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Revisiting The Impact of Occupational Segregation on the Gender Earnings Gap in Malaysia

(Pengkajian Semula Kesan Pengasingan Pekerjaan ke atas Jurang Pendapatan Mengikut Jantina di Malaysia)

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ABSTRACT

More women participate in the labour force nowadays than in the past. However, they do not join the workforce as equal members. Segregation in occupational distribution and pay differentials between men and women remain pervasive. This article uses data from the Malaysian Population and Family Survey 2004 to shed light on the inequality in earnings based on the framework developed by Brown et al. (1980). The empirical results suggest that segregation per se works to the advantage of women. A surprising finding is that the intra-occupational component, which is unjustified by reference to observed characteristics, is responsible for the overall earnings gap. It is likely that the within-occupational earnings discrimination reflects hierarchical segregation. Also, a portion of the earnings gap is attributed to a sample selection effect. Our results suggest that a timely policy intervention would aim to find ways of improving the returns to characteristics earned by women in a given occupation.

Keywords: earnings; gender; Malaysia; segregation

ABSTRAK

Dewasa ini dilihat lebih ramai kaum wanita menyertai tenaga buruh berbanding dengan masa lalu. Walau bagaimanapun, mereka menyertai tenaga kerja secara tidak sama rata. Pengasingan dalam pengagihan pekerjaan dan upah yang berbeza antara pekerja lelaki dan wanita dilihat semakin meluas. Kajian ini menggunakan data daripada Tinjauan Populasi dan Keluarga di Malaysia 2004 untuk memberi penerangan tentang ketaksamaan pendapatan berdasarkan rangka kerja yang dibangunkan oleh Brown et al. (1980). Hasil kajian menunjukan pengasingan per se memberikan kelebihan kepada wanita. Satu penemuan yang mengejutkan mendapati komponen bagi intra-pekerjaan yang mana ia dilihat sebagai tidak wajar dengan merujuk kepada ciri-ciri yang diperhatikan, bertanggungjawab ke atas jurang perbezaan yang berlaku. Kemungkinan berlaku diskriminasi pendapatan dalam pekerjaan yang menunjukkan hierarki pengasingan. Selain itu, sebahagian daripada jurang pendapatan berpunca daripada kesan pemilihan sampel. Kajian ini mencadangkan supaya campurtangan polisi yang tepat pada masanya diambil untuk mencari penyelesaian untuk meningkatkan pulangan berdasarkan ciri-ciri yang diperolehi oleh wanita dalam pekerjaan yang diberikan.

Kata kunci: pendapatan; jantina;Malaysia; pengasingan

INTRODUCTION

Gender-based earning inequalities remain a universal empirical phenomenon. Although the wage gap has decreased over time in many countries, progress is slow and reasons for its persistence remain controversial. One line of reasoning attributes it to differences in marketable characteristics that men (on the one hand) and women (on the other) bring to the labour market. Institutional factors, such as occupational segregation[1] (The forms of segregation may arise from horizontal or vertical dimensions. The horizontal segregation reflects the fact that men and women are allocated differently across occupations while vertical segregation describes how men and women work in different status of occupations. Within an occupation, evidence indicates that men are found in high-paid jobs while women are in lower-paid jobs), by denying women entry into well paid jobs and occupations, can also contributed to women's lower wages worldwide (Treiman and Hartmann 1981; Macpherson and Hirsch 1995; Kidd and Shannon 1996). Groshen (1991) and Peterson and Morgan (1995) claim that gender inequality in earnings is mainly attributable to the tendency for women to be crowded into lower paid jobs and occupations in the US. Likewise, Chapman and Harding (1986) conclude that women in Malaysia do not earn

considerably less than men due to differences in skills and the practice of direct wage discrimination, but because they are allocated to occupations that pay lower wages.

While there is a general agreement that some fractions of the wage gap can be attributed to women being employed in lower-paid jobs, Brown et al. (1980), Miller (1987), Dolton and Kidd (1994) and Liu et al. (2004) have found that it is unequal pay for the same occupation that accounts for most of the wage gap, after controlling for gender occupational segregation. While this holds, Aisenbrey and Bruckner (2008) demonstrate that the relative importance of wage discrimination and occupational segregation in explaining the wage gap depends on a cohort effect.

Following this line of research, it suggests that further insight into the observed earnings gap can be gained when the extent of this gap is simultaneously examined in a model that makes explicit the structures of wages within occupations and the distinct distribution of workers across occupations in wage estimations. However, to our best knowledge, recent evidence in Malaysia (Mohamad-Nor 2000; Fernandez 2006) does not explicitly examine the potential role of occupational segregation on the wage gap except by highlighting earnings discrimination within broad categories of occupations. Hence, an empirical study that pays close attention to the consequences of occupational segregation on the overall earnings gap in Malaysia is of particular importance.

This paper explicitly sheds light on the potential role played by occupational segregation in perpetuating earnings disparity by gender in Malaysia, using a dataset provided by the National Population and Family Development Board. This contributes to our understanding of the overall gender earnings gap in Malaysia by simultaneously analysing the relative contribution of occupational segregation and wage discrimination, based upon the innovative methodology developed by Brown et al. (1980). Specifically, we provide a detailed earnings gap decomposition into explained and unexplained components, which highlights how the earnings gap would look if women had the same occupational structure as men.

The structure of the paper is as follows. Section 2 provides a brief discussion in explaining occupational segregation and the wage gap. Section 3 discusses the methodology and datasets employed in this study. Section 4 presents the findings and a conclusion is presented in section 5.

A REVIEW OF OCCUPATIONAL SEGREGATION AND THE WAGE GAP

Over the last half century or so, female participation has increased in general, and this has consequences for the gender wage gap. Moreover, in many countries women now invest at least as much as men in educational investment. Nevertheless, for a variety of reasons, there remains a degree of occupational segregation.

A close link between the gender wage gap and the proportion of women in the labour force was first explored by Treiman and Hartmann (1981). Although the earnings of both men and women decrease as the proportion of females in an occupation increases, Chevalier (2007) found that the wage penalty for being in feminised occupations is larger for women. Nevertheless, the author revealed that a woman working in a male dominated occupation would typically be paid 22% more than if she were in an occupation in which all workers are women, other things being equal. It is not surprising then for Peterson and Morgan (1995) to note that occupational segregation alone accounts for 64% of the overall gender wage gap in the US.

