

**GENERAL OR VOCATIONAL?
EVIDENCE ON SCHOOL CHOICE, RETURNS, AND
“SHEEP SKIN” EFFECTS FROM EGYPT 1998***

Fatma El-Hamidi

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Send correspondence to: Fatma El-Hamidi, University of Phoenix, Monroeville, USA, Fax:
412-372-5324, Email: fatma@pitt.edu

Abstract

The debate on the relative benefits of upper secondary vocational education and of general education is still going. While this area of research has been very active in the United States and industrialized countries in recent years, empirical work in the Middle East countries still lacking. This study adds new evidence to that debate. The paper identifies factors that influence an individual's choice between vocational and general education in Egypt as well as the relative returns between them and beyond secondary levels. Using an ordered logit model, the study finds that an individual from a well educated family is more likely to undertake general education. The presence of young siblings in the household motivates the parents to send their daughters to vocational schooling, but not their sons. After correcting for self-selection, the study also finds vocational education to offer higher returns (earnings) than general secondary education does for men, but not for women. Sheepskin effect was also evident for men but not for women.

ملخص

لازال النقاش حول مزايا التعليم الثانوي المهني وتلك الخاصة بالتعليم العام دائراً. وبما نشط هذا المجال البحثي في الولايات المتحدة والدول الصناعية في السنوات الأخيرة، إلا أن العمل التجريبي في الشرق الأوسط مازال ناقصاً. وتضيف هذه الدراسة أدلة جديدة لذلك النقاش. إذ تقوم هذه الورقة البحثية بتحديد العوامل التي تؤثر على اختيار الفرد بين التعليم المهني والعام في مصر، بالإضافة إلى العائد بينهما وفيما بعد المراحل الثانوية. وباستخدام نموذج logit منظم، توصلت الدراسة إلى أن الأفراد من الأسر ذات المستوى الأعلى من التعليم عادة ما يختار التعليم العام. كما أن وجود الأطفال الصغار في الأسرة يحفز أولياء الأمور على إرسال بناتهم وليس أبنائهم لتلقي التعليم المهني. وبعد التعديل للإنتقاء الذاتي، وجدت الدراسة أيضاً أن التعليم المهني يعطي عوائد (دخول) أعلى من التعليم الثانوي العام للذكور، ولكن ليس للإناث. كما وضح تأثير الشهادة بالنسبة للذكور وليس للإناث.

1. Introduction

There is no doubt the need for quality technicians and a skilled workforce is crucial to sustainable industrial development, and a key determinant of a country's international competitiveness in a rapidly globalizing world economy. The competitive advantages of a country and its potential for modernization are directly related to the size of accumulated human capital. People, with their education, skills and experience, determine the opportunities of economic growth.

It is well documented in the literature that while tertiary skills are important for growth in developed countries, it is primary and secondary education that are related to development in poorest and intermediate developing countries. Recently, development agencies have been promoting investment in basic and general education in the developing world, as opposed to vocational education, in order to ensure global labor market competitiveness. One reason for this trend is low rates of returns to vocational and technical education. Another is the high cost of that type of education. A third reason has been a weak relationship between vocational school graduates and the need of the labor market. For example, the World Bank has been trying to convince governments in developing countries that basic education should be their top priority and public expenditure on vocational education should be reduced drastically (Bennell and Segerstrom, 1998). The World Bank argues that vocational education and training in developing countries is best left to individuals, enterprises and private sector training institutions, with government interventions kept to a minimum.

The debate on the relative benefits of upper secondary vocational education and of general education continues. While this area of research has been very active in the United States and other industrialized countries in recent years, empirical work in Middle Eastern countries is still lacking. This study adds new evidence to that debate. The paper identifies factors that influence an individual's choice between vocational and general education in Egypt as well as the relative returns between them and beyond secondary levels.

Using an ordered logit model, the study finds that an individual from a well-educated family is more likely to undertake general education. After correcting for self-selection, the study also finds vocational education offers higher returns (earnings) than general secondary education for men, but not for women.

2. Literature Review

There are several approaches in researching education. A number of studies use Mincer's human capital earnings function (HCEF). This model is also the most commonly employed method in labor economics. In the human capital model, an individual invests time and forgone earnings in order to obtain higher future benefits, the discounting method is then used to calculate individual (private) rate of return. The HCEF is a simple regression model with a linear schooling term and a low-order polynomial in potential experience (Card, 1998). The methodology used in the human capital literature is useful for analyzing the role of education in the labor market. However, Mincer's earnings function has been criticized for not taking into consideration other important factors such as family background that are not typically available in wage data. Many of these factors are considered in the education production function approach.

A related model used to calculate educational attainment is the reduced-form estimation model. Studies implementing reduced-form models typically evaluate the influence of family and neighborhood characteristics on returns to education. They set educational attainment as a dependent variable and a number of family and neighborhood characteristics as independent

variables. Numerous studies find strong evidence that parental education has a significant effect on the child's returns to education (Haveman et al, 1991) and (Wilson, 2001).

Psacharopoulos showed that general secondary education offered higher social rates of return, largely because of the high unit cost of providing vocational education (Psacharopoulos, 1986, 1987, 1994). But a new wave of studies stresses the fact that the returns to vocational education depend substantially on the general level of economic development, the availability of private sector jobs and whether or not people are employed in a field related to their training (Bennell and Segerstrom, 1998; Middleton et al., 1993; Neuman and Ziderman, 1990, 1999). Others have shown substantial problems with Psacharopoulos' findings. Bennell, for example, shows that the social rates of return to vocational education are equal to or above those for general secondary education in a number of cases. He finds the methodologies Psacharopoulos uses to calculate the returns are incomparable, and that he excludes data from a number of studies that contradict his conclusions (Bennell, 1996a, b).

The literature on the production function approach to researching education views various school characteristics—specifically teacher salaries, class size, student/teacher ratio and expenditures per student—as inputs, and the educational attainments of individuals—specifically test scores, years of education and graduation rates—as outputs. Such an approach concentrates on the educational process itself and the educational attainment of an individual, (Wilson, 2001; Hanushek, 1986; Kremer, 1995; Greenwald, 1996). The major difference between the human capital model and the production function approach is that the latter does not consider the individual as a decision maker choosing his/her level of schooling. Instead, it evaluates different factors that affect the individual's educational attainment.

Many studies include family background in the models used to estimate returns to education. A number of research studies demonstrate that children who grow up in a low-income family typically have lower educational achievements and, subsequently, lower returns to education than children who grow up in a wealthy family (Haveman et al, 1991). They also find that the mother's education usually has a positive effect on educational returns of a child. Moreover, vast research on returns to education suggests that additional years of schooling increase the return to education. According to Altonji (1998), the wage level rises by 8 percent in response to each additional year of academic postsecondary education. In their study on estimating returns to education for a sample of twins, Ashenfelter and Krueger (1994) find each year of schooling increases wage rate by 12–16 percent. Even when they adjust for a measurement error, their estimates are not less than 9 percent per year of school completed (Ashenfelter and Krueger, 1994).

