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Why are boys falling behind girls in schooling?

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Why are Boys Falling behind Girls in Schooling?

by

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Abstract

The paper tries to explain why women in the Philippines, as yet a low middle income country, obtain higher levels of education than boys. Four empirically based reasons are posited – the substantial expansion of the education system, the growth of job opportunities, the culture that encourages girls to develop better study habits and the high returns to their education. Empirical evidence is provided to support these contentions especially on the returns to women's schooling. The study concentrates in estimating by various methods returns to schooling using individual observations from the labor force survey. The more conventional OLS regressions are first applied to allow comparison with many studies and the semi-parametric estimates. But the semi-parametric additive method had to be used in order to check for specification robustness of the model due to the observed violation of the OLS assumption of normal distribution of error terms. The quantile regression was also applied to reflect the income distribution implications of the returns pattern. An additional insight into the returns estimation is given by the inclusion of the effect of being married and marrying well, i.e., whether the spouses are equally or upward matched in education, or not. We find that returns to education are higher the higher the level of education is and that returns to women's education are higher than returns to men's education. Moreover, being married and married well increase earnings. Additionally, there is a fairly high good matching between education classes, i.e., there is substantial intermarriage among college graduates and other college educated and among lower educated individuals. This implies poor social mobility considering that access to education especially at the higher levels is very much constrained by family resources. Intermarriage between college graduates preserves their high social position since access to education is restricted by income. The paper concludes with a list of social issues that emerge from the findings.

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1. The Philippines, though still a low middle income economy, has joined the rich countries in educating its girls at higher levels than boys. Beginning in mid-1980s, women in most OECD economies have pursued education more intensively than men so that women now have significantly higher education attainment than men. (Becker, Hubbard and Murphy, 2010; Eurydice, 2009; Chiappori, Iyigun and Weiss, 2007; Goldin, Katz and Kuzienko, 2006; Givniy, 2004). This was not always so for historically in virtually all countries, men had been favored in the allocation of education resources as compared to women. Worldwide, women's traditional responsibility for child rearing and home making had kept them at home and held back their formal schooling. Strangely, this very tradition is now considered to have helped girls learn more and complete more education than boys when schooling opportunities opened up for them. The epochal technological developments in production, medicine, communications, transportation and other human activities and sustained economic growth in the West in the past century have wrought synergistic forces that created labor market opportunities for its women and empowered them to make decisions on marriage, the number and timing of children, schooling and employment. Of revolutionary impact was the discovery and rapid market development of contraceptives. (Greenwood, Seshadri and Yorukoglu, 2005) The new technologies lightened work and reduced its hazards making many jobs suitable and attractive to women. Economic growth was accompanied by sectoral changes that created jobs suitable and attractive to women and provided both governments and families with more resources for investment in education and other forms of human capital. Thus, educational institutions grew in breadth and depth and provided wider access to both sexes.

2. The Philippines experience stands out as its women started to catch up with boys in education as early as the mid 1980s when its income per capita was only about \$1,000. The paper tries to explain the phenomenon by developments in the education system and the labor market that encouraged women to pursue education. First is the character of economic growth which has generated rather modest employment opportunities for men¹ particularly those requiring higher education. No transformative industrialization took place as the manufacturing sector grew modestly at only about 10% per year and produced mainly light industrial products. The manufacturing firms were mainly of

¹ Employment opportunities were most abound for men in the Utilities, Construction, and Transportation, Communications and Storage sectors.

small and medium size and had small demand for advanced technical workers suited to men. Meanwhile the population was growing at more than 2% and resulted in persistently high unemployment, close to 10% since the 1985. The excess labor in agriculture plus the new entrants to the labor force stimulated the growth of the service sector which was largely engaged in personal services and retail trade. As early as 1970, the service sector already contributed 39% to GDP. The share declined slightly in the 1980s but since then it has continued to increase reaching 55% in 2007. Women found much employment in this sector.

3. The second major reason for the more intensive pursuit of education by women is the rapid expansion of the educational system throughout the 20th Century. The American colonial occupation of country opened up educational opportunities and professional jobs both boys and girls. The colonial government established a public school system as a means of pacifying the armed resistance against its occupation. The school system was rapidly expanded and fast training of teachers, albeit of low quality, was undertaken to give literacy lessons. The government allowed the few schools founded during the Spanish colonial era to continue operating and let new private schools to open with minimal restraint. Quality was not a priority. Access to education and to teaching jobs was open to both sexes. Teaching proved to be an attractive profession.

4. The country's culture favors girls' superior school performance relative to boys. Traditional attitude and practices have remained much more conservative in the rearing of girls than of boys. Families are more protective of girls' physical and moral wellbeing and therefore more restrictive about their social activities and mobility. They are not as free as boys to spend leisure time outside the home. Staying at home encouraged them to do their homework and read as also observed in other countries. Many boys in poor families work at young ages and forego their schooling. Consequently, boys tend to have higher cost of schooling than girls. (Becker, Hubbard and Murphy, 2010; Goldin, Katz and Kuzienko, 2007; Hill and King, 1993).

5. Girls could expect relatively high monetary returns to education. A number of studies have found returns to women's education are higher than those for men. (Lou and Terada, 2009; Alba, 2006; Shady, 2001; Alonzo, 1995) Our study takes account of returns to marriage and to being married to the "right" person. Being married likely enhances a person's sense of responsibility and may reflect some non-cognitive abilities such as caring, communication skills and discipline. At the same time there is premium to marrying one with the same or higher educational attainment. Both parametric and semi-parametric estimation methods are employed to address distribution problems in the survey data used. The semi-parametric approaches provide finer estimates of returns to education though their results are consistent with those using the OLS. Marital status and marital education matches are found to significantly influence earnings. We try to explain the pattern of returns by inquiries into the demand side of the labor market and the environment for marriage matches.

6. The paper is organized as follows: Section 2 discusses women's progress in education and employment. Section 3 analyzes assortative matching in education. Section 4 presents and discusses results from alternative estimation models of returns to schooling. The last section tries to explain the pattern of returns to women's education and concludes the study.

Section 2. Women's Progress in Education and Market Work

7. The first and the two succeeding Constitutions (1935, 1972 and 1987) provided for universal access to basic education and equitable access to higher levels. Earlier, universal access to basic education was limited to the primary grades. Since 1994, the High School Education Act provided that all students who could not be accommodated by existing public high schools be given tuition subsidy for enrollment in private high schools. The subsidy did encourage many students to pursue high school and the enrollment rate at this level substantially increased. Consequently, the proportion of youth who qualified to enroll in college rose. Numerous private and public higher educational institutions were established to meet increased demand. Public schools grew by 16.6% and private schools by 141.1% in the period 1990-2009. (Table 1) Currently, there are more than 40,000 primary schools, 6,000 high schools and 1,792 colleges and universities including 110 national and 93 local universities and colleges. Added to these are another thousand vocational schools. In 2009, enrollment reached 22.7 million, which is about a quarter of the total population. Close to 14 million are in the primary grades, 6.8 million in secondary and 2.8 million in college/universities.

8. It is evident that girls perform better in school. Figures 1 to 3 show net enrollment rates by sex at the primary, secondary levels and gross enrollment rate at the tertiary level. There is little difference in the net enrollment rate for boys and girls at the primary level but as we move up the education ladder, the female-male ratio rises. In 2009, the ratio for secondary education was 52.5/44.9 or 1.169- and for tertiary, 55/45 or 1.22. Girls have a higher completion rate at each level for they have a lower dropout rate, a higher cohort survival rate and have higher academic performance. Some children begin dropping out even at Grade II and continue to do so at each successively higher level so that only 60% of boys and 68% of girls complete the primary grades. (Figures 1-3, Table 2) Girls performed much better than boys in all subjects in the national achievement tests for Grades 3 and 6 and Secondary Education 2 administered by the Department of Education. (Table 3) The 2003 TIMSS for Grade 8 shows that Filipino girls did better in all subject areas including Science. In many of the participating countries, girls did better in languages but worse in Science and about the same in Math. In the top performing countries where families still favor boys such as Singapore, Taiwan and Korea, boys did slightly better than girls in most subjects. (Table 4)

9. The decadal population censuses evidence a rising trend in the educational attainment of both sexes but with the female overtaking the male as early as 1980. (Table 5) In 1970, more girls than boys had not gone to school or had completed only Grades 1-5; relatively fewer girls had reached high school or college. The female-male ratio of those with 1-3 high school was 81.2%, those with 4 high school, 65.0% and for those with some college, 69.4%. But the ratio for those who had completed college was about 100% which means that proportionately more girls than boys who finished high school and enrolled in college completed it. By 1980, more women than men had finished college, 121.7%. The relative educational attainment of men further worsened so that by 2000, female college graduates exceeded male by 37% and at the post-graduate level by 39.3%.

10. The argument that girls have better discipline than boys brought forth by Eurydice (2009) and Goldin, Katz and Kuzienko (2007) applies to Filipino girls as well. Families try to be physically protective

of girls to preserve their reputation for attracting desirable spouses. Women's traditional home-making roles require that they be trained to keep themselves modest and tidy, to know how to keep a clean house and learn the usual home chores of cooking, caring for the sick and basic sewing. It is customary for the husband to give his wife his full salary since she is viewed to be more knowledgeable and prudent in allocating it. These values and practices have kept her at home where she develops discipline for work that likely extends to studying. Staying at home gives girls more time and opportunity for reading or studying their lessons. Boys in contrast are expected to be the main earner but during childhood they have more freedom to spend time outside the home for sports and other social activities. They could be more easily distracted from their studies. A survey that asks for reasons of dropping out of school reflects these gender differences in attitude and practices. Table 6 shows that boys spend more time employed outside the home than girls while the latter spend more time housekeeping. More boys than girls point to inability to cope with schooling and lack of interest as a reason for dropping out. Two educators interviewed say that boys are easygoing. Apparently, physical access to school is not a big problem for only a small percentage of the sample cited distance to school and cost of transport as reasons for dropping out. Perhaps the preponderance of female teachers and the lack of sports facilities in most schools make schooling not so attractive to boys.

11. Women appear to have developed non-cognitive abilities and taste for jobs that are akin to their traditional role and home-making experiences such as teaching, nursing and office administration. They have pursued fields of study preparatory for such jobs. (Table 7) Female college students were concentrated in three fields of study – teacher training, business and medical which drew, respectively, 17.2%, 29.8% and 20.2% of college students, a total of 67.2% in 2009-2010. Even more majored in these fields in 2005-2006. The other female students were enrolled in many other fields. Male students were also concentrated in few fields with business attracting 21.7%, medical, 10.7%, engineering, 20.4% and maritime, 6.9%, or a total of 59.7%. IT-related field became popular with both sexes as it drew 11.1% of boys and 10.9% of girls. The table also shows that more girls than boys were enrolled in college, 54.7% vs. 45.3%. A higher proportion of girls completed college than boys, 57.4% vs. 42.6%. Of concern is the unpopularity of natural sciences and mathematics to both sexes which attracted only 1.5% boys and 1.1% girls. The government has neglected to support the development of the country's advanced studies and research in the sciences, engineering and mathematics and its innovation system. (Tan 2010)

12. A large proportion of women continued to stay at home and did not engage in market work with their labor force participation rate at 48.6% vs. men's at 78.2% in 2008. (Table 8) Women's LFPR however, showed a slow rising trend from 46.2% and men's at 81.1% in 1990. Women's LFPR increased with level of education, 71.3% for women who have completed college, 42.8% for those with high school and 51.0% for those with primary education. The employment to population ratio for women has a similar pattern with the corresponding figures at 48.6%, 38.1% and 64.4%. The male-female gap in LFPR and employment rate narrowed as education attainment rose. Possibly for the lower educated women, the value of market work was lower than the value of home production especially considering that they have more children to care for and the returns to their education was lower.

