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**EDUCATION AND HOUSEHOLD WELFARE IN
SRI LANKA FROM 1985 TO 2006**

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Abstract

This paper looks at the impact of education on household economic welfare in Sri Lanka over twenty years from 1985 to 2006 using five cross section household survey datasets. Applying quantile regression techniques the analysis finds that the incremental value to household welfare shows a distinct jump for an extra year of education at levels where important national examinations are completed. Moreover, higher quantiles systematically enjoy greater incremental welfare to education levels between Grade 8 to completed Advanced level examinations. Both these effects happen partly via the labour market, as labour market returns to employment display similar trends. The first finding suggests that credentials are important in the labour market. The second finding suggests that individuals in the upper quantiles probably have better quality education as well as social and analytical skills that complement formal education, enabling them to earn higher returns for their education.

Keywords

Sri Lanka, Education, Welfare, Quantile Regression, returns

JEL Classification codes

I00 I20 I21 053.

1. Introduction

Education is important for the economic welfare of a household, not the least because it has a strong influence on employment opportunities, labour market success, productivity and earnings of household members¹. Several papers exist in the empirical literature that look directly at the impact of education on household welfare using micro level data for developing countries, such as Glewwe (1991) and Teal (2004). These papers look at welfare determinants given prior asset accumulations and household characteristics, enabling an interpretation between education and welfare that suggests not simply a correlation but causality. Glewwe finds that education has a positive effect on welfare for those employed in the public sector in Cote D'Ivoire. Teal finds that an extra year of education increased household welfare between 1.9 to 2.9 per cent in Ghana in the 1990s.

Improving access and quality of education has also been recognised as an important means of not just improving welfare but bringing people out of poverty and reducing inequalities (Aslam et.al. 2008, Colclough et.al.2009). However, the impact of education on household welfare and inequality may not be the same for the rich and poor. This may be due, *inter alia*, to differences in the quality of education received or differences in skills that complement formal education that help translate education into higher welfare. A recent paper by Nguyen et. al.(2007) explores some of these issues. It uses Quantile Regression (QR) techniques to look at the determinants of rural-urban gaps in household welfare in Vietnam to find that differences in the quantity of education and other covariates explained the welfare gap in 1993 but reflecting rapid changes in the economy, by 1998 this was true only for those at the lower end of the welfare distribution (i.e., those who were poorer). For those at the upper end, returns to education and other covariates explained much of the rural-urban gap in welfare. This aspect of education is particularly important for developing countries such as Sri Lanka that is emerging from a 30 year old civil conflict. The country's recent regeneration efforts emphasise the role of education to bridge gaps and improve growth. However it is important to look at the trends in the impact of education on welfare during the past few decades, to glean insights as to the direction future investments in education should take.

Sri Lanka's achievements in the sphere of reaching high levels of literacy and education attainment is well known (World Bank 2010), as are the benefits of education in terms of its returns to employment (Aturupane 1993, Gunawardane 2002, Gunawardane et. al. 2008, De Silva 2009, Himaz 2010). However, very little is known about the actual impact of formal education (obtained in schools and universities) on household economic welfare. Does more education mean higher household welfare? Is the impact the same for the poor and the rich? If not, is there consistent evidence suggesting that this could be due to differences in education quality and skills complementing formal education? Are such effects, if they exist, explained at least partially by labour market outcomes? This paper attempts to answer these questions. It looks at the impact of formal education (i.e., grade completion) on household welfare (proxied by the log of real per capita household expenditure) over two decades from 1985 to 2006 in Sri Lanka. It uses 5 cross section data

¹ Theoretical underpinnings for this relationship can be found in the Human Capital Theory (Schultz 1961, Becker 1964). Although household welfare can in turn have a strong impact on education levels [3,4], this is not the focus of this paper.

sets conducted by the Department of Census and Statistics (Household Income Expenditure Surveys) for 1985/6, 1990/91, 1995/6, 2001/2 and 2005/6.

The rest of the paper is organised as follows. Section 2 presents the conceptual framework and empirical specification. Section 3 examines the data and descriptive statistics. Section 4 analyses the impact of education on welfare over time. Section 5 explores whether labour market returns to education shed light on the patterns observed in the previous section. Section 6 provides the conclusions of the analysis..

2. Conceptual Framework and empirical specification

We first look at the influence of education and various other household characteristics, assumed to be exogenous, on household welfare. This is a reduced form estimation of various structural relationships such as earnings functions and production functions. We use Ordinary Least Squares estimation (OLS) as well as quantile regression (QR) analysis². The regression line of an OLS estimation passes through the mean of the sample. In contrast, QR analysis allows us to estimate the impact of education on welfare at different parts of the welfare distribution, making use of the entire distribution. So while OLS looks at effects at the mean, QR analysis can look at effects at other parts of the distribution such as the very poor (lower end of the welfare distribution) and very rich (higher end of the distribution). By looking at the impact of education at various points of the welfare distribution, we can infer to what extent education increases or reduces underlying inequality. The method requires that the spread of education across the welfare distribution is sufficient to conduct the analysis. Although the distribution of education levels is not uniform especially at the very low and very high levels of education, there are at least a few of each level in all of the income groups. For example those with post graduate qualification at the poorest level 5% of the population is less than 1 per cent of the sample, but not 0. However the corresponding proportion for the poorest 25 per cent is much larger.

The function estimated for the determinants of household welfare using OLS analysis is

$$y = \alpha + \sum_{j=0}^7 \delta s_j + \beta X + \varepsilon \quad (1)$$

where y is the log of real per capita monthly household consumption (RPCE) which is used as a proxy for household welfare³, α is the regression intercept, $s_0...s_7$ are dummy variables for the level of schooling of the household head (or spouse if higher) with no schooling (0 years) being the reference level, and the other years of schooling and university level education collapsed into groups numbered 1 to 7 in the following order: completed grades

² The theoretical model for the empirical estimations in this paper is based on Deaton and Muellbauer (1980, 1986), discussed more succinctly in Glewwe (1991).

³ The variable is derived by adding monthly household expenditure on food and non-food items and then adjusting it for spatial variations in prices. This figure is then divided by the Gross Domestic Product deflator to convert it to real terms, so that comparisons across the years become meaningful. We then divide it by the number of household members (not including borders, lodgers and servants) to obtain per capita expenditure figures. The base year is set as 2002³. The empirical estimation will use the natural logarithm of RPCE.

1-4, 5-7, 8-9, passed O/L, passed A/L, degree, or has postgraduate qualification⁴. The coefficient δ measures the extent to which schooling level raises household consumption above the reference level of schooling. The vector X contains several other observable control variables that affect household consumption including age, age square and gender of the household head, household composition (i.e., log of household size and the number of children aged 0 to 14 as a proportion of household members), physical capital and assets (i.e., imputed monthly rental value of house if owned and remittances from within the country and abroad)⁵ rural/estate sector residence (urban omitted), province of residence (Central, Southern, Northern, Eastern, North Central, North Western, Uva and Sabaragamuwa with Western province omitted). The independent error term with mean zero and constant variance is denoted by ε .

Although controlling for the quality of education would have been very desirable, there are no suitable variables in the survey for this purpose. Similarly controlling for community characteristics such as the availability of non-farm employment opportunities, proximity to major towns, etc., would have been desirable. However, the lack of consistent data across the five surveys preclude this. It is assumed that the inclusion of regional dummies account for community based differences at least partially. We have also not included ethnicity as an explanatory variable in the analysis, due to incomparability of this variable across the data sets.

For the quantile regression analysis, our estimations follow the form

$$Q_{\theta}[y|s, X] = \alpha_{\theta} + \sum_{j=0}^7 \delta_{\theta} s_j + \beta_{\theta} X \quad (2)$$

Where y is log RPCE, $Q_{\theta}[y|s, X]$ is the θ th conditional quantile of y , α is the regression intercept, s denotes the category of schooling and X is the covariate matrix (excluding s), all following the explanation for equation (1).

3. Data and Descriptive Statistics

The data for this paper comes from the Household Income Expenditure surveys (HIES) for 1985/86, 1990/91, 1995/96, 2002/3 and 2006/7, carried out by the Department of Census and Statistics, Sri Lanka. The DCS conducts the cross-section HIES roughly once every 5 years. Data collection is done in twelve equal monthly rounds to capture seasonal variations in income and expenditure. A two stage stratified random sample design is used with urban, rural and estate sectors as the domains for stratification. The primary sampling unit is a census block and the secondary sampling unit are the housing units within the selected census blocks. The overall quality of the data is good both in terms of response rates and a coverage that is consistent with other independent surveys carried out on the same population [15:237].

⁴ We are restricted to dividing the school categories in this manner due to the fact that this is how the 1985/6 survey records information on school attendance. Grades 1-4 reflect primary education, 5-7, 8-9 reflect early and intermediate secondary education. Completing O/L reflects schooling further for and 10th and 11th year and reading for the Ordinary Level examinations at the end of the 11th year. Students can then move on to reading for a further 2 years and take the Advanced Level examinations. Success at this stage can qualify the student to pursue university level education. Note that there is no grade repetition in Sri Lankan schools.

