

Kronlid, Karin

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Household Welfare and Education in Urban Ethiopia

Karin Kronlid *

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Abstract

This paper investigates the correlates of household welfare in urban Ethiopia with an emphasis on the impact of education. We use household panel data collected between 1994 and 1997. Welfare is approximated by household income. Although non-educated households are found in all income quintiles, education has a significant effect on household welfare. The effect of education is reduced when parental background is introduced as an explanatory variable, indicating that parents' education has an effect on the quality of children's education. If all main income earners were given at least primary education, average household income would increase by nearly 3 per cent. Female-led households with many children would be among the prime beneficiaries of this.

Keywords: welfare, urban, education, Ethiopia

JEL classification: I30, R15, O20

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* Department of Economics, Göteborg University, karin.kronlid@economics.gu.se

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1 Introduction

During the last decade, the Ethiopian economy has responded positively to the economic reform programmes that started in the early 1990s. Still, the per capita income is only about USD 100, relative to the Sub-Saharan average of USD 550. Around half of the Ethiopian population is regarded as poor, with poverty concentrated in the rural areas. There is evidence that between 1994 and 1997, poverty has been decreasing in rural areas, but there is no clear-cut trend as for poverty in urban areas. The goals of the Ethiopian government are, among others, to improve the living standards of its population and to reduce poverty. To better understand the links between policy measures aiming at improving the welfare of the population and the welfare of the households, there is need for more analysis of the relationship between a household's characteristics and its welfare level.

This paper has two aims: to add to our knowledge of the household characteristics that are correlated with income and welfare, and to analyse the impact of education on household welfare. Two points about the analysis should be noted at the outset. First, private household returns to education are analysed by looking at how education impacts on total household welfare, and not by providing standard earnings functions for individuals (see for instance Krishnan *et al.* 1998, for an Ethiopian application). Second, income, instead of consumption expenditure, is used as an indicator of welfare.

In the literature, there exist two standard techniques to analyse welfare correlates using household data. One way is to estimate the probability of being poor using logit or probit techniques with household characteristics as the explanatory variables. Another way is to estimate household welfare functions with OLS methods. Both methods are helpful in understanding poverty and its causes. Applying the first technique, and using panel survey data from Côte d'Ivoire on both urban and rural households, Grootaert, Kanbur and Oh (1997) report that, for urban households, human capital is the most important factor for determining welfare levels and welfare changes over time. When average households experienced welfare losses, better educated households achieved a higher level of welfare. Taddesse (1997) applied the technique of Grootaert, Kanbur, and Oh (1997) in urban Ethiopia,¹ and finds that well-educated households have greater chances of improving their welfare compared to others, and that households with many dependants are in a worse position. Grootaert (1997) follows the first approach using data from Côte d'Ivoire and concludes that the way households manage to use their endowments is crucial in determining welfare outcomes. For urban households, the way out of poverty is to obtain wage jobs and increase the wage share of their income. Coulombe and McKay (1996) analyse determinants of poverty in Mauritania. Their findings suggest that recent urban migrants are more likely to be found in the upper quintiles of the income distribution than in the lower ones, and that unemployment does not seem to be correlated with standard of living. They conclude that in urban areas, the lack of education and high dependency ratios in the household have negative effects on household welfare, while households in the main centres are better off than others. A study on Kenya (Mwabu *et al.* 2000), using both urban and rural data, finds that mean household education and literacy are strongly and positively correlated with consumption expenditure, while household size is negatively correlated with per capita

¹ Taddesse uses consumption expenditure as a proxy for income.

consumption expenditure. All these studies find education to be an important variable for household welfare.

The next section includes some basic information on Ethiopia and in section 3 the data are presented. Methodology is discussed in section 4, while section 5 gives the models and the results. Finally, section 6 contains conclusions and a final discussion.

2 The Ethiopian context

Ethiopia has had a traumatic history. The overthrow of Haile Selassie in 1974 was followed by a socialist military dictatorship under Mengistu Haile Mariam, which lasted for 15 years. The power of the traditional elite was reduced and extensive nationalization was undertaken. The invasion from Somalia in 1977 was followed by an extended civil war. The country was hit by drought in the early 1980s and a major famine in 1984. These catastrophes, together with the war, led to extensive migration of people, often to the urban areas. High military expenditures, reduced foreign aid, attempts at a socialist transformation with centralization and state control of firms, and ineffective economic policies had profoundly negative effects on the economy. Mengistu was finally overthrown by a coalition led by the EPDRF² in 1991. The new government undertook extensive reforms of the political as well as the economic system. An economic reform programme was adopted in 1992/93 with the support of the Bretton Woods institutions. The objectives of the reforms were, among others, to promote economic growth and to reduce poverty. The economy responded positively to the reforms, and Ethiopia has recorded positive growth rates during most of the 1990s, with the exception of the years 1998-2000 during the war with Eritrea.

Despite positive GDP growth rates, the living conditions of Ethiopia's population are poor and improvement is slow. Life expectancy at birth as of 1999 is around 42 years, primary gross school enrolment is as low as 40 per cent, and the under-5 mortality rate is 18 per cent (see Table 1). The urban population makes up only around 17 per cent of Ethiopia's total population of nearly 63 million. This is a low figure for Sub-Saharan Africa (where the average is around one-third), but the proportion is constantly growing. Projections from the statistical authorities in Ethiopia show that a rapid growth of the urban population is foreseen (CSA 1996), so that it will approach average SSA levels of around one-third of the population in 15 years. The increase is due both to the growth of the existing urban population and to increased migration. Migration could lead to increased urban poverty if rural migrants are less well-equipped for the urban labour market in terms of education and relevant labour market experience.

Poverty is widespread, and is not only a rural problem in Ethiopia. Bigsten *et al.* (2001) find that there is not a significant difference between urban and rural poverty in Ethiopia. Urban poverty went from 37.5 per cent in 1994 to 35.5 per cent in 1997, while the corresponding rural figures were 41.9 per cent and 35.5 per cent, respectively. They also report that the positive effect on incomes of the recent economic growth is partly counteracted by a worsening income distribution. In another paper, Tadesse and Shimeles (2000) investigate the trends in welfare and poverty in urban and rural Ethiopia. Using a rank dominance test, they find that although mean income has gone

² Ethiopian People's Revolutionary Democratic Front

up between 1994 and 1997, overall welfare has not increased and poverty has not decreased.

Enrolment rates are low in Ethiopia. Demeke (1997) reports that in urban areas the primary net enrolment ratio is 60 per cent, junior secondary 24 per cent, senior secondary 23 per cent and tertiary 1 per cent. This means that in urban areas, only two-thirds of the children aged 7-12 years are in primary school. Several reasons for these low figures have been discussed. For rural areas, those most frequently cited are that children are needed in farm work, as well as the long distances to school. Moreover, there is a gender bias towards sending boys rather than girls to school, as can be seen from the national figures. The gender bias is more pronounced in rural areas, but it also exists in urban areas.

Table 1
Social indicators for Ethiopia, 1990-99

	1990	1995	1999
Population			
Population, total (millions)	51.2	56.5	62.8
Population growth (annual %)	3.7 (3.6)	2.9 (2.7)	2.4 (2.5)
Urban population (% of total)	13.4 (28.0)	15.4 (31.2)	17.2 (33.8)
Urban population growth (annual %)	6.2 (5.3)	5.6 (4.8)	5.0 (4.5)
Total fertility rate (births per woman)	6.8 (6.0)	6.5 (5.6)	6.3 (5.3)
Social indicators			
GNP/capita (constant 1995 USD)	103 (597)	102 (554)	112 (561)
Life expectancy at birth, total (years)	45.0 (49.9)	44.1 (49.2)	42.4 (46.8)
Infant mortality rate (per 1,000 live births)	124.2 (101.5)	111.8 (96.2)	103.7 (92.4)
Under-5 mortality rate (per 1,000 live births)	190.0 (154.8)	– (–)	180.0 (160.7)
HDI rank (out of number of countries) ⁽¹⁾	111 (130)	171 (174)	158 (162)
Human development index ⁽¹⁾	0.294 (–)	0.305 (0.389)	0.321 (0.467)
Education indicators			
Adult illiteracy rate, total (% of people ≥ 15)	71.9 (50.1)	67.0 (44.1)	62.6 (39.4)
Female (% of females ≥ 15)	79.6 (59.8)	73.8 (52.9)	68.2 (47.4)
Male (% of males ≥ 15)	64.2 (40.0)	60.3 (35.0)	57.2 (31.1)
Gross primary enrolment (%)	32.7 (75.7)	37.5 (–)	– (–)
Female (%)	26.2 (67.9)	26.9 (–)	– (–)
Male (%)	38.9 (82.8)	48.1 (–)	– (–)
Gross secondary enrolment (%)	14.2 (23.4)	11.6 (–)	– (–)
Female (%)	12.5 (21.0)	10.1 (–)	– (–)
Male (%)	15.9 (26.3)	13.1 (–)	– (–)
Gross tertiary enrolment (%)	0.8 (2.9)	0.7 (–)	– (–)

Note: Average values for Sub-Saharan Africa in parentheses.

