KOLOKIUM STATISTIK 2017
JABATAN PERANGKAAN MALAYSIA

COMPARATIVE ANALYSIS AND MODELLING OF HOUSEHOLD CONSUMPTION EXPENDITURE IN MALAYSIA

This paper was submitted to the University of Technology Mara (UiTM) in January 2015 as partial fulfilment of the requirements for the Master Degree of Science (Applied Statistics)

OUTLINE OF PRESENTATION

- Problem Statement
- Research Questions & Objectives
- Conceptual Framework
- Methodology
- Finding and Analysis
- Scope, Limitations and Significance of Study
- Conclusion dan Recommendations

PROBLEM STATEMENT

Consumption pattern among households are expected to vary. Household's own inflation rate will depend on its individual expenditure patterns (Levell and Oldfiled, 2011)

In Malaysia, specific research in this area are still lacking. Statistics produced by National Statistical Office concentrated only on the means and percentages of average monthly consumption expenditures .

Measurements on the impact of inflation to different sub-populations not well in place

Comparative analysis to understand the differences in household consumption expenditures among sub-populations is still lacking.

Not many studies were done in modelling of household consumption expenditures to determine the factors that significantly affect the consumption expenditures

RESEARCH QUESTIONS

Are the consumption patterns among households in different sub-populations, different?

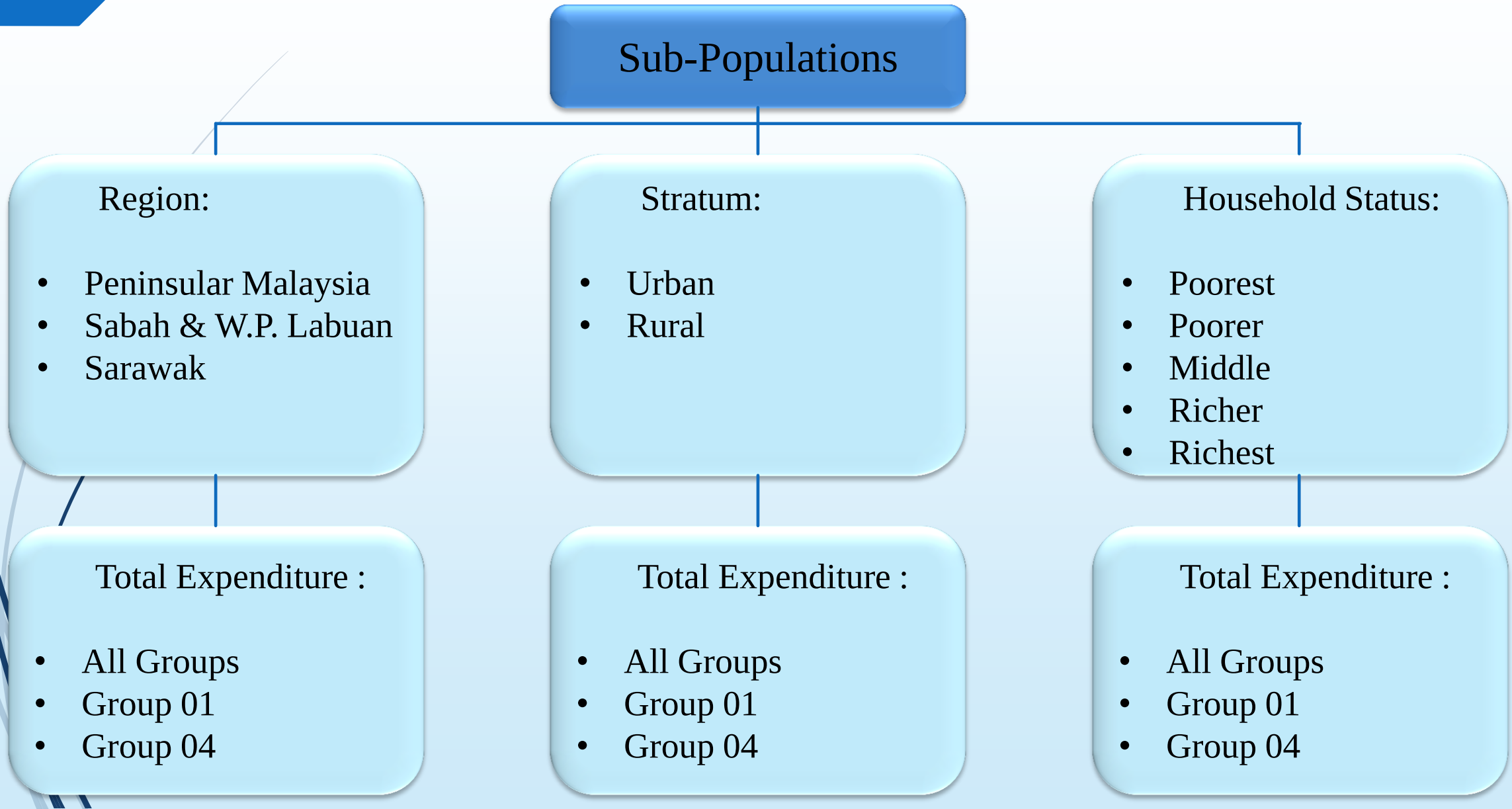
What are the factors that are significantly related to the household consumption expenditures?

RESEARCH OBJECTIVES

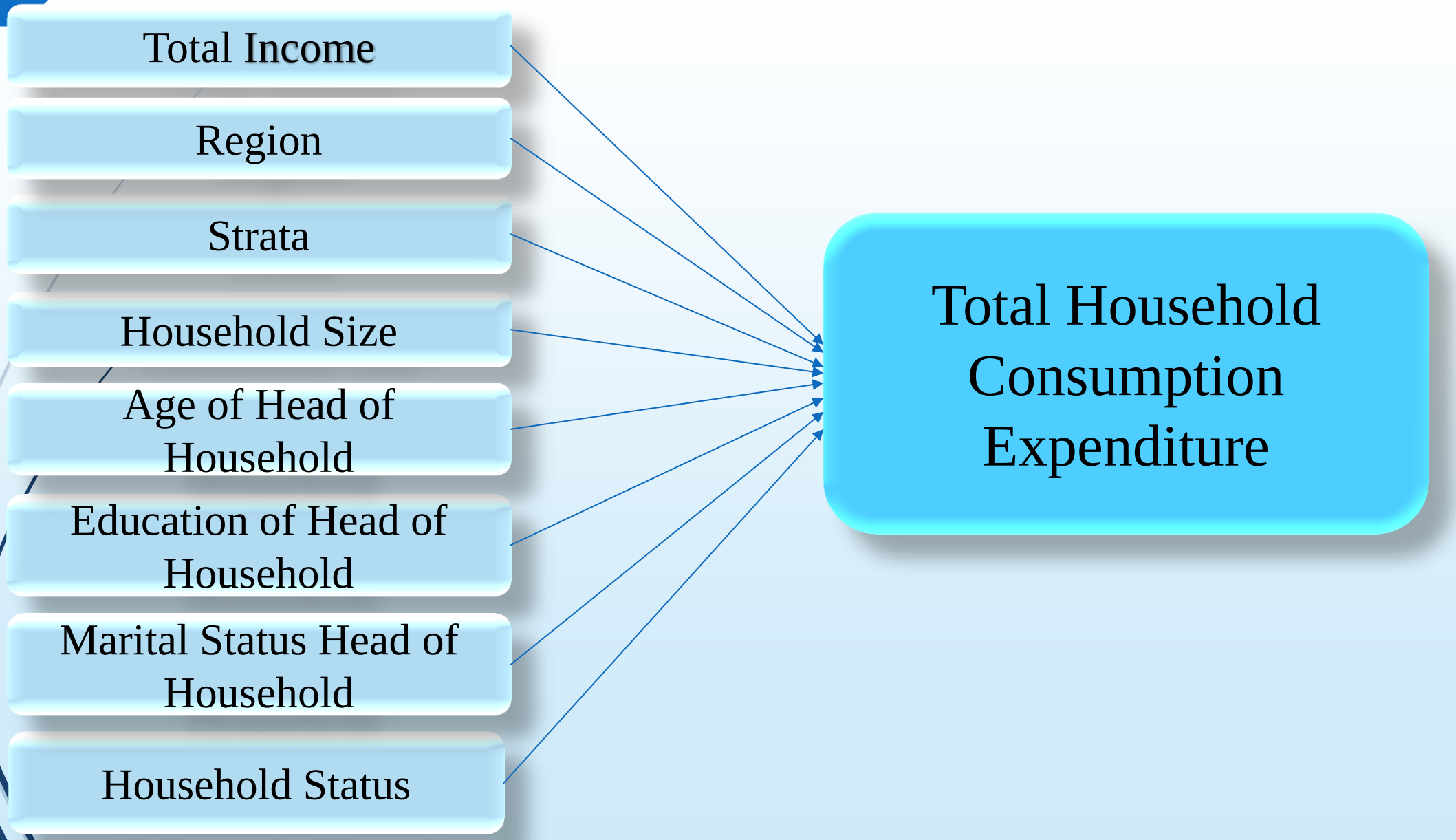
To compare the consumption patterns among households in different sub-populations

