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HUMAN CAPITAL AND REGIONAL WAGE DIFFERENTIALS IN MALAYSIA

Regional wage inequality in Malaysia is still prevalent widely with more developed regions receiving higher proportions of wages compared to the less developed ones. Human capital theory postulates there is a positive relationship between human capital attainment and wages received by individuals through productivity enhancement. The objective of the paper is to analyse the effect of human capital on the household level of wages and to identify the determinants of wage differentials between developed and less developed regions. The analysis is based on the data collected from the field survey on 4,003 households in Peninsular Malaysia in 2007/2008. We find that human capital variables play an important role in determining the regional wage level and wage differentials in Malaysia.

Keywords: *human capital; regional wage differentials; region; household; Malaysia.*

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ЛЮДСЬКИЙ КАПІТАЛ ТА РЕГІОНАЛЬНА НЕРІВНІСТЬ У ЗАРПЛАТАХ: ЗА ДАНИМИ МАЛАЙЗІЇ

У статті продемонстровано регіональну нерівність заробітних плат у Малайзії. Згідно з теорією людського капіталу існує позитивний взаємозв'язок між людським капіталом та індивідуальною заробітною платою через підвищення продуктивності праці. Проаналізовано вплив фактору людського капіталу на економіку домашніх господарств та представлено низку факторів, що визначають різницю у зарплатах між розвиненими та менш розвиненими регіонами країни. Для аналізу використано дані опитування 4300 домогосподарств півострова Малайзія, проведеного у 2007–2008 роках. Доведено, що змінні, пов'язані з розвитком людського капіталу, відіграють значну роль у визначенні регіонального рівня заробітних плат у Малайзії.

Ключові слова: *людський капітал; регіональна різниця у заробітних платах; регіон; домашнє господарство; Малайзія.*

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ЧЕЛОВЕЧЕСКИЙ КАПИТАЛ И РЕГИОНАЛЬНОЕ НЕРАВЕНСТВО В ЗАРПЛАТАХ: ПО ДАННЫМ МАЛАЙЗИИ

В статье показано региональное неравенство по зарплатам в Малайзии. Согласно теории человеческого капитала существует позитивная взаимосвязь между человеческим капиталом и индивидуальной заработной платой путём повышения производительности труда. Проанализировано влияние фактора человеческого капитала на экономику домашних хозяйств и представлен ряд факторов, которые определяют разницу в зарплатах между развитыми и менее развитыми регионами страны. Для анализа использованы данные опроса 4300 домохозяйств полуострова Малайзия, проведённого в 2007–2008 годах. Доказано, что переменные, связанные с развитием человеческого капитала, играют значительную роль в определении регионального уровня заработных плат в Малайзии.

Ключевые слова: *человеческий капитал; региональная разница в заработных платах; регион; домашнее хозяйство; Малайзия.*

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1. Introduction

The Ninth Malaysia Plan unveils the growing trend in income inequality and other dimensions of inequality among Malaysian households. The gap in income inequality is prevalent between rural and urban areas and between less developed and more developed regions. Although the average mean monthly household income has increased and progress has been made to reduce poverty, the proportion of income received by households in developed region is higher compared to less developed regions. The development gaps between the regions are also reflected in investments, urbanisation and population rate that are skewed towards more developed regions (Malaysia, 2006). The implementation of the New Economic Policy (NEP) in 1970 signified government efforts and steps to offset these disparities. Nevertheless, these efforts are still far from reaching the initial targets. Despite achieving a rapid economic growth, especially, in the 1990s, the government is still struggling and facing many obstacles to narrow the growing gap in income earning and distribution.

The human capital theory postulates there is a positive relationship between human capital attainment (education and training) and wage received by individuals through productivity enhancement. Consequently, inequality in human capital attainment will lead to inequality in wage received by households. This theory has been tested using empirical data and most findings support this. Even though, the human capital theory was originally developed to explain individual wage, many past studies used it for macroanalysis like the study that relates human capital to household wage or economic growth.