Source: World Bank (2001) and ⁽¹⁾ UNDP (1990, 1995, and 2001).

3 Ethiopia urban socioeconomic survey—a descriptive overview

The data used in this study come from the three waves of the Ethiopia Urban Socioeconomic Survey³ collected in 1994, 1995, and 1997. In the survey, 1,500 households from seven major urban areas are covered. The urban areas were selected from towns with more than 100,000 inhabitants to be representative in terms of population and cultural diversity, major economic activity of the towns and their surroundings, and administrative importance. The number of households drawn from each urban setting was determined by the urban area's relative population size. Table 2 briefly summarizes the characteristics of the sites.

Within the towns, the sample was distributed over all *woredas* (districts) in proportion to the *woreda* population. Half of the *kebelles* (urban dwellers' association, the lowest administrative unit) in each *woreda* were selected randomly, and in those, the sample size selected was distributed in proportion to the population in the *kebele*. To be included in the survey, a household needed to have permanent residence in 1994, and to remain in the sample it must be possible to trace the household in the following years of the survey. Homeless people are thus excluded from the data.⁴

Table 2
Urban areas in the Ethiopia Urban Socioeconomic Survey

Urban area	N (households)	Characteristics
Addis Ababa	900	Capital of Ethiopia and its largest city, hosts a wide array of socioeconomic groups;
Awassa	73	Situated in the main coffee-producing areas, represents the enset culture ⁽¹⁾ and the different socioeconomic groups in the southern part of Ethiopia;
Bahir Dar	100	Located in the richer cereal-producing areas in the north;
Dire Dawa	126	A trade centre in the eastern chat and coffee-producing parts of the country;
Dessie	101	Represents the poorer cereal-producing areas that are often hit by droughts and famine;
Jimma	100	Situated in the main coffee-producing areas;
Mekele	100	Represents the poorer cereal-producing areas that are often hit by droughts and famine.

Note: ⁽¹⁾ A banana-like plant, of which the starch-rich root and other parts are consumed.

Table 3 gives a brief description of the main variables in the data. Household size is rather constant, around 6.2 persons, over the years. The increase in the number of children over the period from 2.02 to 2.18 is partly offset by a decrease in the number of male adults, while the number of elderly in the household goes down from 0.47 to 0.20. A large proportion of the households (40 per cent) have a female main income earner,⁵

³ There is a corresponding survey for rural Ethiopia, covering basically the same period of time.

⁴ In 1991, there were estimates of about 100,000 homeless street children only in Addis Ababa out of a population around 2 million, excluding adults (Tsfay 1999). Most probably, this number has not gone down but rather increased in the aftermath of the civil war.

⁵ See section 4 for a discussion of main income earner versus household head.

which is high compared to the figure of one-fifth for urban Ivory Coast (Grootaert *et al.* 1997) and one-third for Mauritania (Coulombe and McKay 1996). The educational level is rather low, measured either by average household education (7 years), or by the educational level of the main income earner. Almost 40 per cent of the main income earners have no education, while 14 per cent have completed primary education. Thirty-five per cent have either entered or finished secondary education, and only 3 per cent of the main income earners have some kind of university degree. These numbers are quite stable over the years.

Table 3
Descriptive statistics of the panel households

Variable	1994		1995		1997		Total	
	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Household variables								
Household size	6.18	2.71	6.01	2.69	6.25	2.70	6.15	2.70
No. of male adults	1.87	1.39	1.84	1.37	1.81	1.34	1.84	1.37
No. of female adults	2.28	1.27	2.28	1.32	2.27	1.30	2.28	1.30
No. of children (0-15 yrs)	2.02	1.72	1.89	1.64	2.18	1.78	2.03	1.72
No. of elderly (+55 yrs)	0.47	0.66	0.22	0.46	0.20	0.46	0.30	0.55
Av. years of education ⁽¹⁾	6.89	3.11	6.78	3.13	6.89	3.07	6.85	3.10
Main income earner (MIE)								
Age	42.65	14.13	43.65	14.27	41.53	14.16	42.61	14.21
Female	0.37	0.48	0.41	0.49	0.41	0.49	0.40	0.49
No education	0.38	0.49	0.39	0.49	0.38	0.49	0.38	0.49
Primary education	0.14	0.35	0.15	0.35	0.13	0.34	0.14	0.35
Secondary education	0.17	0.38	0.18	0.39	0.21	0.41	0.19	0.39
Secondary diploma	0.17	0.37	0.16	0.36	0.17	0.37	0.16	0.37
Post-secondary	0.10	0.30	0.10	0.29	0.09	0.28	0.09	0.29
University education	0.04	0.18	0.03	0.17	0.02	0.16	0.03	0.17
Income variables (monthly)								
Total household income (median)	683.24 (376.48)	1001.89	582.42 (318.57)	864.76	712.41 (366.03)	1168.84	659.36 (355.15)	1020.66
Per adult equivalent income (median)	135.91 (77.01)	187.18	119.09 (64.92)	165.32	144.49 (74.96)	290.28	133.16 (72.16)	221.26
Total household income from different sources (monthly) ⁽²⁾								
Wage	336.05	571.93	280.51	464.69	343.03	616.50	319.86	555.25
Business	256.70	831.92	216.43	730.84	244.10	969.08	239.08	849.49
Female household business	24.23	92.50	27.74	97.84	23.92	98.20	25.30	96.20
Children's income	1.43	12.61	1.47	12.30	0.91	7.00	1.27	10.94
Unearned income	64.83	253.39	56.27	205.13	100.45	347.10	73.85	275.52
Share of household income from different sources								
Wage	0.50	0.45	0.46	0.45	0.47	0.45	0.47	0.45
Self-employment	0.21	0.37	0.23	0.38	0.18	0.35	0.21	0.37
Household female business	0.11	0.27	0.13	0.29	0.10	0.26	0.11	0.28
Unearned income	0.19	0.34	0.19	0.34	0.25	0.37	0.21	0.35

Table 3 continues

Table 3 (con't)

Variable	1994		1995		1997		Total	
	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Constant variables:								
Site: Addis Ababa							0.58	0.49
Awassa							0.05	0.22
Bahir Dar							0.07	0.26
Dessie							0.07	0.25
Dire Dawa							0.10	0.30
Jimma							0.07	0.26
Mekele							0.06	0.24
Amhara							0.53	0.50
Ethnic group: Oromo							0.17	0.38
Tigrayan							0.11	0.32
Gurage							0.10	0.30
Other							0.09	0.28

Notes: (1) Average number of years in education for adult household members (older than 15 yrs);
(2) Households without this type of income also included. See below⁶ for average monthly income from different sources only for households with certain type of income.

Source: Three waves of the Ethiopia Urban Socioeconomic Survey.

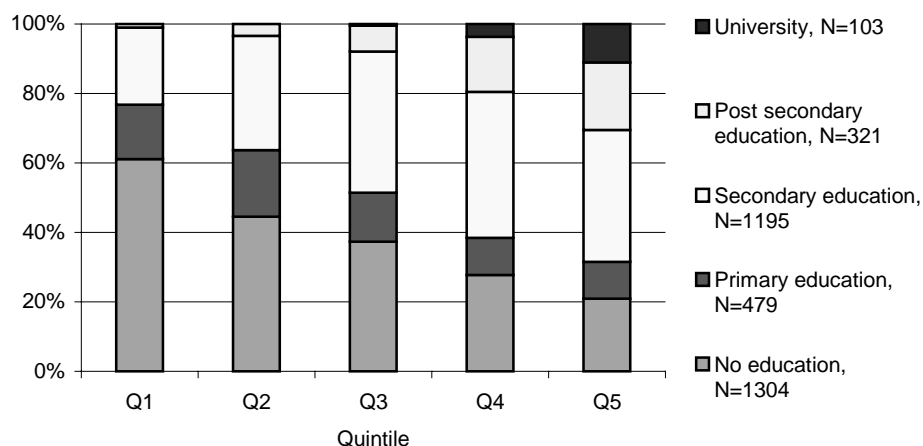
Total household income has five sources: wage income, business income, female household business income, children's income and unearned income (for a thorough description of how the income variable was derived, see Bigsten, Kronlid and Makonnen 1998). Per adult equivalent income drops by 12 per cent between 1994 and 1995, and in 1997 it is 6 per cent higher than in 1994.⁷ Given the economic growth that has occurred, the increase between 1994 and 1997 is to be expected, but the drop in 1995 is more difficult to explain. One probable reason is that the consumer price index for 1995 may overestimate the true development in prices. Wages make up around half of household income, the second biggest source being income from self-employment together with unearned income. An increasing share of household income comes from unearned income. The increasing number of households reporting unearned income could partly explain this, but the average size of the unearned income is also increasing.

