POVERTY, INCOME DISTRIBUTION AND LABOUR MARKETS IN ETHIOPIA

edited by

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A market in the outskirts of Addis Ababa.
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Contents

Foreword

In this book, the authors exploit data sets unique to Africa to investigate different aspects of poverty and inequality in Ethiopia during a period of economic reform. It is the first attempt at comprehensively looking at poverty, its determinants as well as changes over time for Ethiopia. Apart from its input to the stock of knowledge on Ethiopia, the book also contributes to a broader understanding of the links between poverty and development in Africa.

The work reported in this book started in the early 1990s, when the Department of Economics at Addis Ababa University jointly with the Department of Economics at Göteborg University (Sweden), the Centre for the Study of African Economies (CSAE) at Oxford University, and the International Food Policy Research Institute (IFPRI) agreed to undertake a series of urban and rural household surveys in Ethiopia. These were started in 1994 and several rounds of interviews have followed. These series of urban and rural surveys have already generated a wealth of information that has significantly improved empirical research on Ethiopia.

In the late 1990s, the African Economic Research Consortium (AERC) based in Nairobi initiated a poverty project covering a dozen African countries. Within this project a twinning arrangement was set up between Addis Ababa and Göteborg universities, and the bulk of the work reported in this book derives from that work. However, parts of the work have been funded by other sources, such as Oxford University, the Swedish Agency for Research Cooperation with Developing Countries (SAREC), and USAID through Michigan State University. We gratefully acknowledge the support received from all these sources.

We have received a lot of help and encouragement during the work on this study. We would first like to thank the coordinators of AERC's poverty project, Erik Thorbecke, Ali Ali, and Germanu Mwabu, for their guidance and support. We have also benefited a lot from the help received from AERC research directors Ibrahim Elbadawi, Augustin Fosu, and Dominique Njinkeu. Comments received at various seminars and workshops arranged by the AERC were very useful.

The research reported in this volume would not have been possible without the data gathered in the series of urban and rural surveys. Hence, our thanks go to all survey coordinators, supervisors, enumerators and respondents in urban and rural areas whose names are too many to mention.

Finally, we would like to acknowledge the monumental contribution of Mekonnen Taddesse towards the surveys as well as his pioneering role in poverty analysis among Ethiopians – particularly in the analysis of urban poverty. He was the chairman of the Economics Department at Addis Ababa University during

the period in which the first waves of surveys were undertaken. In addition, he initiated the research work reported in this volume. But sadly Mekonnen passed away before the project was completed. We dedicate this book to his memory.

Arne Bigsten *Bereket Kebede* *Abebe Shimeles*

1. Introduction

Arne Bigsten, Bereket Kebede, and Abebe Shimeles

1.1 Introduction

This is one of several country-studies done as part of the collaborative poverty-project of the African Economic Research Consortium (AERC) aimed at analysing poverty, inequality, and labour markets in Africa. With a per capita income of just above US$100,[1] Ethiopia is one of the poorest countries in the world, ranked seventh from the bottom in human development in 2001 (UNDP, 2003). With such low average income, poverty is of course widespread, so understanding the causes of poverty is of utmost importance, but until recently very little household-data was available. This study deals with many aspects of poverty and income-distribution in Ethiopia, providing a wealth of information on household-income and its determinants. We hope that the results will be of interest both to academics working on poverty analysis and to policy makers and donors collaborating with Ethiopia.

1.2 The Data

The panel-data used in this study came from two separate but closely related household-surveys, one rural and the other urban, undertaken by the Department of Economics of Addis Ababa University. The rural surveys were done in collaboration with the Centre for the Study of African Economies of Oxford University and the International Food Policy Research Institute (IFPRI); the urban surveys with the Departments of Economics of Göteborg University and Michigan State University. The two surveys together covered 3,000 households, the sample-size in each being the same. The rural and urban samples were drawn independently of each other but allowing for differences in the two settings, the questionnaires were carefully standardised to enable the collection of comparable data. Both rural and urban surveys collected data on the demographic characteristics of households, their educational and health status, ownership of assets, employment and income, credit, consumption, and expenditure.

The rural household-survey was undertaken in 15 sites in four rounds – the first two in 1994, the third in 1995, and the last in 1997. Though small relative to the size, distribution, and diversity of the rural population, the sample was designed to represent as many of the major socio-economic groups, agro-ecological

1. In 2001. GDP per capita in 1995 US$ was 120, while GDP per capita in PPP terms was US$ 810 (World Development Indicators 2003).

zones, and farming systems as possible, by locating the sites in a variety of the most important regions of the country. While the survey sites were thus purposely selected to represent rural diversity, households in each were sampled randomly, with the sample size of each local sample proportional to the population in the region (for details on the sampling-procedure, see Kebede, 1994).

The urban surveys were conducted over four successive weeks during a month considered to represent average conditions. They covered seven major cities and towns – the capital Addis Ababa, Awasa, Bahir Dar, Dessie, Dire Dawa, Jimma, and Mekele – selected to represent the settings and socio-economic characteristics of the urban population in the country. A predetermined sample-size of 1500 households was allocated to the seven urban centres, then to each of their *weredas* (districts), in proportion to population. Households were then selected by systematic sampling from half of the *kebeles* (the lowest administrative units) in each *wereda* using the official registration of residences available for each *kebele*. Such a sampling frame nevertheless misses an important social group from the point view of poverty measurement, the homeless, whose ranks are swelling alarmingly, especially in the larger urban centres.

The same sample-size of 1500 households was maintained in all subsequent rounds of both the rural and urban surveys by introducing replacements for households that dropped out. The sampled communities were largely stable during the survey-period; attrition was extremely low, about 3% from the rural sample and 7% from the urban. With further loss of data of about the same proportions due to mismatching of household identifications, panel-data on 1403 rural households and 1249 urban households were compiled.

In some of our analyses we wanted to use a nationally-representative sample, so a "national" panel was constructed as follows. The first and second rounds of the rural survey, undertaken in 1994, were merged to form the 1994 variables. The 1995 and 1997 rural data were then obtained from the third and fourth rounds, with appropriate scaling (depending on the ratio of the first and second rounds) to take account of seasonal variations. These were merged with proportional sub-samples of the urban panel (about 15%, the urban weight in the country's population) to form a national panel of 1654 households.

1.3 Main Results

The wars and disruptions in the rural areas of Ethiopia during the Dergue period undermined the urban as well as the rural economy; agricultural production was inhibited and urban unemployment increased. Urbanisation is only half the Sub-Saharan average, but there has been and continues to be an influx of poor people into the urban areas. By the mid-1990s the urban population had increased to about 15% of the total Ethiopian population of about 60 million. Since the urban economy has not been very dynamic, many urban incomes are very low, so poverty is not just a rural problem. Based on poverty-profile and stochastic-domi-

nance estimates, we found that the incidence of poverty was virtually as high in the urban as in the rural areas, which is unusual for Africa. Our headcount measure of poverty was 41.2% nationally for 1994 (41.9% rural and 37.5% urban), declining to 35.5% in 1997 (35.5% both rural and urban), although the change in urban poverty was not statistically significant. Income inequality worsened during this period

In general, poverty tends to be chronic. For instance nationally, in 1997, of the 36% of households which were poor in 1997, more than 60% were also poor in 1994, even though poverty had fallen in the interim; and even more than two thirds of the poor urban households had also been poor in 1994. If those who were non-poor in 1994 had remained so in 1997, poverty would have declined further to 22% in rural and 25% in urban areas. Slippage into poverty therefore limited poverty-reduction.

To get clear results about the change in the level of poverty from 1994 to 1997, we applied stochastic-dominance criteria. Mean rural expenditures increased by 8.8% per year in our sample, 7.2% in the urban sample. Urban incomes were higher, but the difference was not statistically significant. According to the dominance-analysis, rural poverty did not dominate urban poverty; the difference between them in 1994 or 1997 was not statistically significant. We also investigated any changes in urban poverty in Addis Ababa, northern towns, and southern towns, between 1994 and 1997. Addis Ababa showed an increase in per capita consumption expenditure, but generally there was no statistically significant poverty-reduction either there or in the northern and southern towns.

There are some indications that there are considerable scale-economies in a typical urban Ethiopian household, perhaps rural as well. Thus a household's basic needs do not seem to change much with increase in household-size. Yet, some of our regression results indicate that household-size increased the probability of poverty.

We used an objectively fixed poverty line, but computed a 0.31 elasticity of the subjective poverty line with respect to per capita household income. That is, for every 1% increase in per capita household income, people's perception of what are basic needs increased by 0.31%. If poverty lines were adjusted accordingly, the resulting poverty-profiles would change substantially. To check the robustness of our results, we compared a subjective poverty line with a consumption-based one. The results corresponded well; more than 80% of the households were categorized the same with both.

The main difference is that larger households were more likely to be poor in the consumption-based estimates, partly due to neglect of scale-economies in the consumption-based poverty line, while the elasticity of the subjective poverty line with regard to household-size was only 0.15. If the subjective poverty line is more appropriate, our estimates generally exaggerate the extent of poverty in Ethiopia, particularly for large households.

The estimated poverty-figures are thus surprisingly low, especially given the low average income in Ethiopia, but they are roughly the same as in several of the other AERC country-studies using the same approach. It seems that, by setting the poverty line on the basis of caloric intake, the level of poverty seldom exceeds half the population, probably because people have considerable scope for adjusting their diet according to their income. Very poor households tend to eat calorie-intensive cheap foods not expensive calories such as meat. If the food-basket were the same in all countries, Ethiopian poverty would certainly be much higher. This is not such a problem when it comes to identifying the poor and what determines poverty in a certain setting, but for comparisons across countries it would make a huge difference. If that is the aim one needs another basis for comparison.

We analysed factors affecting poverty using probit-analysis, and found rural poverty related to demographics, farming-systems, market-density, and off-farm employment. Urban poverty related to demographics, occupation, and region. The mean age of rural household-members had no significant effect on the probability of being poor, nor did primary education of the household head or the amount of land cultivated. The production of teff (a local grain) and coffee, and the primary education of the wife, were significant at the 10% level, reducing poverty. A high dependency-ratio increased the probability of poverty, as one might have expected. Higher age of the household-head increased the probability of poverty somewhat, as did having a female head. The probability of poverty was higher in the south than in the north. The production of chat, a high-value crop in some regions, decreased the probability of being poor, as did ownership of oxen. Surprisingly, engagement in off-farm employment was associated with higher poverty, suggesting that it is essentially a rural coping strategy chosen when better alternatives were not available. Access to markets reduced the probability of being poor, however.

The probability of urban poverty increased with household size, but unlike in the rural areas, decreased with a higher mean age of household-members. Primary education for the household-head and spouse reduced the probability of urban poverty, and a high dependency-ratio again increased it. The probability of poverty was again higher in the south. Employment in most occupations reduced the risk of urban poverty. The effects were highest for employers and employees, but also reduced for own-account workers. Casual workers, however, had an even higher probability of poverty than the unemployed, which seems to indicate that to be truly unemployed one needs some sort of backup from extended family or other support mechanisms. The destitute are forced to accept all kinds of casual jobs.