To identify the factors that relate to household consumption expenditures

Conceptual Framework : Comparative Analysis



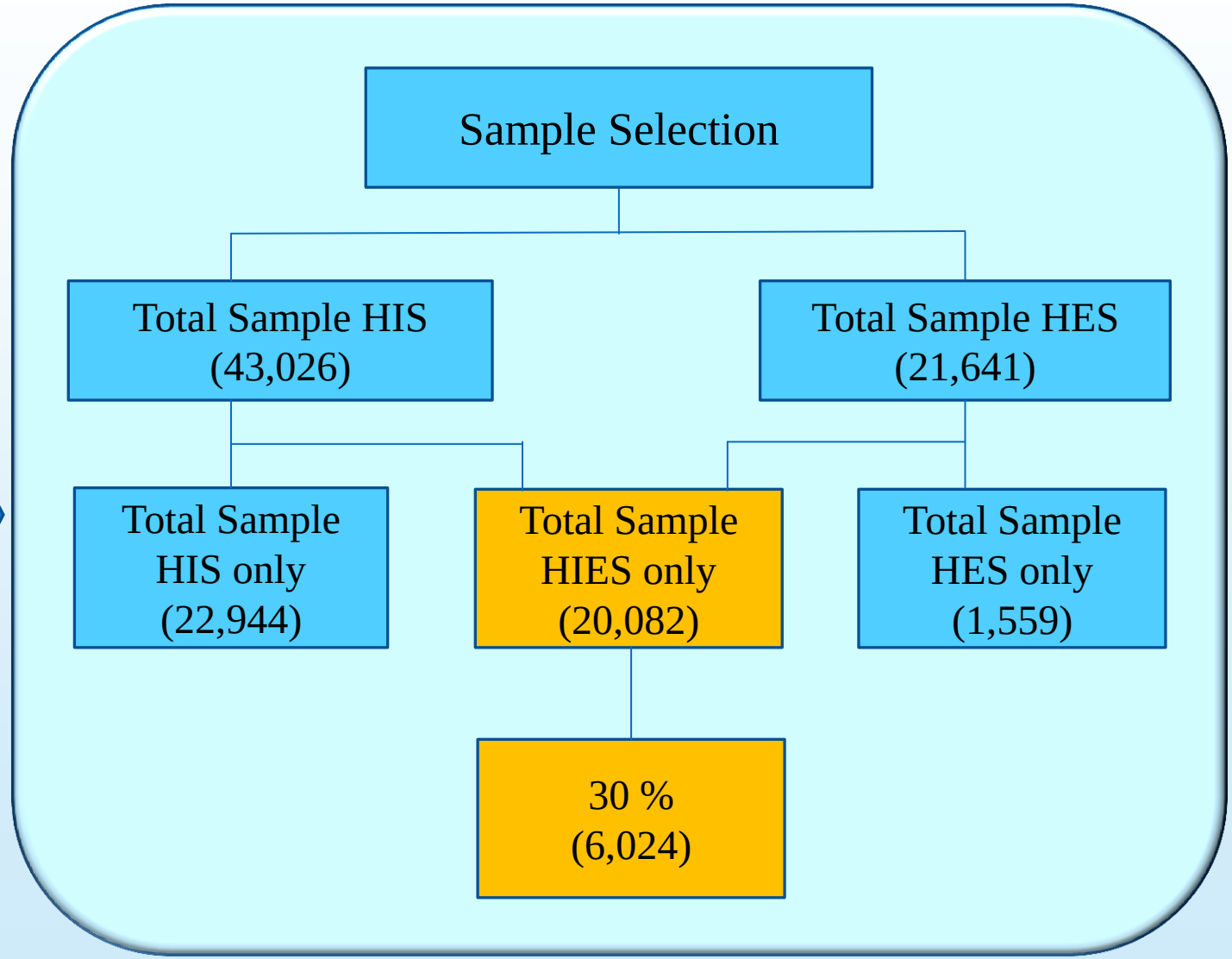
Conceptual Framework : Modelling of Total Household Consumption Expenditure



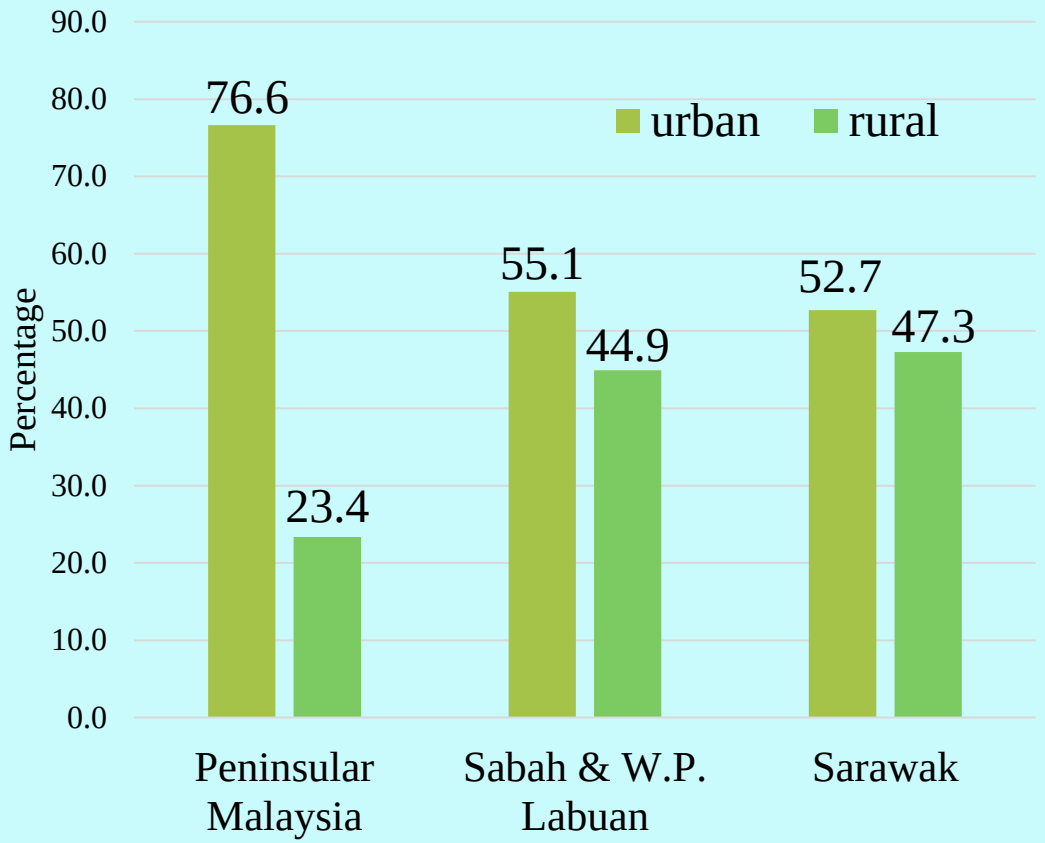
Methodology

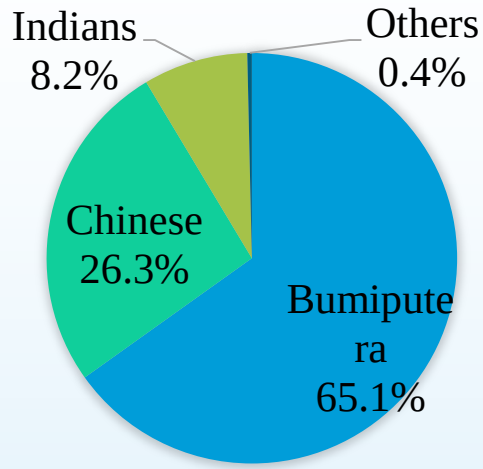
Source of Data :