13. Bad economic policy and weak governance have dampened the country's capacity to achieve its growth potential and did not create good jobs for men. Economic growth has been modest and volatile. (Canlas, Zhuang, Khan, 2009) It averaged 5.8% in the 1970s, 2.0% in the 1980s, 2.9% in the 1990s and 4.6% in the past decade. Population growth was high exceeding 2% while saving and investment rates were low at about 20%. Political instability arising from citizen revolt against rapacious and inept government caused recessions and further pulled down growth, once in 1986 to topple the notorious Marcos regime, then in 2001 to force the resignation of Joseph Estrada for plunder. The country also suffered from the 1998 Asian financial crisis. Meager industrialization was achieved with manufacturing remaining a relatively small sector. Its share in GDP stagnated at about 23% from 1970 to 2008. The services sector had been the dominant sector since the 1970s with a share of 39%; it continued to rise reaching 54% in 2008. Some of the smaller sectors like utilities, finance and education showed higher growth rates in the last two decades with their respective shares rising from .8% to 3.6%, 3.0% to 5.2% and 1.1% to 2.6. The government sector also grew in relative importance. The construction sector grew in relative importance but had more volatile growth. (Table 9)

14. Women's employment grew at about the same rate as the men's over the 1994 to 2000 period. (Table 10) Overseas jobs have become very important since the mid 1970s when the Middle East began importing labor for its construction and other sectors. In the 1990's, BPO became another important new source of employment. Overseas employment is roughly estimated to have reached about 4 million with the bulk in the Middle East and Asia. BPOs began in the mid 1990's and are reported to employ about 500,000. Men and women are equally represented abroad and in BPOs. Overseas employment is largely in blue-collar occupations with professionals representing only 12.3% of the total new hires in 2010. (Table 11) The larger proportion of professionals in earlier years represents musicians and entertainers in Japan. Male overseas workers are largely in production and construction jobs while women are in service jobs in households and restaurants. The professional group consists largely of female nurses. (Table 12) There are teachers, managers and IT specialists but they comprise a relatively small proportion of overseas workers. Higher quality nurses, teachers, programmers and engineers migrate to the US, Canada and Oceania where working conditions and wage rates are far superior to those in the Middle East and other places.

15. The industrial sectors have different sex composition: heavy manufacturing, construction, utilities and transport services are male dominated while services that include health care, education and personal services are largely female sectors. (Table 13) Finance and trade employ a fair mix of the sexes. Women appear to be encroaching into male dominated sectors as seen in their rising female-male employment ratio. It is noted that the male dominance (male/female ratio) in the two highest ranked occupations – executives, managers and administrators - has petered down and employed proportionately more women by 2000. Female employment grew faster than men's in clerical, agricultural and related fields and even in the armed forces. Women are dominant in life science and health professions with male-female ratio at .43 and in the teaching profession at .26. The physical science and engineering professions are male occupations with a ratio of 2.89. The ratios exhibit changes with women finding jobs in male dominated jobs. Women's preponderant presence in the

teaching profession (ratio of .26) may have reduced the attractiveness of schooling to boys. Boys have fewer male mentors to guide them and act as models.

Section 3. Education and Marriage

16. Education is an important identifying mark of an individual. An education category qualifies one for certain occupations such that the higher the education, the higher the occupational ranking. One thinks of oneself as a college graduate or more specifically as a teacher or a lawyer or an engineer. Most production jobs in the formal sector usually require high school education. Blue-collar overseas jobs require high school education. The social identity possibly directs person to live and socialize in a circle of similar education-social class and this is where one finds a prospective spouse.

17. Schools are effective socializing institutions where a large population of students meet and work and live together. (Becker, 1973) Schools are a natural place for finding friends and prospective spouses. However, schools differ in degree of heterogeneity or homogeneity in terms of the socioeconomic and ethnic background, ability and even study habits or work discipline of their students. The public primary schools which cater to the bulk of the school age population have the most heterogeneous population of students. In the Philippines, each town or village school would enroll virtually all its young children. Only the very affluent may send their children to prestigious/expensive schools in the city or capital towns. As we move up the education ladder, students become more homogeneous in socio-economic background and ability. An increasing percentage of students drop out at each succeeding higher level because of poverty, poor ability, poor discipline and/or poor motivation. Those who reach college are more homogeneous than those in the basic level. But even at the college level, schools differ in quality and cost. The better quality institutions have stricter admission requirements. The high quality private colleges/universities charge high fees and admit affluent students. Admission to the higher quality publicly supported universities is also based on scholastic achievement and socio-economic background because their admission tests tend to be biased against poor students who have poorer pre-college education. The students in high quality colleges/universities are likely to be the most homogeneous group of students. There is where friendship and marital matches would likely take place. The odds of homogamous marriage among the students of these institutions are likely to be high. If the labor market pays a premium for quality education, graduates from the high quality institutions will tend to earn higher wage rates. This pattern would perpetuate income inequality. In fact Figure 6 shows that the correlation between wife and husband's earnings is highest among college graduate couples. The correlation is lower for couples that are high school graduates and is the lowest for couples with primary education.

18. In Western societies, mating is conducted largely by the marrying couple. In India and other cultures, marriage is more formally arranged by parents and the matching of human and non-human wealth is more explicitly negotiated. Education and physical wealth could be substitutes. In India, Behrman, Birdsall and Deolalikar (1995) showed how closely matched were the couple's total wealth. A wife's wealth is predicted by the husband's education and parental wealth. The Chinese tradition of parental participation also holds in Taiwan. (Tsai and Kuan, 2004) In the Philippines, the youth are quite free to socialize and find a prospective spouse. But the family keeps its counsel about the human and

non-human capital of the prospective daughter or son in law and gives its approval or disapproval of a match. Parental participation in the courtship likely leads to more homogamous marriages.

19. We follow Becker, Hubbard and Murphy's lifetime (2-period) utility function from marriage where the total utility, **U** is derived from consumption of goods **x** in each period, properly discounted, plus the utility from what they call emotional benefits from married life, **MB**. We take **MB** to include benefits from marital relation, the social life of married couples and family life and the social network that may impact on market work. The total consumption for the two periods is constrained by the monetary returns to the education of each partner – r_h and r_w and the premium on marital match, r_m **MM**. Compare this utility function to that of a single person who earns r_s and enjoys emotional benefits from her lifestyle, **SB**. It derives from having less financial and other responsibilities and a freer social life. The single person's income constraint is the returns to her education. We assume **MB** to be greater or equal to **SB** while r is returns to own education are equal for all ($r_w = r_h = r_s$). The assumption though possibly not totally realistic, is made just to simplify the hypothesis. Married women tend to have shorter work life because of their family responsibilities and earn less than single women.

20. A woman who contemplates marriage possesses human capital E_w . The expected utility from marriage depends on her share on the combined returns from her and her spouse's human capital (or the goods they can buy) plus the emotional benefits from marriage, **MB**. To simplify the analysis, we assume that she shares equally with her spouse in the total utility from their combined human capital. Non-human capital, **K**, may substitute for human capital **E**. Marriage is desirable under the following conditions:

$$U \left[\frac{1}{2} (r_w + r_h + r_m \text{MM}) \right] + U(\text{MB}) \geq U(r_s) + U(\text{SB})$$

21. Marriage is desired if she finds a man with the same or higher education who is expected to earn the same or higher income. Marriage is also desirable even if the husband has a lower human capital provided the utility from her loss of income is compensated for by the difference between **U(MB)** and **U(SB)** and the expected premium from their market work, r_m **MM**. It is also desirable if the lower education of the man is compensated for by physical assets, **K**. There are as well personal traits such as pulchritude, good health, rectitude, social acumen (popularly referred to as EQ) and work and financial discipline that may partly substitute for education and physical capital. The chance of a homogamous marriage also depends on the sex ratio of the population of a particular education level. The chance of a homogamous marriage among college graduates is lower than 100.0% considering the very high female/male ratio of the population of college graduates. The woman may have to be content marrying down so long as her utility from marriage is greater than the utility from being single. We may, therefore, expect some unequal education matching, i.e., cases of hypergamy and hypogamy (marrying up or marrying down).

22. There are homogamous and non-homogamous marriages among women of different education attainment aged 20-29. (Table 12) Homogamous matches are preponderant among women with high school or lower education: 55% for those without any schooling, 65% for those with primary grades and 58% for those with high school level, but only 44% for the college graduates and 39% for the college undergraduates. About 28% of college graduates marry men who have reached but not completed college. Thirty nine percent of the undergraduates marry men with high school education. There are hypergamous and hypogamous matches to the next lower or next higher education level. The college undergraduates have the lowest homogamous marriages with 39% marrying men with high school education. Among the 30-39 years old women, distribution of matches for those with high school

and lower is similar to that of the younger couples. But there is a much higher homogamous marriages among the older college graduates than among the younger group, 61% vs. 44% partly because the sex ratio the college graduates was lower in earlier years. Apparently the college graduates who could not find prospective college graduate spouses marry the next best option, the college undergraduates.

23. We try to see the assortative matching between couples' education and compensating variables such as employment and employment in the formal sector. Following Filoso (2008) we included employment status as another desirable trait of a prospective spouse. He takes employment as a substitute of education. Being employed is definitely a desirable trait considering the high unemployment here especially among young adults who are new entrants to the labor market. The variable region may capture differences in culture and the sex ratio. The equation tested reflects an accomplished marriage and the choice of spouse made by the person with the RHS traits. We expect a positive coefficient of husband's education and employment. The value of the education coefficient would partly depend on the sex ratio prevailing during the mating years. We tested the hypothesis for men and women aged 20-29 and 30-39 to capture the cohort effect.

24. To estimate the effect of education on the marriage market, ordered logistic regression is run with the spouse's educational attainment as the dependent variable. The interest here is to see the magnitude of hypogamy, homogamy and hypergamy among men and women. The merged Family Income and Expenditures Survey (2006) and Labor Force Survey (January 2007) dataset is utilized for this exercise.

The categories of educational attainment are as follows:

- 1 – No grade completed
- 2 – Primary level/graduate
- 3 – Secondary level/graduate
- 4 – College undergraduate
- 5 – College graduate and higher

25. The independent variables tested are the characteristics of men and women including the following: educational attainment, age, employment status, dummy variable for self-employment, occupation, basic pay per hour, dummy variable for urbanity, and regional sex ratios in 2000 for ages 15 to 49.

26. The relationship to test is of this form:

$$\text{Education}_{\text{Man}} = f(\text{Education}_{\text{Woman}}, \text{Age}_{\text{Woman}}, \text{D(Employment)}_{\text{Woman}}, \text{D(Self-employed)}_{\text{Woman}}, \text{Occupation}_{\text{Woman}}, \text{Basic pay per hour}_{\text{Woman}}, \text{Dummy(Urban)}, \text{Regional sex ratio for ages 15-49 in 2000}).$$

Similarly,

$$\text{Education}_{\text{Woman}} = f(\text{Education}_{\text{Man}}, \text{Age}_{\text{Man}}, \text{D(Employment)}_{\text{Man}}, \text{D(Self-employed)}_{\text{Man}}, \text{Occupation}_{\text{Man}}, \text{Basic pay per hour}_{\text{Man}}, \text{Dummy(Urban)}, \text{Regional sex ratio for ages 15-49 in 2000}).$$

27. Estimations are run on two age groups of married couples: 20-29 and 30-39. The chi-squared value is significant for both age groups and both sexes which means that there is a relationship between the woman's education and the husband's education.

Among Women

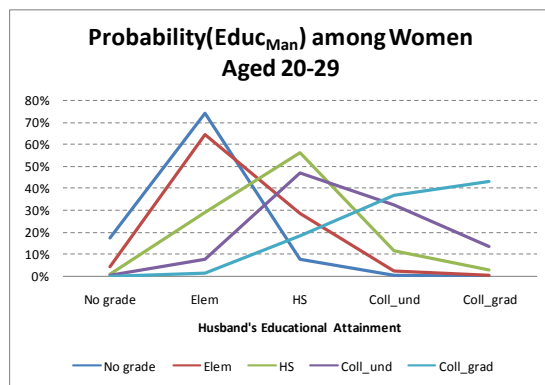
28. Below is the result of the ordered logistic regression. Among women aged 20-29, the positive and highly significant coefficient of the woman's education indicates that the likelihood of marrying a man of equal or higher education increases with the woman's education. The results also point to a negative effect of employment, in general, but to a positive effect of non-wage employment. Basic pay per hour of the woman has a positive effect on the likelihood, albeit very small. Urbanity also has a positive effect. Regional sex ratio (males/females) has a negative effect on the likelihood.

29. Among women aged 30-39, education significantly and positively affects the likelihood of marrying a man of equal or higher education. Being employed has a negative effect, but being self-employed has a positive effect. Urbanity has a positive effect and this effect is higher than among women aged 20-29. Basic pay per hour is significant but the coefficient is low. Regional sex ratio is not significant.

	Aged 20-29		Aged 30-39	
Dependent variable: Education _{Man}	Coef.	Std. Err.	Coef.	Std. Err.
Education _{Woman}	1.5042 ***	0.0530	1.5694 ***	0.0348
D(Employment) _{Woman}	-0.2227 ***	0.0868	-0.2527 ***	0.0670
D(Self-employed) _{Woman}	0.3287 ***	0.1262	0.3594 ***	0.0768
Basicpay_hour _{Woman}	0.0089 ***	0.0026	0.0047 **	0.0022
Sexratio ₂₀₀₀	-1.4360 *	0.8027	-0.1268	0.5369
Dummy(Urban)	0.7719 ***	0.0753	0.8278 ***	0.0488

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

30. The graph that follows shows the predicted probabilities of marrying a man of a certain educational attainment for a woman aged 20-29, considering characteristics of a woman included in the ordered logistic regression (i.e., education, employment status, indicator for self-employment, basic pay per hour, sex ratio in 2000, and indicator for urbanity). Women with no grade completed can only marry up. Somehow they do marry men of varying education levels. This group, however, comprises a very small proportion of the population. Marrying down is more probable among women who are college undergraduates. College graduate women tend to marry men who are also college graduates. Homogamy is also probable among primary level/graduate and secondary level/graduate women.