⁵ All monetary variables are adjusted for price differences spatially and temporally, similar to the dependent variable expenditure. The estimation uses the logarithm of these values.

The number of households in the sample for 1985/86, 1990/91, 1995/6, 2001/2 and 2005/6 are 19410, 18385, 19656, 16573 and 18546, respectively. Table 1 provides summary statistics for the main variables used in this paper. The table shows that real per capita consumption has increased over the years between 1985 and 2005, nearly doubling during that time from Rs.2228 to Rs. 4041. Similarly, the level of education of the household head (or the spouse of the head if the latter is more educated) also increases over the years, by around 1.5 years from around 7 to 8.2. Around 27 per cent of the households have a spouse with higher formal education than the head.⁶ The average age of the head is about 49 years while the gender is male in around 80 per cent of the households in the sample. Roughly 66% of the households in 1985/6 and 1990/1 are from rural or estate areas rather than urban areas while in the later surveys around 80 per cent of the sample is rural. The value of remittances from within the country and overseas have increased considerably in real terms over the 20 years by nearly 8 fold. It was about 3% of the value of consumption in 1985 and 13% in 2006. The imputed rented value of the house, if owned, sees the largest change from Rs. 133.44 to Rs. 2280.2.

Table 2 provides quantile based disaggregation of selected variables used in the analyses. Similar to the table above that shows average values, most of the variable values indicate an upward trend over the 20 years within all quantiles considered. However, within quantile differences of the rate of growth of some of the variables is clearly evident. For example, household welfare (i.e., the real expenditure per capita) of all the quantiles increased over time, but the growth in welfare of the rich increased more than that of the poor. In terms of education levels, those in the lower end of the welfare distribution are notably less educated than those at the higher end. Although education levels are rising within all quantiles, the rise in average education levels of the rich are more than those who are poor.

4. Results for impact of education on welfare

In this section we present the results for the estimations of the relationship between log real per capita consumption expenditure (RPCE) and household socioeconomic characteristics using OLS regression analyses and at various quantiles of the log RPCE distribution, using quantile regression analyses.

The coefficient of the education category dummies in the OLS estimates in Tables 3a-3e, column 1, which can be interpreted as the average percentage impact being educated up to a particular age category has on welfare shows that the more educated is the household head, the larger is the positive impact on consumption, *ceteris paribus*. As the rest of the columns in the tables show, this effect is noticeable at all points of the consumption distribution. So more education is better for household welfare⁷.

⁶ The level of education of the most educated member of the household (more often than not a child of the household head) is about 1.3-2 years more than the household head (or spouse).

⁷ It is entirely possible that the level of education achieved reflects an individual's intrinsic ability. Thus improvements in welfare as education rises are not just due to productivity improvements brought about by completing more grades but an individual's ability to make more money in the labour market. Similarly, an individual may have a high private 'discount rate' that makes them attain low education levels as this is privately optimal but an unobservable characteristic such as ability makes them earn more. The literature on calculating

The positive impact of education on welfare has been rising over time for completed A/L, university and postgraduate categories. The highest rise is for university education, followed by postgraduate education. For other levels, the trend in impact is close to zero.

To make the results clearer, we calculate the incremental increase in welfare for an extra year of schooling using the coefficient values and level of schooling. They are calculated as $\delta_j - \delta_{j-1}/s_j - s_{j-1}$ following the notation in equation (1) where δ_j is the coefficient on schooling level s_j . Since the household head (or spouse if they are more educated) may have completed varying years of schooling within the categories $s_1...s_7$, the average years are used. Thus $s_1= 2.5$, $s_2= 6$, $s_3= 9$, $s_4= 11$, $s_5= 13$, $s_6= 15$ and $s_7= 16$. Similar calculations are made for the QR estimates for the θ th conditional quantile using coefficients presented in full in Tables 3a-3e columns 2-6.

We will first look at the results based on the OLS estimations. Table 4 presents these results. One of the most striking features of the table is how the impact of an extra year of education (excluding the postgraduate category) on incremental household welfare falls into two groups: low and high. For education levels between years 1-10, the impact of an extra year of education on welfare is quite low, between 1 and 5 per cent compared to having no education. For higher levels of education, where O/Ls, A/Ls have been completed or the head has education at the university level, the impact on welfare is much higher ranging between 9 to 16 percent. This seems to suggest that the impact of education on welfare are not linear at every level of education and that credentials such as having completed O/Ls, completed A/Ls, or having university-level training are important. These credentials cause a 'jump' in its impact on household welfare compared to having less than 10 years of education where no comparable national examinations are available.

Emphasising the importance of *more is better* in terms of grade completion, especially after grade 10 education, is the fact that the *gap in returns* between lower levels of education and higher levels of education have widened considerably by 2005/6. For example, investing in an extra year of education in secondary school between grade 8 to 10 compared to grade 5-7 improves household welfare by nearly 2% more in 2005/6 than it did in 1985/6. The gap at higher levels of education is even more. The extra contribution to welfare of passing O/Ls versus passing university level examinations is 8% in 2005/6, compared to 5% in 1990. These widening gaps are significant in the context that the average incremental impact an extra year of education has on welfare ranges between 6.7 to 8.6 per cent over the two decades.

In terms of trends over time, the incremental positive impact of education on economic welfare is rising for A/Ls and university education. It is positive but close to 0 for O/L and 8-10 years of education. It is negative for postgraduate education and close to zero for other levels. Trends over time also show a dip in values for completed O/L, A/L and university levels during the 1990 period when internal strife in the country was particularly high. However these 'returns' and others pick up gradually to peak in 2001/2 during the period of the short-lived peace treaty between the Government and the rebel group, the Liberation Tigers of Tamil Eelam (LTTE).

returns to education has been preoccupied with this issue of accounting for ability for many decades. We will not attempt to account for this here, due to data restrictions.

The results of the quantile regression based estimations are presented in the Tables 3a-3e, columns 2-6. These results are used to calculate the incremental impact on welfare of an extra year of education, for each welfare quantile. The method by which these 'returns' are calculated are similar to that for the OLS estimations, discussed in the previous section. These results are presented by education category in Table 5.

The table shows that the disparity observed in the OLS estimations between education levels below grade 10 and above grade 10 (excluding the postgraduate category) in terms of its impact on welfare, is obvious at all welfare quantiles. For example, the average 'return' in terms of welfare for education levels between 1-10 years over all 20 years at $\theta=0.05$, $\theta=0.25$, $\theta=0.5$, $\theta=0.75$ and $\theta=0.95$ was around 2 to 3 per cent. However, for completed O/Ls and completed A/Ls, this was 0.13, 0.07, 0.09, 0.1, 0.11 and 0.13, respectively. This suggests that credentials (i.e., passing exams-especially the O/Ls and A/Ls) are very important for all welfare groups.

Another key insight that can be drawn is that the coefficients on education categories rise progressively from lower quantiles to higher quantiles consistently for the 8-10 years and completed O/L categories, and for most years for the completed A/L categories. For example, the return in terms of welfare improvement for the completed A/L category at the $\theta=0.05$, $\theta=0.25$, $\theta=0.5$, $\theta=0.75$ and $\theta=0.95$ points in the welfare distribution were 6.8, 9.2, 9.8, 10.9 and 15.3 per cent, respectively, in 2002. This suggests, for example, that those with A/L qualifications in the higher quantiles are better able to translate their education into higher welfare than an O/L qualified person in a lower quantile. This is most likely due to better quality education, better social and analytical skills, and probably other complementary skills vital in today's labour market such as IT skills. This is a very important result not the least because these categories of education (8 to 10 years, completed O/Ls and completed A/Ls) comprise a bulk of the population-around 60 per cent of the sample of household heads in 2006.

The returns in terms of welfare of education at levels between 5-7 years, compared to having no education have been falling slightly over the years, for all welfare groups apart from the poorest $\theta=0.05$. Returns on education between 1-4 years has also been falling for all welfare groups apart from the two poorest. This suggests that improving the delivery of general education, especially years 1-7, can have a considerable impact on improving the welfare of the poorest quartile.

The extra impact on welfare of an extra year of education in the university and postgraduate categories varies considerably across the welfare groups. Generally, the impact of the university category is lower than that of completed A/Ls and O/Ls, with the gap widening the most for the richest group in our analysis where $\theta=0.95$. Here the 'return' on O/Ls and A/Ls is on average around 13 per cent but that of university education just 0.05. This implies inter alia that ability and other characteristics become more important at the higher levels of welfare. It is also reflective of the fact that those with university education go for specific types of jobs such as teaching, state-sector jobs, etc., that may not necessarily pay much but have prestige and job security.