This paper attempts to examine the effect of human capital variables on the level of household wage and to identify the determinants of regional wage differentials in Peninsular Malaysia. The analysis is based on the data collected from the field survey of 4003 households in Peninsular Malaysia in 2007/2008. The first part of this paper contains the discussion on the effect of human capital variables such as the level of education, training, experience and health on household wage based on the estimation of wage function. The second part contains the discussion on the determinants of regional wage differentials using the decomposition model.

2. Literature review

Pioneered by Schlutz (1960) and Becker (1964), human capital has been widely recognised as one of the important inputs for economic growth. Human capital refers to productive capacity of an individual (household, nation) generated through investments in education, training and healthcare. Continuing investment in these human factors will induce and enhance individual inner potential (l knowledge, skills and health), thereby making them more productive and capable to compete with others at job markets.

Previous studies have shown the significant influence of human capital on income distribution with the emphasis on its impact through education and training. Differences in accumulated human capital play an important role in determining wage differentials and thus income distribution. Also, how households allocate their income between consumption and investment in education (human capital) will directly impact wage determination.

Households with higher levels of education have a chance to reap more benefits relative to those with less education. According to Mincer (1970), an increase in one

year of schooling will increase workers yearly earnings by 11.5% in the US. Knowledge and skills obtained from investment in human capital will enhance individual capability, efficiency and productivity thus making them more competitive and marketable (Gianni, 2001; Liu, 2008). Individuals with higher skills will gain more benefits particularly in terms of income earning. The studies by Manson (2006) and Birchenall (2001) find that household income inequality in the United States and Colombia is induced by higher demand for skilled workers compared to unskilled. Lin (2007) shows that skill-biased technological change is the factor that contributes to changes in demand for workers from unskilled towards skilled workers at Taiwan labour market.

Verner (2000; 1999) reveals that worker productivity and wages are positively influenced by the level of education, training and level of experience received. Workers with higher education attainment receive higher payment relatively to those with minimum education. Schady (2000) also disclosed huge differences in workers wage rate of return based on the level of education in the Philippines. Marais (1994) studied the relationship between education and income distribution among black and white people in South Africa and showed that regardless races, income distribution will be equalised with the increase in educational attainment.

Past studies show the importance of government played in accelerating and expanding human capital development among its population in achieving higher economic growth. A country that displays greater emphasis in providing education that can be reachable and accessible by its population will make a decisive impact on its efforts to reduce and equalise the inequality in household income distribution (Psacharopoulos, 1977; Vianne, Zilcha, 2001). Furthermore, an increase in government investment on human capital (education and training) contributes significantly to narrow earning inequality and thereby offsetting the incomes received by households, thus reducing poverty especially among the bottom group (Behr, Neelakantan, 1999; Arabsheibani et al., 2003).

Government allocation on education and training apart from enhancing the quality of human capital also aims to reduce earning inequality among skilled and unskilled workers (Sylwester, 2002; Turrini, 1998). Nevertheless, the effect of government efforts can only be scrutinised in the long run and are influenced by family background and types of education and training received by workers (Sylwester, 2000; Glomm et al., 2003). Many studies show that although the quality of education received by higher income and less income family are similar, inequality in income distribution among lower income families are more obvious. The reason for this trend is that higher income families tend to place more effort and greater emphasis on their children's education.

Apart from education, investment in primary healthcare will positively contribute to high accumulation of human capital and reduce the cost of income risk and poverty level (Kurosaki, Khan, 2001). A productive and healthy body generated by better nutrition, medication and hygiene will stimulate the productivity level and thereby enhance the individual ability and capability towards performance.

Previous research has demonstrated the important role of human capital in influencing income disparities between regions. Xin Meng and Harry X.Wu (1994) and Yoko Asuyama (2008) show that the quality of labour is increasingly important in

determining household income level across the provinces in China. These studies show that the increase in average workers education level has a significant positive income effect. Obviously, to mitigate income differentials and equalising income distribution between urban and rural regions are among the solutions that contribute to raising individual ability (both the general and occupational education level) of population, especially in rural areas. Takahashi (2007) reveals that return to human capital is one of the leading factors that contribute to income differences across the regions in Vietnam. Further, he argues that one of the underlying causes of income gap between the Southern region (more developed) and Northern region (less developed) lies in different endowments of human capital between these two regions.