31. The tables that follow show the predicted probabilities from the ordered logistic regression. For women with no grade completed, her other characteristics matter in predicting her spouse's educational attainment. Among women aged 30-39, more college graduate women tend to marry college graduate men than among the younger group (aged 20-29). College undergraduate women marry down on average. Women who have no grade completed marry up (i.e., primary level/graduate men). Women who are primary level/graduate and secondary level/graduate are more probable towards homogamy.

Predicted Probabilities from Ordered Logistic Regression among Aged 20-29

$Pr(Educ_{Man}=e_i)$	Share of Married Women to Population of Women	Husband's Education				
Woman's Education		No grade	Elem	HS	Coll_und	Coll_grad
No grade completed	48.90	17%	74%	8%	0%	0%
Primary level/graduate	71.32	4%	64%	28%	2%	1%
Secondary level/graduate	60.71	1%	29%	56%	11%	3%
College undergraduate	38.03	0%	8%	47%	32%	13%
College graduate & higher	32.15	0%	2%	18%	37%	43%

Predicted Probabilities from Ordered Logit Regression among Aged 30-39

$Pr(Educ_{Man}=e_i)$	Share of Married Women to Population of Women	Husband's Education				
Woman's Education		No grade	Elem	HS	Coll_und	Coll_grad
No grade completed	73.96	17%	75%	7%	0%	0%
Primary level/graduate	89.55	4%	65%	28%	2%	1%
Secondary level/graduate	87.07	1%	28%	55%	12%	4%
College undergraduate	80.77	0%	7%	45%	32%	16%
College graduate & higher	72.09	0%	2%	17%	33%	49%

Among Men

32. For those aged 20-29, a man's education has a positive effect on the likelihood of marrying a woman with equal or higher education. Being employed negatively affects this likelihood. Basic pay per hour has a positive effect but this effect is higher than that for women aged 20-29. Urbanity positively affects the likelihood.

33. Among men aged 30-39, education has a significant positive effect on the likelihood of marrying a woman of equal or higher education. Unlike the previous sex-age group cohorts, occupation has a positive effect on the likelihood. Basic pay per hour is significant but still has a low positive effect. Urbanity is significant. Regional sex ratio (M/F) is significant and positive, which means that if women are more scarce compared to men in the region, the probability that men will marry a woman with equal or higher education is higher. From this and from the results of the previous cohorts, the coefficient of the regional sex ratio point to assortative mating that favors men.

	Aged 20-29		Aged 30-39	
Dependent variable: Education _{Woman}	Coef.	Std. Err.	Coef.	Std. Err.
Education _{Man}	1.6318 ***	0.0735	1.5369 ***	0.0394
D(Employment) _{Man}	-0.8709 ***	0.1894	(omitted)	
Occupation _{Man}			0.0449 ***	0.0123
D(Self-employed) _{Man}	0.1972	0.1208	0.0722	0.0688
Basicpay_hour _{Man}	0.0108 ***	0.0030	0.0092 ***	0.0016
Sexratio ₂₀₀₀	1.5303	1.0053	2.5161 ***	0.6118
Dummy(Urban)	0.5516 ***	0.1056	0.3621 ***	0.0548

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

34. The predicted probabilities below show that compared to women aged 20-29, men in the same age bracket have a stronger tendency for homogamy and hypergamy. This is particularly the case for men with primary and college education. Men with secondary education tend to marry women of the same educational attainment. Among men aged 30-39, college graduate men tend to marry college graduate women while college undergraduate men are more likely to marry down (i.e., secondary level/graduate women). Primary and secondary level/graduate men are more probable to resort to homogamy. Men with no grade completed marry up (i.e., primary level/graduate women).

Predicted Probabilities from Ordered Logit Regression among Aged 20-29

Pr(Educ _{Woman} =e _i)	Wife's Education				
Man's Education	No grade	Elem	HS	Coll_und	Coll_grad
No grade completed	16%	70%	13%	1%	0%
Primary level/graduate	3%	47%	47%	3%	1%
Secondary level/graduate	1%	14%	66%	15%	4%
College undergraduate	0%	3%	40%	38%	19%
College graduate & higher	0%	0%	10%	29%	61%

Predicted Probabilities from Ordered Logit Regression among Aged 30-39

Pr(Educ _{Woman} =e _i)	Wife's Education				
Man's Education	No grade	Elem	HS	Coll_und	Coll_grad
No grade completed	14%	73%	12%	1%	0%
Primary level/graduate	3%	51%	41%	3%	1%
Secondary level/graduate	1%	18%	62%	14%	6%
College undergraduate	0%	4%	41%	31%	24%
College graduate & higher	0%	1%	11%	22%	66%

Section 4. Returns to Education and Marriage

35. A mainly empirically based or ex post returns to education is estimated here by both parametric and semi-parametric methods. While we assume that the estimated returns are the result of the optimizing behavior of the population, the estimates do not try to test the behavior. We would not know whether the estimated returns approximate equilibrium condition or how market conditions affect the returns values. As Psacharopoulos and Patrinos (2004) argue, the term rate of return is simply the estimated coefficient of education in a wage or earnings function based on survey data at points in time. Following most studies, we estimate a wage function with education, experience and sex as principal arguments. We include being married or not and whether the marriage is homogamous (equal), hypergamous (upward) or hypogamous (down), and fixed effects in environmental variables such as in which industry and location of employment. More recent studies include being married and type of marriage arguments or as RHS variables.

36. Received human capital theory argues that education increases labor productivity or market value. (Schultz 1935; Becker 1965; Spence 1973) Experience hones a person's skills and knowledge and therefore raises productivity. We may expect that higher educated individuals tend to be assigned to tasks that take longer time to master and entail more technological improvements so that return to experience may be higher for the more educated. Sex matters if there is labor market discrimination against women for whatever reason or that women tend to find employment in occupations or industries that pays more or less than the average for a given education category. Becker, Hubbard and Murphy (2010) argued that highly educated women are able to fight sex discrimination at work than lower educated women. This fact will tend to increase the returns to women's education. There may be fixed effects in sector of employment or location that reflect lack of labor mobility, unionism rates, work hazards, firm size and firm ownership. It is casually observed here that foreign firms and some large domestic firms have higher pay scale than the average scale. Government has institutionalized wage scale which give higher wage rates for some positions and lower wage rates for other positions than the private sector as a whole.

37. The coefficient of education in an earnings or wage function is an estimate of gross returns to education. If education costs differ, then the gross returns will also differ. Out-of-pocket costs and foregone income vary across education categories – level, fields and quality. Costs generally increase as education level increases. Gross returns may therefore be expected increase with the level of education. This would not be true in countries that fully subsidize education. Psacharopoulos and Patrinos most recent compilation of rates of return to education (2004) does show that quite a number of countries find higher returns to higher education though the majority show higher returns for basic education. At this time the observed distribution or patterns of returns across countries has yet to be explained.

38. Becker, Murphy and Hubbard (2010) find that married men earned higher wage rate than unmarried men partly because the former face greater pressure to earn to support their family. Being married may also reflect some non-cognitive abilities like patience, generosity and social skills. Having a homogamous or hypergamous marriage may lead to the development of a work and social network that enhances the couple's employment opportunities. They may inspire each other's productivity. Bribe and Nystedt (2010) found that in Sweden, hypergamous (in education) marriage increases income relative to homogamous marriage. But there was a negative effect on income of hypergamy for low educated men. They reason that low educated men might have more traditional attitude regarding male and female social position and are therefore negatively affected by their wives' higher education. In

contrast, the homogamous or hypergamous marriage of highly educated men who are assumed to be more liberal minded enhanced their wives' earnings. In Taiwan, Tsai and Kuan (2004) estimated a family income function with average spouses' education and occupation. They use quantile regression to trace possible changes in the income and occupation parameters over income quintiles. Both education and occupation homogamy are found to exert a constant and positive impact on family income. But the traditional high position given to men leads to a negative effect of men's hypergamous marriage or men married to wives of higher education or higher occupation status. Tradition appears to affect the benefits from men's hypergamous marriage.

39. To estimate returns to education, we try first OLS and quantile regressions with wage as the dependent variable and levels of education, experience, education matches and some fixed effects as explanatory variables. The OLS results allow us to compare returns to education in the Philippines with those in other countries. The OLS regression uses levels of education which allows us to estimate separately returns to primary, secondary and tertiary levels. But it does not allow us to see whether the premium on education matches vary across wage distribution. The quantile regression allows us to estimate the premium on homogamous and hypergamous marriages of low and high income classes.

40. Parametric estimation depends on the ability of its assumptions to hold. In particular, the test for normality point to violation of the assumption of normal error terms. There is a growing amount of literature pointing towards the weaknesses of the typical quadratic Mincerian earnings function and its inadequacy in capturing the effects of the determinants of earnings which would then lead to misleading earnings profiles. (Murphy and Welch, 1990; Zheng, 2000; Miles and Mora, 2003; Dacuycuy, 2006) Specification errors, reliance on strict distributional assumptions, omitted variable biases are among the main culprits that could lead to misleading parametric estimates.

41. In Dacuycuy's (2006) review of the literature on the empirical shortcomings of the parametric specification of the Mincerian earnings function, he lists the existing literature highlighting the inadequacies of the quadratic Mincerian earnings specification. Three separate studies by Miles and Mora (2003), Zheng (2000), and Ginther (2000) reject different variations of the quadratic Mincerian earnings specification which vary through the inclusion of different orders of polynomials in age. The implication of these studies is that the resulting parametric estimates from using the usual OLS Mincerian earnings specification are invalid and would lead to misleading results characterizing the wage/earnings profile studied. (Dacuycuy, 2006) Other such evidence towards the inadequacies of the parametric estimation of the usual Mincer model is the observation that wages may be convex in schooling. (Linton et al, 1997) In the usual Mincer model, the effect of schooling on wages is captured by a linear specification, that is, that the relationship between schooling and wages is captured linearly. If wages are indeed convex in schooling, then the relationship is inadequately captured by the single linear variable that captures the effect of schooling on wages. (Dacuycuy, 2006)

42. Non-parametric estimation methods have the advantage of eliminating the source of biases in parametric estimation methods because they do not hinge on assumptions regarding distribution and eliminate the possibility of misspecification. However, there are trade-offs for the elimination of the said biases through non-parametric estimation methods. Non-parametric methods converge at a slower rate because they get all the information to estimate the model from the dataset for (1) the estimation of the coefficients of the model and (2) the determination of the shape of the function in question. (Wasserman, 2006) This slow rate of convergence for non-parametric estimation methods is especially true once you increase dimensions (or variables) in your estimation. As you increase the number of dimensions, the non-parametric rate of convergence gets slower which results in the full non-parametric

estimates becoming more imprecise. This is of course referred to in the literature as the infamous curse of dimensionality. (Wasserman, 2006)

43. Semiparametric Additive Model (SAM) uses additive functions that are still non-parametric in nature and therefore are not subject to the pitfalls of parametric estimation. It also addresses the weaknesses of full non-parametric estimation in that it is not subject to the curse of dimensionality. (Wasserman, 2006) This allows us to relax some assumptions regarding distribution and functional form specification that have implications on consistency and bias of the results and at the same time, not being subject to the curse of dimensionality.

44. The January 2006 Labor Force Survey dataset is utilized for this OLS exercise². The Mincerian earnings function has long been the workhorse in the labor economics literature, and has also come across its fair share of criticism as mentioned above. In this specification of the Mincerian earnings function, dummy variables for level of educational attainment were used in order to capture the different returns to each level of educational attainment as opposed to the usual years of education variable.

45. The equation used for both males and females for the OLS and quantile regression estimation is as follows:

$$\ln(qbpay)_i = a_i + b_1 experience_i + b_2 experience_i^2 + b_3 educyrs_i + b_{4j} \sum d_j region_{ji} + b_{5j} \sum h_j industry_{ji} + b_6 marrydown_i + u_i$$

where,

$\ln(qbpay)$,	the natural logarithm of quarterly basic pay;
$experience$,	age of the person in years to indicate number of potential years of experience calculated as: age - years of education - 6;
$experience^2$,	experience squared;
$educ$,	years of education ³ ;
$region$,	a vector or dummy variables for regions in the Philippines, aggregated to the level of major island groupings in the country. This is used to capture the effect of working in Luzon, Visayas, or Mindanao on basic pay with NCR as reference;
$industry$,	a vector of dummies for Manufacturing, Transportation, Trade, and Commercial Services which equal 1 if individual i is employed in these industries, with employment in agriculture as reference;
$marrydown$,	dummy variable which equals 1 if individual i is married to someone with less education, with marrying up or marrying someone with equal level of education as the reference group;

² Quantile regressions using the 10th, 25th, 50th, 75th, and 90th quantiles were also run to see the differences in effects in distribution across wage quantiles. Results are consistent with OLS runs.