There were thus differences in the way urban and rural households escaped poverty. In the urban areas, with a more extensive formal sector, education was more important and access to regular occupations mattered very much. In the rural areas the picture was less clear-cut; education did not matter as much. This result has also been obtained in other rural contexts where there is very little in-

novation or change. Agriculture using traditional methods does not seem to require formal education. Access to markets matters, however.

The literature on the intra-household distribution of resources in Africa has generally not found any systematic discrimination between girls and boys. We investigated the issue using a demand-systems approach, in which food surprisingly was identified as a luxury item, suggesting that rural households were in a desperate situation, using extra income for food. This contrasts with our poverty-estimates, which suggest that poverty was not that extreme. "Female goods" were somewhat more income-elastic than "male goods", suggesting that women and girls may suffer more from negative income shocks, but may also be the first to gain from economic growth. Female goods were also more sensitive to changes in own-price and to cross-price changes.

We found a substantial increase in urban income from 1994 to 1997, but decidedly uneven, ranging from 2% for the bottom quintile to 23% for the top; growth had not trickled down to any great degree. This is consistent with the hypothesis that transactions-intensive sectors would be the first to benefit from the return to normalcy (Collier, 1999), and better-off households also seem to have been more able to benefit from liberalisation of the economy.

The capital, Addis Ababa, was not generally better off than other urban areas, and there was in general no big change in the pattern of incomes from 1994 to 1997. The poorest households tended to rely on female household-business and remittances, while regular business-incomes mattered more for those at the top of the ladder. Very few Ethiopian households had multiple income sources compared to Africa in general, probably because of the previous anti-liberal regime, it is taking time to open up the system. This lack of flexibility limits the avenues for households to climb out of poverty.

During the reform-period there did not seem to have been much change in the labour-market, nor much increase in private-sector employment. The labour-market seems to have been rigid and unresponsive. In spite of increasing unemployment among the educated, returns to secondary and tertiary education had not changed much if at all, and returns to primary education remained close to zero. Putting children in primary school would not therefore have paid in terms of labour-market rewards, unless households could keep their children in school also into higher levels. Public sector employment had fallen, but wages had recovered to pre-reform levels. Real wages had also increased somewhat in the private sector.

There has been considerable progress in Ethiopia since the initiation of reforms. The macroeconomic situation has improved, and per capita incomes have increased. One may be concerned, though, about the unevenness of the improvements, reflected in a considerable increase in inequality. One of the main tasks for the future is therefore to devise policies that can sustain growth while making it more relevant to the poor. Our ambition with this book is to contribute to this vital but difficult mission.

Map of survey sites

Note: All borders and survey sites are approximare. SPNNR is the Southern People's and Nations and Nationalities region.
Source of basic map (country and regional borders): UNDP-EUE 1998 (http://www.sas.upenn.edu/African_Studies/eue_web/newzones.gif).

References

Collier, P. (1999), "On the economic consequences of civil war", *Oxford Economic Papers* 51(1):168–183.

Kebede, Bereket (1994), "Report on Site Selection", Department of Economics, Addis Ababa University, mimeo.

UNDP (2003), *Human Development Report 2003*, Oxford University Press, New York.

World Bank (2003), *World Development Indictors 2003*, Washington DC.

2. Overview of the Economy

Arne Bigsten, Bereket Kebede and Abebe Shimeles

2.1 Dictatorship and Civil War

The overthrow of Haile Selassie in 1974 was soon followed by a socialist military dictatorship under Mengistu Haile Mariam, which lasted for 17 years. The power of the traditional elite was reduced and extensive nationalisations were undertaken, which met with only limited resistance. But the conflicts with Eritrea as well as with other guerrilla movements persisted and grew in scale over the years, leading to an extended civil war. The situation was further aggravated by an invasion from Somalia in 1977. The country was hit by drought in the early 1980s and a major famine in 1984. Attempts at a socialist transformation with centralisation and state-control of firms, an ineffective economic policy, high military expenditures, and reduced foreign aid had profoundly negative effects on the economy. Mengistu was finally overthrown by a coalition led by the Ethiopian People's Revolutionary Democratic Front (EPRDF)[1] in 1991.

The civil war also had serious consequences for the economy, destroying resources, causing disruption, and creating social disorder. It also led to a diversion of resources from output-enhancing activities, dissaving, and asset-substitution that led to the flight of assets abroad.[2] Collier (1999) estimates that GDP in 1990 was about 30% lower than it would have been without the civil war. With the restoration of peace disruptive processes were at least partly reversed, so there was a peace-dividend, but there were also factors that made the restoration of growth difficult. It took time to reverse the diversion of resources from production enhancing activities. Investors perceived risks to be higher after the civil war, since there was a risk of a new war. And the civil war polarised the society and reduced social capital, limiting the scope for new capital formation. As is often the case, it was politically difficult to cut the military and expand public expenditures for poverty-reduction. The public sector deficit was over 8% of GDP at the time of Mengistu's fall, which also limited the scope for poverty reducing interventions by the new government.

Collier (1999) notes that war affects not just the level of GDP but also its composition. Sectors intensive in capital or transactions, and activities supplying them, tend to shrink. And sure enough, manufacturing, construction, transport, distribution, and finance were unusually restricted at the end of the civil war, whereas subsistence agriculture, for example, had shrunk far less. This at least

1. With the Tigrai People's Liberation Front (TPLF) dominant.

2. See Collier (1999) for an analysis of the impact of civil wars on economic growth.

provided some cushion for the poor during the bad years. With the restoration of peace, however, the pattern reversed. As capital- and transactions-intensive sectors benefited from the restoration of economic growth, the poor in subsistence agriculture were slow to gain. Economic inequality thus increased in the immediate post-civil war period.

2.2 Peace and Economic Adjustment

The new government that took over after Mengistu initiated extensive political and economic reforms. Apart from restoring peace the stated aims of the government were to establish democracy and respect for human rights; to regionalize through decentralisation of power to regional assemblies; to introduce a market economy and stabilise the economy; and eventually to raise the standard of living of the population. Since Ethiopia is one of the poorest countries in the world, it would not be possible to achieve much poverty reduction unless there were economic growth.

The government aimed to create a decentralised and market-oriented economic system with an increasing role for private enterprise.[1] The economic system was liberalised with regard to production, prices, and trade. The government also began to reform the financial markets, which were deregulated and opened up for private banks.

The macroeconomic stance improved over the period covered by our survey-data. The overall fiscal deficit including grants fell from 3.9% in 1994/95 to 1.5% in 1996/97 (see Table 2.1), the last year covered by our surveys, while military expenditures were low (Table 2.2, discussed more below). Ethiopia increased spending in key sectors, in spite of continuing low tax revenues, and the gap was largely covered by fairly generous external funding (Table 2.1).

Monetary policy was also successful in controlling inflation reasonably well. The growth of broad money fell from 24.3% in 1994/95 to 3.4% in 1996/97, and lending rates came down. The exchange-rate premium in the parallel market was virtually eliminated, although the current account remained weak. There was some export response to the reforms in spite of still considerable trade and foreign-exchange restrictions, and generally a very poor infrastructure for exporters. In spite of its improved competitiveness, the country remained very dependent on its coffee export (IMF, 1999, p.13). From 1995/96 to 1997/98 coffee accounted for three-quarters of the export growth.

1. The transitional programme launched in November 1991 (Transitional Government of Ethiopia, 1991) emphasized the need to develop the private sector. Initial efforts were supported by a World Bank Structural Adjustment Credit and an IMF Enhanced Structural Arrangement for fiscal years 1993/94 to 1995/96.

Table 2.1: Economic indicators, 1994/95–2002/03

	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03
National income and prices (% change)									
GDP at constant prices	6.2	10.6	5.2	-0.5	6.7	5.4	7.2	1.2	-3.8
Consumer prices[1]	13.4	0.9	-6.4	3.7	3.6	4.2	-5.2	-7.2	15.1
External sector									
Exports (million US$)	454	410	599	602	494	486	463	452	483
Imports (million US$)	1063	1413	1403	1519	1509	1611	1556	1696	1940
Terms of trade (% change)	32	-18.5	1.5	18.5	-15.9	-33.9	-3.6	-11.1	-2.7
Official exchange rate (Birr/US$)	5.88	6.33	6.50	6.86	7.53	8.3	8.5	8.6	8.62
Money and credit									
Broad money (% change)	24.3	8.5	3.4	12.8	5.3	12.7	5.9	14	9.5
Lending rates (maximum)	15.0	16.0	10.5	11.3	11.8	13.0	9.5	12.3	11.3
Financial balances									
Gross domestic investment (% of GDP)	16.4	19.1	19.1	18.2	18.6	15.9	17.8	20.5	21.1
External current account balance, including official transfers (million US$)	190	-203	-230	-292	-374	-331	-225	-360	-370
External current account balance, excluding official transfers (million US$)	-238	-594	-456	-552	-613	-433	-605	-814	-923
Government finances (% of GDP)									
Revenues	17.4	18.4	19.0	18.7	19.0	18.4	18.8	20.1	19.6
Expenditures	24.8	27.0	24.3	26.4	25.7	33.0	28.4	32.2	34.8
Overall fiscal balance, including grants	-3.9	-5.6	-1.5	-3.9	-4.3	-11.7	-5.5	-9.3	-8.4
Overall fiscal balance, excluding grants	-7.3	-8.5	-5.2	-6.8	-6.5	-14.8	-9.6	-12.1	-15.8
External debt	80..3	71.6	65.3	143.5	142.4	85.3	86.3	109.8	98.7
Debt-service ratio	35.1	36.5	42.7	44.3	65.8	56.3	43.5	30.5	32.4

[1] Addis Ababa retail price-index until 1996/97, then national consumer price index.

Sources: Policy Framework Paper 1998/99–2000/01, Ethiopia - Recent Economic Developments (1999), Ethiopia (2003), p.10, IMF (2004a,b), data from Ministry of Economic Development and Cooperation.

There was also a certain investment recovery. The share of private investment in GDP increased from 7.5% during 1981-91 to 11.1% in 1996–99, while the public-investment share increased from 6.1% to 7.6% (IMF, 1999, p.11). Domestic savings increased only slowly, and most of that was in the public sector. No significant foreign investment occurred during the study period, although it picked up somewhat beginning 1997/98 (IMF, 1999, p.16).

In spite of the generally poor export performance, the rest of the economy recovered quite well under the new regime, partly due simply to the return of peace as noted, but the economic reforms certainly also contributed. Per capita income increased about 5% annually during the three years in the study period. There was then a setback in 1997/98 when per capita incomes fell about 3%.

The economy inherited from the old regime was largely state controlled, so one would expect the initial effects of reforms to be smaller than in many other African countries. The economy is highly dependent on agriculture, so it is vulnerable to weather-shocks. Yet, agricultural output grew due to improvements in the provision of fertilizers and extension-advice, as well as the recovery of investment in agriculture.

Although the government managed to achieve a fairly good macroeconomic outcome, structural reform left a lot to be desired: there was still an anti-export bias in the trade-regime, as exchange and trade regulations were still cumbersome; privatisation was slow; the financial sector remained weak; and the legal framework for business was not conducive to investment and growth.

As already noted, defence expenditures fell dramatically after the war and remained low during most of the 1990s, but never below 13–15% of recurrent expenditures (Table 2.2). Among economic services, agriculture and water expenditures increased, which was positive from a poverty perspective. There was also an expansion in recurrent education and health expenditures, as well as increasing capital investment in both education and public health (Table 2.3). Although the de-emphasis on agriculture was worrying, there was a strong increase in transport and communications including road construction, which was appropriate.

