

Inequality and Determinants of Earnings in Malaysia, 1984–1997*

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Using three large nationally-representative Malaysian Household Income Surveys from 1984, 1989 and 1997, the present paper examines inequality and determinants of earnings. During the period 1984–1997, Malaysia's real per capita GDP increased by approximately 70 percent, the participation rates for both men and women went up among all age groups, and the average number of years of schooling increased by 1.2 years. There was a significant relative wage improvement among the bottom deciles. The rate of return to an additional year of schooling remained high (at 10 percent), despite the huge increase in the supply of the highly educated. The stable overall rate, however, masks an increased rate of return on women's education, and a decreased rate for men. Wage discrimination against women amounts to 16–20 percent, and the bias has increased in 1997. The pro-Chinese earning ethnic bias is estimated at 31 percent.

Keywords: labor, inequality, education, Malaysia.

JEL classification codes: J21, J31, J7, O12.

I. Introduction

The present paper has several objectives: to examine changes in inequality of earnings in Malaysia, determinants of earnings, and how earnings were influenced by the changes in supply and demand of different types of labor over the 13-year period 1984–1997. This period is composed of two subperiods: 1984–1989 and 1989–1997. The dividing year, 1989, is chosen because it is the last year for which Household Income Survey (HIS) data are available prior to the adoption of the National Development Policy (NDP) in 1991 by the Malaysian Government. The new policy represented also the beginning of a new development strategy, which placed greater emphasis on private sector development and exports.

Fast growth in Malaysia, which averaged more than 4 percent per annum over this 13-year period, was accompanied by deep structural changes: increased education level of workers, rising participation rates among women, reduced

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importance of agriculture both in terms of employment and value added, and rising importance of services. Developments of this kind provide an almost ideal natural experiment setting to study how labor force is affected and, in particular, what happens to the returns to education and possible earning biases against women or different ethnic groups. Consider returns to education. A long-standing literature argues that returns to skills would be higher in relatively poor countries because the share of skilled labor there is less. As the country develops and the average skill level of the population increases, the skill premium should go down (see Psacharopoulos, 1994; Söderbom et al., 2004; Gonzalez and Miles, 2001; Rama, 2003). Offsetting this, however, is the fact that the comparative advantage of a country can also shift toward the production of more skill-intensive products, which, in turn, might keep the demand for higher-skilled labor on a par with its increased supply (see Bourguignon et al., 1998 on Taiwan). Increased labor force participation by women whose average skill levels are, at the early development stage, less than men's might also keep the education premium up. The more recent published literature on endogenous growth suggests that increasing returns to scale and complementarity between highly capital-intensive and skill-intensive processes might help to explain why the education premium has generally remained high or increasing in many countries.¹ Another hypothesis, linked with globalization, is that wage-setting conditions for skilled labor respond to global wage-setting rules, whereas wages of low-skilled labor depend on local conditions (Warner, 2002). This too would tend to keep the education premium higher.

As for possible gender discrimination, increased labor force participation among women and greater openness to trade might both be expected to reduce the bias against women; the former because fewer women could be viewed by employers as simple 'additional household earners' who can be paid less than the primary bread-winners, the latter because of the presumption that the more competitive environment renders discrimination more costly to employers (see Black and Brainerd, 2002; Behrman and King, 2000). The issue of ethnic bias is of crucial importance in Malaysia, a multiethnic society where government's explicit policy, particularly over the 1969–1991 period, was to help the majority Malay population to increase its educational clout and economic role. Therefore, Malaysia's experience during the last 2 decades provides a very fertile ground to test all these hypotheses.

The paper is organized as follows. Section II gives some background information on the evolution of real GDP, real wages and population in Malaysia in the 1984–1997 period. Section III describes the data, obtained from three HIS (in 1984, 1989 and 1997), which we use. Section IV presents descriptive statistics for income-recipients gleaned from these surveys. Sections V and VI are the main

1. There is a huge literature on the recent increases in earnings inequality and education premium in the rich countries. For a non-technical review of the alternative explanation, see Slaughter (1999); for a summary of empirical findings, see Gottschalk and Joyce (1998).

parts of the paper: they analyze respectively changes in the distribution of earnings and determinants of earnings. The findings are summarized in Section VII.

II. Overview of Development in Malaysia, 1984–1997

Over the period under study Malaysia's real GDP per capita increased by 71 percent, or by an average rate of 4.2 percent per year. Real wages of manufacturing workers were approximately 30 percent higher in 1997 than in 1984. However, the overall period consists of two subperiods with significant differences. In the first subperiod, 1984–1989, GDP per capita grew at a relatively modest rate of 1.6 percent per annum. In 2 years, 1985 and 1986, GDP declined by a little over 1 percent. In the second period, the growth rate accelerated significantly, reaching 5.9 percent per capita per annum (Table 1). Other statistics given in Malaysian *Statistical Yearbooks* also reflect the duality between the subperiods (Malaysia Department of Statistics, various years). Manufacturing workers' and engineers' real wages (the latter taken here to represent earnings of skilled professionals) rose by a little over 1 percent per annum on average in the first subperiod. Their growth accelerated to, respectively, 2.8 and 6 percent per annum in the second subperiod. In contrast, plantation workers' daily real wage rate grew substantially during the first period (by more than 6 percent on average), mostly because of the large increases in 2 years (1986 and 1987), but was stagnant in the second subperiod. Overall, if we denote by 100 the real wage of, respectively, manufacturing workers, engineers and plantation workers in 1984, 13 years later they stood at 129, 160 and 136. Engineers' relative wages, therefore, pulled ahead of the other two types of workers.

Population and labor force increased at approximately the same, very high, rate in the first subperiod (3.5 percent per annum), and then decelerated (2.9 percent per annum) in the second subperiod. Labor force represented some

Table 1 Some macro statistics, 1984–1997

	1984–1989	1989–1997	1984–1997
Growth rates			
GDP per capita	1.6	5.9	4.2
Real wage			
In manufacturing	1.1	2.8 ^a	2.3
Engineer's wage	1.3	6.0 ^b	4.0
Plantation daily wage	6.1	0.2 ^a	2.8
Labor force	3.5	2.9	2.9
Population	3.5	2.6	2.7
Levels (at the end of period)			
Labor force as percentage of population	39	40	
GDP per capita (in current US dollars)	2143	4517	

Note: ^aPeriod 1989–1995. ^bPeriod 1989–96.

Sources: World Bank data and Malaysia Department of Statistics (various years).

Table 2 GDI, labor force, exports and education, 1980–2000

	1980	1985	1987	1990	1995	2000
Structure of GDI (%)						
Agriculture	23	21	20	15	13	8
Mining	10	10	13	12	6	10
Manufacturing	20	20	20	24	26	31
Other	47	49	47	49	55	51
Composition of labor force (%)						
Agriculture	37	31	31	26	20	17
Mining	1	1	1	1	0.4	0.3
Manufacturing	15	15	16	20	23	23
Other	46	53	53	54	56	59
Share in GDI (in %)						
Exports	56	55	63	74	94	125
Education	5.2	5.6	5.7	5.5	4.8	5.6

Notes: The structure of GDI, and shares of exports and education expenditures in GDI are all calculated at current prices. GDI, gross domestic income.

Source: Asian Development Bank.

40 percent of the population in 1997 against 39 percent in 1984. Finally, GDP per capita in current dollar terms more than doubled, bringing Malaysia into the group of middle-income countries.

This remarkable growth was accompanied by large structural change. As one would expect, the share of agriculture in total gross domestic income (GDI) decreased from 23 percent in 1980 to only 8 percent 20 years later. The share of labor force employed in agriculture similarly dropped from 37 to 17 percent (see Table 2). Manufacturing exports, which were the cornerstone of the NDP strategy, increased dramatically so that by 2000 Malaysia's exports were 25 percent higher than its GDI, and its combined exports and imports to GDI ratio stood at over 230 percent. This made Malaysia, together with Singapore, Hong Kong and Luxembourg, the most open economy in the world. Simultaneously, of course, the share of manufacturing in total value added expanded from 20 percent in 1980 to 31 percent in 2000. Public education expenditure, which underlies such a massive structural shift, increased *pari passu* with the rise of GDI. They continued to amount to between 5 and 6 percent of GDI.

