Economics Bulletin

Volume 38, Issue 2

Personal income in Malaysia: distribution and differentials

Kim-Leng Goh
Faculty of Economics and Administration, University of Malaya

Nai-peng Tey
Faculty of Economics and Administration, University of Malaya

Abstract

Many studies on income disparities in Malaysia tend to use household data, focus on mean income, and ignore the distribution of income. The linkage to some of the characteristics of the individuals has not been examined. Using nationally representative data at the individual level, this paper shows empirically that the impact of demographic and socio-economic variables on income varies according to different income quantiles. The results of quantile regression suggest that education has a u-shaped effect on income among the graduates. Age and some occupational categories have stronger effects on income differentials at the top end of income distribution. On the other hand, the differentials attributed to gender, ethnicity and employment sector tend to decline as income level rises.

We are grateful to the Population Studies Unit, University of Malaya for funding this research, and the National Population and Family Development Board for providing the data. We thank an anonymous referee for helpful comments that improved this paper.
Citation: Kim-Leng Goh and Nai-peng Tey, (2018) "Personal income in Malaysia: distribution and differentials", *Economics Bulletin*, Volume 38, Issue 2, pages 973-982
Contact: Kim-Leng Goh - klgoh@um.edu.my, Nai-peng Tey - teynp@um.edu.my.
Submitted: December 12, 2017. **Published:** May 12, 2018.

1. Introduction

The rising income disparity is rated as the most important trend in determining global development over the next 10 years (World Economic Forum 2017). The World Economic Forum (2017) warns that unless urgent action is taken, rising income inequality poses as the major risk to the global economy and could result in the rolling back of globalization.

Malaysia has achieved a rather impressive rate of economic growth. Despite the policy measures it has taken, the gain in income has not been uniform across the various segments of the population. With a Gini coefficient of about 0.4, income inequality in Malaysia remains a major challenge in development planning. A sizable body of literature on income distribution and income inequality is available on Malaysia, and many of these focus on ethnic disparity in income (among others, Khalid 2011, Murad *et al*. 2014, Saari *et al*. 2014, and DOSM 2017). The determinants of income which give rise to these disparities that occur between different demographic and socio-economic groups have received relatively little attention. Almost all of these studies are based on household data, and not individual data and hence the linkage to some of the characteristics of the individuals has not been examined.

Many of these studies tend to use ordinary least squares (OLS) method to estimate the impact of a variable on income. Some examples include Schafgans (2000), Milanovic (2006), Ragayah (2008), Ismail and Jajri (2012), and Ismail and Noor (2013). At best, this method provides estimates at the mean income level. The fact that demographic and socio-economic variables may have different impact on income at different income levels is ignored. This paper argues empirically that the distribution of income must be taken into account when examining income differentials. The main reason is that income is not normally distributed and tends to be skewed. The impact of a variable on income measured at its conditional mean is therefore not a good estimate of the impact at other income quantiles.

2. Methodology and Data

This study proposes to use the quantile regression method to overcome the problem of OLS regression that only considers estimates at the conditional mean of income. Quantile regression allows for the differentials to be estimated on the entire distribution of income. The quantile regression for quantile q, $0 < q < 1$, is stated as follows:

$$Q(y_i|x_i') = \alpha + x_i'\beta_q \tag{1}$$

where y_i is personal income for individual i, $i = 1, \ldots, n$, and x_i is the vector of explanatory variables that represent different demographic and socio-economic groups. The coefficients of the explanatory variables that are categorical provide the estimates of income differentials between different groups defined in these variables. The explanatory variables are listed in Table 1. The estimators for quantile q are obtained by minimizing the following objective function

$$Q(\beta_q|x_i') = \sum_{i:y_i \geq \alpha + x_i'\beta_q}^{n} q|y_i - \alpha - x_i'\beta_q| + \sum_{i:y_i < \alpha + x_i'\beta_q}^{n} (1-q)|y_i - \alpha - x_i'\beta_q| \tag{2}$$

via the simplex method. Quantile regression estimators are more robust to non-normal errors and outliers. The standard errors of the estimators are estimated through bootstrapping.