According to this study, education attainment of household in the Southern region is higher compared to the Northern region and this contributes significantly towards widening the income disparity between these regions. Rodriguez-Pose and Vilalta-Bufi (2005) find a significant correlation between the endowment of human capital of European regions and their economic performance. This study shows that regions with higher education attainment are likely to be dynamic regions, have more potential for economic growth and tend to attract firms and educated workers from other areas.

In Malaysia, to the authors' knowledge, there are no specific studies to look at the determinants of regional wage differentials. But few studies have been conducted to look at the effect of human capital on wage and determinants of wage differentials by gender. Anand (1984), Rahmah (1988; 1996; 2001), Chua (1985) and Latifah (1998) show that the private rate of returns from education in Malaysia is between 12% and 14%. The same studies also reveal that the contribution of education in determining wage differentials in Malaysia is between 20% and 37% (Rahmah, 1987; Latifah, 1998).

3. Research methodology and model specification

The analysis in this paper is based on the data collected from the field survey of 4,003 households in Peninsular Malaysia in 2007/2008. For the purpose of this analysis, the classification of region is based on the Development Composite Index (DCI). The states with DCI above 100 are classified as developed regions, while the states with DCI below 100 are classified as less developed regions. Developed regions includes Selangor, Negeri Sembilan, Melaka, Johore, Penang, Perak and the Federal Territory of Kuala Lumpur, whereas, less developed regions are Terengganu, Kelantan, Pahang, Kedah and Perlis. The selection of the respondents was done according to zones, states, demographic and ethnics features (adjusted from the Ninth Malaysia Plan).

This study has two stages of analyses. The first part contains the analysis of results from the estimation of 3 household wage functions, that is using pooled sample, more developed sample and less developed sample. These equations are estimated using the standard ordinary least squares (OLS) procedure. The second part contains the discussion of the decomposition of wage differentials using Oxaca and Ransom (1994) wage decomposition model. The regression model for household wage can be written as follows:

$$\ln W_{ij} = \beta_0 + \beta_1 T + \beta_2 S + \beta_3 P + \beta_4 TC + \beta_5 Exp + \beta_6 Exp^2 + \beta_7 MHL + \beta_8 U + \beta_9 M + \\ + \beta_{10} C + \beta_{11} Serv. + \beta_{12} Manf. + \beta_{13} KW + \mu, \quad (1)$$

where:

lnW_{ij} = natural logarithm of employed households monthly wage;

T = tertiary dummy; 1 if education level is tertiary, 0 otherwise;

S = secondary dummy; 1 if education level is secondary, 0 otherwise;

P = primary dummy; 1 if education level is primary, 0 otherwise;

TC = training or courses dummy; 1 if attended training or courses, 0 otherwise;

Exp = experience;

Exp^2 = experience squares;

MHL = mean score for healthy lifestyle;

U = location dummy, 1 if urban, 0 otherwise;

M = ethnicity dummy; 1 if Malay, 0 otherwise;

C = ethnicity dummy; 1 if Chinese, 0 otherwise;

$Serv.$ = services dummy; 1 if working in the service sector, 0 otherwise;

$Manf.$ = manufacturing dummy; 1 if working in manufacturing sector, 0 otherwise;

DKW = knowledge worker dummy; 1 if works as a senior officer and manager; professional; technician and assistant professional, 0 otherwise;

μ = error term.

The decomposition model for regional household wage differentials can be written as:

$$\overline{\ln W_i} - \overline{\ln W_j} = (\overline{X}_i - \overline{X}_j)\hat{\beta}^* + \overline{X}_i(\hat{\beta}_i - \hat{\beta}^*) + \overline{X}_j(\hat{\beta}^* - \hat{\beta}_j), \quad (2)$$

where $\overline{\ln W_i}, \overline{\ln W_j}, \overline{X}_i, \overline{X}_j, \hat{\beta}_i$ and $\hat{\beta}_j$ are means of the natural logarithm of the observed monthly household wages, mean of the observed productivity-related characteristics and coefficient estimates for developed and less developed regions respectively. $\hat{\beta}^*$ represents the estimated coefficient using a pooled sample of developed and less developed region. The first term on the right-hand side represents the portion of the difference in wages across regions due to region differences in mean levels of productivity and other characteristics. The last two terms on the right-hand side are developed and less developed "treatment effect" which measure the extent to which the returns to developed and less developed characteristics differ from non-discriminatory returns. These two terms are also referred to as discrimination.

