Self Selection Bias in Compensating Wage Differential Theory: Evidence from Vulnerable Workers in Malaysian Labor Market

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ABSTRACT

This paper utilise Hedonic Wage Theory (Rosen 1974 & 1986) to test relationship between vulnerable workers and wage. Analysis is made using the Mincerian semi-log earnings function (Mincer 1974) specified in the tradition of Becker's Human Capital Model (Becker 1964) with a correction for self selection bias. A total of 1705 private sector employees are selected and the result shows that the coefficient for predicted vulnerable worker variable is significant but non-positive. The implication of this result is that no adjustments in wages are made to compensate workers for undesirable job conditions. The third party, namely the government interventions therefore is needed in order to protect and enhance the well-being of the vulnerable workers.

Keywords: Self selection bias, Vulnerable worker, Hedonic wage teory, Mincerian earning function dan Human capital model.

1. Introduction

As a result of globalization, many countries have shifted their substantial demand for low-skill labor to high- skill labor in order to remain competitive in the global economy. This change has led to a more flexible labor market (Vandenberg 2008 and Viebrock & Clasen 2009). In the past, there were many formal jobs in the form of full time employment available. However, full time employment has been decreasing nowadays. It is now replaced with informal jobs in the forms of part-time, contract, temporary and self-employed worker. These informal jobs are often associated with vulnerable occupation. The workers who are vulnerable often have to accept minimal employment benefits from employers. In addition, the vulnerable workers are exposed to accident due to unconducive work environment along with job insecurity (Law Commission of Ontario 2012).

International Labor Organization (ILO) in its annual report on flow of global labor force estimated that about 1.54 billion workers or almost half of world's labor force are involved in vulnerable jobs (ILO, 2013). As a matter of fact, majority of these vulnerable workers are from developing countries. For example, in 2012, about 56 percent of 1.49 billion workers in the developing countries were categorized as vulnerable. This figure is approximately a nine million increase from previous year. The increasing trend has occurred in all places in Southeast Asia and Pacific including Malaysia. Consequently, this large number of vulnerable workers slowed down the country's economic growth since it limits the growth in aggregate demand such as consumption (ILO, 2013).

Previous literature defined vulnerable worker as a worker who works in an unpleasant and insecure job and receives low wage with inadequate employment benefits (Saunders 2003 & 2006; Chaykowski 2005; DTI 2006; Pollert 2007, 2008; TUC 2007; BERR 2008; Pollaert &

Charlwood 2009, Law Commission of Ontario 2012 and ILO 2013). Following to the literature's definition, the number of vulnerable workers in Malaysia's labor market in 2012 was estimated at 2.72 million or 21.3 percent of the entire labor force (Malaysia, 2013). An influx of the low-skill foreign laborers into Malaysia's labor market has worsened the situation. Most employers would particularly choose these low cost foreign laborers for jobs that are considered as low-skill occupation. This has forced the local laborers into vulnerable job and consequently they only enjoy the bare minimum benefits stated in Employment Act 1955.

Many studies (Saunders 2003 & 2006, TUC 2006, Pollert 2007, 2008 and Pollert & Charlwood 2009, Law Commission of Ontario 2012 and ILO 2013) have shown that vulnerable workers existed in the workplace. Its current number is about half of the world's labor force and it is expected to keep increasing (ILO, 2013). The vulnerable workers are identified based on specific characteristics from selected occupational groups considered as "vulnerable". For example, low-skill foreign worker and self-employed worker are often associated with vulnerable. In fact, low-skill foreign workers are very likely to be vulnerable due to the nature of their jobs; dirty, remote and dangerous. The unconducive and unsafe working environment along with long working hours, insecure job, and limited employment benefit can result in a negative effect to the worker's welfare and job security. All characteristics of vulnerable worker have been mentioned in many studies (Saunders 2003 & 2006; DTI 2006; Pollert 2007, 2008; TUC 2007; BERR 2008; Pollaert & Charlwood 2009).

The goal of this paper is twofold. Firstly, the present study attempts to develop an indicator of vulnerable worker in the Malaysia's labor market by using available dataset. The information on vulnerable workers is identified from a survey conducted on selected private firms in Malaysia. Next, the present study applies a Hedonic wage function (Rosen 1974 & 1986) to test a relationship between vulnerable workers and wage using semi-log Mincerian wage function

(Mincer, 1974). This model is based on a traditional human capital Becker model (Becker, 1984) with corrected self-selection bias. Ultimately, the present study decomposes wage differential between vulnerable and non-vulnerable as to identify the extent of wage gap in contributing to the observable and non-observable characteristics.