III. The Data

We use three HIS, conducted, respectively, in 1984, 1989 and 1997. The year 1989 is crucial because it represents the end of an economic and development period. HIS data are normally available in two forms: household-level and individual-level data. Because we deal with individuals' earnings and their determinants, we use individual level data. All three surveys are very big: two contain information for more than 250 000, and one for 170 000 people.²

However, in our analysis, we are interested in income recipients alone. We define as income recipients those individuals who report having positive 'earned income' and non-zero number of hours worked per month. Earned income, in turn, is defined as the sum of income from paid employment, and net income from self-employment (both agricultural and non-agricultural).³ We shall be using the term 'earnings' in preference to 'wages' to convey the fact that self-employment income is included as well. In addition, we are concerned with the population of working age only; that is, with those of between the ages of 14 and 65 years. (In the datasets, all others invariably report zero hours of work anyway.) Therefore, our samples are reduced to approximately 75 000 observations in 1984, approximately 85 000 in 1989, and approximately 59 000 observations in 1997. All statistical information presented in Section IV, and the regressions in the following sections are, therefore, run across that sample only: persons of working age who report positive earnings and positive hours of work.

IV. Descriptive Statistics for Income Recipients, 1984–1997

IV.1 Participation rates

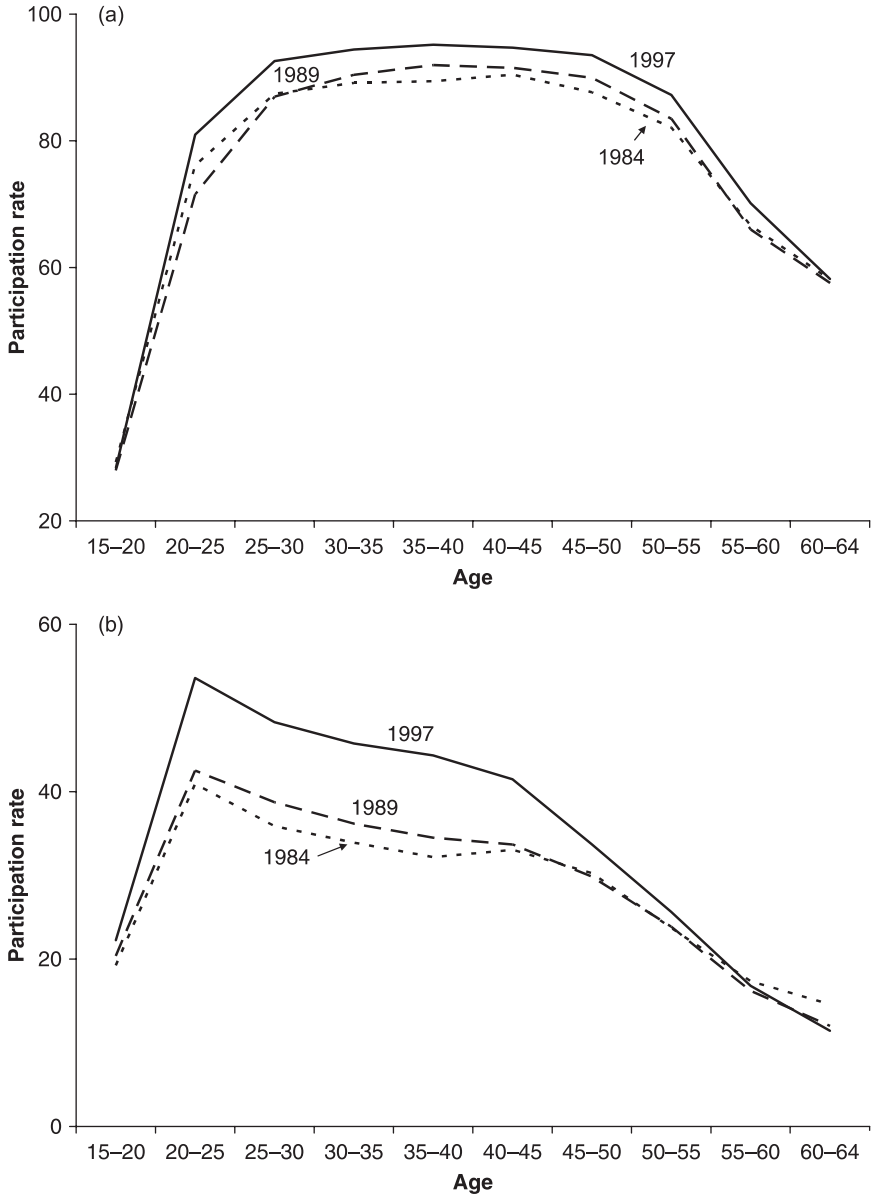
Between 1984 and 1997, the share of income recipients in the population increased from approximately 29 to 34.6 percent. The increase of approximately 5½ percentage points was registered both among women and men. This, of course, suggests that there was an increase in participation rates. The overall participation rate increased from slightly over 50 percent of the working-age population in 1984 to 52 percent in 1989, and then jumped to almost 58 percent in 1997. Men's participation rate went up by 6 percentage points between 1984 and 1997, reaching almost 78 percent, a very high level by international standards, and women's participation rate increased by even more: by 8 percentage points, reaching 38 percent in 1997. The gap between men's and women's participation rates remained as large in 1997 as it was in 1984 (almost 40 percentage points).

The increase in the participation rates was universal: not only across genders, but also across different age groups. Figure 1 shows the participation rates for men and

2. The 1984 Survey has data on approximately 250 000 individuals, the 1989 survey on 278 000; the 1997 survey is somewhat smaller with information on little over 170 000 individuals.

3. The reason why we had to include together people with wage income and the self-employed is that approximately 15 percent of income-recipients report both wage and self-employment income. Because there is no information on the amount of time they spend in each activity, there is no way of isolating wage income only. Dropping all those who report non-zero self-employment income would clearly bias the results, both because their numbers are significant, and because such an adjustment would not be random (i.e. people choose to be wage-earners and/or the self-employed in a systematic fashion). Therefore, we had to choose between two biases: to treat self-employment income (which, of course, includes a capital component) as wage income, or to delete from the sample a non-random set of some 15 percent of income-recipients. We choose the former. Finally, note that the earning data for several other countries combine the self-employed together with wage earners (Norway, Sweden, Taiwan according to Peracci (1999)).

Figure 1 Participation rate for working age population of (a) men and (b) women



Note: The vertical axis scales are different.

women by age. Even for men in the prime working age (between 30 and 50 years of age), the participation rates, which were already high in 1984 and 1989 (around 90 percent), increased further, reaching approximately 94–95 percent in 1997. However, the most dramatic changes occurred for women. Although participation increased only marginally between 1984 and 1989, the increase between 1989 and 1997 was quite extraordinary. The participation rates went up for women of practically all ages, and by quite a lot: for example, for women between the ages of 20 and 25 years, the rate increased from 42 percent in 1989 to 53 percent in 1997. Yet the overall participation rate for women at 37.9 percent is still some 15 percentage points less than that of the OECD countries with the lowest level of women's participation (Italy, Luxembourg, Belgium, Austria and the Netherlands), and some 25 percentage points below the OECD average.⁴

IV.2 Education level

Table 3 shows the distribution of educational levels across all individuals aged 14 years and over. The table shows a strong improvement in educational attainment. For example, the percentage of those with primary education only

Table 3 Educational attainment, 1984–1997^a

	1984	1989	1997
School level (%) ^b			
Primary	35.96	33.22	26.78
Junior high	21.18	22.92	21.36
Senior high	17.87	20.61	28.74
University	4.84	6.21	11.19
Religious education only	20.15	17.04	11.93
Total	100	100	100
Average years of schooling (including religious education) ^c			
Men	7.07	7.50	8.61
Women	5.60	6.25	7.60
All	6.32	6.86	8.10
Average years of schooling (excluding religious education)			
Men	8.03	8.35	9.27
Women	7.80	8.20	9.12
All	7.92	8.28	9.20

Notes: ^a In percentage of population aged 14 and above. ^b For the definition of school levels and calculation of the years of schooling see Annex 1 of the extended version of this paper available from the author on request or from <http://econ.worldbank.org/projects/inequality>.