From the mainstream neoclassical economic view, women often choose certain occupations that are easy to combine and compatible with their family duties (Eccles 1994; Correll 2001; Shauman 2006). Chevalier (2007) also suggests that women with a greater preference for childrearing search the job market with less intensity and thus are more likely to be in jobs that are a poorer match. In sharp contrast, men are socialised to view work as their primary adult role and perceived to be the breadwinner in the family – even though women's earnings may be equally important in supporting the family (Baxter et al. 2005).

Polachek (1981; 2003) as certains that women are more likely than men to choose occupations that can minimise skill attrition in the event of an extended absence from the labour force, and that they self-sort into occupations with lower job skills. Since jobs in typically female occupations tend to have more of the characteristics women particularly want, neoclassical economists predict that individual tastes for jobs with certain characteristics lead to aggregate occupational segregation. Nevertheless, Reskin and Hartmann (1986) argue that there is no reason to expect women to crowd particularly in female-dominated occupations that require less training since there are many male-dominated occupations that require little skill or training in the labour market as well.

Phelps (1972) and Aigner and Cain (1977) attribute gender differences in the occupational distribution to differences in employers' treatment between women and men. Because of imperfect information about the actual productivity of potential applicants, it is in the interest of firms to use sex as an inexpensive screen to segregate occupation along gender lines, despite the fact that group differences may, in fact, be small relative to variation within groups.

Labour market segmentation theory provides another important and very useful implication for understanding sex inequality in paid employment. Institutional economists emphasise the involuntary nature of much occupational segregation. The classic example is the dual labour market introduced by Doeringer and Piore (1971).

The authors argue that the labour market is segmented into two distinctsegments – primary and secondary. Jobs in the primary sector tend to be part of the internal labour market of a firm. The wages and employment outcome in this sector are co-determined by institutional and social influences rather than market forces. These jobs are therefore equipped with better pay, good working conditions, job stability and security and chances for advancement. The secondary market, on the other hand, offers less attractive traits in payments, promotion, and on-the-job training than the primary market. From employers' point of view, women *as a whole* have weaker labour force attachment than men; they have lower interest in economic rewards and they represent a less certain investment when an employer considers training. Due to asymmetric information in the labour market, these attributes are not observed*at the level of the individual* by employers, who thus engage in statistical discrimination by crowding women into the secondary sector.

Feminist economists argue that women's disadvantaged position in the labour market is caused by patriarchal beliefs and institutions.Women's subordinate position in society, and the responsibilities they have for housework and child care, exert significant influence on organisational process in assigning jobs and wages. Feminists emphasise that in explaining gender segregation at work, the structure and operation of the labour market offered by segmentation theory must be expanded to allow for patriarchal relations. Walby (1986), an advocate of dual-systems theory, argues that gender segregation at work, coupled with the subordinate position of women within the labour market and at home, is in the interest of men. Economic power secure under patriarchal practices allows the perpetuation of men's control over women's labour, both within the family and the labour market. Through job segregation, men exclude women from skilled and lucrative forms of employment. This male power ensures that men not only receive higher wages than working women, it also forces low waged women into marriage and secures their unpaid domestic services within the family[2] (she defined sex composition of occupation as percentage of female within each occupation. She arbitrarily classified an occupation as female-dominated occupation if the calculated percentage of female is more than 50, and less than 30% as male-dominated occupation).

Turning to the empirical evidence of occupational segregation on the gender earnings gap in Malaysia, it is standard for researchers to add a set of occupation dummies to the earnings equations estimated within the framework similar to those presented by Oaxaca (1973) and Blinder (1973) frameworks to reflect women's preference for certain types of occupations.The inclusion of occupational dummies will increase the explained component of the wage gap – indeed it cannot decrease it, of course. However, using data from the Household Income Survey 1973, Chua (1984) found that this crude method (based on 7 broad occupational dummies) did not add much to the explained component of the gender earnings gap in Malaysia. Meanwhile, Lee and Nagaraj (1995) examined 1413 manufacturing workers in the Klang Valley, and their results indicated that 46% of male-female earnings differential was attributable to the effects of discrimination, mainly due to differences in returns within individual occupations. Similarly, Low and Goy (2006) found that men in the manufacturing sector in Kuching tended to receive much higher returns than women for all occupational categories, with the exception of clerical workers.

It must be noted that differences in occupational allocation may reflect gender discrimination that limits the economic opportunity of women in the labour market (Brown et al. 1980; Miller 1987; Gunderson 1989). In this circumstance, Brown et al. (1980) state that the inclusion of occupational dummies in the earnings regressions is problematic. This is because it fails to address the impact of sex discrimination at the point of either hiring or through subsequent promotion, and thus the estimated coefficients on the occupational dummies capture some of the discrimination that takes place. Given that the estimate of discrimination is inferred from the unexplained portion of the differential in wage decomposition, this estimate will be downwardly biased.

Mohamad-Nor (2000) and Fernandez (2006) study the gender earnings gap within 1-digit major occupational categories. Using the Malaysian Malaysia Family Life Survey 1988, Mohamad-Nor (2000) reported that earnings vary considerably across occupations. The author found that female dominated (clerical) occupations displayed the lowest monthly earnings gap, while the largest gap was found in sales, which is predominantly a male occupation. Based on the traditional Oaxaca and Ransom (1994) wage decomposition, Mohamad-Nor found that much of this earnings gap is due to discrimination and that this effect is more pronounced in male dominated occupations, namely in the sales, services and manual occupational categories.

Fernandez (2006) confirms the findings of Mohamad-Nor, based on the Household Income Survey 1995. The findings reveal that men's earnings are generally higher than women's *within each* occupational category, but the earnings gap tends to be wider in predominantly male occupations than in female-dominated occupations and gender-integrated occupations. The crude measure of labour market discrimination against women, based on the unexplained component of earnings decomposition, is relatively small (about 9 percentage points) in the clerical occupation - the most female-dominated occupation. This measure is higher (it ranges between 20-30 percentage points) in the integrated occupations (such as technicians and associated professionals, service workers and sales workers, as well as in professional occupations), and attains the highest (about 41 percentage points) in the skilled, agricultural and fishery categories that are classified as male-dominated occupations.

