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Relationship between B40 Household Income and Demographic Factors in Malaysia

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Abstract: ***Income inequality has become a major economic growth problem faced by most countries in the world. The income gap that exists between the rich and the poor grows wider every year. The Malaysian government have set up multiple economic policies and provided various aids that focuses on improving the B40's economic situation and reduce the income gap that exist amongst them. Data for this study are obtained from the Household Income Survey (HIS). This study makes the comparison on the range and average of income amongst the B40 household income of each state in Malaysia. This comparison analyses the income gap that exist amongst the local households. Income inequalities amongst B40 households are prominent in Selangor, which recorded a huge income gap amongst the households. Kelantan has the lowest maximum and average income value amongst B40 from all states. The demographic factors that have significant impacts on the distribution of income amongst the B40 population in Malaysia was analysed using regression models. Residential area, levels of academic studies and working status of the head of household are the factors that effects B40 populations in Malaysia.***

Keywords: B40 household; demographic factors; income; multiple linear regressions.

I. INTRODUCTION

The income distribution of the population shows the rate of distribution of gross domestic product (GDP) for the population of such an area or country. Many theories and studies on the income distribution of the population have been done around the world as this is a major economic problem for many countries trying to balance a fair level of income for their people. The imbalance of income distribution occurs when the income gap between the poor and the rich is large.

In Malaysia, the income difference can clearly be seen based on visual observation of the lifestyle amongst the people that varies differently based on various factors such as age, type of occupation, urbanization of the living area and marital status. The obvious observation can be made in Kuala Lumpur as reported by [1] that the government had to set up a transit center to help the homeless people in the city and Kota Bharu [2] which is the second poorest state in the country. The government has also set up various policies ever since the independence of the country to help reduce the poverty rate and income gap amongst the people.

On a global scale, the United States of America (USA) is facing a huge income gap issue amongst its citizens with the former President of USA, Barack Obama, famously quoted saying the income inequality is the issue that defines this generation [3]. The World Inequality Report 2018 [4] shows that the top 1% earners in the country are accounted for 20% of the overall income while the bottom 50% earners received a total of 13% of the overall income. Meanwhile in China, research by [5] shows that the top 10% earners of the country received 41% of the overall income while the bottom 50% earners only accounted for 15% of the income in 2015.

Malaysian people are divided into three different groups according to their income level for each household, which is T20, M40, and B40 groups. Income classification is created for helping the government monitor the economic progress of the people through different groups, channeling aid to those in need and also reducing income imbalances among the people. T20 is the 20% highest earners in Malaysia; M40 is 40% middle earners and B40 for the lowest 40% earners. Based on the rate released in 2018 during the Budget 2019 report, the B40s are households with average monthly income below RM3860, which also includes those with average income less than Poverty Income Line of RM950 per month. In the Budget 2019 report [6], the B40s are the biggest earners with the government focusing on reducing the income gap and helping people in this category with daily expenses and needs. Examples of the aids announced during the Budget 2019 report is the Household Living Aid for households with income lower than RM4000 a month, subsidization of electricity rate, healthcare protection funds and abolishment of toll booths by stages. The objectives of the research is to make comparisons on the B40 household income amongst states in Malaysia and recognizing the demographic factors that affects the B40 household income rate based on the income comparisons. Demographic factors gave different affects towards the people's rate of income. Research by Khazanah Research Institute [7] shows that households in urban area gets paid an average 80% more income compared to households in the rural area. [5] stated that the research done in China shows that the average income of people from the urban area is 3.5 times higher than of the people from the ural area and accounted for 80% of the overall income in 2015.

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Research by [8] on the indigenous people in Perak shows that the indigenous people that stay in the rural area contributed more towards the people's poverty compared to those living in the city outskirts.

Gender also has a role in affecting the rate of income in Malaysia. [7] explained about the involvement and rate of income of women that is working in this era, and shows that 52% of 2.6 million women in Malaysia chose not to work while only 3.2% out of 69,800 men chose not to work. The research also stated that an increase of 30% of working women can push the nation's GDP up by 12% and also reducing the average age of working women. Research by [8] on the indigenous people also shows that women head of households are contributing more towards poverty compared to men head of household. [9] analyzed the economic prosperity amongst retired senior citizens that was conducted with 1400 respondents from Malaysia and the research showed that there is a difference in income between male respondents and female respondents. Male senior citizens are found to have formal source of income such as pension or other form of works after retiring while female senior citizens' income are from informal sources such as their children's gifts. Human capital is another demographic factor that is highlighted to have big effect on the rate of household income. Human capital is the talent or ability of a worker to do the job that is given and this capital cannot be transferred from one person to another [10]. Human capital can be achieved by individuals through investments in education, job training, health, migration and individual efforts in raising human capital. The study of Human Capital Theory conducted by [11] in Nigeria examines the impact of formal study on the economic development of a country. This formal study is associated with the training or the sharpening of human capital to be used as a factor of income level. The results show that there is a positive correlation between investment in education and economic growth. [12] showed that education levels had an important role to play in increasing the economic situation in Malaysia from 1970 to 2000. Research showed that an increase in literacy rate from 62% of the people in 1970 to 79% in 2000 and the growth of the manufacturing sector made sure that these literates get opportunities to work in the sector

