

Returns to Experience in Mozambique: A Nonparametric Regression Approach

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Abstract

This paper studies the impact of investments in labor market experience on earnings for the low-skilled labor force in Mozambique. In particular, it uses a nonparametric regression approach in order to estimate returns to experience for two groups of workers (those who have completed EP1 and EP2 school level). The data used in this estimations comes from the nationally representative labor force survey (IFTRAB, 2004-05) conducted by the National Institute of Statistics. The main findings indicate that earnings of full-time workers with EP2 tend to dominate those of workers with EP1 level over the working life. Furthermore, we find that there are positive returns to education between completing EP2 level of schooling as compared to EP1. The paper also shows that gender differentiation on earnings is clearly evident from the data. For example, in overall men's returns to experience are always dominating those of women regardless of the level of schooling and regional location. Ultimately, and unlike what human capital theory would predict, however, it is found that low-skilled workers in Mozambique tend to substitute schooling for working mostly due to high opportunity in terms of foregone earnings, poverty, and other credit constraints.

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1. Introduction

Modern labor economics theory identifies the prospect of improved lifetime earnings as being a major inducement for people to invest in an educational or training program (Ehrenberg and Smith, 1999:335). However, one important question is how often this prediction can be vindicated on the empirical grounds. Therefore, it seems worthy investigating these issues in order to fully understand the interaction between human capital investment and earnings.

This paper aims to estimate the effect of labor market experience or on-the-job training on the determination of the distribution of earnings for two groups of workers and given their educational background – EP1 and EP2 levels, respectively. The paper focuses on the impact of human capital accumulation on earnings for two reasons. First, it is recognized that workers with more years of education associated with labor market experience tend to have higher earnings which in turn can translate into direct impact in terms of poverty reduction, since this group can be able to meet its basic needs. Second, human capital accumulation is an important means for poor countries to increase labor productivity, which can consequently attract more foreign direct investment in order to expand economic growth.

The analysis are carried out using data from the nationally representative Labor Force Survey IFTRAB2004-05 which was conducted by the National Institute of Statistics (INE). The main objective of this paper is to fill the existent gap in the literature related to the interactions between schooling and labor market experience in Mozambique, since little is known about the impact of human capital accumulation on the distribution of earnings. For example, the existing literature has often focused on the impact of lower or upper primary education on raising per capita consumption (Handa and Simler, 2000; Handa, Simler and Harrower, 2004; Jones, 2004) but little attention has been paid to the impact of the combination of education and on-the-job-training on earnings probably due to the lack of data on the later.

The paper is organized as follows. After the introduction; section two presents the literature review surrounding issues of the association between labor market experience and earnings; section three describes the data; section four outlines a general neoclassical model of investment in human capital, which is used here to guide the empirical investigations; section five evaluates the impact of labor market on earnings given different levels of worker's education – EP1 and EP2. Moreover, distributions of marginal returns to experience are computed for the two groups of workers. The analysis is also extended to include gender segmentation and area of residence. Finally, section six concludes the paper.

2. Literature review

Numerous studies have attempted to identify the impact that work experience has on wages. Mincer (1957, 1958) pioneered the explicit study of the effect of labor market experience or on-the-job-training on the determination of and distribution of earnings. His model provided an analysis of the manner in which on-the-job-training influences differences in earnings across individuals and this determines the inequality and skewness of earnings. The model, which was based on the assumption of rational economic behavior by individuals in the labor market served as the base for several strands of research in labor economics.

Mincer (1962) estimated rates of returns from on-the-job-training for several different occupations (apprentices, journeymen in contrast to those of the operatives) and found that the rate of return from investment in on-the-job-training were about 9 to 13 percent. However, these rates were slightly higher than those of the returns deriving from schooling. Mincer (1962:66) attributed these differences to numerous measurement issues.

In a later work, Mincer (1962) also discussed investment in on-the-job-training by women compared to men. He found that incentives for women to make these investments were less because the average female expects to spend less than half her working life in the labor force, and has a high probability of dropping out of the labor force for childrearing. Mincer also noted that for these reasons employers would be more reluctant to invest in firm-specific training for women than for men.