2. Hedonic Wage Theory

The fundamental theory of Hedonic wage function argues that the difference in wages is due to different job characteristics. Adam Smith (Smith, 1776) explained that laborers receive different wages due to five factors that are associated with job characteristics; namely worker's willingness to accept job, level of job difficulty, job sustainable factor, job responsibility, and career prospect. To illustrate, if wage is the only criterion for a worker's willingness in accepting a job, there are three things that make the wage differ across labor. These factors are the level of difficulty and risk, hygiene, and social status of the job. The workers should be paid higher than their counterparts if their jobs are challenging, dangerous, and of low level of hygiene and social status. Theoretically, those who are willing to work in this kind of environment must receive high compensation. In principle, a laborer prefers to work in less difficult and dangerous job. The relationship between unpleasant job characteristics and wage produces Hedonic wage model (Rosen 1974, 1986 & Hwang et. al 1998, Frank 1999).

In the Hedonic wage theory, unpleasant job is featured by a specific occupational risk. This condition is very similar to workers who are in vulnerable occupation. The main assumption of the theory is that every worker is bias towards risk or vulnerability. To be able to attract workers to work in an unpleasant job, an increase in risk is associated with an increase in wage as well. Similar relationship can also be found in employer preference. Since a firm's main objective is to maximize profit, for every decrease in risk, there will be a reduction in wage so that the

production cost does not change. As a result, those who receive high wage are those workers who involved in risky or highly unpleasant job.

However, empirical evidence does not totally support that laborers who work in unpleasant jobs earn high wage (Brown 1980 and Elliott & Sandy 1998). Liu et. al (1997) for example found that there was a clear evidence that labor wage depends on the risk of the job in Taiwan's labor market. However, Bocquier et. al (2010) found that there was no wage compensation for laborers who worked in riskier jobs in seven capital cities in West Africa. The study concluded that laborers are still receiving low wage despite their hazardous working environment.

Work Act 1955

In Malaysia there are at least 16 primary labor laws that can be categorized into 6 groups, namely job, wage, occupational health and safety, labor social welfare, labor union, industrial relation. To construct a vulnerable worker indicator, it is sufficient to refer to all the rights that are included in Work Act 1955[1]. The enforcement of the Work Act in the meantime is a legal channel for workers to claim their rights or gain protection. It must be made clear that Work Act 1955 is meant for all private sector workers in the Peninsular Malaysia and Federal Territory of Labuan. Meanwhile, workers in Sabah and Sarawak are subjected to their respective employment regulations, namely Sabah Labor Ordinance (Sabah Bab 67) and Sarawak Labor Ordinance (Sarawak Bab 76).

Among the minimum protections in Work Act 1955 include wage, right on paid leave, working hours, and notification of service contract termination (Section 12). The act also covers wage protection issues such as wage duration, wage reduction, and the requirement for employer to provide pay slip. In the case of wage duration, for example, under a section 18(1), Work Act

[1] Among the basic labor rights in Work Act 1955 are wage, working hour's duration, and leave.

1955, it is mentioned that wage duration should not exceed one month. In another law, the employer must pay the employee with cash unless otherwise stated in the contract of service about the method of payment.

These terms are crucial in order to prevent workers from being exploited by employers. In fact, it is compulsory for employers to inform their employees about the basic terms of contract such as wage, working hour's duration, leave, and notification of contact termination. Meanwhile, pay slip must be given when the employers paid their workers' monthly salary. The primary terms of work act and their implications are shown in Table 1.

TABLE 1: The Primary Terms of Work Act and Their Implications.

Work Act 1955	Term	Implication to Employer
For labor in Peninsular Malaysia that receive wage lower than RM2000	Salary < RM2000	All workers must be given a contract of service.
	Section 18, Section 19, Section 24 (9a,b,c) & Section 25	Wages are paid within 7 days of the following month. Any deduction is subject to worker permission. Maximum limit of wage deduction is 50% or 75% (including housing loan).
	Working hour *Section 60A(1)*	The regular working hour can't exceed 8 hours per day or 48 hours per week.
	Public holiday *Section 60D*	At least 11 days must be authorized.
	Leave Benefit *Section 60(E)* Sick Leave *Section 60(F)*	Paid annual leave, sick leave & public holiday. Minimum annual leave benefits depends on number of years in the firm < 2 years - 8 days 2 - 5 years -12 days > 5 years - 16 days. 14 - 22 days of paid sick leave & 60 days paid hospital admission.
	Regular payment rate *Section 60(I)*	Monthly worker: (Monthly payment rate/26) Weekly worker: (Weekly payment rate /6) Daily worker: (Total wage in the previous wage duration)/(Actual days of wage duration)
	Working overtime on: Regular day *Section 60A(3)(a)* Leave day *Section*	 1.5 x hourly wage rate 2 x hourly wage rate