II. METHODOLOGY

A. Data

The research uses data from the 2016 Household Income Survey (HIS) obtained from the Department of Statistics Malaysia (DOSM). Data collected are distributed by state to obtain household income information from each state in Malaysia. Data is sorted to get data with the lowest 40% income from each state, which is defined as the B40 population that will be used in this research. The final data that will be used throughout the study will be divided by state and includes information on head of household i.e. residential area, number of households, gender, categorized age, citizenship status, marital status, highest level of education, current employment status, type of employment , the job industry involved and household monthly income.

This data will also provide the range and average of income for each state to fulfill the objectives of this research.

B. Multiple Linear Regression

Multiple linear regression (MLR) is used to identify the influence of several independent variables (x_1, x_2, ... x_n) against the dependent variable (y_i). The linear regression model for this study is as follows:-

$$log(y)_i = \beta_0+\beta_1 x_1+\beta_2 x_2+...+\beta_n x_n+\epsilon$$

The β_0 symbol is a constant or parameter for y_i value when (x_1, x_2, ... $x_n = 0$). β_n is the coefficient for each independent variable and ε represents the deviation of this model. This study uses the monthly income data of the population, y_i, which provides positive values, causing these dependent variable data to be the right skewed. Log-transforms of the monthly income data are used to obtain normal scattered data. The regression models for this research are generated using *R* programming.

C. Normality Tests

Normality tests are carried out to detect if there are independent variables that have a high effect on the dependent variable. This is a statistical error that can provide a regression model that is not appropriate for the purpose of the study. Statistical errors usually exist in scientific studies and about 50% of published articles have at least one mistake [13]. The test to determine whether data indicates significant deviation is important for a study.

The use of *R* programming will produce a diagnostic plot diagram to determine visually if there are high-profile variables. It displays a diagnostic plot of Normal Q-Q plot and the data will be considered as normal distribution if the probability plot forms a straight line through the origin [14]. Another normality test is by identifying R2 value which is a statistic measure to evaluate the level of data fitting and the regression model generated. The R2 value that is suitable for this research is R2 that is more than 0.20 [15] and [16].

The use of appropriate independent variables is important in choosing a good model for regression analysis. A good model has many variables that are significant at the stated significance level of p-value less than 0.05. Methods that are used to get the best model are by using different reference variables, combining insignificant variables and eliminating insignificant variables.

III. RESULTS AND DISCUSSION

A. Descriptive Analysis

Table 1 shows the number of B40 households according to the state in Malaysia used in this study based on the data of HIS 2016. Sarawak, Sabah and Selangor show the highest number of B40 household compared to other states while Federal Territory (FT) of Putrajaya has the lowest population size of 57 households.

FT of Kuala Lumpur's status as the capital of Malaysia recorded the highest number of households amongst the federal territories with 585.

Table 1: Number of B40 households according to states in Malaysia

States	No of B40 Households
Johor	800
Kedah	613
Kelantan	597
Melaka	300
Negeri Sembilan	367
Pulau Pinang	559
Pahang	497
Perak	681
Perlis	198
Sabah	1,196
Sarawak	1,393
Selangor	979
Terengganu	461
Federal Territory (FT) of:	
Putrajaya	57
Labuan	121
Kuala Lumpur	585
Total	**9,404**

Based on residential area, data shows that Perlis households living in the urban area are 50% and in rural area are 50% with minimal income difference. Kelantan shows the highest percentage of population living in the rural area with 67% while Sarawak with 65% of the population. Analysis on the data also shows that more than 70% head of households from B40 group in Malaysia are male. Terengganu and FT of Labuan have the highest percentage of male head household with 85% and 86% each.

Based on age categories for B40 households in Malaysia, data shows that age category group of 35-44 and 45-54 years old is the category with the highest percentage of people, with both categories accounted for more than 44% of the data. FT of Putrajaya age data showed different trends compared to other states, with 92% of the B40 from Putrajaya is from the age category of 25-44 years old. Data also showed that the average monthly income of the people decreased significantly after 60 years old due to retirements [9]. Meanwhile, the ethnicity distribution in the data shows that Kelantan and Terengganu have the highest percentage of bumiputera (native born citizens) with 97% and 99% each. Even though Kelantan has majority of bumiputera citizens, data shows that the non-bumiputera earns higher average income compared to bumiputera. Pulau Pinang is the only state with higher non-bumiputera people with almost 51% of the B40 population.