4. The results

4.1. Profile of respondents. Table 1 presents the distribution of employed households in this study. The total of 5733 employed households are successfully interviewed with the majority of them being from developed regions (4,412) and 1,321 are from less developed regions. They represent 75.6% Malays, 17.9% Chinese and 6.5% Indians.

Table 1. **Distribution of employed households by regions and ethnic groups**

Ethnic Group	Region				Total	
	Developed		Less Developed			
	Frequency	%	Frequency	%	Frequency	%
Malay	3329	75.5	1006	76.2	4335	75.6
Chinese	794	18.0	229	17.3	1023	17.9
Indian	289	6.5	86	6.5	375	6.5
Total	4412	100.0	1321	100.0	5733	100.0

Source: Field Survey (2007/ 2008).

Table 2 shows the number of employed households of major sectors in developed and less developed regions. The majority of the respondents are involved in services and manufacturing. The percentage of employed households in services and manufacturing in developed regions are higher compared with less developed regions. While the percentage of employed households in agriculture is relatively higher (9.1%) in less developed regions compared to developed ones. This indicates that agriculture is a more important source of income for households in less developed regions.

Table 2. **Distribution of employed households by sectors**

Sector	Region				Total	
	Developed		Less Developed			
	Frequency	%	Frequency	%	Frequency	%
Service	3346	77.1	908	70.1	4254	75.5
Manufacturing	737	17.0	188	14.5	925	16.4
Agriculture	108	2.5	118	9.1	226	4.0
Mining	6	0.1	2	0.2	8	0.1
Construction	143	3.3	79	6.1	222	3.9
Total	4340	100.0	1295	100.0	5635	100.0

Source: Field Survey (2007/ 2008).

Table 3 presents the distribution of employed households by occupational category. The majority of employed households (in both region groups) are involved in services and sales, and professional categories. The percentage of respondents in both occupations is higher in more developed regions. While in agriculture and fishery, the percentage involvement is higher for less developed regions as compared to developed ones.

Table 3. **Distribution of employed households by occupations**

Sector	Region				Total	
	Developed		Less Developed			
	Frequency	%	Frequency	%	Frequency	%
Senior Officers & Managers	336	7.8	58	4.6	394	7.1
Professionals	885	20.5	238	19.0	1123	20.2
Technicians & Associates Professionals	411	9.5	127	10.2	538	9.7
Clerical Employees	578	13.4	156	12.5	734	13.2
Services & Sales Staff	1077	25.0	260	20.8	1337	24.0
Agriculture & Fishery	95	2.2	96	7.7	191	3.4
Craft & Trade	28	0.6	20	1.6	48	0.9
Plant, Machine & Installation Operators	542	12.6	138	11.0	680	12.2
Elementary Occupations	358	8.3	157	12.6	515	9.3
Total	4310	100.0	1250	100.0	5560	100.0

Source: Field Survey (2007/ 2008).

4.2. Estimation results. Table 4 shows the results of the estimation of 3 regression models using the pooled sample, developed region sample and less developed region sample of households. The R^2 for these 3 models are considerably high with the value of 0.464, 0.451 and 0.499 respectively. This indicates that more than 40% of the variation in dependent variables is explained by incorporated independent variables.

The results seem to support the findings from past studies on the influence of human capital on wages. Human capital variables like years of schooling (tertiary level [*T*] and secondary level [*S*]), training and courses attended (*TC*), working experience (Exp) and healthy lifestyle (MHL) significantly influence household wages. For

example, employed households with tertiary, secondary and primary levels of education are likely to receive 56.7%, 69.7% and 27.3% higher wages respectively than those with no schooling. Similarly, employed households who attended training or courses are likely to receive 16.6% to 22.4% higher wages as compared to those without training or courses. The result also shows that working experience and lifestyle have a significant positive impact on wages in both regions.

