OVER-EDUCATION AND UNDER-EDUCATION IN MALAYSIA: DOES ETHNICITY MATTER?

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ABSTRACT

This paper explores the incidence and wage impact of over-education and under-education across ethnic groups in Malaysia. Using the second Malaysia Productivity Investment Climate Survey (PICS-2), over-education and under-education stand at 18% and 28%, respectively. There is a variation of the incidence across ethnic groups - over-education is higher among Malay (19%) whilst under-education is predominately Chinese (33%). With respect to earnings outcomes, Ordinary Least Square (OLS) models revealed that irrespective of gender, being overeducated resulted in a greater earnings loss, around 9 to 11% whereas being undereducated resulted in a wage premium by around 9 to 12%. Again, the pay loss for over-education and pay premium for under education vary across ethnic and sector. The penalty was higher (lower) for the Indian (Chinese). Nevertheless, the wage premium for being undereducated was higher (lower) for the Malays (Chinese). By sector, no evidence of pay loss for overeducated Chinese. Instead, Malay and Indian face a higher earning loss due to over-education. These results imply that there are significant costs to work in an occupation unrelated to the major due to human capital acquired is not completely general and cannot simply be transferred to other occupations. The Chinese have more advantages over the Malay and Indian in this respect.

Field of Research: over-education, under-education, wages, ethnic, Malaysia

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1. Introduction

Over-education and under-education are the terms used in the economics of education to identify to some extent individuals are utilised in their job with respect to educational background. Over-education can be defined as workers who have higher schooling than what their jobs require while those with lower schooling than what is required are considered 'undereducated'.

Up to date, there are numerous studies related to both incidences in the literature across ethnic groups (Verdugo and Verdugo, 1988; Battu and Sloane, 2002, 2004; Green, Kler and Leeves, 2006; Kler, 2007; Nielson, 2007; Nielson, 2008; Wald and Fang, 2008; Lindley, 2009; Thomas, 2010; Chiswick and Miller, 2011). Despite extensive research on racial differences on over-education, the limitation with these studies is that the most of the studies are focused on western labour market, especially in the UK (Battu and Sloane, 2002, 2004; Nielson, 2008; Lindley, 2009), Australia (Green, Kler and Leeves, 2006; Kler, 2007; Chiswick and Miller, 2011), USA (Verdugo and Verdugo, 1988; Thomas, 2010), Canada (Wald and Fang, 2008) and Denmark (Nielson, 2007). There has no study focus on non-western labour market. It is reasonable to expect that non-western labour market might vary in how they perceive over-education and under education, especially Malaysia.

This lack of attention is somewhat surprising given Malaysia is not only a multi-racial country, consists of three major ethnic, Malay and indigenous (62%), Chinese (22%) and Indians (7%) but also on the involvement of the different ethnic groups at the economic activity. Following the 2012 Labour Force Survey (LFS), while the labour force participation rate (LFPR) stood at 66% in 2012, the rate was vary when it comes to ethnic matter. The Chinese was ahead of other ethnic with 66% compared to the Malays and the Indians with 62% each. In terms of employment, the Malays remained dominant with 57%, followed by the Chinese (23%) and the Indians (6.5%). Again, when looking at the occupation, nearly 40% of the Chinese were in professionals, managerial, and associate professional jobs. Instead, a quarter and one third of the Malays and the Indians were in the elementary jobs. This compared to 13% for the Chinese. This compared to only 30% and 31% for the Malays for the Indians, respectively. With respect to education, there has been a significant increase in enrolments at the tertiary level where between 1995 and 2005, the total number of students in tertiary education at degree level increased by over 200% (MOHE, 2009). As a result, the number of graduates (both diploma and degree qualifications) produced by public HEIs has tremendously increased, from 62,990 in 1985 to 392,552 in 2005, an increase of 5.23 times. This helps to improve the quality of the workforce - by 2010, the percentage of the labour force with tertiary education had increased to 24%, more than three times higher than it was in 1985, about 7%.

Looking at the both statistics particularly LFPR and employment by the ethnic groups, it seems that the Chinese has advantageous over other ethnics. This is consistent with many empirical studies in Malaysia where Chinese workers have better labour market outcomes than their Malays and Indian counterparts, particularly with respect to earnings (Mazumdar, 1981, 1991; Blau, 1985; Gallup, 1997; Chung, 2003, 2004; Milanovic, 2006). While there is ethnic disparities in the labour market, to date no study has addressed about the quality of job held by workers in the labour market across ethnic groups in Malaysia. While there have been a number of studies examining over-education in Malaysia (Lim et. al, 2008; Osman et. al, 2010; Lim, 2011; Zainizam, 2013; Zainizam and Battu, 2013), to our knowledge, only two studies have directly considered the wage impact of overeducation (Osman et. al, 2010; Zainizam, 2013). Indeed, the study on this topic is ignored in any developing country with respect to ethnic groups.

Therefore, the main objectives of this paper are to document the extent of over and under-education and their impacts on individuals' wages across ethnic groups. In doing so, this paper is organised as follows. Section 2 focuses on a review of ethnic and the mismatch study in the literature. Section 3 outlines the data by mainly focusing on the measurement and the incidence of over and under-education while section 4 details empirical estimation methods. Section 5 highlights the results of the effects of over and under-education, and the final section concludes.

2. Over-education, Under-education and Ethnic Minorities

As mentioned earlier, studies of over-education and racial disparities can be generally divided into two parts - one focused on ethnic minorities (Verdugo and Verdugo, 1988; Battu and Sloane, 2002, 2003; Lindley, 2009) and another one highlighted immigrants workers (Green et. al, 2007, Kler, 2007; Wald and Fang, 2008; Thomas, 2010; Nielsen, 2011)

Verdugo and Verdugo (1988) and Battu and Sloane explore the wage of over and under education among ethnic minorities in the USA and the UK, respectively. The authors restricted their study on male workers and using a stratified random sample of males from the 1980 census, they found that there was a pay penalty for being over-education, roughly 13%-18% with the highest pay loss reported for Mexican American (18%) and the lowest one belongs to White (13%). Meanwhile, undereducated white, black, Mexican American, Puerto Rican, Cuban, and other Hispanic workers earned from 9% to

18% more than their counterparts who were not undereducated. Higher wage premium of over-education reported for Cuban ethnic.