The returns on postgraduate education show considerable fluctuations especially in the lower welfare groups, probably due to the very small number in the sample in these

categories. For the higher welfare groups, the 'return' on post graduate qualifications is quite high, some times more than that for other levels of education.

Other factors that influence welfare significantly are remittances, both domestic and overseas. Overall, a percentage rise in foreign remittances increases household welfare by about 5 per cent, with the impact almost the same across all the income quantiles. Similarly, physical household assets also exert a significant positive impact on welfare. Residing in a rural area compared to being in an urban area is a significant negative influence through all the years and quantiles. As for gender of the household head, being male exerts a significant positive impact on welfare, *ceteris paribus*, for those in the lower quartiles (0.05, 0.25 and 0.5 in our paper), but is insignificant for the richer quartiles.

Robustness checks

As a check of robustness of results, an alternative specification was carried out, including occupation and industry category of the household head and spouse separately in the regression analysis. This was possible for all the survey years apart from 2001/2, as during this year, information regarding occupation and industry was only collected for wage earners. The results for the remaining years (not reported) show that the impact of occupation category on household welfare becomes more important over the two decades. Not only are the coefficients of the occupation dummies larger in the later years than in 1985, the gap between the marginal effects of skilled and unskilled occupations (i.e., managerial/professional/technical versus agricultural workers/craft etc) is larger in 2006 than in 1985. The returns on highly skilled managerial and professional occupations have increased markedly since 1990. In contrast returns for low skilled occupations such as agricultural and fisheries workers have actually fallen over the years, as have those for craft workers. Other low skilled and semi skilled categories such as plant and machine operators, sales workers and clerks have increased in their contribution to household welfare over time, but not as much as the high skilled white collar jobs. These trends are probably driven by a combination of demand side reasons such as the increasing knowledge intensity of economic production activities, supply side reasons (education and its quality), and exogenous reasons such as the civil war in parts of Sri Lanka during the period of the study.

In order to see whether the armed conflict, internal political instability and civil strife during the period under study had taken its toll on household welfare, and whether our basic results are robust to this, we pool all the data together and capture year-based effects by adding year dummies (omitting 2001/2). Sri Lanka was a country in conflict during the entire period from 1985- 2006, apart from a brief couple of years starting 2002, when a peace treaty was signed. But soon after, the conflict worsened, with severe impacts on household welfare. The coefficients on the year dummies show a clear negative impact (unreported). This has impacted the effect of education on welfare: It seems to drop until 1995, before picking up with the change of government until the peace treaty in the year 2000 when it peaks, before starting to fall again as the country sunk once again into war. Interestingly, this has not affected the impact of occupation category on welfare—skills, which always has a strong demand.

We now move to examining whether the main results of the QR analysis—that those in the upper end of the welfare distribution can translate their education into higher welfare

through probably higher earnings-can be explained at least partially by what happens in the labour market.

5. Returns to education

5.1. Methodology and descriptive statistics

In this section we estimate returns to education for males in employment (both wage and non-wage). The standard Mincerian specification is used Mincer (1974), matching most of the existing empirical literature in Sri Lanka in this area.

The function estimated to calculate returns to education using OLS analysis is

$$w = \alpha + \sum_{j=0}^7 \delta s_j + \beta X + \varepsilon \quad (3)$$

where w is the log of earnings of an individual aged between 18-60, α is the regression intercept, $s_0 \dots s_7$ are dummy variables for the level of schooling of the individual with no schooling (0 years) being the reference level, and the other years of schooling and university level education collapsed into groups numbered 1 to 7 in the following order: completed grades 1-4, 5-7, 8-9, passed O/L, passed A/L, degree, or has postgraduate qualification. Note that the categorisation of schooling is the same as for the previous welfare analysis. However, the coefficient δ in this case measures the extent to which schooling level raises wages above the reference level of schooling. The vector X contains several observable influences on earnings such as the age and age square of the individual to capture experience. Although we would like to use occupation and industry category as explanatory variables we cannot do so as this information is consistently available only for wage earners. We also use province and sector of residence (rural versus urban).

Returns to education are also estimated using a series of quantile regressions of the form:

$$Q_\theta[w|s, X] = \alpha_\theta + \sum_{j=0}^7 \delta_\theta s_j + \beta_\theta X \quad (4)$$

where w is log earnings, $Q_\theta[w|s, X]$ is the θ th conditional quantile of w , α is the regression intercept, s denotes the category of schooling and X is the covariate matrix (excluding s), all following explanation for equation (3). Note that in the analysis of the previous section, our quantiles were defined by the expenditure per capita that was the proxy for wealth. In this section, our quantiles are conditioned by the distribution of wages. As the distribution of female education across the quantiles is very skewed with few university and post graduate qualified women in the lowest quantile and almost no women with education of 1-4 or 5-7 years in the highest quantile, QR cannot be performed on the female subsample. We will therefore estimate returns only for males.

Table 6 presents some descriptive statistics at the mean, for male earners. Earnings have been rising over time. The average age of individuals in our sample is about 35. The years of education increase gradually over the years. The sample sizes are 32004, 25087, 25228, 16109 and 19835, respectively for 1985/6, 1990/91, 1995/6, 2001/2 and 2005/6.

5.2. Returns based on OLS and QR estimations

The results of the OLS and QR estimations are provided in Tables 7a-7e. The coefficients on the regressions are used to calculate returns to education as $\delta_j - \delta_{j-1}/s_j -$

s_{j-1} following the notation in equation (3) where δ_j is the coefficient on schooling level s_j . Since individuals may have completed varying years of schooling within the categories $s_1 \dots s_7$, the average years are used. Thus $s_1 = 2.5$, $s_2 = 6$, $s_3 = 9$, $s_4 = 11$, $s_5 = 13$, $s_6 = 15$ and $s_7 = 16$. Similar calculations are made for the QR estimates for the θ^{th} conditional quantile. The returns are presented in the tables 8.

The average returns for males have been falling over the years for education categories 1-4, 5-7 and completed O/Ls categories while it has been rising for education levels between 8-10 years, completed A/Ls, and university education categories. Returns to postgraduate education has been falling over time. The QR analysis matches these trends at every quantile but shows that certain returns such as those for A/Ls and university education rises over time more sharply at the higher end of the earnings distribution than the lower end.

The OLS results also show a 'jump' in returns once national exams have been completed, similar to the finding in the welfare analysis in the previous section. The QR results show that this credential value of education (i.e., the sheepskin effect) is prominent at all levels of the earnings distribution. Thus the importance of credentials in the welfare estimations may be driven entirely by the fact that credentials are important in the labour market.

The results for returns based on QR analysis in Table 9 shows that for 1985/6 and 1990/1, the returns are systematically higher for higher quantiles for education levels between 8-10 years. For 1995/6, 2000/1 and 2005/6 this is true for education levels between 8-11 years (i.e., completed O/Ls). This implies that for the education levels concerned, those at the upper end of the earnings distribution can translate their formal education into higher earnings better than those at the lower quantiles. This is probably due to the possession of vital social, analytical and communication skills complementary to formal cognitive skills, or perhaps due to differences in the quality of education received. This trend has become more pronounced over the two decades as upper quantiles displayed systematically higher returns compared to lower quantiles for a wider range of education levels in 2006 than in 1985.

It should be recapitulated that in the previous section analysing welfare, the 'returns' based on welfare were systematically higher for education levels between 8 to 13 years (completed/Ls) of education. However the labour market returns analysis based on individual earnings in this section indicates systematically higher returns by quantile only for education levels between 8 to 10 or 11 years. Can these results be reconciled? It can be reconciled by noting that the trends in the labour market returns based on individual males explain only partially why returns to household head's education in terms of household welfare was seen to be systematically higher for upper quantiles. Other reasons may lie in the fact that richer households have more members in employment than poorer households and that these members are likely to have better quality education and complementary skills than their poorer counterparts⁸. This probably results in larger contributions to household welfare in terms of earnings that are not linear. It is also possible that trends in positive

⁸ The first of the explanations can be easily verified. In 2005/6 for example, welfare quantiles 1 to 4 ranging from poorest to richest had 1.21, 1.43, 1.54 and 1.67 members in employment respectively. For 2001/2 the corresponding figures were 1.24, 1.5, 1.61 and 1.64. For 1995/6 they were 1.25, 1.57, 1.68 and 1.73. For 1990/91 it was 1.34, 1.56, 1.59 and 1.78.

assortative mating contributes to some of the differences noticed. If individuals seek partners with similar or higher educational attainment, it is likely that the joint impact on household welfare causes increased inequality between the quantiles captured by the welfare analysis but not in the individual returns analysis. It is also possible, however, that there is negative assortative mating. Moreover, the net effect of assortative mating on household welfare could have changed over time. There has been no research conducted in Sri Lanka on this aspect and this remains to be investigated.

For education levels beyond passing A/Ls and above, the returns are not consistently higher for higher quantiles. Thus the important policy message seems to be that the quality of *general* education and the acquisition of non-cognitive skills complementing the cognitive skills acquired through formal education is pivotal in improving earnings of those who are poorer, and to reducing the earnings gap between the rich and poor.