⁶ Average monthly income from different sources:

Variable	1994			1995			1997			Total		
	N	Mean	Std dev.	N	Mean	Std dev.	N	Mean	Std dev.	N	Mean	Std dev.
Wage	684	557.14	647.50	642	495.48	524.40	651	597.54	714.27	1,977	550.42	635.35
Business	291	1000.35	1399.09	348	705.28	1182.47	262	1056.51	1793.06	901	902.71	1458.51
Female hhd business	188	146.13	184.20	252	124.84	176.19	203	133.62	198.38	643	133.84	185.68
Unearned income	487	150.97	369.66	477	133.76	299.62	580	196.40	465.70	1,544	162.72	390.95
Children's income	34	47.65	56.46	39	42.68	52.04	29	35.63	26.50	102	42.33	47.72

⁷ The comparison of the income figures to consumption expenditure figures from the same data set for this period, using per capita figures instead of per adult equivalent, shows that income in the first year is 13 per cent higher than consumption expenditures, income in 1995 is 7 per cent lower and in the final survey year income is 3 per cent higher than consumption expenditures (consumption expenditures are calculated on a somewhat larger sample).

Figure 1
Per cent of households by main earner's education and by income quintiles,
using real per adult equivalent income, N=3402



More than half of the panel households live in the capital, and the rest of the urban areas are represented by 5-10 per cent respectively of the panel households. The largest ethnic group is Amhara, followed by Oromo, and around 10 per cent of the households are Gurage or Tigrayan or from other ethnic groups, respectively. One-tenth of the households are migrants.⁸

Looking more closely at the education variable and the relation between a certain education level⁹ and household income (see Figure 1), we see that the majority of the households in the lowest income quintile (Q1) have no education, and around 15 per cent have completed primary education. In the second lowest income quintile, slightly less than half of the households have no education, while a quarter have completed primary education. Even in the top income quintile, around 20 per cent of the households have no education and around 10 per cent have only completed primary. Households with no education are thus found in all income quintiles, although to a decreasing degree.

Around a third of the no-education households are in the lowest income quintile, but as much as a quarter of them belong to the two top quintiles. Households with primary education most likely end up in the second lowest income quintile, and around two-thirds of them are found in the three lowest quintiles. Households with university education are most likely to be in the top income quintile. Education alone does not seem to predict household income, except for those few who have university education.

⁸ Households considered as migrants have reported in 1994 that they were not living in the current urban area 10 years ago.

⁹ Measured by main income earner's education

4 Modelling correlates of household welfare

The purpose of the paper is to analyse correlates of welfare in urban Ethiopia, and to specifically discuss the importance of education for household welfare. The theoretical basis for the methods used in this paper is directly derived from the standard household utility maximization model (see for instance Deaton and Muellbauer 1980). As Glewwe (1991: 312) points out, in applying the standard methods discussed in the introduction we can only show the possible impact of government policies on household welfare conditional on past decisions on capital accumulation within the households, but not how policies affect the accumulation process itself. We use real household per adult equivalent income as the dependent variable (see below for a discussion on income versus consumption expenditures) in a model with exogenous household endowments and characteristics as explanatory variables:

$$(I_i/A_i) = f(R_i; C_i) \quad (1)$$

where I_i = real income of household i

A_i = number of adult equivalents of household i ¹⁰

C_i = characteristics of household i

R_i = characteristics that describe the economic environment in which household i operates.

C_i and R_i can, in urban areas, be categorized into four groups (Glewwe 1991):

- 1) household composition and size (C_i),
- 2) residential area (R_i),
- 3) human capital (C_i), and
- 4) community characteristics (R_i).

In rural areas, one would also add

- 5) physical assets owned by the household (C_i).

There, assets such as tools, land, and cattle affect the production of the household. In urban areas, one could argue that for self-employed households, for instance, house ownership assumes the same role.¹¹ Community characteristics (4) were not collected in the data that we are using. Residential area, and household composition and size are included in the analysis more as control variables than as policy variables. Household size and the number of dependants should negatively affect income. The human capital variables (education and age) are expected to positively affect income (the latter through a non-linear relationship). Other household characteristics of interest are migrant status,

¹⁰ A nutrition based adult equivalent scale for East Africa was used, see Tadesse (1998)

¹¹ It was difficult to get meaningful information out of the data on imputed rent, thus this variable has not been used in the analysis.

of which the effect is uncertain. If the migrant leaves the original residence because of lack of opportunities to support him/herself or the household, the effect on income of being a migrant should be negative. On the other hand, if the migrant has special skills that have a higher pay-off in the new residence than in the original one, the effect on income should be positive. For instance, Coulombe and McKay (1996) find that in urban Mauritania, being a migrant is not systematically associated with being poor.

We assume that household size, location, and the other right-hand side variables are exogenous to household income. As Coulombe and McKay (1996) discuss, in a life cycle perspective, this may not be true. In the long run, household size and location, for instance, are probably determined by a household's economic situation. Since we are analysing correlates of living standards at a point in time, in the short run these variables can be considered as exogenous.

To analyse correlates of household welfare, a standard individual earnings function cannot be applied since the households contain a multitude of individuals. Instead we try to find certain indicators of the household characteristics we believe to be important for household welfare and use them instead of all the individual characteristics. The most common solution is to use the characteristics of the household head, who is assigned by the household and has the role of decision-maker in the household. Traditionally it is the oldest male and, in the absence of him, his spouse or widow. We use the characteristics of the main income earner instead. The main income earner in our data is the adult in the household with the highest income, and the second income earner is the one with the next highest income or—in cases where there is only a single breadwinner—the most educated of the remaining household members.¹² Main income earner's characteristics seem more likely than the characteristics of the head to be correlated with, for instance, the socio-economic status of the household. A household with a retired head, without any income, can still have income-generating younger members in wage employment. We also found that stated and actual activity of individuals often diverge in the data. The group of non-working households in our data, as classified by their main income earners' stated activity, shrunk considerably when we switched instead to actual income-generating activity of the main income earner as a basis for the classification.

When analysing household welfare, an important issue is determining what welfare indicator to use. Household utility is an indicator of household welfare, and Deaton and Muellbauer (1980) show that money metric utility in itself can be used as a utility indicator since utility is unobservable. The welfare indicator must take into account welfare differences due to differences in household size, in relative prices, and in the case of a longer time period, changes in the absolute price level. The main choice of money metric welfare indicator is between consumption expenditure and income, even though a number of other indicators have been discussed (see, for instance, Chaudhuri and Ravallion 1994). Using money metric utility as an indicator of household welfare implies that we limit the household's welfare measure to include only marketed goods and services. Other goods, such as free health care, clean air, or for instance, children are not included. We assume that a household welfare function exists, and that the

¹² It could be argued that main income earner's characteristics are not exogenous since the household determines who should use its resources for income-generating activities and who should use them for other purposes based on the income-generating capabilities of the individuals. However, this decision by the household is determined by past choices of the household members.

household's objective is to maximize it. This assumes away intra-household issues, although a strand of the literature has shown that inequality among household members can be substantial (see, for instance, Haddad and Kanbur 1990; Thomas 1990; and Behrman 1988).

Lipton and Ravallion (1995) discuss the choice between consumption expenditure and income as an indicator of welfare and welfare changes. The advantages of consumption expenditure are, for instance, that the current economic status of the household is better reflected by consumption expenditure than by income. Via consumption smoothing, current consumption gives information on past as well as on expected future income and thus indicates the long-term average living standard of the household in a better way than current income can do. In general, income varies more over the years, and between seasons, than consumption, at least among the poor. Usually, there are also practical problems mentioned as impediments to using household income as the indicator of household welfare (Deaton 1997). The variability of income in a rural economy, both over years and seasons, is one. In using income, multiple re-interviews at different times or recall questions are necessary to capture the living standard of a household. The difficulty of calculating an income for a household deriving most, if not all, of its income from self-employment agriculture is another. Deaton, however, argues that there is no support for the lifetime consumption hypotheses in the short run in developing countries, and that the practical arguments against the use of income as a welfare indicator are stronger.