2.3 The Eritrean War, Coffee Prices, and Drought

The first seven years under the new regime were economically successful, partly due to good weather and the peace but also due to the economic reforms. However, further reforms were needed and much remained to be done, but it was put on hold during the conflict with Eritrea, which started with border skirmishes in May 1998 and escalated to a full-scale war in February 1999. Hostilities essentially ceased in 2000, but the peace agreement is not yet fully implemented and the final borders are not agreed upon.

Table 2.2: Recurrent expenditure by function, 1985/86–2000/01 (% share)

	85/86–90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
Administrative and general services	51.6	32.1	33.0	30.0	29.0	34.9	32.6	35.2	54.0	61.0	49.0
Defence	41.2	19.2	19.3	14.7	13.5	13.8	14.6	14.6	41.0	50.0	32.0
Others	10.4	12.9	13.7	15.3	15.5	21.1	18.0	19.1	13.0	11.0	17.0
Economic services	5.5	7.4	9.5	9.9	9.9	11.1	10.9	10.8	7.6	5.9	9.1
Agriculture and water	3.0	4.1	4.9	5.5	5.9	6.9	7.2	8.1	5.6	3.9	6.1
Construction	1.6	2.1	2.4	2.4	2.7	2.8	3.0	1.2	0.7	0.7	1.0
Others	0.9	1.2	2.2	1.9	1.3	1.6	1.5	1.6	1.8	1.3	2.0
Social services	17.9	23.9	27.2	26.9	24.6	25.5	26.2	28.8	18.2	15.3	21.5
Education	11.9	14.8	17.2	16.4	15.1	16.9	18.0	19.7	11.9	9.5	14.6
Health	3.5	4.6	5.4	6.2	5.4	5.9	5.8	6.6	0.3	0.2	0.3
Others	2.5	4.5	4.7	4.2	4.0	2.7	2.3	1.5	6.1	5.6	6.6
Debt and transfers	16.4	24.3	26.5	32.5	32.8	43.8	25.1	25.2	10.6	8.9	11.1
Public debt	10.2	10.9	17.5	24.1	23.4	16.5	16.1	16.2	9.5	8.2	10.4
Subsidy	2.2	1.8	0.2	1.9	3.7	3.1	2.2	0.0	0.0	0.0	0.0
Pension	4.0	5.9	6.5	6.1	4.8	5.2	5.3	5.5	0.0	0.0	0.0
Others	0.1	5.7	2.3	0.4	0.8	1.1	1.5	3.4	1.1	0.7	0.7
External assistance	8.6	12.3	3.8	1.2	3.7	2.6	4.5	0.0	5.0	2.9	0.0

Source: Data from Ministry of Economic Development and Finance, 2004.

Table 2.3: Capital expenditure by sector 1985/86–2002/03 (% share)

Category	1985–1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Economic development	90.0	89.9	88.4	84.1	73.3	77.5	74.4	76.3	68.9	73.5	72.9	58.2	55.6	66.5
Agriculture & land settlement	27.4	23.1	25.4	18.1	13.9	9.3	10.0	7.8	8.1	16.9	15.8	9.2	13.4	14.9
Mining & energy	20.7	18.1	14.7	8.2	8.2	8.5	10.7	19.9	15.8	15.5	14.4	6.8	5.3	8.0
Industry	12.1	20.9	15.4	17.4	9.8	10.4	10.0	6.7	2.5	0.9	1.1	0.7	0.3	0.8
Transport, communic. & construction	14.4	12.2	13.8	18.9	26.2	29.6	25.1	27.4	27.0	29.0	31.6	32.8	29.4	31.8
Water resources	12.7	13.8	16.0	17.7	12.9	14.7	11.9	13.2	13.2	10.3	9.0	8.7	7.0	11.0
Commerce & tourism	1.0	0.0	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1
Financial agencies	1.8	1.7	3.1	3.4	2.2	5.0	5.8	0.2	2.0	0.3	0.5	0.0	0.0	0.0
Science & technology	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.2	0.5	0.4	0.0	0.0	0.0
Social development	8.0	8.2	9.6	14.4	23.0	16.1	20.0	17.2	21.2	17.1	15.5	24.4	19.9	26.8
Education	3.0	3.5	4.0	5.0	9.5	8.5	12.4	9.9	11.0	10.7	8.3	12.4	9.7	16.4
Culture & sport	0.1	0.1	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.2	0.6	0.1	0.2	0.4
Public health	2.3	2.6	3.9	3.7	2.5	3.8	4.3	5.7	7.0	4.3	4.8	9.3	7.4	8.3
Others	2.6	1.9	1.6	5.7	10.8	3.6	3.1	1.5	3.0	1.9	1.7	2.6	2.7	1.8
General services	2.0	1.9	2.0	1.5	3.7	6.4	5.6	6.5	9.9	9.5	11.6	9.9	10.8	2.7
Strengthening of customs	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public buildings	1.3	1.5	1.4	1.3	3.0	5.9	4.9	5.1	5.5	7.1	5.4	4.7	4.6	0.9
Statistics	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	1.6	1.1	1.2	1.0	2.3	1.8
Compensation payments	0.7	0.4	0.4	0.2	0.7	0.5	0.4	0.3	0.4	0.4	0.0	0.1	0.1	0.0
Social rehabilitation & demobilisation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.4	0.9	5.0	4.0	3.8	0.0

Source: Data from Ministry of Economic Development and Finance, 2004.

The effects on the economy were substantial, with increased military expenditures in 1998/99 and onwards undermining the fiscal position (Table 2.1).and crowding out other types of expenditures (Table 2.2). Total government expenditures increased from 25.7% of GDP in 1998/99 to 33% in 1998/99 to 33% in 1999/2000. Since it was difficult to increase government revenue, the budget deficit shot up (Table 2.1), and has remained high since. With the weakening budget there was more rapid expansion of the money supply, but inflation remained relatively low. There was a drop in investments during the war, terms of trade declined, driven by falling coffee prices, but GDP growth was high during 1998-2001 anyway.

Coffee prices had been declining since the mid-90s, which had serious consequences for Ethiopian farmers. Export-earnings from coffee (in US$) fell 55% from 1998/99 to 2001/02, which had a negative effect on the whole economy, since coffee is the major export. And since smallholders produce more than 95% of Ethiopian coffee, they suffered most. The government has eliminated the 6% export tax and introduced some other measures to help coffee-farmers, but not enough to compensate for their losses.

After the war with Eritrea the country was hit by a severe drought in 2002, so 2002/03 was extremely difficult. There was a 12% drop in agricultural output, inflation shot up over 15% and real GDP fell by 3.8%, compared to 6 % average growth over the preceding ten years. The war with Eritrea had had only small effect on growth, while the drought had a very large effect, showing that the economy in Ethiopia is strongly affected by the weather. Nevertheless government spending on social and economic infrastructure was maintained at a reasonably high level.

Economic reforms had continued during the conflict with Eritrea, including the establishment of an inter-bank foreign-exchange market in 2001, to pave the way for a market-determined exchange rate. The Birr slowly depreciated throughout the 1980s and 1990s. The capital market was also liberalized, and all interest rates except those on savings-accounts are now market-determined. The country also introduced a 15% value added tax.[1]

In 2002 the government launched a comprehensive new strategy named the Sustainable Development and Poverty Reduction Programme (Ethiopia, 2003) with the aim of further changing Ethiopia into a market economy. There are four pillars in this new strategy: 1) agricultural development-led industrialization; 2) reforms of the justice system and the civil service; 3) decentralization and empowerment; and 4) capacity-building in the private and public sectors. The emphasis on agriculture reflects the fact that the overwhelming majority of poor people in Ethiopia are engaged in agriculture. At the same time the intention is to exploit

1.The distributional consequences of which have been analysed, and show that there has been a small increase in taxation on the poor. However, much of the increased revenue has been used to provide services that benefit the poor.

forward-linkages to industry, which Ethiopia needs. As in other African countries, the government is also trying to improve governance and develop institutions. Progress has been rather slow, and some believe (Hansson, 2004) that the government is not fully committed to transforming Ethiopia into a full-blown market economy. The business environment is still inferior to that in most of Sub-Saharan Africa (Kaufmann et al., 2003; World Bank, 2003).

Until the war with Eritrea, the World Bank regarded Ethiopia as one of the successful reformers in Africa. The war was an economic setback and undermined the economic reform programme. Still, the subsequent drought had a much greater negative effect: per capita incomes fell dramatically, while the government had to spend huge sums on famine-prevention.

Ethiopia started from an extremely low income-level, so even after more than a decade of (mostly) progress, the per capita income is still only about $110, relative to the Sub-Saharan average of $550. The growth since 1991 has only started to make a dent in Ethiopia's extensive poverty.

References

Collier, P. (1999), "On the economic consequences of civil war", *Oxford Economic Papers* 51:168–83.

Ethiopia (2003), *Ethiopia: Sustainable Development and Poverty Reduction Strategy Programme*, Ministry of Finance and Economic Development, December, Addis Ababa.

Hansson, G. (2004), *Ethiopia 2003/04 – Economic Performance Threats and Potentials: The role of the private sector*, Sida Economic Studies, Stockholm.

IMF (1998), *Ethiopia – Enhanced Structural Adjustment Facility: Medium-Term Economic and Financial Policy Framework paper, 1998/99-2000/01*, Washington DC.

IMF (1999), *Ethiopia: Recent Economic Developments*, Washington DC.

IMF (2004a), *The Federal Democratic Republic of Ethiopia: Poverty Reduction Strategy Paper: Annual Progress Report*, Washington DC.

IMF (2004b), *The Federal Democratic Republic of Ethiopia: Fifth Review under the Three-Year Arrangement under the Poverty Reduction and Growth Facility – Staff Report*, Washington DC.

Kaufmann, D.A., A. Kray and M. Mastruzzi (2003), *Government Matters III: Government Indicators for 1996-2002*, World Bank, Washington DC

Transitional Government of Ethiopia (1991), *Ethiopia's Economic Policy during the Transition Period*, November, Addis Ababa

World Bank (2003), *2003 Country Policy and Institutional Assessment – Africa Region*, Washington DC.

3. Theory and Methods of Poverty Analysis

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3.1 Introduction

Concern about poverty in the industrialised world declined as economic growth and development ensured better lives for the majority and it came to be regarded as a problem of a few isolated segments of the population that could be addressed through targeted social welfare measures. In the rest of the world, however, poverty remained deeply rooted, a source of tremendous human suffering. For a long time after the Second World War, development economics generally addressed poverty secondarily, as an addendum to growth and income-inequality. The literature on the measurement of poverty owes a great deal to Sen (1976) for breaking ground in an area that had remained largely hidden, despite growing poverty in many parts of the world.

The literature on poverty measurement and the analysis of determinants or correlates of poverty has evolved rapidly over the last two decades; the body of work on measurement grew substantially following Sen's (1976) seminal paper. The definition of poverty that one adopts affects both the measurement of poverty and the design of anti-poverty policies (Lipton and Ravallion, 1995; Deininger and Squire, 1998). The debate on the measurement of poverty has focused on deriving an index of poverty satisfying certain ethical properties (more on this below).