Table 1: List of variables

Variable name	Variable definition
Income*	Monthly personal income (Malaysian ringgit, RM)
Age	Age in years
Male	1 if gender is male, 0 if female
Urban	1 if place of residence is in an urban area, 0 otherwise
Education	
Primary	Completed primary education - reference group
Lowersec	1 if completed lower secondary education, 0 otherwise
Uppersec	1 if completed upper secondary education, 0 otherwise
Tertiary	1 if completed tertiary education, 0 otherwise
Ethnic group	
Malay	1 if Malay, 0 otherwise
Chinese	1 if Chinese, 0 otherwise
Indian	1 if Indian, 0 otherwise
Others	Other ethnic groups - reference group
Employment sector	
Ownaccount	Respondent is own account worker - reference group
Employer	1 if respondent is employer, 0 otherwise
Public	1 if respondent is employee in the public sector, 0 otherwise
Private	1 if respondent is employee in the private sector, 0 otherwise
Occupation	
Manager	1 if occupation is manager, 0 otherwise
Professional	1 if occupation is professional, 0 otherwise
Technician	1 if occupation is technician, 0 otherwise
Clerk	1 if occupation is clerk, 0 otherwise
Salesser	1 if occupation is sales/service worker, 0 otherwise
Agricultural	1 if occupation is agricultural worker, 0 otherwise
Craft	1 if occupation is craft worker, 0 otherwise
Plantmacoperator	1 if occupation is plant/machine operator, 0 otherwise
Elementary	Elementary job worker – reference group

*Dependent variable

Data for this study are taken from the Fifth Malaysian Population and Family Survey (MPFS-5) conducted by the National Population and Family Development Board in 2014. MPFS-5 is a nationally representative survey, covering 7,644 married women (aged 15-59), and a sub-sample of 4,167 men who are spouse of these women. This study focuses only on 7,074 individuals who are working (3,322 women and 3,752 men). Despite the limitation that this survey includes only those who are married, it is the only nationally representative source that provides information on individual incomes. Detailed information about monthly income (in Malaysian ringgit, or RM) and the sample distribution by the demographic and socio-economic variables included in this study is reported in Table 2. Those aged 40-49 have the highest mean income. The male-female

income differential is RM730 per month. The Chinese, those residing in urban areas and with better educational attainment have higher mean income than the others. The other groups with higher mean income are the private sector employees and the managers and professionals.

Table 2: Sample characteristics and summary statistics on income

Variable	Category	Number of cases	Percent	Monthly income (RM)*	
				Mean	Standard deviation
Total		7074	100.0	2139.20	2321.36
Age	Below 30	842	11.9	1767.75	1907.65
	30-39	2057	29.1	2241.54	1965.93
	40-49	2353	33.3	2246.78	2507.57
	50+	1822	25.8	2056.39	2582.09
Gender	Female	3322	47.0	1774.47	1880.08
	Male	3752	53.0	2462.13	2609.49
Ethnicity	Malay	4768	67.4	2152.64	2293.26
	Chinese	808	11.4	2897.31	2876.50
	Indian	465	6.6	2211.05	2271.86
	Others	1033	14.6	1451.81	1709.64
Place of residence	Rural	2488	35.2	1488.04	1943.57
	Urban	4586	64.8	2492.47	2430.83
Education	Primary	1138	16.1	1003.09	1440.28
	Lower secondary	1310	18.5	1390.11	1242.20
	Upper secondary	2943	41.6	1868.94	1887.04
	Tertiary	1683	23.8	3963.06	3010.30
Employment sector	Own account	1971	27.9	1207.97	1497.34
	Employer	285	4.0	3969.03	4651.52
	Public sector employee	1588	22.4	3157.05	1980.71
	Private sector employee	3230	45.7	2045.57	2293.80
Occupation	Manager	516	7.3	4648.76	4223.49
	Professional	1216	17.2	3746.43	2811.07
	Technician	508	7.2	2774.79	1920.39
	Clerk	597	8.4	1967.13	1041.46
	Service and sales worker	1529	21.6	1529.64	1617.73
	Agricultural workers	728	10.3	757.42	627.90
	Craft and related workers	685	9.7	1329.12	1182.83
	Plant and machine operators	669	9.5	1641.70	1024.75
	Elementary occupation	626	8.8	1110.77	1275.89