According to Deaton (1997), arguments against consumption expenditure include problems with consumption smoothing for the poor, who face constraints on borrowing as well as on saving. Using current income to measure their current living standard might not be as cumbersome as in measuring the current living standard of the less poor. Furthermore, if households have a tendency to report usual rather than actual consumption expenditures, which has been shown to be the case (Scott and Amenuvegbe 1990), income can be a better measure of welfare in times of economic change.

In this study we use household income as indicator of household utility. Deflated by household size and by a regional price index, household income will meet the requirements for an indicator of household utility. The study analyses a poor population during a time of economic change, which makes the argument in favour of income instead of consumption expenditure valid. In addition, we are dealing with an urban population living mainly on wage or business income, or, to a smaller extent, on unearned income. The consumption of self-produced goods is limited. The household economy is monetized to a larger extent than what is the case in rural areas. Given that we are not attempting to analyse the long-term situation of the Ethiopian urban population but to give a snapshot of the current situation, household income corresponds to the needs of our analysis.¹³

¹³ In Appendix Figures A1-A2, the frequencies of the logged income variables are plotted against a normal distribution. Normality tests are shown in Appendix Table A1.

5 Correlates of household welfare—the importance of education

In this section, we analyse the correlates of urban Ethiopian households' welfare. First we run an OLS regression with the log of per adult equivalent monthly household income as the dependent variable, with household and main income earner's characteristics as explanatory variables.¹⁴

5.1 OLS

In Table 4, the results from the OLS are displayed. Large households and households with many children have lower incomes. Households with female main income earners, all other things equal, have as much as 21 per cent lower welfare per capita than households with male main income earners (looking at the marginal effect). A household with a married female main income earner has 4 per cent higher welfare than a household with a married male income earner, although its welfare is still lower compared to households with a non-married male income earner. The interaction term probably catches the effect of a spouse who could be sending money to the household. The age effect of the main income earner implies that income peaks at the age of 61 years. Migration has a positive and significant effect on household income--households that have migrated to the current residence after 1984 have 12 per cent higher income than older residents. This indicates that more able households migrate to urban areas, and this is in line with the findings of Coulombe and McKay (1996). The human capital of other household members, as measured by average years of education of adult household members except main and second income earner, has a negative effect on household income. The effect reaches a bottom level at five years of education, and the effect on household income becomes positive at around 10 years of education (almost completed secondary education). One possible explanation is that household members with relatively high education are still in school and thus do not contribute to household income, but it could also be a result of the labour market structure in urban Ethiopia. To gain access to better-paid jobs (wage employment), it could be that an individual needs to have at least secondary education.

The larger the share of household income coming from unearned income or female household income for a given share of wage income, the lower the household income. Households relying on these income sources probably have no access to more remunerative activities. The effect is the opposite for self-employment income, but not as large. This could reflect good business opportunities as a result of the economic reforms.

In 1995, there is a negative time effect of 10 per cent and from Table 3, we can see that mean per adult equivalent income was 12 per cent lower in 1995 than in 1994. This drop in income is thus not explained by changes in the other explanatory variables over the years, but needs to be explained by other factors. It could be changes in the economic environment, but for instance the GDP growth registered in 1995/96 was higher than the 1994/95 growth rates. As was noted earlier, it could be the choice of price

¹⁴ In this study, we pool the data across household main activities. Other studies separately analyse wage employees, self-employed etc. In order to present a general picture of the conditions for urban Ethiopian households, we choose to pool across activities. One could also for instance imagine separate analyses for male- and female-led households.

Table 4
OLS results, log of per adult equivalent monthly income used as dependent variable

	Coefficient	Std err.	Marginal effect ⁽¹⁾
Constant	3.7211 **	0.1805	40.3103
D 1995	-0.1014 *	0.0418	-0.0964
D 1997	0.0636	0.0420	0.0657
No. of household members	-0.0614 **	0.0093	-0.0421
Share of 0-15	-0.5241 **	0.1214	-0.4478
Share of adult females	0.3473 **	0.1166	0.3991
Migrated	0.1176 *	0.0597	0.1248
Female main income earner (MIE)	-0.2320 **	0.0663	-0.2070
Married MIE	-0.1643 **	0.0601	-0.1515
Female MIE*Married MIE	0.2172 *	0.0859	0.2426
Age MIE	0.0363 **	0.0071	0.1710
Age MIE squared	-0.0003 **	0.0001	-0.0002
Average household education	-0.0494 **	0.0169	-0.0386
Average household education squared	0.0051 **	0.0014	0.0062
Share of household income from:			
Household female business	-1.0396 **	0.0745	-0.9279
Unearned income	-1.0795 **	0.0583	-0.8595
Self-employment	0.4326 **	0.0531	0.4730
Main income earner's (MIE) education:			
Primary	0.1411 *	0.0547	0.1515
Secondary education	0.4520 **	0.0482	0.5714
Post-secondary	0.8819 **	0.0713	1.4156
University	1.4967 **	0.1093	3.4670
Second income earner's(SIE) education:			
Primary	-0.0157	0.0677	-0.0156
Secondary	-0.1048 *	0.0427	-0.0995
Post-secondary	0.2260 **	0.0719	0.2536
University	0.3193 *	0.1318	0.3761
Awassa	0.3376 **	0.0812	0.4015
Bahir Dar	0.3556 **	0.0711	0.4270
Dessie	-0.0886	0.0720	-0.0847
Dire Dawa	0.6390 **	0.0605	0.8945
Jimma	0.5776 **	0.0699	0.7818
Mekele	-0.0838	0.0999	-0.0803
Oromo	-0.0303	0.0501	-0.0299
Tigrayan	0.1463 *	0.0744	0.1576
Gurage	0.1213 #	0.0622	0.1290
Other ethnic	0.0091	0.0659	0.0092
N	3402		
F(34, 3367)	58.9500		
Prob > F	0.0000		
R-squared	0.3732		
Adj R-squared	0.3668		
Root MSE	0.9928		

Notes: ⁽¹⁾ For continuous variables: evaluated at variable means; for dummy variables: using the interpretation in Kennedy (1996), on per adult equivalent income

** , * and # mean significant at the 1, 5 and 10% level, respectively

Reference household has a male MIE, has lived at current residence for more than 10 years in 1994, lives in Addis Ababa, main and second income earner have no education, works in the public sector, and is of Amharic origin.

deflator that leads to the 1995 results. The site and ethnic control variables show that households in Awassa, Bahir Dar, Dire Dawa and Jimma are better-off compared to living in the capital, and households with Tigrayan or Gurage main income earners are also better-off than households with Amharic main income earners.

All levels of main income earner’s education have positive and significant effects on household income. Education has two effects on income—it can give access to better paid jobs and it increases the income from a given job. Here, the two effects are mixed together. The pay-off to household income of having a main income earner with primary education compared to having no education is 14 per cent, and the difference in household income between having a main income earner with primary and secondary education is 36 per cent (see Table 5). Main income earner completing post-secondary education has an income premium of 54 per cent; only 10 per cent of the households have a main income earner with post-secondary education. The share of households with university education is even lower, around 3 per cent of the sample. A household with a main income earner with university education is 184 per cent better off than one with secondary education. Primary education of the second income earner has no significant effect on income, while post-secondary and university education have a positive significant effect on household income (though much lower than for the main income earner). A second income earner with secondary education reduces household income by 10 per cent.

Table 5
Marginal effects of main income earner’s education on household income,
and returns to education at household level, OLS model

Marginal effects	OSL		Returns to education ⁽¹⁾	OSL	
	MIE	SIE		MIE (%)	SIE (%)
Primary education	0.1411*	-0.0157	Primary vs no education	15	-2
Secondary education	0.4520**	-0.1048*	Secondary vs primary	36	-9
Post-secondary education	0.8819**	0.2260**	Post-secondary vs secondary	54	39
University education	1.4967**	0.3193*	University vs secondary	184	53

Note: ⁽¹⁾ Returns to education = $\exp(b2-b1)-1$.