What has been missing so far in the two aforementioned studies is an empirical study that pays close attention to the consequences of occupational segregation on the overall earnings gap in Malaysia. In this study, both views - discrimination as the fundamental cause of occupational segregation and occupational segregation as the consequence of rational, income-maximising decisions by female workers - are simultaneously addressed. Further insight into the observed earnings gap can also be gained when the extent of this gap is simultaneously examined in a model that makes explicit the structures of wages within occupations and the distinct distribution of workers across occupations in wage estimations.

AN OVERALL VIEW OF OCCUPATIONAL SEGREGATION IN MALAYSIA

Figure 1 shows the trend of labour force participation rates separately for working age (15-64) men and women in Malaysia over the period of 1980-2008. While more Malaysian women are contemporarily participating in paid employment, and are doing so for longer periods and with less intermittency (Labour Force Survey, various years), they are concentrated in sectors and occupations that are different to those favoured by men. Figure 2 shows the representation of workers within sectors in 2007. It can be seen that gender segregation takes the form of the underrepresentation of women in production industries,

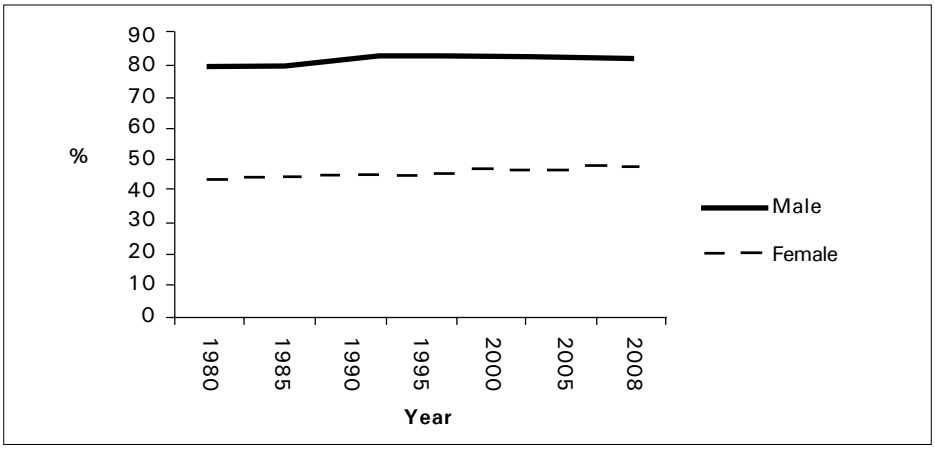

FIGURE 1. Labour Force Participation Rate by Gender in Malaysia, 1980-2008

Source: Labour Force Survey, various years.

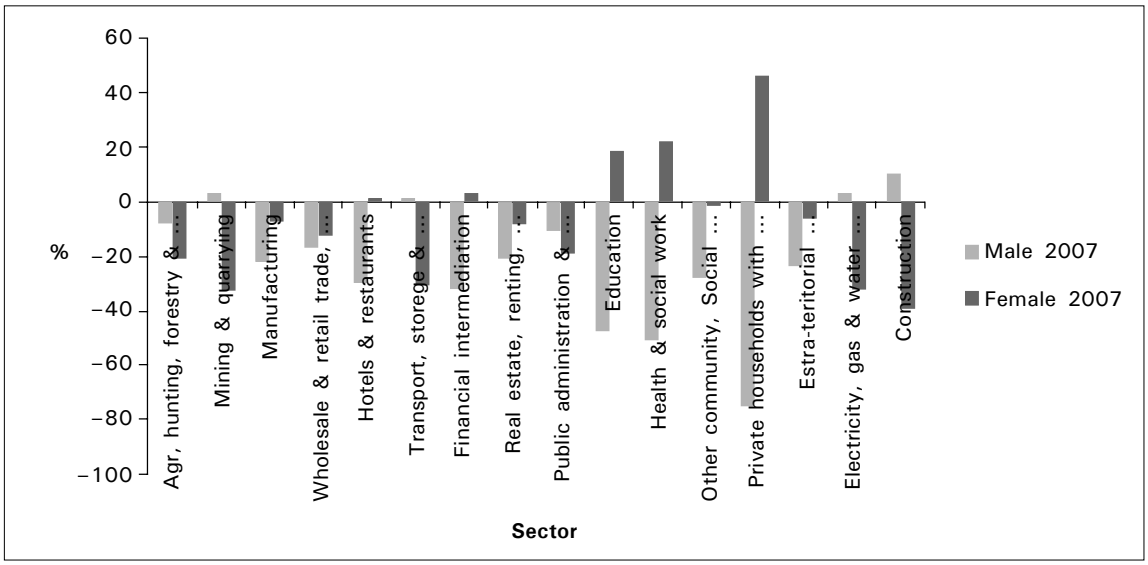

FIGURE 2. Representation of Workers by Sector in Malaysia, 2007

Note: In 2007, men accounted for 82.3% in the rate of labour force participation. The corresponding figure for women was 46.7%. Therefore, a sector with more than 82.3% (46.7%) of male (female) workers is associated with an overrepresentation of male (female) workers.

Source: Calculated from the *Key Indicators of the Labour Market* (International Labour Organisation).

TABLE 1. Representation Ratio* in Nine Major Occupations by Gender in Malaysia, 2007

Occupational Category	Representation Ratio
Legislators, senior officials and managers	0.640
Professionals	1.259
Technicians and associate professionals	1.087
Clerical workers	1.915
Services and shop and market sales workers	1.228
Skilled agricultural and fishery workers	0.723
Craft and related trade workers	0.391
Plant and machine-operators and assemblers	0.787
Elementary occupations	1.018

Note: Calculated from ILO (http://laborsta.ilo.org).

*The representation ratio is calculated as follows: $\frac{\%\ femalei}{PFEM}$ where $\%\ femalei = \frac{Female\ in\ occupational}{Total\ workers\ in\ occupational}$ and PFEM $\frac{Female\ in\ overall\ employment}{Total\ employment}$ (Anker, 1998: 70).

such as mining and quarrying; gas and water supply; and construction. However, women are overrepresented in the services sector, particularly in education; health, and social work; and as employees in private households (domestic service).