Another important variable often discussed in the literature is educational level. Years of education are important, but the fact that an individual spent 12 years in school does not necessarily mean that he or she received a high school diploma. For example, that person could have repeated one or more years. That is why it is important to study not only how years of education affect future earnings, but also how the educational level that an individual ultimately achieves affects his/her wages.

Cosca (2000) confirms the finding of many economists that, in general, employees with a bachelor's, master's, doctoral, or professional degree have higher average incomes and lower unemployment rates than do employees with less education. Hecker's (1992) study was done in the early 1990's and has similar results to those of Cosca. He proves that earnings rise with education level. Jaeger and Page (1996) estimate the returns to schooling and the "sheepskin" effect. The sheepskin effect reflects the difference in earnings due to the possession of a degree. The reason is simply that a diploma serves as a signal of productivity in the labor market, thus increasing the individual's potential earnings. Jaeger and Page demonstrate

strong evidence that diploma effects exist for all post-secondary degrees. An important test to this finding is to estimate the same model using years of schooling rather than educational dummies to find out if the labor market values degrees more than the equivalent years of schooling.

3. Overview of the Egyptian Education System

The education system in Egypt is four-tiered: Elementary; preparatory, secondary and high institutions and university. Elementary school (5 years) and preparatory school (3 years) are compulsory for all children between the ages 6-14. Upon completion of preparatory school and successfully passing the examinations, children receive a basic education certificate which permits admission to the secondary education level. (Figure 1).

Secondary education is comprised of a three-year general secondary education cycle, from which successful students can go on to study at post-secondary level, and a vocational secondary education cycle. There are two different types of courses at vocational secondary schools: 1- the three-year vocational secondary school leading to qualification as “Technician” for the three main sectors: industry, agriculture and commerce; and 2- the five-year advanced vocational/technical secondary school leading to qualification as “First Technician”. Table (1) shows enrollment in secondary and higher education between 1990 and 1995.

Vocational and technical secondary degrees are considered terminal degrees, whereas a general secondary degree is viewed as a route to college. Vocational and technical institutions are normally not free to choose the most competent students. The decision is set by politicians who decide that students who do not reach a particular limit in general education ought to go to vocational education. This, in turn, is reflected in lack of ability and lack of motivation in those students since they have failed the academic examination.

One of the main characteristics of the education system in Egypt is the long standing government responsibility to employ all graduates of tertiary education. This commitment extended in 1963 to cover vocational and technical education graduates. The policy has impacted the labor market well into 1990s.

During the 1970s, the government of Egypt expanded vocational secondary education, believing this would heal the urban youth unemployment problem¹. By the early 1980s, and throughout the 1990s, this idea manifested itself in the enrolment of almost 70 percent of preparatory graduates into vocational and technical secondary education (commercial, industrial, and agricultural). The main objective of this policy was to ease the pressure on university education, not to meet/match the demand on those skills. This policy resulted in deterioration of quality of both graduates and teachers due to low pay rates and outdated equipments.

4. Methodology

The research on returns to education is based on the work by Becker (1967) and Mincer (1974). In the traditional specification, returns to education are estimated as follows:

$$\ln W = \beta_0 + \beta_1 \text{EDU} + \beta_2 \text{EXP} + \beta_3 \text{EXP}^2 + u \quad (1)$$

Where EDU is the number of years of schooling, EXP is experience in years, EXP² is experience squared, and u is a random disturbance term. The specification is shown logarithmically in order for the regressors to be interpreted in terms of marginal effects. In this way index β is interpreted as the rate of returns to schooling.

¹ Antoninis reports male urban unemployment rate in Egypt (including discouraged unemployment) in 1997 is 10 percent, and 28 percent for women, compared to 8 percent and 38 percent respectively in rural Egypt.

This function that has been introduced by Mincer (1974) is known as the human capital earnings function. It has been the basis of practically all research on returns to education.

Griliches (1977), however, pointed out that the coefficient estimates of the OLS estimation of the classical model could suffer from what is now known as “self-selection bias.” When an individual’s family background and ability influence his/her educational attainment, the individual is said to be self-selected into that educational attainment. If educational attainment of an individual is partially determined by his/her abilities and family backgrounds, estimating the previous classical earnings function without taking into account the possibility that family background and ability might influence educational attainment, could give biased results.

One approach to reduce the bias is to include control variables that might capture part of the unobserved components in the error term. These controls should also enter in the form of interaction terms with education to allow for heterogeneous slope coefficients. The higher the correlation between the added variables and the unobserved components, the lower the endogeneity bias. Control variables include family background characteristics such as the father and mother’s level of education and father’s occupation. An interaction term between education and family background can capture the effect of family background on returns to education.

These results, however, are still subject to another type of selection bias. Basically, the equation has been estimated from data on workers, resulting in a censored sample of the entire population. When estimating the wage equation, only those who reported wages at the time of the survey are entered into the analysis, while the ones who were not working did not report any wage. In order to solve the problem of sample selection bias, Heckman (1979) suggests estimating two equations. First the participation equation is estimated, which uses a logit to estimate, for the purpose of this study, the probability of having worked at the time of the survey, and of being out of school (using the entire sample: workers and non-workers). From the logit results, a selection variable (the inverse Mills ratio term) is created. This estimate is used in the second step, as an additional regressor in the wage equation, yielding consistent estimates of the coefficients free of censoring bias.

A recent extension to this model is to capture the so-called “certification effect” or “sheep skin effect” considered by Dougherty and Jimenez (1987). The idea is that an employer might value a worker with a certificate more than a worker without one. For this reason, and to allow for estimated rate of return to vary by level of schooling, dummies for levels of education are used instead of years of schooling.

The modified Mincerian earnings function is:

$$\ln W = \beta_0 + \sum \beta_k E.Dum_{ik} + \beta_2 EXP + \beta_3 EXP^2 + u \quad (2)$$

Where E.Dum consists of dummies for levels of education. Years of experience are calculated by the following formula:

Age - Year of survey (that is 98, for 1998) – year at which individual entered the labor force.

In this specification, the private rate of return to the k^{th} level of education is estimated by the following formula:

$$r_k = (\beta_k - \beta_{k-1}) / \Delta n_k \quad (3)$$

where β_k is the coefficient of a specific level of education, β_{k-1} is the coefficient of the previous level of education, and Δn is the difference in years of schooling between K and $K-1$. (Psacharopoulos, 1981).