5.2 Panel models

The data we are using were collected by interviewing the same households three times. If there are unobservable household characteristics that are fixed over time and that affect income—unobserved heterogeneity¹⁵—we try to control for these with panel methods. To do so, we ran a random effects model with the same dependent and explanatory variables as in the OLS. The results are shown in Appendix Table A2. The random effects model rests on the assumption that the household specific effect is uncorrelated with the other explanatory variables in the model, and this can be tested with a Hausman test. The coefficients from the random and fixed effects model are compared, and if the assumption of the random effects model holds, the coefficients should not differ systematically. In our case, the hypothesis of no systematic differences is rejected, and thus also the random effects model (see Appendix Table A2). An

¹⁵ It has for instance been argued that children of the elite in African countries have higher chances to themselves ending up in the elite, after controlling for other characteristics (Glewwe 1991).

alternative to the random effects model is the fixed effects model. It uses deviations from the household means of the variables to explain deviations of household income from the household mean. However, the fixed effects estimation led to very low degrees of significance for the coefficients. Most of the explanatory variables do not vary very much over time for the same household (see Appendix Table A3). Particularly, the education variables are constant for more than three-quarters of the households. Therefore, panel models that rely on changes in the explanatory variables to explain changes in the dependent variable do not seem suitable to use. Another issue that limits the usefulness of panel methods is raised by Deaton (1997: 108): If regressors are measured with error, difference- and within-estimators are not consistent in the presence of unobserved individual fixed effects, and the biases are not necessarily less than that of the uncorrected OLS estimator. This could also explain the limited explanatory power of the panel estimates.

5.3 Enlarged OLS

Still, we hypothesize that there could exist unobserved heterogeneity to be controlled for in the model. An alternative to modelling the unobserved heterogeneity at household level, as in the panel models, is to model it groupwise. Therefore, we introduce control variables for the household's socioeconomic group as well as family background in the original OLS model because that we believe that there are unobservable characteristics of the household which affect the household welfare and which could be correlated with the education variables. Parental background is likely to be a good alternative to control for the unobservable characteristics. Weir (2000) finds that in rural Ethiopia, higher parental education reduces the likelihood of children starting school later than normal, and this could also influence actual achievement in school. The socioeconomic group is important to control for because a household that, for instance, has managed to get a public sector job could be better off than a comparable household in self-employment or living from casual or domestic work. The variables used include the main and second income earners' activity (socioeconomic group), as well as the mother's and father's education and activity (parental background).

In Table 6, the results from the enlarged OLS are shown for the variables originally included in the OLS.¹⁶ The control variables are shown in Appendix Table A4.¹⁷ The introduction of socioeconomic and background control variables have not changed

¹⁶ Pooling of the full OLS model over the years was tested, and rejected. We still keep the pooled model. There are many dimensions by which the data could be split, for instance sex of main income earner, capital versus rest of urban areas, socio-economic group of main income earner etc. All these splits of the data would give additional information, but would be outside the scope of this paper: to discuss correlates of household characteristics and household welfare, as well as the effect of education, at the household level.

¹⁷ Multicollinearity was detected, as expected, both in the original model and in the enlarged one. However, the large sample size and the relatively good overall fit of the model makes the potential problems associated with multicollinearity (fluctuating parameter estimates with negligible changes in sample size, 'wrong' signs of coefficients, important coefficients that turn out insignificant, and inability to determine the relative importance of collinear variables) of a less serious concern (see for instance Mason and Perreault (1991) on the issue of multicollinearity). To omit the variables that cause multi-collinearity, a common solution, leads to omitted-variable-bias if the true coefficients of the omitted variables are not zero. This could represent a more serious problem. We have chosen to keep the variables in the model, since their true coefficients, as predicted by our theory, are not zero.

Table 6
OLS results, log of per adult equivalent monthly income used as dependent variable, full model

	Coefficient	Std err.	Marginal effects ⁽¹⁾
Constant	3.9815 **	0.1939	52.5966
D 1995	-0.0817 *	0.0409	-0.0785
D 1997	0.0735 #	0.0407	0.0762
No. of household members	-0.0656 **	0.0092	-0.0438
Share of 0-15	-0.4803 **	0.1199	-0.4158
Share of adult females	0.3253 **	0.1142	0.3706
Migrated	0.1083 #	0.0583	0.1144
Female MIE	-0.2519 **	0.0652	-0.2227
Married MIE	-0.0971	0.0591	-0.0926
Female MIE*Married MIE	0.1835 *	0.0842	0.2015
Age MIE	0.0370 **	0.0072	0.1790
Age MIE squared	-0.0003 **	0.0001	-0.0002
Av. household education	-0.0504 **	0.0165	-0.0392
Av. household education squared	0.0049 **	0.0014	0.0060
Share of household income from:			
Female household business	-0.9444 **	0.1086	-0.8517
Unearned income	-0.9421 **	0.0818	-0.7722
Self-employment	0.2565 **	0.0902	0.2704
Main income earner's (MIE) education:			
Primary	0.1209 *	0.0532	0.1285
Secondary	0.3664 **	0.0489	0.4426
Post-secondary	0.6844 **	0.0732	0.9825
University	1.2943 **	0.1084	2.6485
Second income earner's (SIE) education:			
Primary	0.0062	0.0669	0.0062
Secondary	-0.0150	0.0441	-0.0149
Post-secondary	0.1263 #	0.0715	0.1347
University	0.2388 #	0.1291	0.2698
Awassa	0.3325 **	0.0791	0.3944
Bahir Dar	0.3507 **	0.0700	0.4201
Dessie	-0.1142	0.0702	-0.1079
Dire Dawa	.6140 **	0.0593	0.8478
Jimma	.5151 **	0.0687	0.6738
Mekele	0.1000	0.0977	-0.0952
Oromo	0.0007	0.0487	-0.0007
Tigrayan	0.0901	0.0727	0.0943
Gurage	0.1187 #	0.0610	0.1260
Other ethnic group	-0.0265	0.0640	-0.0261
N	3402		
F(57, 3344)	42.3500		
Prob > F	0.0000		
R-squared	0.4192		
Adj R-squared	0.4093		
Root MSE	0.9589		

Notes: Only those variables shown that were included in original model, for control variables, see Appendix Table A4;

⁽¹⁾ For continuous variables: evaluated at variable means; for dummy variables: using the interpretation in Kennedy (1996), on per adult equivalent income;

**, * and # means significant at the 1%- 5% and 10%-level, respectively;

Reference household has a male MIE, has lived at current residence for more than 10 years in 1994, has no education, works in the public sector, lives in Addis Ababa, and is of Amharic origin. Also, SIE has no education and works in the public sector. Father and mother of MIE no education and work/have worked as farmers.

the sign and significance of most coefficients used in the first model, even if the absolute magnitudes decrease. It should be noted that the marital status of main income earner becomes insignificant, as does the ethnic control variable for Tigrayans and secondary education of second income earner. Migrant households still have around 11 per cent higher welfare than non-migrant households. Households with female main income earners have 22 per cent lower incomes than households with male main income earners, while the difference shrinks to 2 per cent if the female main income earner is married. The negative effect from having a female main income earner thus persists even when activity variables are included; no matter what income-generating activity the female-led households are involved in, their income is lower than for male-led households. The shares of household income coming from different sources remain highly significant compared to the original OLS model, although their absolute magnitudes decrease. This is explained by the introduction of main and second income earners' activities in the model, that are likely to pick up the same effect as the income share variables. For instance (see Appendix Table A4), if the main income earner is engaged in self-employment, compared to being in the public sector, the household has a 32 per cent higher income and this is likely to reduce the effect from the variable share of income from self-employment. In the same way, a household with an unemployed main income earner has 23 per cent lower income than a household with a main income earner in the public sector, and this should be added to the negative effect from the share of income from unearned income. Note that the marginal effect from having a main income earner in casual or domestic employment is the same as from having an unemployed main income earner—some households can 'afford' being unemployed while others cannot.

Introducing both parental education and second income earner's education into the model also reduces the impact of main income earner's education on household income (see Table 7). The effect is more noticeable at the higher levels of education—the effect of main income earner's primary education compared to no education remains basically the same and the difference between secondary and primary is reduced from 36 per cent to 28 per cent in the full OLS model. The difference between completing post-secondary education compared to secondary education is reduced from 54 per cent to 37 per cent, and the difference between secondary and university education decreases from 184 per cent to 153 per cent when other individuals' education and activity variables are introduced into the model.¹⁸ In the original OLS regression, the variables for main and second income earners' education seem to hide the effects from other variables.

From Appendix Table A4 we can see that all levels of the father's education had a positive significant effect on household income, while the mother's education is positive and significant only for primary education. The activity variables of the father are all insignificant, while the mother having any job has a negative significant impact on household income. It thus seems likely that it is the education background rather than the activity of the parents that has an affect on the children's welfare.¹⁹ Having parents

¹⁸ Testing main income earner's education coefficients against each other (see Appendix Table A5) in an F-test, they all turn out significantly different from each other at the one per cent level.

¹⁹ Testing the education variables for each individual (main income earner, second income earner, parents of main income earner) jointly in an F-test (see Appendix Table A5), they come out significant for main income earner and father of main income earner at the 1 per cent-level, at the 10 per cent-level for mother of main income earner but insignificant for second income earner. Testing the activity variables in the same manner shows that the activity variables for main as well as for

with education seems to lead to a better effect of the child's education—for instance, if there is a difference in school quality, an educated parent would probably put the child in the better school.