^c Religious education only is assumed to equal zero years of formal education.

4. For comparison, in 1997, women's participation rates were 71 percent in the USA, 67 percent in Great Britain, 62 percent in Germany, 61 percent in France, but 82 percent in Sweden (probably the highest rate in the world). Source: *World Development Indicators*, World Bank.

decreased from 36 percent in 1984 to 27 percent in 1997, and the share of those with university education went up from less than 5 percent to 11 percent. Noticeable also is a fast decline in the percentage of people with religious education only: from 20 percent in 1984 to 12 percent in 1997. The average number of years of schooling increased by more than a year and a half (if religious education is included) and by 1.2 years if it is not.⁵

Like the changes in the participation rates, improvements in education levels were evenly distributed across genders. The percentage of university-educated men doubled from 6 to 12 percent. For women, the change was again stronger: perhaps because their starting position was worse. Therefore, the percentage of university-educated women went up from less than 4 percent in 1984 to more than 10 percent in 1997. The major difference in the educational attainment between men and women persists at the level of religious education. Whereas only approximately 7 percent of men have only religious education, the percentage of such women is 16.5 percent. Between 1984 and 1997, the average number of years of schooling for women (if we include religious education) increased by 2 years; for men, by 1½ years (Table 3).

IV.3 Work experience

Table 4 shows the average work experience for income-recipients. The overall values are quite stable at around 21 years, with average work experience of men increasing a bit and those of women decreasing slightly. This result is the outcome of several factors. Both men and women now tend to join the labor force at a later age simply because more of them continue schooling past elementary education.⁶ Between 1984 and 1997, the average age when men and women join labor force has increased by more than a year. There are some interesting changes in the distribution of women's work experience. Between 1989 and 1997, there was an increase in the share of women with longer work experience (between 20 and 25 years), but also a decrease in the share of women with very long work

Table 4 Average work experience (in years) for income recipients

	1984	1989	1997
Men	21.96	22.36	22.08
Women	18.41	18.32	18.27
All	20.89	21.11	20.82

5. Because we have no information on the actual number of years of religious education, we take that the formal education of people with religious education only is equal to zero.

6. Figure 3 shows that there are four peak ages when people begin to work, reflecting, respectively, the end of compulsory elementary school (11–12 years), junior high (14 years), senior high (16 years) and university (21 years).

experience (over 30 years). The first element can be explained by the aging of the population, the second can be explained by higher incomes and women's decisions to quit working sooner than before.

V. Distribution of Earnings

V.1 Earnings inequality

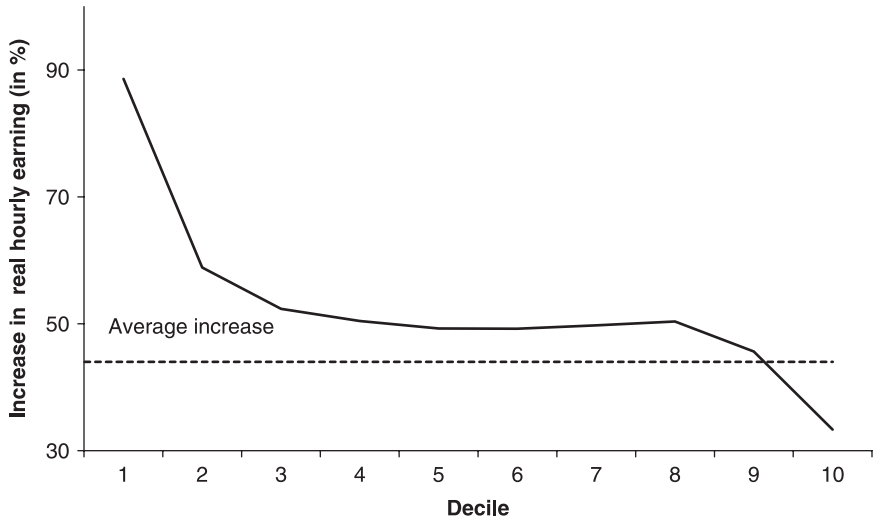
Over the period 1984–1997, real earnings increased by 44 percent. This yields an average annual real increase of 2.8 percent. However, as mentioned before, this number masks two different periods. In the first (1984–1989) real earnings went down by, on average, 0.9 percent per annum, so that in 1989 mean earnings were approximately 4.2 percent less than in 1984 (see Table 5). In the second period, however, earnings rose, over an 8-year period, by an average rate of 5.2 percent per annum, ending 50 percent higher than in 1989.

Table 5 Real earnings: Amounts and distribution, 1984–1997

<i>Decile and measures of inequality</i>	<i>1984</i>	<i>1989</i>	<i>1997</i>
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
Decile			
First	28.04	29.97	52.88
Second	66.49	69.11	105.62
Third	94.10	96.15	143.35
Fourth	119.57	120.88	179.87
Fifth	145.85	147.74	217.69
Sixth	175.43	178.00	261.76
Seventh	213.91	216.65	320.36
Eighth	271.04	273.15	407.51
Ninth	383.87	376.46	559.02
Tenth	989.43	874.19	1319.04
Overall mean	248.70	238.10	357.53
Median	169.92	168.75	235.56
Increase of the mean (% per annum)		-0.9	+5.2
Increase of the median (% per annum)		-0.9	+4.3
Measures of inequality			
Gini ^a	50.1	47.4	47.4
Theil ^a	52.8	44.5	46.1
Ratio 50–10	3.17	3.05	2.83
Ratio 90–50	3.03	2.90	2.87
Ratio 90–10	9.62	8.85	8.13
ln 90/10	2.26	2.18	2.10
Decile ratio ^b	35.3	29.2	24.9

Note: All values are in 1997 ringgit per hour of work (however, see footnote 17). Ratios are calculated exactly at the percentile points. ^a Gini and Theil indexes calculated across individuals and weighted by sample weights. ^b Ratio between the mean earnings of the top decile and mean earnings of the bottom decile.

Figure 2 Increase in real hourly earnings by decile between 1984 and 1997



Between 1984 and 1989 inequality in the distribution of hourly earnings decreased from a Gini of 50.1 to 47.4.⁷ It stayed at the same level in 1997.⁸ More significantly, inequality measured by the ratio between different key percentile points decreased throughout. The ratio between the earnings at the 50th percentile and those at the 10th percentile went steadily down from 3.17 in 1984 to 2.83 in 1997. The change was more moderate in the upper range of earnings where the ratio between the earnings at the 90th and 50th percentile decreased from 3.03 to 2.87. Consequently, inequality was reduced because there was a shrinkage across the entire wage distribution. The 90:10 ratio was reduced from almost 10 to a little over 8.

Figure 2 shows the increase in real hourly earnings between 1984 and 1997 across deciles. Whereas the bottom decile's mean earnings increased between 1984 and 1997 by almost 90 percent, the top decile's earnings went up only one-third. It is also clear from the picture that the increases in the bottom three deciles were quite significant (all above 50 percent in real terms). The next five deciles registered increases of approximately 50 percent, whereas the ninth and the tenth decile had increases of, respectively, 46 and 33 percent. Therefore, only the top decile grew less than the mean (44 percent). The shrinking of the earnings distribution is unmistakable. What the figure also shows is that the shrinking was driven

7. The definition of earnings is as follows. All earnings are defined on an annual basis. This amount is then divided by the reported average weekly number of hours worked. These amounts in ringgit are shown in the text. Therefore, to get true hourly earnings, one needs to divide the reported amounts by 52 (weeks).