The results also demonstrate that household residents in urban areas are likely to acquire higher wages compared with household residents in rural areas for these 3 samples. Further, the results for both regions demonstrate that wages earned by the Chinese are significantly higher compared with the Indians. But there is no significant difference between wages earned by the Malays compared with the Indians in less developed regions.

Table 4. **Estimation results of the regression model**

Independent Variable	Region		
	Pooled Model	Developed	Less Developed
	β (t)	β (t)	β (t)
Constant	5.946 (62.101)***	5.888 (50.547)***	6.108 (36.364)***
(a) Human Capital			
Tertiary Education (DT)	.567 (6.464)***	.697 (6.603)***	.273 (1.753)*
Secondary Education (DS)	.309 (3.557)***	.449 (4.287)***	-.036 (-0.236)
Primary Education (DP)	.062 (0.665)	.184 (1.658)*	-.262 (-1.555)
Training and Courses Attended (DTC)	.166 (11.240)***	.144 (9.079)***	.224 (6.363)***
Experience (Exp)	.052 (22.641)***	.051 (20.183)***	.056 (11.338)***
Experience square (Exp2)	-0.001 (-16.600)***	-0.001 (-14.894)***	-0.001 (-8.380)***
Healthy lifestyle (MHL)	.058 (5.519)***	.076 (6.593)***	.068 (2.916)***
(b) Location			
Urban/Rural (DU)	.276 (17.694)***	.238 (12.894)***	.175 (5.512)***
(c) Ethnicity			
Malays (DM)	.044 (1.624)	.085 (2.858)***	-0.077 (-1.267)
Chinese (DC)	.266 (8.738)***	.306 (9.228)***	.166 (2.433)**
(d) Job Characteristic			
Services Workers (DS)	.172 (6.372)***	.099 (3.137)***	.256 (4.906)***
Manufacturing Workers (DS)	.130 (4.251)***	.071 (2.003)**	.132 (2.141)**
Knowledge Workers (DKW)	.409 (24.685)***	0.392 (22.035)***	.440 (11.072)***
Adjusted R^2	0.464	0.451	0.499
R^2	0.465	0.453	0.505
Overall F	341.662***	253.787***	86.782***
N	5125	4004	1121

Note: ***Significant at the 1% significance level; **Significant at the 5% significance level; *Significant at the 10% significance level; t - values in parenthesis.

Job characteristics also significantly influence wages. Household members who work as senior officer and managers, professionals, technicians and assistant professionals or knowledge workers (*KW*) are likely to acquire higher wages as compared to those who work in services and manufacturing. It is also shown that knowledge workers are likely to receive 39.2% to 44.0 % higher wages than other workers. Similarly, employed households involved in manufacturing and services receive higher wages than those in agriculture.

4.3. Decomposition of wage differentials. Table 5 illustrates the decomposition of regional wage differentials, which is divided into 2 parts. The first part is due to differences in the estimated coefficients on those factors. This part is commonly known as the explained portion of the wage gap, while the second part is the unexplained portion. The second part is important since it measures the extent to which the returns to developed and less developed regions' characteristics differ from non-discriminatory returns. The result shows that only 36.6% of developed – less developed wage differentials can be explained. Unexplained variables contribute 63.4% of developed – less developed wage differentials and the divergence coefficient is 0.203.

Regional differences in stock of human capital and job characteristic explain 4.1% and 7.0% respectively of the wage gap between developed and less developed regions. Location variable contributes about almost two-thirds of the explained portion of the wage gap. This shows that urban and rural employed households have the largest contribution to wage differentials. However, regional difference due to ethnicity is the negatively explained portion of the wage gap. The treatment effect of human capital is large and helps to widen up the wage gap by 130.1%. However, job characteristic creates a negative effect and helps to shrink the wage gap by about 50.0%.