Looking briefly at the control variables, we see, as was noted earlier, that a household with a self-employed main income earner, or with a main income earner employed in the private sector, is better off than a household with a main income earner in the public sector (32 per cent and 15 per cent, respectively). Households with unemployed or casual or domestic workers as main income earners are 23 per cent worse-off compared to public sector employees. For the second income earner, all other activities give a lower household income than being in the public sector. Households well established in the labour market as well as successful entrepreneurs are thus enjoying the highest incomes and welfare levels.

Table 7
Marginal effects of main income earner's education on household income, and returns to education at household level

Marginal effects	Original OLS model		Full OLS model	
	MIE	SIE	MIE	SIE
Primary education	0.1411*	-0.0157	0.1209*	0.0062
Secondary education	0.4520**	-0.1048*	0.3664**	-0.0150
Post-secondary education	0.8819**	0.2260**	0.6844**	0.1263#
University education	1.4967**	0.3193*	1.2943**	0.2388#
	Original OLS model		Full OLS mode	
Returns to education ⁽¹⁾	MIE (%)	SIE (%)	MIE (%)	SIE (%)
Primary versus no	15	-2	13	1
Secondary versus primary	36	-9	28	-2
Post-secondary versus secondary	54	39	37	15
University versus secondary	184	53	153	29

Note: ⁽¹⁾ Returns to education = $\exp(b2-b1)-1$.

5.3 Other studies

Other studies from urban Sub-Saharan Africa analysing the returns to education in a household context (for instance, Coulombe and McKay 1996; Glewwe 1991; Krishnan *et al.* 1998; and Wambugu 2001) have found similar results on the importance of education to household welfare. In Table 8, the results from these studies are summarized. Some results stand out. Compared to other urban data from Sub-Saharan Africa, the returns to primary education are much lower in Ethiopia. Possible explanations include lower school quality and late enrolment in urban Ethiopia. The returns to university education in the present study are much higher than in any other study, even those that only look at the returns for wage employees. Very few of the main income earners in urban Ethiopia have university education (only 3 per cent). Krishnan *et al.* (1998) however do report similar figures for individual data on men in the public sector in urban Ethiopia in 1994.

second income earner are jointly significant at the one per cent level, while mothers' and fathers' activity variables are each jointly insignificant.

Table 8
Returns to education at household level, compared to completing degree below, %

Urban Mauritania ⁽¹⁾	Non-working	Wage employee	Self-employed	
School 1-5	10	50 **	102 **	
School 6+	64 **	11 **	4	
Kenya ⁽²⁾	Farm	Wage employee	Self-employed	
Complete primary	13 **	57 **	25 **	
Completed secondary	6 **	50 **	40 **	
Post-secondary	-6	27 **	-6 **	
University	69 **	92 **	51 **	
Urban Côte d'Ivoire ⁽³⁾	Male	Female		
Elementary	46 **	12 #		
Junior secondary	28 **	14 **		
Senior secondary	19 **	11 **		
University	15 **	19 **		
Urban Ethiopia ⁽⁴⁾	OLS (MIE)	Full OLS (MIE)	Full OLS (SIE)	Full OLS (MIE + SIE)
Primary	15 *	13 *	1	14
Secondary	36 **	28 **	-2	26
Post-secondary	54 **	37 **	15 #	52
University ^(a)	184 **	153 **	29 #	182
Urban Ethiopia ⁽⁵⁾	Men		Women	
Public sector	1994	1997	1994	1997
Primary	68 **	71 **	-19	-8
Secondary	52 **	31 **	27	-4
Tertiary	169 **	69 **	80 #	78
Private sector				
Primary	113 **	26	35	-21
Secondary	46 **	60 *	-3	261 *
Tertiary	66 **	95 **	20	-22 #

Notes: Returns to specific level of education compared to level below, calculated as $\exp(b_2 - b_1) - 1$;

** , * and # means significant at the 1, 5 and 10%-level, respectively

(a) Compared to secondary education.

Sources: Own calculations based on the following sources:

(1) Coulombe and McKay (1996) household survey data from 1990, using education of household head, OLS after multinomial logit of household allocation into sectors (table 4);

(2) Wambugu (2001) household survey data from 1995-96, national representative survey, separate OLS on each sector (tables 5.2-4);

(3) Glewwe (1991) household survey data from 1985-86, OLS using education of most educated male and female (table 2);

(4) This study;

(5) Krishnan *et al.* (1998), household survey data from 1994-97, individual returns for 15-64 years old, OLS after multinomial logit on allocation into wage employment (table A6).

The differences between our household-based returns to education, and the individual approach in Krishnan *et al.* (1998) deserve some comments. Returns to primary education for women at the individual level are negative (and non-significant) for most women. Our findings of very low returns to primary education at the household level (13 per cent) can easily be reconciled with the much higher earnings at the individual level if one considers the fact that 40 per cent of the households in our data are female-led, and that only half of the households are in wage employment. The lower returns to

secondary education at the household level compared to individual level data can be explained in the same way. Also, the study on individual level data presents returns to education after having controlled for the effect of education on selection into wage employment.

Compared to estimates of social returns to investment in primary education (Psacharopoulos [1994] provides an overview), the figures reported in this study for private household returns to education are low. This could imply that investment in primary education, perceived as being profitable for the society, might not lead to higher enrolment rates.

5.5 Implications

Clearly, the results so far show that education is important for household welfare in urban Ethiopia, as expected. Yet, a large proportion of the main income earners in the households (39 per cent) lack even the lowest level of education (primary). What would be the effect on household income, if all non-educated main income earners were given primary education? Obviously, this would rise per adult equivalent income in that group by 13 per cent (using the coefficient for primary education from the full OLS model). The effect on per adult equivalent income in the entire sample would, however, be lower, amounting to 2.9 per cent. Raising the education level of all individuals in a household to at least primary level would reduce the positive income effect to 2.3 per cent. This is caused by the low positive effect on income from second income earner's primary education, as well as the negative income effect from other household members' education up to 10 years of education. As was earlier discussed, the OLS coefficient for primary education represents two effects of education on household income, namely access to better paid jobs and, given the employment category, higher wages. This means that in order to achieve these positive results, there must also be openings in the labour market so that the better educated individuals can find jobs that correspond to their education.

In Table 9, households are described by their level of education. Households with non-educated main income earners are smaller than in the other education groups, there are more children and fewer adults in them, and they are to a much larger extent female-led. These households are also more dependent on unearned income and household female business income, while the share of household income from wages is much smaller than in other groups. The per adult equivalent income of households with a non-educated main income earner is lower than for other groups, amounting, for instance, to 75 per cent of the income of households with a main income earner with primary education, and to only 24 per cent of the income of households with university education. Thus, female-led households with many children would be the prime beneficiaries of increasing the lowest level of education among main income earners to primary, given that this increased human capital would have the same pay-off among the households as the current level of education has. Per adult equivalent income for this group would increase from 91 birr to 103 birr per month.

Table 9
Descriptive statistics of households by main income earner's education

Variable	Level of education:									
	No education		Primary		Secondary		Post-secondary		University	
	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Household size	6.01	2.85	6.32	2.61	6.16	2.66	6.34	2.42	6.37	2.22
No. of male adults	1.63	1.38	1.96	1.39	1.92	1.32	2.15	1.33	2.10	1.27
No. of female adults	2.22	1.25	2.26	1.24	2.25	1.36	2.55	1.31	2.53	1.38
No. of children	2.16	1.87	2.10	1.68	1.99	1.64	1.63	1.42	1.74	1.38
No. of elderly	0.33	0.54	0.42	0.62	0.22	0.51	0.29	0.55	0.26	0.61
Age of MIE	48.17	13.84	48.82	15.49	35.76	11.34	37.06	10.22	40.12	9.87
Female MIE	0.58	0.49	0.34	0.47	0.28	0.45	0.30	0.46	0.06	0.24
Migrated household	0.07	0.25	0.06	0.23	0.12	0.32	0.18	0.39	0.15	0.35
Average years of education	4.59	2.67	6.47	1.97	8.32	2.18	9.99	2.25	10.52	1.99
Total household income	461.56	876.66	629.96	1138.64	681.19	956.07	1028.66	1005.70	1895.98	1576.51
Per adult equivalent income	90.99	151.11	119.76	223.63	145.03	262.40	203.36	190.17	372.92	296.80
Total wage income	129.68	282.31	189.80	426.63	359.89	480.15	752.62	613.87	1519.42	1387.34
Total business income	224.97	774.77	327.72	993.95	233.33	845.59	195.51	873.92	207.99	975.13
Total female household business income	40.53	121.45	30.66	105.91	13.75	66.08	2.72	19.48	11.73	94.01
Total unearned income	64.47	273.86	80.21	398.07	73.53	224.37	77.02	162.17	156.83	387.61
Total children's income	1.90	12.28	1.57	14.79	0.70	7.30	0.78	11.39	0.00	0.00
Share of income from:										
Wage	0.30	0.41	0.37	0.44	0.60	0.43	0.76	0.35	0.83	0.29
Self-employment	0.24	0.39	0.31	0.43	0.17	0.34	0.10	0.26	0.06	0.19
Household female business	0.20	0.36	0.12	0.29	0.05	0.18	0.01	0.03	0.01	0.05
Unearned income	0.27	0.39	0.20	0.34	0.18	0.32	0.14	0.28	0.10	0.23
N	1304		479		1995		321		103	

6 Conclusions and discussion

The aim of this paper is to study the welfare situation of urban Ethiopian households and to add to our knowledge of what household characteristics are correlated with household income and welfare. We also specifically set out to discuss the impact of education on household welfare. The analysis in this paper is based on income data and the analysis approximates household characteristics by the characteristics of the main income earner instead of the household head.