6. Conclusions

The analyses so far examined the impact of education on welfare over the past two decades in Sri Lanka. There are two main results that come out of the analyses. Firstly, there is a jump in the incremental effect of education on welfare between 1 to 10 years of education and the completed O/L, A/L, university categories. For education levels between 1-10 years, the impact is between 1 and 5 per cent. For higher levels it is 9-16 per cent. This implies that credentials (completing important national exams) are very important in translating education to higher welfare, perhaps via labour market effects. Secondly, upper quantiles systematically display higher impact of education (between 8-13 years) on welfare than lower quantiles, indicating that these households are better able to translate their human capital to welfare.

To see if these impacts of education on welfare may be explained at least partially by what happens in the labour market, we looked for similar patterns in labour market returns for all male income earners from 1985 to 2006. The analysis is confined just to males because the spread of education across the earnings distribution is insufficient to conduct the analysis for females. The results are supportive of the results for the welfare analysis. The 'sheepskin effect' where credentials are important is seen in labour market returns to education, with the effect prevalent across the earnings distribution. As for returns being systematically higher for the higher quantiles, this holds for education levels 8 to 10 years for years 1985/6 and 1990/91 and for education levels 8 to 11 years (completed O/Ls) for the rest of the period of study. Returns may be systematically higher for higher quantiles due to the richer individuals having skills complementing formal education or a better quality education that enables them to earn more in the labour market. These skills could include *inter alia* social and analytical skills, computer literacy or better English language ability that are all vital in a knowledge economy. Thus the returns analysis indicates that at least a part of the reason that the same level of household human capital translates to higher welfare for richer households, can be explained by dynamics in the labour market.

The policy implications that arise are as follows. First, the target seems to be to encourage not just general education, but the completion of important national exams or at least develop a viable alternative in terms of well recognised vocational qualification skills, as credentials are important for household welfare and labour market returns. This may have particularly strong implications for post conflict reconstruction and reducing inequality. Second, there are higher welfare and labour market returns to investing in improving quality of education and complementary skills, especially for general education up to completing

O/Ls. Thus developing complementary skills should be a part of the general education curriculum, not something introduced to school leavers at age 16 or after completing A/Ls. Finally, the returns to university education are particularly high compared to levels of education below this. There is a case, therefore for the expansion of the tertiary education sector. Returns to post graduate education, however, fluctuate considerably and remains an area for further investigation.

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Table 1: Summary statistics for key variables 1985-2006

	1985/6 ¹	1990/1	1995/6	2002/3	2005/6
Real per capita consumption (Sri Lankan Rupees)	2228.606	2458.55	2517.13	3600.38	4041.73
Education level- Grade completed of household head or spouse (if the latter is more educated)	n/a	7.05	7.48	8.21	8.24
No schooling	0.09	0.08	0.07	0.06	0.06
1 to 4 years	0.26	0.17	0.16	0.11	0.13
5 to 7 years	0.26	0.24	0.23	0.18	0.18
8 to 10 years	0.18	0.28	0.29	0.34	0.32
Completed O/L (11 years)	0.15	0.16	0.17	0.17	0.17
Completed A/L (13 years)	0.03	0.03	0.06	0.09	0.11
University	0.01	0.01	0.01	0.02	0.02
Post graduate	0.01	0.01	0.01	0.01	0.01
Age	48.3	49.6	48.8	49.26	50.48
Gender of household head (proportion of males)	0.79	.80	.80	.80	.76
Household size	5.1	4.92	4.56	4.24	4.16
Proportion of 0-14 year olds	0.3	0.27	0.26	0.23	0.23
Rural residence (proportion)	0.67	.66	.81	.81	.75
Remittances-domestic (real value, Sri Lankan Rupees)	32.98	21.17	48.80	102.48	267.7193
Remittances-abroad (real value, Sri Lankan Rupees)	70.58	90.39	145.17	230.89	532.3578
Imputed rental value of house (if owned)	133.44	289.61	767.7	1386.56	2280.479

Note: Education in terms of years completed is not available in the 1985/86 survey as this survey groups level of education in 5 categories –no education, grade 1-4, 5-7, 8-9, passed O/L, passed A/L, degree, postgraduate qualification.

Table 2: Within quartile means of selected variables; 1985-2006

	Lowest	Expenditure quartile		Highest
		Second	Third	
1985/6				
Real per capita expenditure	874.52	1388.99	2006.85	4644.39
Education in years ¹	-	-	-	-
1-4 years	0.37	0.3	0.24	0.13
5-7 years	0.29	0.3	0.28	0.19
8-10 years	0.15	0.19	0.2	0.19
Passed O/L	0.05	0.09	0.16	0.31
Passed A/L	>0.01	0.01	0.02	0.07
University level	>0.01	>0.01	0.01	0.05
Post graduate	>0.01	>0.01	>0.01	0.02
1990/91				
Real per capita expenditure	1105.64	1677.27	2321.31	4730.33
Education in years ¹	5.79	6.43	7.10	8.88
1-4 years	0.23	0.2	0.15	0.09
5-7 years	0.3	0.27	0.24	0.16
8-10 years	0.27	0.29	0.31	0.26
Passed O/L	0.07	0.12	0.17	0.29

Passed A/L	0.01	0.02	0.03	0.08
University level	>0.01	>0.01	0.01	0.05
Post graduate	>0.01	>0.01	>0.01	0.02
1995/6				
Real per capita expenditure	1101.67	1657.17	2342.07	4968.31
Education in years ¹	6.15	6.64	7.49	9.64
1-4 years	0.23	0.19	0.14	0.08
5-7 years	0.28	0.28	0.23	0.12
8-10 years	0.3	0.32	0.33	0.24
Passed O/L	0.09	0.11	0.17	0.3
Passed A/L	0.01	0.02	0.05	0.16
University level	>0.01	>0.01	0.01	0.05
Post graduate	>0.01	>0.01	0	0.03
2001/2				
Real per capita expenditure	1232.3	1979.56	3046.26	8146.57
Education in years ¹	6.25	7.35	8.55	10.63
1-4 years	0.19	0.13	0.09	0.04
5-7 years	0.25	0.22	0.18	0.08
8-10 years	0.34	0.4	0.37	0.26
Passed O/L	0.08	0.13	0.21	0.27
Passed A/L	0.02	0.04	0.09	0.24
University level	>0.01	>0.01	0.01	0.07
Post graduate	>0.01	>0.01	>0.01	0.03
2005/6				
Real per capita expenditure	1571.63	2496.52	3697.14	8401.63
Education in years ¹	6.22	7.52	8.77	10.44
1-4 years	0.21	0.15	0.1	0.06
5-7 years	0.25	0.2	0.17	0.09
8-10 years	0.33	0.37	0.34	0.25
Passed O/L	0.07	0.14	0.22	0.26
Passed A/L	0.02	0.05	0.11	0.23
University level	>0.01	>0.01	0.01	0.07
Post graduate	>0.01	>0.01	>0.01	0.03

Note: 1. The regression analysis does not include this variable.

Table 3a: Determinants of welfare: 1985
Dependent variable: log of real per capita consumption

	OLS		Quintile			
		0.05	0.25	0.50	0.75	0.95
1-4 years	0.0893*** (0.0117)	0.0323 (0.0206)	0.0573*** (0.0155)	0.0925*** (0.0173)	0.0959*** (0.0175)	0.0967** (0.0402)
5-7 years	0.205*** (0.0135)	0.129*** (0.0181)	0.160*** (0.0157)	0.195*** (0.0111)	0.218*** (0.0198)	0.228*** (0.0319)
8-10 years	0.314*** (0.0153)	0.217*** (0.0195)	0.260*** (0.0197)	0.301*** (0.0167)	0.320*** (0.0237)	0.396*** (0.0503)
Passed O/L	0.604*** (0.0161)	0.444*** (0.0222)	0.524*** (0.0181)	0.582*** (0.0163)	0.640*** (0.0230)	0.746*** (0.0555)
Passed A/L	0.858*** (0.0271)	0.662*** (0.0477)	0.795*** (0.0240)	0.848*** (0.0275)	0.879*** (0.0355)	1.025*** (0.0856)
University level	1.044*** (0.0257)	1.047*** (0.0687)	1.003*** (0.0389)	1.003*** (0.0360)	1.050*** (0.0556)	1.111*** (0.0966)
Post graduate	1.232*** (0.0718)	0.686*** (0.139)	1.072*** (0.0568)	1.305*** (0.0938)	1.369*** (0.102)	1.432*** (0.128)
Sex	0.0463*** (0.00943)	0.101*** (0.0216)	0.0761*** (0.00953)	0.0358*** (0.0124)	0.0119 (0.0161)	0.0203 (0.0247)
Inhhsz2	-0.416*** (0.00958)	-0.381*** (0.0106)	-0.382*** (0.0112)	-0.402*** (0.0122)	-0.426*** (0.0104)	-0.488*** (0.0285)
prop0_14	-0.525*** (0.0220)	-0.494*** (0.0339)	-0.489*** (0.0236)	-0.518*** (0.0221)	-0.539*** (0.0262)	-0.566*** (0.0393)
	(1.45e-05)	(2.27e-05)	(2.03e-05)	(1.99e-05)	(2.01e-05)	(4.31e-05)