Sen (1983, 1985) and others (e.g., Streeten, 1994) have argued that the so-called welfarist approach to the measurement of poverty, which makes use of the concept of the social welfare-function, which is in turn a function of the indirect utility-functions of individual households,[1] considers material goods and services as providing utility directly, while in fact they are also a *means* towards achieving well-being by allowing individuals to function well. Thus, a mere increase in income might not lead to an improvement in well-being for a variety of reasons (see Lipton and Ravallion, 1995). This non-welfarist or the "capability" approach eventually inspired the publication of the Human Development Index by the UNDP.

Nevertheless, the dominant approach to the measurement of poverty is money-metric, measuring income or expenditure per capita. Critics of the money-

1. The construction of social-welfare functions from individual utility functions follows the early tradition as in Dalton (1920). The translation into income space was made by Atkinson (1970), which was interpreted later as the indirect utility-function defined over income and prices as dual to the expenditure function.

metric method of measurement have argued that broader definitions (such as Sen's capabilities approach) provide a better understanding of poverty. But money-metric measurement is relatively simple and straightforward, and can be linked up easily with other methods of analysis in development economics, such as computable general equilibrium models (Decaluwe, et al., 1998), macroeconomic simulations (Kanbur, 1987), demand-systems (Ravallion and van de Walle, 1987), and many others.

The money-metric approach generally involves two interrelated steps (Sen, 1976, 1980). First is identification of the poor, which requires the setting of a poverty line to distinguish the poor from the non-poor. How the poverty line is constructed crucially affects the results, and thus has also been controversial. Poverty lines are designed to measure either absolute or relative poverty. When they are fixed over time or across groups or countries, then absolute poverty is being measured, whereas when they are variable, relative poverty is being measured. The measurement of relative poverty is also not without difficulties and conceptual ambiguities (Chakravarty, 1983; Foster and Shorrocks, 1991; Kanbur and Squire, 1998; Ravallion, 1996; and Ali and Thorbecke, 2000).

The second step in the measurement of poverty is aggregating the degree of poverty experienced by the poor, which rests essentially on two fundamental concepts: average and relative deprivation (Sen, 1976). Average deprivation is the proportional deviation of the mean income of the poor from the designated poverty line, while relative deprivation refers to inequality among the poor.

The aim of this chapter is to provide a concise user's guide to the literature on these two fundamentals of poverty analysis, identification and aggregation, while it provides a basis for judging the empirical estimates reported in subsequent chapters. The next section reviews the literature on the measurement of poverty more thoroughly, while Section 3.3 looks briefly at the popular techniques for estimating the determinants of poverty. The last section summarises and concludes.

3.2 A Review of Poverty Measurement

3.2.1 Axioms of Poverty Analysis

The pioneering work by Sen (1976) consisted of the formulation of axioms that should hold in the measurement of poverty. Sen began by offering a critique of poverty-indices commonly used at that time, the head-count ratio and the poverty-gap ratio. If incomes of individuals in a population are ranked in ascending order as

$$y_1 \leq y_2 \leq .... \leq y_q \leq z \leq y_{q+1} .. \leq y_n \qquad (1)$$

where z is a poverty line, however defined, income below which classified an individual as being poor, then the head-count ratio, H, is

$$\mathbf{H = q/n} \tag{2}$$

where q is the number of people with an income below z, and n is the total population. H thus measures the percentage of people falling below the poverty line, or the prevalence of poverty.

Similarly, the income gap ratio, I, is defined as

$$I = \frac{\sum_{i=1}^{q}(z - y_i)}{qz} \tag{3}$$

which is the average amount that the incomes of the poor are below the poverty line relative to the poverty line, or the average level of deprivation among the poor.

Sen (1976, 1983) argued that any poverty-index should be able to provide three basic pieces of information: who the poor are; their average deprivation; and their relative deprivation. And Sen (1976) showed that the two popular measures of poverty just discussed violate one or both of the following appealing axioms:

a) The monotonicity axiom: All other things equal, a reduction in the income of a person below the poverty line should increase the poverty-index;

b) The transfer axiom: All other things equal, a transfer from one person below the poverty line to another who is richer, but may still be poor, should increase the poverty index.

The head-count ratio H violates both monotonicity and transfer axioms, because it only reflects the number of the poor, not the depth of their poverty, while the income-gap ratio I violates the transfer axiom, because it only reflects the average gap, not inequality among the poor.

Instead, Sen (1976, pp. 224–26) formulated a poverty-index by starting from the general expression

$$Q(x) = A(z, \mathbf{y}) \sum_{i \in (x)}^{q} (z - y_i)\, v_i(z, \mathbf{y}) \tag{4}$$

where Q(x) is the normalized weighted sum of the income gaps of people with income no higher than x; A (z, **y**) is a normalising factor; and v_i (z, **y**) is a non-negative weight given to the income-gap of the i^{th} person, a function of the entire vector **y**. The income-gap of the i^{th} and the j^{th} persons receives different weights if their incomes are different, so that the index includes relative deprivation. Sen then defined a poverty measure, $P = \max_x Q(x)$. The index of poverty P = Q(z) is given by the maximum aggregate weighted income gap of the poor.

If all poor had equal income, then complete information on poverty would be obtained from an index P=HI, multiplying the number of poor times the average of the income gap. If the poor have different incomes, as is in fact the case, then

monotonicity, normalised poverty value, and ordinal rank-order weights axioms defined by Sen (1976) are sufficient to generate a poverty index acceptable for a quasi-concave social welfare function. Thus, Sen suggested

$$\mathbf{S = H[I+(1-I)G_p]} \quad (5)$$

where G_p is the Gini-coefficient among the poor.

The literature following Sen introduced a number of other desirable properties representing a range of ethical considerations. Thon (1979, 1981) argued that in certain cases Sen's index violates the so-called strong transfer axiom, causing inconsistencies. For instance, a transfer of income from one poor person to another, whose income thereby rises above the poverty line decreases poverty as measured by Sen's index. In other words, the index declines in certain cases, where the Gini-index for the censored distribution increases.[1] Thon and others (Takayama 1979; Kakwani 1980a, 1980b; Blackorby and Donaldson, 1980; Clark et al., 1981; and Chakravarty, 1983) attempted to construct better indices, and the list of desirable properties to be satisfied by a poverty-index has grown. The most important ones, for a poverty index P(y,z), are[2]

i. P(y,z) should be independent of the incomes of the rich, that is, the poverty index should be based on a censored income-distribution (with the incomes of all above the poverty line held at the poverty line).[3] Sometimes this property is known as the axiom of focus.
ii. P(y,z) should be non-decreasing in z.
iii. A reduction in the income of a person below the poverty line should increase the poverty index (monotonicity axiom).
iv. A transfer from one person below the poverty line to another who is richer should increase the poverty index, unless the number of persons below the poverty line is reduced by the transfer (weak transfer axiom).
v. A pure transfer from a person below the poverty line to anyone who is richer should increase the poverty index (strong transfer axiom).
vi. P(y,z) should be left unchanged by permutation of the incomes (impartiality).
vii. P(y,z) should be jointly continuous in (y,z).
viii. The poverty index for a population should be able to be written as a weighted average of the poverty indices for a set of mutually exclusive and collectively exhaustive sub-populations (additive decomposability).

1. Sen (1980) defended the index by arguing that in dealing with absolute poverty, the overriding priority should be to lift as many people as possible above the poverty line, so the poverty index rightly declines as a result of a transfer of income from one poor person to another, allowing the recipient to escape from poverty.

2. See Rodgers and Rodgers (1991) and Chakravarty (1983) for further discussion.

3. That is, the income distribution $(y_1, y_2,\ldots y_q, y_{q+1}, \ldots, y_n)$ is transformed into $(y_1, y_2,\ldots y_q, z_{q+1},. .,z_n)$, where z is now the income of all non-poor.

Hagenaars (1987) showed that no poverty index can meet all the desirable properties simultaneously, and thus that a choice of a poverty-index always implies the preference of some normative judgements over others. It is therefore important for policy makers to select a poverty index based on properties consistent with their policy objectives, since the same distribution will be judged differently by different poverty indices.

3.2.2 Aggregate Poverty Measures

Poverty indices are aggregate measures defined over mean income, the chosen poverty line, and the parameters characterising the underlying income-distribution, that is

$$\mathbf{P = P\ (\mu/z, L)} \qquad (6)$$

where μ is mean income, z is the poverty line, and L is the parameter characterising the income-distribution as measured by the Lorenz-function.[1]

The specification of P as in (6) has advantages from a practical point of view. It is possible to construct tests of the statistical significance of a poverty-estimate for a given poverty line (see Kakwani, 1990), and it is simpler to decompose changes in poverty into those related to changes in mean income and those related to changes in income-distribution. One can also compute elasticity-values with respect to mean income and inequality parameters. Furthermore, it can be shown quite easily that all sound indices of poverty suggested in the literature can be expressed in terms of mean income and the income distribution.

If a poverty index of the form (6) is homogenous of degree zero with respect to the poverty line and mean income, then it measures relative poverty; on the other hand, it measures absolute poverty if it remains unchanged when the same amount of income is added to or subtracted from all incomes and the poverty line itself. Thus, all aggregate poverty-indices that use some rule of normalisation introduce relativity.

For the head-count (H) and income-gap (I) poverty-measures one can show that by knowing the parameters of the underlying Lorenz-function, which gives the consumption-expenditure by the poorest p% of the population, $H = \mu(L'p)$, which is the inverse function of the distribution-function p=F(y), and therefore $L'(H)=z/\mu$. I can then be calculated using the fact that the mean income among the poor is given by $\mu L(H)/H$. Given the parameters of the Lorenz-function, H and I can be read off easily.

1. The Lorenz-function can be represented as a curve with cumulative share of income or expenditure on the horizontal axis and the cumulative percentage of the population on the vertical. If p represents the cumulative percentage of population, then L(p) shows the corresponding consumption-expenditure or income by the poorest p%. See Gastwirth (1971) and Kakwani (1980a) for the mathematical properties of the Lorenz-function.

Explicit specification of P has led to the use of a popular index suggested by Foster, Greer and Thorbecke (1984) (hereafter the FGT-index).[1] The FGT index is given as

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(z - y_i)}{z}\right]^\alpha \quad (7)$$
$$\text{where } \alpha \geq 0.$$

For α=0, the FGT index reduces to the head-count ratio H. For α=1 it is the poverty-gap P_1, measuring intensity of poverty. This is equal to HI, and is thus just a renormalization of the income gap measure presented above. For α=2 the FGT-index has been interpreted as indicating the severity of poverty. As α increases, the FGT index gives more weight to the lowest incomes (see Ravallion, 1992).

The FGT index has been the most popular index estimated recently. Its attraction lies in the fact that while possessing most of the properties thought desirable, it is also decomposable and sub-group consistent. That means, if there are n mutually exclusive sub-groups of households, classified by regions, employment sector, or some other way, then with the FGT index overall poverty can be expressed as the population weighted sum of the poverty within each sub-group. Thus, if P_s represents poverty estimated within each sub-group s, overall poverty is given by

$$P = \sum_{i=1}^{s} w_s P_s \quad (8)$$

where w_s represents the population share of sub-group s.[2]

3.2.3 Setting Poverty Lines

A poverty line is a level of standard of living below which a household is designated as being in poverty. The exact level of a poverty line is difficult to determine and varies across a spectrum of factors peculiar to individual households. A poverty line is somewhat subjective, and a given household can be considered poor by some indicator and as non-poor by another.