In light of disparities in the opportunities presented to men and women in the employment sectors, Table 1 shows that women also experience segregation *within* broad categories of occupations. Just as women are overrepresented in the services sector, women tend to concentrate in white-collar occupations, such as professional, clerical and services. Men, in sharp contrast, are overrepresented in the skilled form of employment in the agriculture, production and decision-making related occupations.

Although it is not shown in the table, it is worth noting that the presence of womenin the professional occupations is concentrated in low status and feminised positions. Therefore, while there is a heavy concentration of women in teaching occupations, the proportion of female academic staff in the categories of professor and associate professor in public universities still lags far behind than that of men (Wan Abdullah and Mansor 2009). In other professions, such as doctors, engineers and lawyers, female participation remains low, despite a trend of increasing participation of women in such professions (Nair and Goy 2009).

Using the multivariate analysis, Goy and Johnes (2011) revealed that the extent of occupational segregation in Malaysia based on a worker's gender is startling. Gender alone, on average, explains about 82% of the extent of occupational segregation in Malaysia between 1985 and 2005, after controlling for gender differences in educational attainment, work experience and ethnic groups. If the allocation of workers across occupations and jobs operates along gender lines for whatever reasons, Anker (1998) suggests that it would have a negative effect on how women see themselves, as well as how men see women.

DATA AND METHODOLOGY EMPLOYED

The data used in the empirical analysis is drawn from the Malaysia Population and Family Survey (MPFS) 2004, conducted by the National Population and Family Development Board. We limit our analysis to respondents within the age range 16 to 64 who have paid employment. After these selections, we are left with 3240 males and 2411 females. The final sample for analysis, however, is slightly smaller than these figures,owing to missing information on some variables. Females comprise 43% (2379/5583) of the total sample in this study.

The explanatory variables used are described in Table 2. Data limitations mean that we can employ only a basic specification of the human capital model. Table 3 presents the descriptive statistics of the variables used in the study

TABLE 2. Description for Main Variables Used in the Analysis

Variables	Coding
Metropolitan	A dummy variable takes the value of 1 if the individual resides in big cities in Johore Bahru, Penang, Selangor and Federal Territory, 0 if otherwise (reference group: small town or rural area).
Urban	A dummy variable takes the value of 1 if the individual resides in urban area other than Johore Bahru, Penang, Selangor and Federal Territory, 0 if otherwise (reference group: small town or rural area).
Bumiputra	A dummy variable takes the value of 1 if the individual is either a Malay or native, 0 if otherwise (reference group: Indians and others).
Chinese	A dummy variable takes the value of 1 if the individual is a Chinese, 0 if otherwise (reference group: Indians and others).
Secondary	A dummy variable takes the value of 1 if the individual has secondary education, 0 if otherwise (base category: education standard 6 and below).
Beyond secondary	A dummy variable takes the value of 1 if the individual has education beyond secondary level, 0 if otherwise (base category: education standard 6 and below).
Experience	Potential work experience (age-6-years of education)
Experience square	Potential experience to its square
Married	A dummy variable takes the value of 1 if the individual has even been married, 0 if otherwise.

TABLE 3. Descriptive Statistics for Main Variables Used in the Analysis

Individual Variables	Men	Women
Experience	23.75	21.80
	(12.06)	(12.98)
Age	39.63	37.94
	(10.34)	(10.25)
Secondary	0.586	0.489
	(0.49)	(0.50)
Beyond secondary	0.174	0.252
	(0.38)	(0.43)
Metropolitan	0.369	0.407
	(0.48)	(0.49)
Urban	0.215	0.243
	(0.41)	(0.43)
Bumiputra	0.703	0.671
	(0.46)	(0.47)
Chinese	0.194	0.216
	(0.40)	(0.41)
Married	0.846	0.850
	(0.36)	(0.36)
Female		0.426
		(0.50)
Monthly earnings (RM)	1524.53	1099.22
	(1436.64)	(1157.36)
Log monthly earnings	7.0379	6.6129
	(0.74)	(0.90)
Sample size	3204	2379

Notes: Standard deviations in parentheses. The results are computed from the *Malaysian Population and Family Survey 2004.*

Source: Malaysia Population and Family Survey 2004.

across genders. The simple summary suggests a few differences that are worth exploring. First, men typically possess more years of potential work experience than women.[3] (Potential experience is defined, in the usual way, as the difference between current age and years of schooling plus 6 years of pre-schooling (age-schooling-6)). The development of labour saving devices for the home makes this argument less compelling than it might have been in the past. Women have fewer years of potential work experience because they are, on average, younger than the men in our sample.[4] (This is in part due to the way in which the data were collected; women were selected at random, and about 77% of the men in the sample are partners of the women. Since women tend to partner men that are older than themselves, the average age of men in the sample exceeds that of women. This means that the sampling procedure introduces a slight bias (which we ignore) in the selection of men).

Second, while the percentage of respondents that have undertaken secondary education is statistically higher for men than women, a higher proportion of women than of men have education beyond secondary level. The distribution of education across gender is therefore complex, with women on average being more highly educated than men on one measure, but less on another. We know that women's participation in the labour market is much lower than that of men and it is likely that, at individual level, their decision to participate is related to their educational attainment. While it would be useful to analyse data on specialism at a tertiary level, the MPFS data does not offer sufficient detail to allow this.

About 41% of the working women reside in metropolitan areas, while about a third (35%) of them live in small towns. This likely reflects differences in employment opportunity. Relating to the ethnicity variable, a higher percentage of males are Bumiputra, but Chinese women are more likely to be covered in the analysis.