Rural	-0.131*** (0.0104)	-0.119*** (0.0115)	-0.131*** (0.00900)	-0.125*** (0.0108)	-0.124*** (0.0130)	-0.148*** (0.0304)
Inremitdom	0.00819*** (0.00268)	0.00964** (0.00393)	0.00760*** (0.00275)	0.00792*** (0.00260)	0.0107*** (0.00347)	0.0140* (0.00736)
Inremitabr	0.0428*** (0.00247)	0.0502*** (0.00360)	0.0447*** (0.00280)	0.0419*** (0.00300)	0.0373*** (0.00350)	0.0449*** (0.00706)
Inhouseval	0.0304*** (0.00172)	0.0523*** (0.00332)	0.0286*** (0.00180)	0.0257*** (0.00164)	0.0229*** (0.00146)	0.0328*** (0.00349)
Constant	7.743*** (0.0400)	6.936*** (0.0554)	7.450*** (0.0486)	7.779*** (0.0571)	8.145*** (0.0429)	8.416*** (0.141)
Observations	19410	19410	19410	19410	19410	19410
R-squared	0.447					

Note: Age, square of age and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications
*** p<0.01, ** p<0.05, * p<0.1

Table 3b: Determinants of welfare 1990
Dependent variable: log of real per capita consumption

	OLS	Quintile				
		0.05	0.25	0.50	0.75	0.95
1-4 years	0.0722*** (0.0122)	0.0875** (0.0348)	0.0658*** (0.0179)	0.0624*** (0.0167)	0.0667*** (0.0207)	0.0735** (0.0299)
5-7 years	0.131*** (0.0122)	0.143*** (0.0265)	0.111*** (0.0241)	0.124*** (0.0148)	0.127*** (0.0175)	0.134*** (0.0316)
8-10 years	0.229*** (0.0122)	0.209*** (0.0371)	0.204*** (0.0233)	0.203*** (0.0141)	0.221*** (0.0195)	0.276*** (0.0286)
Passed O/L	0.459*** (0.0168)	0.386*** (0.0373)	0.396*** (0.0218)	0.433*** (0.0178)	0.467*** (0.0183)	0.586*** (0.0431)
Passed A/L	0.669*** (0.0230)	0.564*** (0.0423)	0.582*** (0.0311)	0.634*** (0.0258)	0.655*** (0.0398)	0.877*** (0.0981)
University level	0.884*** (0.0326)	0.780*** (0.0977)	0.824*** (0.0436)	0.829*** (0.0260)	0.872*** (0.0336)	1.091*** (0.0989)
Post graduate	1.067*** (0.0685)	0.841*** (0.107)	0.937*** (0.0718)	1.067*** (0.0589)	1.121*** (0.0592)	1.396*** (0.188)
Sex	0.0300*** (0.0107)	0.0764*** (0.0196)	0.0363*** (0.00911)	0.0230** (0.0106)	0.0101 (0.0142)	0.0168 (0.0204)
Inhhsz2	-0.420*** (0.00853)	-0.340*** (0.0147)	-0.389*** (0.0130)	-0.421*** (0.00938)	-0.446*** (0.00885)	-0.491*** (0.0198)
prop0_14	-0.334*** (0.0206)	-0.317*** (0.0400)	-0.314*** (0.0210)	-0.309*** (0.0209)	-0.335*** (0.0199)	-0.395*** (0.0329)
Rural	-0.0969*** (0.00819)	-0.0504*** (0.0180)	-0.0679*** (0.0123)	-0.0881*** (0.00916)	-0.120*** (0.0103)	-0.176*** (0.0178)
Inremitdom	0.00491* (0.00284)	0.00739 (0.00583)	0.00636 (0.00484)	0.00664*** (0.00252)	0.00652* (0.00380)	-0.0102* (0.00617)
Inremitabr	0.0311*** (0.00276)	0.0285*** (0.00353)	0.0256*** (0.00332)	0.0294*** (0.00342)	0.0319*** (0.00218)	0.0315*** (0.00484)
Inhouseval	0.0329*** (0.00145)	0.0481*** (0.00526)	0.0334*** (0.00236)	0.0296*** (0.00190)	0.0258*** (0.00159)	0.0359*** (0.00336)
Constant	7.895*** (0.0431)	6.965*** (0.0681)	7.514*** (0.0415)	7.893*** (0.0403)	8.226*** (0.0491)	8.826*** (0.117)
Observations	18385	18385	18385	18385	18385	18385
R-squared	0.379					

Note: Age, square of age and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications
 *** p<0.01, ** p<0.05, * p<0.1

Table 3c: Determinants of Welfare 1995
Dependent variable: log of real per capita consumption

	OLS	Quintile				
		0.05	0.25	0.50	0.75	0.95
1-4 years	0.0576*** (0.0127)	0.0804*** (0.0255)	0.0537** (0.0225)	0.0543*** (0.0171)	0.0252 (0.0154)	0.00672 (0.0333)
5-7 years	0.111*** (0.0136)	0.112*** (0.0254)	0.112*** (0.0240)	0.115*** (0.0222)	0.0809*** (0.0164)	0.0579* (0.0330)
8-10 years	0.193*** (0.0112)	0.168*** (0.0359)	0.171*** (0.0234)	0.182*** (0.0236)	0.169*** (0.0158)	0.216*** (0.0365)
Passed O/L	0.452*** (0.0155)	0.296*** (0.0259)	0.379*** (0.0231)	0.436*** (0.0276)	0.482*** (0.0190)	0.568*** (0.0363)
Passed A/L	0.722*** (0.0198)	0.577*** (0.0329)	0.657*** (0.0279)	0.731*** (0.0271)	0.736*** (0.0240)	0.880*** (0.0678)
University level	0.947*** (0.0312)	0.840*** (0.0580)	0.884*** (0.0400)	0.930*** (0.0525)	0.989*** (0.0467)	0.998*** (0.0675)
Post graduate	0.979*** (0.0381)	0.783*** (0.0754)	0.961*** (0.0580)	0.990*** (0.0666)	0.956*** (0.0545)	1.194*** (0.125)
Sex	0.0307*** (0.00851)	0.0746*** (0.0191)	0.0390*** (0.0115)	0.0194* (0.0101)	0.0173** (0.00738)	-0.000947 (0.0214)
Inhhsiz2	-0.429*** (0.00942)	-0.339*** (0.0224)	-0.388*** (0.0125)	-0.411*** (0.00945)	-0.442*** (0.0155)	-0.488*** (0.0186)
prop0_14	-0.334*** (0.0178)	-0.346*** (0.0310)	-0.341*** (0.0158)	-0.342*** (0.0183)	-0.368*** (0.0286)	-0.343*** (0.0381)
Rural	-0.156*** (0.00955)	-0.0805*** (0.0128)	-0.109*** (0.0110)	-0.139*** (0.00799)	-0.189*** (0.0121)	-0.246*** (0.0271)
Inremitdom	0.0182*** (0.00206)	0.0357*** (0.00484)	0.0197*** (0.00280)	0.0176*** (0.00354)	0.0164*** (0.00342)	0.0123* (0.00739)
Inremitabr	0.0334*** (0.00177)	0.0369*** (0.00384)	0.0352*** (0.00182)	0.0343*** (0.00132)	0.0308*** (0.00249)	0.0297*** (0.00605)
Inhouseval	0.0355*** (0.00125)	0.0434*** (0.00518)	0.0312*** (0.00160)	0.0288*** (0.000984)	0.0313*** (0.00174)	0.0379*** (0.00316)
Constant	8.003*** (0.0359)	7.265*** (0.0760)	7.738*** (0.0511)	7.993*** (0.0474)	8.388*** (0.0536)	8.878*** (0.0898)
Observations	19656	19657	19657	19657	19657	19657
R-squared	0.454					

Note: Age, square of age and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications
 *** p<0.01, ** p<0.05, * p<0.1

Table 3d: Determinants of Welfare 2002
Dependent variable: log of real per capita consumption

	OLS	Quintile				
		0.05	0.25	0.50	0.75	0.95
1-4 years	0.0853*** (0.0192)	0.0952*** (0.0347)	0.0764*** (0.0245)	0.0492*** (0.0161)	0.0524** (0.0238)	0.133*** (0.0446)
5-7 years	0.166***	0.129***	0.154***	0.146***	0.144***	0.174***