³ An alternative regression, where education dummies are used in place of years of education, is presented in the Appendix.

See Table 15 for the complete presentation of results.

46. Tests for normality of the error terms were performed and point to the violation of the normality assumption held in parametric estimation. To test the robustness of the model to changes in specification, a semiparametric estimation of the same model was performed.

Ordinary Least Squares

47. For the regressions of the full sample using OLS, we get the expected result regarding returns to education for both males and females, that as you increase the years of education, the returns to education increases. The returns to females are greater than their male counterparts as you move up the quantiles, suggesting that the returns to education increase and are greater for women than for men.

48. We get the usual result for experience which has a positive effect on log of quarterly basic pay, with its square having a negative effect. For OLS estimates, the coefficient estimate for experience for males is 0.3923, while for females it is 0.3173. For the squared experience term, the OLS estimate for males is -0.0054, while for females it is -0.0040. These estimates for experience and its square is a result consistent with the literature, which implies a diminishing marginal effect of experience on the log of quarterly basic pay. Returns to experience seem to be greater for males as opposed to females. The coefficient estimates for experience and experience squared are also statistically significant for both OLS and quantile regression.

49. For the full sample, marrying down (hypogamy) has the expected negative effect on the log of quarterly basic pay for both males and females in both OLS and quantile regression results. The coefficient estimates are also statistically significant in both OLS and quantile regression. Based on the results from the quantile regression, it can be seen that for both males and females, those in the 10th quantile experience the largest penalty as a result of marrying down. Also of interest is that in both OLS and quantile regression, females experience a larger penalty as opposed to males as a result of marrying down across all quantiles.

50. Separate regressions were done for married males and females and single males and females, with no drastic change in results. These results are presented in the appendix. See Tables 15 and 16.

Semiparametric Additive Model Result

51. The model used for the Semiparametric Additive Model⁴ is as follows:

$$\ln(qbpay)_i = a_i + m_1(experience_i) + m_2(years\ of\ schooling_i) + b_{1j} \sum d_j region_{ji} + b_{2j} \sum h_j industry_{ji} + b_3 marrydown_i + u_i$$

52. The above model makes no assumptions on functional form for both experience and years of schooling. The reason why these two variables are the only variables estimated non-parametrically is because of the evidence in the literature against the usual quadratic Mincerian specification. We include other variables previously included in the OLS and quantile regression estimations in order to compare

⁴ $m_1(experience_i)$ and $m_2(years\ of\ schooling_i)$ are the semiparametric parts of the model.

with earlier runs of the model. However, these variables are to be estimated parametrically only, and are included as a means to avoid omitted variable bias. Separate Semiparametric Additive Regressions were done for Males and Females.

53. The plot of the schooling-earnings relationship that for males and females, the schooling-wage relationship appears to be convex. (Figure 7) This result is true for both males and females. This implies that it is only for a certain range of years of education that the returns to schooling are increasing, and there is another range for years of schooling wherein wages decrease with schooling. The graph tells us that there are differential rates of return for schooling at different levels of years of education. Again, comparing the plots of the schooling-earnings relationship, it can be observed that the returns to education for females are greater than their male counterparts. This is reflected by the steeper curve for the schooling-earnings relationship for females compared to males.

54. Comparing the plots for the schooling-earnings relationship between males and females, the differences between the behavior of returns to schooling for between males and females can be seen by looking at the shape of both graphs.

55. For males, the schooling-earnings relationship starts out flat, suggesting a low rate of return for the early years of education. The slope of the graph eventually becomes steeper and steeper suggesting that higher rates of return are captured for higher years of educational attainment.

56. For females, it can be seen that for low levels of schooling the returns to education are actually decreasing. The returns to education start to increase at around the four year mark, but start out very flat, again suggesting that for these early years of schooling, returns to education are low. It is only at around the eight year mark that that returns to education start to increase at a higher rate, which can be seen by the steeper slope of the graph starting from the eight year mark.

57. From the plot of the experience-wage relationship for both males and females, it appears that the experience-wage relationship is not entirely concave. (Figure 8) Again, this is true for both males and females. This would seem to imply that the inclusion of a quadratic term for experience may not sufficiently capture the effect of experience on wages.

58. The results for the parametric estimates for both males and females proved to be consistent with the earlier OLS and quantile regressions. As expected, marrying down has a negative impact on the log of hourly wages for both males and females. All parametric estimates are statistically significant at the 1% level of significance for both males and females.

Conclusion

The paper inquires into why women in the Philippines are pursuing education more intensively than men at an early stage of the country's economic development. Four reasons are seen to explain the phenomenon – great expansion of education institutions, growth of job opportunities for women, the traditional culture that keeps girls at home where they acquire greater discipline and allows them to study better and the high returns to women's education relative to men's. Empirical information is presented to support these contentions. The paper traces the rapid expansion of the school system from the early years of the American colonial era when the government established the public school as a means of pacifying the armed resistance against US occupation. Henceforth, both the colonial and the

government of the independent nation followed a populist policy that allowed education institutions to open as demand warranted. Early on, the Philippine Constitution provided for universal enrollment in basic education. The education system has expanded from a few hundred in the 1950s to the current numbers of 40,000 primary schools, close to 6,000 high schools and some 1,740 colleges and universities. The expanding school system provided girls with more education facilities as well as jobs as school teachers. Teaching has remained the most important single occupation for women. Other jobs in the service sector, foreign markets and BPOs were opening to women in the last three decades.

The paper focused on estimating returns to women's education. We argued that returns to education include returns to marriage where there is a tendency for prospective partners' to match their human and non-human capital. An assortative matching hypothesis is suggested and tested where a woman's education is regressed (logistically) against her spouse's education. The results are significant and of the right sign. However, the value of the coefficient of the employment of the husband is negative and less than unity. The equal match between college graduates is about 50% though as much as 30% intermarry with college undergraduates. The degree of education under-matching is partly due to the fact that there are more than 30% more girls who have completed college than boys. There could also be slips in education matches due to weak information, differences in taste, non-human capital and other traits such as pulchritude and good health.

Three methodologies were employed in estimating returns to education – the Mincerian OLS, quantile regression and semi-parametric additive method or SAM all using the 2006 labor force surveys. The quantile regression gives us the range of returns over wage or income levels. We had to apply SAM because the test for normality of the error term assumed by OLS is violated. We run the OLS to give us a basis for comparison with other studies and with the non-parametric results. The same RHS variables were used in all three methods: the years of education obtained; experience and experience squared proxied by age; being married; having homogamous or hypergamous marriage vs. hypogamous marriage; and fixed effects of location or residence and industry to account for labor organization and market conditions. The pattern of returns to education for women and men obtained from the three methodologies are similar – returns to education increases as the level of education rises from primary to secondary to college, and returns to women's education are higher than returns to men's education. There are some differences in the coefficients of experience, with the parametric results from OLS suggesting a purely concave relationship between experience and the log of quarterly basic pay, whereas the SAM results suggest that experience is not purely concave. The SAM results tell the same basic story as OLS, where the returns to schooling increase with the level of educational attainment and that the returns to schooling are generally greater for females as opposed to males. The added benefit of SAM is we get to see a much more complete picture of the schooling-earnings relationship that we cannot see from using usual parametric methods. By using SAM, we also get to uncover the trend of decreasing returns to schooling for females at low levels and the relatively flat shape of returns to schooling for males at low levels of schooling, which would not have been possible from using purely parametric methods.

The data and empirical results bring out a number of issues related to the following findings:

1. An increasing proportion of women get more education than men especially at the college level, currently about 35% more women than men are college graduates.
2. The highly educated women are beginning to dominate executive/managerial positions. They have dominated the teaching positions especially at the basic level and the professional jobs in foreign markets, i.e. nursing and teaching.
3. Returns to women's schooling are higher than returns to men's.
4. Returns to schooling increase as the level of education increases
5. Returns to marriage and to well-matched marriage are positive
6. Returns to well-matched marriage increase as the level of education of the couple increases.
7. The labor force participation rate of women is much lower than that of men 48.6% vs. 78.2%. Women's LFPR increases with their education so that the LFPR of college educated women is close to the men's average.
8. Both men and women continue to be employed in their respective traditionally gender dominated occupations and pursue fields of study preparatory to their respective favored occupation. Too few pursue natural science and mathematics.

The paper offers some explanation about the rising dominance of women in education and in some critical jobs. Should this be of concern? What are the social and economic implications of this trend? In school, boys are deprived of male role models and guide. The quality of education is poor in general for all levels which probably discourage boys more strongly than girls in continuing their schooling. The lack of laboratory equipment for male fields of specializations such as engineering and vocational training for industrial skills likely makes schools less attractive to boys. Would innovations in industry be less lagging if men had been given more education especially in their usual fields of interest in the sciences and engineering? And would criminality be lessened if men get more educated and assume social dominance? It appears that some answers are related to the poor quality of education and the minimal existence of good quality S&T colleges and universities that would be attractive to boys.

All three econometric techniques give similar results, that returns to education increase as education level rises. Moreover, returns to well matched marriage also increase with the education of the spouses and that there is a fairly high good matching by education levels. These imply some social groupings by education with the more educated marrying among themselves and earning much higher income than the less educated. This problem is traceable to the high income inequality in the population which prevents equal access to education. A follow up study will address the distribution of access to education.

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APPENDIX: TABLES AND FIGURES

Table 1: Higher Education Institutions (Public and Private, 1990-2009)

	Public			Total Public	Private		Total Private	Total
	SUC	LUC	Other		Sectarian	Non-Sect		
1945-46				5			105	110
1990-91	81	54	59	174	225	412	637	811
1994-95	97	27	113	237	249	701	950	1187
2000-01	107	40	19	166	312	902	1214	1380
2004-05	111	50	15	176	340	1103	1443	1619
2008-09	110	77	16	203	302	1236	1538	1741
Growth Rate (1990-2009, %)	35.8	126.5	72.9	16.6	34.2	200	141.1	114.7

Source: Yearbook of Philippine Statistics

Table 2: Dropout rate in Elementary and Secondary Schools, by sex (%)

		2002	2003	2004	2005	2006	2007	2008	2009
Grade 1	MF	2.0	2.1	2.0	2.0	1.8	1.7	1.6	1.6
	M	2.3	2.4	2.3	2.3	2.1	2.0	1.9	1.8
	F	1.7	1.7	1.6	1.6	1.5	1.4	1.3	1.3
Grade 2	MF	1.2	1.2	1.2	1.2	1.1	1.1	0.9	0.9
	M	1.5	1.5	1.5	1.5	1.4	1.3	1.1	1.1
	F	0.9	0.9	0.8	0.8	0.9	0.8	0.7	0.7
Grade 3	MF	1.2	1.2	1.2	1.2	1.1	1.0	0.9	0.9
	M	1.5	1.6	1.5	1.5	1.4	1.3	1.2	1.1
	F	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.6
Grade 4	MF	1.1	1.2	1.1	1.2	1.1	1.0	0.9	0.8
	M	1.5	1.6	1.5	1.6	1.4	1.3	1.2	1.1
	F	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.6
Grade 5	MF	1.2	1.3	1.2	1.3	1.2	1.1	1.0	0.9
	M	1.7	1.7	1.7	1.8	1.6	1.4	1.3	1.2
	F	0.8	0.8	0.8	0.9	0.8	0.7	0.6	0.6
Grade 6	MF	1.1	1.0	1.1	1.1	1.0	0.9	0.8	0.8
	M	1.4	1.4	1.4	1.5	1.3	1.2	1.1	1.0
	F	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5
Average dropout rate	MF	1.3	1.4	1.3	1.4	1.3	1.2	1.1	1.0
	M	1.7	1.7	1.7	1.7	1.6	1.5	1.3	1.3
	F	1.0	1.0	0.9	1.0	0.9	0.9	0.8	0.8
Total dropouts	MF	157,605	164,011	151,765	155,291	149,477	139,147	127,780	75,325
	M	101,628	106,802	99,592	102,157	96,062	89,726	82,921	47,609
	F	55,977	57,209	52,173	53,134	53,415	49,421	44,859	27,716
Total previous enrolment	MF	11,761,730	11,934,888	11,410,564	11,426,890	11,873,983	11,969,008	12,167,172	7,214,251
	M	6,030,332	6,135,266	5,887,105	5,889,157	6,102,551	6,156,447	6,266,104	3,689,937
	F	5,731,398	5,799,622	5,523,459	5,537,733	5,771,432	5,812,561	5,901,068	3,524,314