Roshlom *et al* (2006) using firm data from Sub-Saharan Africa, evaluate the effect of onthe-job-training on log wages using matching estimators. Their findings show that training tends to improve wages and that the effect is larger and well-determined for long training duration and in large firms. Similarly, Booth and Bryan (2006), and using data from Britain also show that work-related training is potentially important from a distributional standpoint, since it significantly increases individual's longer term earnings prospects.

Shultz (2003) combining the impact of human capital accumulation in the form of both schooling and labor market experience on earnings finds that private returns to investment in human capital in six African countries (Kenya, Ghana, Cote d' Ivoire, South Africa, Nigeria, and Burkina Faso) are much higher for secondary and post-secondary education nowadays. This contrasts with earlier findings from Psacharoupoulos (1985) where returns were higher for primary education.

The literature on the effect of labor market experience on earnings has expanded to include issues of gender differentials on wages. For example, Olliveti (2006) using the PSID data studied the evolution of gender differentials in rates of return to labor market experience between the 1970s and the 1990s. Over this time period it was found that returns to experience increased within gender groups. Surprisingly, these were relatively larger for women than for men.¹

¹ This finding may have been generated by sample selection problems and simultaneity bias as acknowledged by Olliveti (2006). Nonetheless, Psacharoupoulos (1985) using cross-country evidence from 60 countries also confirms a similar pattern in which women's return to experience and schooling are much larger than those for men.

3. The Data

The database, collected from October, 2004 to September, 2005 by the National Statistics Institute in coordination with the Ministry of Labor (MITRAB) – the *Inquérito Integrado à Força de Trabalho* (IFTRAB, 2004-05), is the first post independence labor force survey of the country. The IFTRAB, 2004-05 is a multipurpose household survey, and contains detailed information on employment, unemployment, under-employment, sectors of economic activity of the labor force, number of hours worked, total volume of earnings, and also an additional questionnaire on child labor characteristics. The sample was designed to be representative at national level, provincial, and by area of residence (rural and urban). The selected sample corresponds to 17800 households, from which 17151 households were interviewed at national level, being 8681 in urban areas while 8470 were in rural areas. This represents a coverage rate of 96.4 percent of the selected sample.

4. Theoretical Framework

The links between schooling, labor market experience or on-the-job-training and earnings have been explored extensively in the literature regarding human capital accumulation. Labor market experience has a potential of improving overall welfare of households through increased future wage earnings as well as an indirect role in the welfare of households through its impact on the human capital accumulation as predicted by the human capital theory. In this section, we outline the theoretical framework used to examine the effect of labor market experience on earnings.

4.1. Theory

The estimation of the impact of labor market experience on earnings is guided by a nonparametric regression approach as discussed in Deaton (1997). The main advantage of this approach is the fact that it assumes no functional form for the relationship, allowing the data to choose, not only the parameter estimates, but the shape of the curve itself. However, the price of the flexibility is the much greater data requirements and the

difficulty of handling high-dimensional problems, and to a lesser extent, computational costs. But this seems not problematic in the context of this paper since we are using household survey data which contains enough information.

For estimation purposes, we define labor market experience by subtracting the age of completion of schooling from reported age minus six, as suggested by Mincer (1974:47). Moreover, we will investigate the impact of experience on log wages of two distinct groups of workers (those with completed EP2 school level and EP1) and by gender and area of residence (urban and rural). The model can be written as follows:

$$E(w \mid y \exp) = g(y \exp) \tag{1}$$

$$g(\operatorname{yexp}_i) = m(\operatorname{yexp}_i, S_i^*) + e_i \tag{1'}$$

Where i = 1...n indexes of individuals and w_i =logarithm of monthly earnings, $y \exp_i =$ years of potential experience (i.e. age – years of schooling – 6), and $S_i^*=1$ if individual has completed primary EP2 level and zero if individual has completed primary EP1 level. For simplicity, we also assume that $y \exp_i$ and S_i^* are strictly exogenous for e_i . Since w_i differs from its expectation by a residual (e_i) that is, by construction, uncorrelated with the latter, the statistical definition coincides with the standard linear regression model when the regression function is linear. Note that the function $g(y \exp)$, which in general will not be linear, is the regression function of w_i on $y \exp_i$. However, it should also be noted that, given a joint distribution of any set of variables, we can always calculate the regression function for any one variable conditional on the others.