8-10 years	(0.0186) 0.312***	(0.0300) 0.192***	(0.0222) 0.259***	(0.0162) 0.262***	(0.0203) 0.317***	(0.0390) 0.490***
Passed O/L	(0.0186) 0.600***	(0.0348) 0.390***	(0.0172) 0.503***	(0.0137) 0.568***	(0.0233) 0.636***	(0.0374) 0.854***
Passed A/L	(0.0179) 0.922***	(0.0361) 0.617***	(0.0222) 0.789***	(0.0166) 0.888***	(0.0237) 0.993***	(0.0551) 1.239***
University level	(0.0196) 1.195***	(0.0384) 0.890***	(0.0171) 1.086***	(0.0248) 1.163***	(0.0341) 1.260***	(0.0669) 1.500***
Post graduate	(0.0337) 1.398***	(0.0824) 0.892***	(0.0440) 1.287***	(0.0431) 1.390***	(0.0470) 1.478***	(0.0970) 1.809***
sex	(0.0611) 0.0211**	(0.235) 0.0514***	(0.0598) 0.0267**	(0.0768) 0.0217**	(0.113) -0.00338	(0.109) -0.0142
Inhhsiz2	(0.00974) -0.474***	(0.0195) -0.380***	(0.0113) -0.422***	(0.00870) -0.457***	(0.0114) -0.507***	(0.0355) -0.613***
prop0_14	(0.0128) -0.270***	(0.0170) -0.261***	(0.0147) -0.301***	(0.0130) -0.306***	(0.0150) -0.251***	(0.0256) -0.200***
rural	(0.0206) -0.297***	(0.0427) -0.213***	(0.0309) -0.271***	(0.0330) -0.275***	(0.0327) -0.303***	(0.0768) -0.337***
Inremitdom	(0.0126) 0.0283***	(0.0239) 0.0223***	(0.0186) 0.0246***	(0.0141) 0.0261***	(0.0184) 0.0241***	(0.0282) 0.0460***
Inremitabr	(0.00380) 0.0435***	(0.00826) 0.0427***	(0.00347) 0.0393***	(0.00440) 0.0382***	(0.00450) 0.0376***	(0.0141) 0.0644***
Inhouseval	(0.00340) 0.0453***	(0.00385) 0.0994***	(0.00331) 0.0528***	(0.00327) 0.0400***	(0.00565) 0.0363***	(0.00997) 0.0406***
Constant	(0.00209) 8.139***	(0.00489) 7.078***	(0.00188) 7.807***	(0.00192) 8.182***	(0.00224) 8.558***	(0.00414) 8.941***
	(0.0568)	(0.0875)	(0.0473)	(0.0505)	(0.0732)	(0.118)
Observations	16573	16573	16573	16573	16573	16573
R-squared	0.459					

Note: Age, square of age and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications
*** p<0.01, ** p<0.05, * p<0.1

Table 3e: Determinants of welfare 2006/7
Dependent variable: log of real per capita consumption

	OLS	0.05	0.25	Quintile 0.50	0.75	0.95
1-4 years	0.0905*** (0.0170)	0.108*** (0.0341)	0.0914*** (0.0179)	0.0854*** (0.0204)	0.0928*** (0.0203)	0.0979** (0.0449)
5-7 years	0.148*** (0.0175)	0.142*** (0.0348)	0.140*** (0.0165)	0.138*** (0.0211)	0.153*** (0.0140)	0.157*** (0.0326)
8-10 years	0.269*** (0.0174)	0.228*** (0.0356)	0.229*** (0.0206)	0.263*** (0.0197)	0.297*** (0.0179)	0.314*** (0.0347)
Passed O/L	0.525*** (0.0222)	0.414*** (0.0410)	0.457*** (0.0230)	0.508*** (0.0225)	0.562*** (0.0221)	0.638*** (0.0309)
Passed A/L	0.785*** (0.0236)	0.600*** (0.0243)	0.689*** (0.0252)	0.787*** (0.0259)	0.850*** (0.0179)	0.967*** (0.0359)
University level	1.064*** (0.0344)	0.902*** (0.0536)	0.981*** (0.0378)	1.028*** (0.0315)	1.133*** (0.0647)	1.286*** (0.0787)
Post graduate	1.176*** (0.0409)	1.043*** (0.0557)	1.095*** (0.0707)	1.124*** (0.0343)	1.262*** (0.0771)	1.314*** (0.0811)
sex	0.0206** (0.00975)	0.0457*** (0.0159)	0.0287** (0.0120)	0.0166* (0.00942)	-0.00210 (0.0128)	-0.0102 (0.0309)
Inhhsiz2	-0.468*** (0.00874)	-0.396*** (0.0145)	-0.440*** (0.00899)	-0.469*** (0.0108)	-0.479*** (0.0118)	-0.515*** (0.0287)
prop0_14	-0.200***	-0.201***	-0.197***	-0.218***	-0.211***	-0.242***

	(0.0190)	(0.0377)	(0.0240)	(0.0267)	(0.0266)	(0.0520)
rural	-0.177***	-0.152***	-0.154***	-0.165***	-0.185***	-0.221***
	(0.0100)	(0.0166)	(0.00961)	(0.00626)	(0.00931)	(0.0238)
Inremitdom	0.0104***	0.0147**	0.0116***	0.0135***	0.0127***	0.00478
	(0.00245)	(0.00594)	(0.00237)	(0.00311)	(0.00275)	(0.00443)
Inremitabr	0.0314***	0.0342***	0.0311***	0.0315***	0.0300***	0.0312***
	(0.00232)	(0.00484)	(0.00315)	(0.00214)	(0.00300)	(0.00519)
Inhouseval	0.0350***	0.0377***	0.0320***	0.0318***	0.0327***	0.0410***
	(0.000999)	(0.00357)	(0.00186)	(0.00133)	(0.00200)	(0.00256)
Constant	8.321***	7.532***	7.992***	8.267***	8.626***	9.281***
	(0.0410)	(0.0756)	(0.0739)	(0.0360)	(0.0568)	(0.0894)
Observations	18543	18543	18543	18543	18543	18543
R-squared	0.434					

Note: Age, square of age and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Incremental impact of education on welfare due to an extra year of schooling using OLS estimates

Years of education	1985	1990	1995	2002	2006
1 to 4	0.036	0.029	0.023	0.034	0.036
5 to 7	0.033	0.017	0.015	0.023	0.016
8 to 10	0.036	0.033	0.027	0.049	0.04
Completed year 11	0.145	0.115	0.129	0.144	0.128
Completed year 13	0.127	0.105	0.135	0.161	0.13
University	0.093	0.108	0.11	0.137	0.14
Post graduate	0.188	0.183	0.035	0.203	0.112

Source: Based on OLS estimates in column 1 of Tables 3a-3e. Baseline: 0 years of education

Table 5: Incremental impact of education on welfare due to an extra year of schooling using QR estimates

	1985	1990	1995	2002	2006
1 – 4 years of education					
$\theta=0.05$	0.014	0.037	0.035	0.046	0.048
$\theta=0.25$	0.024	0.023	0.023	0.026	0.034
$\theta=0.5$	0.034	0.023	0.02	0.02	0.035
$\theta=0.75$	0.04	0.019	0.012	0.024	0.035
$\theta=0.95$	0.042	0.025	0.013	0.035	0.032
5 – 7 years of education					
$\theta=0.05$	0.032	0.017	0.01	0.009	0.006
$\theta=0.25$	0.027	0.014	0.016	0.024	0.014
$\theta=0.5$	0.031	0.017	0.016	0.027	0.018
$\theta=0.75$	0.032	0.019	0.016	0.025	0.016
$\theta=0.95$	0.038	0.023	0.016	0.018	0.014
8 – 10 years of education					
$\theta=0.05$	0.027	0.023	0.015	0.023	0.028
$\theta=0.25$	0.026	0.028	0.018	0.029	0.026
$\theta=0.5$	0.031	0.027	0.022	0.036	0.033

$\theta=0.75$	0.032	0.033	0.027	0.048	0.041
$\theta=0.95$	0.049	0.044	0.045	0.085	0.043
Completed O/Ls (11 years)					
$\theta=0.05$	0.086	0.08	0.061	0.081	0.076
$\theta=0.25$	0.103	0.072	0.083	0.105	0.096
$\theta=0.5$	0.11	0.094	0.107	0.12	0.099
$\theta=0.75$	0.125	0.105	0.124	0.135	0.099
$\theta=0.95$	0.143	0.133	0.144	0.134	0.126
Completed A/Ls (13 years)					
$\theta=0.05$	0.056	0.054	0.075	0.068	0.079
$\theta=0.25$	0.075	0.068	0.089	0.092	0.078
$\theta=0.5$	0.093	0.055	0.099	0.098	0.091
$\theta=0.75$	0.101	0.071	0.089	0.109	0.101
$\theta=0.95$	0.13	0.131	0.111	0.153	0.106
University					
$\theta=0.05$	0.085	0.059	0.059	0.077	0.065
$\theta=0.25$	0.077	0.068	0.052	0.077	0.077
$\theta=0.5$	0.045	0.081	0.061	0.082	0.073
$\theta=0.75$	0.029	0.075	0.063	0.075	0.074
$\theta=0.95$	0.003	0.058	0.059	0.071	0.094
Postgraduate					
$\theta=0.05$	-0.138	0.08	0.038	-0.105	0.083
$\theta=0.25$	-0.01	0.171	0.071	0.224	0.094
$\theta=0.5$	0.312	0.233	0.035	0.183	0.107
$\theta=0.75$	0.367	0.211	0.041	0.345	0.115
$\theta=0.95$	0.332	0.239	0.104	0.314	0.123

Source: Based on QR estimates presented in Table 3a-3e, columns 2-6. Baseline: 0 years of education.