	60(3)(c) Public holiday *Section 60D(3)(aa)*	3 x hourly wage rate
	Female labor night work prohibition *Section 34*	Female workers are not allowed to work in industry or agricultural between 10pm-5am, except with permission by Workforce Head of Director
	Female labor maternity protection *Section37(2)*	Minimum maternity leave of 60 days. For female workers who are paid on daily or weekly basis – Allowance is based on the worker's regular payment rate or minimum payment of RM6.00 per day, or whichever higher. For female workers who are paid on monthly basis– Allowance is based on monthly wage rate.
	Notification of Service Termination *Section 12 (2)*	The duration of notification must be mentioned in the contract. The minimum of notification duration is based on years of working: < 2 years – 4 weeks notification 2 - 5 years - 6 weeks notification > 5 years - 8 weeks notification
	Termination of Service Benefits *Rules 1980*	The payment depends of years of working < 2 years – 10 days of wage for every year of service 2 - 5 years - 15 days of wage for every year of service > 5 years - 20 days of wage for every year of service

Source: Malaysia, Human Resource Ministry.

Criteria of Vulnerable Worker in Malaysia

It can be concluded that there are two important characteristics that could cause workers' vulnerability; those are basic labor right and labor protection channel[2]. For the first characteristic, vulnerable workers are denied their basic labor rights. In the second characteristic, the vulnerable workers do not have a proper channel to protect themselves (Osman, 2011). The prospect of being a vulnerable worker corresponds to the above characteristics shown in Table 2.

[2] The risk of vulnerable workers being denied their basic labor rights are high and they do not have enough capability to protect themselves from being exploited by their employers (CONIAC, 2009).

TABLE 2: Vulnerable Worker Prospect

		Capability/Protection Channel	
		High	Low
Risk Of Being Denied Labor Basic Right	Low	1. Protected by existing laws	2. Protected by third parties
	High	3. Self-protection	**4. Vulnerable**

The workers are not considered as vulnerable if they have regular working hours of 8 hours per day or 48 hours per week. They also deserve at least one day weekly leave or at least 11 public holiday leaves as shown in Table 1. Moreover, the workers must also be given their pay slips whenever they receive their salaries.

It is significant to emphasize here that the first two terms, i.e. duration of working hours and paid leave, are very important for labor welfare. However, these terms are easily exploited by the employer. Therefore, it is sufficient at this point to mention that a worker is considered as vulnerable if the employer does not fulfill the requirement of both working duration and paid leave. For example, a worker can be considered vulnerable if there is no paid leave, and works more than permissible hours although there is a pay slip given with the salary. The number of vulnerable workers in this study is shown in Table 3 below.

TABLE 3: Number of Vulnerable Workers

	Numbers	Percentage (%)
Vulnerable worker (Vul = 1)	274	16.1
Non-vulnerable worker (Vul = 0)	1431	83.9
Total	1705	100.0

3. Data Statistics and Description

This paper utilized the 2012 Labor Survey (LS) as a sample of the Malaysian workers. The data were collected for the Department of Higher Education, Malaysian Ministry of Education under the Fundamental Research Grant Scheme (FRGS). The main objective of this survey was to provide a comprehensive information and national-level estimates for Malaysia's labor force behavior and other information such as demographic status and human capital characteristics, employment background, individuals' attitudes and satisfaction at work, and a number of geographical dimensions. The LS was conducted on a sample of currently employed workers between 15 and 80 years of age distributed nationwide. It included the workers from all regions in Peninsular Malaysia. It intended to obtain information from private sector employees who earned a monthly income of lesser than RM2000. For the present paper, the 2012 LS is particularly suitable because it serves as a national sample of interviews with workers across all sectors. Additionally, it is also the most recent dataset that provides relevant information on the current trends among labor in the Malaysian labor market, (see previous studies by Osman-Rani (1980) and Zulkifly and Ishak (1998) that analyzed with different data). However, the present study concentrated solely on private sector employees, the largest sector subgroup. We restricted the 2012 LS to salaried workers between the age of 15 and 65, so that self-employed and unpaid family-employed workers are not included in the sample. This is because data gaps will result in the calculation of their wages impossible. Thus, we are left with a sample of 1,117 private sector workers.

Table 4 shows a distribution of observations according to region and gender. It can be seen that male accounted about 42.4% of the population sample.

TABLE 4: Number of observations by region and gender.

	North	Central	South	East	Total
Male	71	182	250	220	723
Female	80	254	316	332	982
Total	151	436	566	552	1705

Temporary workers were dominated by female while number of males were higher among contract workers. Overall, female was the dominant group in the study. Table 5 shows job status for all observations.

TABLE 5: Workers' Job Status

	Permanent	Contract	Temporary	Total
Male	517	142	64	723
Female	719	137	126	982
Total	1236	279	190	1,705

Further, Table 6 shows educational background of the workers along with their income. The average labor years of schooling was 12; thus, implying that most of the workers had at least high school certificate.