Using the statistical properties of conditional expectations it is possible to link equation (1) to the underlying distribution. In particular, we can write:

$$E(w \mid y \exp) = \int w f_C(w \mid y \exp) dw = \int w f_J(w, y \exp) dw / f_M(y \exp)$$
(2)

Where the *C*, *M*, and *J* subscripts denote conditional, marginal and joint distributions, respectively. Alternatively, the regression function can be written entirely in terms of the joint distribution:

$$g(y\exp) = E(w \mid y\exp) = \int w f_J(w, y\exp) dw / \int f_J(w, y\exp) dw$$
(3)

This equation suggests a nonparametric method for estimating the regression function; estimate the joint density using kernel (or other) methods, and use the results to calculate (3). However, an obvious way to calculate a regression function is to use the sample information to calculate the average of all w-values corresponding to each $y \exp$. With an infinite sample, or discrete explanatory variables, such an approach would be feasible. Given the nature of data used in this paper, this approach seems to be appropriate.

Moreover, as with density estimation, weighting is desirable so as to avoid discontinuities in the regression function as individual observations move into and out of the bands, and this can be dealt with by calculating kernel regressions that are closely analogous to kernel estimates of densities. Indeed, the concept is perhaps already more familiar with regressions; the common practice of smoothing time series by calculating a moving average over a number of adjacent points is effectively a (rectangular) kernel regression of the form:

$$\tilde{f}(y\exp) = \frac{1}{nh} \sum_{i=1}^{n} \left(-\frac{h}{2} \le y\exp - y\exp_i \le \frac{h}{2} \right)$$
(4)

where *h* is the bandwidth and *n* is the sample size. Note that the choice of the bandwidth value is very important issue when doing serious research. In general, the point to note is that the bandwidth ought to be smaller the larger is the sample size.²

While the estimator in (4) captures the essential idea of nonparametric density estimation using "kernel" method, however, by giving all points inside the band equal weight, the estimator does not give consistent estimates. Instead, one solution should be that of using a "kernel" function that gives more weight to points that are near $y \exp and less$ to those far away, so that the points have a weight of zero both just outside and just inside the band. This can be done by replacing the indicator function in (4) by a "kernel" function K(.), so that:

$$\tilde{f}(y\exp) = \frac{1}{nh} \sum_{i=1}^{n} K\left(\frac{y\exp-y\exp_i}{h}\right)$$
(5)

² Silverman (1986) provides an extensive treatment of this topic. For further details about alternative nonparametric regression approaches see: Gallant (1981) and Cleveland (1979).

The kernel regression estimator can be written as follows:

$$\tilde{g}(y\exp) = \sum_{i=1}^{n} w_i K\left(\frac{y\exp-y\exp_i}{h}\right) / \sum_{i=1}^{n} K\left(\frac{y\exp-y\exp_i}{h}\right)$$
(6)

Which, using the f(yexp) the kernel estimate of the density at yexp from (5), can be written as:

$$\tilde{g}(y\exp) = \frac{1}{nh} \sum_{i=1}^{n} w_i K \left(\frac{y\exp - y\exp_i}{h} \right) / \tilde{f}(y\exp)$$
(7)

This equation can be assumed as a direct implementation of (2) with the kernels acting to smooth out the discrete sample points. Using (6), the estimate of the regression function can also be written as a weighted average of the w-values.

$$\tilde{g}(y\exp) = \sum_{i=1}^{n} k_i (y\exp)w_i$$
(8)

Where the weights k_i are given from equation (6). According to equation (8), the estimated regression is a weighted average of all the w_i in the sample with the weights depending on how far away each corresponding $y \exp_i$ is from the point at which we are calculating the function. Therefore, combining equation (1') with the result in (8), basically we are estimating the following relations:

$$g(\operatorname{yexp}_i) = m(\operatorname{yexp}_i, 0) + m(\operatorname{yexp}_i, 1) * E[S_i^* | \operatorname{yexp}]$$
(9)

