

Discrepancy in Effect of Education

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Abstract

Although researchers agree that education has positive effect on income, literatures reveal there are significant discrepancies in the effect of education on income. Becker (1993), Gerber & Cheung (2008), and Schultz (1993) point out that estimating the effect of education must take into account many other variables. To carefully examine the effect of education on income, this paper included urbanization and occupation as additional control variables. Using national survey data in Thailand and the cumulative logit model, my finding supports those of Becker's and Schultz's that the effect of education on wages is positive but not constant across different levels of education. While the finding indicates that education higher than secondary school significantly increases one's chance of making higher income, the fact that being in Bangkok and Metropolitan area increases one's odd of earning more by 7.4 times suggests that the effect of other variables on income could be more powerful than that of education variable. When comparing this finding with literature in the past, it suggests that effect of education is not time invariant as it is sensitive to the changing structure in the labor market. Positive effect of higher level of education is likely to be more persistence than that of primary and secondary education to changes in the labor market.

Keywords: effect of education, human capital, cumulative logit model, categorical response

1. Introduction

Human capital theories suggest a positive effect between education and income. Thus, one attends school hoping to make more money afterward. Although researchers agree that education has positive effect on income, literature reveals that there are significant discrepancies in the effect of education on income. While Becker (1993) and Schultz (1993b) insist that this positive effect of education on income is not uniform, Meghir & Rivkin (2010) point to more recent studies that find evidences to suggest that education type is heterogeneous. Using national survey data administered by King Prajadhipok's Institute, this paper evaluates effect of education without imposing convenience restriction that effect of education is strictly monotonic increasing. Removing such strict assumption is consistence with numerous empirical evidences that find different levels of education are not perfect substitute for one another (Meghir & Rivkin, 2010). To carefully evaluate the discrepancies in the effect of education on income, I include controls for effect of urbanization as well as the effect of self-selection into different occupation.

Because the response variable of our data is a multilevel ordinal response variable, instead of using the conventional regression model, I use a cumulative logit model to fit this data. Agresti (2007) and Ramsey & Schafer (2002) recommend using the cumulative logit model with an ordinal response variable as it allows the model to capture information embedded in the internal ordering of the income level and to give simpler interpretations with possibly more power than other logits model.

2. Literature

Although researchers agree that education has positive effect on income, literature reveals that there are significant discrepancies in the effect of education on income. Previous research (e.g. Becker (1993), Gerber & Cheung (2008), Heckman *et al.* (2003), and Schultz (1993b)), have found effect of education on income to vary substantially due many other factors including gender and conditions in the labor market. For example, despite acknowledging that education pays dividends for men and women, Leicht (2008) argues that long-run trends and mechanisms in the labor market are quite different for both groups that earnings inequality between male and female will continue. Although Schultz (1993a) finds earnings inequality in most countries to favor men, he points out that returns to education for Thai women in 1976, 1981, and 1986 to be higher than that of Thai men. Even though the data for this paper cannot make direct comparison with returns to education, it can certainly provide argument either for or against Schultz's earlier finding.

Changes in the labor structure have also been identified as factor influencing both demand and effect of education since human capital theories predict that rising jobs demand in the manufacturing and service sector may drive demand for higher education because jobs in these sectors normally require higher levels of education (Buchmann & Brakewood, 2000). This is particular true in the late 20th century when number of employment in the manufacturing sector has outgrown such number in the agriculture sector. Positions in the manufacturing sector generally require at least a secondary level of education, thus, those competing for the positions would respond by acquiring more education. In 1980, the importance and benefit of secondary school education was evidenced both in the US and Thailand. In the US, Heckman *et al.* (2003) report that high school education, at that time, was regarded as a real wage determinant in the country as jobs in the manufacturing sector increases. While in Thailand, Buchmann & Brakewood (2000) find that more jobs in manufacturing sectors have supported the demand for secondary school education. Although Heckman *et al.* (2003) and Buchmann & Brakewood (2000) suggest that secondary education would have positive effect on income and the size of such effect should increase even more as the size of manufacturing sector grows, Buchmann & Brakewood (2000) note of the possibility that such positive relationship between secondary education and growth of manufacturing and service sectors may be short-lived as both sectors provide jobs opportunities for individuals with high and low level of education.