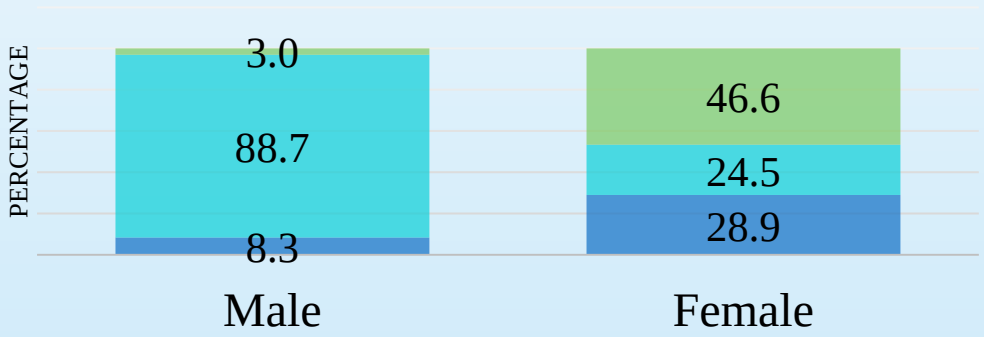
- Department of Statistics, Malaysia
- Sub-sample of data from Household Income Expenditure Survey 2009/2010
- 6,024 households (30 per cent) selected proportionately according to states using systematic sampling



DESCRIPTIVE ANALYSIS : PROFILING OF HOUSEHOLDS







83% - Males
16.4% - Females

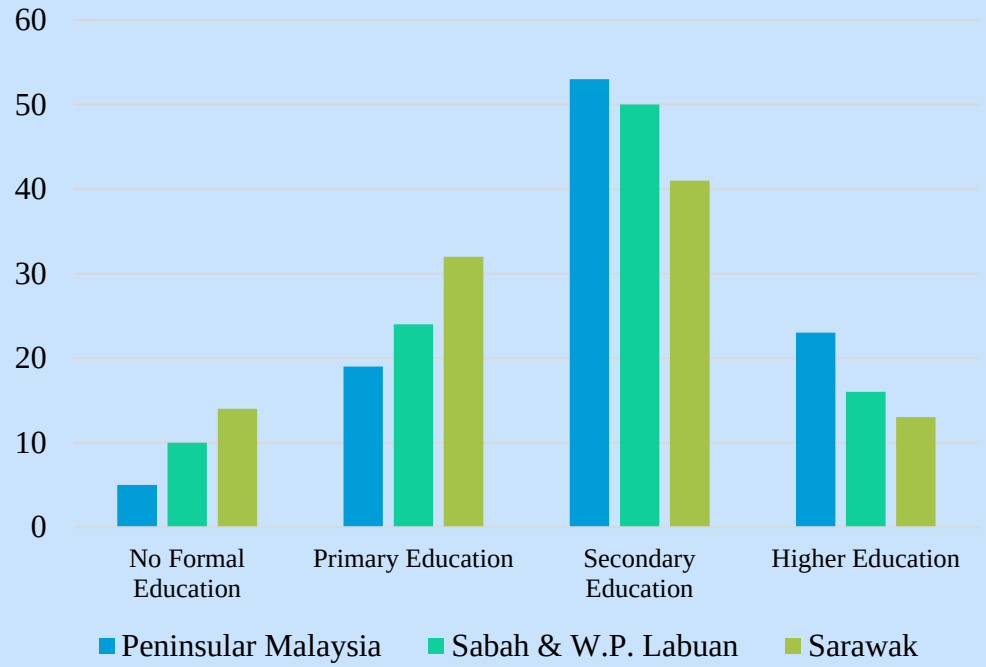
MEAN AGE OF HEAD OF HOUSEHOLD AND HOUSEHOLD SIZE

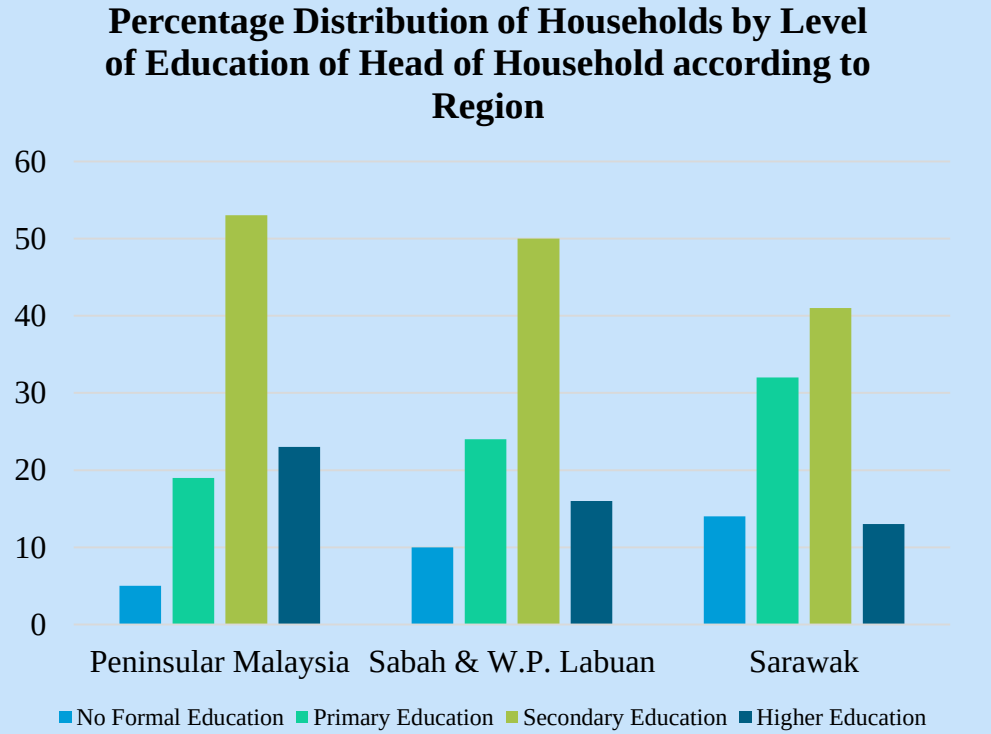
Region	Mean Age		Household Size	
	Urban	Rural	Urban	Rural
Malaysia	45.07	48.48	4.0	4.5
Peninsular Malaysia	45.24	49.19	3.9	4.3
Sabah and W.P. Labuan	42.69	45.02	4.7	5.4
Sarawak	45.27	48.43	4.5	4.7

HoH in urban areas are younger as compared to rural HoH. Larger household size was found in rural areas compared to urban areas

EDUCATION LEVEL OF HEAD OF HOUSEHOLD

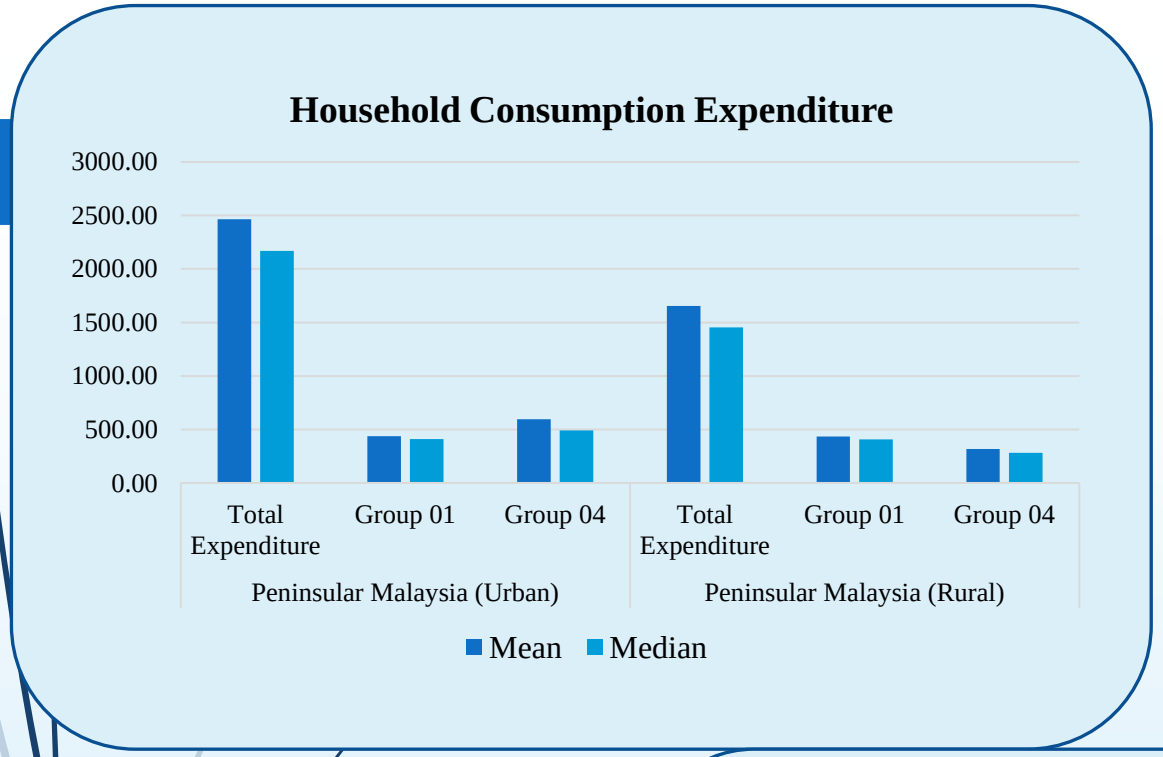
Majority heads of households in Peninsular Malaysia are having secondary and higher education while both in Sabah & W.P. Labuan and Sarawak are having Primary and secondary education.