TABLE 6: Observations Income and Educational Background

	Years of schooling	Age	Income (RM)
Male	12.2	29.0	1,192.20
Female	12.5	27.4	1,033.30
Total	12.4	28.1	1,100.70

On average, most of the respondents were young workers with income of about RM1100 per month. Apart from that, male received higher wage than female although female had slightly higher years of schooling. This finding could be due to a gender wage discrimination; and this

scenario has taken place in the labor market since a while ago (Chua 1984; Latifah 1998 & 2000; Rahmah & Zulridah 2005; Rahmah 2011; Rahmah et al. 2013).

4. Methodology & Model Specification

Specification

The model employed in the present study applied the switching regression models with endogenous switching developed by Madala and Nelson (1975) and Nakosteen and Zimmer (1980). Two separate income equations were utilized for vulnerable and non-vulnerable workers. In addition, the model also included an equation describing the dichotomous decision to select vulnerable job. The decision equation served as an endogenous selectivity criterion that determines the strategy adopted to find employment.

A person chooses vulnerable occupation if

$$(W_{iI} - W_{i0})/ W_{i0} > \beta_i \qquad (1)$$

Where W_I is the wage received if the individual engages in vulnerable occupation and W_O if the individual does not. β_i represents direct and indirect costs as a proportion of income incurred by individual *i* if they engage in vulnerable occupation.[3] The proportionate costs are represented as a function of individual personal characteristics (X_i) and a random disturbance term as follows:

$$\beta_i = g(X_i) + \varepsilon_i \qquad (2)$$

Thus, individual *i* chooses to vulnerable occupation if

$$I_i^* > 0 \qquad (3)$$

And, does not choose vulnerable occupation if

$$I_i^* \leq 0 \qquad (4)$$

Where,

$$I_i^* = \alpha_0 + \alpha_1 [(W_{iI} - W_{i0})/W_{i0}] + \alpha_2(g(X_i)) - \varepsilon_i \qquad (5)$$

[3] Direct costs include cost of purchasing safety or health equipment, while indirect costs could include health and safety risk incurred.

And,

$$W_{iI} = \theta_{0I} + \theta_{1I} X_i + \varepsilon_{iI} \quad (6)$$

$$W_{i0} = \theta_{00} + \theta_{10} X_i + \varepsilon_{i0} \quad (7)$$

The vector of explanatory variables in the income equations does not necessarily have the same elements as those appear in the decision equation above. Furthermore, ε_{iI} and ε_{i0} are assumed to be normally distributed with variances σ_I^2 and σ_0^2 respectively.

Therefore, I^*, W_I and W_0 are endogenous variables. I^* is not observed, but only the choice of I is observed as follows:

$$I_i = 1 \text{ if } I_i^* > 0 \quad (8)$$

$$I_i = 0 \text{ if } I_i^* \leq 0 \quad (9)$$

Furthermore, $(W_{iI} - W_{i0})/W_{i0}$ is approximated by $\log W_{iI} - \log W_{i0}$. Thus, the model is stated as follows:

$$I_i^* = \alpha_0 + \alpha_2[\log W_{iI} - \log W_{i0}] + \alpha_3(g(Xi)) - \varepsilon_i \quad (10)$$

Sample Selection Bias

When estimating this gap, self-selection bias to engage in vulnerable occupation is taken into account. The difference in the nature of the two types of occupations (vulnerable and non-vulnerable) is likely to induce workers to self-select based upon their observable and unobservable characteristics, such as risk and monetary benefits. To illustrate, vulnerable occupations are expected to be more common among male, young and high-skill workers. Thus, the failure to consider this problem may result in a self-selected sample rather than a random sample.

Sources of selection bias are derived from hedonic wage theory. Specifically, all individuals select their own desired job. Workers often avoid working in vulnerable occupation that features 3Ds characteristics (dirty, dangerous, difficult). Although this type of job offers high salary, it is often associated with high risk, unpleasant and uncomfortable working environment. Therefore, failure to consider this bias may result in bias in estimation.

Estimation

First, the analysis began by running a probit regression model of vulnerable worker;

$$P(Yi = 1|Xi) = 1 - \phi(-Xi'\beta/\sigma) = \phi(Xi'\beta/\sigma) \quad (11)$$

Second, an inverse mill ratio (IMR) is obtained from the probit model. The IMR is used to account for the self selection bias in selecting vulnerable occupation. The IMR can be written as

$$\lambda_{Ii} = -\frac{\phi(X_i'\beta)}{\Phi(X_i'\beta)}$$

and for $Y_i = 0$

$$\lambda_{oi} = -\frac{\phi(X_i'\beta)}{(1-\Phi)(X_i'\beta)} \quad (12)$$

This study used the hedonic wage theory (Rosen 1974 & 1986) to explain the effect of vulnerable worker on wage. This theory was then strengthened by an empirical analysis using Mincer wage equation model (Mincer, 1974). The model was initially based on Becker human capital model (Becker, 1964). Based on Hedonic theory, vulnerable variable should yield a positive sign. That is, vulnerable workers receive higher wage as compared to their counterparts.