The discrepancies in the effect of education have led to many ways of estimating effects of education but the majority uses a regression model and years of education as explanatory variable. Unfortunately, using years of education as explanatory variable implies that different education levels are perfect substitute for each other. Imposing restriction that effect of education on income is homogenous across all education levels is questionable at best since Meghir & Rivkin (2010, p.12) claim that many researchers consistently find that different levels of education are not perfect substitute for one another and thus a model should account for heterogeneity in effect of education on income across different levels of schooling. Therefore, an extra year of primary education would affect one's ability to earn income differently than an extra year of secondary or college education, for instance. Since education effects are heterogeneity by nature, Meghir & Rivkin (2010) maintain that changing supply of educated workers at different education levels may lead to temporal change in returns to education at various levels and studies of this constant changing effect of education make it possible for policy makers to evaluate and make inform decision regarding the nation's education and education financing policy.

Although traditional model used to estimate effects of education requires that income variable be continuous, the income variable of this dataset is categorical. To deal with this type of response variable, Agresti (2007) and Ramsey & Schafer (2002) recommend using the cumulative logit model. They insist that using cumulative logit model with an ordinal response variable allows the model to capture information embedded in the internal ordering of the income level where using other logit models may waste information from this latent structure. In fact, Oksuzler (2008) employs this cumulative logit model to investigate the effect of education on individual income in Turkey via Mincer's equation. Oksuzler finds education at all levels increase one's odd of earning more, thus education has positive effect on individual's income, consistent with human capital analysis that assumes schooling raises earnings mainly by providing knowledge and skills. But as Meghir & Rivkin (2010) explain that effect of education is not homogenous, Oksuzler's model fails to account for heterogeneity in effect of education on income across different levels of schooling. Using education level for years of schooling to account for such heterogeneity in education effects should allow the model to capture the variation in the effects of education on income.

3. Data and Methodology

3.1 Data

Between 2009 and 2010, the King Prajadhipok's Institute (KPI) conducted a national survey study on the country confidence on many aspects where the institute or KPI administered this survey country wide using a stratified survey method. This entire data set contains 1,880 samples with 155 variables but many of the variables collected were unrelated to the main interest of this research, thus only 9 relevant variables were selected for this study.

The original survey recorded respondents' occupation as text input, after cleaning the data this "Occupation" variable can be categorized into five main occupation types. The response variable is a multilevel categorical response of monthly income level and originally classified into 8 levels ranging from less than 5,000 Baht (160 USD) to over 100,000 Baht (3,175USD). But illustrates that samples with income over 40,000 Baht account for less than five per cent of the entire sample. The right hand side of shows recounts after reclassification of income level into 5 levels.

This KPI data contains two variables as a measure of education; 1) Years of Schooling and 2) Education Level. For years of schooling, the minimum, median, and maximum value is 0, 9.23, and 39 years, respectively. As for

the education level, this variable categorized education into ten categories from 'no official schooling' to 'higher than a bachelor degree'. Although this categorical variable is nominal, it can be recategorized to an ordinal variable by combining vocational education with general education system. Table 2 shows the counts of Education Level pre and post classification.

Although research on effect of education or returns of education is not novel, Schultz (1993a) warns that many studies tend to overestimate the effect or returns of education because their samples contain only employed individuals and such sample bias could impact their results. Excluding unemployed individuals in low-income countries such as Thailand may exaggerate the result even more as reveals the number of respondents who were "Unemployed, Student, and Retired" was higher than those employed by "Government or Crown corporations". To avoid sample bias noted by Schultz, this dataset contains samples of both wage earners and non-wage earners.