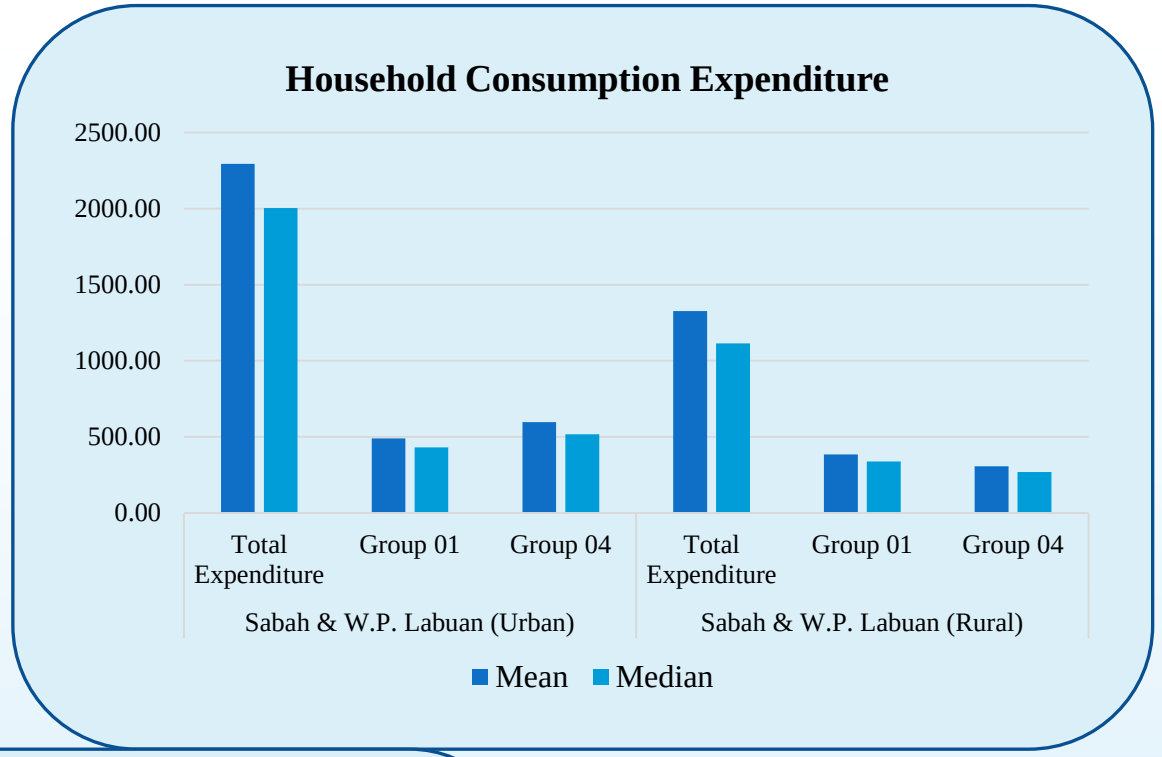




The distribution of households are dominated by those heads with secondary education