Mincer wage equation starts with a standard Ordinary Least Square regression incorporated with inverse mill ratio to control for self-selection bias as following;

$$\begin{aligned} InW_i = {} & \zeta_0 + \zeta_1 S_i + \zeta_2 EXP_i + \zeta_3 (EXP_i)^2 + \zeta_4 G_i + \zeta_5 Vul_i + \zeta_6 Tenured_i \\ & + \zeta_7 Contract_i + \zeta_8 North_i + \zeta_9 Central_i + \zeta_{10} South_i \\ & + \zeta_{11} Labor\ Union_i + \zeta_{12} Foreign\ worker\ presence_i + \zeta_{12} Inverse\ Mills\ Ratio + \varepsilon \end{aligned} \quad (13)$$

with,

lnW_i = log wage/hour
S_i = years of schooling.
EXP_i = years of experience {(Age) – (years of schooling + 6)}.
G_i = Male = 1 and = 0 otherwise.
Vul_i = Vulnerable worker =1 and = 0 otherwise.
$Tenured_i$ = Tenured position =1 and = 0 otherwise.
$Contract_i$ = Contract worker =1 and = 0 otherwise.
$North_i$ = North zone = 1 and = 0 otherwise.
$Central_i$ = Central zone = 1 and = 0 otherwise.
$South_i$ = South zone = 1 and = 0 otherwise.
$Labor\ Union_i$ = Union member =1 and = 0 otherwise.
Foreign worker presence$_i$ = Presence of foreign worker =1 and = 0 otherwise

The interested variable is vulnerable worker (Vul) with a value of 1, otherwise zero (0).

Identification

An "exclusion restriction" is the key to solve an identification problem in this selection model by incorporating variables that influence an individual's decision in selecting vulnerable or non-vulnerable job during the first stage regression of probit model; but they are excluded in the second stage of wage regression. This exclusion restriction variable is the contract of service's status. This variable contributes in determining the propensity score at searching for vulnerable or non-vulnerable job, but not related to wages obtained. Contract of service does not affect labor wage. In particular, those who have the service contract are not being paid higher than those who are without. According to Section 2(1) Work Act 1955, contract of service is defined as "All verbal and written agreements between employer and employee to serve and work in respective employer's firm". The service contract is a very important document for workers to refer to in the event their employers deny their labor rights stated in the document. Indirectly, the document serves as a worker's protection from being vulnerable in the workplace. Unfortunately, there is no legal channel that monitors a proper submission of service of contract to the labor. As a result,

many of them do not have their service contracts. In addition, since the contract of service is given at the start of the workers' employment, many have forgotten its content and how it should be used when their employers violate the agreement.

Vulnerable Worker Wage Decomposition

The present study further decomposed a wage differential between vulnerable and non-vulnerable workers. Thus, to estimate the wage differential between the two groups, a standard Oaxaca Decomposition (Oaxaca, 1973) incorporating self-selection bias was employed.

$$ln\overline{W_I} - ln\overline{W_0} = \overline{X}_I(\hat{\beta}_I - \hat{\beta}_0) + (\overline{X}_I - \overline{X}_0)\widehat{\beta_0} + (\hat{\theta}_I\,\overline{\lambda_I} - \hat{\theta}_0\,\overline{\lambda_0}) \qquad (14)$$

The first term in the right hand side is the wage gap attributable to difference in unobserved characteristics. The second term is the wage gap attributable to difference in characteristics. The third term of the decomposition accounts for the contribution of selection bias due to the wage differential between vulnerable workers and non-vulnerable workers.

5. Result

Table 7 shows a probit regression model of vulnerable worker's status on all individual charateristics. Female, older worker and non-union worker are positively associated with being vulnerable. Level of education significantly reduces the likelihood of being vulnerable. Those who attend longer schooling are expected to have better jobs. These jobs typically feature good working condition which possibly limits the likelihood of being vulnerable. Foreign worker who complement domestic worker could be a good explanation to the negative relationship with the unintended choice of being vulnerable. The "exclusion restriction" variable, contract of service has a negative coefficient. It explained that those who do not have a contract of service are very likely to be vulnerable workers. In other words, those who have contract of service are more

aware about their rights in the workplace. Therefore, having the service contract reduces the likelihood of being vulnerable.