3.2 Methodology

As noted earlier that the income variable of this dataset is not continuous variable but categorical, I address this issue by using a cumulative logit model to fit this data as suggested by Agresti (2007) and Ramsey & Schafer (2002). They insist that using cumulative logit model with an ordinal response variable allows the model to capture information embedded in the internal ordering of the income level where using other logit models may waste information from this latent structure. Additionally, they maintain that cumulative logit model would give simpler interpretations and possibly more power than other logits model¹. This cumulative logit model can be written as;

$$\text{logit}[P(Y \leq i)] = \alpha_i + \beta_j X_j, \quad i = 1, \dots, 4 \text{ and } j = 1, \dots, n$$

where β_j is the coefficient of the j^{th} explanatory variable while i represents the i^{th} income level. Using this cumulative logits model, as in equation above, we are essentially comparing the probability of being in the i^{th} or smaller income level, $Y \leq i$, to probability of being in a higher income level, $Y > i$. To compute π_i or $P(Y = i)$, we need to compute $P(Y \leq i) - P(Y \leq i - 1)$, where

$$P(Y \leq i) = \frac{e^{\alpha_i - \beta_j X_j}}{1 + e^{\alpha_i + \beta_j X_j}}$$

Note the negative sign for β_j , this is so that $\beta_j > 0$ corresponds to Y being more likely to fall at the high end of the scale as x increases (Agresti, 2007 p. 182).

Since empirical evidence consistently finds significant discrepancies in the effect of education on income, I used education level variable in place of years of schooling as proxy for effect of education on income in order to evaluate effect of education without imposing unrealistic restriction that effect of education is strictly monotonic increasing. With years of education in the model, the outcome would suggest that an extra year of education whether at a kindergarten or college level affects one's ability to make money equally. Substituting education level for years of schooling, place no constrain that all education level has to have positive effect on income². The covariates in the model closely follows that of the Mincer Model where income level is a function of education, gender, age, and age-squared as proxy for experience as well as accounting for nonlinearity in experience. Then, converting polychotomous covariate into multiple dummy variables, this cumulative logit income model can be expressed mathematically as;

$$\begin{aligned} P(Y \leq i) = & \alpha_i + \beta_1 \text{Female} + \beta_2 \text{Age} + \beta_3 \text{Age}^2 + \beta_4 \text{NF.Elementary} \\ & + \beta_5 \text{F.Elementary} + \beta_6 \text{NF.Secondary} + \beta_7 \text{F.Secondary} \\ & + \beta_8 \text{Pursue.BA} + \beta_9 \text{Finish.BA} + \beta_{10} \text{HigherThan.BA}, \quad i = 1, \dots, 4 \end{aligned}$$

In this logit model, the coefficient of the covariates gives an estimate of the odd of being in the next income level and these coefficients are merely analogous to the slope in the Ordinary Least Square (OLS) regression. This cumulative logit model yields one constant coefficient for each explanatory variable, therefore, each of the four logits will have the same set of coefficients - $\beta_1, \beta_2, \beta_3,$ and β_{10} . Addition to the 10 coefficients, the model produces four intercepts which is indexed by i , where $i = 4$ represents the highest income level and $i = 0$ represents the baseline or lowest income level. NF and F are short for 'not finish' and 'finish'. Becker (1993), Buchmann & Brakewood (2000), and Schultz (1993a), all suggests that we should expect different pattern of β_4 to β_{10} . While Schultz (1993a) finds effect of education in Thailand to vary from one level to another, Becker (1993) asserts that returns to education would decline with more advanced schooling. If Becker's assertion is correct, we will see a positive but decreasing trend in the coefficients of education level that is $\beta_4 > \beta_5 > \beta_6 \dots > \beta_{10}$ >

¹An Ordinary Least Square (OLS) regressions have been fit and it suggests that years of schooling and education is positively associated with income level (p-value = 0) but the residual plot and normal Q-Q plot suggest that the normal assumptions of the response and error terms were violated.