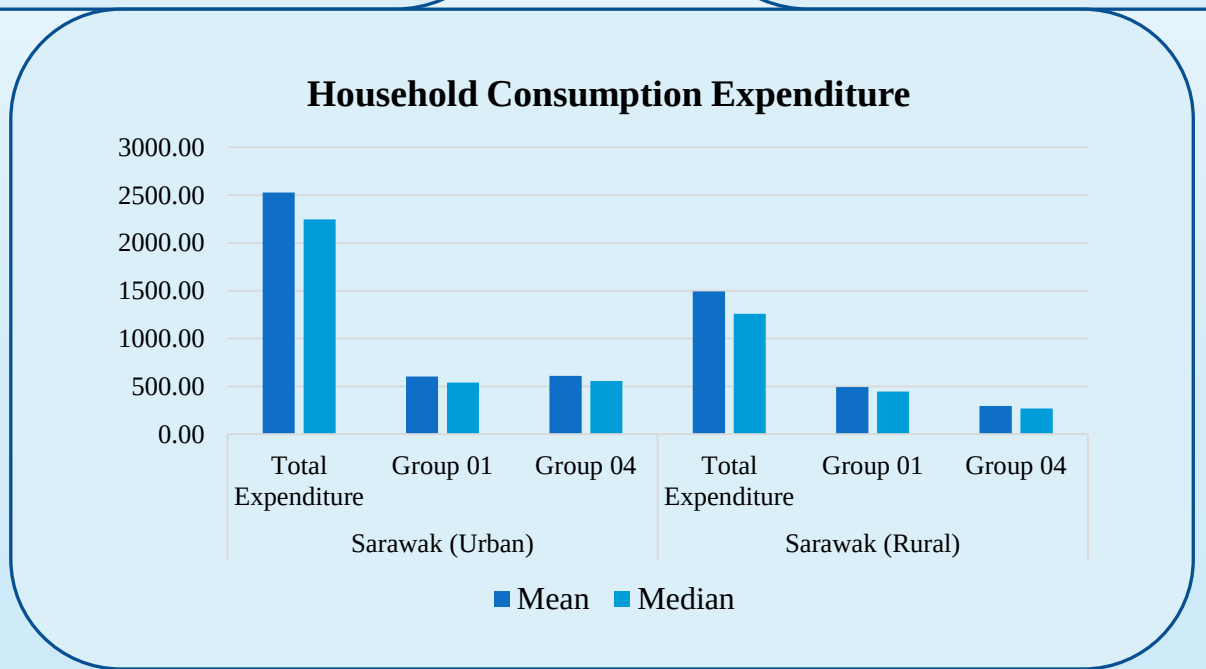
HOUSEHOLD CONSUMPTION EXPENDITURE ACROSS GEOGRAPHIC LOCATION



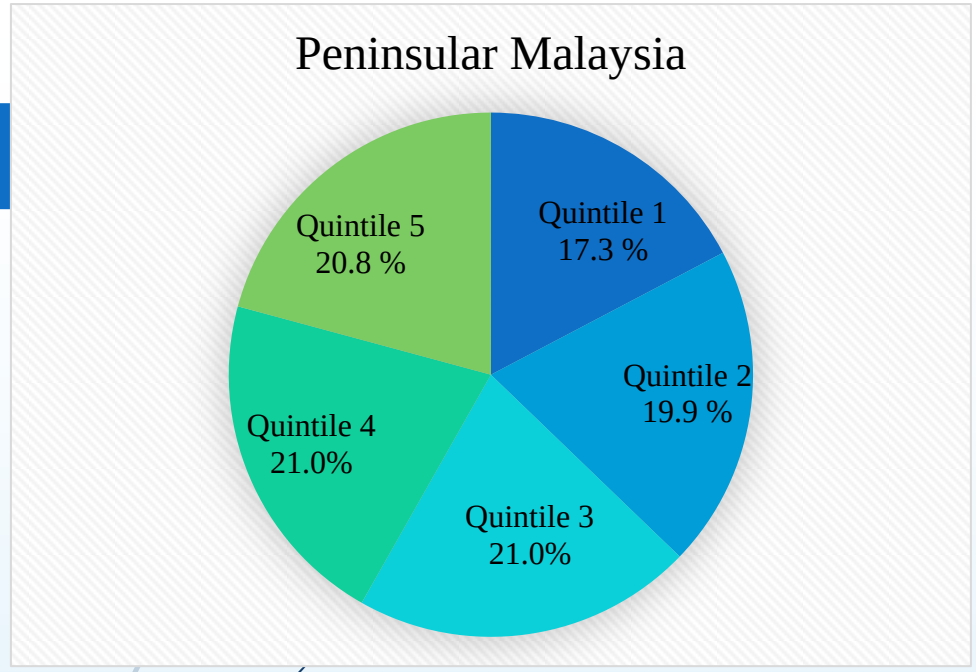


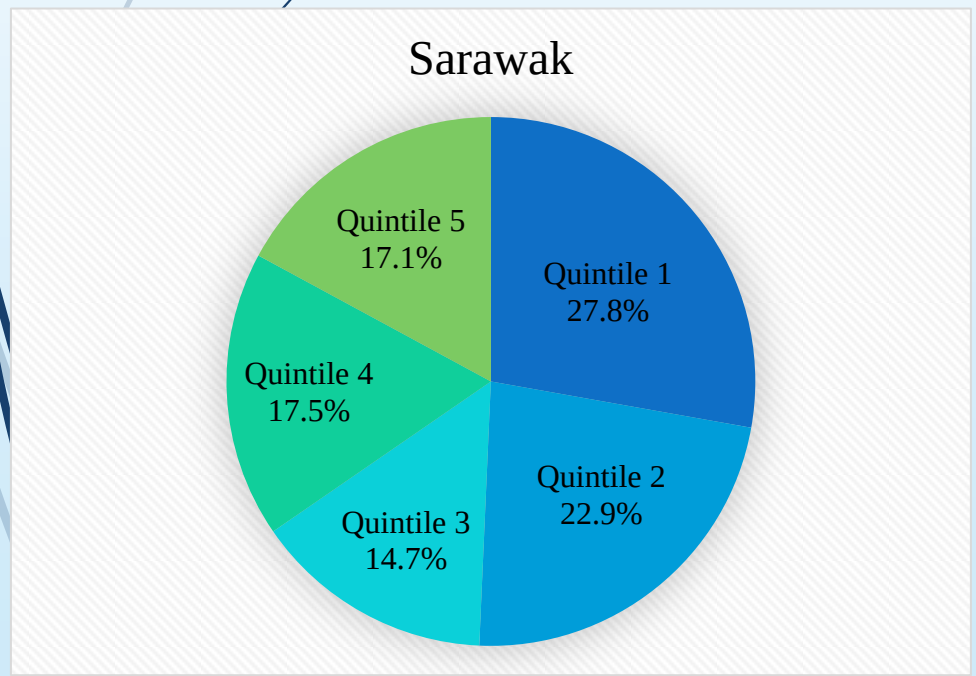
Total Consumption
Median < Mean

Group 01 & 04
Median ≈ Mean

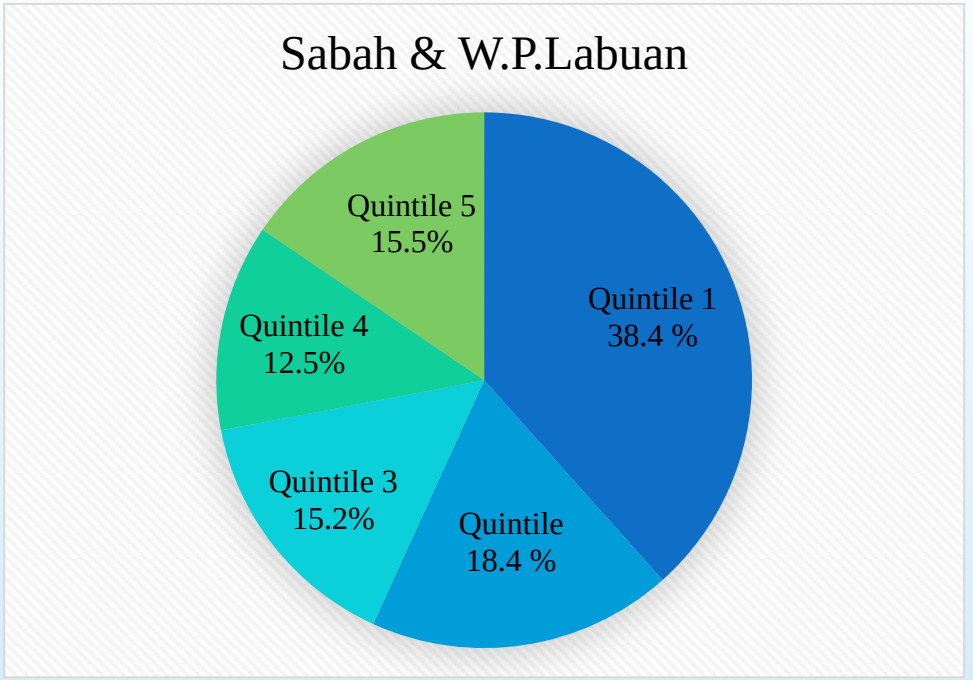


All Regions
Urban > Rural

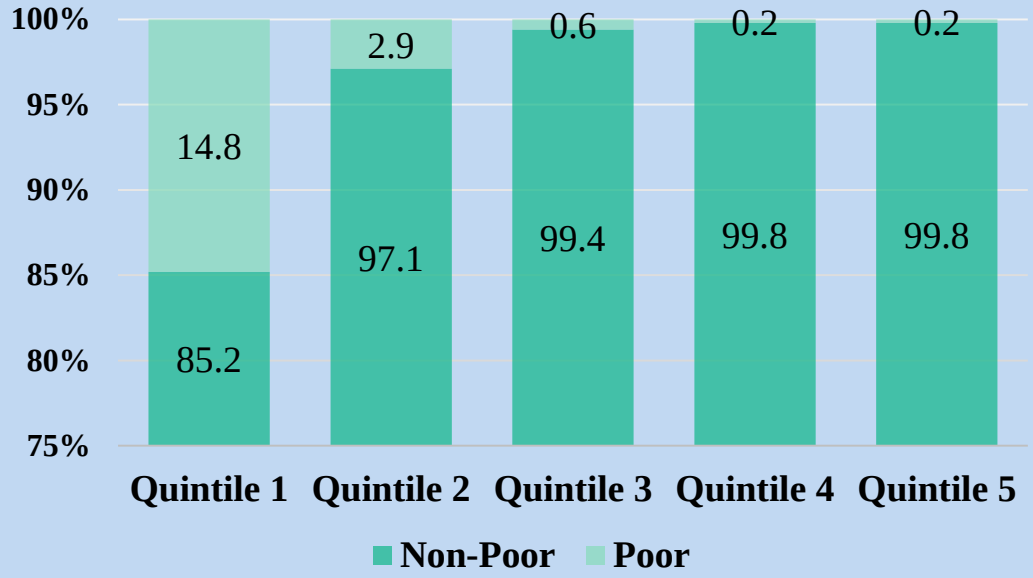




Households in Peninsular Malaysia are distributed almost equally according to quintile group, slightly lower for the poorest group (Quintile 1)