These are locally-weighted average of $m(y \exp_i, 1)$ and $m(y \exp_i, 0)$, respectively. Thereafter, and using the result in (8), several theoretical hypothesis can be tested. Most specifically, we are interested in evaluating the following:

(a). $m(y \exp_i, 1) - m(y \exp_i, 0) > 0$ (there are positive returns to education – EP2 vs. EP1– given experience)

(b).
$$\frac{\partial m(y \exp_i, S_i^*)}{\partial y \exp_i} = m_{y \exp} > 0 \text{ (there are positive returns to experience)}$$

(c).
$$m_{y \exp}(y \exp_i, 1) - m_{y \exp}(y \exp_i, 0) >< 0 \text{ (Are the two forms of human capital)}$$

accumulation – schooling and labor market experience are complements or substitutes).

Furthermore, we extend the neoclassical model of investment in human capital in order to investigate the way through which individual's decision to invest in labor market experience affects their marginal returns. In this framework, we assume that workers make on-the-job-training investment decisions to maximize their net wage earnings or utility (U). Utility is defined by subtracting the costs of investment in labor market experience ($r(I_{ij})$) from gross wages $w(y \exp_{ij})$. Utility is maximized subject to cost of investment constraint.³ A simple version of this model can be written as:

Max U
$$(yexp_{ij}) = w(yexp_{ij}) - r(I_{ij}) * yexp_{ij}$$
 (Utility) (10)
Subject to:

$$r(I_{ij}) = \eta + \lambda I_{ij} \quad \text{(Cost of investment in on-the-job-training)}$$
(11)

Taking FOC in order of $yexp_{ij}$, we have that:

$$w'(y \exp_{ii}) = \eta \text{ if } I_{ii} = 0$$
 (Marginal returns to experience) (12)

$$w'(y \exp_{ij}) = \eta + \lambda \text{ if } I_{ij} = 1$$
 (Marginal returns to experience) (13)

The theoretical framework above discussed is then used to test the following hypothesis: (a). Difference in marginal returns between workers with EP1 and EP2 school level

- Let I_{ij}=1 if worker have EP2 level and zero for EP1. If λ>0, then it implies that marginal returns to experience for workers with EP2 level are higher than those of workers with EP1 school level. In other words, marginal earnings difference between the two groups is positive which reinforces inequality.
- (b). Difference in marginal returns by gender given same level of education
 - Let $I_{ij}=1$ if worker have EP2 level and is male, and zero if worker have EP2 and is female. If $\lambda > 0$, then it implies that given the same level of education; however; male workers enjoy higher marginal returns to experience than their counterpart.

³ The investment cost on acquiring labor market experience can assume different forms: for example, some on-the-job-training is *learning by doing* (as one hammers nails month after month, one skill's naturally improve) and therefore require both psychological and physical efforts from the workers. Other costs include credit constraints, opportunity costs of foregone earnings or low wages, as well as uncomfortable working conditions.

Putting it more simply, we can conclude that gender discrimination persists given same level of schooling.

(c). Difference in marginal earnings by area of residence and given same level of education

Let I_{ij}=1 if worker have EP2 level and lives in urban area, and zero if worker have EP2, and living in rural area. If λ >0, then it implies that given the same level of education; however; workers in urban areas enjoy higher marginal returns to experience than their counterpart in rural areas. More specifically, we can conclude that wage differentiation across areas of residence persists which can contribute to widen income inequality between urban and rural areas.