² The result with *years of schooling* as proxy for effect of education is report in the footnote in the Results and Discussion section.

0, indicating returns to schooling would decline with more advanced schooling. It would be interesting to see what this data set will reveal.

Becker (1993), Buchmann & Brakewood (2000), and Gerber & Cheung (2008) point out that estimating the effect of education must take into account many other variables such as gender, occupation type, age, experience, as well as region. Discrepancies found in the effect of education on income permit the possibility that effect of other variables may eventually be more powerful than that of education variable on explaining their association with income or that other variables could alter the direction or strength of education effect on income. Thus, to carefully examine the effect of education on income, this paper included control variables, whether or not a person lives in Bangkok and Metropolitan and occupation types, in addition to education variable. Unfortunately, occupation is also nominal, thereby, creating even more variables in the model. Such model can be expressed as:

$$\begin{aligned}
 P(Y \leq i) = & \alpha_i + \beta_1 \text{Female} + \beta_2 \text{Age} + \beta_3 \text{Age}^2 + \beta_4 \text{BKK} + \beta_5 \text{Agriculture} \\
 & + \beta_6 \text{Retail} + \beta_7 \text{Government. and. Crown} + \beta_8 \text{Other} \\
 & + \beta_9 \text{NF. Elementary} + \beta_{10} \text{F. Elementary} + \beta_{11} \text{NF. Secondary} \\
 & + \beta_{12} \text{F. Secondary} + \beta_{13} \text{Pursue. BA} + \beta_{14} \text{Finish. BA} \\
 & + \beta_{15} \text{HigherThan. BA}, \quad i = 1, \dots, 4
 \end{aligned}$$

As more covariates are added to the model, the main focus remain to be on observing the sign and size of the education coefficients, however, it can be reassure that the effect of education would not be overstated should the pattern of the education coefficient remain robust. Otherwise, other explanatory variables in the model may play a much bigger role on one's ability income than education level.

4. Results and Discussion

presents the estimate coefficients of the two cumulative logit models. Positive coefficient indicates favorable odd whilst negative coefficient indicates unfavorable odd³.

In both models, results in suggest that the observed effects of education are only favourable for education higher than secondary education level. Comparing to a person with no education, a person with some level of university education is more likely to make more money but regrettably a person with primary and secondary education is more likely to end up making less money than a person with no education at all.

Initially, not all education levels are statistically significant, Hosmer & Lemeshow (2004) suggest that such model can be simplified by collapsing the number of level and make decision to collapse the levels based on the Chi-square test. shows only the finished results.

Differences in size and sign of the coefficients estimated for each education level perfectly illustrates discrepancies in the effect of education underline by Becker (1993), Buchmann & Brakewood (2000), and Schultz (1993a, 1993b) as the size and sign of the coefficient measures the strength and direction, respectively, of the association between education and income.

For postsecondary education and up, the odd favor one with advanced education to one without it. Conversely, the odd are against those with less than postsecondary education when compare with those without one. For instance, the odd for a person with a bachelor degree to earn higher income is $e^{1.37} = 3.9$ times greater than one with no education at all, while the odd is against one who finish elementary school by a factor of $e^{1.02} = 2.8$ times. Although the negative coefficients at the primary and secondary education level are inconsistent with human capital theories that suggest positive association between income and education, the rising coefficient at higher education levels further supports other empirical studies that found evidences contradicting with Becker's view that returns to schooling would decline with more advanced schooling.

As for gender coefficient, in spite of suggesting that men are more likely to make more than women by a factor of $e^{0.0436} = 1.045$ times or 4.5%, the standard error of the coefficient indicates that there is not enough information to conclude that gender significantly determine one's earnings. This result is inconsistent with Schultz (1993a) finding in the late 1970's that suggest education to work in favor of Thai women rather than Thai men. This variation is most likely due to the passage of time since the female participation rate in university level has increase significantly since then. Knodel (1997) noted that Thais had preferred to send sons over daughters to school but by 1990 the gender gap for all education levels, including university levels, has closed. The rising number of female participation in the postsecondary level further supports my result that suggests postsecondary education to have remarkable effect on income.