Battu and Sloane (2002, 2003) also examine the incidence and the wage impact of over and under education among White and ethnic minorities in the UK. Using data from the 4th National Survey conducted in 1993/1994, they found that over-education stands at 19.7% for Whites and 24% for non-whites. Within non-whites, different ethnic groups have different levels of over-education with the highest incidence being amongst the Indian and African-Asian groups and Chinese, roughly 33% each. For under education, Bangladeshi suffers a greater incidence, with 36% and follow up by Chinese with 12%. Lower incidence of under education reported for the Indian (5.4%) whilst Whites represents 9%. In terms of earning outcomes, the author found no evidence of a positive premium associated with over-education for UK-born non-whites. By contrast, there was a premium associated with surplus education, 7% for non-whites and 13% for whites. For under-education, they find that earnings are discounted - the negative return to under-education ranges from around 12% to 31%, with the penalty being higher for non-native non-whites.

Meanwhile, Lindley (2009) also explores the incidence and earnings outcomes among overeducated and undereducated immigrants and natives who hold UK for men and women. Using data drawn from the Quarterly Labour Force Survey 1993–2003, male natives tend to have the required level of schooling (48.4%) compared to being under-educated (29.1%) or being over-educated (22.5%). The corresponding figures for females are 50.6% (required education), 20.6% (under-education) and 28.7% (over-educated). Estimating earnings equations shows significantly large over-education penalties for South Asian immigrant and native men, as well as White immigrant men, Black women and White UK born women.

Other studies have focused on immigrants. Green, Kler and Leeves (2007) provide an empirical evidence of over-education among recently male immigrants arrived in Australia. They differentiate the source region of immigrants by three broad categories, English speaking background (ESB), Asian non-English speaking background (NESB) and Other NESB using the Longitudinal Survey of Immigrants to Australia (LSIA). They find that native-born are the best matched, i.e-lowest incidence of over-education over time (less than 10%), whilst Asian NESB immigrants have the highest rate of over-education. Though, there are some variations in the incidence of overeducation across the waves, between 32% and 40% for Asian immigrants and between 32% and 35% for Other. This may result from increasing levels of employment over time. For ESB, the incidence of overeducation stands at on average 19% for cohort 1 and 22% in Cohort 2. With respect to earnings, the return to required education is positive for all immigrants, with ESB immigrants experiencing a higher return than NESB immigrants (14% against 9%). The Asian NESB figure is comparable to the native born returns (10%). Surplus education earns a wage premium, around 3% (Other) to 8% (ESB).

Wald and Fang (2008) address the over-education incidence among recent immigrants in the Canadian labour market. Based on data from the 1999 Workplace and Employee Survey (WES), over-education among recent immigrants are slightly higher compared with Canadian-born workers - around 49% among recent immigrants, 35% for non-recent immigrants and 31% the Canadian-born. About 11% of recent immigrants are classified as being undereducated with a corresponding figure of 17% each among non-recent immigrants and Canadian-born. Immigrant works also earn relatively low returns for surplus education as compared to the Canadian-born (4% against 6%).

Thomas (2010) provides a comparative–international approach by examining over and under education across ethnic groups among immigrants between the USA and South Africa (SA). Using data from the USA and South Africa, there was an association between racial similarities and overeducation. In South Africa, for example, the prevalence of overeducation is lowest among Black than White and Asian immigrants, while in the USA, the lowest prevalence of overeducation is clearly found among Whites.

Similar to SA, overeducation is more prevalence among in the USA. The study also finds that native ethnic than immigrants are less likely to be undereducated in both countries.

Greater incidence of over-education among immigrants is also found in Denmark. Using register-based panel data, Nielsen (2011) reveals that the median approach postulates that foreign-educated immigrants are found to be more prone to over-education (39%) than both native Danes (20%) and immigrants educated in Denmark (15%).[1] In terms of wages, overeducated workers earn slightly lower than their well-matched counterparts. Though, the penalty is slightly more severe for Danish-educated immigrants compared with native Danes. For each year of surplus education, Danish-educated immigrants are rewarded by only a 5.2% increase in wages with a corresponding figure of 5.9% among native Danes.

From above studies, it is clearly that the incidence and wage penalty for over-education are more prevalent among ethnic minorities and immigrants as compared to the native workers. Despite a number of studies on over-education available in Malaysia, research on racial differences on over-education has been ignored. Instead, studies of over-education in Malaysia have focused on general sample and graduates. Lim et al. (2008) investigate labour market outcomes among recent graduates from University Utara Malaysia. The authors found that 28.4% were employed in a full-time job commensurate with qualifications, a further 28% were in jobs not commensurate with qualifications. By field of study, accounting graduates have better labour market achievements relative to other graduates: 57% were employed in jobs that corresponded to their degree, while only 18% were in positions that did not require their degree. In contrast, 49% of economics graduates were employed in jobs that did not match their qualifications relative to 22% who were in employment in line with their degree.

Osman et al (2010) estimate the returns to over-education for workers in the labour market of selected services sector in Malaysia. Using their own survey of cross-section data of workers, they find that the rate of return to schooling is at 13.8%. The penalty in the rate of return to over-education is estimated at –2.76 percentage points. Zainizam (2013) also examines the incidence and wage impact of over-education among workers in the manufacturing sector in Malaysia. Based on data from the Second Productivity Investment Climate Survey (PICS-2) conducted in 2007, the author found that nearly 20% and one-third of workers were overeducated and undereducated, respectively. With respect to earnings outcomes, the overeducated workers earn significantly lower than their co-workers who are in similar jobs but who have less education, but well matched (6% against 10%).

In another study, Lim (2011) investigate the relationship between over-education and overall life-happiness among graduate. Using his own longitudinal survey, around 41% of the employed graduates are overeducated, i.e., in employment not commensurate with their qualification. Using a probit model, the results reveal that graduates who reported a higher level of predetermined happiness are less likely to be overeducated. In particular, one unit increase in happiness (7-point ordinal scale) will reduce the probability of being overeducated by 11% (marginal effect). The author also finds that over-education is significantly and negatively associated with one's current level of happiness.

Zainizam and Battu (2013) explore the effects of over-education on job satisfaction among graduates in Malaysia. Based upon the 2007 Graduate Tracer Study (GTS-07), four multi-dimensions of satisfaction are distinguished- high self-satisfaction, valuable work experience, anything can be learnt for the job occupied and job challenging. The study found that 32% of workers were overeducated - moderately overeducated (22%) and severely overeducated (10%). The logit model suggests that overeducation decreased individuals' job satisfaction across the four job satisfaction dimensions. This negative effects

[1] However, the author finds that the level of over-education is somewhat higher when the mode approach is applied - 47% for foreign-educated immigrants, 40% for Danish-educated immigrants and 33% for native Danes.

are much higher for high self-satisfaction and for the workers who are severely rather than moderately overeducated.