This procedure involves three assumptions:

1. Direct costs are either minor, or are compensated by a student's part-time and/or summer earnings. This assumption is satisfied in the current analysis since education is either free or involves minimal fees.
2. The opportunity cost of foregone earnings is equal to the earnings of the next lower level predicted by the model.
3. The earnings profiles are isomorphic, that is, they are of the form $y_c f(x)$, where y_c are the initial earnings of the educational category in question and $f(x)$ is a multiplicative experience function common to all educational levels.

It is expected to see the rate of returns to educational levels fall as the educational level gets higher, since the opportunity cost of education increases with educational level.

4.1. First Stage: Ordered Logit Model

In this study, I use the ordered logit model where education variable is ordered from zero to four, where 0 = less than secondary; 1 = general secondary; 2 = vocational secondary; 3 = higher institutions; and 4 = university and above. The model is:

$$y_i^* = x_i' \beta + \varepsilon_i \quad (4)$$

Where is a latent variable that is a function of a vector of explanatory variables.

The standard logistic distribution has a mean of 0 and its density function is:

$$F(\varepsilon_i) = \frac{1}{1 + e^{-\varepsilon_i}} \quad (5)$$

The relation between the unobserved latent variable and the outcome can be expressed as:

$$\begin{aligned} y_i &= 0 \text{ if } y_i^* \leq \mu_1, \\ &= 2 \text{ if } \mu_1 < y_i^* \leq \mu_2, \\ &= 3 \text{ if } \mu_2 < y_i^* \leq \mu_3, \\ &\dots \\ &= 4 \text{ if } \mu_3 \leq y_i^*. \end{aligned} \quad (6)$$

These must satisfy the rule: $0 < \mu_1 < \mu_2 < \mu_3 < \mu_4$. Since the disturbance terms are logistically distributed, we obtain the following probabilities:

$$\begin{aligned}
\Pr(y_i = 0) &= \Pr(x_i' \beta + \varepsilon_i \leq \mu_0) = \frac{1}{1 + \exp(x_i' \beta - \mu_0)}, \\
\Pr(y_i = 1) &= \Pr(x_i' \beta + \varepsilon_i \leq \mu_1) - \Pr(x_i' \beta + \varepsilon_i \leq \mu_0) \\
&= \frac{1}{1 + \exp(x_i' \beta - \mu_1)} - \frac{1}{1 + \exp(x_i' \beta - \mu_0)}, \\
\Pr(y_i = 2) &= \Pr(x_i' \beta + \varepsilon_i \leq \mu_2) - \Pr(x_i' \beta + \varepsilon_i \leq \mu_1) \\
&= \frac{1}{1 + \exp(x_i' \beta - \mu_2)} - \frac{1}{1 + \exp(x_i' \beta - \mu_1)}, \\
&\dots \\
\Pr(y_i = 4) &= \Pr(\mu_3 \leq x_i' \beta + \varepsilon_i) \\
&= 1 - \frac{1}{1 + \exp(x_i' \beta - \mu_3)}.
\end{aligned} \tag{7}$$

The estimation of the unknown coefficients β and thresholds can be estimated using maximum likelihood method, where the above probabilities are the elements of the likelihood function.

Explanatory variables that enter into the ordered logit model include: educational dummies for the father and the mother as proxies for household socioeconomic status. It is assumed that higher parental educational attainment implies higher socioeconomic status. Since the mother is often the provider of the learning environment for her children, mother's education (rather than father's) might have a more significant impact on the individual's education decision, as discussed in Behrman and Wolfe (1984), Chiswick (1986) and Heckman and Hotz (1986). The father's occupation is another explanatory variable reflecting the status of the household. Regional differences in choosing a certain level of education is captured by regional dummies. Other explanatory variables include number of siblings in the household. It is expected to find that lower educated parents and the presence of young siblings in the household are associated with choosing a vocational secondary education, since this is considered a terminal degree after which the graduate assumes employment.

4.2. Second Stage: Earnings Function

Estimating the parameters in the first stage allows calculating the selection term, to correct for selectivity bias, which is then entered linearly into the wage equation.

The dependent variable in the wage equation is the log hourly earnings. Log hourly earnings is used (instead of hourly earning) because it reduces the effects of earnings outliers. The model therefore is:

$$\ln W = \beta_0 + \sum \beta_k E.Dum_{ik} + \beta_2 EXP + \beta_3 EXP^2 + \sum \beta_j Reg. Dum_{ij} + \beta_4 \lambda + u \tag{8}$$

Where E.Dum are dummies for levels of education, experience, experience squared, regional dummies and the selection term.

Experience variables are included in the model since workers with more years of job experience are likely to earn more. (Higher experience is often associated with higher skills and higher productivity.) A firm is likely to use higher wages to induce experienced workers to stay on in their jobs, as the cost of training new workers could be very expensive. The experience squared variable is included to capture the possibility of a non-linear relationship between experience and earnings. I expect a positive sign of the experience variable because working experience is likely to contribute to enhancement of an individual's human capital

and negative coefficient of experience squared, as marginal returns from experience tend to decline over the lifetime.

The interaction of the effects of schooling and experience on earnings should not be neglected. The first few years in the labor market are often a time for experimenting and frequent job change. As a consequence, earnings of many individuals rise in their first years in the labor force, then level off and increase by a decreasing rate. Another rationale is that the life-time earning patterns of individuals with a low level of education and those who are highly educated differ by nature. For example, the marginal effects of experience on education for a worker with a vocational education are likely to increase during the first years of work and diminish afterwards. A university educated worker, on the other hand, faces increasing marginal returns to experience. Omission of the interaction variable, therefore, leads to the omitted variable bias in the coefficients' estimates.

The coefficients of educational variables are expected to be positive and their magnitudes increase through post general school levels as follows (in ascending order): general secondary, vocational secondary, higher institutes and university and above. That is, I assume private earnings increase as level of education increases. In theory, a main objective of technical/vocational education (among others) is to provide job-specific training. Another desirable outcome of secondary vocational education is a possibility for a better match between skills acquired in school and the industry, although empirical evidence is ambiguous. In case of a better match of vocational skills, and because vocational degrees are terminal, I would expect the labor market to reward vocational skills more than general education.

5. Data and Empirical Methodology

The empirical analysis is based on a 1998 nationally representative household survey, the Egyptian Labor Market Survey (ELMS). The survey includes rich data concerning basic demographics, employment, unemployment, occupational history, migration, education, earnings and parental background. The ELMS 1998 was conducted on a sample of 5,000 households.

The analysis is restricted to urban², non-agriculture³, private sector workers⁴, who are sons or daughters of the household heads between the ages of 15 and 64, and not currently enrolled in school. The sample on which the analysis is based on consists of 4,843 urban private sector workers in 1998.

Table (A-1) in the appendix displays means and standard deviations for variables used in the analysis. A summary statistics by gender and level of education is in process.