Table 8 shows the OLS regression of log wage for all workers. Years of schooling, experience and experience square show significant and expected coeffcients sign as in human capital theory (Becker, 1964). The results were consistent with other studies such as Psacharopoulos & Patrinos 2004 and Zulkifly Osman et. al 2010. In the meantime, the coefficient of the worker vulnerability status was significantly positive. In particular, a vulnerable worker received about 15% lower wage than non-vulnerable worker. This result contradicted the Hedonic wage theory which states that vulnerable worker should receive wage compensation in the form of high salary. This phenomenon arises due to the concentration of vulnerable workers in low-skill occupations. As a result, the vulnerable workers in the labor market suffer from working in unsafe and unpleasant conditions as well as earning low wage.

Due to the small likelihood of being vulnerable, male workers earned about 16.2% more than their female counterparts. This also contradicted the Hedonic theory on wage distribution of vulnerable worker. On the other hand, although non-union workers increase their likelihood of being vulnerable worker, they earned about 6.4% more than those union workers. This result seems to be consistent with Hedonic wage theory. As non-union workers are very likely to be vulnerable, Hedonic wage theory argues that they should be paid higher than union workers as to compensate for their unpleasant working conditions. In the meantime, the presence of foreign workers reduces the wage of domestic labor. The present study has proven through the probit model that workers are less likely to be vulnerable in the presence of foreign workers. However, firms may take advantage from the foreign workers' low reservation wage to offer slightly lower wage to domestic laborers since they have limited choices in selecting occupation. Nonetheless, the employers who take the advantage of not compensating the domestic workers with sufficient

wage for working in unpleasant job (vulnerable) could have another possible explanation to this phenomenon.

Table 9 and 10 show separate OLS regression of log wage for vulnerable and non-vulnerable workers with self-selection bias corrected. Vulnerable workers yield higher return than non-vulnerable workers both in experience and years of schooling. As the Hedonic wage theory argues that those vulnerable workers should be paid high wages, their compensation to education and experience working in an unpleasant condition should also be higher than those who enjoy working under safe and comfortable environment. Furthermore, working in such unsafe conditions typically requires certain type of training. In general, this type of training is relatively difficult and long. Therefore, it is undoubtedly the compensation to education is higher as well as relative.

Table 11 shows Oaxaca wage decomposition with self selction bias corrected. On average, vulnerable workers received about 10 percent lower wages than non-vulnerable. This finding contradicted the Hedonic wage theory. This phenomenon could be explained by high concentration of vulnerable workers in low wage occupation. As a result, it causes a wider wage gap with non-vulnerable workers. About 41 percent wage gap between vulnerable and non-vulnerable workers were explained by individual observed characteristics. In particular, non-vulnerable workers have some individual charaterictics advantage over vulnerable worker in wage distribution. On the top of individual advantages, there are unobserved characteristics among the non-vulnerable workers who are able to raise their wage prospect. Oaxaca wage decomposition showed that the unobserved individual characteristics contributed about 29 percent of the wage differential between these two groups. In the meantime, one cannot ignore the significance of self-selection bias in the wide gap between these two groups. In particular,

about 29 percent of the wage differential between vulnerable and non-vulnerable was due to the worker's self select in vulnerable and non-vulnerable occupation.

6. Conclusion

This study found that a significant number of laborers that can be categorized as vulnerable worker following to the minimum standard of Work Act 1995. After correcting for selection bias, this study concluded that vulnerable does not necessarily increase labor wage; thus, contradicting the hedonic wage theory. In particular, those who work in an unpleasant job do not receive any wage compensation. This is because those unpleasant jobs seemed to be treated as low-skill jobs. The employers in the mean time took this to their advantage by offering lower wage to selected workers. Non- vulnerable worker on the other hand is found to work mainly in high-skill job. Hence, as a result of occupation segregation, a wage gap between these two groups exists. This study concluded that wage differential mainly exist due to worker observable characteristic. Nevertheless, laborers who self-select to work in vulnerable or non-vulnerable occupation cause a wider gap between these groups.

Therefore, there is a need for policymakers to take the appropriate actions in order to protect and safeguard all vulnerable workers in Malaysia's labor market. Vulnerable workers could appear in both low- skill and unpleasant jobs. Thus, there must be a clear direction in differentiating 3Ds (dangerous, difficult, dirty) jobs from low-skill jobs. Workers who are vulnerable and worked in low-skill job must remain with their current wage. In contrast, the vulnerable workers who are not in the low-skill job should be compensated with higher wage. The supply of labor in 3Ds jobs will continue to drop if vulnerable workers in this type of occupation are not properly compensated.

References

Becker, G. S. 1964. *Human Capital*. New York: National Bureau of Economic Research.

BERR (Business, Enterprise & Regulatory Reform). 2008. *Vulnerable Worker Enforcement Forum: Final report and government conclusions.* United Kingdom: Department for Business, Enterprise & Regulatory Reform, (www.berr.gov.uk).

Bocquier, P., J. Nordman, J. &A. Vescovo. 2010. Employment Vulnerability and earnings in urban West Africa. Paris: IRD, Dauphine University.