Source: BEIS, Department of Education

**Table 3: Ratio of female/male performance in the National Achievement Test
Grades 3 and 6 and 2nd Year High School (2005-2010)**

Grade 3					
Subjects	SY 2005-2006	SY 2006-2007	SY 2007-2008	SY 2008-2009	SY 2009-2010
English Reading	1.065	1.064	1.074	1.660	1.076
Filipino Reading	1.070	1.059	1.040	1.063	1.082
English Grammar	-	-	1.065	1.064	1.080
Filipino Grammar	-	-	1.060	1.065	1.078
Science	-	-	1.050	1.044	1.067
Mathematics	-	-	1.059	1.058	1.066
Total Test	-	-	1.065	1.060	1.075

Grade 6					
Subjects	SY 2005-2006	SY 2006-2007	SY 2007-2008	SY 2008-2009	SY 2009-2010
Filipino	1.995	1.060	1.037	1.045	1.051
Mathematics	1.065	1.052	1.032	1.036	1.035
English	1.082	1.075	1.040	1.041	1.051
Science	1.034	1.030	1.021	1.021	1.021
Hekasi	1.067	1.055	1.034	1.036	1.042
Overall	1.070	1.055	1.033	1.041	1.040

2nd Year High School							
Subjects	SY 2005-2006	SY 2006-2007	SY 2007-2008	SY 2008-2009		SY 2009-2010	
				National	Public	National	Public
Filipino	1.080	1.094	1.064	1.100	1.091	1.095	1.083
Mathematics	1.020	1.020	1.021	1.041	1.031	1.031	1.024
English	1.098	1.119	1.050	1.098	1.085	1.101	1.084
Science	1.030	1.052	1.033	1.054	1.043	1.056	1.045
Araling Panlipunan	1.076	1.078	1.071	1.077	1.056	1.048	1.036
Overall	1.040	1.078	1.052	1.081	1.043	1.069	1.057

Source: Author's computation using data from the Department of Education – National Education Testing and Research Center

Table 4: 2003 Trends International Mathematics and Science Study (TIMMS) Average Science Achievement in Grade 8, by sex and content

Note: Standard errors in parentheses.

Participating Country	Life Science		Chemistry		Physics	
	Girls	Boys	Girls	Boys	Girls	Boys
Indonesia	422 (4.0)	425 (4.3)	393 (4.3)	389 (4.4)	417 (4.2)	443 (4.6)
Korea	555 (1.9)	562 (2.1)	527 (3.0)	531 (2.8)	575 (2.7)	582 (1.8)
Malaysia	504 (4.3)	504 (4.2)	513 (4.9)	514 (4.9)	512 (4.3)	527 (3.9)
<i>Philippines</i>	<i>395 (5.9)</i>	<i>377 (6.5)</i>	<i>348 (6.2)</i>	<i>334 (8.2)</i>	<i>377 (4.9)</i>	<i>385 (4.3)</i>
Singapore	571 (3.7)	566 (4.8)	584 (4.0)	581 (5.1)	578 (3.4)	579 (4.0)
Taipei	563 (3.6)	562 (3.4)	589 (4.3)	579 (4.6)	568 (3.6)	571 (3.8)
International average	476 (0.6)	473 (0.6)	474 (0.6)	474 (0.6)	468 (0.6)	480 (0.6)
Participating Country	Earth Science		Environmental Science		Science (Overall)	
	Girls	Boys	Girls	Boys	Girls	Boys
Indonesia	424 (4.2)	438 (4.2)	451 (4.1)	457 (4.0)	415 (3.9)	426 (4.6)
Korea	527 (2.0)	552 (2.4)	538 (2.0)	548 (1.7)	552 (2.1)	564 (1.9)
Malaysia	494 (4.6)	510 (3.9)	509 (3.6)	516 (3.8)	505 (4.3)	515 (4.0)
Philippines	376 (6.0)	377 (7.4)	410 (5.4)	394 (6.0)	380 (5.9)	374 (6.4)
Singapore	542 (4.1)	556 (4.4)	566 (3.7)	569 (4.5)	576 (4.0)	579 (5.0)
Taipei	542 (3.2)	554 (3.9)	561 (3.5)	558 (3.2)	571 (3.8)	572 (3.8)
International average	466 (0.6)	482 (0.6)	472 (0.6)	476 (0.6)	471 (0.7)	477 (0.7)

Source: Clarissa David, Jose Ramon Albert, and Sheryl Lyn Carreon-Monterola. (December 2009). In pursuit of sex parity: Are girls becoming more educated than boys? Policy Notes. Philippine Institute for Development Studies.

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Table 5: Female-Male Ratio of Population 5 years old and older by education level (1970, 1980, 2000)

	1970	1980	2000
No grade	133.4	113.4	96.1
Pre school			96.5
Elementary			
1-4	105.8	93.6	87.6
5-6	104.8	109.2	100.0
High School			
Undergraduate	81.2	97.5	101.3
Graduate	65.0	85.0	102.9
Post High			
Undergrad			80.2
Grad			100.2
College			
Undergraduate	69.4	96.5	1.123
Degree	100.2	131.7	1.375
Post			1.393
Not stated		1.236	1.000
Total Male			33.467
Total Female			33.199

Source: Philippine Population Census

Table 6: Reasons for not attending school, by sex and age group, 2008 (%)

Reasons for not attending school	Age 6-12		Age 13-17		Age 18-24	
	Male	Female	Male	Female	Male	Female
Schools are far/No school within barangay	6.7	7.0	2.0	2.7	0.8	0.7
No regular transportation	0.5	0.9	0.3	0.8	0.3	0.1
High cost of education	11.8	12.3	28.2	37.5	22.0	18.8
Illness/Disability	8.9	8.7	3.2	3.8	1.7	1.6
Housekeeping	0.8	1.7	0.9	6.4	0.6	8.8
Employment/Looking for work	1.0	0.3	14.5	13.8	32.4	22.6
Lack of personal interest	40.2	28.6	46.2	23.3	23.7	7.9
Cannot cope with school work	3.1	2.6	1.8	1.3	0.7	0.4
Finished schooling	-	-	0.1	0.2	8.6	15.4
Others	27.0	38.0	2.8	10.3	9.1	23.9
TOTAL	100	100	100	100	100	100

Source: Annual Poverty Incidence Survey (2008)

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Table 7: Share to total enrolment in public and private HEIs

Public and Private (Female)								
Discipline Group	Enrolment					Share of Female Enrollees to Total	Share of Female Graduates to Total	
	2005/06	2006/07	2007/08	2008/09	2009/10	2009/10	2009/10	2009/10
GENERAL	0.75	0.61	1.33	0.52	0.57	61.31		58.83
EDUCATION SCIENCE AND TEACHER TRAINING	19.52	17.11	17.50	16.51	17.18	73.96		73.29
FINE AND APPLIED ARTS	0.31	0.33	0.45	0.48	0.53	48.11		48.67
HUMANITIES	1.04	1.04	1.13	1.09	1.03	55.80		53.83
RELIGION AND THEOLOGY	0.11	0.11	0.11	0.12	0.10	21.23		15.74
SOCIAL AND BEHAVIORAL SCIENCES	3.04	3.08	3.29	3.25	3.32	65.62		64.39
BUSINESS ADMINISTRATION AND RELATED	24.19	24.78	25.93	27.78	29.81	62.37		62.71
LAW AND JURISPRUDENCE	0.62	0.53	0.60	0.61	0.61	45.68		45.79
NATURAL SCIENCE	1.09	1.04	1.09	0.99	0.99	61.97		64.76
MATHEMATICS	0.47	0.62	0.50	0.58	0.47	58.37		58.15
IT-RELATED	8.76	8.39	9.17	9.79	11.04	47.99		52.59
MEDICAL AND ALLIED	27.44	28.87	25.73	24.72	20.22	69.56		69.59
TRADE, CRAFT AND INDUSTRIAL	-0.00	0.30	0.15	0.11	0.11	42.81		46.41
ENGINEERING	5.67	5.33	5.55	5.51	5.82	25.59		25.19
ARCHITECTURAL AND TOWN-PLANNING	0.42	0.39	0.49	0.44	0.48	35.36		35.56
AGRICULTURAL, FORESTRY, AND FISHERIES	2.25	2.00	1.95	2.10	1.87	47.57		48.14
HOME ECONOMICS	0.36	0.34	0.29	0.28	0.28	81.61		86.97
SERVICE TRADES	0.81	1.11	1.31	1.41	1.89	78.78		74.33
MASS COMMUNICATION AND DOCUMENTATION	1.22	1.52	1.38	1.45	1.49	72.73		68.35
OTHER DISCIPLINES	1.78	2.45	1.91	2.10	2.13	27.53		25.59
MARITIME	0.14	0.04	0.15	0.15	0.06	1.10		0.72
Total	100.00	100.00	100.00	100.00	100.00	54.68		57.44

Public and Private (Male)								
Discipline Group	Enrolment					Share of Male Enrollees to Total	Share of Male Graduates to Total	
	2005/06	2006/07	2007/08	2008/09	2009/10	2009/10	2009/10	2009/10
GENERAL	1.10	1.01	1.33	0.52	0.44	38.69		41.17
EDUCATION SCIENCE AND TEACHER TRAINING	8.64	7.55	9.74	7.48	7.30	26.04		26.71
FINE AND APPLIED ARTS	0.63	0.63	0.53	0.57	0.69	51.89		51.33
HUMANITIES	1.04	0.99	1.07	1.06	0.99	44.20		46.17
RELIGION AND THEOLOGY	0.50	0.58	0.52	0.51	0.44	78.77		84.26
SOCIAL AND BEHAVIORAL SCIENCES	2.03	2.01	2.15	2.15	2.10	34.38		35.61
BUSINESS ADMINISTRATION AND RELATED	18.03	18.65	19.68	21.12	21.70	37.63		37.29
LAW AND JURISPRUDENCE	0.92	0.80	0.79	0.89	0.87	54.32		54.21
NATURAL SCIENCE	0.72	0.71	0.77	0.71	0.73	38.03		35.24
MATHEMATICS	0.39	0.49	0.46	0.54	0.40	41.63		41.85
IT-RELATED	10.99	11.16	12.24	13.44	14.43	52.01		47.41
MEDICAL AND ALLIED	15.78	16.96	14.55	13.74	10.67	30.44		30.41
TRADE, CRAFT AND INDUSTRIAL	-0.00	0.48	0.30	0.24	0.17	57.19		53.59
ENGINEERING	20.57	20.11	19.10	20.11	20.42	74.41		74.81
ARCHITECTURAL AND TOWN-PLANNING	1.23	1.13	1.01	0.98	1.05	64.64		64.44
AGRICULTURAL, FORESTRY, AND FISHERIES	2.96	2.62	2.48	2.78	2.49	52.43		51.86
HOME ECONOMICS	0.06	0.07	0.07	0.07	0.08	18.39		13.03
SERVICE TRADES	0.23	0.35	0.41	0.56	0.61	21.22		25.67
MASS COMMUNICATION AND DOCUMENTATION	0.64	0.71	0.70	0.70	0.67	27.27		31.65
OTHER DISCIPLINES	7.09	8.45	6.59	6.55	6.78	72.47		74.41
MARITIME	6.43	4.55	5.52	5.28	6.97	98.90		99.28
Total	100.00	100.00	100.00	100.00	100.00	45.32		42.56

Source: CHED

Table 7.1: Number of Schools and Enrollment by level (1945-46 to 2009-10)

	Number of Schools						Enrollment (in thousands)		
	Primary	% Public	Secondary	% Public	Tertiary	% Public	Primary	Secondary	Tertiary
1945-46	13,483	84.6	448	23.7	115(5)	4.5			
1950-51	23,096	96	1,496	23	426(15)	3.5	3,936	577	205 (HE)
1960-61	31,059	95.3	1,756	22.5	384(45)	11.8	4,198	604	259 (HE)
1970-71	23,804	95.9	4,111	51.6	828(116)		6,969	1,719	595 (TE)
1980-81	31,455	96.2	5,156	61.3	1,084(309)	28.2	8,290	3,019	1,084 (TE)
1990-91	34,964	95.2	5,550	61.2	2,071(510)	24.6	10,427	4,034	1,347 (TE)
1994-95	35,671	91.6	6,069	60.7	2,457(522)		10,911	4,723	1,652 (TE)
2000-01	40,284		7,509		1,603		12,760	5,402	2,402 (HE)
2008-09	37,964		6,650		983 (HE)		13,569	6,610	2,625 (HE)
2009-10	38,176		7,016		1083 (HE)		12,789	5,417	2,771 (HE)

Source: Yearbook of Philippine Statistics

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Table 8: Employed to working-age population ratio and labor force participation rate

RATIO: EMPLOYED TO WORKING-AGE POPULATION (in %)
(Aged 15 & above)