5.1. Ordered Logit Estimates:

Tables (2) and (3) show the marginal effects of the explanatory variables on the probability of choosing certain levels of education derived from an ordered logit model for men and women. Since all explanatory variables are dummies, the marginal effects show the effect of a discrete change from zero to one. The reference individual lives in Cairo with illiterate parents and no siblings.

The tables show region does not affect men's decision to enroll in vocational education, but that it does for women. Vocational educated women are more likely to reside in Cairo than other urban cities.

² To avoid the problems of labor market definition associated with subsistence agriculture in rural areas.

³ High rates of seasonal employment within the agriculture sector are justification for excluding them from the analysis.

⁴ Since labor earnings for this group are more likely to be immune from potential biases due to the noncompetitive nature of the public and government sectors.

Parent's education appears to have the expected effect. Mother's education is significant for men and that significance increases in magnitude the higher the level of education. The higher the level of mother's education (beyond lower secondary), the higher the chance the individual chooses high institute or university education. A mother with secondary general education or a post secondary degree increases the chance her son will choose a university education by 30 percent and 26 percent respectively. For daughters, mother's education is significant in choosing any level of secondary or university education. The magnitude of the effect is higher in vocational education compared to other levels, but it gets higher again at the university level. This finding is consistent with Tunali's in Turkey (Tunali, 2003).

The higher the father's education, the less likely his son will choose vocational education. For example, if a father has a university education, it is 18 percent less likely that his son will choose a vocational education and 61 percent more likely his son will choose to pursue a university education.

A father's education is also an essential factor in women's decision to choose a secondary and above education. The pattern depicted in men's cases appears here too. For fathers with lower levels of education, their daughters are likely to choose vocational education, while daughters whose fathers have higher levels of education are, on average, 74 percent more likely to opt for a university education⁵.

The magnitude of the effect of the presence of siblings younger than six years of age is very small in all levels except in vocational education. The presence of siblings under six years of age in the household reduces the probability of choosing a vocational education by 0.04 percent for men, but increases the chances for women by 0.16 percent. A possible interpretation is that since the vocational education is considered a terminal degree, women with young siblings are expected to get a job right after graduating, to help their families financially. Parents who send their kids to vocational schools expect quick returns and less risky investment. On the other hand, the presence of siblings older than six years does not seem to have a significant effect on the enrollment choices in any type of secondary or higher education, for women or men.

5.2. Returns to Education Estimates

Table (4) displays selectivity corrected estimates of the returns equation with interaction terms for both men and women. The following analysis applies to both men and women unless otherwise indicated.

The selection term is insignificant for men and women, indicating that sample selection is not a problem. Experience has the expected profile. A positive sign of the experience variable indicates working experience is likely to contribute to the growth of an individual's human capital, and negative coefficient of experience square as marginal returns from experience tend to decline over the lifetime. Figure (A-1), in the Appendix, depicts the earning-experience profile for men and women. The figure makes clear the differences in men's and women's profiles. Women tend to have shorter life experience and steeper decline in their profile than men.

Back to Table (4), no differences appear in earnings between the largest three urban cities (Cairo, Alexandria and Suez Canal), but earnings are lower in both upper and lower urban Egypt compared to Cairo, with upper urban Egypt having a greater earnings difference than lower urban Egypt for men. Earnings in lower urban Egypt are 6 percent lower than those in Cairo, compared to 13 percent for upper urban Egypt. For women, the difference in earnings

⁵ Adding father's occupation to the model produced insignificant coefficients for all occupation dummies.

between upper or lower urban Egypt compared to Cairo was lower by almost 3 percent in both regions.

The coefficients of the education dummies all have the expected positive sign, and the majority are significantly different from zero at the 1 percent level or more. These results may suggest that employers are affected by credentialism in their wage-setting. The education coefficients in this case may be regarded as evidence of credentialism or screening for ability. These results do not match those obtained by Assaad⁶ (1997)—using 1988 data—and Antoninis (2002)—using 1997 data—on Egypt. Both Assaad and Antoninis found rates of return to vocational secondary schooling and higher institutes in the private sector are either negative or very low for both men and women. The results also disagree with those found by Arabsheinbani (2001) in Libya. He found the returns to years of education do not strongly support a sheepskin effect. According to his data, the largest marginal return is at 8 years of education (not a diploma year). (Results of the interactions between education dummies and family background will be available by conference time in December).

5.3. Private Rates of Return

Tables (5) and (6) present private rates of return to education for men and women respectively using equation 3⁷. The tables do not support the hypothesis that rates of returns are expected to decline as education levels increase because of an increasing opportunity cost. Table (5) for example demonstrates returns to vocational secondary are 29 percent higher than general secondary for men. This may support the fact that general secondary is not considered a terminal degree. Although he did not differentiate between vocational and secondary education, Antoninis found that secondary school graduates earn more than less than [WHICH IS IT??] secondary education. Since 95 percent of his secondary educated workers were graduates of vocational schools, he dismissed the notion that expansion of vocational education led to higher unemployment and deteriorating quality of education. Whereas Assaad (1997) reported negative returns to general and vocational (commercial) secondary education investment in the private sector in 1988, while the return to industrial secondary education for males in the private sector was a significant 2 percent.

Table (6) displays returns to higher institutes graduates are around 11 percent higher than vocational secondary graduates. This is in line with Kane who found the average person who attended a two-year college in the United States earned about 10 percent more than those without any college education (Kane, 1995). Empirical evidence in this matter is still mixed. Antoninis (2001), for example, found no evidence that going to high institute in Egypt adds to earnings significantly. He explains this finding by interactions between supply side (poor quality of education) and demand side (poor choice of graduates). Evidence from the United States reveal that community college graduates earn 20 percent more than high school graduates, and those with bachelor's degrees earn 40 percent more (Casse, 1998). The puzzling result, though, is the returns to university education are only 10 percent higher than that of vocational education, compared to 17 percent for general secondary. Further investigation is pending.

For women, the differences in returns are smaller in magnitude compared to men. For example, the difference in rates of return to high institutes is only 4 percent higher than that of vocational education. The returns to university education are merely 6 percent higher than that of higher institutes.

⁶ Assaad differentiates between vocational blue collars, vocational white collars, and technical institutes in his analysis

⁷ To insure these rates of return are significant, tests of restrictions that the coefficients of k^{th} variables are equal to those of $(k-1)^{\text{th}}$ were all significant at the 5% level or above.

6. Concluding Remarks

The purpose of this study is two-fold: First, to determine factors that influence an individual's choice of a specific level of education, specifically general secondary versus vocational secondary education. The second objective is to estimate selectivity corrected returns to different levels of education, that is, "sheepskin effects" from which a crude estimate of the private rate of return is estimated.

The analysis in this study shows that children of parents with lower levels of education are more likely to get vocational education compared to children of parents with higher education. The presence of young siblings in the household affects women by positively influencing their decision to join vocational education, whereas the effect on men is insignificant.