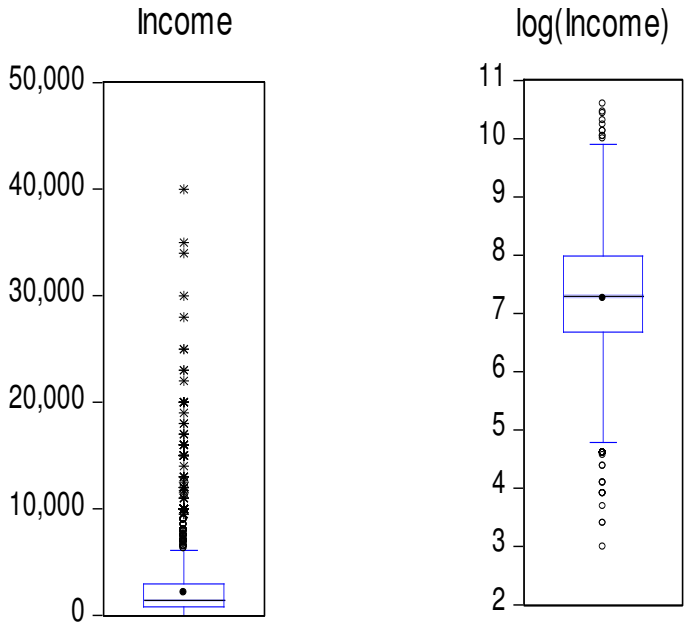
Note: *RM is Malaysian ringgit. The current exchange rate is approximately RM3.9 for one USD.

3. Results

The box plots in Figure 1 suggest that the distribution of personal income is not symmetrical. The distribution is highly skewed on its right tail. Although the distribution is less skewed when the personal income variable is transformed in logarithm, outliers are still present (see also the summary statistics in Table 3). The Jarque-Bera test rejects the null hypothesis of normality.

The estimates for the quantile regressions are reported in Table 4. The OLS estimates are also provided for comparison. The table reports only results at the 20th, 50th and 80th percentiles, but the estimates at each decile are shown in Figure 2 for all the variables. While all the variables are significant at 5 percent or less, it is clear that the impacts of the demographic and socio-economic variables on income are not the same at different income quantiles.

Figure 1: Box plot of personal income and log personal income



The OLS estimators, if interpreted inappropriately, can under- or over-estimate such impacts. For instance, the effect of age on income is over-estimated by OLS at lower income quantiles, and under-estimated at higher quantiles. The impact of age on personal income differential is much higher among those in the higher income bracket, but the gap is smaller for the lower income group. Most of those in the high income bracket are working in the private or public sector. In the top 20 percent group, 35 percent are private sector employees, and almost half are public sector employees. Work experience that is often associated with seniority is an important factor in determining earnings in these sectors, particularly for higher pay positions.

Table 3: Summary statistics for personal income

	Income	Log of income
Mean	2139.20	7.26
Median	1500.00	7.31
Maximum	40000.00	10.60
Minimum	20.00	3.00
Standard deviation	2321.36	0.93
Skewness	4.54	-0.24
Kurtosis	42.61	3.22
Jarque-Bera statistic	486688 (0.00)	79.99 (0.00)

Note: Figures in parentheses are p-values.

