala Lumpur	336	12.7	2,357	89.2	-	-	2,643
Wilayah Persekutuan Labuan	-	-	-	-	-	-	2

Punca : Kementerian Pelajaran Malaysia
Source : Ministry of Education, Malaysia

BIBLIOGRAPHY

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                          ii) –Sek Men Kebangsaan Seri Pekan (PMR & SPM)

                          iii)- Kolej Matrikulasi Negeri Sembilan

                          iv)- Universiti Malaysia Terengganu

AWARD   : Silver Award for SPM (5A)

MEMBERWSHIP FUNCTION OF POVERTY IN MALAYSIA USING FUZZY SET THEORY - NOR AIDA BINTI MAT ISA