Evidence on sheepskin effect, or credentialism, for men is manifested in the significant raise in positive schooling coefficients the higher the level of education. Finally, estimates of the private rate of return to education indicate an increase of 29 percent in returns to vocational secondary education if compared to general secondary, and only 10 percent increase in returns for a high institution or university degrees compared to vocational degree. The sheepskin effect is not as evident for women.

The current educational data, trends and policies in Egypt imply an oversupply of technical and vocational skills. Gill points out that if technically demanding industries operated efficiently, the current system in Egypt could supply five to seven times the required number of skilled workers, according to conservative estimates (Gill et al, 2000). One suggestion is for the government to develop a third form of secondary education which combines the best of general and vocational education, a model that draws on the instructive/academic and structural approaches. This "third way" would provide vocational training that is applicable to a wider range of occupations and is more responsive to local demand for labor.

It is well acknowledged that the development of a 'high skill-high participation' workforce is essential in order to achieve the levels of international competitiveness that are now required in a rapidly growing number of economic sectors. However, country experiences show that this type of labor force cannot be created voluntarily, or by relying on the private sector. Without active labor market policies based on continuing government intervention in funding and providing for high-quality vocational education and training, this type of workforce is unlikely to develop in most countries. Because of the high capital investment needed for quality vocational education, it cannot be left to be determined by market forces alone. Most private-sector entities have neither the vision nor the capacity to provide the level of training that is needed to create an optimally skillful workforce.

Further Research:

Separating three years of vocational education from five years is the first pressing test of the findings of this paper, accompanied by a clear distinction between the three divisions of vocational education: commercial, industrial and agricultural.

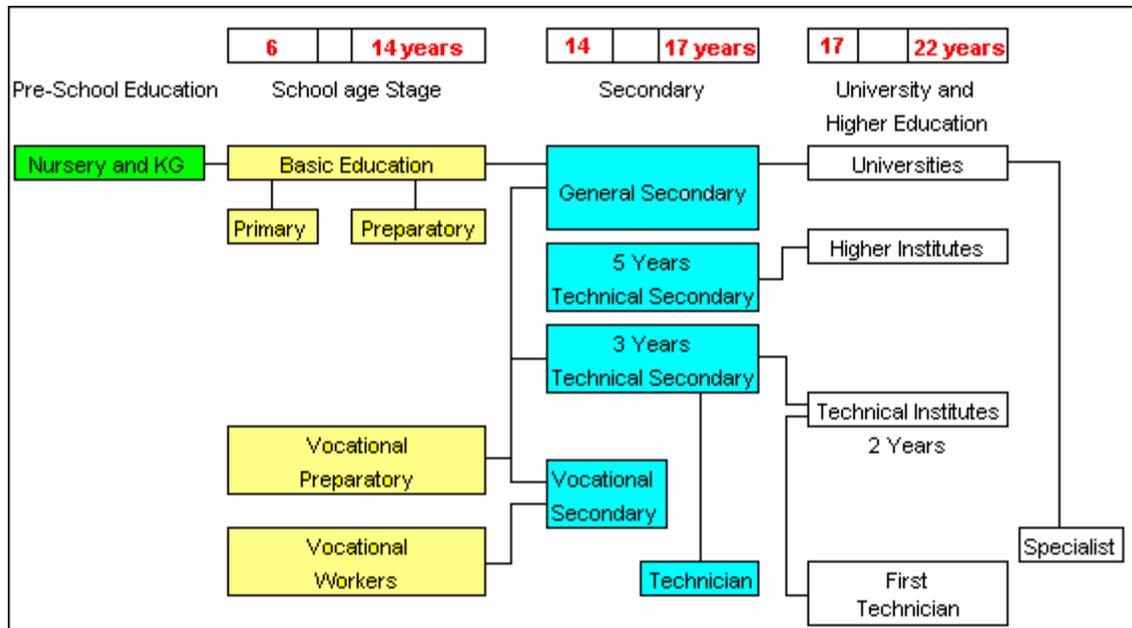
References

- Altonji, Joseph G. 1998. "Effects of Personal and School Characteristics on Estimates of the Return to Education." *Economic Perspectives*. Vol. 22: 65-80.
- Angrist, Joshua D. and Alan B. Krueger. 1991. "Does Compulsory School Attendance Affect Schooling and Earnings?" *The Quarterly Journal of Economics*. Vol. 106: 979-1014.
- Antoninis, Emmanouil. 2001. "The Expansion of Technical Secondary Education in Egypt and its Effect on the Labour Market." Ph.D. Dissertation. St. Anthony's College.
- Arabsheibani, Reza G. and Lamine Manfor. 2001. "Non-Linearities in Returns to Education in Libya." *Education Economics*. Vol. 9: 139-144.
- Arias, Omar, Kevin F. Hallock and Walter Sosa-Escudero. 2001. "Individual Heterogeneity in the Returns to Schooling: Instrumental Variables Quantile Regression Using Twins Data." *Empirical Economics*. Vol. 26: 7-40.
- Arriagada, A.M. and A. Ziderman. 1992. "Vocational Secondary Schooling: Occupational Choice and Earnings in Brazil." The World Bank, Washington, DC.
- Ashenfelter, Orley and Alan Krueger. 1994. "Estimates of the Economic Return to Schooling from a New Sample of Twins." *American Economic Review*. Vol. 84: 1157-1174.
- Behrman, J. R., and B. L. Wolfe. 1984. "The Socioeconomic Impact of Schooling in a Developing Country." *Review of Economics and Statistics*. Vol. 66: 296-303.
- Bellew, R. and P. Moock. 1990. Vocational and Technical Education in Peru. *Economics of Education Review*. Vol. 9, No. 4: 365-375.
- Bennell, P. 1996a. "General Versus Vocational Secondary Education in Developing Countries: a Review of the Rates of Return Evidence." *The Journal of Development Studies*. Vol. 33, No. 2: 230-247.
- Bennell, P. 1996b. "Using and Abusing Rates of Return: a Critique of the World Bank's 1995 Education Sector Review." *International Journal of Educational Development*. Vol. 16, No. 3: 235-248.
- Bennell, P. and J. Segerstrom. 1998. "Vocational Education and Training In Developing Countries: Has the World Bank Got It Right?" *International Journal of Educational Development*. Vol. 18, No. 4: 271-287.
- Boissiere, M, J. B. Knight and R. H. Sabot. 1985. "Earnings, Schooling, and Cognitive Skills." *The American Economic Review*. Vol. 75: 1016-1030.
- Card, David and Alan B. Krueger. 1992. "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States." *The Journal of Political Economy*. Vol. 100: 1-40.
- Card, David. 1998. "The Casual Effect of Education on Earnings." The Center for Labor Economics, working paper 2.
- Casse, Daniel and Bruno V. Manno. 1998. "The Cost and Price of College and the Value of Higher Education." *Academic Questions*. Vol. 11: 38-55.
- Chiswick, B. R. 1986. "Comment on Hauser and Sewell." *Journal of Labor Economics*. Vol. 4(3 (Part 2)): S116-S120.
- Cosca, Theresa. 1998. "Earnings of College Graduates in 1996." *Occupational Outlook Quarterly*. Vol. 42: 20-29.
- Gaston, N. and R. Sturm. 1991. "Educational Attainment and the Returns to Education for Australian Youth: Evidence of Self Selection?" *Economic Analysis and Policy*. Vol. 21, No. 1: 29-45.
- Gill, I. S. and S. P. Heyneman. 2000. "Arab Republic of Egypt" in I.S. Gill, F. Fluitman and A. Dar (eds.) *Vocational Education and Training Reform: Matching Skills to Markets and Budgets*. A joint study of the World Bank and the International Labour Office, Oxford University Press.
- Griliches, Z. 1977. "Estimating the Returns to Schooling: Some Econometric Problems." *Econometrica*. Vol. 45: 1-22.