To explore how other factors may influence effect of education on income, I added control in urbanization and

³ For comparison's sake, the coefficient for 'years of education' was estimated to be 0.1425 (p-value =0) with same sample size. The coefficient of years of education suggest that an extra year of education, regardless of education types, increases the probability of earning more by $e^{1425} = 1.15$ times or 15 per cent.

occupation types. The result suggests that the effect of education level on income remains relatively the same without changing the initial outcome of the model even though size of urbanization effect is astonishing. The estimate effect of urbanization is 2 (SE = .10) suggesting that being in Bangkok and Metropolitan area increases one's odd of earning more by $e^2 = 7.4$ times. For a 95% confidence interval, this odd can be as low as 6 times or as high as 9 times. Despite not changing the original outcome, the most notable differences after adding urbanization and occupation as control variable in model are that coefficients of a person with primary education and a person pursuing a bachelor degree had changed by a great deal. When accounting for whether or not a person lives in Bangkok and Metropolitan area, the model suggests that a person pursuing bachelor degree is more likely to earn even more because the odd of earning more had increased from $e^{0.7970} = 2.22$ times to $e^{1.0477} = 2.85$ times after including control for urbanization factor. Growth in the service industry (e.g. tourism and entertainment businesses) in Thailand has opened doors for university students in the Bangkok and Metropolitan area to make money while pursuing their bachelor degree in the city.

As for occupation type variable, no significant effect was found. But the result regrettably reiterates the fact that Thai farmers remain to be the less-fortunate profession in Thailand. Relative to those considered "unemployed, student, and retired", a farmer is approximately twice ($e^{0.74}$) more likely to earn less than 5,000 Baht, holding other variables constant.

The fact that secondary school education is not a significant explanatory variable or actually affect income negatively challenges the finding of Buchmann & Brakewood (2000) that more jobs in manufacturing sectors have supported the demand for secondary school education. Has the size of manufacturing or service sector become significantly smaller such that it causes the returns to be negative? But as shows, that is not the case since the size of manufacturing sector has become actually bigger and it is now the largest labor sector in Thailand.

The explanation to this negative effect of secondary education may be as Buchmann & Brakewood (2000) point out that job opportunities in manufacturing and service sectors provide opportunities not only well-educated individuals but also individuals with lower level education.

The positive effect of postsecondary education is consistent with the current trend in Thailand's Higher Education Industry that welcomes the rise in number of students enrolled in university as well as the rise in number of postsecondary institutions in Thailand. Data from the Ministry of Education indicates that the percentage of first year students enrolled in university compared to school-aged population had surpassed 50% since year 2000 and this number continues to increase passing 80% in several occasions. While data from the Higher Education Commission indicates that the number of postsecondary institution in Thailand, ignoring all the teacher's colleges, has gone from a total of 44 institutions in 1991 to a staggering total of 80 institutions in 2012.

5. Conclusion

Results suggest 1) effect of education on income is heterogeneous and not strictly monotonic increasing, 2) the strength of the association is higher at higher level of education, and 3) gender inequality is not an issue. Having use education level for years of schooling allows the model to capture discrepancies in the effects of education on income that have been observed in the literature. Thus, one shortcoming of using years of schooling as proxy for education effects on income is that it incorrectly treats all levels of education the same. One extra year (unit) of elementary school should not be the same as one extra year of postsecondary education.

Interestingly, my result suggests that only postsecondary education and higher that has positive effect on one's income level while both primary and secondary educations negatively affect one's income level. This departure from the traditional view of human capital suggest that positive effect of higher level of education is likely to be more persistence than that of primary and secondary education as conditions in the labor market changes.