MALE

Year	Total	No Grade	Elementary	Highschool	Some College	College Grad & over
1990	74.5	76.3	86.8	66.8	55.1	78.5
1995	73.4	77.4	86.1	66.0	55.5	75.6
2000	74.4	77.9	88.8	67.8	57.3	73.6
2008	70.2	72.7	82.4	67.2	56.3	67.4

FEMALE

Year	Total	No Grade	Elementary	Highschool	Some College	College Grad & over
1990	41.9	36.3	45.8	33.6	29.0	69.3
1995	41.6	35.2	45.0	34.6	31.0	68.2
2000	44.3	34.2	49.2	37.3	34.7	66.8
2008	44.0	38.6	48.6	38.1	34.9	64.4

LABOR FORCE PARTICIPATION RATE (in %)

MALE

Year	Total	No Grade	Elementary	Highschool	Some College	College Grad & over
1990	81.1	79.8	94.6	72.4	61.3	85.5
1995	79.2	81.5	92.5	71.2	60.9	82.7
2000	81.9	81.1	94.1	76.1	66.2	84.9
2008	78.2	77.7	87.7	75.9	65.8	79.1

FEMALE

Year	Total	No Grade	Elementary	Highschool	Some College	College Grad & over
1990	46.2	38.9	50.0	37.3	33.8	76.7
1995	45.1	36.3	48.3	38.0	35.0	73.6
2000	48.7	38.3	52.1	41.9	39.6	74.1
2008	48.6	41.7	51.0	42.8	40.5	71.3

Source: National Statistics Office – Labor Force Surveys (January)

Table 9: Share in Gross Domestic Product of Production Sectors, Philippines (%)

Sector and Subsector	1970	1980	1990	2000	2006
Agriculture, fisheries, forestry	29.5	25.1	21.9	15.8	14.2
a. Mining and Quarrying	2.1	2.2	1.5	0.6	1.3
b. Manufacturing	24.9	25.7	24.8	22.2	22.9
Food manufactures	9.6	9.0	10.4	9.5	10.8
Textile manufactures	1.1	1.4	0.9	0.3	0.3
c. Construction	4.1	9.3	6.0	6.5	3.9
d. Electricity, gas, water	0.8	1.6	2.1	2.9	3.6
Services	38.6	36.1	43.6	52.0	54.2
Land & water transport	-	2.9	2.9	3.0	3.2
a. Trade	9.7	12.2	14.4	14.1	14.5
b. Finance	3.0	3.9	3.9	4.4	5.2
c. Private Services	7.4	5.3	7.5	11.4	13.8
Education	1.1	0.8	1.0	2.3	2.6
Personal	2.0	1.0	2.1	2.9	2.9
d. Government services	6.7	4.9	7.2	9.5	7.5

Source: National Statistics Coordination Board (various years)

**Table 10: Average annual growth rate of employment, by sex and occupation
1991-2000**

OCCUPATION		1994-1997	1997-2000	2004-2006	2006-2008
Professional, technical and related workers	M	6.4	11.6	-4.8	-1.7
	F	6.7	13.5	-4.8	-1.2
Administrative, executive, and managerial workers	M	10.7	15	2.2	-0.3
	F	16.3	17.8	2.7	0.9
Clerical and related workers	M	5.9	9.2	-3.9	3.5
	F	7.9	10	-5.4	0.4
Sales workers	M	8.7	13.3	-1	1
	F	8.1	11.8	-4.5	1.6
Service workers	M	9.1	14.3	-1.1	-0.9
	F	4.4	10.5	-2.3	0.2
Agricultural, animal husbandry, and forestry workers, fishermen, and hunters	M	5.1	8.2	7.8	0.5
	F	6.4	8.7	8	2.4
Production and related workers, transport and equipment operators	M	8.2	11.6	-1.9	-1.5
	F	4.8	8.1	-2.5	-3
Workers not classified by occupation	M	6	22.3	17.7	21.1
	F	8.8	17.2	8	19.2
Members of the Armed Forces	M	0.6	4.1	0.7	-4.7
	F	27.3	10.6	4.2	-9.7
TOTAL	M	6.7	10.4	2.6	-0.3
	F	6.6	10.5	0.2	0.6

Source: Labor Force Surveys

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Table 11: Share to Total: Deployed Land-based Overseas Filipino Workers by Major Occupational Category, New Hires (in percent)

Major Occupational Group	2004	2010
Professional, Medical, Technical and Related Workers	33.4	12.3
Administrative and Managerial Workers	0.2	0.4
Clerical Workers	1.9	3.1
Sales Workers	1.4	2.1
Service Workers	40.3	45.4
Agricultural Workers	0.2	0.3
Production Workers	22.6	35.5
Others	0.0	0.8
Total	100	100

Source: POEA

Table 12: Number of Deployed Landbased Overseas Filipino Workers by Top Ten Occupational Categories and Sex, New Hires, 2010

All Occupational Categories	Male	Female	Both Sexes	Share to Both Sexes	
				Male	Female
Household Service Workers	1,703	94,880	96,583	1.8	98.2
Charworkers, Cleaners and Related Workers	2,612	9,521	12,133	21.5	78.5
Nurses Professional	1,828	10,254	12,082	15.1	84.9
Caregivers and Caretakers	543	8,750	9,293	5.8	94.2
Waiters, Bartenders and Related Workers	4,393	4,396	8,789	50.0	50.0
Wiremen and Electrical Workers	8,576	30	8,606	99.7	0.3
Plumbers and Pipe Fitters	8,391	16	8,407	99.8	0.2
Welders and Flame-Cutters	5,037	22	5,059	99.6	0.4
Housekeeping and Related Service Workers	701	4,098	4,799	14.6	85.4
Bricklayers, Stonemasons and Tile Setters	4,478	29	4,507	99.4	0.6
Total	38,262	131,996	170,258	22.5	77.5

Source: POEA

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Table 13: Male-female ratio in industries

Industry	2001	2002	2003	2006	2008
Agricultural, Forestry, Fishery and Related Laborers	1.86	1.56	1.59	1.54	1.58
Animal Products	0.82	0.79	0.77	0.75	0.60
Armed Forces	26.90	35.14	88.33	50.20	58.75
Corporate Executives and Specialized Managers	1.23	1.37	1.25	1.24	1.05
Customer Services Clerks	0.61	0.64	0.63	0.54	0.58
Drivers and Mobile Plant Operators	105.72	132.26	127.44	106.02	84.64
Farmers and Other Plant Growers	4.74	5.98	6.12	7.24	7.40
Fishermen	14.93	15.74	13.61	19.50	25.63
Forestry and Related Workers	2.61	3.35	5.11	5.50	7.13
General Managers or Managing-Proprietors	0.49	0.61	0.60	0.61	0.62
Hunters and Trappers					
Laborers in Mining, Construction, Manufacturing, and Transport	9.52	6.96	6.78	5.27	5.92
Life Science and Health Associate Professionals	0.29	0.34	0.39	0.40	0.31
Life Science and Health Professionals	0.37	0.48	0.33	0.29	0.43
Machine Operators and Assemblers	1.31	1.17	1.21	1.16	1.25
Metal, Machinery, and Related Trade Workers	17.09	18.42	16.67	27.27	32.65
Mining, Construction, and Related Trade Workers	55.21	60.68	70.69	69.97	76.20
Models, Salespersons, Demonstrators	0.51	0.57	0.58	0.59	0.62
Office Clerks	0.45	0.50	0.47	0.58	0.56
Officials of Government and Special Interest Organizations	1.85	2.11	1.73	2.17	1.71
Other Craft and Related Trade Workers	0.63	0.61	0.56	0.63	0.68
Other Professionals	0.83	0.90	0.91	0.85	0.73
Personal and Protective Service Workers	1.54	1.62	1.62	1.55	1.50
Physical Science and Engineering Associate Professionals	3.39	3.27	2.58	2.80	2.89
Physical, Mathematical, and Engineering Science Professionals	2.87	2.65	2.69	3.16	2.84
Precision, Handicraft, Printing and Related Trades Workers	1.55	1.59	1.62	2.40	2.15
Related Associate Professionals	0.96	1.04	0.9	1.13	0.97
Sales and Services Elementary Occupations	0.50	0.49	0.52	0.52	0.52
Stationary Plant and Related Operators	4.11	6.07	7.48	10.75	9.77
Supervisors	1.69	1.82	1.82	1.62	1.47
Teaching Associate Professionals	0.32	0.38	0.25	0.27	0.38
Teaching Professionals	0.24	0.24	0.24	0.25	0.26
Workers reporting occupations unidentifiable or inadequately defined	1.78	1.97		2.66	2.50

Source: Labor Force Surveys

Table 14: Women aged 20-29 and 30-39 by education and education of their husbands, 2006 (%)**Aged 20-29**

	Husband's Education					
Woman's Education	No grade completed	Elementary level/graduate	High School level/graduate	College undergraduate	College graduate & higher	Total
No grade completed	55.00	41.25	3.75	0.00	0.00	100
Elementary level/graduate	3.79	65.16	27.36	3.42	0.28	100
High School level/graduate	0.33	27.76	57.85	10.81	3.26	100
College undergraduate	0.00	8.39	40.41	38.53	12.67	100
College graduate & higher	0.00	5.75	22.70	27.87	43.68	100
Total	2.17	33.08	43.76	13.94	7.05	100

Aged 30-39

	Husband's Education					
Woman's Education	No grade completed	Elementary level/graduate	High School level/graduate	College undergraduate	College graduate & higher	Total
No grade completed	47.59	43.85	6.95	1.60	0.00	100
Elementary level/graduate	3.13	67.37	25.90	2.97	0.63	100
Highschool level/graduate	0.20	26.92	58.15	11.53	3.21	100
College undergraduate	0.32	9.60	34.52	38.17	17.38	100
College graduate & higher	0.09	4.44	22.20	25.40	47.87	100
Total	1.97	33.25	40.59	14.33	9.85	100

Source: Merged FIES 2006-LFS (January) 2007 dataset

APPENDIX: TABLES AND FIGURES

Table 15: Results of Ordinary Least Squares

	Full Sample		Married		Single	
<i>Dep var: log(quarterly basic pay)</i>	Males	Females	Males	Females	Males	Females
Years of education	0.3523 ***	0.4110 ***	0.3301 ***	0.3862 ***	0.5268 ***	0.6054 ***
Experience	0.3923 ***	0.3173 ***	0.3690 ***	0.3083 ***	0.3306 ***	0.1634 ***
Experience_squared	-0.0054 ***	-0.0040 ***	-0.0051 ***	-0.0042 ***	-0.0045 ***	-0.0017 ***
Luzon	-0.1189 ***	-0.0693 ***	-0.1816 ***	-0.2026 ***	-0.0735 ***	-0.0512 **
Visayas	-0.1394 ***	-0.1029 ***	-0.2500 ***	-0.2679 ***	-0.0414	-0.0448 *
Mindanao	-0.1502 ***	-0.1161 ***	-0.2310 ***	-0.2878 ***	-0.0793 ***	-0.0508 **
Manufacturing	-0.0437 **	0.1125 ***	0.0382	0.0649	0.0323	0.0636 **
Trans, Comm, Storage	-0.0790 ***	-0.0650 ***	-0.1893 ***	-0.1905	-0.0045	-0.0723
Trade	-0.0618 ***	0.0401 ***	-0.0078	-0.1915 ***	-0.0215	0.0188
Community Services, etc.	-0.3469 ***	-0.1234 ***	-0.5367 ***	-0.5928 ***	-0.1138 ***	-0.1003 ***
Married	0.1922 ***	0.0398 ***				
Marrydown	-0.0128	-0.1175 ***	-0.2041 ***	-0.2880 ***		
constant	0.3201 ***	0.1324 ***	1.2879 ***	1.3538 ***	0.1117 ***	0.1009 ***

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

Table 16: Results of Quantile Regression

Quantile Regression (Full Sample)	Q10		Q25		Q50		Q75		Q90	
<i>Dep var: log(quarterly basic pay)</i>	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Years of education	0.2187 ***	0.3329 ***	0.2159 ***	0.3030 ***	0.2702 ***	0.3213 ***	0.3669 ***	0.4505 ***	0.4035 ***	0.5082 ***
Experience	0.4562 ***	0.3272 ***	0.4888 ***	0.3797 ***	0.4877 ***	0.4022 ***	0.4226 ***	0.3307 ***	0.3627 ***	0.3116 ***
Experience_squared	-0.0071 ***	-0.0048 ***	-0.0076 ***	-0.0057 ***	-0.0074 ***	-0.0058 ***	-0.0059 ***	-0.0040 ***	-0.0047 ***	-0.0034 ***
Luzon	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2917 ***	-0.0654
Visayas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2917 ***	-0.0654
Mindanao	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2917 ***	-0.0654
Manufacturing	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0190	0.1672 ***	0.0890
Trans, Comm, Storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2170 **	-0.1126 *	-0.5459 ***
Trade	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2170 **	-0.0273	-0.1930
Community Services, etc.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.2170 **	-0.1126	-0.5459 ***
Married	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6483 ***	0.2631 ***	1.6762 ***	0.6270 ***
Marrydown	-0.1673 ***	-0.1648 ***	-0.1827 ***	-0.1318 ***	-0.1344 ***	-0.1189 ***	0.2132	-0.1044 *	0.8661 ***	0.0660
constant	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2170 **	0.4043 ***	0.6112 ***