- Hanushek, Eric A. 1995. "Interpreting Recent Research on Schooling in Developing Countries." *The World Bank Research Observer*. Vol. 10: 227.
- Haveman, Robert, Barbara Wolfe and James Spaulding. 1991. "Childhood Events and Circumstances Influencing High School Completion." *Demography*. Vol. 28: 133-157.
- Hecker, Daniel E. 1992. "College Graduates: Do We Have Too Many or Too Few? College Earnings and Why They Vary." *Occupational Outlook Quarterly*. Vol. 36: 13.
- Heckman, J. J. and V. J. Hotz. 1986. "An Investigation of the Labor Market Earnings of Panamanian Males: Evaluating the Sources of Inequality." *Journal of Human Resources*. Vol. 21: 507-542.
- Hollenbeck, K. 1993. "Postsecondary Education as Triage: Returns to Academic and Technical Programs." *Economics of Education Review*. 213-232.
- Jaeger, David A. and Marianne E. Page. 1996. "Degree Matter: New Evidence on Sheepskin Effects in the Returns to Education." *The Review of Economics and Statistics*. Vol. 78: 733-740.
- Kane, Thomas J. and Cecilia Elena Rouse. 1995. "Labor-Market Returns to Two- and Four-Year College." *American Economic Review*. Vol. 85: 600-615.
- Kremer, Michael R. 1995. "Research on Schooling: What We Know and What We Don't – A Comment on Hanushek." *The World Bank Research Observer*. Vol. 10: 247.
- Lassibille, Gerard and Lucia Navarro Gomez. 1998. "The Evolution of Returns to Education in Spain 1980-1991." *Education Economics*. Vol. 6: 3-10.
- Middleton, J., A. Ziderman and A. Adams. 1993. *Skills for Productivity: Vocational Education and Training in Developing Countries*. New York: Oxford University Press for the World Bank.
- Mincer, J. 1974. *Schooling, Experience and Earnings*. New York: National Bureau of Economic Research.
- Myers, C. N. and S. Chalongphob. 1991. *Educational and Economic Development: Issues and Options for Policy and Reform*. The Thailand
- Neuman, S. and A. Ziderman. 1991. "Vocational Schooling, Occupational Matching and Labor Market Earnings in Israel." *Journal of Human Resources*. Vol. 26, No. 2: 413-425.
- Neuman, S. and A. Ziderman. 1999. "Vocational Education in Israel: Wage Effects of the Voced-Occupation Match." *Journal of Human Resources*. Vol. 4, No. 2: 907-932.
- Orapin, S. 1991. *Three More Years in School: Parents' Opinions and Problems*. Bangkok, Thailand: The Thailand Development Research Institute.
- Psacharopoulos, G. 1986. "Returns to Education." *The Journal of Human Resources*. Vol. 20, No. 4: 583-604.
- Psacharopoulos, G. 1987. "To Vocationalize or Not to Vocationalize? That is the Curriculum Question." *International Review of Education*. Vol. 33, No. 2: 187-211.
- Psacharopoulos, G. 1994. "Returns to Investment in Education: a Global Update." *World Development* Vol. 22, No. 9: 1325-1343.
- Psacharopoulos, George and Eduardo Velez. 1996. "Returns to Education During Economic Boom and Recession: Mexico 1984, 1989, and 1992." *Education Economics*. Vol. 4: 219-231.
- Psacharopoulos, George. 1995. "The Profitability of Investment in Education." Working Paper.
- Rupert, Peter and Mark E. Schweitzer. 1996. "Earnings, Education, and Experience." *Economic Review*. Vol. 32: 2-13.
- Siphambe, H. K. 2000. "Rates of Return to Education in Botswana." *Economics of Education Review*. Vol. 19: 291-300.
- Tansel, A. 1994. "Wage Employment, Earnings and Returns to Schooling for Men and Women in Turkey." *Economics of Education Review*. Vol. 13: 305-320.
- Toh, Mun Heng and Chai Shing Wong. 1999. "Rates of Return to Education in Singapore." *Education Economics*. Vol. 7: 235-253.

- Trost, R. P. and L. F. Lee. 1984. "Technical Training and Earnings: a Polychotomous Choice Model With Selectivity." *The Review of Economics and Statistics*. Vol. 66: 151–156.
- Wilson, Kathryn. 2001. "The Determinants of Educational Attainment: Modeling and Estimating the Human Capital Model and Education Production Functions." *Southern Economic Journal*. Vol. 67: 518-551.
- World Bank. 1995. *Priorities and Strategies for Education: A World Bank Sector Review*. Washington, D.C.: Education and Social Policy Department, World Bank.

Figure 1: The Education System in Egypt



Source: National report presented to the 45th session of the International Conference on Education, Geneva, 30 September - 5 October 1996.

Table 1: Enrollment, by Level and Type of Education, 1990-91 to 1994-95, (Thousands of students)

Type of education	1990-91	1994-95	(Percent Change)
Primary	6,402.5	7,313.0	142
Secondary	1,648.9	2,788.2	66
General	576.4	894.4	47
Technical-vocational	1,026.2	1,893.8	85
Higher	215.8	224.5	5
Universities	74.3	148.4	200

Source: Gill, et al (2000).