While positive effect of high level education bode well for postsecondary industry in Thailand, the negative effect on income at the primary and secondary education level put forward a legitimate question on the quality of statutory education in Thailand should these students were to attend university only because they realized that they will never survive on their high school diploma. In order to make a decent living, the only alternative is to pursue a university degree since their high school education is not enough to qualify for a decent job. Thus, this negative effect of primary and secondary education on income may explain why universities in Thailand had been enjoying an increasing number and percentage of student enrollments at both private and public universities (Thoviriyavej, 2011).

The fact that certain types of education are worth more than another or that the benefit of such education types tend to persevere despite the changing labor conditions make it possible for policy makers to evaluate and make inform decision regarding the nation's education financing policy. Heckman *et al.* (2003), Schultz (1993b), and Meghir & Rivkin (2010) note that the varying effect of education on income can have substantial implication

to the nation's education financing program. From a public financing perspective, my findings suggest more monetary funding at a lower level education and less monetary funding at a higher level education since extra year of education in higher education has the potential to generate more return than extra year of lower level education.

In summary, this paper reiterates recent findings in human capital literature that effect of education is not constant across all education levels as well as offers guideline for education financing policy.

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Table 1: Classification of Monthly Income Level

| Original Classification | Counts | Percentage | Reclassification | Counts | Percentage |
|-------------------------|-------------|------------|----------------------|-------------|------------|
| Less than 5,000 Baht | 425 | 22.65% | Less than 5,000 Baht | 425 | 22.65% |
| Over 5,000 - 10,000 | 519 | 27.67% | Over 5,000 - 10,000 | 519 | 27.67% |
| Over 10,000 - 20,000 | 452 | 24.09% | Over 10,000 - 20,000 | 452 | 24.09% |
| Over 20,000 - 30,000 | 270 | 14.39% | Over 20,000 - 30,000 | 270 | 14.39% |
| Over 30,000 - 40,000 | 131 | 6.98% | Over 30,000 | 210 | 11.19% |
| Over 40,000 - 60,000 | 44 | 2.35% | | | |
| Over 70,000 - 100,000 | 21 | 1.12% | | | |
| Over 100,000 | 14 | 0.75% | | | |
| Total | 1876 | | Total | 1876 | |

Note: there are four NA's. Approximately 1 USD = 31 Baht, 5,000 Baht = 160 USD and 100,000 Baht = 3,175 USD

Table 2: Classification of Education Level

| Original Classification | Counts | Percentage | Reclassification | Counts | Percentage |
|-------------------------|-------------|------------|-----------------------|-------------|------------|
| No Schooling | 52 | 2.77% | No Schooling | 52 | 2.77% |
| Not Finish Elementary | 140 | 7.47% | Not Finish Elementary | 140 | 7.47% |
| Finish Elementary | 639 | 34.10% | Finish Elementary | 639 | 34.10% |
| Not Finish VS | 32 | 1.71% | Not Finish HS or VS | 63 | 3.36% |
| Finish VS | 230 | 12.27% | Finish HS or VS | 635 | 33.88% |
| Not Finish HS | 31 | 1.65% | | | |
| Finish HS | 405 | 21.61% | | | |
| Persuing BA | 103 | 5.50% | Persuing BA | 103 | 5.50% |
| Finish BA | 219 | 11.69% | Finish BA | 219 | 11.69% |
| Higher than BA | 23 | 1.23% | Higher than BA | 23 | 1.23% |
| Total | 1874 | | Total | 1874 | |

Note: there are six NA's. HS = High School, VS = Vocational School, and BA = Bachelor Degree