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

Quantile Regression (Married)	Q10		Q25		Q50		Q75		Q90	
<i>Dep var: log(quarterly basic pay)</i>	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Years of education	0.2142 ***	0.3346 ***	0.2133 ***	0.3036 ***	0.2671 ***	0.3321 ***	0.2360 ***	0.3653 ***	0.1582 ***	0.2323 ***
Experience	0.4646 ***	0.3438 ***	0.4956 ***	0.4063 ***	0.4888 ***	0.4133 ***	0.2133 ***	0.2613 ***	0.1136 ***	0.0999 ***
Experience_squared	-0.0073 ***	-0.0053 ***	-0.0078 ***	-0.0065 ***	-0.0075 ***	-0.0065 ***	-0.0030 ***	-0.0035 ***	-0.0015 ***	-0.0012 ***
Luzon	0.0000	0.0000	-0.0070	0.0000	-0.0672	0.0000	-0.2098 ***	-0.3071 ***	-0.2421 ***	-0.3108 ***
Visayas	-0.0071	0.0000	-0.0070	0.0000	-0.1066 **	0.0000	-0.2850 ***	-0.3787 ***	-0.3521 ***	-0.4352 ***
Mindanao	-0.0312	0.0000	-0.0070	0.0000	-0.1066 **	0.0000	-0.2647 ***	-0.4148 ***	-0.3427 ***	-0.4030 ***
Manufacturing	0.0000	0.0000	0.0000	0.0000	0.0220	0.1070	0.1124 ***	0.0398	0.1442 ***	0.1655 ***
Trans, Comm, Storage	0.0000	0.0000	0.0000	0.0000	-0.1219 **	-0.1323	-0.1164 **	0.0022	0.0392	0.0978
Trade	0.0000	0.0000	0.0000	0.0000	-0.0553	-0.4223 ***	0.0510	-0.2166 *	0.0743	-0.0529
Community Services, etc.	0.0000	0.0000 **	-0.0070	0.0000	-0.1613 ***	-0.5233 ***	-0.3743 ***	-0.7439 ***	-0.0357	-0.2347 ***
Marrydown	-0.1968 ***	-0.2240 ***	-0.2190 ***	-0.2267 ***	-0.2636 ***	-0.2944 ***	-0.1858 ***	-0.3163 ***	-0.1005 ***	-0.2181 ***
constant	0.0000	0.0000 **	0.0070	0.0000	0.2284 ***	0.5233 ***	5.0410 ***	3.1559 ***	7.3805 ***	6.7016 ***

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

APPENDIX: TABLES AND FIGURES

Quantile Regression (Single Males)	Q10	Q25	Q50	Q75	Q90
<i>Dep var: log(quarterly basic pay)</i>					
Years of education	0.3681 ***	0.4190 ***	0.5370 ***	0.6284 ***	0.6703 ***
Experience	0.3621 ***	0.3893 ***	0.3477 ***	0.3573 ***	0.4105 ***
Experience_squared	-0.0061 ***	-0.0067 ***	-0.0052 ***	-0.0044 ***	-0.0049 ***
Luzon	0.0000 *	0.0000	0.0000	0.0000	0.0000
Visayas	0.0000 **	0.0000	0.0000	0.0000	0.0000
Mindanao	0.0000 *	0.0000	0.0000	0.0000	0.0000
Manufacturing	0.0000	0.0000	0.0000	0.0000	0.0000
Trans, Comm, Storage	0.0000	0.0000	0.0000	0.0000	0.0000
Trade	0.0000	0.0000	0.0000	0.0000	0.0000
Community Services, etc.	0.0000	0.0000	0.0000	0.0000	0.0000
constant	0.0000 *	0.0000	0.0000	0.0000	0.0000

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

[Convergence not achieved in quantile regression among single females.]

Table 17: Results of Semiparametric Additive Model Estimation

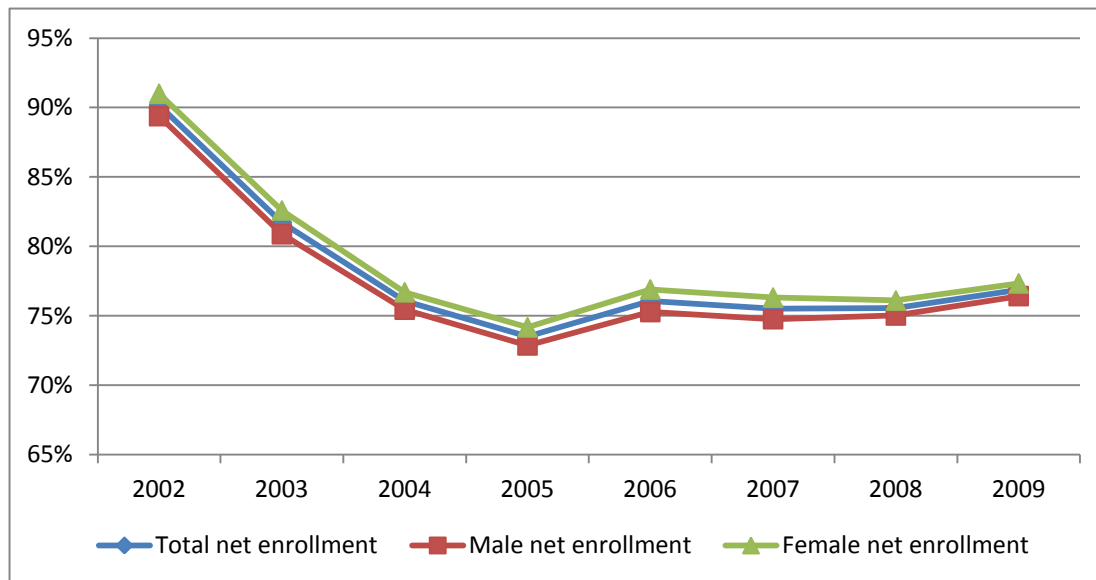
	Males	Females
<i>log of quarterly basic pay</i>		
intercept	3.921851 ***	2.168562 ***
Years of education (EDF)	5.968 ***	5.964 ***
Experience (EDF)	8.979 ***	8.987 ***
<i>Parametric component of SAM</i>		
Luzon	-0.36055 ***	-0.35735 ***
Visayas	-0.60496 ***	-0.61389 ***
Mindanao	-0.50444 ***	-0.51588 ***
Manufacturing	0.29038 ***	0.33712 ***
Transportation	0.3241 ***	0.30543 ***
Trade	0.18685 ***	0.16013 ***
Commercial Services	0.23862 ***	0.24641 ***
Marry down	-0.13195 ***	-0.15459 ***
Constant	9.70615 ***	9.704 ***

EDF=defines the number of observations by the error degrees of freedom(approximate significance of smooth terms)

*** - significant at 1%, ** - significant at 5%, * - significant at 10%

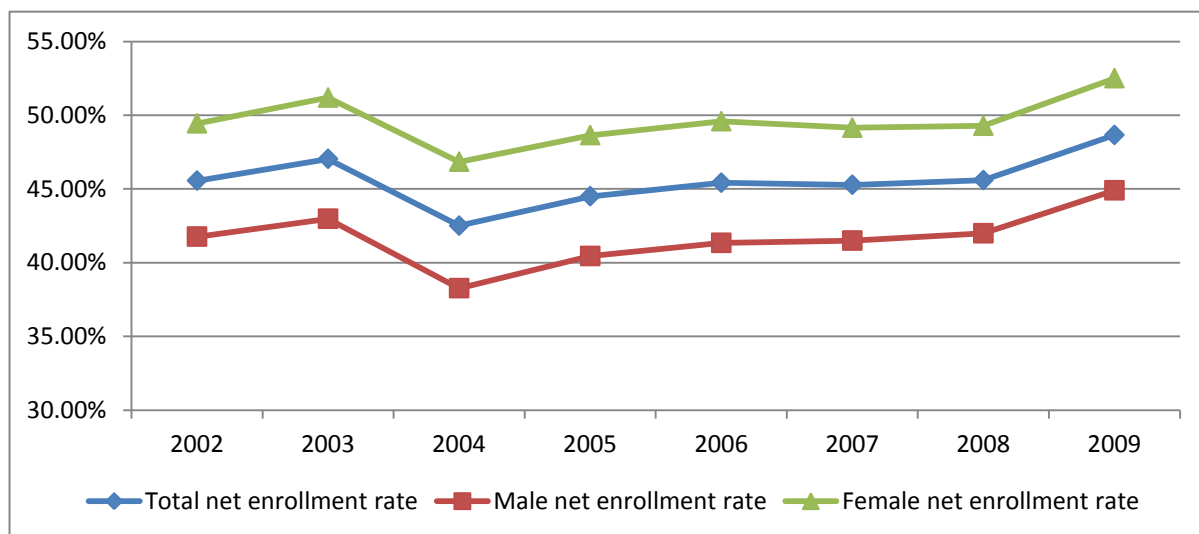
Figures

Figure 1 – Net enrollment rate in public elementary schools



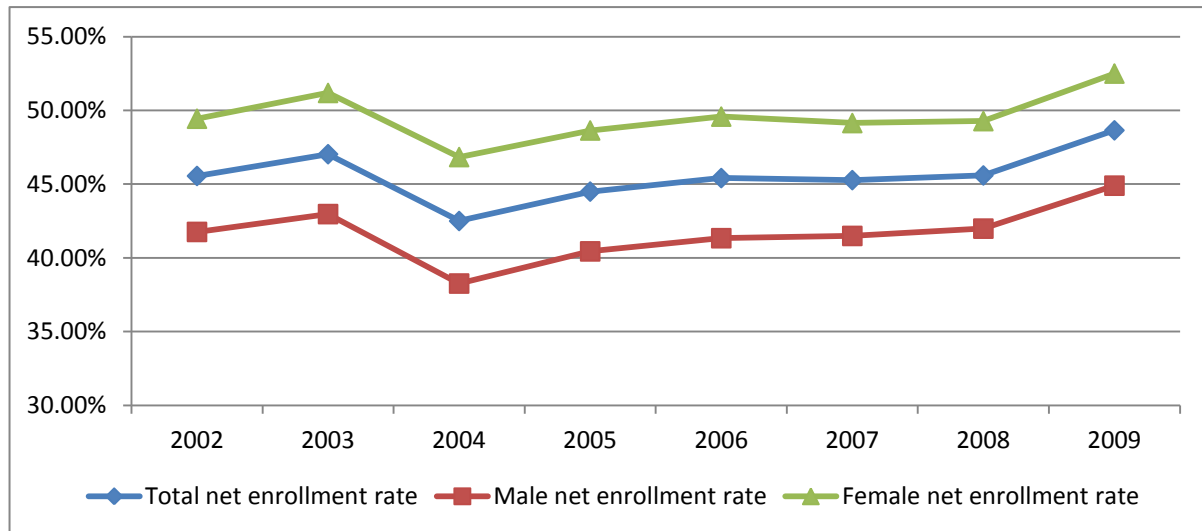
Source: BEIS, DepEd

Figure 2 – Net enrollment in public secondary schools



Source: BEIS, DepEd

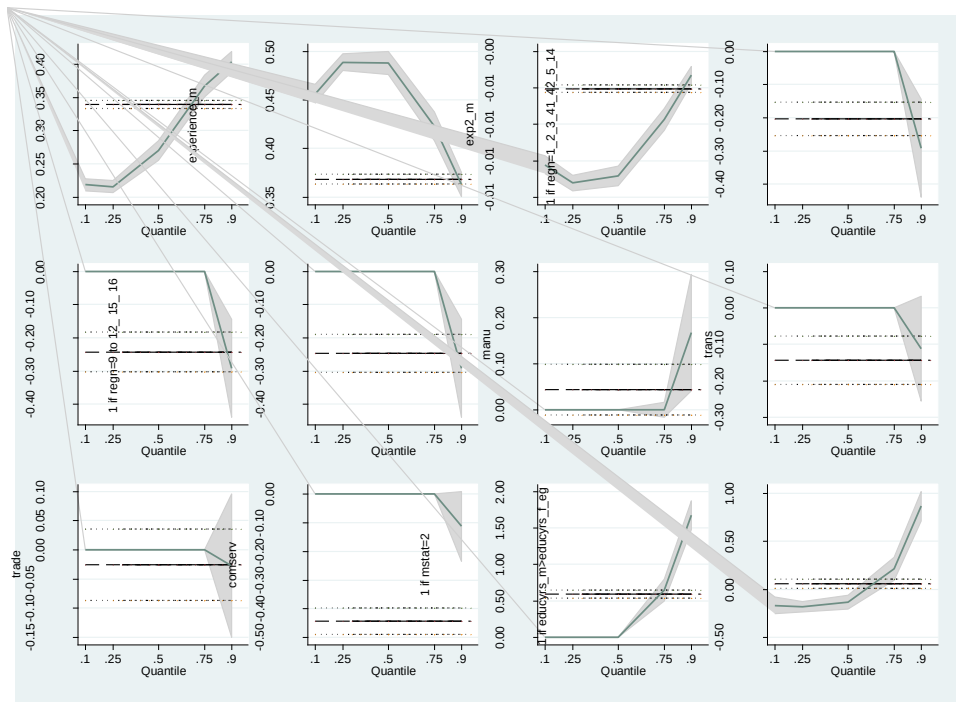
Figure 3 – Enrollment in public and private tertiary schools, by sex