Table 2: Marginal Effects of Maximum Likelihood Ordered Logit Estimation of School Choice for Urban Private Sector Men, Egypt 1998

Variables	General Secondary		Vocational Secondary		High Institutes		University and Above	
	Marginal Effects	Std. Err.	Marginal Effects	Std. Err.	Marginal Effects	Std. Err.	Marginal Effects	Std. Err.
Region (Cairo=Reference)								
Alexandria & Suez Canal	0.00	(0.000)	-0.02	(0.018)	-0.01	(0.006)	-0.01	(0.010)
Lower Urban Egypt	0.00	(0.000)	-0.03	(0.017)	-0.01	(0.005)	-0.01	(0.009)
Upper Urban Egypt	0.00	(0.000)	0.00	(0.016)	0.00	(0.005)	0.00	(0.010)
Mother's Education (Illit=Ref.)								
Read and Write	0.00	(0.001)	0.06	(0.011)	0.03	(0.008)	0.06	(0.016)
Primary	0.01	(0.001)	0.07	(0.008)	0.05	(0.011)	0.10	(0.028)
Lower Secondary	0.03	(0.002)	0.07	(0.010)	0.06	(0.016)	0.13	(0.050)
General Secondary	0.01	(0.003)	0.00	(0.056)	0.09	(0.010)	0.30	(0.099)
Vocational Secondary	0.02	(0.002)	0.07	(0.115)	0.06	(0.017)	0.15	(0.057)
University & above	0.01	(0.003)	0.02	(0.064)	0.08	(0.016)	0.26	(0.124)
Father's Education (Illit=Ref.)								
Read and Write	-0.01	(0.000)	0.07	(0.012)	0.03	(0.006)	0.05	(0.012)
Primary	0.03	(0.001)	0.08	(0.008)	0.05	(0.010)	0.11	(0.024)
Lower Secondary	0.01	(0.002)	0.06	(0.014)	0.07	(0.011)	0.18	(0.038)
General Secondary	0.08	(0.002)	0.02	(0.027)	0.09	(0.010)	0.28	(0.051)
Vocational Secondary	0.01	(0.002)	-0.01	(0.036)	0.09	(0.009)	0.33	(0.062)
High Institute	0.04	(0.003)	-0.08	(0.043)	0.08	(0.012)	0.46	(0.071)
University & above	0.06	(0.003)	-0.18	(0.044)	0.05	(0.020)	0.61	(0.077)
Siblings 0-6	0.00	(0.000)	-0.04	(0.016)	-0.01	(0.005)	-0.02	(0.008)
Siblings >6	0.00	(0.001)	-0.02	(0.021)	-0.02	(0.011)	-0.03	(0.022)

Source: Author's Calculations

Table 3: Marginal Effects of Maximum Likelihood Ordered Logit Estimation of School Choice for Urban Private Sector Women, Egypt 1998

Variables	General Secondary			Vocational Secondary			High Institutes			University and Above		
	Marginal Effects	Std. Err.	†	Marginal Effects	Std. Err.	†	Marginal Effects	Std. Err.	†	Marginal Effects	Std. Err.	†
Region (Cairo=Reference)	†	†	†	†	†	†	†	†	†	†	†	†
Alexandria & Suez Canal	0.00	(0.001)	**	-0.03	(0.015)	**	-0.01	(0.003)	**	-0.01	(0.003)	**
Lower Urban Egypt	0.00	(0.001)	**	-0.03	(0.015)	**	-0.01	(0.003)	**	-0.01	(0.003)	**
Upper Urban Egypt	0.00	(0.001)	***	-0.05	(0.015)	***	-0.01	(0.003)	***	-0.01	(0.003)	***
Mother's Education (Illit=Ref.)	†	†	†	†	†	†	†	†	†	†	†	†
Read and Write	0.02	(0.001)	***	0.12	(0.016)	***	0.03	(0.005)	***	0.04	(0.007)	***
Primary	0.04	(0.001)	***	0.17	(0.021)	***	0.05	(0.012)	***	0.07	(0.019)	***
Lower Secondary	0.10	(0.001)	***	0.10	(0.042)	**	0.02	(0.013)	*	0.03	(0.017)	**
General Secondary	0.03	(0.003)	***	0.19	(0.011)	***	0.09	(0.022)	***	0.15	(0.048)	***
Vocational Secondary	0.00	(0.003)	***	0.19	(0.011)	***	0.09	(0.021)	***	0.15	(0.048)	**
University & above	0.07	(0.006)	***	0.19	(0.030)	***	0.11	(0.038)	**	0.18	(0.107)	*
Father's Education (Illit=Ref.)	†	†	†	†	†	†	†	†	†	†	†	†
Read and Write	0.06	(0.001)	***	0.11	(0.014)	***	0.03	(0.004)	***	0.03	(0.005)	***
Primary	0.04	(0.001)	***	0.19	(0.015)	***	0.06	(0.010)	***	0.09	(0.016)	***
Lower Secondary	0.04	(0.002)	†	0.20	(0.011)	***	0.09	(0.014)	***	0.15	(0.028)	***
General Secondary	0.05	(0.002)	†	0.19	(0.014)	***	0.11	(0.013)	***	0.20	(0.032)	***
Vocational Secondary	0.00	(0.002)	†	0.19	(0.016)	***	0.11	(0.017)	***	0.19	(0.045)	***
High Institute	0.06	(0.002)	***	0.16	(0.024)	***	0.13	(0.014)	***	0.28	(0.046)	***
University & above	-0.06	(0.002)	***	-0.10	(0.037)	***	0.07	(0.026)	***	0.74	(0.073)	***
Siblings 0-6	0.00	(0.001)	***	0.16	(0.012)	***	0.01	(0.003)	***	0.01	(0.003)	***
Siblings >6	0.00	(0.002)	†	-0.03	(0.036)	†	-0.01	(0.008)	†	-0.01	(0.010)	†

Source: Author's Calculations

Table 4: Selectivity Corrected Wage Equation for Men and Women, Egypt 1998

Variables	Men	Women
Experience	0.111** (0.013)	0.033** (0.011)
Experience Sq.	-0.002** (0.000)	-0.001** (0.000)
Region		
(Cairo=Ref)		
Alex & Sz Cnl	-0.038 (0.032)	0.001 (0.018)
Lower Urban Egypt	-0.063* (0.031)	-0.032* (0.007)
Upper Urban Egypt	-0.132** (0.031)	-0.027* (0.017)
Education		
(Lwr Sec=Ref)		
General Sec	0.061 (0.168)	0.268* (0.128)
Vocational Sec	0.354** (0.088)	0.307** (0.063)
Higher Institute	0.569** (0.162)	0.380+ (0.125)
University & Above	0.735** (0.260)	0.490** (0.080)
Interactions		
GenSecXExp	0.063** (0.014)	0.039** (0.011)
GenSecXExp2	-0.001** (0.000)	-0.001** (0.000)
VocSecXExp	0.085 (0.048)	0.035 (0.023)
VocSecXExp2	-0.001 (0.001)	-0.001 (0.000)
HinstXExp	0.073** (0.015)	0.029* (0.011)
HInstXExp2	-0.001** (0.000)	-0.001* (0.000)
Univ+Xexp	0.065** (0.023)	0.033* (0.016)
Univ+XExp2	-0.001** (0.000)	-0.001* (0.000)
Selection Term	-0.053 (0.023)	-0.012 (0.018)
Constant	-0.879** (0.160)	-0.210+ (0.124)
Observations	1914	3313
R-squared	0.34	0.24

Notes: Standard errors in parenthesis; * significant at 5%; ** significant at 1%; + significant at 10%.