Gender wage gap continues to exist across all income groups. The gap, however, narrows at the top end of income distribution. The sector of employment has an important role to play. Among those with high income, a high percentage of the females are employed in the public sector. Among the women in the top 40th percentile income bracket, 60 percent are public sector employees. The salary for the public sector is fixed according to a tiered-system that defines the pay scheme for different job grades. Wage discrimination is therefore not possible among those in the same grade. On the other hand, close to two thirds of men as well as women are own account workers in the bottom 20 percentile. Given the absence of a structured employment scheme, there is a likelihood that these women are working on casual basis to supplement their family income. Additionally, educational attainment is also important. In the top 40 percent income bracket, about two third of the females have tertiary education qualification compared to 44 percent of the males. Notwithstanding these arguments, the sample includes only married women. To cope with the escalating cost of living, dual income family has become more common, and women with high pays are much more likely to continue working.

On the other hand, the urban-rural income disparity and income gap attributed to educational attainment, particularly at the tertiary level, are lowest among the medium income group. A u-shaped effect can be observed, where the gaps are big at both ends of the income distribution, but small in the centre. The bottom income earners are mainly own account workers whereas a majority of those in the high income brackets are in the private or public sectors. The urban-rural wage gap in these two extreme categories are likely due to better business and job opportunities in the urban areas and the lack of them in the rural areas. The u-shaped phenomenon observed for the tertiary education variable suggests problems of under-employment among the graduates in the 40th to 60th percentile income brackets. The monthly income of this group that is in the range of RM1,250 to RM2,000 with a mean of RM1,776 is less than the typical income of a graduate.

Table 4: The estimated quantile regression

Variable	OLS	Q(0.20)	Q(0.50)	Q(0.80)
Age	0.0084**	0.0069**	0.0091**	0.0139**
Gender				
Male	0.5055**	0.5094**	0.4223**	0.4314**
Female (reference)				
Place of residence				
Urban	0.1650**	0.1820**	0.1462**	0.1724**
Rural (ref)				
Education				
Primary (reference)				
Lowersec	0.1777**	0.1521**	0.1746**	0.1747**
Uppersec	0.3488**	0.3373**	0.3444**	0.3694**
Tertiary	0.8233**	0.8429**	0.7456**	0.8074**
Ethnic group				
Malay	0.1172**	0.1020**	0.1344**	0.1000**
Chinese	0.4287**	0.3929**	0.4465**	0.3871**
Indian	0.2184**	0.2304**	0.2214**	0.1986**
Others (reference)				
Employment sector				
Ownaccount (reference)				
Employer	0.6208**	0.7349**	0.6201**	0.5723**
Public	0.2885**	0.5109**	0.3082**	0.1255**
Private	0.5674**	0.8160**	0.6134**	0.3459**
Occupation				
Manager	0.7938**	0.7026**	0.8146**	0.9357**
Professional	0.6654**	0.5929**	0.7236**	0.7190**
Technician	0.4854**	0.4212**	0.5060**	0.5505**
Clerk	0.4797**	0.4699**	0.4372**	0.4542**
Salesser	0.2095**	0.1213**	0.1875**	0.2801**
Agricultural	-0.1429**	-0.1025**	-0.1588**	-0.1685**
Craft	0.0716*	0.0693*	0.1110**	0.1157**
Plantmacoperator	0.3299**	0.3779**	0.3084**	0.2897**
Elementary (reference)				
Constant	5.4167**	4.8882**	5.4356**	5.7918**

Note: Dependent variable is log of personal income. OLS refers to the ordinary least squares. Q(0.20), Q(0.50) and Q(0.80) refers to the quantile regression at the 20th, 50th and 80th percentile respectively. The variable definitions are given in Table 1.
**,*Significant at 1% and 5% respectively.