The welfarist approach anchors the concept of poverty line in the link between income and utility or standard of living, which offers an opportunity to interpret the poverty line as the minimum cost of achieving a certain level of utility

1. For α =0 the FGT-index reduces to the head-count index, which as discussed above fails to meet the axioms of monotonicity and transfer. But for α>0, the FGT index satisfies most of the properties discussed. The poverty-gap-ratio is sometimes expressed as the aggregate gap of the poor as a proportion of GDP.
2. The issue of decomposability and sub-group consistency is important in the measurement of poverty; for a detailed discussion see Hagenaars (1987) and Foster and Shorrocks (1991).

defining poverty. This money metric utility is derived from neo-classical theory of consumer behaviour.

It is well known that given a utility function u defined over exhaustive commodities x_1, ..., x_n and the respective market prices, p_1,...$p_{n,}$, and a fixed income of a consumer, y, the consumer's problem can be stated as:

$$\textbf{Max } u(x_1,...,x_n) \quad \textit{subject to:} \quad y \geq \sum_{i=1}^{n} x_i p_i \tag{9}$$

The solution of the constrained maximisation problem leads to the indirect utility function V(**P**,y), where **P** is a vector of prices and y is the level of income. The inverse of the indirect utility function or the dual of the maximising problem in (9) provides the expenditure function given by y=E(**P**,u). If we define u^r to represent a reference utility level designating poverty, then, the poverty line z is given by z= E(**P**,u^r), which is defined as the money cost of achieving a certain level of utility defining poverty.

Thus, it is analytically possible to link the determination of the poverty line to underlying demand systems that are derived from neo-classical choice theory. But, the application of this approach is beset with a number of measurement and identification problems. On the one hand, the reference utility level defining poverty is difficult to establish. Some works (e.g., Lewis and Ulph, 1988) suggested that poverty can be thought of a discontinuity in the utility function for lack of certain commodities or services. The demand functions that emerge from such an approach are very difficult to estimate empirically because of identification problems.

The difficulties encountered and the complexities arising from the conceptualisation of the poverty line reduced its estimation to a single indicator: observed income or expenditure sufficient to meet a certain level of basic needs as defined by local standards.

3.2.3.1 Equivalence Scales

A recurring problem in the use of income or total expenditure to set the poverty line is the issue of family-size and economies of scale in consumption. Households are composed of family members with different ages and sexes, leading to differences in need, consumption habits and preferences. The same level of income cannot serve equally the needs of households which are different in composition. Some households can attain basic needs with relatively lower income than others.

Various methods have been suggested to adjust differences in the composition of households using the concept of equivalence-scales (see Lanjouw and Ravallion, 1995 for a comprehensive survey). The equivalence scale concept is based on the assumption that households having different compositions reveal their

preferences in the market for a given income and price structure. It is thus possible to establish equivalence in the consumption needs of households having different compositions. One of the most popular equivalence-scales is adult-equivalence, which establishes the basic needs of all individuals as a percentage of those of an adult male.[1] It is argued, however, that in a situation where the poor consume both marketable and non-marketable goods, it is difficult to use equivalent scales generated from preferences revealed only from marketable goods (Lipton and Ravallion, 1995). On the other hand, some also staunchly argue that equivalence scales should be estimated from the data itself (see Coutler et al. 1992) since the measurement error arising from the use of a ready-made equivalence-scale can severely affect the measurement of poverty.

But, the main issue in the measurement of poverty is not in the precision of our estimate of the poverty line per se but in being able to compare poverty among households. One has to be careful not to classify households earning the same income into poor and non-poor, leading to the absence of robustness of poverty measurements.

3.2.3.2 Setting Poverty Lines: Practical Methods

Despite the conceptual complexities in defining poverty lines, the tradition of fixing certain basic needs as a minimum to avoid poverty (say minimum wage legislations) or defining a basket of consumption goods as representing basic goods is not a recent phenomenon. The basic question remains whether it is possible to have a poverty line that can offer a poverty profile, which is consistent. That is, one which makes the relative position of a household remain unchanged whichever sub-group it belongs to. In the current literature the most popular methods of estimating poverty lines are the food-energy-intake method and the cost-of-basic-needs method.

The Food-Energy-Intake (FEI) Method

This method of setting the poverty line stipulates the cost of attaining a predetermined level of food-energy intake. There are a number of ways of estimating the total expenditure needed to arrive at the stipulated food-energy intake. The common procedure is to run a regression of the cost of a basket of commodities consumed by each household over the calorie equivalent or the food energy implied by the basket of goods. One then proceeds to calculate how much it would cost to buy a basket of commodities that would be considered sufficient. The energy intake is a predetermined value expressed in terms of calorie equivalents. Another procedure is to take a sub-sample of households with total expenditure equivalent or close to the stipulated calorie level and compute a simple average. The FEI method provides directly the total expenditure implied by the level of food ex-

1. The World Health Organisation has constructed an adult equivalence ratio for a range of household size and sex to be used for comparing consumption expenditure.

penditure that provides the stipulated calorie intake, since the latter is the dependent variable in the regression equation. Thus, for a specified level of calories, a corresponding total expenditure is immediately obtained.

This method has been extensively applied (see for instance Omani 1981 and Greer and Thorbecke 1986). Despite its simplicity in estimation there are some caveats to be considered when one uses this method. One is that the FEI method has difficulty mapping calorie-intakes into expenditure spaces in a manner consistent with preferences and tastes of consumers. Ravallion and Bidani (1994) argued that the FEI method is weak in terms of offering a consistent and robust poverty profile. There is no provision in the FEI method for differences in relative prices, tastes and preferences across sub-groups. Instead, they suggested the cost-of-basic-needs approach that is anchored in the estimation of relevant Engel functions consistent with the neo-classical theory of demand.

The Cost-of-Basic-Needs Approach (CBN)

The measurement of a poverty line based on basic needs is far from being new in the literature. It dates back to the work by Rowntree (1901) who attempted to construct a poverty line by defining a basic needs basket to study poverty in New York (see Atkinson, 1987 for comments). Since then, the basic needs approach to define the poverty line has gained practical application in various research works. But, the fact that the definition of basic needs remained conceptually elusive and has become difficult to reconcile with proper theory of choice, meant that the FEI-method dominated much of the earlier work in the construction of poverty lines.

Ravallion and Bidani (1994) argued that the CBN method provides a more robust poverty profile as compared to the FEI-method of constructing poverty lines. The procedure introduced in Ravallion and Bidani for constructing poverty lines on the basis of the CBN is to make effective use of consumption pattern among poor households to meet basic needs. In their procedure, the first step involves the identification of a common food basket based on the expenditure pattern of the 40^{th} percentile. The cost of achieving the minimum calorie intake is then computed from this basket, the value of which gives the food poverty line. To account for the non-food component of basic needs, they suggested estimating the marginal budget share for food from an Engel function by regressing the food share on the logarithm of total expenditure, taking into consideration differences in household size and composition and other exogenous variables. Ravallion and Bidani (1994) have compared and contrasted the two methods of constructing poverty lines using Indonesian data and concluded that the CBN method offers a consistent and robust poverty profile.

It is true, however, that the two dominant approaches of setting poverty lines are not mutually exclusive. For instance, the CBN-method uses an arbitrary cluster of households to generate the cost of acquiring the minimum calorie needs. It is possible to use additional information from the data as in FEI to accurately es-

timate the food poverty line. In the next step, one can use the CBN method to arrive at a total poverty line.

There is a major caveat expressed in the literature. If a person rises above the poverty line by one extra dollar, the implication is that his life-style changes from being poor to non-poor. Such instant gradation causes discontinuity in poverty measurement at the poverty line for which the justification is far from satisfactory (see Atkinson 1987, Lipton and Ravallion 1995). Thus, there is a need for caution in interpreting the classification of households into poor and non-poor based only on poverty lines howsoever they are defined.

3.3 Determinants of Poverty

One of the major reasons for using consumption-expenditure, or income as an indicator of welfare is that one can analyse the individual attributes, and other socio-economic conditions that determine poverty. In addition, the continuity and more or less uni-dimensionality of consumption expenditure brings with it the possibility of decomposing poverty measures along some chosen classifications. In either case, we can construct poverty-profiles, and model poverty, which are critical ingredients of any poverty analysis.

Poverty-profiles are routinely reported to provide basic information on the relative dispersion of poverty across space, economic sectors, social groups, or any other mode of classification helpful for policy discourse. In most cases, a poverty profile is constructed on the basis of regions, such as urban-rural, or economic sectors, or social groups such as gender, ethnic group, religion, or any other classification helpful to policy makers. One of the advantages of constructing a poverty profile is to compare poverty within different contexts so as to draw the attention of policy makers on how they can link up their growth strategies with poverty reduction strategies. For example, an economic sector might be growing well, but not reducing poverty very much, while another might have less growth potential overall but might be better at reducing poverty. This distinction is crucial for a policy-maker eager to reduce poverty. Similarly, regional poverty profiles can identify deep poverty pockets that might benefit from prompt government interventions.

In many respects, constructing poverty profiles raises no conceptual or analytical worries, as it is a simple accounting exercise. The problem arises when interest focuses on what determines the incidence of poverty in a given context. An extension of the poverty profile exercise then is to set up a discrete choice model, where one computes probability rates of falling into or escaping out of poverty for some household characteristics. Suppose y_i is the income of a poor household i, that is $y_i<z$, the poverty line, with exogenous household characteristics provided by the vector **X.** An increasingly common practice is to construct a poverty profile by running a regression of

$$y_i/z=\beta x_i + \varepsilon_i \quad (10)$$

where β is a vector of parameters and ε_i is an error term. From this it is possible to define a binary variable $h_i=1$ if $y_i/z<1$ and 0 otherwise. One can then set up a probability distribution function

$$P(\frac{y_i}{z} < 1|X) = F(1-\beta X), \quad (11)$$

where F is the cumulative density function for the error term in the levels regression. Depending on the assumptions about the structure of the error term, a probit or logit function is estimated (see Ravallion, 1996 for details).

There are several criticisms of this approach. One is the difficulty in interpreting the estimated coefficients in terms of probabilistic events. Second, the discrete choice approach would have made a lot of sense if the underlying dependent variable were not observable, but in fact, the vector of coefficient, can be estimated directly from the levels regression (see also Datt and Jolliffe, 2001), by including the incomes of the non-poor. Third, the coefficients of the discrete choice model may not be stable as one changes the cut-off point (or the poverty line) between the poor and non-poor households. Despite their limitations however, it has become quite common to use hazard rates to compute the probability of falling into poverty or exiting out of it.