The ratio of the monthly earnings of women to that of men is 72%. This difference results, in part, from differences in hours worked.[5] (In the absence of information of hours worked in our study, it suggests that the earnings gap measured in our study is likely to be overestimated. Alternatively, if we treat working hours as our explanatory variable, the proportion of explained component in the earnings decomposition is likely to increase). Nevertheless, information regarding the number of hours worked is not available in our MPFS dataset. The dependent variable in our subsequent wage equation therefore has to be measured by monthly earnings. We acknowledge that a gap defined in monthly earnings may inflate the hourly wage gap artificially. However, Mohamad-Nor, (2000) and Milanovic (2001) note that the incidence of part-time working in Malaysia is negligible[6]; it may, however, be the case that men work longer hours of overtime than women and, this being the case, our results need to be interpreted with an appropriate degree of caution. (Milanovic (2001) reported that men in Malaysia worked for longer hours than women in a week, but the gap reduced over time from 3.3 hours in 1984 to 2.7 hours in 1997, based on the Household Income Survey. Using data from the Malaysia Family Life Survey 1988, Mohamad-Nor (2000) indicated that although men and women, on average, worked for 40 hours or more in a week across 1-digit major occupational categories, the reported standard deviation of working hours is higher for women than for men, especially in the service occupation).

Table 4 shows further that men earn higher average (log) monthly earnings than women. This occurs not just across all occupations, but within each broad occupation group. However, the degree of this advantage varies across occupations. The next question to be examined is how much of the gap is due to human capital variables, such as education and experience, and how much is the results of gender differences in occupational distribution. Following Oaxaca (1973) and Blinder (1973), estimation of gender wage differentials is summarised and decomposed into differences in measurable characteristics and differences in coefficients attached to those characteristics. The latter is conveniently interpreted as discrimination, after controlling for gender differences in

TABLE 4. The Average Gender Log Monthly Earnings Across Occupational Attainment

Occupational Category	Male		Female	
	Log Monthly Earnings	Sample Size	Log Monthly Earnings	Sample Size
Legislator, senior officer and manager	7.722 (0.785)	287	7.564 (1.011)	98
Professional	7.812 (0.586)	201	7.639 (0.603)	199
Associate professional	7.406 (0.583)	414	7.051 (0.656)	403
Clerical	7.132 (0.447)	198	7.029 (0.504)	371
Service workers and shop sales workers	7.037 (0.670)	404	6.171 (0.793)	443
Skilled agricultural and fishery workers	6.362 (0.625)	487	5.819 (0.717)	188
Craftsman	6.780 (0.615)	422	5.855 (0.839)	177
Plant and machine operator	7.002 (0.503)	445	6.476 (0.454)	257
Elementary occupations	6.843 (0.579)	324	6.130 (0.711)	233

Note: Figures in parentheses refer to standard deviation.

Source: Malaysia Population and Family Survey 2004.

marketable characteristics. It must be pointed out that, in light of the parsimonious specification of our earnings equations, differences in reward structures in our subsequent occupation-specific earnings functions provide indicative, rather than definitive, evidence of wage discrimination.

As we have seen, both individual preferences and overt discrimination have potential to significantly impact differences in gender occupational attainment. Extending the decomposition technique introduced by Oaxaca-Blinder, Brown et al. (1980) provided behavioural insight into the possible effect of occupational segregation on the wage gap. In this setting, the actual proportions of males and females, together with a hypothetical occupational distribution structure for women ($\widehat{P_f}$), in each occupation are explicitly examined, in addition to the impact of differences in characteristics on the occupation-specific earnings decomposition.

Following Brown et al. (1980), the gross logarithmic gender monthly earnings differential ($\overline{\ln W^m} - \overline{\ln W^f}$) can be expressed as a weighted average of the occupation-specific wage specification:

$$\overline{\ln W^m} - \overline{\ln W^f} = \sum_k \left(P_k^m \overline{\ln W^m} - P_k^f \overline{\ln W^f} \right) \text{ for } k = 1,2,...9 \quad (1)$$

where P denotes the actual proportion of males (m) and females in each occupational category (j).

When the earnings function used by Mincer (1974)[7] ($\ln W_{ij} = \beta X_{ij} + \mu_{ij}$ i = 1,2,3 .... n and j = m and f where X ia a vector of human capital attributes; β is a vector of parameters representing the impact of these attributes on wages and μ is a random error term with the assumption of mean equals zero and constant standard deviation.) is estimated for males (m) and females (f) separately and the error term is zero at mean values of the explanatory variables, the observed gross differences in average monthly earnings between the groups in (1) can be re-expressed as

$$\overline{\ln W^m} - \overline{\ln W^f} = \sum_k P_k^f \left(\hat{\beta}_k^m \overline{X}_k^m - \hat{\beta}_k^f \overline{X}_k^f \right) + \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(P_k^m - P_k^f \right) \quad (2)$$

Following Brown et al. the first term on the right hand side represents the wage difference attributable to differences within (W) occupations and the second term denotes the wage difference attributable to gender differences in occupational distributions (B).

Like Oaxaca-Blinder (1973), Brown et al. separates within-between-occupational component into justifiable wage differences (J) and discriminatory wage factors (D).

$$\sum_k P_k^f \left(\hat{\beta}_k^m \overline{X}_k^m - \hat{\beta}_k^f \overline{X}_k^f \right) = \sum_k P_k^f \hat{\beta}_k^m \left(\overline{X}_k^m - \overline{X}_k^f \right) + \sum_k P_k^f \overline{X}_k^f \left(\hat{\beta}_k^m - \hat{\beta}_k^f \right)$$

$$\sum_k \hat{\beta}_k^m \overline{X}_k^m \left(P_k^m - P_k^f \right) = \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(P_k^m - \hat{P}_k^{f'} \right)_{(WJ)} + \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(\hat{P}_k^{f'} - P_k^f \right)_{(BJ)} + \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(\hat{P}_k^{f'} - P_k^f \right)_{(WD)} \quad (3)$$

$$(BD)$$

where $\hat{P}_k^{f'}$ implies the hypothetical occupational distribution structure for women when they face the same occupational distribution structure as men.