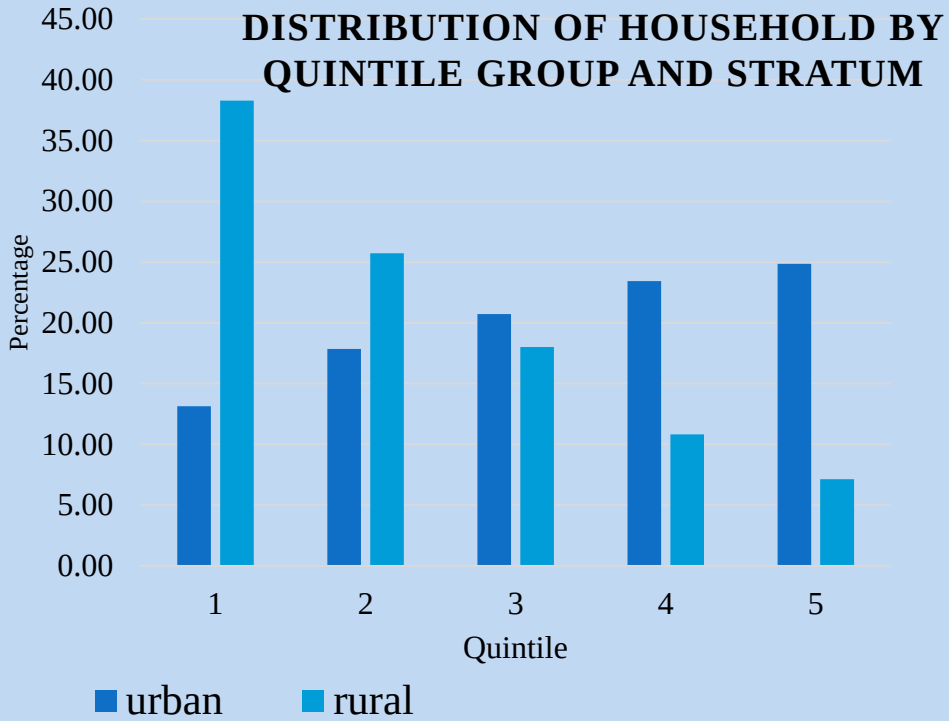


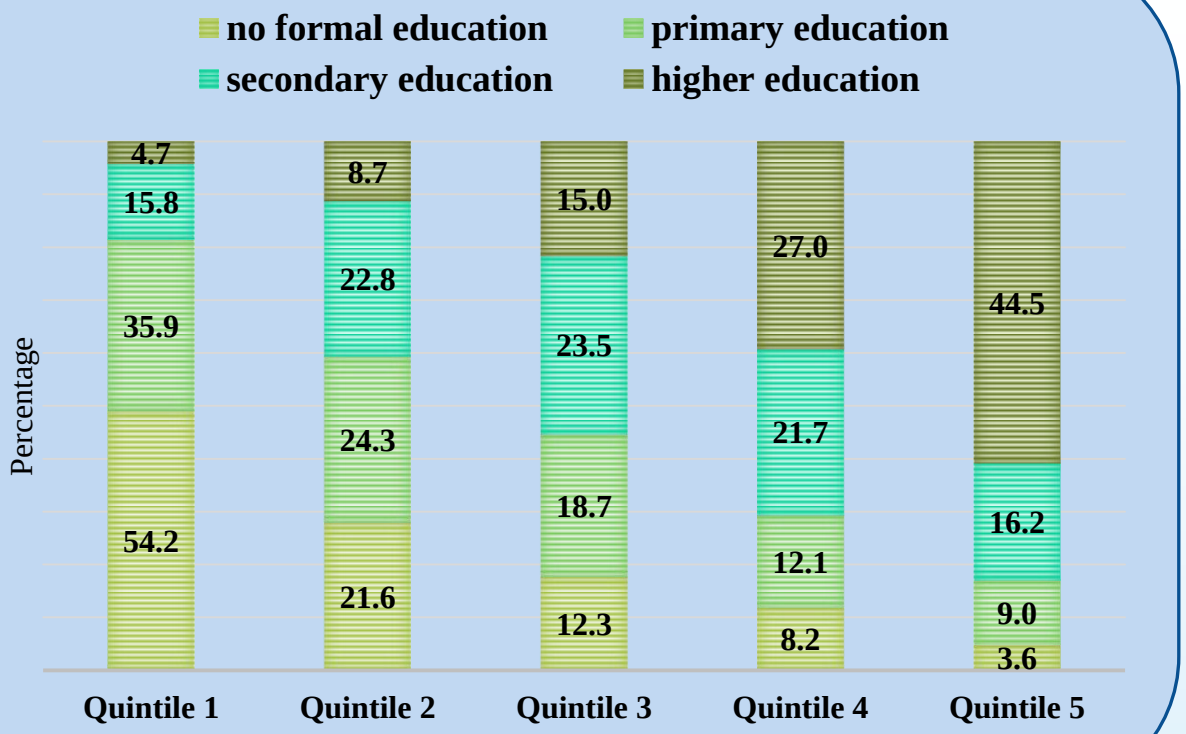
Sabah & W.P. Labuan and Sarawak recorded a higher percentage in the poor groups (Quintile 1 and Quintile 2) which are 56.8% and 50.7% respectively



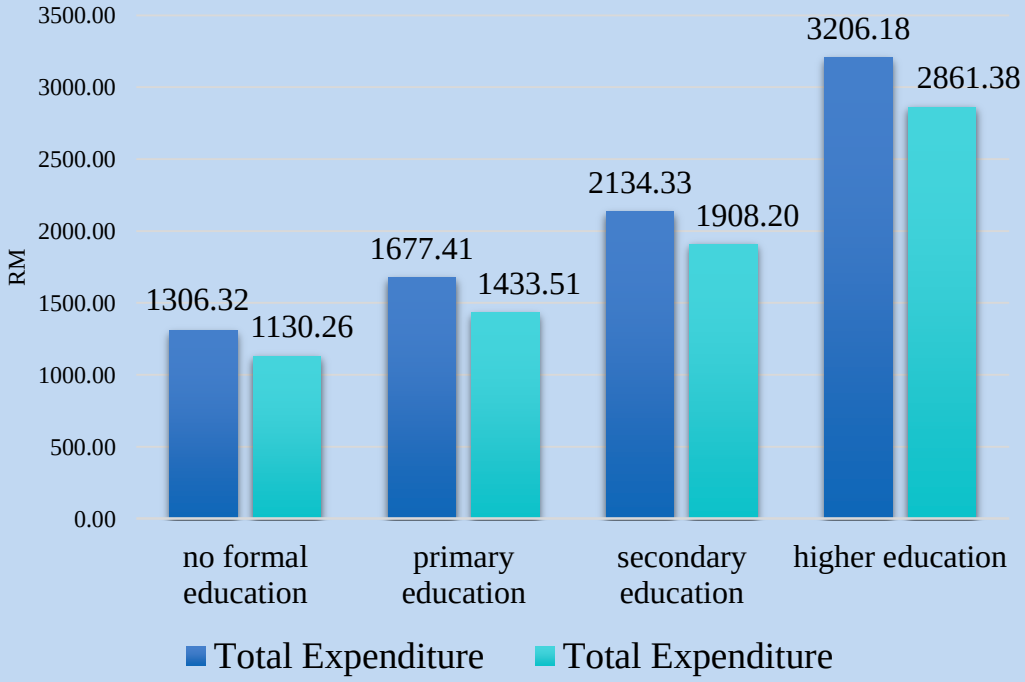
The poor households according to income approach were the highest in Quintile 1 and only 0.2 percent households in Quintile 4 and 5 were poor

Households who are residing in rural areas tend to be in the lower quintile, while households in urban areas tend to be in the higher quintile

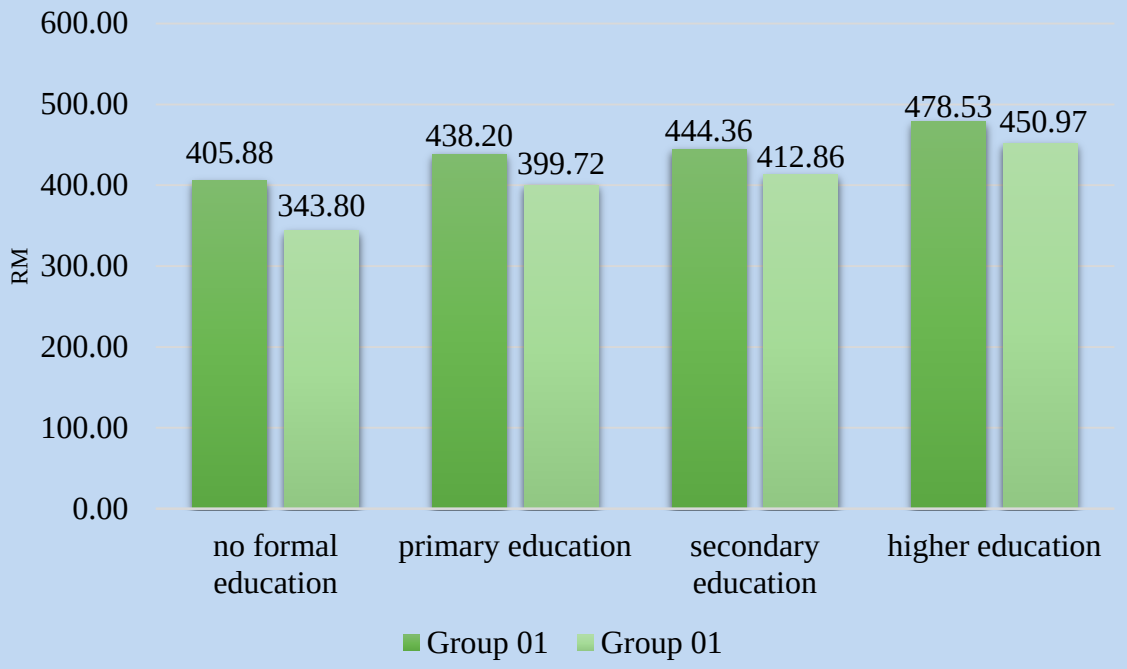




Households who are headed by those with higher education tend to be in the higher quintiles while majority of those with no formal education are in Quintile 1 (54.2 %)