Table 5. **Decomposition of developed – less developed wage differentials**

Variable	$\overline{\ln W_i} - \overline{\ln W_j} = 0.292$			
	$(\overline{X}_i - \overline{X}_j)\hat{\beta}^*$	$\overline{X}_i(\hat{\beta}_i - \hat{\beta}^*)$	$\overline{X}_j(\hat{\beta}^* - \hat{\beta}_j)$	Total discrimination
		-0.058 (-19.9)	-0.162 (-55.5)	-0.22 (-75.3)
(a) Human Capital	0.013 (4.4)	0.163 (55.8)	0.217 (74.3)	0.380 (130.1)
(b) Location	0.074 (25.3)	-0.023 (-7.9)	0.047 (16.1)	0.024 (8.2)
(c) Ethnicity	-0.002 (-0.7)	0.038 (13.0)	0.109 (37.3)	0.147 (50.3)
(d) Job Characteristic	0.022 (7.5)	-0.073 (-25.0)	-0.073 (-25.0)	-0.146 (-50.0)
Overall	0.107 (36.6)	0.047 (16.1)	0.138 (47.3)	0.185 (63.4)
Divergence Coefficient (D)				0.203

Note: % of total differentials.

5. Conclusion

The results of this study reveal that human capital variables like the number of years of schooling, training and courses attended and healthy lifestyle are highly significant in determining and influencing wages acquired by households in both

regions. In developed regions, the result shows that the influence of schooling and healthy lifestyle on household wages is higher compared with less developed regions. Also, in less developed regions, training and course attended by household members are proven to have a higher significant impact on their wages. The continuous efforts to gain knowledge and skills are proven to be worthwhile especially for households in less developed regions. In both regions, knowledge workers receive higher wage and it is even higher in less developed regions. These findings are consistent with the past studies, which demonstrate that continuous investment in human capital development is likely to improve and increase the acquired wages among households.

The regression result also demonstrates the important influence of location, ethnicity and job characteristic variables on household wages. Households in urban areas within both locations receive higher wages and Chinese households receive higher wages than Indian ones. Involvement in more productive business activities and services-related sectors are the main reasons attributed to higher wages acquired by the Chinese. This finding clearly indicates that involvement in higher value-added activities is a prerequisite for wage increase.

The decomposition of regional wage differentials shows that the most important explained variable is location followed by job characteristics and human capital variables. However, the most important treatment effect is human capital followed by ethnicity. These results imply that different treatments exist between developed and less developed regions with regards to the opportunity to obtain human capital that may be due to discriminatory practices of the related parties. This can be explained by lower quality of educational facilities and training in less developed regions. Ethnicity is another important treatment effect that leads to wage gap between developed and less developed regions in Malaysia. This phenomenon can be related to employers' discriminatory practices at labour market. It is commonly observed and accepted that job opportunities among races are different and possibly biased towards their own ethnicity at least in the long run with regards to promotion.

The findings of this study bear some policy implications. In order to increase household wages, household members must invest more in human capital especially in education and training. It is particularly important to achieve higher level of education to gain higher wages as shown by the results. Education and training are also associated with job held by household members. The higher is the educational attainment, the more likely the individuals will be at a higher job rank, such as educated and knowledge workers will benefit and enjoy more with higher wages.

In order to reduce wage gap between developed and less developed regions, several measures must be considered and implemented. First, viewing from the important attribution of location on wage differentials, enhancing the development of less developed regions is of utmost importance and priority. Through this, regions will be viable and thus able to create higher value added activities to further pay higher wages and benefit workers. What is more vital and important is to develop manufacturing and services related activities since these two sectors are proven to generate higher wages. Training is important for skills enhancement and promotion. In this respect, employers are urged to provide constant training to their workers. Another relevant aspect that needs attention is reducing the role of treatment effect in determining wage differentials. It is increasingly important to have a fair treatment especially in

providing educational facilities in developed and less developed regions. Employers should look at the proactive merit level aspects when dealing with promotion or hiring workers.

In conclusion, we advocate that wage differential is an important and salient subject to be studied. This issue must be tackled efficiently and prudently for the sake of equal benefits to society and create harmony and goodwill among concerned parties. An increase in wage level and a corresponding decrease in wage gap among households will improve the quality of life and welfare. This will subsequently lead to the sustainable development of all the states and Malaysia as a whole.

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