Income differential is found to exist between different ethnic groups, with the Chinese having the highest personal income, and this is followed by the Indians, then the Malays and lastly the other ethnic groups. Despite the presence of ethnic differentials, it should be noted the income gaps become smaller as income increases, especially among the top 20%. A further analysis of the employment sector shows that the Chinese are more likely to be engaged in business, either as own account workers or employers, compared to the other ethnic groups. While sector of employment may provide a partial explanation, the results also suggest the Chinese tend to do better when other effects are controlled for. The differential in wages that market pays, whether due to labour intrinsic endowment or productivity, remains to be investigated. Despite this, it should be noted that the extent of this effect has lessened at the top end of the income distribution.

Personal incomes of those who are employers are higher than those employed in the private sector, which in turn have higher personal income than the public employees, while the personal incomes of own account workers are the lowest. However, the quantile regression results also show that differentials due to employment sector are high at low income quantiles, but the differentials are smaller at higher quantiles. It means that employment sector has lesser effect on income differentials at high income levels. This is likely due to a smaller variability in skill sets and ability among those in high paying jobs. The reverse, however, is true for certain occupational categories including managers, professionals, technicians, and the sales and service workers. The effects of these occupational categories are stronger at higher income quantiles. This could be attributable to the skills required for these occupations and the willingness of the labour market to pay a premium for such skills at the higher end of the income distribution.

Figure 2: Quantile estimates for income differentials by demographic and socio-economic variables