Brown, Charles. 1980. Equalizing Differences in the Labor Market. *The Quarterly Journal of Economics*, vol. 94, No. 1, (February): 113-134.

Chaykowski, Richard P. 2005. *Non-standard Work and Economic Vulnerability*. Vulnerable WorkersSeries – No 3. Ontario: Canadian Policy Research Networks.

Chua Yee Yen. 1984. Wage Differentials in Peninsular Malaysia. Ph. D. dissertation. University of California, Santa Barbara.

DTI (Department of Trade and Industry). 2006. *Success at Work: Protecting Vulnerable Workers, Supporting Good Employers. A Policy Statement for This Parliament*. London: Department of Trade & Industry.

Eaton, G. E. 2001. Globalisation and Labour Market Reform: Issues of Governance, Accountability and Equity, dlm. Paraskevopoulos, C, A. Kintis & A. Kondonassis (ed.) *Globalisation and the Political Economy of Trade Policy*, Canada: *APF* Press.

Elliott, Robert F. & Robert Sandy. 1998. Adam Smith may have been right after all: A new approach to the analysis of compensating differentials. *Economics Letters*, Elsevier, vol. 59(1) (April):127-131.

Frank, Robert H. 1999. What Price the Moral High Ground, *Southern Economic Journal* 63 (July): 1-17.

Hwang, H., Mortensen, D.T. & Reed, W.R. 1998. Hedonic wages and labor market search. *Journal of Labor Economics*, 16(4), 815-847.

International Labour Organization (ILO). 2013. *Global Employment Trends 2013.* Geneva: International Labour Office.

Latifah Mohd. Nor. 1998. An Overview of Gender Earnings Differentials in Peninsular Malaysia. *IIUM Journal of Economics and Management* 6(1): 23–49.

_____ 2000. Occupational Sex Segrerration and Discrimination in Peninsular Malaysia. *Jurnal Pengurusan.* 19: 89–107.

Liu, Jin Tan, J.K. Hammitt & Jin Long Liu. 1997. Estimated hedonic wage function and value of life in a developing country. *Economics Letters*, Vol. 75 (3): 353–358.

Law Commission of Ontario. 2012. *Vulnerable Workers and Precarious Work.* Toronto.

Malaysia, 2013. *Laporan Penyiasatan Tenaga Buruh Malaysia 2012*. Kuala Lumpur: Jabatan Perangkaan Malaysia.

Mincer, J. 1974. *Schooling, experience and earnings.* New York: Columbia University Press.

Pollert, A. 2007. *The Unorganised Vulnerable Worker: the Case for Union Organising.* Liverpool, United Kingdom: Institute for Employment Rights.

Pollert, Anna. 2008. *The Vulnerable Worker in Britain and Problems at Work.* Saint Etienne: UWE Bristol Business School.

Pollert, A. & Charlwood, A. 2009.The vulnerable worker in Britain and problems at work. *Work Employment Society,* 23, 343-362.

Psacharopoulos, G. & H.A. Patrinos. 2004. Returns to investment in education: a further update. *Education* Economics12 (2): 111-134.

Rahmah Ismail and Zulridah Mohd. Noor. 2005. Gender Wage Differentials In The Malaysian Manufacturing Sector. *IIUM Journal of Economics and Management.* 13(2): 119–37.

Rahmah Ismail. 2011. Gender Wage Differentials in Malaysian Services Sector. *African Journal of Business Management.* 5(19): 7781–7789.

Rahmah Ismail, Zulkifly Osman, Syazwani A. Malek. 2013. Perbezaan Upah Mengikut Jantina dan Diskriminasi Majikan dalam Sektor Teknologi Maklumat dan Komunikasi, *Jurnal Teknologi (Social Sciences) 63:1: 41–50.*

Rosen, Sherwin. 1974. Hedonic Price and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy,* Vol. 82: 34-55.

Rosen, S. 1986. The theory of equalizing differences. In O. Ashenfelter & Layard, R. (Eds.). *Handbook of Labor Economics*, (Chapter 12). New York: Elsevier Science Publishers.

Saunders, R. 2003. *Defining Vulnerability in the Labour Market*. Ottawa: Canadian Policy Research Networks, Document No|1, Research Paper W|21.

----------. 2006. *Risk and Opportunity: Creating Options for Vulnerable Workers*. Ottawa: Canadian Policy Research Networks, Document No|7.

Smith, Adam. 1776. *An Inquiry into the Nature & Causes of the Wealth of Nations,* Vol.1. London: W. Stranhan & T. Cadell.

TUC (Trades Union Congress). 2006. Who are the vulnerable workers in the UK labour market? The hidden one-in-five. TUC *vulnerable report***.** London: TUC (www.tuc.org.uk/extras/oneinfive.pdf).