5. Results

This section discusses the main findings of the paper. First, the experience-earnings profile of workers with EP2 and EP1 school level is analyzed. Second, the hypothesis of existence of positive returns to education (between workers with EP2 versus EP1 school level), and given years of labor market experience is discussed. Third, estimates of returns to experience are reported and analyzed. Fourth, the hypothesis of whether labor market experience and schooling are substitutes or complements is investigated by means of marginal earnings difference distribution curves. It is important to note before doing the nonparametric regressions one has to choose an appropriate "kernel" function. Since we are interested in estimating marginal returns or derivative that is continuous, then we choose the quartic or "biweight" kernel function:⁴

$$K(z) = \begin{cases} \frac{15}{16} (1 - z^2)^2, \text{ if } -1 \le z \le 1\\ 0, \text{ if } |z| \ge 1 \end{cases}$$
(14)

⁴ There are many possible choices of kernel function. Because is a weighting function, it should be positive and integrate to unity over the band, it should be symmetric around zero, so that points below x get the same weight as those an equal distance above, and it should be decreasing in the absolute value of its argument. Examples of kernel functions are: Epanechnikov kernel and Gaussian Kernel, Rectangular kernel among.

Another critical issue when estimating nonparametric regression is that of bandwidth choice, since there is a trade-off between sample size and the former. In this particular application a bandwidth of 2.0 was chosen for a sample size of about 10178 observations of positive wage earners.

5.1. Labor market experience-earnings profile

Human capital theory predicts that average earnings of full-time workers rise with the level of education. However, earnings profiles imply a decline in on-the-job-training investments with age, which is attributed to the decline with age in the length of the remaining working life. Figure 1, 2 and 3 graph the 2004-05 earnings of working labor force with two distinct levels of completed education, EP1 and EP2 respectively. An examination of these figures reveals the following notable characteristics:

- Average earnings of full-time workers with EP2 level of schooling are much greater than those of workers with EP1 level, for the first five years after they start working;
- (ii) The most rapid increase in earnings occurs early for full-time workers with EP1 school level in urban areas, whereas in rural areas, earnings start pretty high and then they drop sharply before stabilizing for the remaining working life. The initial drop in earnings may in part reflect earnings volatility within this group of workers, since they are the least skilled of the whole labor force, thus vulnerable to shocks (especially in rural areas).
- (iii) In overall, earnings of full-time workers with EP2 tend to dominate those of their counterpart over the working life. This implies that schooling also plays a significant role in the determination of earnings for these groups of workers known as the least endowed.
- (iv) One important finding is the fact that earnings gap between these two categories of workers tend to shrink as they acquire more of labor market experience over their working life. This implies that investing in on-the-job training, especially for workers with EP1 levels of schooling can help to reduce inequality in the distribution of earnings between these groups of workers and thus impact positively on poverty reduction.



Figure 1: Relationship between labor market experience and wages - National

Figure 2: Relationship between labor market experience and wages - Rural areas



Figure 3: Relationship between labor market experience and wages - Urban areas



5.2. Returns to education given same labor market experience

In the preceding section we used human capital theory to analyze the impact of labor market experience on earnings for the two groups of workers (those with completed EP1 level of schooling, and those with EP2). From the analysis described above we can also investigate the impact of another source of investment in human capital (e.g. schooling) on earnings. This can be done as follows: given same amount of labor market experience, we then derive the difference on earnings than is accounted by worker's level of education. If the difference turns to be positive then we can conclude that there are positive returns to education, all things being equal. In fact the later assumption carries important implications for empirical analysis. For example, people with EP1 schooling level and who have ability to learn quickly are likely to be presented by employers with, training opportunities as well as greater remuneration than those with EP2. In that case, returns will tend to look pretty much higher for EP1 workers than those with completed EP2.

Figures 4, 5 and 6 depict earnings differences between workers with completed EP2 and those with EP1. The analysis were done for three domains; national, rural and urban areas. The results indicate that in Mozambique there are evidences of positive and diminishing returns to education between the group of workers who have completed EP2 and those with EP1. The reason why worker's returns for completing EP2 than EP1 are diminishing over working life may be due to the fact that as EP1 workers acquire more labor experience, then their earnings start to rise more sharply and therefore the earnings gap begins to shrink. Note that this effect is much pronounced in rural areas where earnings difference converges more quickly towards zero before both groups of workers have completed 10 years of labor market experience.