3.4 Conclusions

Most of the recent literature on the measurement of poverty has focussed on the money-metric approach. Nearly all the poverty indices suggested in the literature have followed the Dalton-Pigou social welfare criterion to set up conditions that have to be met in poverty measurement. Particularly, approaches to normalize income shortfalls from the poverty line fall into two categories: those that use rank order (as in Sen, 1976; Thon, 1979, 1981; Takayama, 1979; Kakwani, 1980b) and those that use equal-weight or weighting by population in line with a utilitarian social-welfare function (Clark et al., 1981; Foster et al., 1984 and others). Others have used the equivalent-income concept which is a direct extension of the Dalton-Pigou criterion for comparing social welfare in different states (e.g. Clark et al., 1981 ; Pyatt, 1987; Lewis and Ulph, 1988 and others). In short, these works tried to embed value judgements in the measurement of poverty that are consistent with the welfare economics literature. The FGT-index received wide acceptance because it meets most of the desirable properties suggested in the literature (Hagenaars, 1987; Ravallion, 1992). Using the FGT-index one can estimate three aspects of poverty: incidence, depth and severity. In addition, it is additively decomposable, so that we can conveniently get total poverty if we have information on poverty by sub-groups, and it is also sub-group consistent, so that

overall poverty changes monotonically with changes in poverty among sub-groups.

The construction of poverty lines is one of the least discussed but perhaps the most important aspect of any poverty analysis. Two basic issues have been explored in the chapter, continuity and comparability or robustness. The first is basically about the difference between falling above or below a poverty line by a small margin (see Atkinson, 1987; Bourguignon and Fields, 1994), an issue that is addressed in Chapter 5 in the context of stochastic dominance criterion. Robustness means that a person identified as being poor in one sub-group should remain so in any other sub-group, as long as we are dealing with absolute poverty. But in practice, this is extremely difficult, since the real value of the poverty line varies with the standard of living achieved by different countries (Ravallion et al, 1991; Kanbur and Squire, 1998). This suggests that one can have the same capabilities but different incomes. Regardless of this, the two leading methods of setting the poverty line are the food-energy-intake method and the cost-of-basic-needs approach. Both methods provide the minimum cost of a basket of commodities considered necessary for survival in a given context. There is no conclusive evidence that either of the methods is robust; in fact, one can sometimes benefit from using a combination of the two.

References

Ali, A.G.A and E. Thorbecke (2000), "The State and Path of Poverty in Africa, Journal of African Economies", Special Issue of the Biannual Workshop of the African Economic Research Consortium, Nairobi, May.

Atkinson, A.B. (1970), "On the Measurement of Income Inequality", *Journal of Economic Theory* 2(3):244–63.

Atkinson, A.B. (1987). "On the Measurement of Poverty". *Econometrica* 55(4):749–64.

Blackorby, C. and D. Donaldson (1980), "Ethical Indices for the Measurement of Poverty", *Econometrica* 48(4):1053–60.

Bourguignon, F., and G. Fields (1994), "Discontinuous Losses from Poverty, Generalized Pα Measures, and Optimal Transfers to the Poor", mimeo, DELTA and Cornell University.

Chakravarty, S.R. (1983), "Ethically Flexible Measures of Poverty", *Canadian Journal of Economics* 16(1):74–85.

Clark, S., R. Hemming and D. Ulph (1981), "On Indices for the Measurement of Poverty", *Economic Journal* 91(2):525–36.

Coulter, A.E., A.C. Cowell and S.P. Jenkins (1992), "Equivalence Scale Relativities and the Extent of Inequality and Poverty", *Economic Journal* 102(5):1067–82.

Dalton, H. (1920), "The Measurement of the Inequality of Incomes", *Economic Journal* 30(3):348–61.

Datt, G. and D. Joliffe (2001), "Poverty in Egypt: Modelling and Policy Simulations", mimeo, World Bank, Washington DC.

Decaluwe, B., A. Patry and L. Savard (1998), "Income Distribution, Poverty Measures, and Trade Shocks: A Computable General Equilibrium Model of Archetype Developing Country", mimeo, University of Laval.

Deininger, K. and L. Squire (1998), "New Ways of Looking at Old Issues: Inequality and Growth", *Journal of Development Economics* 57(2):259–87.

Foster, J., J. Greer and E. Thorbecke (1984), "A Class of Decomposable Poverty Measures", *Econometrica* 52(3):761–66.

Foster, J. and A.F. Shorrocks (1991), "Sub-Group Consistent Poverty Indices", *Econometrica* 59(3):687–09.

Gastwirth, J.L. (1971), "A General Definition of Lorenz Curve", *Econometrica* 39(6):1037

Greer, J., and E. Thorbecke (1986), "A Methodology for Measuring Food Poverty Applied to Kenya", *Journal of Development Economics* 52(3):761–66

Hagenaars, A. (1987), "A Class of Poverty Indices", *International Economic Review* 28(3): 583–607.

Kakwani, N. (1980a), *Income Inequality and Poverty: Methods of Estimation and Policy Applications*, Oxford University Press, Oxford.

Kakwani, N. (1980b), "On a Class of Poverty Measures", *Econometrica* 48(2):437–46.

Kakwani, N. (1990). "Testing the Significance of Poverty Differences with Applications to Cote d'Ivoire". LSMS Working Paper 62, World Bank, Washington DC.

Kakwani, N. (1990), "Poverty and Economic Growth with an Application to Cote d'Ivoire", LSMS Working Paper 63, World Bank, Washington DC.

Kanbur, R. (1987), "Structural Adjustment, Macroeconomic Adjustments and Poverty: A Methodology of Analysis", *World Development* 15(12):1515–26.

Kundu, A. and A.E. Smith (1983), "An Impossibility Theorem on Poverty Indices", *International Economic Review* 24(2):423–434.

Lanjouw, P. and M. Ravallion (1995), "Poverty and Household Size", *Economic Journal* 105(6):1415–34.

Lewis, G.W. and D.T. Ulph (1988), "Poverty, Inequality and Welfare", *Economic Journal* 98 (supplement):117–31.

Lipton, M. and M. Ravallion (1995), "Poverty and Policy", in Behrman, J. and T.R. Srinivasan (eds), *Handbook of Development Economics,* Vol. 3. North–Holland, Amsterdam.

Omani, S.R. (1981), "Conceptual Issues in the Measurement of Poverty: A Synoptical Note", presented in the BIDS Rural Studies Workshop, January.

Pyatt, G. (1987), "Measuring Welfare, Poverty and Inequality", *Economic Journal* 97(2):459–67.

Ravallion, M. (1992), "Poverty: A Guide to Concepts and Methods", LSMS Working Paper 88, World Bank, Washington DC.

Ravallion, M. (1996), "Issues in Measuring and Modelling Poverty", *Economic Journal* 106(5):1328–43.

Ravallion, M. and B. Bidani (1994), "How Robust Is a Poverty Profile?", *World Bank Economic Review* 8(1):75–102.

Ravallion, M. and N. van de Walle (1991), "The Impact of Food Pricing Reforms: A Welfare Analysis of Indonesia", *Journal of Policy Modelling* 13(2):281–99.

Ravallion, M., D. Datt, G. and N. van de Walle (1991) "Quantifying Absolute Poverty in the Developing World", *Review of Income and Wealth* 37; 345–61.

Rodgers, J. and J. Rodgers (1991), "Measuring the Intensity of Poverty among Sub-Populations: Applications to the US", *Journal of Human Resources* 21(2):338–59.

Rowntree, B.S. (1901), *Poverty: A Study of Town Life*, Macmillan, London.

Sen, A. (1976), "Poverty: An Ordinal Approach to Measurement", *Econometrica* 44(2):220.

Sen, A. (1983), "Poor Relatively Speaking", *Oxford Economic Papers* 35(2):153–69.

Sen, A. (1985), *Commodities and Capabilities*, North Holland, Amsterdam.

Streeten, P. (1994), "Human Development: Means and Ends", *American Economic Review* 84(2):232–237.

Takayama, N. (1979). "Poverty, Income Inequality, and Their Measures: Professor Sen's Axiomatic Approach Reconsidered", *Econometrica* 47: 747–759.

Thon, D. (1979), "On Measuring Poverty", *Review of Income and Wealth* 35(4):429–440.

Thon, D. (1981), "Income Inequality and Poverty: Some Problems", *Review of Income and Wealth* 27(2):207–11.

4. Rural and Urban Poverty Profiles

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4.1 Introduction

This chapter profiles rural and urban poverty in Ethiopia in the mid-1990s, both statically and dynamically, by region, sector, and occupation of the heads of household, based on the extensive household surveys of living standards conducted by the Department of Economics of Addis Ababa University in collaboration with Oxford University's Centre for the Study of African Economies and Göteborg University since 1994. The resulting panel-data covers 3,000 households, equally divided between urban and rural areas.

This chapter uses the Foster-Greer-Thorbecke measures of the incidence, depth, and severity of poverty, which are frequently used, because of their immediate policy-implications through the decomposition of the contributions of growth and change in income-inequality to changes in overall poverty. Incidence refers to the percentage of people living below a minimum threshold or poverty line as defined by local living-standards. Depth refers to how far below the poverty line the poor are on average, while severity is a measure of relative deprivation among the poor. In short, the incidence of poverty identifies the poor population, while measures of depth and severity aggregate the amount of poverty they experience.

The national poverty rates reported in this chapter are drawn from a "national" sample of households. As mentioned, an equal number of urban and rural households were surveyed. Since urban areas account for only 15% of the total population, part of the urban sample was randomly selected and added to the rural sample to derive a "national" sample in the right proportions.

The next section reports estimates of poverty and inequality on the basis of the panel data, while Section 4.3 reports poverty-profiles for 1994. Section 4.4 then discusses movements into and out of poverty from 1994 to 1997. Section 4.5 summarizes and draws conclusions.

4.2 Estimates of Poverty Based on Panel Data

4.2.1 Estimation of Poverty Lines

We estimated poverty lines in two stages, first the food poverty lines and then adjustments to account for basic non-food consumption. The food poverty lines were constructed following the cost-of-basic-needs approach. In implementing it, we first estimated the average quantities of the various food-items most frequently con-

sumed by households in the lower half of the expenditure-distribution in 1994; the food-bundles and food poverty lines computed on this basis changed little if we instead used households below the 40th or 30th percentile. These food-bundles were then converted into caloric consumption and scaled to provide 2,100 kcal. per person per day, the minimum energy required for normal life under Ethiopian conditions as estimated by the Ethiopian Nutrition Institute. This bundle was kept constant over the study-period and valued at market-prices in each locality at the time of each survey to arrive at the food poverty line relevant for each survey-site. An alternative would have been to use different food-bundles reflecting local tastes and availabilities. We considered different bundles for rural and urban areas, or for urban areas, cereal-producing areas and *enset*-producing areas.[1]

However, using the same food-basket for all regions makes comparisons of poverty-rates across regions more consistent; rural-urban, rural-rural, and urban-urban poverty figures are more comparable using this approach. But using the same food basket everywhere is not free of limitations. For example, the weight given to *enset* in our "national" food-basket was smaller than in regions where it is the staple food. If *enset* is cheaper than other equivalent calorie-sources (which it most likely is), then our poverty-figures for those regions may be biased upwards.[2]

The non-food component of the poverty line was estimated using the simple and common practice of dividing the food poverty line in each locality by the average food-share of households that failed to attain the minimum calorie-intake. This method is easy to apply and, similar to most other methods that are anchored in the consumption-behaviour of the poor. But it tends to overestimate the overall poverty line for richer localities, such as urban areas, where the food-share is lower, so our poverty-figures for these localities may also be overestimated.