3. Dataset

Second Malaysia Productivity Investment Climate Survey (PICS-2) dataset is employed to ascertain the incidence and wage impacts of overeducation across ethnic groups in Malaysia. The PICS-2 is a workplace survey which was carried out in 2007 by the World Bank and the Economic Planning Unit across manufacturing and business support services sectors. The survey attempts to understand the investment climate faced by enterprises and how this impacts upon business performance. There were nine major industries in the manufacturing sector (i.e. - food processing, textiles, garments, wood and furniture, chemical and chemical products, rubber and plastics, machinery and equipment, electrics and electronics and motor vehicles and parts) and five business support service industry (Telecommunication, Accounting, Advertising, Business Logistic and Information Technology). Total respondents in this survey were 13,500 across 1,418 workplaces. Respondents in this study however are confined to those who were in full-time employment, aged between 15 and 64 and who reported no missing in earnings. By such restriction, this leaves about 13,420 respondents, of which 53.6% are males and 46.4% are females.[2]

Table 1 provides summary statistics for the key variables in this analysis. In line with other studies using this dataset the data throughout are unweighted (World Bank, 2009; Zainizam, 2013). As such care should be taken in interpreting our descriptive statistics especially when comparing Malay and non-Malays. Respondents are on average 34 years old and reported to have had about 11.3 years of schooling attained which is equivalent in Malaysia to upper secondary qualifications. Nearly 40% of workers had once attended a training course at workplace. Married respondents and Malay ethnic represents a large proportion of respondents. Over 40% of the respondents were from the central region. With respect to occupation, nearly one-third of the workers were employed as skilled workers and about one-fifth were in professional and managerial jobs. On average, workers earn about RM 1,800 per month. Around 48% and 72% of workers employ in small firm size and firms purely domestically owned.

There is a variation across ethnic groups. Chinese ethnic seems to have better human capital accumulation, especially education and labour market outcomes as compared to other groups. Nearly 40% of Chinese employees hold higher education qualification, i.e. diploma and university degree with the corresponding figures of 26% and 22% for to the Malays and the Indian. Instead, a higher percentage of Malay and Indian hold an upper secondary qualification. The Chinese also have better jobs - around 40% of them work in the upper level job, i.e. professional and managerial. This compared to less than 25% for the Malays and the Indians. By contrast, a large proportion the Malays and the Indians were overrepresented in skilled jobs level. Better labour market outcomes among the Chinese may reflect the earnings they receive. They earn on average RM500 to RM700 higher than that the one earn by the Indians and the Malays counterparts.

Nevertheless, the main concern about the dataset is how one measured over-education. In general, over-education is measured by comparing an individual's actual education with the required education for a particular job. The PICS-2 allows us measuring overeducation using the subjective method which relies on the worker's own assessment about the required education to obtain or do a particular job. In particular, respondents were asked directly about "*According to you, what is the most appropriate level of education for the work you are doing?"* There were seven educational levels to choose from,

[2] It should be acknowledged that the exact number of workers for the analysis purpose could be lower due to missing data in some explanatory variables.

starting from (1) degree, to (7) no qualification. Table 2 shows raw responses and it seems to us that upper secondary qualifications were the most appropriate level of education in doing their job (33%), followed up by Diploma (20%) and Degree qualification (16%). By ethnic group, while Malay and Indian show no difference, Chinese ethnic instead shows that nearly 50% of workers believe that higher education (both diploma and degree) are the most appropriate level of education in doing their current job. This compares to just 28% for upper secondary education.

By comparing the survey respondents' actual educational attainment (Table 1) with the perceived appropriate education required for the job (Table 2), we derived conventional estimates of over-education. Where an individuals' actual schooling exceeds what the job requires they are considered to be overeducated ($S^a > S^r$). Where an individuals' actual level of education is below that required for the job they are classified as under-educated ($S^a < S^r$). Those whose actual educational attainment is appropriate for the job (i.e. actual and required education are the same) are deemed well-matched ($S^a = S^r$). The estimate of over-education incidence as shown in Table 3 is 17%, well-matched (55%) and undereducated (28%). There is no gender difference in over-education, nevertheless, well-matched job is higher for the women whereas under-education is overrepresented in the men sample. Across ethnic group, Figure 1 shows Chinese and Indian have lower (higher) over-education (under-education) incidence than their Malay counterparts.

Over-education in Malaysia seems to be at the lower while under education seems to be higher as compared to the existing estimates.[3] This might be due to the fact that our country has experienced a skill shortage in the last decade (World Bank, 2009). As a result, perhaps employers in this sector employ individuals with lower educational attainment to do jobs that are typically done by highly educated workers, hence higher undereducation. However, this remains speculative as we have been unable to obtain specific growth rates to investigate this further. Higher over-education among the Malays relative to ethnic minorities, especially Chinese is contrast to finding from other countries (Verdugo, 1988; Battu and Sloane, 2002; 2004; Linsdley, 2009). The incidence is perhaps partly attributable to the fact that the PICS-2 is only for the private sector. Many studies in Malaysia have shown that the Chinese have more advantages over the Malay in the private sector in terms of higher earnings and better job position.[4]

With respect to earnings across mismatch, Table 4 postulates a well-matched worker earn much higher than their overeducated counterparts irrespective of ethnic groups. Unweighted data reveals that being employed in a well-matched job result in RM1,947 per month and this compares to RM1,341 and RM1,811 for the overeducated and undereducated workers, respectively. As Chinese earn more higher than other groups (see Table 1), it is not surprisingly that the wage premium for their well-matched, overeducated and undereducated workers also greater as one compared to the rest of the group.

4. Empirical Methods

To allow the effect of over-education and under-education on earnings, an augmented Mincer equation is employed by inducing a dummy for overeducation and under-education following (McGuinnes, 2006), as shown in the following equation:

$$\ln w = x\beta_1 + \beta_2 S + \beta_3 OE + \beta_4 UE + \beta_5 X + \beta_6 X^2 + \mu \qquad (1)$$

[3] See Groot and Maassen van den Brink (2000), McGuinness (2006) and Oosterbeek and Leuven (2011). For example, a recent review by Leuven and Oosterbeek (2011), over-education using the subjective method stands at an average over-education rate of 37% whilst under education stands at an average of 23%.