8. Levy and Murnane (1992) report the US Gini coefficient for all earners to have been around 46–47 in the mid-1980s.

**Table 6 Unadjusted earnings for different educational groups
(ringgit in 1997 prices)**

	1984	1989	1997	Growth 1984–1997 (% per annum)
Primary	196.2	190.2	228.4	1.2
Junior high	207.8	192.8	274.1	2.2
Senior high	301.2	265.6	355.8	1.3
University	785.9	625.6	821.8	0.3
Religious education only	133.5	130.5	158.3	1.3
Average	248.5	238.1	357.5	2.8
University to primary ratio	4.0	3.3	3.6	

Note: For the definition of ‘hourly’ see footnote 15 above.

by what was happening in the two bottom deciles and the very top. The relative earnings of the bottom increased; the relative earnings of the top decreased, and the relative earnings of some 70 percent of income-recipients remained the same.⁹

V.2 Education levels and earnings

Table 6 gives the average earnings for five levels of education. Those with a university education are always paid the most, a religious education the least. The university-to-primary ratio decreased from 4 to 3.3 over the first subperiod, and then widened to 3.6. Growth rates for all individual groups were less than the average growth rate of earnings, indicating a significant educational shift toward the better paid educational groups. Because there was a massive increase in university education, the most interesting changes concern the university-educated workers. University-educated workers are, of course, heavily concentrated in the top decile (see Figure 3, panel d). In turn, the top decile is also more and more ‘dominated’ by the university-educated. In 1984, 36 percent of those in the top decile were university-educated; in 1989, their share increased to 42 percent, and in 1997 to 56 percent. However, because at the same time there was a massive increase in the number of university-educated people, the conditional probability of a person with university education being in the top decile declined from 57 percent in 1984 to 40 percent in 1997.

The probability distributions for those with primary and religious education also changed. In 1997, much more than in 1984, they were bunched among the bottom wage groups. In 1997, approximately 50 percent of those with religious education, and more than 30 percent of those with primary education, belonged to the bottom two deciles. Therefore, changes in the supply and demand of education mean that in 1997, more than before, primary or religious education virtually guaranteed that the person will end up among the bottom 20 percent of earners.

9. These are not, of course, 70 percent of actual people because in the absence of longitudinal data we cannot say much about what happened to individual earners. We simply observe that the relative wage (compared to the mean) of people who were, say in the fourth decile, was the same in 1984 and 1997.

Figure 3 Distribution of workers with given educational categories across wage deciles, 1984–1997. (a) Primary education, (b) junior high, (c) senior high, (d) university education and (e) religious education only

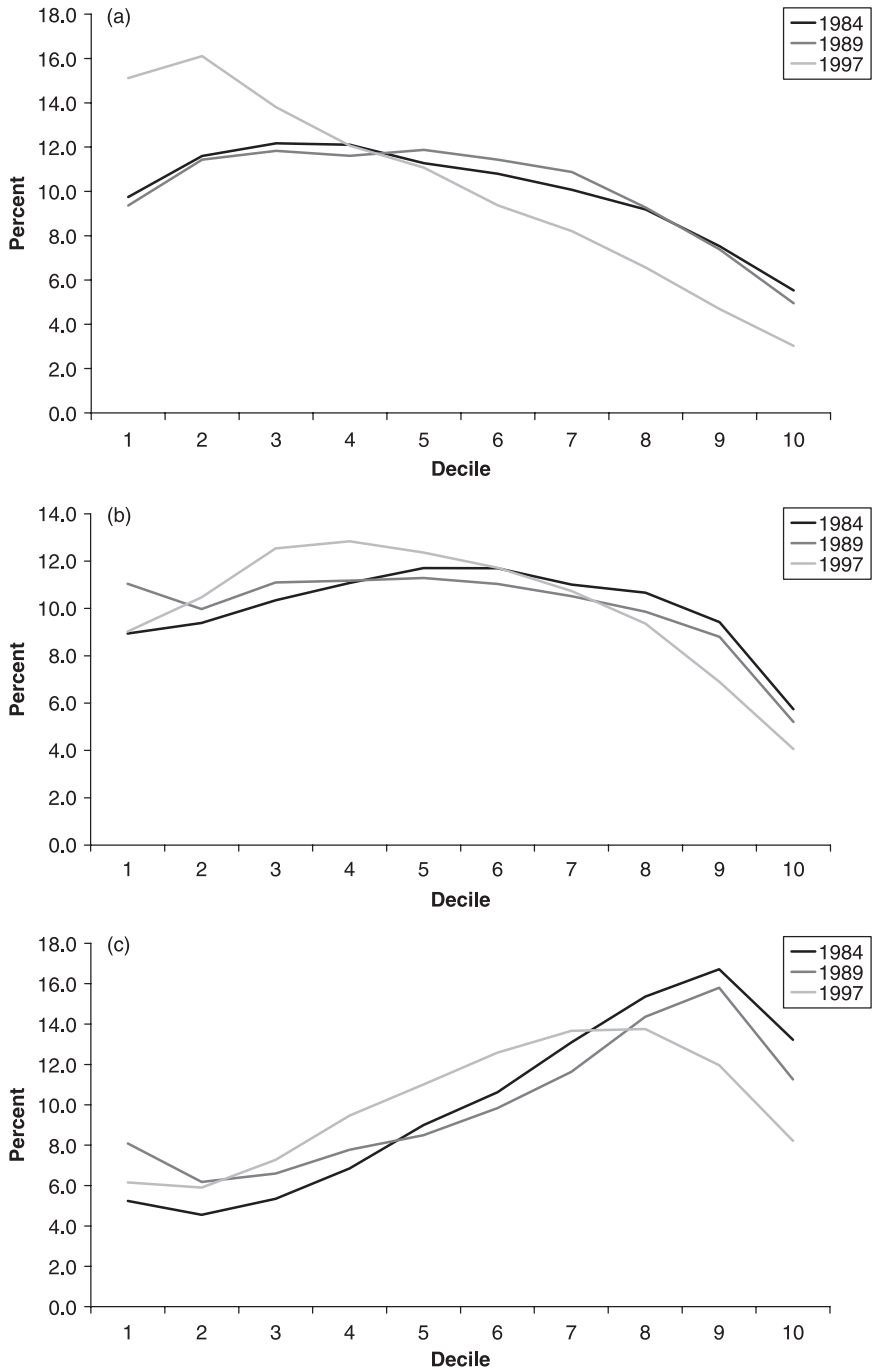
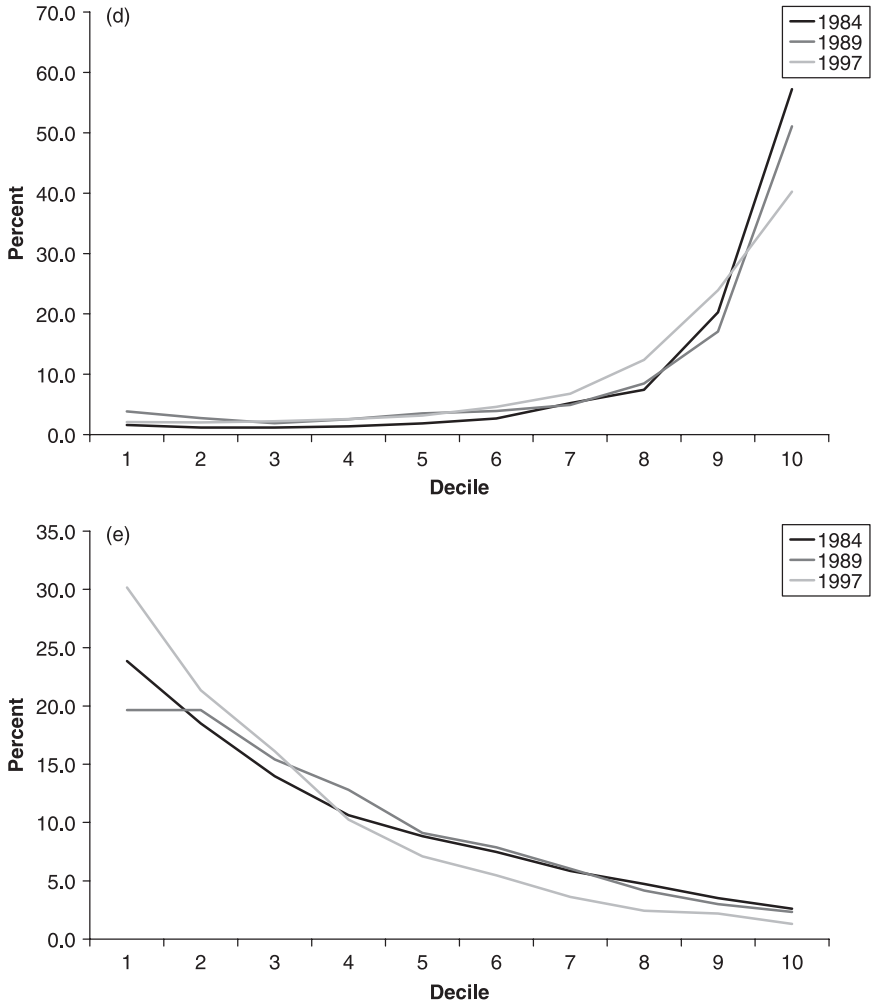


Figure 3 (continued)



Note: Vertical axis scales differ. Each figure shows the distribution of workers with a given level of education across 10 earning deciles. Therefore, the downward sloping line for primary education (panel a) shows that the workers with primary education will be much more highly represented among low than high earning deciles.