Table 6: Within quartile means for selected variables used in labour market returns analysis

	Expenditure quartile			
	Lowest	Second	Third	Highest
1985/6				
earnings	31.147	483.886	844.122	2630.226
Age	44.08	38.362	38.73	42.251
1 to 4	0.397	0.384	0.302	0.162
5 to 7	0.259	0.27	0.268	0.217
8 to 10	0.154	0.163	0.2	0.194
Completed year 11	0.074	0.074	0.141	0.285
Completed year 13	0.011	0.009	0.028	0.07
University	0.001	0.001	0.005	0.039
Post graduate	0.002	0.001	0.001	0.015
Rural	0.84	0.782	0.637	0.543
1990/91				
earnings	165.782	889.226	1570.053	4536.207
Age	44.823	39.762	38.49	41.802
1 to 4	0.253	0.257	0.168	0.09
5 to 7	0.3	0.295	0.244	0.165
8 to 10	0.243	0.273	0.345	0.29
Completed year 11	0.095	0.082	0.164	0.29
Completed year 13	0.014	0.012	0.037	0.096
University	0.001	0	0.003	0.042

Post graduate	0.0004	0.001	0.0003	0.014
Rural	0.859	0.802	0.63	0.553
1995/6				
earnings	266.88	1579.073	2768.917	7432.227
Age	44.255	39.091	38.47	41.39
1 to 4	0.257	0.238	0.141	0.064
5 to 7	0.263	0.285	0.224	0.132
8 to 10	0.271	0.288	0.359	0.284
Completed year 11	0.101	0.086	0.176	0.287
Completed year 13	0.019	0.022	0.058	0.157
University	0.001	0.001	0.005	0.045
Post graduate	0.001	0.0003	0.0004	0.019
Rural	0.954	0.894	0.794	0.673
2001/2				
earnings	577.974	3645.898	5703.26	16344.22
Age	38.047	36.529	37.608	40.443
1 to 4	0.213	0.152	0.097	0.048
5 to 7	0.246	0.223	0.168	0.088
8 to 10	0.362	0.421	0.411	0.32
Completed year 11	0.085	0.113	0.202	0.246
Completed year 13	0.029	0.045	0.088	0.213
University	0.002	0.002	0.012	0.057
Post graduate	0.001	0.002	0.002	0.022
rural	0.928	0.839	0.776	0.687
2005/6				
earnings	1661.539	6408.552	10300.5	30372.58
Age	44.934	38.912	39.816	42.624
1 to 4	0.242	0.159	0.1	0.059
5 to 7	0.242	0.201	0.164	0.097
8 to 10	0.326	0.414	0.419	0.297
Completed year 11	0.094	0.132	0.195	0.239
Completed year 13	0.03	0.052	0.094	0.215
University	0.003	0.002	0.008	0.063
Post graduate	0.001	0.001	0.003	0.021
rural	0.869	0.769	0.726	0.667

Table 7a-Private returns to education for males 1985

Dependent variable: log of earnings

	OLS	0.05	0.25	Quintile 0.50	0.75	0.95
Age	0.071*** (0.002)	0.071*** (0.008)	0.098*** (0.003)	0.076*** (0.002)	0.057*** (0.002)	0.058*** (0.005)
1-4 years	0.152*** (0.024)	0.0533 (0.086)	0.123*** (0.029)	0.128*** (0.020)	0.140*** (0.022)	0.188*** (0.048)
5-7 years	0.311*** (0.025)	0.122 (0.088)	0.270*** (0.030)	0.268*** (0.021)	0.326*** (0.022)	0.475*** (0.049)
8-10 years	0.397*** (0.026)	0.0426 (0.093)	0.316*** (0.032)	0.367*** (0.022)	0.443*** (0.024)	0.621*** (0.053)
Passed O/L	0.734*** (0.027)	0.485*** (0.097)	0.668*** (0.033)	0.697*** (0.023)	0.699*** (0.024)	0.999*** (0.054)
Passed A/L	0.981*** (0.040)	0.886*** (0.145)	0.915*** (0.049)	0.870*** (0.034)	0.910*** (0.036)	1.258*** (0.081)
University level	1.278*** (0.057)	1.697*** (0.203)	1.243*** (0.071)	1.115*** (0.048)	1.122*** (0.052)	1.178*** (0.112)
Post graduate	1.376*** (0.086)	1.602*** (0.300)	1.198*** (0.106)	1.348*** (0.072)	1.416*** (0.077)	1.633*** (0.169)
rural	-0.410***	-0.848***	-0.461***	-0.300***	-0.240***	-0.270***

	(0.013)	(0.048)	(0.016)	(0.011)	(0.012)	(0.027)
Constant	6.34***	5.26***	5.60***	6.38***	6.95***	7.40***
	(0.052)	(0.184)	(0.063)	(0.043)	(0.046)	(0.106)
Observations	31704	31704	31704	31704	31704	31704
R-squared	0.182					

Note: Square of age, a dummy indicating whether the individual is married and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications *** p<0.01, ** p<0.05, * p<0.1

Table 7b- Private returns to education for males -1990

Dependent variable: log of earnings

	OLS	0.05	0.25	Quintile		
				0.50	0.75	0.95
Age	0.062*** (0.003)	0.061*** (0.010)	0.078*** (0.004)	0.067*** (0.002)	0.052*** (0.002)	0.048*** (0.004)
1-4 years	0.173*** (0.029)	0.243** (0.114)	0.165*** (0.041)	0.123*** (0.027)	0.163*** (0.026)	0.263*** (0.048)
5-7 years	0.225*** (0.028)	0.126 (0.111)	0.204*** (0.040)	0.203*** (0.026)	0.275*** (0.025)	0.343*** (0.047)
8-10 years	0.394*** (0.028)	0.156 (0.112)	0.338*** (0.040)	0.383*** (0.026)	0.493*** (0.025)	0.592*** (0.047)
Passed O/L	0.674*** (0.030)	0.239** (0.119)	0.610*** (0.043)	0.718*** (0.028)	0.780*** (0.027)	0.865*** (0.050)
Passed A/L	0.928*** (0.041)	0.586*** (0.160)	0.934*** (0.057)	0.910*** (0.038)	0.975*** (0.036)	1.062*** (0.067)
University level	1.403*** (0.063)	1.521*** (0.243)	1.409*** (0.088)	1.252*** (0.059)	1.330*** (0.057)	1.321*** (0.104)
Post graduate	1.615*** (0.102)	1.458*** (0.363)	1.689*** (0.142)	1.588*** (0.095)	1.554*** (0.092)	1.683*** (0.156)
Rural	-0.427*** (0.015)	-0.817*** (0.059)	-0.448*** (0.021)	-0.302*** (0.014)	-0.273*** (0.014)	-0.422*** (0.026)
Constant	6.611*** (0.059)	5.522*** (0.235)	6.000*** (0.082)	6.561*** (0.055)	7.096*** (0.052)	7.750*** (0.091)
Observations	24949	24949	24949	24949	24949	24949
R-squared	0.204					

Note: Square of age, a dummy indicating whether the individual is married and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications *** p<0.01, ** p<0.05, * p<0.1

Table 7c- Private returns to education for males -1995

Dependent variable: log of earnings

	OLS	0.05	0.25	Quintile		
				0.50	0.75	0.95
Age	0.064*** (0.003)	0.071*** (0.009)	0.088*** (0.003)	0.071*** (0.002)	0.048*** (0.002)	0.037*** (0.004)
1-4 years	0.049 (0.031)	-0.115 (0.112)	-0.024 (0.042)	0.048* (0.026)	0.099*** (0.027)	0.152*** (0.054)
5-7 years	0.197*** (0.030)	0.064 (0.109)	0.121*** (0.040)	0.175*** (0.026)	0.249*** (0.026)	0.287*** (0.053)
8-10 years	0.360*** (0.0297)	0.021 (0.108)	0.273*** (0.039)	0.364*** (0.025)	0.437*** (0.026)	0.525*** (0.052)
Passed O/L	0.646*** (0.031)	0.214* (0.117)	0.556*** (0.042)	0.653*** (0.026)	0.733*** (0.027)	0.838*** (0.055)
Passed A/L	0.946*** (0.037)	0.634*** (0.138)	0.866*** (0.050)	0.908*** (0.032)	0.990*** (0.033)	1.035*** (0.066)