[4] Indeed, data in hand revealed that Chinese workers have better educational attainment and occupation as compared to other groups.

ln (w) is a natural logarithm of earnings (monthly), X is a vector of explanatory variables, S is educational attainment, OE and UE correspond to dummy variables, indicating that the individual is overeducated or undereducated, with the well matched being the omitted group. Exp is experience and Exp^2 is a quadratic term of potential work experience, and ε is the error term for individual i. In equation (1), the overeducated and undereducated are being compared to individuals with the same education but are well matched. The majority of studies discovered that the coefficient on overeducation is generally negative: overeducated workers earn less than their comparably educated counterparts who are appropriately matched (see a review by McGuinness, 2006, and Leuven and Oosterbeek, 2011)

All unknown parameters are estimated using Ordinary Least Square (OLS) technique. We also regress separately for men and women and by ethnic group to ascertain whether returns to over-education and under-education vary between men and women and between Malay and non-Malay. We should note that apart from over-education and under-education, we also controlled for other variables as shown in Table 1.

5. Empirical Results

Tables 5 to 9 present the results of wage impacts of over-education and under-education. Looking at firstly Table 5, two specifications are proposed - specification 1 without controlling for educational mismatch and in specification 2, we included dummy variables for over-education and under-education. We discuss briefly specification 1 and 59% of the variation in earnings (R-square) are explained by the model and 41% by unobserved characters. In line with human capital theory and many previous studies, earnings are positively associated with education, age and training. Respondents with a university degree earn much higher than those without one, approximately between 17% ($e^{-0.1904}$) and 43% ($e^{-0.5698}$).[5] Positive and negative coefficient of age and age square, respectively indicate that wage increases with age but at a diminishing rate. Return for each training session attended is around 9% and this return is found to be higher than the return to age (proxy for work experience). Females are found to earn significantly lower, i.e – 21% than that of males. With regards to the ethnic group, the Chinese and the Indians earn 37% and 5%, respectively higher than the Malays counterpart (reference group). Though, this finding is consistent with other studies for Malaysia (Mazumdar, 1981, 1991; Blau, 1985; Gallup, 1997; Chung, 2003; Rahmah and Zulridah, 2005; Milanovic, 2006).

Turning to our main concern of the paper, specification 2 reveals that the model slightly increases to 0.6003 (R-adjusted) when dummy variables of over and under-education are included in the regression. The coefficient on overeducation is negative whiles the coefficient on under-education is positive, and both are highly significant. This means that overeducation (under education) earn significantly less (more) than their well-matched counterparts. In particular, overeducated earn about 10% less than their well-matched counterparts. By contrast, undereducated earn around 11% higher than that of well-matched workers. We also should note that controlling for educational mismatch variables do not alter the coefficients of other variables as mentioned in specification 1 albeit the coefficients on education variables become higher. This would suggest that education effects pick up some of effects of overeducation and under-education on earnings.

As acknowledged earlier females earn significantly less than men and for this reason, separate analysis was also undertaken for males and females. As shown in Table 5, the overeducation coefficient is

[5] Since the earnings regression specification is in semi-logarithmic form, the percentage point effect (PE) is obtained using the following formula:

$PE = (e^{\beta} - 1) \times 100$, where β is the coefficient estimate.

The percentage point effect will be used throughout the discussion in this paper.

negative and statistically significant and the size of effect is slightly higher for females than males. Overeducated men earn about 9% less than their well-matched counterpart with the corresponding figure of 11% for women. Yet, women enjoy a higher wage premium of under-education than their men counterpart (12% against 9%).

In line with our main objectives, Table 6 demonstrates the wage effects of over and under-education across ethnic groups. It is clear from the table that being employed in overeducated (undereducated) jobs reduces (increases) the workers' earnings regardless of ethnic group. Interestingly, however, there is a variation in earnings penalty or premium where the magnitude of effects does ethnic matter. Wage penalty for being overeducated is lower (higher) among the Chinese (Indian) workers. In particular, an over-education Chinese worker earn around 5% less than his/her counterpart, adequately-matched worker. This compared to 16% for the Indian workers and 10% for the Malays. In other words, wage loss among Chinese is 2 and 3 times lower than the loss reported for the Malays and the Indians, respectively. With respect to under-education, there is evidence of wage premium for being undereducated, particular among Malay and Chinese workers. The Malays, however experience a greater wage premium than the Chinese one (14% against 9%). There is no evidence of wage premium among Indian and Others.[6]

Table 7 and Table 8, respectively provide the estimation returns to over-education and under-education for men and women separately across ethnic group. Looking at firstly male sample (Table 7), the earnings loss for being overeducated only evidence among Malay and Indian sample, roughly 10% and 11%, respectively. There is no evidence reported among Chinese male. For under-education, there is strong evidence at 0.01 that undereducated men from the Malays and Chinese ethnic experience a higher wage premium. Turning to female sample (Table 8), there is evidence that being employed in jobs for which corresponds to individuals' actual educational attainment result in greater earnings loss, between 6% and 18%. The highest paying loss belongs to the Indians whilst the lowest one reported for Chinese. The penalty for Malay females stands at 11%. Nevertheless, Malay females earn higher wage premium than their Chinese female colleague (16% vs 9%).

Finally, we present Table 9 to investigate return to over and under-education among ethnic groups across the two sectors – manufacturing and business support service. While Table 6 showed the wage penalty (premium) of over-education (under-education) exists across ethnic group, the penalty (premium) varies depending upon which sector individuals work at. For manufacturing sector (the first four columns of the Table), there is no evidence of paying loss among the overeducated Chinese. By contrast, the wage loss is more evident among the Malays and the Indians, and the latter faces a greater earning loss than the former (17% against 10%). For business support service sector, the pay penalty is only evident for Malays and Chinese, roughly 10% and 7%, respectively. With respect to under-education, wage premium is evident across the three major ethnic groups but only for the manufacturing sector. The premium is greater for Malay, roughly 14% as compared to 11% for Chinese and 7% for Indian. For business support service, the premium is apparent among Malay workers.

To summarise thus far, the earnings penalty for overeducation stood at 10% (Table 5) but by ethnic group (Table 6), the loss was higher reported for Indian and was much lower for Chinese workers. Nevertheless, the wage loss of over-education among Malay was moderate. Greater earnings loss for Indian and lower pay loss for Chinese were robust even after we run separately by gender (Tables 7 and 8) and by sector (Table 9). Indeed, Indian females who were overeducated earned significantly lower at 17% less than their well-matched counterparts. A lower wage penalty for Chinese workers

[6] Another interesting result from Table 6 is with regard to education where the earnings gap between university degree holders and non-university degree holders is greater among Malay and Indian as compared to Chinese. For example, Malay with a university qualification earns 25% ($e^{-0.2911}$) more than Malay with diploma qualification. The corresponding figures are 22% and 15% for Indian and Chinese, respectively. We will comment upon this later.

compared to main ethnic, i.e. Malay however is not comparable to other studies. The greater pay penalty for the Indians and the Malays are perhaps as compared to Chinese counterpart explained by the fact that they are crowded into lower level jobs which offer fewer opportunities for a successful job match.