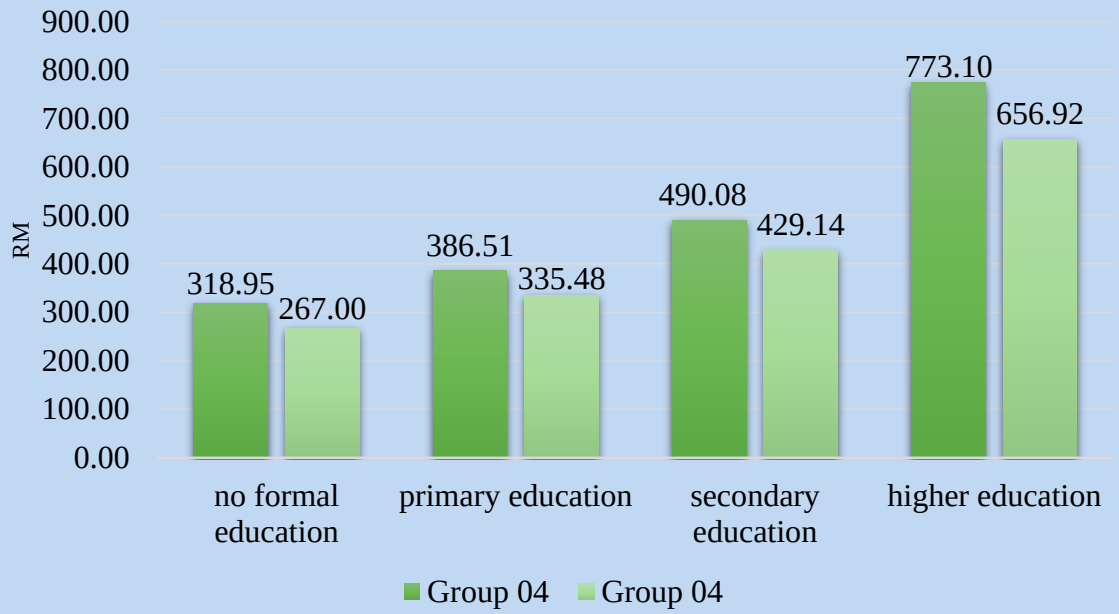


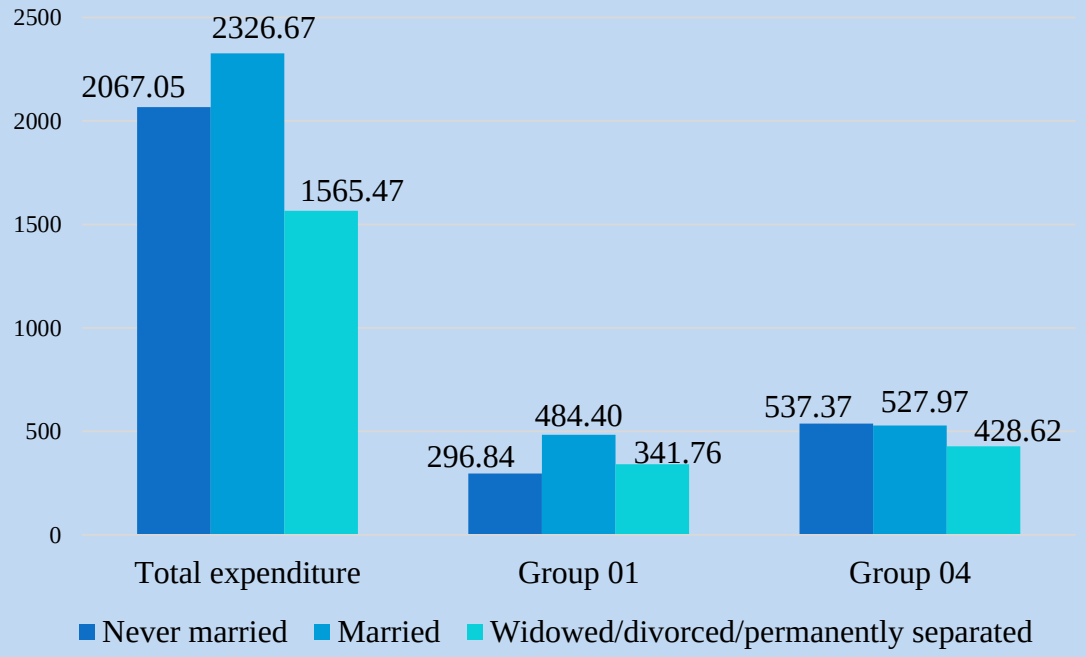
The mean total expenditure for those headed by higher education was 145.44% higher as compared to those headed by no formal education, 91.14% compared to primary education and 50.22 % compared to secondary education



The mean and median amount spent for Food and Non-alcoholic Beverages were not much different across different households headed by different level of education. Bigger gap between the mean and median values for lower education level

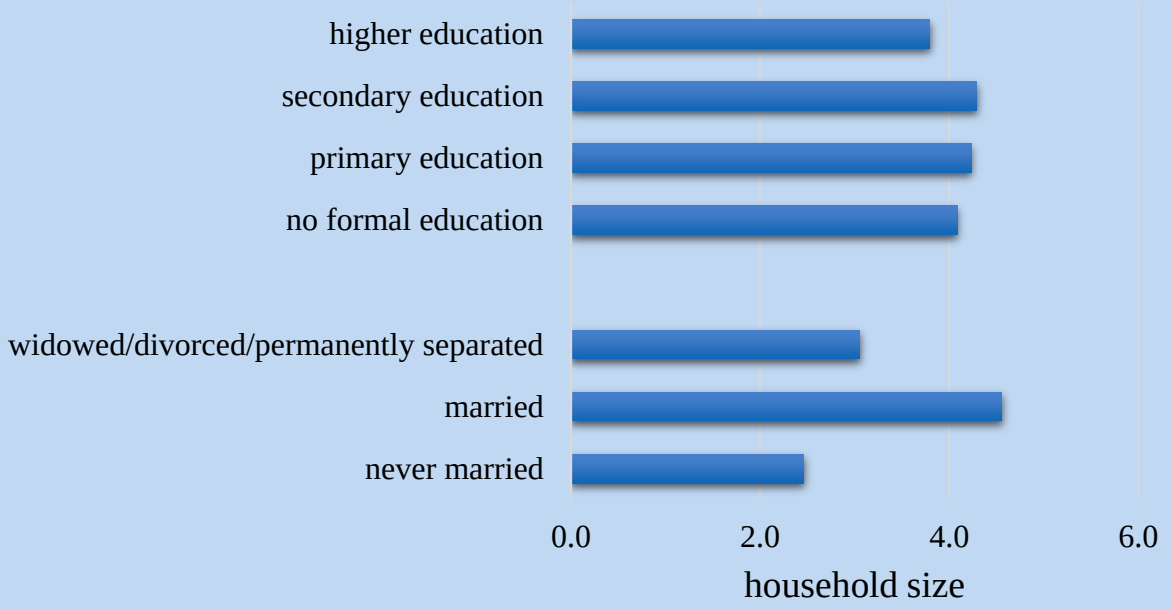
Amount spent for Housing, Water, Electricity, Gas and Other Fuels were higher as the education level increases. Higher education which dominated by households in Quintile 4 and 5 most probably pay higher rental or living in the house with higher estimated rent. They also spent higher for electricity bill based on the electrical appliances that they have

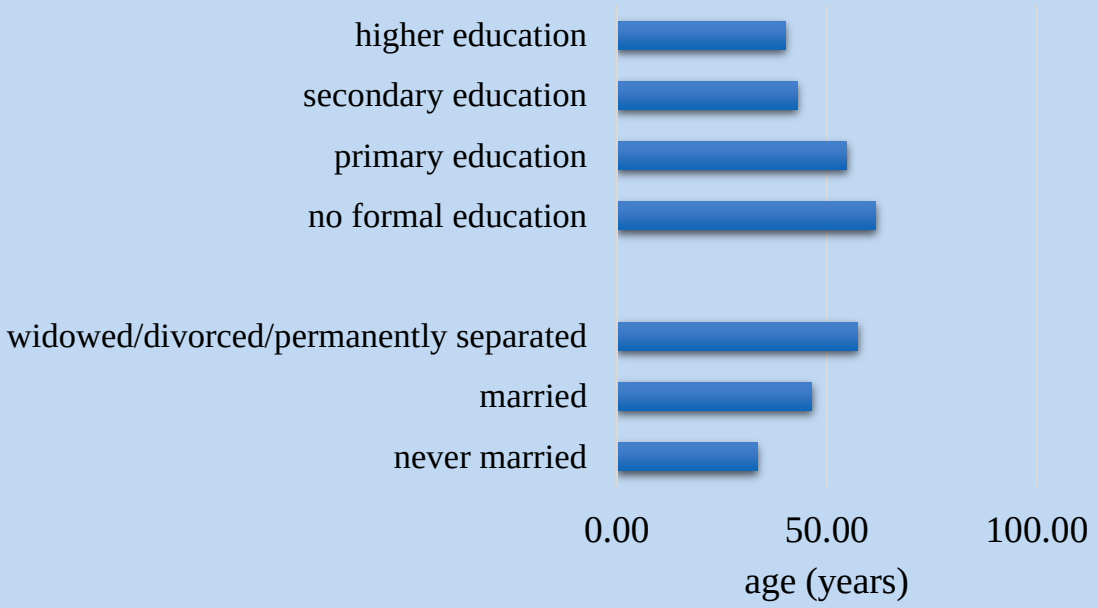




The amount spent for total and Group 01 were the highest for households headed by married person as compared to those headed by single or widowed/divorced/permanently separated. This might contributed by the larger household size for household headed by married persons.