Overall, the non-bumiputera only covers a quarter of the B40 population percentage but they have higher average income compared to the bumiputera. Analysis on the marital status of the B40 population shows that 69% of the population is married and one of the highest earners with RM2915 average monthly income while the highest earner is the head of household that is not married with RM2952 per month. Data also shows that married head of households have the largest average size of household with 4 people. Based on the highest level of education, majority of the head of B40 households, 37%, stated that SPM is the highest education certificates that they have while 35% of the household do not have any sort of education certificates. Bachelor's degree holder only amounted to 2% of the B40 populations but recorded the highest average monthly income amongst others with RM4232 per month. Next, data shows that more than 47% of the B40 populations work in the private sector while 28% of it worked on their own. Head of households that work in the government sector shows the highest average of income with RM3704 per month. The professional employment with the highest average of monthly income is RM4152 per month.

B. Comparisons of B40 Household Income

Table 2 shows the range and average value of B40 household income amongst states in Malaysia.

Table 2: Minimum, Maximum and Average value of income for B40 households in Malaysia

States	Min Income (RM)	Max Income (RM)	Average Income (RM)
Johor	491.67	4636.83	3080.09
Kedah	416.67	3112.50	2053.78
Kelantan	507.50	2545.83	1799.52
Melaka	943.33	4689.78	3288.20
N.Sembilan	269.58	3849.17	2483.02
P.Pinang	550.00	4546.25	3147.47
Pahang	526.00	3497.00	2567.14
Perak	510.83	3391.92	2247.72
Perlis	434.17	3611.50	2529.60
Sabah	505.42	3197.75	2074.34
Sarawak	472.67	3351.00	2164.82
Selangor	575.00	6029.17	4200.68
Terengganu	579.42	3979.17	2868.42
FT of Putrajaya	3113.33	7305.00	5615.43
FT of Labuan	846.75	5104.91	3504.03
FT of Kuala Lumpur	1077.50	7610.00	5242.03

Data shows FT of Kuala Lumpur and Selangor as the states with the biggest difference between the highest and lowest paid population, with Kuala Lumpur recorded a RM6533 difference, while Selangor's income gap is RM5454. The smallest income gap is recorded in Kelantan with the difference between the highest and lowest income amongst the B40 household is RM2038. Although the minimum income value for Kelantan is almost the same as other states, the Kelantan population has the lowest value for the maximum income value amongst the state, at a value of RM2546. This value is much lower than in other states, which is at least RM3000, with Kedah as the nearest state in terms of maximum salary value at RM3113. The highest average income can be seen recorded in the states of Selangor, FT of Kuala Lumpur and FT of Putrajaya, each with an average income of RM4201, RM5242 and RM5615 while the lowest average income is in Kelantan with RM1800.

These states have the three highest average income values because of the existence of modern cities that become the hub for economic and technological developments [5].

C. Multiple Linear Regression

Table 3 shows the demographic factors that have a relationship towards the income rate of the people from each state. The regression assumptions are done using scattered diagram and no multicollinearity issues detected for the sample used.

Based on the analysis, two states were selected to generate the best income regression model, which is Kelantan and Selangor.

Kelantan has the lowest average and maximum income value of the B40 population comprising of 597 residents while Selangor is among the states with the highest income gap among the B40 with 979 residents.

Table 3: Independent variables of income regression model for each state

States	Independent variables for *log(Income)*
Johor	Size, Age Category, Ethnicity, Marital, Education, Status, Type of Employment
Kedah	Area, Size, Marital, Education, Status
Kelantan	Area, Size, Gender, Age Category, Education, Status
FT Kuala Lumpur	Area, Size, Gender, Age Category, Marital, Education, Status
FT Labuan	Gender, Status, Type of Employment
Melaka	Size, Gender, Education, Status
Negeri Sembilan	Size, Gender, Education, Status, Type of Employment
Pahang	Area, Size, Ethnicity, Marital, Education, Status, Type of Employment
Penang	Size, Gender, Ethnicity, Education, Status
Perak	Area, Size, Ethnicity, Marital, Education, Status, Type of Employment
Perlis	Size, Education
FT Putrajaya	Size, Education
Sabah	Area, Size, Age Category, Ethnicity, Education, Status, Type of Employment
Sarawak	Area, Size, Gender, Age Category, Ethnicity, Education, Status, Type of Employment
Selangor	Area, Size, Gender, Ethnicity, Marital, Education, Status, Type of Employment
Terengganu	Area, Size, Marital, Status

Table 4 shows the completed income model for Selangor with R2 value of 0.2028, which shows that the independent variables for the model explained has the variance of 20.28% for Selangor's B40 household.