6. Conclusions

This paper is an attempt to fill a lingering gap in the existing studies on overeducation by examining the incidence and the effects of over-education on earnings across ethnic groups in the context of a developing country such as Malaysia. Using the workers' own self-assessment, we find whilst the majority of are in well-matched jobs, overeducation accounted for about 17% of the sample and nearly 30% of our sample was undereducated. The estimate of over-education and under education was vary across ethnic groups where Chinese had lower over-education incidence than their Malay counterparts. Nevertheless, the Indians experienced highest over-education incidence than other groups.

Looking into earnings outcomes, overeducated workers earned 10% less than their comparable well-matched workers whilst under education enjoyed a wage premium of 11%. However, the magnitude of effects was differ with respect to ethnic groups where the Chinese (the Indians) experienced lower (higher) wage penalty, while the Malays have a moderate effect (between Chinese and Indian). In other words, the pay loss among Chinese is 2 and 3 times lower than the loss reported for Malay and Indian, respectively. The pay loss was differ by gender across ethnic groups. For men, the pay loss for being overeducated was only evidence for the Malays and the Indians samples. For female, Indian (Chinese) faced a greater (lowest) paying loss.

Returns to over-education and under education across ethnic also vary by sector. For manufacturing sector, there is no evidence of paying loss among the overeducated Chinese. By contrast, the wage loss was more evident among the Malays and the Indians. The latter faces a greater earning loss than the former. For business support service sector, the pay penalty is only evident for the Malays and Chinese. With respect to under-education, wage premium is evident across the three major ethnic groups but only for the manufacturing sector. For business support service, the premium is apparent among Malay workers.

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TABLE 1 Mean and standard deviation of selected variables

Variable	POOLED (n = 13,420)		MALAY (n = 6,410)		CHINESE (n = 4,560)		INDIAN (n = 1,122)		OTHERS (n = 1,328)	
	Mean	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**	**Mean**	**S.D**
Age	34.207	9.565	33.684	9.128	35.765	10.326	36.503	9.640	29.437	6.401
Sex	1.464	0.499	1.465	0.499	1.542	0.498	1.486	0.500	1.175	0.380
Education level										
Degree	0.141	0.348	0.121	0.326	0.206	0.404	0.104	0.306	0.044	0.206
Diploma	0.145	0.352	0.140	0.347	0.188	0.391	0.123	0.328	0.041	0.198
Upper Secondary	0.363	0.481	0.436	0.496	0.309	0.462	0.321	0.467	0.236	0.425
Lower Secondary	0.217	0.412	0.211	0.408	0.185	0.388	0.298	0.458	0.290	0.454
Primary	0.105	0.306	0.082	0.274	0.096	0.295	0.132	0.338	0.220	0.414
Informal	0.029	0.169	0.011	0.106	0.016	0.124	0.022	0.148	0.169	0.375
Training	0.397	0.489	0.463	0.499	0.335	0.472	0.427	0.495	0.266	0.442
Marital status										
Single	0.368	0.482	0.331	0.470	0.392	0.488	0.291	0.455	0.531	0.499
Married	0.616	0.486	0.650	0.477	0.594	0.491	0.696	0.460	0.463	0.499
Separated/Widowed	0.016	0.125	0.020	0.139	0.014	0.119	0.012	0.111	0.006	0.077
Ethnic										
Malay	0.478	0.500								
Chinese	0.340	0.474								
Indian	0.084	0.277								
Others	0.099	0.298								
Region										
Central	0.433	0.496	0.420	0.494	0.443	0.497	0.549	0.498	0.369	0.483
North	0.208	0.406	0.171	0.376	0.224	0.417	0.302	0.459	0.256	0.437
South	0.263	0.440	0.282	0.450	0.247	0.431	0.148	0.355	0.318	0.466
East Coast	0.020	0.141	0.039	0.193	0.002	0.044	0.002	0.042	0.009	0.095
Malaysia East	0.076	0.264	0.088	0.284	0.084	0.278			0.048	0.214
Occupation										
Management	0.138	0.345	0.115	0.320	0.209	0.407	0.123	0.329	0.019	0.136
Professional	0.127	0.333	0.109	0.312	0.182	0.386	0.116	0.320	0.032	0.177
Skilled Worker	0.322	0.467	0.365	0.481	0.277	0.447	0.315	0.465	0.277	0.448
Unskilled Worker	0.243	0.429	0.229	0.420	0.157	0.364	0.256	0.437	0.592	0.492
Non-Production/Clerical Worker	0.161	0.368	0.175	0.380	0.163	0.370	0.182	0.386	0.070	0.255
Apprentice	0.009	0.094	0.007	0.083	0.011	0.106	0.009	0.094	0.010	0.099
Salary (RM Monthly)	1,806.8	2,088.8	1,625.4	1,828.9	2,338.1	2,543.0	1,764.6	1,781.6	892.0	1,044.8
Industry										
Food Processing	0.169	0.374	0.176	0.381	0.165	0.372	0.156	0.363	0.154	0.362
Textiles	0.028	0.166	0.031	0.175	0.027	0.162	0.019	0.136	0.027	0.163

Garments	0.064	0.245	0.034	0.181	0.098	0.297	0.028	0.166	0.128	0.334
Chemicals	0.059	0.235	0.068	0.252	0.045	0.206	0.065	0.247	0.057	0.231
Rubber And Plastics	0.201	0.400	0.196	0.397	0.161	0.368	0.287	0.452	0.287	0.453
Machinery And Equipment	0.066	0.249	0.056	0.231	0.087	0.282	0.054	0.227	0.054	0.225
Electric Appliances	0.026	0.159	0.035	0.183	0.014	0.116	0.028	0.164	0.026	0.158
Electronics	0.053	0.225	0.070	0.255	0.035	0.183	0.068	0.251	0.026	0.160
Auto Parts	0.024	0.152	0.031	0.174	0.017	0.130	0.018	0.132	0.013	0.113
Wood And Furniture	0.094	0.291	0.078	0.268	0.097	0.296	0.059	0.235	0.190	0.392
Information Technology	0.028	0.165	0.022	0.147	0.042	0.200	0.029	0.169	0.007	0.082
Telecommunication	0.007	0.086	0.008	0.089	0.007	0.085	0.013	0.115	0.001	0.027
Accounting	0.082	0.274	0.088	0.283	0.102	0.303	0.042	0.200	0.016	0.125
Advertising	0.019	0.137	0.011	0.105	0.035	0.183	0.018	0.132	0.007	0.082
Business Logistic	0.080	0.271	0.096	0.294	0.069	0.254	0.117	0.321	0.008	0.091
Firm size										
Small (<50 Emp)	0.475	0.499	0.398	0.490	0.552	0.497	0.401	0.490	0.644	0.479
Medium (50-150 Emp)	0.285	0.452	0.294	0.455	0.280	0.449	0.330	0.471	0.225	0.417
Large (>150 Emp)	0.240	0.427	0.308	0.462	0.168	0.374	0.269	0.444	0.131	0.338
Ownership										
Purely Domestically-Owned	0.722	0.448	0.672	0.470	0.782	0.413	0.687	0.464	0.786	0.410
Less Than 30% Foreign-Owned	0.043	0.203	0.048	0.213	0.040	0.195	0.038	0.192	0.037	0.189
More Than 30% Foreign-Owned	0.235	0.424	0.281	0.449	0.179	0.383	0.275	0.447	0.177	0.382