To derive this hypothetical occupational distribution for women, we adopted the behavioural model suggested by Brown et al. (1980)[8] (This methodology is widely adopted by researchers in this area (for instance, Dolton and Kidd 1994; Liu et al. 2004). In contrast, Miller (1987) applies ordered probit to simulate non-discriminatory female employment distribution). Assuming the probability of a male worker i being in the kth occupation is a function of worker characteristics, Z based on the following reduced form model.

$$P_{ik} = \text{prob}\,(Y_i = occ_k) = \frac{\exp\,(Z_i \alpha_k)}{1 + \sum_{k=1}^{9} \exp\,(Z_i \alpha_k)} \quad i=1,2,3...n \quad k = 1, ...9$$

and the probability for the reference category (k=9) is given by:

$$P_{ik} = \text{prob}\left(Y_i = occ_k\right) = \frac{1}{1+\sum_{k=1}^{9}\exp\left(Z_i\alpha_k\right)} \quad i = 1,\ldots n \tag{4}$$

The explanatory variables (Z) include the individual's educational attainment, potential labour market experience and its square term, region of residence, race and the presence of children below 6 years old. α_k is a vector of coefficients corresponding to the kth occupation. The estimated parameters are then substituted into the working female sample to get a vector of predicted probabilities for each occupation. These predicted probabilities of being in each occupation are then summed over observations to produce the simulated women's distribution across occupations. The findings are presented in Table 5.

Table 5 reinforces the evidence provided earlier about gender differences in occupational access. Column 3 indicates that if women's occupational structures were rewarded in the same way as men while retaining women's own characteristics, the proportions of women in associate professional, clerical and sales occupations would be much lower than is actually the case. On the other hand, far more women would hold post as legislators, senior officers and managers. Within the production occupations, more women would be hired in more prestigious and well-paid male dominated occupations, such as craftsmen and plant and machine operators.

Further evidence is provided by the Duncan index of dissimilarity (Duncan 1955): should women be rewarded in the same way as men, only 4.2% of women (men) would have to change jobs for the occupational distribution to be identical; as things stand, some 22% need to change jobs for this to be the case. All of the above suggests that gender differences in characteristics are not adequate to justify women's concentration in low-paid occupations.

TABLE 5. Percentage Distribution of Gender Occupational Attainment

Occupational Category	Men's Actual Distribution (P^m)	Women's Actual Distribution (P^f)	Women's Predicted Distribution ($\hat{P}^{f'}$)
Legislator, senior officer and manager	9.0	4.1	9.8
Professional	6.3	8.5	8.5
Associate professional	13.0	17.0	13.8
Clerical	6.2	15.7	6.5
Service workers and shop sales workers	12.8	18.7	12.6
Skilled agricultural and fishery workers	15.2	7.8	12.7
Craftsman	13.3	7.5	12.6
Plant and machine operator	14.0	10.9	13.5
Elementary occupations	10.2	9.8	9.8

Source: Malaysia Population and Family Survey 2004.

In recognition that there are systematic differences in the characteristics of jobs taken by women and men (Polachek and Kim 1994; Dolton and Kidd 1994), correction for sample selection in the occupational-specific earnings equation along the lines developed by Lee (1983) is employed. An inverse Mills ratio variable[9] is added into the existing occupation-specific earnings specification to account for the possibility that the unobserved characteristics affecting a worker's choice of an occupation correlate with unobserved characteristics of occupation-specific wage specification. (The inverse Mills ratio is obtained by estimating the occupational choice of individuals under the multinomial logit framework in the first stage. The explanatory variables are similar to those discussed in footnote 7. In addition to the nine occupational categories, we add another category - not in the paid labour force in the given occupational choice and it is treated as the base category in our multinomial logit model.) While a two-stage Lee model yields consistent estimated parameters in the earnings model, inefficient standard errors arise due to the nature of procedure. We, therefore, bootstrap (redrawing the sample 100 times with replacement) to obtain efficient standard errors.

With correction for selectivity bias, the mean log monthly earnings differential sum over all the occupational categories in (4) is expressed as (Dolton and Kidd 1994):

$$\begin{aligned}\overline{\ln W^m} - \overline{\ln W^f} = &\sum_k P_k^f \hat{\beta}_k^m \left(\overline{X}_k^m - \overline{X}_k^f\right) \\ &+ \sum_j P_k^f \overline{X}_k^f \left(\hat{\beta}_k^m - \hat{\beta}_k^f\right) \\ &+ \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(P_k^m - \hat{P}_k^{f'}\right) \\ &\quad \text{(BJ)} \\ &+ \sum_k \hat{\beta}_k^m \overline{X}_k^m \left(\hat{P}_k^{f'} - P_k^f\right) \\ &\quad \text{(WJ)} \qquad \text{(WD)} \\ &\quad \text{(BD)} \\ &+ \sum_j \left(P_j^m \rho_j^m \lambda_j^m - P_j^f \rho_j^f \lambda_j^f\right) \\ &\quad \text{(non-random sampling)}\end{aligned} \tag{5}$$

where ρ denotes the correlation between the error terms in unobserved occupation decision and wage equation and λ indicates the inverse Mills ratio. The first two terms on the right hand side are similar to those that appear in (4) and the last portion corresponds to the correction for non-random sampling[10]. (The correction term does not break down into differences in characteristics and differences in return to those characteristics.)

TABLE 6. Occupation-Specific Earnings Specification with Correction for Sample Selection Bia