Figure 4: Earnings difference given labor market experience - National

Figure 5: Earnings difference given labor market experience - Rural areas



Figure 6: Earnings difference given labor market experience - Urban areas



5.3. Returns to experience

A comparison of Figures 7, 8 and 9 discloses immediately that there are positive returns to experience. Moreover, returns to on-the-job training of workers that have completed EP1 are greater than those of workers with completed EP2 schooling level. The gap is much greater in urban areas while in the rural areas it tends to get narrow over working life. For example, and during the first five years of working experience the returns to experience for workers with EP1 in rural areas is about 15 percent against 11 percent for workers with EP2. This implies a 4 percentage point's gap in returns of investment in labor market experience. In contrast, in urban areas the returns to experience gap between these two categories of workers averages 6 percentage points for the corresponding working experience. Therefore, and based on rational expectations model we can deduce that urban workers with completed EP1 have more incentives to invest in on-the-job training than their counterparts in rural areas.

Like earnings-experience profiles, returns to labor market experience generally rise steeply early on, and then flatten, and may eventually fall. In fact, the early increases are so steep relative to those on the latter levels of working experience. This may probably reflects a potential depreciation of skills or a decline in on-the-job training investments with age (Chiswich, 2003).

Furthermore, it is important to note that the data reflected in Figures 7, 8, and 9 do not "follow" specific individuals through time; rather, they match earnings with potential labor market experience in a given year. Thus the generally declining profiles for workers with more than 20 years of potential experience could reflect reduced job opportunities for unskilled labor force, changes in the composition of working labor force that have completed EP1 and EP2 and working full-time, or some factor that may depressed earnings.

Figure 7: Returns to experience - National



Figure 8: Returns to experience - Rural areas



Figure 9: Returns to experience - Urban areas



5.4. Trade-off between investments in labor market experience and schooling

Human capital theory predicts a positive correlation between acquisition of labor market experience and schooling. In general, better-educated workers tend to invest more in onthe-job training than their counterparts (Ehrenberg and Smith, 1999). Therefore, this section is aimed at testing whether this empirical finding is also holds for the case of the least skilled workers. An investigation of the Figures 10, 11, and 12 clearly reveals a striking result as compared to what human capital theory would predict. It is shown that there is a trade-off in investing on both schooling and labor market experience for the least skilled workers (EP1 and EP2 schooling level). That is, workers with completed EP1 level often tend to substitute investments in schooling for acquisition of more of working life experience. This finding may be attributed to liquidity constraints as well as to high opportunity costs in terms of foregone earnings. Poverty may also be a cause of this trade-off since most of adult members of poor households in Mozambique have not even completed EP2 and are forced to drop out of school and enter labor market in order to earn some income to meet their basic needs.





Figure 11: Marginal earnings difference - Rural areas



Figure 12: Marginal earnings difference - Urban areas



5.5. Earnings difference by area of residence

Figures 13 and 14 display the distribution of earnings differences between urban and rural workers who have completed the EP1 and EP2 level, respectively. The results show that while earnings gap is quite narrow among workers in both areas of residence, however, it tends to widen over working life experience for the case of workers with EP2 in urban areas as compared to those in the rural areas. This means that within the same schooling level (EP2) inequality in earnings tend to increase with labor market experience and regional location. This may in part reflect a depression on earnings of EP2 workers in rural areas as compared to their counterparts in the urban areas.

Therefore, policies aimed at creating stable and more labor intensive jobs in the rural areas would be worthy in order to narrow this gap.



Figure 13: Earnings difference for workers with EP1 by area of residence - urban vs. rural

Figure 14: Earnings difference for workers with EP2 by area of residence - urban vs. rural



Another interesting relationship to analyze is whether investments in schooling and labor market experience are substitutes or complements across regions and given same level of education. Figures 15 and 16 depict marginal earnings for workers with completed EP1 and EP2 in urban vs. rural areas. Conclusions about whether marginal earnings difference is positive or negative among EP1 workers in urban areas as compared to those in rural areas is not pretty clear from the data since the distribution is centered around zero. Nevertheless, there are evidences that indicate a positive association between investments in schooling and working experience, at least for the first 5 years after workers with completed EP2 level in urban areas start working. However, eventually and beyond that level of working experience they start substituting schooling for work as shown by the negative values of marginal earnings difference which lie below zero (see Figure 16).