VI. Determinants of Earnings

Although the tabulations in Section V allow us to look at the relationship between some individual characteristics like education and earnings, their informational content is limited because they do not isolate the marginal contributions of each factor to earnings. The latter is done through a multivariate regression

analysis where the dependent (right-hand side) variable is (ln) of real hourly earnings, and explanatory variables are education, work experience, location etc. However, running these regressions without acknowledging that the decision to participate in the labor force is not random would yield biased and inconsistent estimates. The system to be estimated is composed of the selection (probit) equation (Equation 1), which explains the decision to join the labor force, and the typical earning regression (Equation 2):

$$P_i = f(X_i, Z_{1i}, e_i) \quad (1)$$

$$W_i = g(X_i, Z_{2i}, u_i), \quad (2)$$

where P_i is an indicator variable taking values 1 or 0 for those who are, respectively, in the labor force or not, W_i is earnings as defined above, X_i is the set of explanatory variables, which are the same in both equations (e.g. education, gender, experience etc.), Z_1 and Z_2 are variables that explain, respectively, the decision to participate and earnings (so to ensure the identification requirements), and e_i and u_i are error terms. Z_1 and Z_2 need to be different to exactly identify the two equations. We use Z_1 = income from capital to capture the fact that people with greater non-labor sources of income are less likely to participate in the labor force;¹⁰ and Z_2 = dummy variable for non-agricultural self-employment, which explains earnings but might not influence the decision to participate. The use of income from capital as an identifying variable is relatively common (see e.g. Schafgans, 2000). Note that the fact that individuals with high capital income tend to be richer means that both the income and the substitution effect (through higher opportunity cost of being employed) will tend to work in the same direction; namely, to reduce a person's participation in the labor force. Normally, the error terms from Equations (1) and (2) will be correlated, $e_i = \rho u_i$, because we expect that (say) greater likelihood to participate in the labor force will be associated with higher earnings. (This is a different way of saying that the opportunity cost of non-participation is greater for those likely to earn more.) Therefore, we would expect $\rho > 0$. This, however, is not the case here. Only in a separate regression for women do we find that ρ is statistically significant and positive in 1997. Otherwise, it is negative or statistically not significant.

The results for a set of regressions for the years 1984, 1989 and 1997, using maximum likelihood estimation are shown in Table 7. We run three types of regressions: the basic regressions for all 3 years; the regression with non-agricultural income presence (a dummy variable) for 1989 and 1997 because we do not have information on non-agricultural income for 1984; and, finally, in a regression for 1997 only, we include ethnicity dummies. (Ethnic data are not available for the other 2 years.) We shall consider, in turn, the effect of each characteristic.

10. This, of course, opens the issue of endogeneity because high current capital income might be the result of previous labor force participation and high earnings. Note, however, that this is not much different from possible endogeneity of education.

Table 7 Determinants of earnings
(maximum likelihood estimation; dependent variable: ln of earnings)

<i>Regression number</i>	<i>1984</i>		<i>1989</i>		<i>1997</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
	<i>Basic</i>	<i>Basic</i>	<i>With non-agricultural income</i>	<i>Basic</i>	<i>With non-agricultural income</i>	<i>With ethnicity</i>
Female	-0.4090 (0.000)	-0.3978 (0.000)	-0.3977 (0.000)	-0.3749 (0.000)	-0.3748 (0.000)	-0.3622 (0.000)
Years of schooling	0.1052 (0.000)	0.1023 (0.000)	0.1023 (0.000)	0.1009 (0.000)	0.1008 (0.000)	0.1009 (0.000)
Religious education	0.2595 (0.000)	0.2873 (0.000)	0.2873 (0.000)	0.3904 (0.000)	0.3900 (0.000)	0.4145 (0.000)
Work experience	0.0829 (0.000)	0.0901 (0.000)	0.0901 (0.000)	0.0602 (0.000)	0.0602 (0.000)	0.0588 (0.000)
Experience squared	-0.0012 (0.000)	-0.0013 (0.000)	-0.0013 (0.000)	-0.0008 (0.000)	-0.0008 (0.000)	-0.0009 (0.000)
Employer	0.4413 (0.000)	0.3552 (0.000)	0.3555 (0.000)	0.4334 (0.000)	0.4349 (0.000)	0.4057 (0.000)
Employee	0.0896 (0.000)	0.0719 (0.000)	0.0710 (0.000)	0.1121 (0.000)	0.1050 (0.000)	0.1039 (0.000)
Unpaid family worker	-0.7411 (0.000)	-0.8691 (0.000)	-0.8694 (0.000)	-0.3985 (0.000)	-0.4019 (0.000)	-0.4572 (0.000)
Non-agricultural income source			-0.0014 (0.919)		-0.0103 (0.554)	-0.0371 (0.017)
Chinese						0.2292 (0.000)
Indian, Pakistani						-0.0199 (0.046)
Johor	0.3351 (0.000)	0.3691 (0.000)	0.3691 (0.000)	0.5538 (0.000)	0.5536 (0.000)	0.5024 (0.000)

Table 7 (continued)

<i>Regression number</i>	<i>1984</i>		<i>1989</i>		<i>1997</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
	<i>Basic</i>	<i>Basic</i>	<i>With non-agricultural income</i>	<i>Basic</i>	<i>With non-agricultural income</i>	<i>With ethnicity</i>
Kedah	0.0166 (0.415)	0.1224 (0.000)	0.1224 (0.000)	0.2742 (0.000)	0.2741 (0.000)	0.2480 (0.000)
Melaka	0.2045 (0.000)	0.1968 (0.000)	0.1967 (0.000)	0.3718 (0.000)	0.3716 (0.000)	0.3093 (0.000)
Negeri Sembilan	0.3095 (0.000)	0.3167 (0.000)	0.3167 (0.000)	0.4532 (0.000)	0.4529 (0.000)	0.4030 (0.000)
Pahang	0.4298 (0.000)	0.4499 (0.000)	0.4497 (0.000)	0.3711 (0.000)	0.3706 (0.000)	0.3443 (0.000)
Pulau Pinang	0.1348 (0.000)	0.2859 (0.000)	0.2859 (0.000)	0.4706 (0.000)	0.4705 (0.000)	0.4034 (0.000)
Perak	0.2429 (0.000)	0.1753 (0.000)	0.1753 (0.000)	0.4588 (0.000)	0.4588 (0.000)	0.3968 (0.000)
Perlis	-0.0031 (0.938)	0.1886 (0.000)	0.1885 (0.000)	0.1995 (0.000)	0.1995 (0.000)	0.1800 (0.000)
Selangor	0.3987 (0.000)	0.3379 (0.000)	0.3378 (0.000)	0.5842 (0.000)	0.5840 (0.000)	0.5577 (0.000)
Terengganu	0.1383 (0.000)	0.0811 (0.000)	0.0811 (0.000)	0.0824 (0.000)	0.0823 (0.000)	0.0673 (0.000)
Sabah	0.3074 (0.000)	0.3207 (0.000)	0.3207 (0.000)	0.1484 (0.000)	0.1483 (0.000)	0.3725 (0.000)
Sarawak	0.2935 (0.000)	0.2986 (0.000)	0.2985 (0.000)	0.3265 (0.000)	0.3259 (0.000)	0.3025 (0.000)