Not much different in the amount spent for Group 04 by different marital status of head of households. Larger household size was found in household headed by lower level of education





The mean age of head of households with no formal education was the highest (61.57 years) as compared to other education levels. On an average, those with marital status 'never married' and 'married' are in the working age population (33.52 and 46.39 years) while those who are widowed/divorced/permanently separated approach the retirement age (57.33 years)

- The higher the education level of heads of households, the higher the consumption expenditure
- Higher quintile groups were dominated by households headed with higher education level
- Majority of the poor households were in Quintile 1
- Higher percentages of households in Quintile 1 and 2 are those residing in Sabah and W.P.Labuan; and Sarawak
- Households headed by those with Secondary Education were dominant in all the three regions
- Urban households tend to have higher expenditure as compared to rural households

COMPARATIVE ANALYSIS USING MULTIVARATE ANALYSIS OF VARIANCE (MANOVA)

Normality

For dependent variables in each groups (region, stratum, household status)

Histogram, Normal Probability Plot, Box-Plot, Skewness, Kurtosis, Test for Normality

Transformation of dependent variables (Log). Removing of further extremes outliers (1.3 percent). Skewness close to 0, Kurtosis ± 3. Drastic improvement on Test for Normality

Linearity among Dependent

Scatter Plot : Oval-shaped of bivariate scatterplot of each pair of dependent variable

Homogeneity of Variance-Covariance

Box's M Test (Reject Ho if p-value < α = 0.001). In the absence of this assumption the Pillai's Trace Statistics was used

Ref : Chauduri et. al (2002), Tabachnick and Fidell (2000), Johnson and Wichern (2000),Coakes and Ong (2011)

Summary of Tests between Subject Effects

Source	Dependent Variable	P-value
Region	Log (Total Expenditure)	0.000
	Log (Group 01)	0.000
	Log (Group 04)	0.298
Strata	Log (Total Expenditure)	0.000
	Log (Group 01)	0.311
	Log (Group 04)	0.000
Education	Log (Total Expenditure)	0.000
	Log (Group 01)	0.000
	Log (Group 04)	0.000

- There is no significant different in the amount spent on Group 04 across regions

- There is no significant different in the amount spent on Group 01 between urban and rural households

- The total amount spent for Group 01-Group 12 are different between households residing in Peninsular Malaysia, Sabah & W.P. Labuan and Sarawak, between urban and rural households as well as among the different level of education of heads of households

The Benferroni Simultaneous Confidence Intervals revealed the following :

Total Expenditure

- The total amount spent for households in Peninsular Malaysia was higher as compared to the other regions. Sabah & W.P. Labuan has lower total expenditure compared to Sarawak
- The urban households had a higher total expenditure compared to their counter part in rural areas
- The total expenditure for households headed by Higher Education > Secondary Education > Primary Education > No Formal Education

Group 01

- There is no significant different in the amount spent between households in Peninsular Malaysia and Sabah & W.P. Labuan. However, Sarawak spent a significantly higher compared to other regions.
- There is no significant different in the expenditure between households headed by Primary Education and Secondary Education; between Secondary Education and Higher Education
- Those headed by persons with No Formal Education were having significantly lower expenditure compared to other levels of education

The Benferroni Simultaneous Confidence Intervals revealed the following :

Group 04

- Urban households spent significantly higher on housing, water, electricity, gas and other fuels compared to rural households
- Significant different in amount spent by households headed by different level of education where the amount spent by those headed with No formal Education < Primary Education < Secondary Education < Higher Education

Poor households tend to have lower expenditures as compared to the non-poor households. The poorer groups tend to have similar amount on the expenditure on Food and Non-alcoholic Beverages. The same scenario for the richer groups where their expenditure for Food and Non-alcoholic Beverages were not significantly different.

MODELLING OF TOTAL HOUSEHOLD CONSUMPTION EXPENDITURE

Normality for Dependent Variable (Total Consumption Expenditure)

Histogram, Normal Probability Plot, Box-Plot, Skewness, Kurtosis, Test for Normality

Transformation of dependent variable (Log). Removing of further extremes outliers using Residual Analysis

Linear Relationship between Log (Total Consumption Expenditure) and Continuous IndependentVariables)

- Correlation Coefficient:

Log (Total Income) = 0.861
Household Size = 0.221
Age = - 0.110

- Literature Reviews

Model Adequacy

- Adjusted R Square
- Partial Correlation
- Assumption of Multiple Linear Regression through residual analysis

Ref : Montgomery et. al (2012), Coakes and Ong (2011), Sekaran and Bougie (2010), Hair et. al (2006), Kutner et. al (2011), Osborne and Water (2002)

Regression Analysis

Log (Expenditure) = 1.089 + 0.608 Log (Income) + 0.012 (household size) – 0.034 (Rural) – 0.024 (Sabah&W.P.Labuan) + 0.001 (Age) – 0.022 (Widowed) – 0.038 (No education) – 0.018 (Primary) + 0.017 (Sarawak) – 0.025 (Poor) + 0.010 (Higher)

- Stepwise Regression Method
- Dummy for categorical variable. The reference category was based on highest frequency count. Reference category : Stratum - Urban, Marital Status - Married, Level of Education – Secondary, Household Status – Non-Poor
- Never Married was not significant predictor variable
- Adjusted R Square = 0.783, highest contribution was Total Income (0.769)
- Total Income, Household Size and Age of Head of Households positively related to Total Consumption Expenditure

Regression Analysis – cont'd

Households in Rural Areas had lower expenditure with reference to Urban households, Sabah & W.P. Labuan had lower expenditure with reference to Peninsular Malaysia but Sarawak had higher expenditure with reference to Peninsular Malaysia

Expenditure for households headed by No Formal and Primary Education were lower with reference to Secondary Education but Higher Education was higher compared to Secondary Education

Total Expenditure by household headed by widowed/divorced/permanently separated persons were lower compared to reference (married)

Poor households had lower expenditures with reference to Non-Poor household

SCOPE AND LIMITATIONS

- Analysis was based on the expenditures made by households that are categorized as consumption expenditures. The non-consumption expenditures are excluded.
- Variables used are limited to the variables collected during the survey
- Analysis was carried out for Total Consumption, and two main groups namely Food and Non-Alcoholic Beverages and Housing, Water, Electricity, Gas and Other Fuels
- The sub-population groups were according to regions, strata and household status

SIGNIFICANCE OF STUDY

The results will be very useful to the government in understanding the impact of any policy related to the increase in price of goods and services to the households

The modelling will be able to provide more regular statistics on household consumption expenditure using the information from household income survey (2½ years instead of 5 years)

As a basis for reviewing the structures of household expenditures as part of the component in compiling the private consumption expenditure for Gross Domestic Product (GDP) statistics in between surveys

CONCLUSIONS

- Generally, households in Malaysia have different consumption patterns across regions, strata and household status
- The differences were attributed by geographic locations. Different areas experienced different level of development
- Price of goods and services were different which directly affect the household spending
- Urban households and household headed by higher level of education will have higher income

CONCLUSIONS – CONT'D

- Different households will have different purchasing power
- Education plays an important role in determining the household status. The bigger the gap, the higher tendency the consumption expenditure to be different
- Different socio-demographic composition contributed to the differences in the goods and services purchased/consumed

RECOMMENDATIONS

- Study at a more detailed level such as at 4-Digit items especially in monitoring the impact of price increase to different sub-populations
- Implication of policies related to consumer spending should be evaluated at micro level instead of macro level especially when it gives more impacts to the poor
- The use of median as an indicator for income and expenditure study instead of mean. Both income and expenditure have skewed distributions in nature
- The information gathered during the conducts of national survey needs to be fully utilized in order to get more precise result as an input for policy formulations and implementation