Variable	Legislator, Senior Officials and Manager	Professional	Associate Professional	Clerk	Service, Shop and Sales Person	Skilled Agricultural and Fishery	Craftsmen	Plant and Machine Operator	Elementary Occupation
Panel A: Male									
	1.5119	0.3058	0.4405	0.2361	0.3092	0.0600	0.4937	0.2738	0.3186
Metropolitan	(2.93)	(3.21)	(4.74)	(1.20)	(3.84)	(0.14)	(5.60)	(4.69)	(4.01)
	0.8906	0.0190	0.2526	0.0126	0.1347	0.0024	0.0521	0.0599	0.0884
Urban	(2.20)	(0.13)	(2.40)	(0.14)	(1.40)	(0.01)	(0.57)	(0.88)	(1.19)
	-0.3704	-0.1340	0.0236	-0.0207	-0.2892	-0.0892	-0.1731	-0.2622	-0.2562
Bumiputra	(-1.72)	(-0.94)	(0.22)	(-0.18)	(-2.22)	(-0.51)	(-1.19)	(-1.85)	(-2.08)
	0.9609	0.1608	0.0288	0.1066	0.2495	0.5566	0.3714	0.0186	0.2583
Chinese	(2.27)	(0.97)	(0.29)	(0.29)	(1.63)	(3.32)	(1.89)	(0.12)	(1.58)
	0.6317	0.7784	0.7489	0.4617	0.3200	0.2155	0.2860	0.0953	0.2815
Secondary	(2.25)	(1.36)	(2.64)	(1.36)	(3.62)	(1.27)	(2.87)	(1.41)	(3.28)
	2.1900	1.1807	1.1073	0.8177	0.5935	0.1357	0.7191	0.0991	0.5698
Beyond secondary	(3.57)	(0.88)	(2.80)	(2.19)	(3.81)	(0.30)	(1.92)	(0.36)	(1.53)
	0.1792	0.0447	0.0495	0.0199	0.0531	0.0131	0.0261	0.0341	0.0123
Experience	(2.85)	(1.89)	(3.87)	(1.22)	(4.97)	(0.79)	(2.63)	(3.26)	(1.26)
	-0.0037	-0.0007	-0.0009	-0.0001	-0.0011	-0.0002	-0.0005	-0.0007	-0.0002
Experience square	(-2.52)	(-1.34)	(-2.74)	(-0.44)	(-4.89)	(-1.00)	(-1.91)	(-2.77)	(-0.82)
	1.1674	0.1163	0.2590	0.1540	0.2492	0.2328	0.1710	0.1746	0.2456
Married	(2.17)	(0.38)	(2.29)	(1.14)	(2.31)	(1.80)	(1.61)	(1.66)	(3.08)
	-2.5287	0.0713	-0.3981	-0.0599	-0.4952	-0.0008	0.1258	-0.2282	-0.189
Inverse Mills ratio	(-2.19)	(0.09)	(-0.89)	(-0.09)	(-1.40)	(-0.00)	(0.32)	(-0.67)	(-0.54)
	-1.6927	6.1753	4.8950	5.9329	5.1875	5.9030	6.2109	6.1581	5.8926
Constant	(-0.24)	(2.63)	(4.24)	(3.85)	(7.11)	(9.06)	(11.08)	(13.13)	(11.24)
Panel B: Female									
	0.3990	0.2432	0.4308	0.3248	0.1801	0.2030	0.1891	0.2512	0.3365
Metropolitan	(1.37)	(2.42)	(4.36)	(5.06)	(2.05)	(0.61)	(1.31)	(4.65)	(2.33)
	0.005	-0.0320	0.3420	0.0861	0.0415	-0.0708	0.0265	0.0081	0.1949
Urban	(0.02)	(0.30)	(3.51)	(1.20)	(0.39)	(-0.30)	(0.15)	(0.12)	(1.62)
	-0.2448	0.1595	0.0026	0.0523	0.0288	-0.0534	0.0178	-0.1086	-0.0992
Bumiputra	(-0.73)	(1.05)	(0.03)	(0.51)	(0.20)	(-0.30)	(0.08)	(-1.45)	(-0.91)
	0.0473	0.1617	0.2657	0.2558	0.5125	0.5164	0.7603	0.2188	-0.0638
Chinese	(0.12)	(0.90)	(2.90)	(2.35)	(3.34)	(2.49)	(2.86)	(1.08)	(-0.32)

	1.6700	-0.7184	0.5146	0.6692	0.1235	0.2570	0.2195	0.2345	-0.0558
Secondary	(3.13)	(-0.74)	(2.13)	(3.77)	(1.18)	(0.99)	(1.31)	(2.79)	(-0.36)
	2.7740	0.3965	1.0315	1.0790	0.1662	1.0150	-0.1019	0.4893	0.5354
Beyond secondary	(3.13)	(0.36)	(3.44)	(5.87)	(0.68)	(1.07)	(-0.31)	(2.22)	(1.35)
	0.0438	0.0490	0.0273	0.0513	0.0258	0.0262	0.0158	0.0226	0.0029
Experience	(1.03)	(2.71)	(2.02)	(5.54)	(2.10)	(0.89)	(0.67)	(2.30)	(0.20)
	0.0001	-0.0008	-0.0004	-0.0009	-0.0006	-0.0004	-0.0004	-0.0005	-0.0002
Experience square	(0.05)	(-1.44)	(-0.92)	(-3.68)	(-3.11)	(-0.90)	(-0.99)	(-2.21)	(-0.60)
	-0.3027	-0.1501	0.0581	0.0178	-0.1222	-0.1789	-0.4748	-0.0061	0.0366
Married	(-1.10)	(-1.04)	(0.69)	(0.34)	(-1.00)	(-0.92)	(-2.17)	(-0.08)	(0.16)
	-0.2598	-0.1963	-0.0380	-0.1211	-0.3768	0.0648	-0.8295	0.0414	-0.1700
Inverse Mills ratio	(-0.30)	(-0.73)	(-0.25)	(-1.62)	(-2.34)	(0.29)	(-2.53)	(0.35)	(-0.65)
	4.2015	6.5101	5.5132	5.2537	5.1918	5.5760	4.032	6.1265	5.7719
Constant	(1.53)	(4.74)	(11.31)	(18.05)	(15.20)	(8.78)	(4.79)	(40.33)	(8.93)

Note: Figures in parentheses are z-statistics.
Source: Malaysia Population and Family Survey 2004.

FINDINGS

Table 6 shows a series of occupation-specific earnings equations estimated separately for males and females for nine broadly defined occupational categories[11]. (It must be borne in mind that the breath of the occupational classification to a great extent would affect the observed earnings differential.). It can be seen that the estimated coefficients vary substantially among the occupational groupings. This indicates that the relationship between characteristics and earnings is not the same for each occupation.

It is evident that higher levels of educational attainment are associated with higher earnings. For instance, for a male service and sales worker with secondary education, earnings, on average, are 37.8% higher than an otherwise similar worker who attained below secondary education.

Where women are more likely than men to shoulder household responsibilities as a result of entrenched traditional division of labour in the family, we would expect them to experience an earning penalty for being married. The earning penalty is observed in six groups of occupations in this study, the exceptions being associate professional, clerical and elementary occupations. Nevertheless, the estimated coefficients across occupations are not statistically significant. For men, as expected, there is an earning premium associated with being married and this is usually statistically significant.