Figure 16: Marginal earnings difference for workers with EP2 - urban vs. rural



5.6. Returns to experience by gender and area of residence

A brief inspection of Figures 17, 18, 19 and 20 reveal that there are positive returns to experience regardless of gender and geographical location. Nevertheless, one notable characteristic that arise clearly from the data is the fact that men's returns to experience are always greater than those of women given same level of education and regional location. In addition to that, the gap in returns is much larger among workers who have only completed the EP1 level, as illustrated by Figures 17 and 19. For example, and for workers with EP1 level in rural areas, men's returns to experience averages about 10 percent after five years of work, and can rise to 14 percent after 25 years of working experience. In contrast, women's returns start very low at about 7 percent and decline to less than 6 percent after 25 years of work. Similar pattern is also observed for the case of urban areas.

Given what we have seen above, it seems relevant to question about the main factors that make women's returns so low as compared to men. According to human capital theory, differences in expected work life between men and women constitute a primary cause of differences in returns to working experience. For example, the incentives for women to make investment in a longer working life experience are less because the average female expects to spend less than half her working life in the labor force, and has a high probability of dropping out of the labor force for child-rearing (Chiswich, 2003; Ehrenberg and Smith). While this finding may be reasonable for the case of female workers who have only completed the EP1 level of schooling, however recent changes in the labor force participation of women, especially married women of childbearing age and who are relatively well-educated (primary EP2 and beyond), are causing dramatic changes in the acquisition of schooling and working experience, and consequently on the distribution of earnings. In fact, this can be confirmed by the data in the case of rural workers with completed EP2. For example, while men's returns to experience start at 6 percent against only 4 percent for women after 5 years of work, however women's returns eventually start catching up as a result of more investment in both schooling and labor market experience. Consequently, in rural areas the return's to experience gap

between men and women tends to fade away after about 25 years of working experience as illustrated in Figure 18.



Figure 17: Returns to experience for workers with EP1 and by gender - Rural areas

Figure 18: Returns to experience for workers with EP2 and by gender - Rural areas





Figure 19: Returns to experience for workers with EP1 and by gender - Urban areas





6. Conclusions

In this paper we highlighted the impact of work-related experience on earnings distribution. We demonstrated that earnings of full-time workers with EP2 tend to dominate those of workers with EP1 level over the working life. This implies that schooling also plays a significant role in the determination of earnings for these groups of workers known as the least endowed. We then showed that earnings gap between these two categories of workers tend to shrink as they acquire more of labor market experience which implies that investing in on-the-job training, especially for workers with EP1 schooling can help to reduce inequality in the distribution of earnings thus impact positively on poverty reduction.

Furthermore, we find that there are positive returns to education between completing EP2 level of schooling as compared to EP1. This finding indirectly reinforces previous research on human capital, household welfare and schooling in Mozambique which indicated a positive and significant correlation between completion of EP2 level and improvements in household consumption (Handa, Simler and Harrower, 2004). In addition, the paper also provided evidence that workers who have completed the EP1 level of schooling tend to have greater returns to labor market experience than their counterpart. This finding although surprising, however, may find an explanation on the rational decision of low-skilled workers in terms of investing more on work-related experience rather than schooling in order to meet their basic needs. It also important to note that since opportunity costs of investing on schooling instead of work are high for this group then given that in equilibrium marginal costs have to be equal to marginal benefits, therefore the finding above seems reasonable.

Gender differentiation on earnings is clearly evident from the data. For example, in overall men's returns to experience are always dominating those of women regardless of the level of schooling and regional location. Nevertheless, women's returns seem to catch up with those of men, especially at the top of the distribution and for workers who have completed EP2. This finding appeals to the need of more investment on both schooling and work-related experience for women living in rural areas in order to reduce poverty and inequality in income distribution.

The paper also showed that unlike what human capital would predict, however, there is a trade-off between investing on schooling and labor market experience at least for this group of low-skilled workers in Mozambique. Therefore, elimination of credit constraints and other opportunity costs that makes worker's investments in schooling more expensive (especially in rural areas) would be worthy. This would ultimately impact positively in terms of raising productivity of labor, and thus expand economic growth and welfare in the grassroots.

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