Table 3: Income Level and Occupation

| Monthly Income Level (in Baht) | Occupation Type | | | | |
|-----------------------------------|------------------------------------|-------------|--------|-------------------------|-------|
| | Unemployed, Student and Retired | Agriculture | Retail | Government and Crown | Other |
| less than 5,000 | 28 | 283 | 55 | 4 | 55 |
| over 5,000 - 10,000 | 59 | 292 | 74 | 22 | 72 |
| over 10,000 - 20,000 | 79 | 202 | 61 | 33 | 77 |
| over 20,000 - 30,000 | 40 | 124 | 34 | 29 | 43 |
| over 30,000 | 36 | 89 | 28 | 18 | 39 |

Note: This data is based on national stratified survey administered by King Prajadhipok's Institute (KPI)

Table 4: Estimate Coefficient of CLM

| | Model 1 | | | Model 2 | | |
|----------------------------|-------------------|-----|----------|-------------------|-----|----------|
| | AIC = 5494 | | | AIC = 5072 | | |
| | N = 1858 | | | N = 1858 | | |
| <u>Intercepts</u> | | | | | | |
| Less than 5,000 | baseline | | | baseline | | |
| Over 5,000-10,000 | -0.1845 | | (0.4493) | -0.3176 | | (0.4661) |
| Over 10,000-20,000 | 1.1868 | ** | (0.4495) | 1.3137 | ** | (0.4662) |
| Over 20,000-30,000 | 2.3846 | *** | (0.4517) | 2.7633 | *** | (0.4697) |
| Over 30,000 | 3.5104 | *** | (0.4565) | 4.0042 | *** | (0.4756) |
| <u>Coefficients</u> | | | | | | |
| Female | -0.0436 | | (0.0846) | -0.1057 | | (0.0878) |
| Age | 0.054 | ** | (0.0185) | 0.0562 | ** | (0.0191) |
| Age ² | -0.0005 | * | (0.0002) | -0.0006 | ** | (0.0002) |
| In BKK and Metro | | | | 1.9946 | *** | (0.1047) |
| in Agriculture | | | | -0.7441 | *** | (0.1362) |
| in Retail | | | | -0.5768 | ** | (0.1686) |
| in Gov. and Crown | | | | 0.1496 | | (0.2197) |
| in Other | | | | 0.0022 | | (0.1663) |
| <i>Education Variables</i> | | | | | | |
| NF Elementary | -0.8741 | ** | (0.2343) | -0.6369 | ** | (0.235) |
| Finish Elementary | -1.0245 | *** | (0.1871) | -0.6313 | ** | (0.1894) |
| Finish Secondary | -0.0718 | | (0.185) | -0.0056 | | (0.1869) |
| Pursuing BA | 0.797 | ** | (0.2487) | 1.0477 | *** | (0.255) |
| Finish | | | | | | |
| BA | 1.3753 | *** | (0.2127) | 1.3563 | *** | (0.2178) |
| Higher than BA | 2.594 | *** | (0.4552) | 2.6297 | *** | (0.4935) |

Note: standard errors are in parentheses, *P < .05, **P < .01, ***P < 0 (Wald z-test). NF = Not Finish and BA = Bachelor Degree. For model 1, three Chi-square tests to remove either NF or Finish Secondary, and both yield p-value of .48, .19, and .40, respectively. However, only NF Secondary was removed because of interest in comparing coefficient at secondary level to other education level.

Table 5: Industry Types (Percentage)

| Industry | Year 2003 | Year 2009 |
|-----------------------------------------|------------------|------------------|
| Agriculture and Fishing | 16.64% | 15.96% |
| Manufacturing | 27.49% | 24.02% |
| Construction and Real Estate | 12.55% | 13.86% |
| Wholesale & Retail trade | 12.28% | 12.81% |
| Hotels, Restaurants, and Finance | 6.22% | 6.43% |
| Communication | 3.62% | 3.37% |
| Public Admin. & Defence | 6.52% | 7.85% |
| Education | 6.51% | 6.81% |
| Health & Social work | 3.19% | 3.91% |
| Others | 4.99% | 4.98% |

Source: Table recreated from data obtained from the National Statistics Office