Source: Commission on Higher Education

Figure 4: Quantile Regression Plots for Full Sample

(a) Males



(b) Females

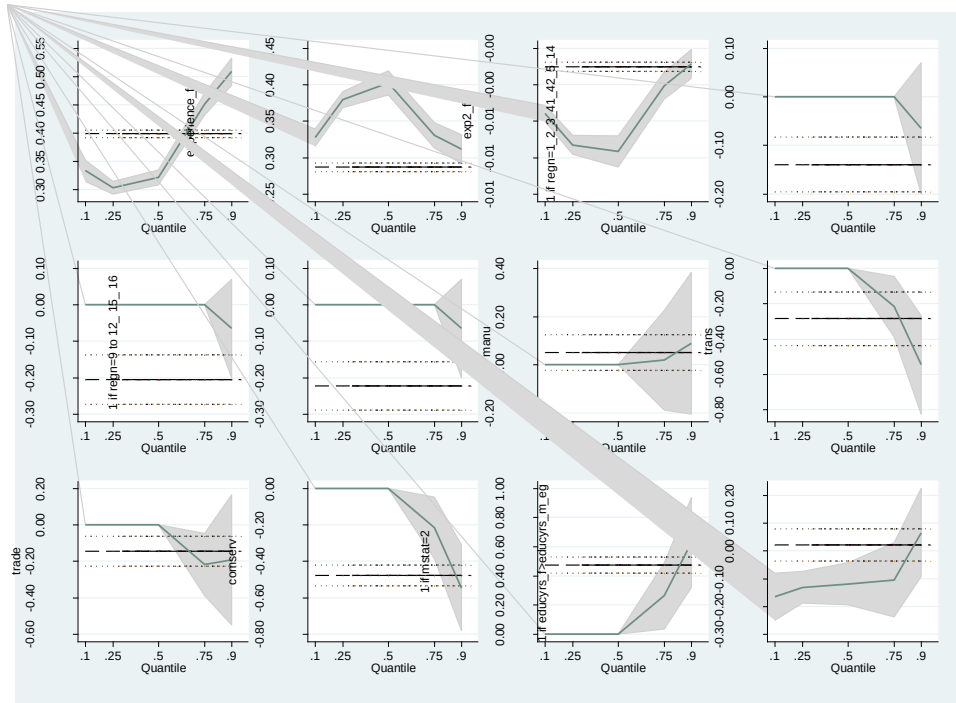
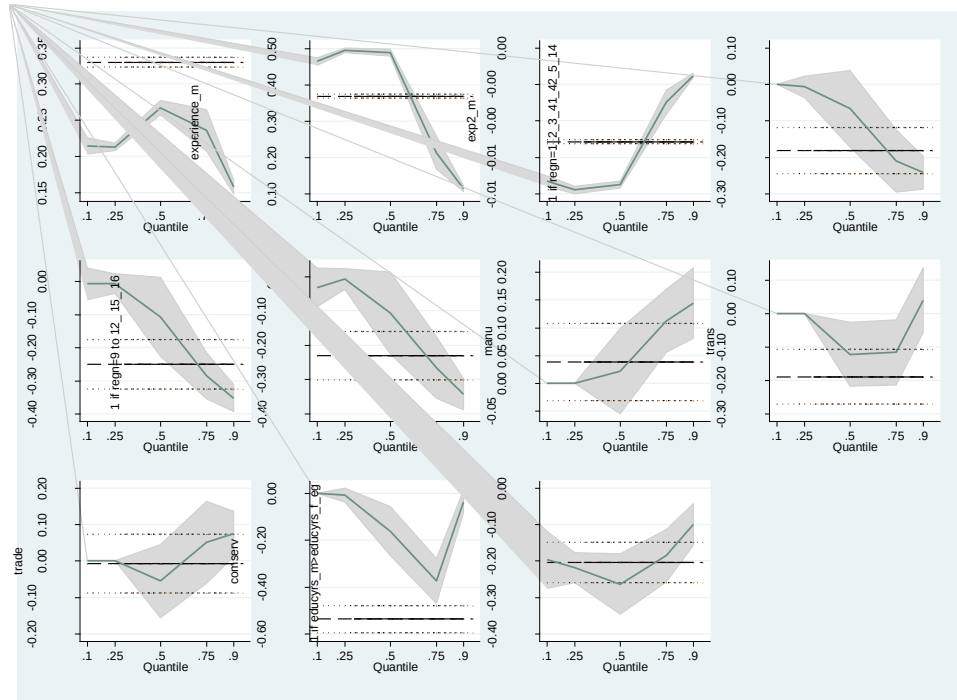


Figure 5: Quantile Regression Plots of Married Persons

(a) Males



(b) Females

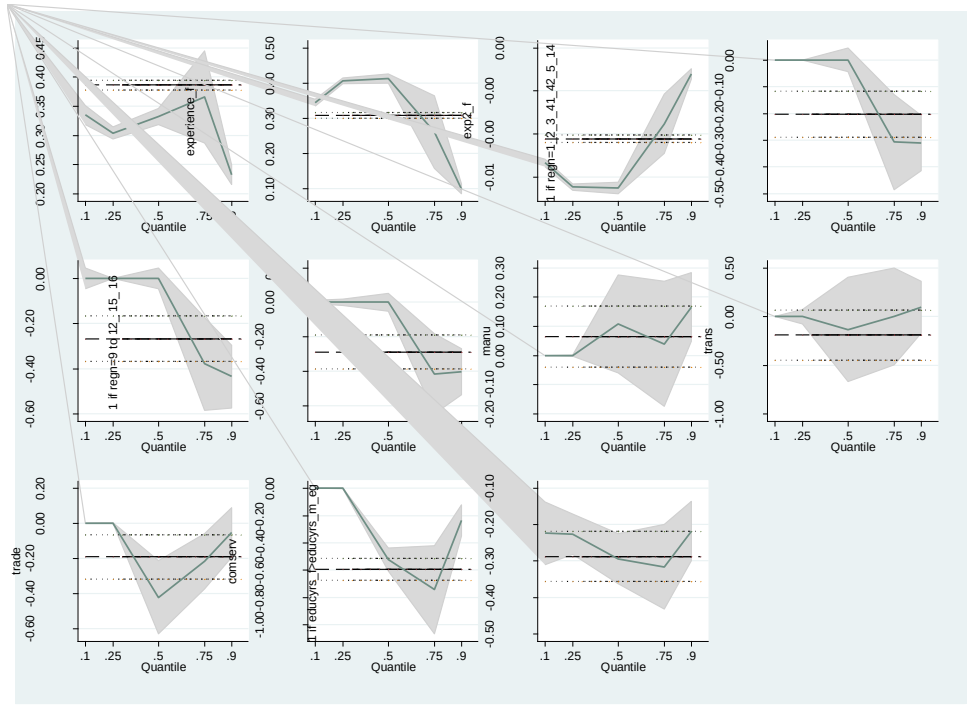


Figure 6: Quantile Regression Plots of Single Persons

(a) Males

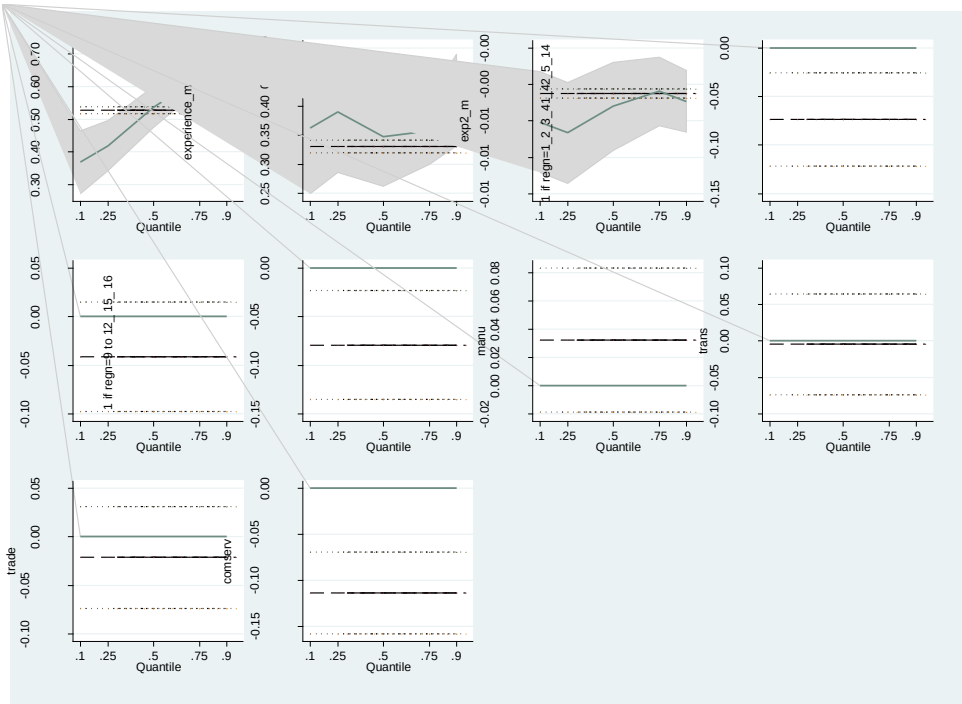
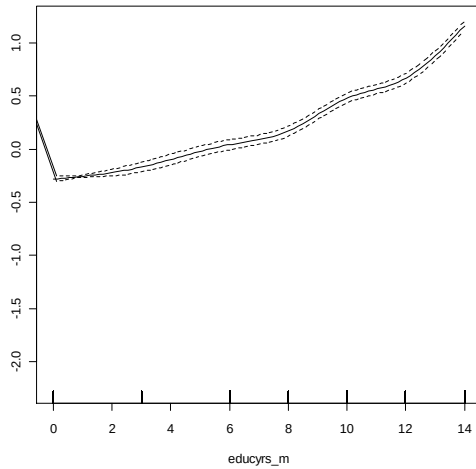


Figure 7: Semiparametric Additive Model Estimation – Years of education vs. $\ln(\text{quarterly basic pay})$

(a) Males



(b) Females

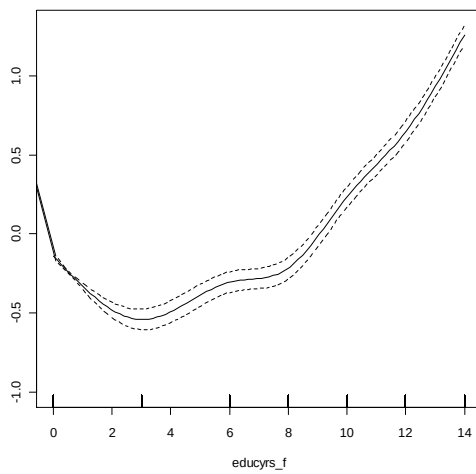
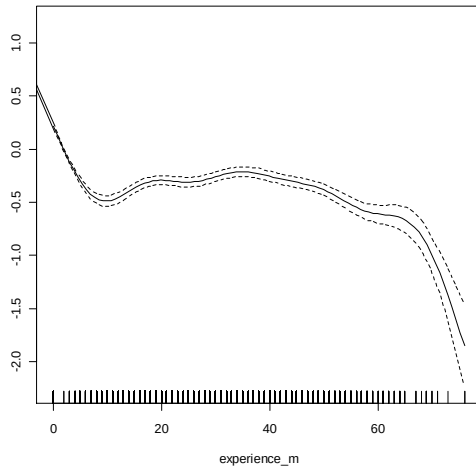


Figure 8: Semiparametric Additive Model Estimation – Experience vs. $\ln(\text{quarterly basic pay})$

(a) Males



(b) Females