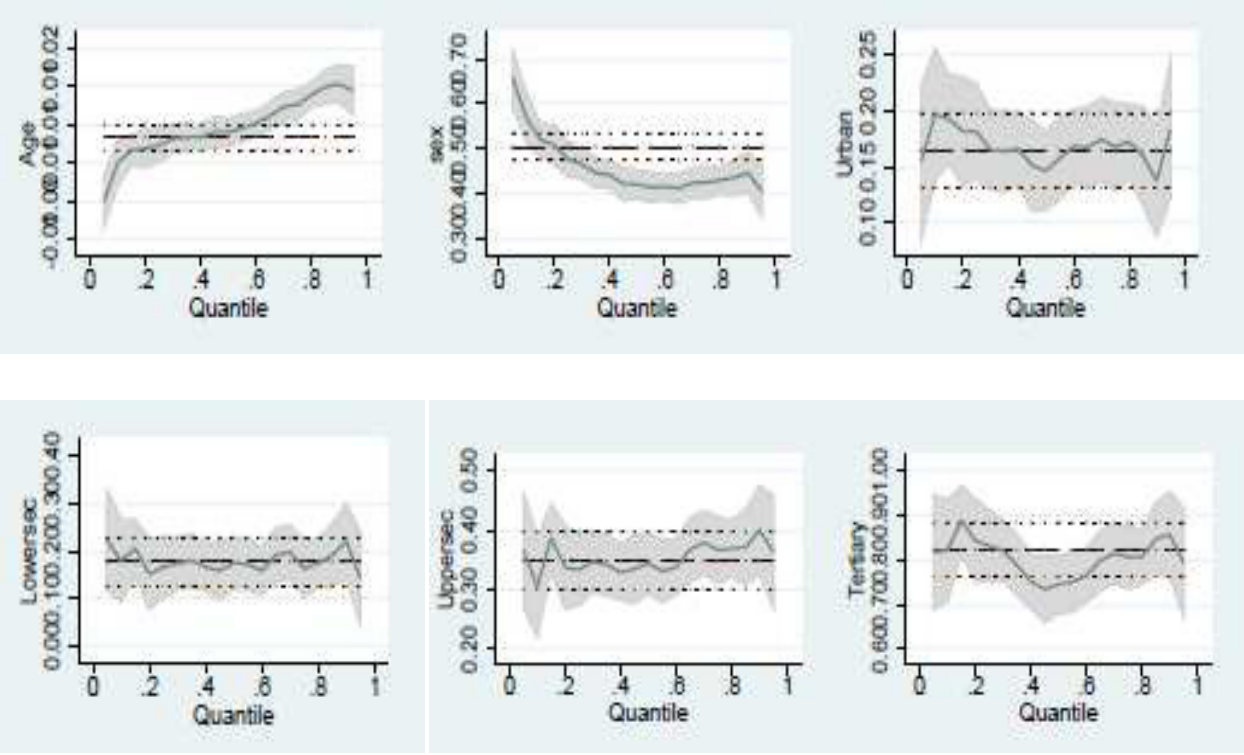
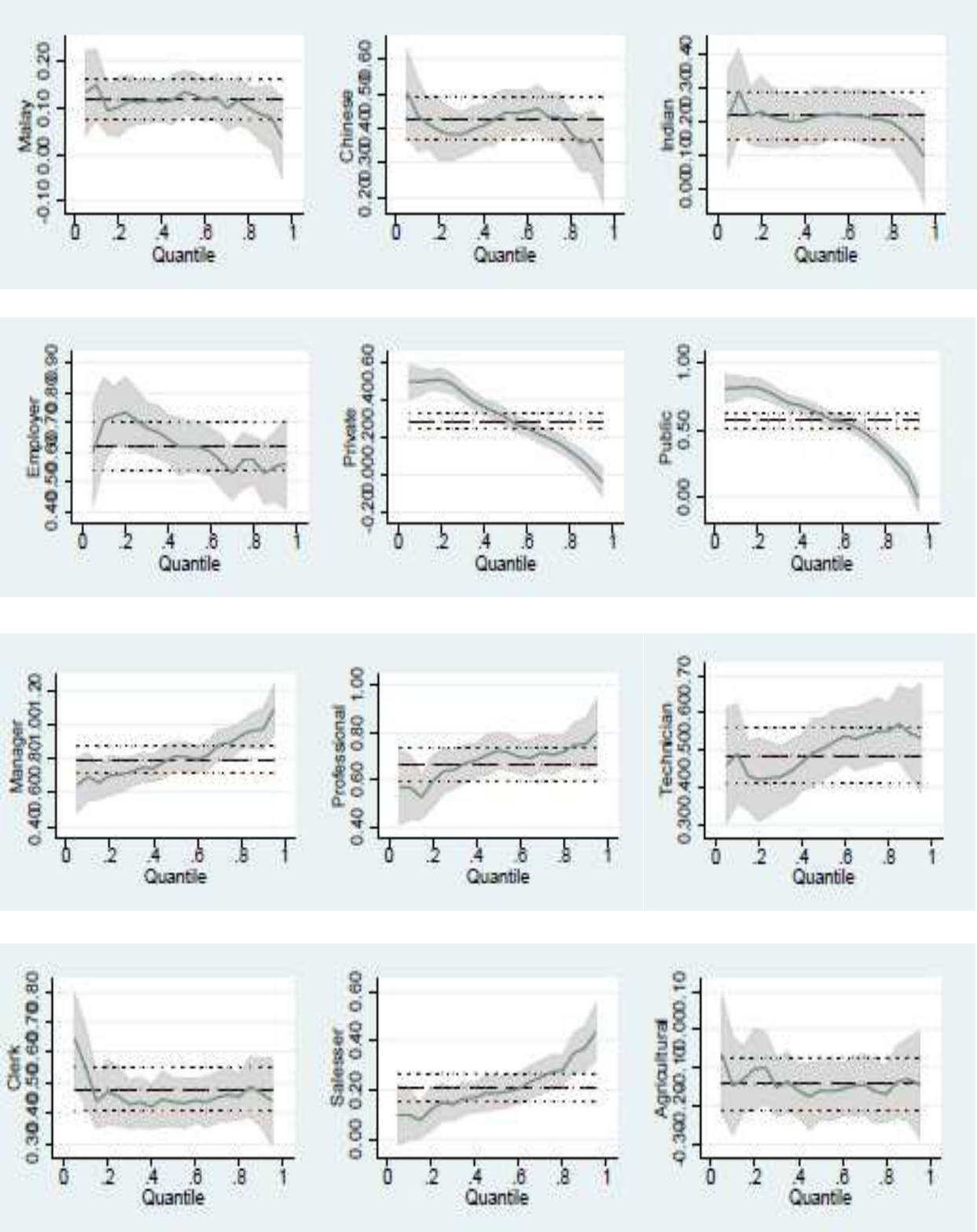


Figure 2 (cont'd)



Note: The horizontal thick dash lines show the OLS estimates.