According to the main findings concerning correlates of household welfare, large households and households with many children are worse off than other households, and households with female main income earners face considerably lower welfare than households with male main income earners. This is also true after controlling for the activity of main income earner. The human capital of household members other than the main and second income earners affects household welfare negatively, a fact attributed to the education requirements of entering into wage employment.

A quarter of the households with no education are found in the two top income quintiles. However, the education variables of the main income earner turned out to be important in explaining household income, and the returns to education in urban Ethiopia are high compared to other Sub-Saharan African countries, especially for higher education. This is probably due to the fact that the education level in Ethiopia is extremely low by Sub-Saharan standards, and that the few with higher education are well compensated for it. Family background variables reduced the importance of education. The importance of parental educational background could indicate that parents with education could add value to their children's education, either by choosing a better quality school or by encouraging children to make better results while in school, and that these effects show up in the higher household welfare associated with parental education.

If all main income earners had at least primary education, the income of the no education group would increase by 13 per cent, while the entire sample's income would increase by 2.9 per cent. However, these calculations do not entirely correspond to the real situation, since the coefficients in the OLS models only show the impact of past decisions on human capital accumulation and indicate nothing about the effect on income from improving human capital within the household. Also, it is based on the assumption that there will be openings in the labour market for the people that have upgraded their human capital, or that they will be remunerated at their current position according to their new educational status.

One conclusion to draw from this study is that education is important for household welfare. However, there seem to be other ways to improve the living conditions for Ethiopia's urban households: 40 per cent of the urban Ethiopian households and a majority of the households without primary education are female-led. Improving women's income earning possibilities and their access to formal wage employment is another option for making the urban Ethiopian population better off.

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Appendix

Figure A1
Log of the different types of income, frequency, normal distribution line added

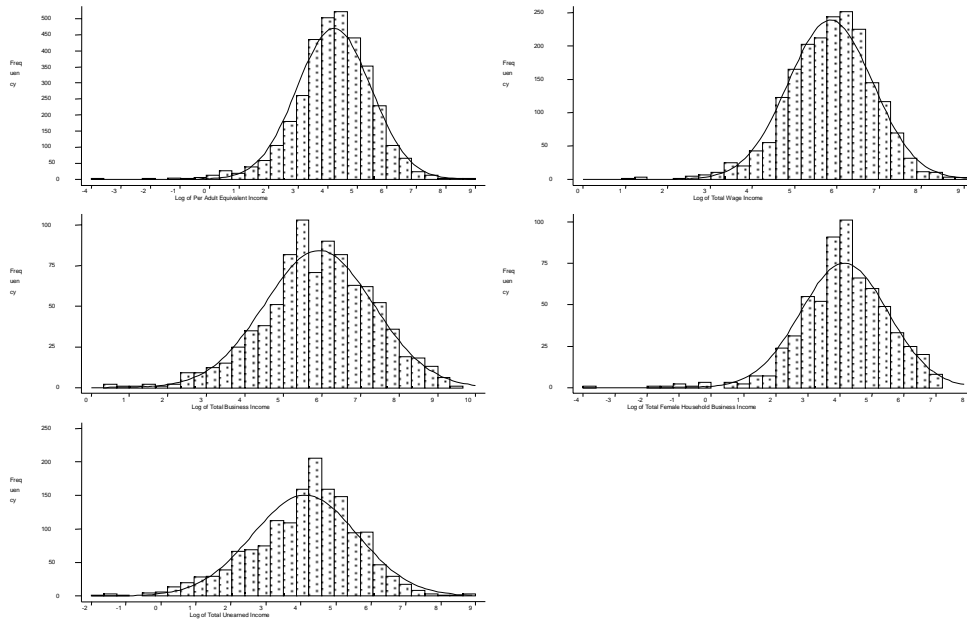
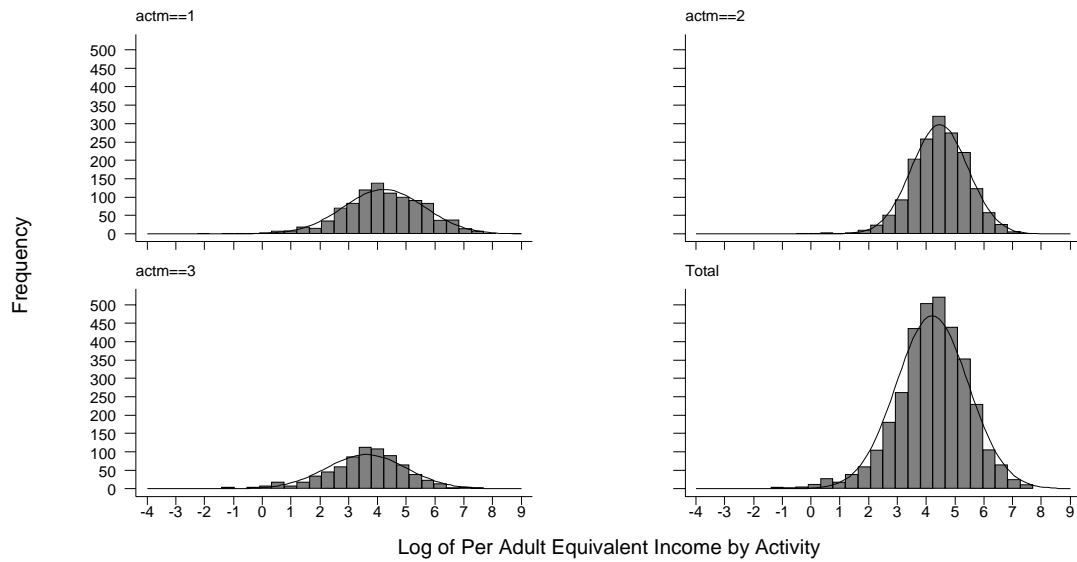


Figure A2
Log of per adult equivalent household income by activity of main income earner, frequency, normal distribution line added



Appendix Table A1
Normality test of logged income variables

Variable	Pr (Skewness)	Pr (Kurtosis)	Joint	
			adj chi2 (2)	Prob>chi2
Per adult equivalent income	0.000	0.000	–	0.0000
Wage income	0.000	0.000	71.28	0.0000
Self-employment income	0.000	0.036	17.53	0.0002
Household female business income	0.000	0.000	–	0.0000
Unearned income	0.000	0.001	53.06	0.0000

Skewness/Kurtosis tests for Normality (STATA 7).