Kuala Lumpur	0.4285 (0.000)	0.4074 (0.000)	0.4073 (0.000)	0.6746 (0.000)	0.6743 (0.000)	0.5996 (0.000)
Labuan	0.5648 (0.000)	0.5696 (0.000)	0.5695 (0.000)	0.3130 (0.000)	0.3129 (0.000)	0.4634 (0.000)
Armed forces, government	0.6596 (0.000)	0.6526 (0.000)	0.6530 (0.000)	0.5903 (0.000)	0.5942 (0.000)	0.4630 (0.000)
Legislators, managers	0.8465 (0.000)	0.7488 (0.000)	0.7493 (0.000)	0.6741 (0.000)	0.6782 (0.000)	0.5325 (0.000)
Professionals	0.9542 (0.000)	0.8463 (0.000)	0.8468 (0.000)	0.9433 (0.000)	0.9476 (0.000)	0.7629 (0.000)
Technicians	0.4245 (0.000)	0.3835 (0.000)	0.3839 (0.000)	0.3866 (0.000)	0.3904 (0.000)	0.2563 (0.000)
Clerks	0.2208 (0.000)	0.1327 (0.000)	0.1334 (0.000)	0.3008 (0.000)	0.3061 (0.000)	0.1733 (0.000)
Service workers	0.0744 (0.000)	0.0004 (0.968)	0.0009 (0.937)	-0.0043 (0.879)	0.0000 (0.998)	-0.0675 (0.000)
Craft workers	0.1323 (0.000)	-0.0020 (0.873)	-0.0015 (0.997)	0.1474 (0.000)	0.1517 (0.000)	0.0784 (0.000)
Machine operators	0.2127 (0.000)	0.1035 (0.000)	0.1040 (0.000)	0.1952 (0.000)	0.1992 (0.000)	0.1046 (0.000)
Elementary occupations	0.1090 (0.000)	-0.0009 (0.93)	-0.0004 (0.967)	0.1235 (0.000)	0.1276 (0.000)	0.0439 (0.001)
Constant	2.5119 (0.000)	2.4880 (0.000)	2.4885 (0.000)	3.1510 (0.000)	3.1544 (0.000)	3.2631 (0.000)
Rho	-0.0547 (0.000)	-0.0357 (0.000)	-0.036 (0.000)	-0.0876 (0.000)	-0.0881 (0.000)	-0.0704 (0.000)
Number of observations	75 644	85 521	85 521	59 137	59 137	49 936

Notes: The dependent variable is \ln real earned hourly income. For the model and the selection regression, see Equations (1) and (2) above. Excluded categories are: agricultural income source from self-employment, state of Kelantan, self-employed as the principal employment status, agricultural worker and Malay ethnicity. The p values are shown in parentheses.

Table 8 Male and female real hourly earnings

	1984	1989	1997
(1) Female unadjusted earnings	179.0	179.6	283.1
(2) Male unadjusted earnings	279.0	264.3	394.1
Female 'discrimination' (in % of male earnings)			
Based on unadjusted earnings (1)-to-(2) divided by (2)	-35.8	-32.0	-28.2
Based on adjusted (regressions) earnings ^a	-40.9	-39.8	-37.5
Based on adjusted (regressions) earnings including government sector			-35.7
Based on Oaxaca decomposition	-18.1	-15.7	-21.5

Notes: Hourly earnings in 1997 ringgit. ^aUsing the same formulations; that is, regressions 1,2 and 4 (Table 7).

Consider first the effect of gender. If a person is a woman, with all other characteristics the same as of her male colleague, her earnings would be almost 40 percent less. The unadjusted wage difference was, throughout, less than the one calculated (more accurately) from the regressions (Table 8).¹¹ The unadjusted difference went steeply down from 35.8 percent in 1984 to 28.2 percent in 1997. The 'true discrimination' (adjusted wage difference) decreased too but much less, going down from 41 percent in 1984 to 36–37 percent (depending on the formulation) in 1997. These results imply that, based on the observable factors like education, experience and location, women should have had higher average earnings than men. Because men are overrepresented in government jobs, which are, under the *ceteris paribus* conditions, paid more than private-sector jobs, a part of the difference in earnings ('discrimination') disappears once we introduce a dummy variable for government employment. The discrimination coefficient goes down from 37.5 to 35.7 percent (data not shown here; available from the author on request).

Returns to human capital are captured in the coefficient on the years to schooling. It is remarkable how stable the returns to education are: each additional year of schooling is associated with a wage increase of slightly over 10 percent and that percentage is the same in 1997 as it was in 1989 and 1984.¹² The absolute amount of the education premium, however, is large compared to the high-income countries, a fact which is explicable by the still existing relative (com-

11. The unadjusted difference simply shows the difference in average wages of men and women without taking into account that many other factors might be different (e.g. level of education or experience).

12. Other studies for Malaysia, done in the 1970s and 1980s, find similar rates of return. Psacharopoulos (1994) reports the results of a 1979 study by Chapman and Harding (1985), who estimate the returns to be 9.4 percent. Mazumdar (1991), using the 1984 household survey finds returns to male workers to have varied between 7 and 15 percent (depending on whether working in production or sales). Using the data from the second (1988–1989) Malaysian Life Family Survey (a much less comprehensive survey than the surveys used here), Gallup (1997) calculates a rate of return of 7.6 percent.

pared to the OECD countries) scarcity of highly educated people in Malaysia.¹³ However, the fact that the returns to education have been stable over the 13-year period during which the average level of education in the country had expanded significantly suggests that the demand side must have shifted up as well: in approximately the same proportion as did the supply.

Because we do not know the number of years of education of people with religious education alone, we have to introduce a binary (0–1) variable for them. It shows that returns to religious education have increased from being equivalent to approximately 2.5 years of schooling in 1984 (0.2595 divided by 0.1052) to being equivalent to approximately 4 years of schooling. This might reflect the fact that people with religious education have indeed had, on average, more years of such education in 1997 than in 1984, or that the characteristics that are being developed in religious schools are more valued in 1997 than before.

The age-earnings profile shows a typical inverted-U (concave) pattern with earnings at first rising, peaking at some middle age, and then slowly decreasing. The results show a gradual shift of the peak toward older age. In 1984, earnings peaked for 34 years of experience; in 1989, the peak moved to almost 35 years, and in 1997, it was 38 years. The (linear) premium on experience decreased from 8 to 9 percent for each year in 1984 and 1989 to approximately 6 percent in 1997.

Ethnic differences can be explored using only the 1997 data. Being Chinese (with all other attributes the same) results in an almost 23 percent wage premium compared to being a Malay.¹⁴ These differences are less than the unadjusted wage differences, which were twice as large: 46.4 percent in 1997 (Table 9).

Table 9 Difference in hourly earnings by ethnic group, 1997

	<i>Malays</i>	<i>Chinese</i>	<i>Indians</i>
Average earnings (in ringgit)	320.0	468.5	314.8
Unadjusted difference (in % of Malay earnings)	0	+46.4	-1.6
Adjusted difference (based on regression Table 7)	0	+22.9	-2.0
Adjusted difference including government sector	0	+25.1	0.0
Based on Oaxaca decomposition	0	+30.6	

13. Psacharopoulos (1994), in his extensive survey of the rates of return to education, shows that in OECD countries, the returns are, on average, slightly under 7 percent. More recently, Martins and Pereira (2004) report the results for 16 rich economies in the 1990s, obtained using the same methodology as used by Psacharopoulos and fairly comparable surveys. The mean rate of return to schooling is 8 percent, and in no country (except Portugal) does the rate exceed 10 percent. For upper middle-income countries, where Malaysia belongs, Psacharopoulos (1994) gives an average rate of 7.8 percent.

14. Using a slightly different earnings function than here, Mazumdar (1991) estimates the ethnic (pro-Chinese) bias for male and female workers in 1973, 1984 and 1987. For men, he finds the bias to have varied between 18 and 25 percent; for women, to have been approximately 15 percent.

The implication is, of course, that the Chinese have more characteristics valued by the economy so that looking at the unadjusted wage differences exaggerates the extent of the 'pro-Chinese bias'.¹⁵ However, once we allow for the fact that Malays are more represented in the government sector and that working in the government carries a premium of approximately 15 percent, the 'pro Chinese bias' increases to 25 percent.¹⁶ As for the difference in wages between the Malays and the people of Indian, Pakistani or Bangladeshi background, both the adjusted and unadjusted differences in earnings are minimal (approximately 2 percent). Moreover, once government employment is introduced in the regression, the effect entirely dissipates.