In common with the findings of Dolton and Kidd (1994), the coefficients attached to the inverse Mills ratio in this study are not statistically different from zero. Without strong evidence to support the existence of selection bias in our data, one would suggest disregarding the effect of the selectivity bias term in the subsequent earnings decomposition given the fact that non-random sampling is not severe. However, we notice that considerable changes in the estimated parameters arise once the problem of non-random sampling is factored into the earnings regression[12]. (Due to space problem, we do not report the results here.). This would lead the magnitudes of various earnings decomposition components to be misspecified should we fail to account for sample selection.

Using the results from Table 5 and 6, Table 7 presents the earnings decomposition as a share of the gross log earnings differential into the respective five components: WJ, WD, BJ, BD and non-random sampling as stated in (6). This allows us to discern the relative importance of across occupational segregation and the within-occupation wage differential in explaining the earnings gap. In particular, we are interested in exploring whether the considerable differences in occupational distributions that we have estimated in the Duncan index of dissimilarity or, on the other hand, wage discrimination within the same occupation are the main source of overall earnings gap between men and women.

The first observation to be made in Table 7 is that the log monthly earnings gap of 0.425 is mainly driven by the within-occupational factor - it accounts for more than 80% of the gap. Particularly marked in the within-occupational earnings gap are gender differences in rewards to characteristics that they bring to the labour market. This concurs with the findings of Mohamad-Nor (2000) and Fernandez (2006) that most of the earnings gap is due to differences in coefficients of those characteristics captured in their models. That said, some unmeasured productivity related differences between men and women in light of data limitations may lead to an estimate of discrimination that is biased upwards.

Despite the discrepancy of the observed female occupational distribution and that which would arise if women had the occupational structure of men, surprisingly, neither the unexplained occupational distribution (BD) nor the explained occupational distribution (BJ) contributes to the gender earnings gap. The decomposition analysis suggests that the existence of high segregation in our dataset, at least, is not always bad for women since occupational segregation works to the advantage of women.This could be because when men and women are working in occupations that favour of their own sex, it reduces discrimination on the basis of gender for women's advancement in female dominated and integrated jobs (Blackburn and Jarman 2005). As such, high overall segregation is accompanied by less gender inequality in earnings.

The final component of the observed earnings gap is the non-random sampling effect. The proportion of the gap associated with sample selection seems large, in view of the fact that selectivity correction terms do not reach conventional levels of statistical significance[13]. (Sample selection only accounts for about 7% of the overall wage gap in the study of Dolton and Kidd (1994).). However, given the small number of observations for each occupational category and the limited information that we included in the multinomial logit for sample selection in the first stage, the findings must be interpreted with care.

TABLE 7. Earnings Decomposition Based on Brown et al. with Correction for Sample Selection Bias

Components		
Differential in logarithm of monthly earnings		**0.4250**
Within-occupational:		**0.3554**
		(83.6)
Justifiable (WJ)	0.0196	
Unjustifiable (WD)	0.3358	
Between-occupational:		**-0.1982**
		(-46.7)
Justifiable (BJ)	-0.0116	
Unjustifiable (BD)	-0.1866	
Sample selection		**0.2678**
		(63.1)

Note: Figures in parentheses refer to percentage of the overall gap.
Source: Malaysia Population and Family Survey 2004.

CONCLUSION

In this paper we have examined the factors that contribute to the gender earnings gap in Malaysia, using data provided by the National Population and Family Development Board. Unlike previous studies conducted in Malaysia, we specifically investigate the relative importance of occupational segregation and unequal treatment of given characteristics between men and women in explaining the gap aggregated over nine broadly defined occupational categories. Based on the wage gap decomposition framework developed by Brown et al. (1980), our findings suggest that much of the earnings gap is associated with the within-occupation effect. Against our prior expectations, occupational segregation in the Malaysian labour market actually serves to *reduce* the earnings gap. It is important to note that the surprising results might be sensitive to the level of occupational aggregation in our data. When we disaggregate these componentsinto explained and unexplained factors, we have found that differences in treatment interpreted as discrimination[14] (this unequal treatment could also arise due to inadequate controls for labour market variables in this study) dominate the within-occupational effect.

The data analysed in this study isnecessarily limited, but the findings nevertheless suggest that earnings discrimination against women and in favour of men still persists in a rapidly developing country like Malaysia. This could be because labour markets are not perfectly competitive, as they contain significant rigidities (such as vertical occupational segregation) and forms of discrimination that affect women's potential in the labour market. Indeed, there is a policy of equal pay for equal work in Malaysia since 1969. Nevertheless, the policy is only legally applied to all employees in the public sector, while the private sector accepts this concept only in principle (Fernandez 2006: 310)[15]. (The legal framework for salary and wage payment in Malaysia is governed by the Employment Act 1955. The Employment Act does not govern every aspect of wages. For example, wage rates or levels are not regulated by the Act but are determined through negotiations between an employer and an employee or, in the case of unionized companies, between the representatives of the company and the trade union. However, wage determination for some employees, such as hotel and restaurant workers, are subject to the minimum wage requirements of the Wage Councils Ordinance 1947). Without a proper mechanism to monitor the implementation of the equal pay policy, it opens the way for the private sector to practise a discriminatory wage policy against women.

Our results suggest that it is timely to re-evaluate the existing system in order to find ways of improving the returns to characteristics earned by women in a given occupation. An appealing possibility, widely used elsewhere, would be to require large employers to undertake job evaluations and to remunerate their workers, regardless of gender, on the basis of these. It must be borne in mind thateven if pay structures within occupations are relatively equitable, in the absence of equal employment requirements, women will remain confined to lower paying jobs within an occupation resulting from employers with a taste for discrimination. Changes in employers'mindsets are definitely needed if women, with similar levels of acquired human capital to male counterparts, are to compete effectively with men in the labour market.

It is also imperative to change gender stereotypes and typical prejudices, both inside and outside the labour market, about the supposed abilities, preferences, appropriate work and societal roles for men and women. In order to increase awareness that men and women have similar capabilities for most types of work, programmes to increase gender sensitisationand eliminate gender stereotypes through media could be initiated with the concerted effort from the government and non-governmental organisations.

If gender equality in the labour market is our prime social goal as a means to eradicate wage discrimination as found in this study, policies that address the negative impact of family responsibilities on gender wage gap must be initiated. This includes flexible work arrangements, parental leave and child care facilities.

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