TABLE 2 Raw response of the most appropriate level of education for the current work

Appropriate education	**Pooled (%)**	**Malay (%)**	**Chinese (%)**	**Indian (%)**	**Other (%)**
Degree	2,188	886	1,115	145	42
	16.3	*13.82*	*24.45*	*12.92*	*3.16*
Diploma	2,602	1,262	1,104	192	44
	19.39	*19.69*	*24.21*	*17.11*	*3.31*
Upper secondary	4,389	2,421	1,278	363	327
	32.7	*37.77*	*28.03*	*32.35*	*24.62*
Lower secondary	2,638	1,208	643	290	497
	19.66	*18.85*	*14.1*	*25.85*	*37.42*
Primary	968	420	235	91	222
	7.21	*6.55*	*5.15*	*8.11*	*16.72*
Informal	635	213	185	41	196
	4.73	*3.32*	*4.06*	*3.65*	*14.76*
Total	**13,420**	**6,410**	**4,560**	**1,122**	**1,328**
	100	***100***	***100***	***100***	***100***

TABLE 3 The incidence overeducation and undereducation

	Pooled (%)	**Male** (%)	**Female** (%)
Well-matched	7,372	3,729	3,643
	54.94	*51.83*	*58.52*
Overeducated	2,302	1,247	1,055
	17.15	*17.33*	*16.93*
Undereducated	3,746	2,218	1,528
	27.92	*30.83*	*24.55*

Total	**13,420**	**7,194**	**6,226**
	100.00	***100.00***	***100.00***

FIGURE 1 The incidence overeducation and education across ethnic groups

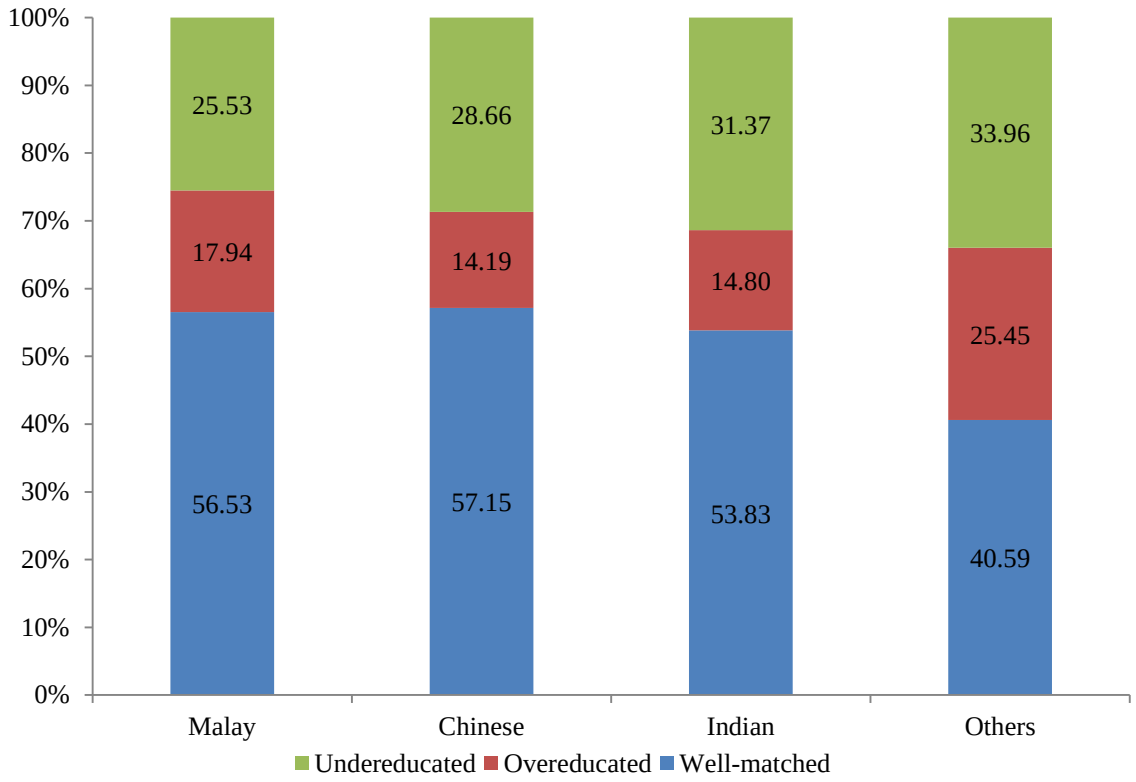

TABLE 4 Earnings differences among over and undereducated acros ethnic group

	Pooled	**Malay**	**Chinese**	**Indian**	**Other**

Well-matched	1,947.3	1,714.6	2,459.0	1,989.5	976.5
	2,169.9	*1,823.1*	*2,609.7*	*2,161.2*	*1,135.3*
Overeducated	1,340.6	1,211.0	1,876.9	1,272.0	777.4
	1,368.2	*1,343.2*	*1,620.0*	*958.2*	*441.9*
Undereducated	1,811.0	1,713.8	2,296.9	1,612.2	887.6
	2,236.2	*2,077.9*	*2,721.1*	*1,205.3*	*1,251.0*
Total	**1,805.0**	**1,624.0**	**2,329.3**	**1,764.5**	**895.5**
	2,086.0	***1,828.0***	***2,534.5***	***1,780.8***	***1,053.1***