It would rash to conclude that the premium enjoyed by the Chinese necessarily denotes some 'pro-Chinese discrimination'. The result can be a result of, for example, the fact that our occupation and education variables are too 'rough'; occupation categories are broad and the likely greater participation of the Chinese in the financial services or among other high-paying occupations like lawyers or doctors is not sufficiently well captured. Similarly, quality of education, for which we have no information, may differ. However, it is a result that is worth looking into, both if one wants to explore channels through which this bias (if there is indeed one) might occur and to check whether its extent is rising or decreasing in time. It is, therefore, unfortunate that the ethnic variable is available only in the 1997 dataset.

Social group (e.g. employer, employee) also matters. On average, being an employer carries a premium of over 40 percent (over the self-employed agricultural worker with the exactly the same characteristics) in both 1984 and 1997. The premium was less (35.5 percent) in 1989. We can explain this finding by arguing that in the conditions of a strongly performing economy and rising earnings, the employers in particular do well and their premium expands. When the economy is not performing as well and earnings are stagnant, the employers' premium shrinks too. Employees, compared to the self-employed, have higher earnings and their premium also expands with a better performing economy. The absolute amount of the premium, however, is less: it ranges between 7 and 11 percent.

For 1989 and 1997, when such data exist, we introduce a binary variable to check whether there is a difference between agricultural and non-agricultural self-employed workers. The variable is not significant in either year so long as the regressions do not include the ethnic variable. However, once we include the ethnic variable in 1997, non-agricultural self-employed workers are paid, under *ceteris paribus* conditions, approximately 3.6 percent less than the agricultural

15. For example, the average number of years of schooling is 6.68 for the Chinese, and 6.18 for the Malays.

16. Available from the author on request or see Table A3 in the Annex of the longer version of this paper available from <http://econ.worldbank.org/projects/inequality>. Notice that higher public than private sector wages were mentioned by Mazumdar (1993) and even earlier, for the period of the 1970s, by Lucas and Verry (1989).

self-employed workers. This is because of the fact that there are relatively more Chinese among the non-agricultural than among the agricultural self-employed.¹⁷ Therefore, they help to 'keep' the non-agricultural self-employed earnings at the agricultural level and the coefficient is not significant. However, once we allow for ethnicity, the ethnic (Chinese) effect 'picks up' some of the earnings of the non-agricultural self-employed, who then turn out to be worse off than those in agriculture.

We find location to be a strong determinant of differences in earnings. Kelantan, which is among the three poorest states, is our excluded category. Therefore, not surprisingly, earnings in all other states are higher. For example, whereas the locational premium in Kuala Lumpur was 40–43 percent for the years 1984 and 1989, it increased to between 60 and 67 percent (depending on the formulation) in 1997. Only Terengganu seems to be consistently getting closer (more similar) to Kelantan. The locational premium in Terengganu, compared to Kelantan, decreased from approximately 14 percent in 1984 to 8 percent in 1997.

Occupation, independent of other characteristics like education, is also an important determinant of earnings. Everything else being the same, a professional will have earnings almost twice as large as an agricultural self-employed worker. However, the premium decreases to 76 percent (see equation 6 in Table 7) if the race variable is introduced. This is explained by the fact that some of the premium is 'picked up' by the ethnic (Chinese) variable because the Chinese are quite heavily represented among professionals. In other words, what appears to be an occupational premium alone when there is no ethnic variable dissolves into the occupational and ethnic premiums in the approximate proportions of three-quarters and one-quarter.

*VI.1 Running separate regressions for men and women*¹⁸

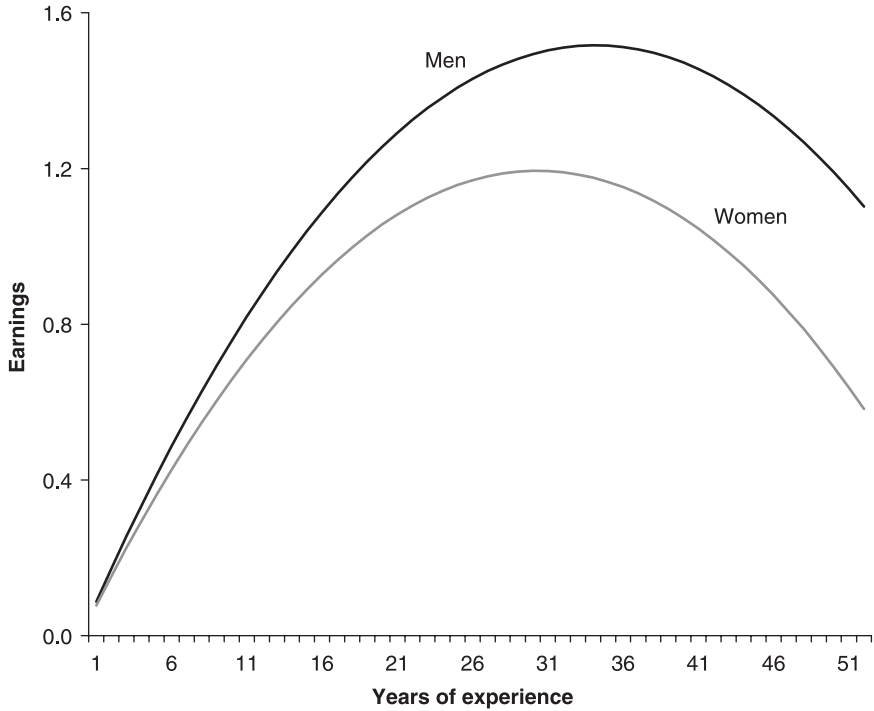
The gender differences are more pervasive than the difference in the average earnings alone would suggest. The importance of various determinants of earnings differs between men and women. To investigate this, we run separate regressions for men and women. We find, for example, that whereas the returns to education to men show a constant decline between 1984 and 1989 and 1997, going down by almost 1 percentage point, the rate of return on women's education increased from 10.5 percent in 1984 to 10.7 percent in 1997, and in 1997 were almost 1.5 percentage points higher than the rate for men.¹⁹ There are other

17. Among the agricultural self-employed, only 2.2 percent are Chinese, whereas their percentage among the non-agricultural self-employed is 5.

18. To save space, the regressions, on which the results reported in this section are based, are omitted. They can be obtained from the author on request or seen in Annex 2 of the longer version of the paper available at <http://econ.worldbank.org/projects/inequality>.

19. Schafgans (2000) reports the same results using the Second Malaysian Family Life Survey from 1988–1989. She finds that secondary schooling and above (as opposed to less than completed primary education) raises women's earnings by 26 percent versus 16 percent for men.

Figure 4 Age earnings profile for men and women, 1997



significant differences. Returns to experience, shown on the 1997 data in Figure 4, are throughout the entire range higher for men than women. Even in old age, the difference does not diminish. Women’s earnings peak earlier (at 30 years of experience) than men’s (at 34 years). Both are relatively high values compared to international experience, where peaks are reached for around 20 years of experience. Finally, religious education, which is equivalent for men to 3.8 years of conventional education, is worth almost 5 years of conventional education to women. We do not know if this is because women with religious education only are treated by the labor market better than men with only religious education or because women attend religious education longer than men.²⁰

Running separate regressions for men and women allows us to estimate the gender discrimination by another method (Oaxaca, 1973). Discrimination is now calculated by first using men’s structure of earnings as a yardstick, and calculating what would have been men’s and women’s wages if they were both paid as men. Then, we repeat the same calculation using women’s earnings structure as a yardstick. The difference between the two calculated earnings and the actual

20. Recall that we do not have the data for the duration of religious education.

earnings yields an estimate of the discrimination. The results are shown in Table 9. The estimates of the gender discrimination are now lower than when calculated from a single regression. For example, in 1997 women's unadjusted earnings were 28 percent less than men's. However, using men's earning structure, women should have been paid only 8 percent less; therefore, the estimated discrimination is 20 percent (28-8). If we use women's earning structure as a yardstick, then women should have been paid only 5 percent less, and the gender discrimination is approximately 23 percent. Averaging the two estimates yields the Oaxaca value of 21.5 percent for 1997. This is less than in the USA where gender discrimination was found to be approximately 30 percent (see Oaxaca and Ransom, 1994, as quoted in Chase, 1999, p. 11). It is interesting to note that the discrimination increased even as the unadjusted gap between women's and men's earning went down significantly between 1984 and 1997. The reason is that women's earning characteristics (education, experience) improved faster than those of men, and the unadjusted wage gap did not decline as much as one would have expected.