The reference variable for this model is the population from rural areas, bumiputera ethnicity, married head of households, the head of household with other education certificates, head of household that work as an employer and the head of household working as a service & salesman.

The equation of the regression model for variables that is significant at $p < 0.05$ is;

log(IncomeSelangor) ~ 3.3650 + 0.0501(AreaUrban) + 0.0153(Size) + 0.0216(Ethnicity2) – 0.03365(Marital1) – 0.0513(Marital3) + 0.0961(Education1) + 0.0895(Education2) + 0.0412(Education3) + 0.0852(Status1) + 0.0617(Status2) – 0.0758(Status3) + 0.0734(TypeEmp1) + 0.0457(TypeEmp2) + 0.0619(TypeEmp3) + 0.0249(TypeEmp5)

i) Selangor

Table 4: Selangor Income Regression model

	Beta	*T* value	*P* value
(Constant)	3.3650	134.581	< 2e-16
Urban	0.0501	4.002	0.0001
Size	0.0153	5.424	0.0000
Non Bumiputera	0.0216	2.188	0.0289
Single	-0.0365	-2.762	5.85E-03
Divorced	-0.0513	-3.462	5.60E-04
Bachelor's Degree	0.0961	4.239	2.46E-05
Diploma/STPM	0.0895	5.969	3.35E-09
SPM	0.0412	3.682	2.44E-04
Employer/Working on their own	0.0852	4.707	2.88E-06
Government Employee	0.0617	2.719	0.0067
Private Employee	0.0758	4.739	2.47E-06
Manager/Professional	0.0734	3.687	0.0002
Technicians & associate professionals	0.0457	2.685	0.0074
Clerical support workers	0.0619	3.099	0.0020
Other occupations	0.0249	1.794	0.0732

ii) Kelantan

Table 5: Kelantan Income Regression model

	Beta	*T* value	*P* value
(Constant)	3.1330	136.519	< 2e-16
Rural	-0.0405	-4.025	0.0001
Size	0.0127	4.517	0.0000
Female	-0.0358	-3.072	0.0022
Age Category 45-54	0.0440	3.026	0.0026
Age Category 55-64	0.0524	3.292	0.0011
Age Category 65-74	0.0610	3.24	0.0013
Age Category others	0.0234	1.566	0.1180
No education certificates	-0.0325	-2.973	0.0031
Employer/ Working on their own	0.0641	3.948	0.0001
Government Employee	0.1865	3.831	1.41E-04
Private Employee	0.0982	5.75	1.44E-08
Not working	0.0863	3.836	1.39E-04

Table 5 shows the completed income model for Kelantan with R2 value of 0.2343, which shows that the independent variables for the model explained has the variance of 23.43% for Kelantan's B40 household. The reference variable for this model is the population from urban areas, male head of households, age category of 35-44 years old, head of household with any education certificates and head of households with employment status of others. The equation of the regression model for variables that is significant at $p < 0.05$ is;

log(IncomeKelantan)~ 3.1330 – 0.0405(AreaRural) + 0.0127(Size) – 0.0358(Gender2) + 0.044(AgeCate45-54) + 0.0524(AgeCate55-64) + 0.0610(AgeCate65-74) – 0.0325(EducationNS) + 0.0641(Status1) + 0.1865(Status2) + 0.0982(Status3) + 0.0863(StatusNW)

IV. CONCLUSIONS

This study has shown that demographic factors have a significant effect towards the income rate for the B40 population in Malaysia. Residential areas play an enormous role in income distribution.

States that have a low percentage of people living in rural areas showed a higher average monthly income than states with higher percentage of rural population. The research also found that the gender of the head of household in Malaysia had a significant impact on the household income of the B40 population. The average wage for female head of household is lower than the head of the male household for each state except Federal Territory of Labuan. The level of education for the head of household also has a significant impact on the income of the B40 population. The study clearly shows that an increase in the level of education certificate will provide a significant increase in resident's income. Comparison made on the range of B40 income shows that the state of Selangor and Federal Territory of Kuala Lumpur have the largest income gap amongst the B40 population while Kelantan recorded the smallest income gap amongst all states. Kelantan also has the lowest average income, showing that Kelantan is the poorest state amongst B40 population while Selangor and FT of Kuala Lumpur were among the top three richest states, which at least doubled Kelantan's average income value. Selangor's regression model shows that the income level of the B40 population in the state is influenced by the residential area, size of households, the ethnicity status, the marital status, the highest level of education, the status of employment and the type of occupation of head of households. The significant factors that affects the B40's level of income which are described by the regression model for Kelantan are residential areas, size of households, gender, age group, education level and status of employment of head of household.

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