Source: Author's calculations

Table 5: Private Rate of Return to Education for Men, Egypt 1998

Educ. Level	Coef.	Educ. Level	Coef.	Rate of Return
Vocational Sec	0.354	Gen. Sec	0.061	$(.354-.061)=\mathbf{0.293}$
Higher Inst.	0.569	Voc Sec	0.354	$(.569-.354)/2=\mathbf{0.108}$
University & above	0.735	Higher Inst.	0.569	$(.735-.569)/2=\mathbf{0.083}$
University & above	0.735	Voc Sec	0.354	$(.735-.354)/4=\mathbf{0.095}$
University & above	0.735	Gen. Sec	0.061	$(.735-.061)/4=\mathbf{0.169}$

Source: Author's calculations

Table 6: Private Rate of Return to Education for Women, Egypt 1998

Educ. Level	Coef.	Educ. Level	Coef.	Rate of Return
Vocational Sec	0.307	Gen. Sec	0.268	$(.307-.286)=\mathbf{-0.021}$
Higher Inst.	0.380	Voc Sec	0.307	$(.380-.307)/2=\mathbf{0.03}$
University & above	0.490	Higher Inst.	0.380	$(.490-.380)/2=\mathbf{0.055}$
University & above	0.490	Voc Sec	0.307	$(.490-.307)/4=\mathbf{0.046}$
University & above	0.490	Gen. Sec	0.268	$(.490-.268)/4=\mathbf{0.056}$

Source: Author's calculations

Appendix

Figure (A-1)

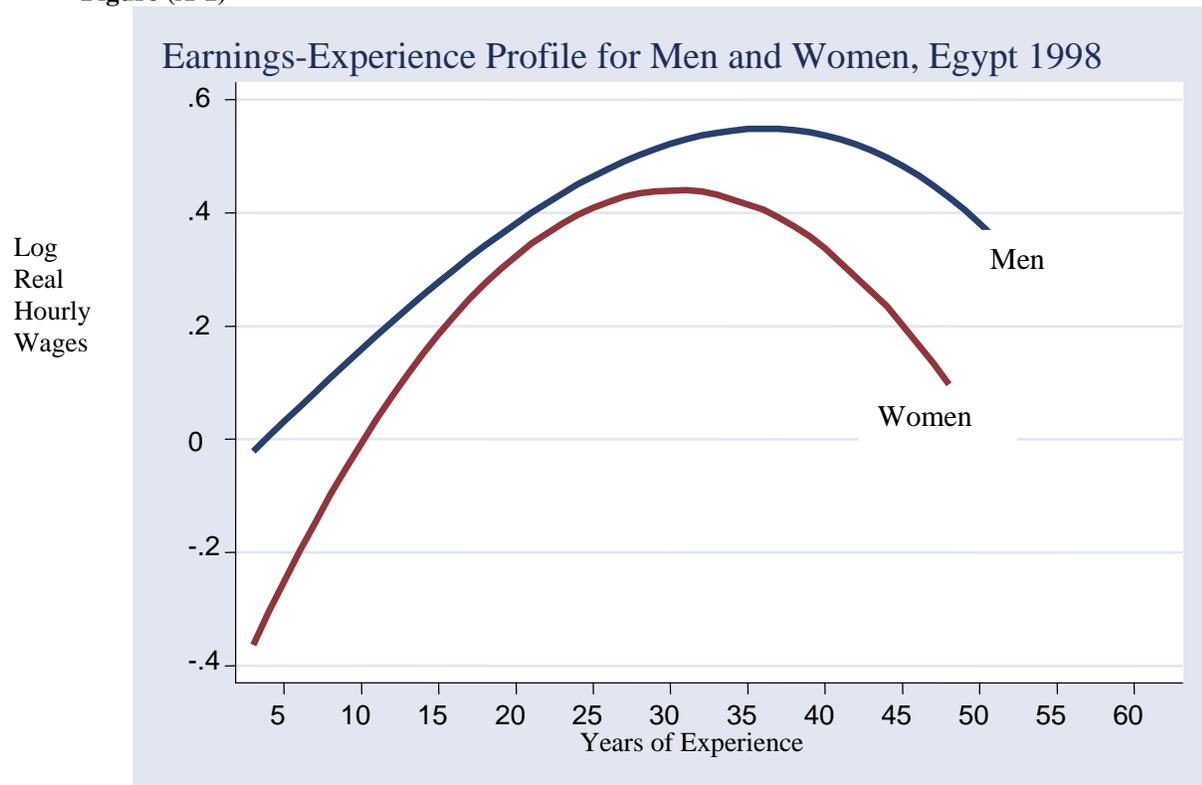


Table (A-1): Means and Standard Deviations of Variables Used in the Analysis

† Variables	Men		Women	
	Mean	† Std. Dev.	Mean	† Std. Dev.
Log Real Hourly Wage	0.159	0.519	-0.041	0.353
Experience	18.178	14.962	23.499	14.712
Region	†	†	†	†
Cairo	0.307	0.461	0.299	0.458
Alexandria & Suez Canal	0.193	0.395	0.193	0.395
Lower Urban Egypt	0.247	0.431	0.253	0.435
Upper Urban Egypt	0.253	0.435	0.254	0.436
Level of Education	†	†	†	†
General Secondary	0.520	0.500	0.681	0.466
Vocational Secondary	0.013	0.111	0.015	0.123
High Institute	0.280	0.449	0.198	0.399
University & above	0.057	0.232	0.039	0.193
Household Characteristics	†	†	†	†
Siblings 0-6	0.230	0.421	0.364	0.481
Siblings >6	0.951	0.215	0.973	0.163
Mother's Education	†	†	†	†
Read and Write	0.132	0.339	0.128	0.334
Primary	0.055	0.229	0.028	0.164
Lower Secondary	0.026	0.160	0.014	0.118
General Secondary	0.017	0.128	0.014	0.118
Vocational Secondary	0.020	0.140	0.011	0.106
University & above	0.009	0.097	0.005	0.074
Father's Education	†	†	†	†
Read and Write	0.286	0.452	0.306	0.461
Primary	0.090	0.286	0.065	0.247
Lower Secondary	0.047	0.212	0.032	0.177
General Secondary	0.044	0.206	0.041	0.198
Vocational Secondary	0.033	0.178	0.017	0.130
High Institute	0.036	0.185	0.035	0.183
University & above	0.023	0.150	0.010	0.101
No. of Observations		1914		3313