VI.2 Running separate regressions for Malays and Chinese²¹

For 1997, we can run separate earnings regressions for Malays and Chinese to see how much their earning structures differ, and to estimate Oaxaca discrimination (the same way as was done for women and men). We have seen that the unadjusted Chinese earnings are 46.4 percent higher than those of the Malays (see Table 9). The difference drops to approximately 25 percent when earnings are adjusted for individual characteristics like education, location and occupation. The Oaxaca decomposition yields an estimate for the pro-Chinese bias of 31 percent. The two earning structures do not differ much. Whether we use the Chinese or Malay earning structure as a yardstick, the estimate of the bias is approximately the same.

Chinese women seem to be more discriminated (*vis-à-vis* their male ethnic colleagues) than Malay women: the earnings loss of being a woman is almost 41 percent of men's earnings for the Chinese and 34 percent for the Malays. The returns to education are slightly higher for the Malays than for the Chinese (10.4 vs 9.1 percent).²² For all occupations without exception, the occupational premium (compared to being an agricultural worker) is greater for the Chinese than for the Malays. Working for the government (as compared to the private sector) carries a much greater premium for the Malays: their premium is 15.4 percent compared to 8.7 percent for the Chinese.

21. To save space, the regressions, on which the results reported in this section are based, are omitted. They can be obtained from the author on request or seen in Annex 2 of the longer version of the paper available at <http://econ.worldbank.org/projects/inequality>.

22. Gallup (1997) similarly finds a higher rate of return to education for Malays (10.5 percent) than Chinese (7.4 percent).

VII. Summary and Conclusions

Malaysia recorded a very high GDP growth rate (4.2 percent per annum per capita) over the period of 13 years from 1984 to 1997. The main trends that one observes read almost like a stylized picture of what fast development accomplishes.

- 1 Participation rates increased for both men and women and across practically all ages. However, a large gap between participation rates of men and women persists.
- 2 There was a large improvement in educational attainment. The average number of years of schooling increased from 8 years in 1984 to 9.2 years in 1997. The increase occurred equally among men and women. It occurred primarily through greater percentage of people completing university and senior-high school, and a decrease of those with religious and primary education only.
- 3 Work experience remained stable overall, and for men and women separately.
- 4 There was a significant growth in paid employment (wage laborers). Whereas in 1984, 73 percent of income-recipients were employees, their share increased to 78 percent in 1997. It happened to the detriment of the self-employed, mostly those engaged in agriculture.

Turning to inequality of earnings, the most important change was the reduction in inequality during the 'lean' times between 1984 and 1989. This reduction was not reversed in the second period. The Gini coefficient of earnings was at the same level in 1997 as in 1989.

During the first subperiod (1984–1989), real earnings did not increase, mostly because of the 1985–1986 recession. In the second subperiod (1989–1997), they increased briskly so that mean hourly earnings in 1997 were 50 percent higher than in 1989. The increase in real earnings between 1984 and 1997 was particularly strong among the bottom three deciles. On the other end of the spectrum, the top decile registered below-average growth.

Despite massive expansion of education and improvement in educational attainment, rate of return to schooling remained at the same, very high, level of approximately 10 percent per each additional year of schooling. However, whereas the rate of return for men decreased by approximately 1 percentage point (between 1984 and 1997), for women it went up by 1.5 percent, so that it is now higher for women than for men, a reversal of the 1984 situation.

Gender discrimination remains high even if looking simply at the unadjusted male–female differences in earnings overestimates true discrimination. However, the trends are different. The shortfall of unadjusted women's earnings decreased from 36 percent in 1984 to 28 percent in 1997. Discrimination, measured by the Oaxaca method, meanwhile increased from 18 to 22 percentage points.

The ethnic pro-Chinese bias is overestimated when one looks at the difference in unadjusted earnings. This is because the Chinese have more characteristics valued by the economy than the Malays. The Chinese have unadjusted earnings some

46 percent higher than the Malays. The net bias is estimated by three different methods to range between 23 and 31 percent. Yet, one must keep in mind that our estimates of either gender or ethnic bias are imperfect because we are unable to account for many unobservable characteristics that might influence earnings.

References

- Behrman, J. R. and E. M. King, 2000, Competition and gender gaps in wages: Evidence from 16 countries. World Bank, Washington, DC, mimeo.
- Black, S. E. and E. Brainerd, 2002, Importing equality? The effects of increased competition on the gender wage gap. National Bureau of Economic Research Working Paper No. 9110. National Bureau of Economic Research, Cambridge, MA.
- Bourguignon, F., M. Fournier and M. Gurgand, 1998, Distribution, development and education: Taiwan, 1979–1994. World Bank, Washington, DC, mimeo, June.
- Chase, R., 1999, An analysis of the labor market in the Republic of Latvia. Paper prepared for the World Bank Latvia Poverty Assessment, September.
- Chapman, B. J. and R. Harding, 1985, Sex differences in earnings: An analysis of Malaysian wage data. *Journal of Development Studies*, **21**, pp. 362–76.
- Gallup, J. L., 1997, Ethnicity and earnings in Malaysia. Harvard Institute for International Development Working Paper No. 593. Harvard, Cambridge, MA.
- Gonzalez, X. and D. Miles, 2001, Wage inequality in a developing country: Decrease in minimum wage or increase in education returns. *Empirical Economics*, **2**, pp. 135–48.
- Gottschalk, P. and M. Joyce, 1998, Cross-national differences in the rise of earnings inequality: Market and institutional factors. *Review of Economics and Statistics*, **80**, pp. 489–502.
- Levy, F. and R. J. Murnane, 1992, U.S. earnings levels and earnings inequality: A review of recent trends and proposed explanations. *Journal of Economic Literature*, **30**, pp. 1333–81.
- Lucas, R. and D. Verry, 1989, Human resource development project. Draft final report, ILO/UNDP, Kuala Lumpur.
- Malaysia Department of Statistics, various years, *Yearbook of Statistics Malaysia*. Malaysia Department of Statistics, Malaysia.
- Martins, P. S. and P. T. Pereira, 2004, Does education reduce wage inequality? Quantile regression evidence from 16 countries. *Labor Economics*, **11**, pp. 355–71.
- Mazumdar, D., 1991, Malaysian labor market under structural adjustment. World Bank Working Paper No. 573. World Bank, Washington, DC.
- Mazumdar, D., 1993, Labor market adjustment in open Asian economies: The Republic of Korea and Malaysia. *World Bank Economic Review*, **7**, pp. 349–80.
- Oaxaca, R., 1973, Male-female wage differentials in urban labor markets. *International Economic Review*, **14**, pp. 693–709.
- Oaxaca, R. L. and M. R. Ransom, 1994, On discrimination and the decomposition of wage differentials. *Journal of Econometrics*, **61**, pp. 5–21.
- Peracci, F., 1999, Earnings inequality in international perspective. Luxembourg Income Study Working Paper No. 208, Luxembourg.
- Psacharopoulos, G., 1994, Returns to investment in education: A global update. *World Development*, **22**, pp. 1325–43.
- Rama, M., 2003, Globalization and workers in developing countries. World Bank Research Working Paper No. 2958. World Bank, Washington, DC.
- Schafgans, M., 2000, Gender wage differences in Malaysia: Parametric and semiparametric estimation. *Journal of Development Economics*, **63**, pp. 351–78.
- Slaughter, M., 1999, Globalization and wages: A tale of two perspectives, *World Economy* **22**, pp. 609–29.

- Söderbom, M., F. Teal, A. Wambagu and G. Kahyarara, 2004, The dynamics of returns to education in Zambian and Tanzanian manufacturing. CSAE Working Paper 2003-17, Centre for the Study of African Economies, Oxford University, January. [online; cited January 2006]. Available from URL: <http://www.csae.ox.ac.uk/workingpapers/wps-list.html>
- Warner, A., 2002, International wage determination and globalization. Paper presented at the NBER Conference on Labor and the Global Economy, Cambridge, MA, May 2001 (Revised March 2002).