Appendix Table A2
Random and fixed effects model, Hausman-test,
log of per adult equivalent monthly household income used as dependent variable

	Random effects		Fixed effects (within)		Difference
	Coefficient	Std err.	Coefficient	Std err.	
Constant	3.8428**	0.1989	4.9019**	0.3387	
D 1995	-0.1029**	0.0353	-0.1174**	0.0354	-0.0146
D 1997	0.0634#	0.0356	0.0584	0.0358	-0.0050
No. of household members	-0.0652**	0.0106	-0.1022**	0.0218	-0.0370
Share of 0-15	-0.5753**	0.1381	-0.4585#	0.2637	0.1168
Share of adult females	0.2354#	0.1309	-0.0949	0.2316	-0.3303
Migrated	0.1222	0.0753	(dropped)		
Female main income earner (MIE)	-0.1808**	0.0686	-0.0877	0.0907	0.0931
Married MIE	-0.1141#	0.0655	-0.1230	0.1082	-0.0089
Female MIE*Married MIE	0.1103	0.0901	-0.1792	0.1231	-0.2895
Age MIE	0.0336**	0.0077	0.0230*	0.0113	-0.0107
Age MIE squared	-0.0003**	0.0001	-0.0003*	0.0001	0.0001
Av. household education	-0.0517**	0.0180	-0.0323	0.0249	0.0194
Av. household education squared	0.0051**	0.0015	0.0016	0.0022	-0.0036
Share of household income from:					
Female household business	-0.9137**	0.0790	-0.5587**	0.1090	0.3550
Unearned income	-1.0446**	0.0621	-0.9565**	0.0859	0.0881
Self-employment	0.4459**	0.0582	0.5083**	0.0870	0.0624
MIE education:					
Education	0.1118#	0.0622	-0.0328	0.1173	-0.1445
Secondary education	0.4305**	0.0543	0.0695	0.1025	-0.3610
Post-secondary	0.8295**	0.0802	0.0472	0.1602	-0.7823
University	1.3891**	0.1232	0.4443#	0.2300	-0.9448
Second income earner (SIE) education:					
Primary education	0.0457	0.0705	0.1157	0.1025	0.0699
Secondary education	-0.0832#	0.0442	-0.1535*	0.0652	-0.0702
Post-secondary	0.2323**	0.0762	-0.1368	0.1225	-0.3691
University	0.3254*	0.1337	0.0159	0.1831	-0.3095
Awassa	0.3359**	0.1025	(dropped)		
Bahir Dar	0.3522**	0.0897	(dropped)		
Dessie	-0.0926	0.0907	(dropped)		
Dire Dawa	0.6197**	0.0762	(dropped)		
Jimma	0.5681**	0.0883	(dropped)		
Mekele	-0.1150	0.1252	(dropped)		
Oromo	-0.0291	0.0613	-0.0528	0.1878	-0.0237
Tigrayan	0.1624#	0.0923	0.2728	0.3635	0.1104
Gurage	0.1197	0.0769	0.1854	0.2988	0.0657
Other ethnic	0.0357	0.0802	0.5088*	0.2312	0.4731
N	3402		3402		
R-squared					
Within	0.1410		0.1634		
Between	0.4988		0.2078		
Overall	0.3718		0.1923		

Test: Ho: difference in coefficients not systematic:

$$\chi^2(27) = (b-B)'[S^{-1}](b-B), S = (S_{fe} - S_{re}) = 104.15 \quad \text{Prob}>\chi^2 = 0.0000$$

Note: **, * and # means significant at the 1, 5 and 10 per cent level, respectively.

Reference household has a male MIE, has lived at current residence for more than 10 years in 1994, lives in Addis Ababa, MIE and SIE have no education, MIE works in the public sector, and is of Amharic origin.

Appendix Table A3
Changes in explanatory variables between the years (variable year 2—variable year 1),
mean, standard deviation and per cent

Variable	1994-95			1995-97		
	Mean	Std dev.	Changes (%)	Mean	Std dev.	Change (%)
No. of household members	-0.1658	1.2353	46.2	0.2434	1.4188	53.5
Share of 0-15	-0.0130	0.1174	49.6	0.0338	0.1274	56.4
Share of adult females	0.0082	0.1193	52.8	-0.0195	0.1446	61.8
Female MIE(a)	0.0353	0.4144	17.3	0.0018	0.4243	18.0
Married MIE	0.0115	0.2983	8.9	-0.0265	0.3076	9.5
Female MIE*Married MIE	0.0265	0.3018	9.2	0.0132	0.3319	11.0
Age MIE	1.0026	12.5602	99.7	-2.1226	12.4113	99.7
Age MIE squared	90.5917	1121.0470	99.7	-183.8316	1100.9910	99.7
Av. household education	-0.1024	2.8710	59.4	0.0253	3.3362	67.7
Av. household education squared	-1.3642	31.1168	59.4	1.4951	37.4253	67.7
Share of household income from:						
Female business	0.0209	0.2684	24.1	-0.0287	0.2665	25.3
Unearned income	-0.0019	0.3158	49.7	0.0612	0.3450	55.1
Self-employment	0.0188	0.3255	34.3	-0.0418	0.3248	34.4
MIE education:						
Primary	0.0018	0.2556	6.5	-0.0123	0.2621	6.9
Secondary	-0.0018	0.3614	13.1	0.0362	0.3752	14.2
Post-secondary	-0.0062	0.1947	3.8	-0.0088	0.2013	4.1
University	-0.0044	0.1224	1.5	-0.0062	0.1223	1.5
Oromo	0.0044	0.1294	1.7	-0.0062	0.1294	1.7
Tigrayan	-0.0026	0.0786	0.6	0.0035	0.0727	0.5
Gurage	-0.0035	0.0840	0.7	-0.0009	0.0786	0.6
Other ethnic	-0.0009	0.0891	0.8	0.0026	0.1225	1.5

Note: 'Mean' is mean absolute change in the variable between two years;
'Changes' mean percentage of observations where the variable change between two years.

Appendix Table A4
Control variables from full OLS model

	Variable means	Coefficient	Std err.	Marginal effects ⁽¹⁾
Main income earner (MIE):				
Self-employed	0.19	0.2803**	0.0877	0.3235
Female household business	0.10	0.0138	0.1027	0.0139
Private employee	0.09	0.1402*	0.0670	0.1505
Casual/domestic worker	0.10	-0.2655**	0.0678	-0.2332
Unemployed	0.04	-0.2708**	0.1018	-0.2372
Not working ⁽²⁾	0.18	-0.0918	0.0778	-0.0877
Second income earner (SIE)				
Self-employed	0.05	-0.2724**	0.0883	-0.2384
Female household business	0.05	-0.4088**	0.0904	-0.3355
Private employee	0.04	-0.0368	0.0915	-0.0361
Casual/domestic worker	0.07	-0.1193	0.0778	-0.1125
Unemployed	0.19	-0.6163**	0.0568	-0.4601
Not working ⁽²⁾	0.39	-0.4134**	0.0477	-0.3386
Father of MIE:				
Primary education	0.21	0.1295**	0.0450	0.1383
Secondary education	0.06	0.2496**	0.0809	0.2835
Higher education	0.02	0.2688#	0.1452	0.3084
Self-employed	0.11	0.0306	0.0584	0.0310
Civil servant	0.12	0.0778	0.0606	0.0809
Other wage employment	0.04	-0.0574	0.0893	-0.0558
Not working ⁽²⁾	0.07	0.1104	0.0720	0.1168
Mother of MIE:				
Primary education	0.07	0.1515*	0.0715	0.1636
Secondary education	0.02	-0.0275	0.1411	-0.0271
Higher education	0.00	0.4341	0.2777	0.5436
Any job	0.17	-0.0896#	0.0481	-0.0857

Note: ⁽¹⁾ For continuous variables: evaluated at variable means; for dummy variables: using the interpretation in Kennedy (1996), on per adult equivalent income;

⁽²⁾ Not working includes housewife, pensioner, not employed but not looking for job, etc.

** , * and # means significant at the 1, 5 and 10 per cent level, respectively.

Appendix Table A5
F-tests of education and activity variables from full OLS model

H0	MIE	SIE	Father of MIE	Mother of MIE
<u>All individual's education variables jointly zero</u>				
	F(4, 3343) = 45.25 Prob > F = 0.0000	F(4, 3343) = 1.91 Prob > F = 0.1064	F(3, 3343) = 5.32 Prob > F = 0.0012	F(3, 3343) = 2.16 Prob > F = 0.0912
<u>All individual's activity variables jointly zero</u>				
	F(6, 3343) = 10.01 Prob > F = 0.0000	F(6, 3343) = 25.23 Prob > F = 0.0000	F(4, 3343) = 1.01 Prob > F = 0.4014	F(1, 3343) = 1.25 Prob > F = 0.2634
<u>Primary education = secondary education</u>				
	F(1, 3343) = 18.00 Prob > F = 0.0000	F(1, 3343) = 0.21 Prob > F = 0.6489	F(1, 3343) = 2.14 Prob > F = 0.1432	F(1, 3343) = 1.87 Prob > F = 0.1711
<u>Secondary education = post-secondary education</u>				
	F(1, 3343) = 24.44 Prob > F = 0.0000	F(1, 3343) = 4.75 Prob > F = 0.0293		
<u>Post-secondary education = university education</u>				
	F(1, 3343) = 30.61 Prob > F = 0.0000	F(1, 3343) = 0.67 Prob > F = 0.4126		
<u>Secondary education = higher education</u>				
			F(1, 3343) = 0.03 Prob > F = 0.8640	F(1, 3343) = 2.06 Prob > F = 0.1515