Table 5 The wage effects of overeducation and undereducation

Log income (monthly)	Pooled		Male		Female	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Education (ref group - degree)						
Diploma	-0.1904***	-0.2317***	-0.1997***	-0.2341***	-0.1765***	-0.2215***
	(0.0155)	(0.0156)	(0.0245)	(0.0246)	(0.0195)	(0.0197)
Upper sec	-0.3754***	-0.4431***	-0.3775***	-0.4322***	-0.3484***	-0.4253***
	(0.0158)	(0.0162)	(0.0249)	(0.0252)	(0.0203)	(0.0209)
Lower sec	-0.4569***	-0.5609***	-0.4410***	-0.5294***	-0.4522***	-0.5660***
	(0.0183)	(0.0195)	(0.0267)	(0.0284)	(0.0258)	(0.0274)
Primary	-0.5789***	-0.7148***	-0.5069***	-0.6229***	-0.6186***	-0.7676***
	(0.0218)	(0.0239)	(0.0304)	(0.0333)	(0.0323)	(0.0350)
Informal	-0.5698***	-0.7408***	-0.4701***	-0.6188***	-0.7008***	-0.8817***
	(0.0289)	(0.0314)	(0.0369)	(0.0408)	(0.0502)	(0.0527)
Mismatch (ref group -Well-matched)						
Overeducated		-0.0995***		-0.0948***		-0.1061***
		(0.0110)		(0.0153)		(0.0153)
Undereducated		0.1070***		0.0868***		0.1164***
		(0.0104)		(0.0139)		(0.0154)
Age	0.0559***	0.0553***	0.0586***	0.0592***	0.0599***	0.0576***
	(0.0029)	(0.0029)	(0.0037)	(0.0037)	(0.0047)	(0.0047)
Age square	-0.0005***	-0.0005***	-0.0005***	-0.0006***	-0.0006***	-0.0006***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Training	0.0925***	0.0773***	0.0623***	0.0487***	0.1239***	0.1081***
	(0.0093)	(0.0093)	(0.0130)	(0.0130)	(0.0131)	(0.0130)
Female	-0.2363***	-0.2348***				
	(0.0086)	(0.0086)				
Ethnic (ref group - Malay)						
Chinese	0.3120***	0.3031***	0.2726***	0.2681***	0.3323***	0.3200***

	(0.0097)	(0.0096)	(0.0145)	(0.0144)	(0.0127)	(0.0127)
Indian	0.0448***	0.0440***	0.1033***	0.1041***	-0.0164	-0.0200
	(0.0152)	(0.0151)	(0.0210)	(0.0208)	(0.0212)	(0.0209)
Others	0.0538	0.0556	0.0439	0.0471	0.0344	0.0322
	(0.0472)	(0.0459)	(0.0690)	(0.0671)	(0.0658)	(0.0636)
Cons	6.5591***	6.6296***	6.2374***	6.2808***	6.2730***	6.3742***
	(0.0808)	(0.0799)	(0.1066)	(0.1054)	(0.1284)	(0.1266)
N	13200	13200	7076	7076	6124	6124
R-square	0.5947	0.6018	0.5913	0.5969	0.6167	0.6246
R-adjusted	0.5932	0.6003	0.5884	0.5940	0.6136	0.6215
Log-likelihood	-8172.57	-8055.29	-4426.02	-4376.91	-3522.14	-3457.89

Robust standard errors in parentheses
, ** and * denote 0.1, ** and ***, respectively*
Other controlled variables - marital status (3), household size, region (5),cummuting time, work distance, occupation (7),hours of work, tenure, union,industry (15), firm size(3), ownership (3) and age of firm

Table 6 The effect of over-eduction and under-education on wages across ethnic group

Log wage (monthly)	Malay	Chinese	Indian	Others
Mismatch (ref group -Well-matched)				
Overeducated	-0.1059***	-0.0524**	-0.1650***	-0.0560**
	(0.0153)	(0.0207)	(0.0374)	(0.0277)
Undereducated	0.1278***	0.0926***	0.0433	0.0231
	(0.0148)	(0.0190)	(0.0355)	(0.0287)
Education (ref group - degree)				
Diploma	-0.2911***	-0.1701***	-0.2544***	-0.1210
	(0.0234)	(0.0229)	(0.0639)	(0.0994)
Upper sec	-0.5090***	-0.3317***	-0.4582***	-0.3691***
	(0.0241)	(0.0259)	(0.0630)	(0.0757)
Lower sec	-0.6283***	-0.4578***	-0.6381***	-0.3676***
	(0.0284)	(0.0337)	(0.0708)	(0.0785)
Primary	-0.7552***	-0.6769***	-0.7349***	-0.4293***
	(0.0361)	(0.0432)	(0.0848)	(0.0821)
Informal	-0.8522***	-0.8669***	-0.7092***	-0.3932***
	(0.0662)	(0.0660)	(0.1090)	(0.0832)
Age	0.0638***	0.0577***	0.0447***	0.0191
	(0.0044)	(0.0048)	(0.0104)	(0.0122)
Age square	-0.0007***	-0.0005***	-0.0004***	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Training	0.0920***	0.0752***	0.0559*	0.0186
	(0.0126)	(0.0172)	(0.0311)	(0.0249)
Female	-0.2293***	-0.2030***	-0.3624***	-0.1665***
	(0.0116)	(0.0155)	(0.0284)	(0.0295)
Cons	7.2747***	6.8371***	6.8599***	7.2979***
	(0.3132)	(0.1506)	(0.2141)	(0.2371)

N	6302	4522	1111	1265
R-square	0.5988	0.5156	0.6192	0.5284
R-adjusted	0.5956	0.5103	0.6020	0.5094
Log-likelihood	-3579.43	-2951.94	-637.80	-403.35

Robust standard errors in parentheses
, ** and * denote 0.1, ** and ***, respectively*
Other controlled variables - marital status (3), household size, region (5),cummuting time, work distance, occupation (7),hours of work, tenure, union,industry (15), firm size(3), ownership (3) and age of firm

Table 7 The effect of over-eduction and under-education on wages across ethnic group – Male sample

Log wage (monthly)	**Malay**	**Chinese**	**Indian**	**Others**
Mismatch (ref group -Well-matched)				
Overeducated	-0.1021***	-0.0461	-0.1136*	-0.0310
	(0.0226)	(0.0312)	(0.0588)	(0.0318)
Undereducated	0.1012***	0.0877***	0.0006	0.0318
	(0.0193)	(0.0297)	(0.0490)	(0.0312)
Education (ref group - degree)				
Diploma	-0.3241***	-0.1699***	-0.1232	-0.0816
	(0.0373)	(0.0385)	(0.0950)	(0.1128)
Upper sec	-0.5544***	-0.2824***	-0.3224***	-0.3258***
	(0.0383)	(0.0446)	(0.0858)	(0.0908)
Lower sec	-0.6518***	-0.4040***	-0.4652***	-0.3009***
	(0.0429)	(0.0520)	(0.0974)	(0.0929)
Primary	-0.7494***	-0.5253***	-0.4661***	-0.3586***
	(0.0505)	(0.0652)	(0.1181)	(0.0969)
Informal	-0.8362***	-0.7654***	-0.4589***	-0.3100***
	(0.0899)	(0.0970)	(0.1581)	(0.0970)
Age	0.0604***	0.0687***	0.0598***	0.0196
	(0.0057)	(0.0068)	(0.0143)	(0.0139)
Age square	-0.0006***	-0.0007***	-0.0005***	-0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
Training	0.0743***	0.0308	0.0212	-0.0052
	(0.0181)	(0.0262)	(0.0459)	(0.0277)
Cons	6.6997***	6.3634***	6.0639***	7.0805***
	(0.4417)	(0.1745)	(0.2722)	(0.2776)
N	3383	2083	572	1038
R-square	0.5668	0.4644	0.5872	0.4855
R-adjusted	0.5606	0.4518	0.5502	0.4611
Log-likelihood	-1981.94	-1412.29	-314.28	-329.06