One can simply classify households, in any given locality, with nominal expenditure less than the poverty line for that locality and date as poor. An equivalent alternative is to use the poverty line of one locality in 1994 as a reference, dividing all other poverty lines by it, and then using the results as deflators of the nominal expenditures of households in the various localities. The poverty line of the reference-locality and date can then be used for all. The real expenditure figures reported in this chapter were computed on this basis (see Ravallion, 1998 for a discussion of using poverty lines as deflators).

The 1994, 1995, and 1997 rounds of the urban survey were done at almost the same time of the year, so any seasonal variations in expenditure do not affect the results. But the results of the rural survey were done at different times of the

1. *Enset* is the trunk of a false banana tree and is used as staple food in many parts of the Southern Region

2. For further discussion of issues regarding the use of one or more food baskets see Ravallion, 1998.

year, and seasonal variations in expenditure can be large. Information from all rounds was combined to smooth out these variations and to minimize the problem.

In the literature, endogenously or exogenously derived adult-equivalence scales are often used to adjust for differences in household size and composition. In view of the complexities involved in the estimation of equivalence scales from the data itself and the unavailability of previously estimated scales for Ethiopia, we adjusted for differences in household-size only by using per capita expenditures yielding poverty-figures higher than if adult-equivalent expenditures had been used. Adult-equivalent scales were used in the analysis of urban incomes in Chapter 8.

In many Ethiopian households, meal-sharing with non-members can occur frequently and thus must be accounted for in estimating household-size and poverty. The surveys collected data useful for making the appropriate adjustments.

4.2.2 Poverty and Income Distribution, 1994–97

Table 4.1 reports real annual expenditure per capita for rural, urban, and national samples for 1994–1997.

Table 4.1: Per capita real consumption expenditure (Birr)

	1994	1995	1997
Rural	1089	1500	1377
Urban	1248	1320	1457
National	1113	1473	1389

Source: Calculations based on household panel-data

Nationally expenditures showed a large jump (32%) from 1994 to 1995 (almost 37% in the rural areas), then fell 5.7% from 1995 to 1997 (8% in the rural areas). From 1994 to 1997, expenditures increased annually in rural areas by 8.8%, in urban areas 7.2%,[1] for overall annual growth of 8.3%. For details on changes at the site-level, see Table A4.1 (in the Appendix); it also describes the cities and gives the number of households surveyed in each.

Rural expenditure went from being below the national average in 1994 to being above it and then below it again in 1997. During this period the Gini-coefficient of income-inequality increased from 0.39 to 0.54 nationally in one year (1994–1995)! Given the extreme care taken in computing per capita consumption-expenditures and the massive data-cleaning undertaken for the entire dataset, it is hard to attribute these extreme changes to errors unique to the administration of the 1995 survey. The major reason seems to be the huge increase in

1. The rural surveys in 1994 and 1997 were three full years apart, but the urban surveys were only separated by two and a quarter years, so annual growth was calculated accordingly.

consumption expenditure reported by the top rural decile in 1995, up more than 100% in one year (Table A4.2 in the Appendix). We will refrain from speculating about what could have caused this change. In what follows, we will concentrate on changes in expenditures, inequality, and poverty from 1994 to 1997.

Table (4.2) reports the incidence (P_0), depth (P_1) and severity (P_2) of poverty in Ethiopia between 1994 and 1997. One of the striking features of poverty during this period was that the incidence of poverty was similar between urban and rural areas. In 1994 poverty in urban areas was only one percentage point less than rural, and in 1997 they were the same (36%).Though the urban areas were richer on average (Table 4.1), income-inequality was generally higher there. In 1997 the expenditures of the lowest urban decile (Table A4.2) were substantially lower than the lowest rural decile, and this was actually true for all deciles up to the highest, but then urban expenditures were much higher than rural. In 1994, the expenditure of the lowest urban decile had also been lower than the lowest rural decile (though this was only true for that lowest decile). But from 1994 to 1997 the expenditures of the lowest urban decile fell slightly, while those of the lowest rural decile rose substantially (after an interim fall in 1995).

Table 4.2: Evolution of poverty and inequality in Ethiopia

Region	1994				1995				1997			
	P0	P1	P2	Gini	P0	P1	P2	Gini	P0	P1	P2	Gini
Rural	41	16	8	39	37	16	9	56	36	13	6	43
Urban	40	15	8	44	38	15	8	45	36	15	9	48
National	41	16	8	39	37	16	9	54	36	13	6	43

Source: Calculations based on the household panel-data

Nevertheless, most of the benefits of the economic recovery and growth overall went to those in higher deciles as Gini-coefficients rose (Table 4.2). Poverty was clearly influenced by agro-ecological conditions and economic systems: in the predominantly *enset*-growing region. poverty was more widespread than in cereal-growing regions (Table 4.3). From 1994 to 1997, however, the headcount ratio in the *enset*-growing regions fell 13.6 percentage points, as opposed to just 3.4 percentage points in cereal-growing regions.

Table 4.3: Poverty-profile of Ethiopia by region and town 1994–97

Region	1994			1995			1997		
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Rural	41	16	8	37	16	9	36	13	6
Enset-growing regions	53.7	20.2	9.7	58.4	28.4	17.1	40.1	14.8	7.3
Cereal-growing regions	36.9	15.3	8.3	28.7	11.0	5.7	33.5	11.9	5.8
Urban	39	15	8	38	15	8	36	15	9
Addis Ababa	44.9	19.9	10.7	46.4	17.3	14.2	39.9	14.4	8.0
Awassa	49.1	21.4	12.9	40.4	14.2	6.5	33.0	16.7	10.4
Jimma	36.7	12.1	5.8	25.6	10.6	5.3	42.9	15.3	6.9
Dessie	36.9	14.1	6.8	37.2	14.6	7.0	37.8	14.4	7.6
Mekele	30.9	12.1	6.2	36.4	20.5	13.9	34.9	11.8	5.9
Dire Dawa	18.2	5.8	2.2	28.6	8.6	3.6	36.6	12.3	5.8
Bahir Dar	26.2	9.4	5.3	26.1	9.0	5.0	24.0	8.7	4.1

Source: Calculations based on the panel data

Addis Ababa, the capital, had the second highest headcount in both 1994 and 1997, although it had declined by 5 percentage points in the interim. The town with the highest incidence of poverty in 1994 was Awassa (49%), the centre of the Southern Region, where the headcount declined sixteen percentage points by 1997. The centre of the coffee-growing region, Jimma, which had the highest headcount ratio in 1997 (42.9%) had also had one of the highest figures in 1994, but was lowest in 1995. The headcount in Dire Dawa, near Djibouti and its port, rose steadily from 18.2% in 1994 to 28.6% in 1995 and 36.6% in 1997, as it lost its position as one of the busiest trading centres in the country due to changes in government trade-policy.[1] Poverty in Dessie and Mekele, which had intermediate headcount ratios, increased slightly from 1994 to 1997, while Bahir Dar, which was the second lowest in 1994, fell a little to the lowest position (24%) in 1997.

With a few exceptions, poverty rates thus varied considerably across regions and towns and over time. We will take a close look at the underlying causes for such variations, starting with a decomposition of changes in headcount ratios due to economic growth (as captured by growth in consumption-expenditure per capita) and changes in income-inequality (as captured by changes in the Gini co-efficient of consumption-expenditure).

Kakwani (1990) and Datt and Ravallion (1992) initiated such decomposition-analysis. Kakwani showed that changes in a poverty-index defined as a function of mean income (μ) and a poverty line (z) and income-inequality (L)

$$\mathbf{P_t = P(\mu_t/z, L_t) \text{ and } P_{t+n} = P(\mu_{t+n}/z, L_{t+n})} \quad (1)$$

can be decomposed into growth and distribution components as

1. For much of the 1980s and early 1990s, Dire Dawa was known throughout the country as the primary market for contraband imports. As the government eased import-licensing and foreign exchange availability, its importance declined dramatically.

$$P_{t+n} - P_t = [P(\mu_t/z, L_t) - P(\mu_{t+n}, L_t)] + [P(\mu_t/z, L_t) - P(\mu_t/z, L_{t+n})] \quad (2)$$

Equation (2) decomposes the absolute change in the level of poverty between periods t and t+n into the components of growth given by the first term and distribution change given by the second term. The growth-component expresses the change in poverty with income-distribution held constant, while the distribution-component expresses the change with income held constant. This decomposition assumes that the poverty-index is additively separable. Datt and Ravallion (1992) suggested a more general decomposition-rule incorporating a residual interpreted as the difference between the growth component evaluated at the terminal and initial Lorenz curves and the redistribution component evaluated at mean incomes. So the decomposition by Datt and Ravallion (1991) is given by:

$$P_{t+n} - P_t = \underbrace{[P(\mu_{t+n}/z, L_t) - P(\mu_t/z, L_t)]}_{\text{Growth Component}} + \underbrace{[P(\mu_t/z, L_t) - P(\mu_t, z, L_{t+n})]}_{\text{Redistribution Component}} + \textbf{Residual} \quad (3)$$

Table 4.4: Growth and distribution components of changes in poverty 1994–97

Region	Growth component			Redistribution component			Residual			Totall change		
	ΔP0	ΔP1	ΔP2	ΔP0	ΔP1	ΔP2	R0	R1	R2	ΔP0	ΔP1	ΔP2
Rural	-12.7	-7.8	-3.6	3.0	3.9	3.1	1.9	-0.1	-2.2	-7.8	-4.0	-2.7
Urban	-7.7	-5.0	-3.6	2.1	2.6	2.3	0.7	0.1	0	-4.9	-2.3	-1.3
National	-12.6	-7.7	-5.2	3.2	3.6	2.6	1.8	-0.3	-0.6	-7.6	-4.4	-3.2

Source: Calculations based on household panel-data

Table 4.4 shows such decompositions of the changes shown in Table 4.2. From 1994 to 1997 the headcount ratio declined nationally by 7.6 percentage points: It would have declined by 12.6 percentage points based only on the increase in consumption-expenditure per capita, but it increased by 3.2 percentage points due to increased income-inequality. The same dampening effect of increased income-inequality on poverty-reduction due to economic growth is also apparent in both rural and urban samples.

In 1995 the Ethiopian Central Statistical Authority also conducted a Household Income, Consumption, and Expenditure Survey on behalf of the Ethiopian Welfare Monitoring Unit (WMU).[1] Comparison of these results and ours reveals some differences. For example, WMU found real annual consumption-expenditure nationally of 1085 Birr (Table A4.3 in the Appendix), much lower than the 1473 we found (Table 4.1). More specifically, they reported 1411 Birr for urban

1. The Welfare Monitoring Unit is a government agency entrusted with the responsibility of conducting periodic surveillance of welfare and poverty effects of the economic reforms begun in 1992. The agency has sponsored household-surveys on living standards in 1995, 1996/97, and 2000. The Welfare Monitoring Unit (1999) reports the results of the 1995 survey.

areas, 7% more than the 1320 Birr we found; but for rural areas they found 1034 Birr, 31% less than the 1500 Birr we found. As noted earlier, our 1995 rural figure also raised questions because it seemed out of line with other development from 1994 to 1997, and because almost all of the huge rise in rural expenditure reported from 1994 to 1995 seemed to occur in the top decile. We cannot speculate further at this point about any deeper reason for this inconsistency.