_____. 2007. *Hard Work and Hidden Lives*. Commission on Vulnerable Employment. London: Trades Union Congress (TUC) (*www.vulnerableworkers.org.uk*).

Vandenberg, Paul. 2008. *Is Asia adopting flexicurity? A survey of employment policies in six countries.* Economic and Labour Market Analysis Department – ILO: Geneva. (Economic and labour market papers; 2008/4).

Viebrock, Elke dan Jochen Clasen. 2009. State of the Art: Flexicurity and welfare reform: a review. *Socio-Economic Review* , 7 (February): 305–331.

Zulkifly Osman, Ishak Yussof & Abu Hasssan Shaari Mohd Nor. 2010. Inflasi pendidikan mengikut ketentuan dalam pasaran buruh Malaysia, *Journal Ekonomi Malaysia* 44: 61-71.

Zulkifly Osman. 2011. Kualiti Pekerjaan dan Indikator Pekerja Vulnerable. Dlm. Mansor Jusoh et al. (eds.) *Prosiding – Ekonomi Berpendapatan Tinggi: Transformasi Ke Arah Peningkatan Inovasi, Produktiviti dan Kualiti Hidup* (Jilid 1). Bangi: Penerbit UKM untuk Fakulti Ekonomi dan Perniagaan, 368-376.

Table 7: Probit regression model of vulnerable worker status on all individual charateristics.

Variable	Coefficient
Gender	-.1106929
	(.1008522)
Age	.0170796
	(.0053009)
Foreign Worker	-.5847751
	(.117378)
Permanent Worker	-.6560554
	(.1390014)
Contract Worker	-.3726519
	(.1933827)
Years of Schooling	-.0587233
	(.0204352)
North	-.8071027
	(.2848068)
Central	-.0254628
	(.1356743)
South	.2772934
	(.1252718)
Non-Union Member	.183305
	(.1391926)
Pay Slip	-2.032077
	(.1053834)
Service Contract	-.1703394
	(.1240603)
Constant	1.153958
	(.3107791)

Table 8: OLS regression of log wage on individual characteristics for all workers

Variable	Coefficient
Vulnerable Status	-.1466774***
	(.0219516)
Experience	.0122273***
	(.0025533)
Experiense Square	-.0003216***
	(.0000711)
Years of Schooling	.0441221***
	(.0033785)
Permanent Worker	.2046325***
	(.0257883)
Contract Worker	.2031691***
	(.031102)
North	.0799907***
	(.0297482)
Central	.3181887***
	(.0207774)
South	.1127774***
	(.0194606)
Foreign Worker	-.008227
	(.0168635)
Male	.1627545***
	(.0156024)
Non-Union Member	.0609868***
	(.0210995)
Constant	.6303172***
	(.0530323)

Table 9: OLS regression of log wage on individual characteristics for vulnerable workers

Variable	Coefficient
Experience	.0184765*
	(.0071323)
Experiense Square	-.0003463
	(.0001951)
Years of Schooling	.0487588***
	(.0084393)
Permanent Worker	.2708411***
	(.0584016)
Contract Worker	.1878873***
	(.0696443)
North	.1143387
	(.1243858)
Central	.4165241***
	(.0600865)
South	.1396118***
	(.0500228)
Foreign Worker	-.0687219
	(.0632472)
Male	.2078386***
	(.042881)
Non-Union Member	-.0065165
	(.0631562)
Inverse Mills Ratio	.0259317
	(.0378889)
Constant	.2822199*
	(.1196202)

Table 10: OLS regression of log wage on individual characteristics for non-vulnerable workers

Variable	Coefficient
Experience	.0111664***
	(.0027321)
Experiense Square	-.0003199***
	(.0000761)
Years of Schooling	.0410714***
	(.0037409)
Permanent Worker	.1416119***
	(.0314721)
Contract Worker	.1559631***
	(.0368365)
North	.0349136
	(.0349279)
Central	.295078***
	(.0225391)
South	.103990***
	(.0211966)
Foreign Worker	-.0242662
	(.0191917)
Male	.1478359***
	(.0167249)
Non-Union Member	.062565**
	(.0223806)
Inverse Mills Ratio	.042044
	(.0165467)
Constant	.6668961***
	(.0622528)

Table 11: A Oaxaca Wage Decomposition between vulnerable and non-vulnerable workers

	$\overline{X_I}(\hat{\beta}_I - \hat{\beta}_0)$	$(\overline{X}_I - \overline{X}_0)\hat{\beta}_0$	$(\hat{\theta}_I \overline{\lambda_I} - \hat{\theta}_0 \overline{\lambda_0})$	**Wage Gap**
Total difference	**(29.56%)**	**(41.33%)**	**(29.10%)**	**-0.5289**

Mean hour wage for vulnerable workers	**RM4.8602**
Mean hour wage for non-vulnerable workers	**RM5.3892**