University level	1.390*** (0.063)	1.263*** (0.224)	1.343*** (0.084)	1.229*** (0.053)	1.299*** (0.055)	1.400*** (0.109)
Post graduate	1.478*** (0.093)	1.091*** (0.335)	1.427*** (0.125)	1.489*** (0.079)	1.523*** (0.081)	1.335*** (0.163)
Rural	-0.461*** (0.018)	-1.179*** (0.066)	-0.447*** (0.024)	-0.278*** (0.015)	-0.258*** (0.016)	-0.417*** (0.033)
Constant	6.687*** (0.062)	5.645*** (0.223)	6.006*** (0.083)	6.611*** (0.053)	7.286*** (0.055)	8.072*** (0.111)
Observations	25079	25079	25079	25079	25079	25079
R-squared	0.218					

Note: Square of age, a dummy indicating whether the individual is married and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications *** p<0.01, ** p<0.05, * p<0.1

Table 7d-- Private returns to education for males -2002
Dependent variable: *log of earnings*

	OLS	0.05	0.25	Quintile 0.50	0.75	0.95
Age	0.052*** (0.002)	0.063*** (0.008)	0.070*** (0.003)	0.053*** (0.002)	0.046*** (0.002)	0.039*** (0.006)
1-4 years	0.058 (0.038)	-0.023 (0.117)	-0.027 (0.046)	0.058 (0.036)	0.133*** (0.037)	0.126 (0.083)
5-7 years	0.211*** (0.038)	0.127 (0.114)	0.140*** (0.045)	0.220*** (0.036)	0.279*** (0.036)	0.220*** (0.082)
8-10 years	0.424*** (0.036)	0.271** (0.110)	0.362*** (0.043)	0.424*** (0.034)	0.503*** (0.035)	0.481*** (0.078)
Passed O/L	0.675*** (0.038)	0.493*** (0.116)	0.592*** (0.046)	0.688*** (0.036)	0.750*** (0.037)	0.755*** (0.083)
Passed A/L	0.970*** (0.040)	0.852*** (0.123)	0.912*** (0.048)	0.947*** (0.038)	0.977*** (0.039)	1.047*** (0.088)
University level	1.407*** (0.058)	1.645*** (0.176)	1.337*** (0.069)	1.302*** (0.055)	1.414*** (0.055)	1.348*** (0.127)
Post graduate	1.554*** (0.086)	1.611*** (0.261)	1.440*** (0.104)	1.440*** (0.082)	1.474*** (0.083)	1.562*** (0.188)
Rural	-0.259*** (0.015)	-0.468*** (0.044)	-0.249*** (0.018)	-0.187*** (0.014)	-0.153*** (0.014)	-0.238*** (0.033)
Constant	7.120*** (0.067)	6.183*** (0.204)	6.543*** (0.080)	7.065*** (0.064)	7.436*** (0.065)	8.117*** (0.149)
Observations	19731	19731	19731	19731	19731	19731
R-squared	0.201					

Note: Square of age, a dummy indicating whether the individual is married and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications *** p<0.01, ** p<0.05, * p<0.1

Table 7e- Private returns to education for males -2006
Dependent variable: *log of earnings*

	OLS	0.05	0.25	Quintile 0.50	0.75	0.95
Age	0.051*** (0.004)	0.066*** (0.014)	0.055*** (0.005)	0.052*** (0.004)	0.047*** (0.004)	0.053*** (0.010)

1-4 years	0.068*	-0.094	-0.032	0.086**	0.122***	0.131
	(0.039)	(0.120)	(0.0483)	(0.036)	(0.034)	(0.092)
5-7 years	0.210***	0.0477	0.136***	0.231***	0.265***	0.229**
	(0.038)	(0.117)	(0.047)	(0.036)	(0.033)	(0.090)
8-10 years	0.423***	0.210*	0.360***	0.440***	0.481***	0.481***
	(0.036)	(0.113)	(0.045)	(0.034)	(0.032)	(0.086)
Passed O/L	0.698***	0.475***	0.606***	0.710***	0.723***	0.781***
	(0.038)	(0.118)	(0.047)	(0.036)	(0.033)	(0.092)
Passed A/L	0.987***	0.810***	0.916***	0.966***	0.956***	1.041***
	(0.040)	(0.124)	(0.049)	(0.038)	(0.035)	(0.095)
University level	1.447***	1.615***	1.360***	1.324***	1.387***	1.376***
	(0.057)	(0.174)	(0.071)	(0.054)	(0.050)	(0.135)
Post graduate	1.484***	1.543***	1.430***	1.436***	1.396***	1.354***
	(0.086)	(0.259)	(0.107)	(0.081)	(0.0755)	(0.199)
Rural	-0.243***	-0.459***	-0.235***	-0.179***	-0.148***	-0.188***
	(0.015)	(0.043)	(0.018)	(0.013)	(0.013)	(0.034)
Constant	7.110***	6.174***	6.767***	7.064***	7.411***	7.825***
	(0.0855)	(0.267)	(0.106)	(0.0806)	(0.0751)	(0.203)
Observations	17955	17955	17955	17955	17955	17955
R-squared	0.186					

Note: Square of age, a dummy indicating whether the individual is married and dummies indicating province of residence have been used in the analysis but not reported in the table. Bootstrapped Standard errors in parentheses, 50 replications *** p<0.01, ** p<0.05, * p<0.1

Table 8-Returns to education for male income earners-based on OLS estimation

Years of education	Males					Females				
	1985	1990	1995	2002	2006	1985	1990	1995	2002	2006
1-4	0.03	0.02	0.02	0.02	0	-0.01	-0.01	0	-0.02	-0.02
5-7	0.028	0.019	0.024	0.025	0.012	0.036	0.003	0.012	0.006	0.015
8-10	0.026	0.045	0.032	0.031	0.048	0.04	0.047	0.048	0.059	0.064
11-12	0.099	0.115	0.109	0.072	0.14	0.162	0.142	0.14	0.106	0.133
13-14	0.063	0.072	0.072	0.083	0.043	0.001	0.034	0.043	0.042	0.109
15	0.102	0.121	0.109	0.096	0.126	0.157	0.14	0.126	0.159	0.163
16 and above	0.078	0.252	0.193	0.082	0.157	0.08	0.298	0.157	0.134	0.139

Source: Tables 7a-7e, column 1

Table 9. Returns to education among males incomes earners based on QR estimation

	1985				
	q=0.05	q=0.25	q=0.5	q=0.75	q=0.95
1 to 4	0.021	0.049	0.051	0.056	0.075
5 to 7	0.02	0.037	0.035	0.053	0.082
8 to 10	-0.023	0.012	0.033	0.039	0.049
11 to 12	0.126	0.176	0.165	0.128	0.189
13 to 14	0.115	0.124	0.087	0.106	0.13
University	0.232	0.164	0.123	0.106	-0.04
Post graduate	-0.027	-0.045	0.233	0.294	0.455

	1990					
1 to 4		0.097	0.066	0.049	0.065	0.105
5 to 7		-0.033	0.01	0.02	0.032	0.023
8 to 10		0.009	0.034	0.06	0.073	0.083
11 to 12		0.024	0.136	0.168	0.144	0.137
13 to 14		0.099	0.162	0.096	0.098	0.099
University		0.267	0.238	0.171	0.178	0.13
Post graduate		-0.018	0.28	0.336	0.224	0.362
	1995					
1 to 4		-0.046	-0.009	0.019	0.04	0.061
5 to 7		0.051	0.036	0.032	0.043	0.039
8 to 10		-0.012	0.038	0.063	0.063	0.079
11 to 12		0.055	0.142	0.145	0.148	0.157
13 to 14		0.12	0.155	0.128	0.129	0.099
University		0.18	0.239	0.161	0.155	0.183
Post graduate		-0.049	0.084	0.26	0.224	-0.065
	2000					
1 to 4		-0.009	-0.011	0.024	0.053	0.05
5 to 7		0.043	0.042	0.04	0.042	0.027
8 to 10		0.041	0.056	0.068	0.075	0.087
11 to 12		0.063	0.115	0.132	0.124	0.137
13 to 14		0.103	0.16	0.13	0.11	0.146
University		0.227	0.213	0.178	0.222	0.151
Post graduate		-0.01	0.103	0.138	0.06	0.214
	2005					
1 to 4		-0.038	-0.013	0.034	0.049	0.052
5 to 7		0.041	0.042	0.036	0.041	0.028
8 to 10		0.046	0.056	0.07	0.072	0.084
11 to 12		0.076	0.123	0.135	0.121	0.15
13 to 14		0.096	0.155	0.128	0.117	0.13
University		0.23	0.222	0.179	0.216	0.168
Post graduate		-0.021	0.07	0.112	0.009	-0.022

Source: Tables 7a-7e, columns 2-6