4. Conclusion

This paper provides empirical evidence to show that wrong inferences can be made regarding the impact of different demographic and socio-economic groups on income differentials if estimations are made at the mean level, typically using OLS. This is largely because income is not normally distributed and tends to be skewed. The impact of these variables on income can vary across different income brackets. For the case of Malaysia, education has a u-shaped effect on income, where the differentials are low among the graduates in the medium income group. Age and some occupational categories have stronger effects on income differentials among those in the high income bracket. On the other hand, the differentials attributed to gender, ethnicity and employment sector tend to decline as income level rises.

The results highlight some policy concerns. While policy design should continue to redress income differentials due to gender and ethnicity, the focus should target the lower income groups. The various five-year development plans of Malaysia have placed emphasis on poverty eradication and reducing ethnic income inequality. The latest Eleventh Malaysia Plan (2016-2020) has given attention to raise the income level of the bottom 40 percent with the aim of reducing inter- and intra-ethnic income differentials. More in-depth studies are needed on the cause of income differentials, particularly due to gender, to establish the extent of wage discrimination in the labour market. Likewise, the reasons for wage gap due to ethnicity should be explored further to understand the effect of related endowment on the willingness of market to pay. The issue of under-employment among the graduates requires careful human resource planning at the national level to address the problems of skill mismatch in the labour market.

References

Department of Statistics Malaysia (DOSM) (2017) *Report on Household Income and Basic Amenities Survey 2016*, Press release, DOSM. https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=RUZ5REwveU1ra1hGL21JWVlPRmU2Zz09

Ismail, R. and I. Jajri (2012) "Gender wage differentials and discrimination in Malaysian labour market" *World Applied Sciences Journal* ***19***(5), 719-728.

Ismail, R. and Z. M. Noor (2013) "Gender wage differentials in the Malaysian manufacturing sector" *International Journal of Economics, Management and Accounting* ***13***(2), 119-137.

Khalid, M. A. (2011) "Household wealth in Malaysia: Composition and inequality among ethnic groups" *Jurnal Ekonomi Malaysia* ***45***(1), 71-80.

Milanovic, B. (2006) "Inequality and determinants of earning in Malaysia, 1984-1997" *Asian Economic Journal* ***20****(2), 191-216.* DOI: 10.1111/j.1467-8381.2006.00230.x

Murad, M. W., M.M. Hasan, S. Islam and M.M. Alam (2014) "Socio-economic profile of the low income and poor communities in Kuala Lumpur city, Malaysia" *International Journal of Ethics in Social Sciences* ***2***(1), 113-130.

Ragayah, H. M. Z. (2008) "Income inequality in Malaysia" *Asian Economic Policy Review* ***3***(1), 114-132. DOI:10.1111/j.1748-3131.2008.00096.x

Saari, M. Y., E. Dietzenbacher and B. Los (2014) "Income distribution across ethnic groups in Malaysia: Results from a new social accounting matrix" *Asian Economic Journal* ***28***(3), 259-278. DOI: 10.1111/asej.12036

Schafgans, M. M. A. (2000) "Gender wage differences in Malaysia: Parametric and semiparametric estimation" *Journal of Development Economics* ***63***(2), 351-378. DOI: 10.1016/S0304-3878(00)00114-0

World Economic Forum (2017). *The Global Risks Report 2017*. 12th edition. World Economic Forum: Geneva, Switzerland.