Robust standard errors in parentheses

*, ** and *** denote 0.1, ** and ***, respectively
Other controlled variables – marital status (3), household size, region (5),cummuting time, work distance, occupation (7),hours of work, tenure, union,industry (15), firm size(3), ownership (3), age of firm

Table 8 The effect of over-eduction and under-education on wages across ethnic group – Female sample

Log wage (monthly)	Malay	Chinese	Indian	Others
Mismatch (ref group -Well-matched)				
Overeducated	-0.1112***	-0.0655**	-0.1868***	-0.1673**
	(0.0202)	(0.0273)	(0.0539)	(0.0721)
Undereducated	0.1501***	0.0933***	0.0593	0.0193
	(0.0228)	(0.0243)	(0.0529)	(0.0670)
Education (ref group - degree)				
Diploma	-0.2519***	-0.1798***	-0.3401***	-0.2774
	(0.0291)	(0.0280)	(0.0909)	(0.2010)
Upper sec	-0.4545***	-0.3560***	-0.5172***	-0.5966***
	(0.0309)	(0.0316)	(0.0994)	(0.1624)
Lower sec	-0.5949***	-0.4984***	-0.7415***	-0.6744***
	(0.0384)	(0.0454)	(0.1098)	(0.1635)
Primary	-0.7467***	-0.7797***	-0.8874***	-0.7661***
	(0.0524)	(0.0573)	(0.1366)	(0.1658)
Informal	-0.8420***	-0.9628***	-0.8896***	-0.9647***
	(0.0855)	(0.0887)	(0.1572)	(0.1831)
Age	0.0718***	0.0522***	0.0329**	0.0408*
	(0.0060)	(0.0077)	(0.0150)	(0.0208)
Age square	-0.0008***	-0.0005***	-0.0002	-0.0005
	(0.0001)	(0.0001)	(0.0002)	(0.0003)
Training	0.1101***	0.1098***	0.0701	0.1830***
	(0.0172)	(0.0224)	(0.0477)	(0.0562)
Cons	6.9763***	6.9404***	6.6141***	6.5176***
	(0.3435)	(0.2414)	(0.3730)	(0.4645)
N	2919	2439	539	227
R-square	0.6292	0.5604	0.6226	0.7607
R-adjusted	0.6230	0.5515	0.5873	0.6962
Log-likelihood	-1489.68	-1445.23	-283.81	-32.61

Robust standard errors in parentheses
*, ** and *** denote 0.1, ** and ***, respectively*

Other controlled variables – marital status (3), household size, region (5),cummuting time, work distance, occupation (7),hours of work, tenure, union,industry (15), firm size(3), ownership (3), age of firm

TABLE 9 The effect of overeduction and unedereducation on wages across by sector

Log income (monthly)	Manufacturing				Business Suport Service			
	Malay	Chinese	Indian	Other	Malay	Chinese	Indian	Other
Mismatch (ref group -Well-matched)								
Overeducated	-0.1060***	-0.0376	-0.1862***	-0.0499*	-0.1046***	-0.0732*	-0.1097	-1.3375**
	(0.0165)	(0.0236)	(0.0403)	(0.0277)	(0.0368)	(0.0413)	(0.0970)	(0.5585)
Undereducated	0.1400***	0.1080***	0.0678*	0.0202	0.0659**	0.0378	-0.0382	1.1997*
	(0.0161)	(0.0221)	(0.0381)	(0.0289)	(0.0335)	(0.0341)	(0.1019)	(0.5718)
Education (ref group - degree)								
Diploma	-0.2757***	-0.2029***	-0.2696***	-0.1290	-0.3401***	-0.1505***	-0.2950***	0.2018
	(0.0302)	(0.0293)	(0.0946)	(0.0972)	(0.0364)	(0.0369)	(0.1081)	(0.5477)
Upper sec	-0.5109***	-0.3736***	-0.5162***	-0.3082***	-0.5140***	-0.2677***	-0.4570***	-1.3989
	(0.0294)	(0.0309)	(0.0873)	(0.0792)	(0.0409)	(0.0516)	(0.1191)	(1.2990)
Lower sec	-0.6325***	-0.4888***	-0.7423***	-0.3250***	-0.6268***	-0.3913***	-0.3530**	-1.9109
	(0.0323)	(0.0388)	(0.0926)	(0.0803)	(0.0684)	(0.0709)	(0.1614)	(1.4497)
Primary	-0.7676***	-0.7048***	-0.8497***	-0.3838***	-0.5055***	-0.3357**	-0.2378	-2.1217
	(0.0385)	(0.0475)	(0.1054)	(0.0832)	(0.1216)	(0.1453)	(0.2443)	(1.2113)
Informal	-0.9157***	-0.9118***	-0.8090***	-0.3414***	-0.1324	-0.1647	-0.1249	-1.7115
	(0.0576)	(0.0695)	(0.1275)	(0.0849)	(0.2496)	(0.1893)	(0.2904)	(1.7024)
Cons	7.4147***	7.0845***	6.9520***	7.2278***	6.4689***	6.5524***	6.9650***	3.2759
	(0.3389)	(0.1693)	(0.2176)	(0.2498)	(0.2249)	(0.2297)	(0.6510)	(3.3310)
N	4916	3387	871	1216	1386	1135	240	49
R-square	0.5606	0.4624	0.5983	0.4201	0.5497	0.5090	0.5574	0.9649
R-adjusted	0.5567	0.4553	0.5774	0.3983	0.5374	0.4924	0.4789	0.8596
Log-likelihood	-2667.73	-2289.55	-470.02	-352.87	-776.32	-584.07	-126.10	19.47

Robust standard errors in parentheses
, ** and * denote 0.1, ** and ***, respectively*