Another difference is that we estimated a poverty line of 726 Birr per person per year, or 49% of the mean expenditure in our national sample in 1995, and based on that we found a national head count ratio of 37%. WMU estimated a poverty line of 1075 Birr or 99% of their estimated mean expenditure per capita, and based on that found a national headcount ratio of 45.5% (47.5% rural and 33.2% urban; Table A4.3 in the Appendix). Thus using a poverty line 48% higher than ours, they found a headcount only 9 percentage points higher than ours, suggesting that for the poverty line they used they actually have underestimated the incidence of poverty. Using their poverty line we would find 62% of the population in poverty.

As noted WMU also found much lower urban than rural poverty, which is actually consistent with the general view of poverty in less developed countries, whereas we found almost identical headcount-ratios in 1994 and 1995 (and identical in 1997). While both WMU and we used the same basic food-bundle for all sites, this difference may depend upon the fact that WMU also used the same budget-share for food to scale up to the overall poverty line in both urban and rural areas, whereas in fact typically the urban budget-share for food is smaller, i.e., urban residents have more other basic and necessary expenses. Since WMU essentially ignored these other expenses, they naturally found a lower urban headcount-ratio. We would thus emphasize once again the crucial importance of the method for setting the poverty lines for the results obtained.

Table A4.3 in the Appendix also shows expenditure per capita and measures of poverty by region as reported by WMU. Tigray had the highest headcount-ratio (57.9%), followed by Amhara (56.7%) and Southern Region (56.5%); Dire Dawa (24.6%) and Hararri (29.1%) had the lowest. The negative correlation between expenditure per capita and headcount-ratios was not perfect, but it was close, approximately -0.9.

In summary, despite differences in approach, sample-design, and coverage, the WMU results confirm that in the mid-1990s poverty in Ethiopia was widespread, deep, and severe.

4.3 Static Determinants of Poverty

Because correlates of poverty might differ, for rural and urban areas, we estimated probit equations separately, but also because if we used a "national" sample the small number of urban households would reduce our degree of freedom. In both

cases, the dependent variable was a dummy identifying households below the poverty line in 1994.

The independent variables for the rural sites were: household size (hhsize); the mean age of household-members and its square (meanage, meanage2), the sex of the household head (hhhfem); the age of the household head and its square (agehhh and agehhh2); the number of oxen owned by the household (oxen): the amount of cultivated land (cultivat); the dependency ratio (dependrat) defined as the percentage of household-members below 15 and above 65 and dummy variables for primary education of the household-head and his wife; for *teff*-, coffee-, and *chat*-producing households; for sites located in the north and in *enset*-producing areas; and for off-farm employment. We also included market-proximity computed by dividing the population of the nearest urban area by its distance from the survey site. The probit results for rural areas are given in Table 4.5.

Table 4.5: Probit estimates for rural areas, 1994

	Coefficient	Standard error	z	P>|z|
Household size	0.0845	0.0176	4.813	0.000
Mean age	0.0074	0.0193	0.384	0.701
(Mean age)^2	-0.0002	0.0002	-0.977	0.329
Female-headed	0.2272	0.1012	2.244	0.025
Age of head	0.0314	0.0141	-2.226	0.0260
(Age of head)^2	-0.0003	0.0001	1.970	0.049
Primary ed. of head	-0.0007	0.1492	-0.005	0.996
Primary ed. of wife	-0.6138	0.3440	-1.784	0.074
Teff	-0.1581	0.0966	-1.637	0.102
Coffee	-0.2418	0.1289	-1.876	0.061
Chat	-1.0182	0.1605	-6.344	0.000
Dependency ratio	0.7954	0.2412	3.297	0.001
North	-0.2556	0.1236	-2.070	0.038
Distance from town	-0.0001	0.0000	-6.217	0.000
Enset	-0.1306	0.1490	-0.877	0.380
Oxen	-0.1790	0.0310	-5.774	0.000
Size of cultivated land	-0.0233	0.0601	-0.388	0.698
Off-farm employment	0.2818	0.0815	3.459	0.001
Constant	-1.1092	0.4288	-2.586	0.010

Number of observations = 1329; LR chi2(18) = 290.61; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.1605; Log likelihood = -760.01419

Source: Calculations based on household panel survey.

From the coefficients we computed the predicted probability of being below the poverty line for each household and then calculated the means of these for groups of households with similar attributes.

The mean age of household-members, primary education of the household head and the wife, amount of cultivated land, and production of *teff* and coffee were not significant at the 5% level.

Larger households were more likely to be below the poverty line, but this is hardly surprising since we used expenditure per capita to define poverty, which ignores economies of scale. Female-headed households were slightly more likely to be below the poverty lines. The mean predicted probability for female-headed households was 0.48, for male-headed 0.41. The probability of poverty increased with the age of the household-head but was lower at very low and very high levels (indicated by the negative coefficient for its square). And northern households were less likely to be in poverty. Their mean probability was 0.39, for others 0.44. As would be expected, the dependency-ratio was strongly related to the probability of poverty.

The production of marketed crops seems to have decreased the probability of poverty. *Teff* is one of the main domestically marketed crops in Ethiopia, and it is an important source of cash-income for many rural households. Coffee and *chat* are also important exported cash-crops, coffee being Ethiopia's single most important export. The mean probability of *chat*-producing households being poor was 0.24, compared to 0.44 for all others. This may indicate the importance of relatively new cash-crops (particularly exportables) in the alleviation of poverty.

As expected, the number of oxen owned was highly correlated (negatively) with the probability of being in poverty, as indicated by Table 4.6 below. This underscores the importance of oxen in the agricultural systems of most of rural Ethiopia.

Table 4.6: Mean predicted probabilities of falling into poverty by the number of oxen owned

Number of oxen owned by households	Mean predicted probabilities
0	0.52
1	0.49
2	0.37
3	0.28
4	0.26
5	0.18
6	0.13
7	0.11
8	0.12
9	0.15
10	0.06

Source: Own calculations based on household panel survey.

Surprisingly, off-farm employment was associated with a higher probability of poverty, which may indicate that it is a coping mechanism of the poor, rather than a way of enriching oneself. Finally, as expected market proximity reduced the probability of poverty.

A similar probit regression was run for the urban households (Table 4.7). While dropping the variables not relevant for them, we included dummies for

residence in a regional capital and for the occupation of the household-heads: private business employer; own account worker; civil servant; public enterprise employee; private sector employee; casual worker; or unemployed.

Table 4.7: Probit estimates for urban areas, 1994

	Coefficient	Standard error	z	P>|z|
Household size	0.0721	0.0172	4.182	0.000
Mean age	-0.0438	0.0186	-2.352	0.019
(Mean age)^2	0.0004	0.0002	1.583	0.113
Female-headed	-0.0341	0.0979	-0.349	0.727
Age of head	0.0265	0.0133	1.987	0.047
(Age of head)^2	-0.0002	0.0001	-1.614	0.106
Primary ed. of head	-0.4763	0.0962	-4.952	0.000
Primary ed. of wife	-0.4463	0.1034	-4.317	0.000
Private business	-0.9752	0.3079	-3.168	0.002
Own-account worker	-0.6083	0.1172	-5.189	0.000
Civil servant	-0.2461	0.1310	-1.879	0.060
Public enterprise employee	-0.5559	0.1655	-3.359	0.001
Private sector employee	-0.8441	0.2176	-3.880	0.000
Casual worker	0.2550	0.1643	1.552	0.121
Unemployed	0.1405	0.1792	0.784	0.433
Dependency ratio	0.8420	0.2174	3.873	0.000
North	-0.4087	0.0998	-4.096	0.000
Capital city	0.4219	0.0950	4.441	0.000
Constant	-0.6352	0.4902	-1.296	0.195

Number of observations = 1330; LR chi2(18) = 287.81; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.1617; Log likelihood = -746.10646

Source: Calculations based on household panel survey.

As above, and probably for the same reason, household-size was positively related with poverty. Higher mean-age of a household reduced its probability of being in poverty, though at a decreasing rate. Higher age of the household head raised the probability of poverty, but again at a decreasing rate.

If the household head or the wife has completed primary education, that will significantly decrease the chance of the household falling into poverty; the coefficients on both variables are highly significant and the value of the coefficients are also relatively high.

As expected, the dependency ratio increased the probability of being in poverty; Northern households were again less likely to be in poverty. Households in regional capitals had a higher probability of being in poverty.

Most of the occupation coefficients were highly significant, and all reduced the probability of poverty except casual work and being unemployed. Casual workers had the highest probability of being in poverty (63%), while all the others collectively had the lowest (37%). Some of the latter were unemployed with a lower probability of poverty (52%) than the casual workers, probably indicating that they could better afford to wait for a job, perhaps depending on social net-

works of support in the meantime, whereas casual workers were perhaps more desperate. Of those otherwise employed, private business employers had the lowest probability of poverty (20%), followed by private sector (22%) and public sector (23%) employees. Civil servants were considerably higher (30+%), almost as high as own- account workers (32%).

Table 4.8 : Mean predicted probabilities of falling into poverty by occupation

Occupation	Probability in the Occupation	Probability outside the Occupation
Private business employer	0.20	0.39
Own account worker	0.32	0.41
Civil servant	0.30	0.41
Public enterprise worker	0.23	0.40
Private sector employee	0.22	0.40
Casual worker	0.63	0.37
Unemployed	0.52	0.38

Source: Own calculations based on household panel survey.

There are some striking similarities and differences in the urban and rural results. The age of the household-head increased the probability of poverty, but at a declining rate in both samples. Household mean-age followed the same pattern in the rural sample, although the coefficients were far from significant, and much smaller than for the urban sample, where the signs were reversed and the results much more significant. In the urban sample it seems clear that increasing mean household age was associated with reduced probability of poverty, perhaps because more household-members might be of prime working age and able to hold a job. In the rural areas, where young and old alike work on the farm, the relationship was less clear.

Perhaps the most striking result was the effect of primary education, which reduced the probability of poverty in both rural and urban areas. In urban areas the effects were highly significant and about the same magnitude for both the household-head and his wife. In the rural areas the effect for the household-head was small and highly non-significant, but for his wife, though slightly less significant than for the urban wife, the magnitude of the effect was considerably larger.

4.4 Poverty dynamics

4.4.1 Movement into and out of Poverty

Tables 4.9 and 4.10 report mobility in and out of poverty for both rural and urban areas between 1994 and 1997, including sub-periods 1994–1995 and 1995–1997. Generally the percentages of people who moved out of poverty were higher than those who slipped into poverty, but, in rural areas the movements in both directions were larger. Yet, the percentage of poor rural households that remained poor in 1994–97 was 52.3%, while 76.7% of the non-poor households remained non-poor; for urban areas 57.0% remained poor and 80.8% remained non-poor. Thus mobility in rural areas was higher than in urban areas.

As we saw earlier (Table 4.1), rural expenditure per capita increased dramatically from 1994 to 1995, then fell back somewhat in 1997. One might then expect that more people would have moved out of poverty in 1994–95 than in 1995–97, but in fact only 44.5% of households who were poor in 1994 became non-poor in 1995, while 61.5% of households who were poor in 1995 became non-poor in 1997. It is true nevertheless that in 1995–97, the most people slipped into poverty. Who gains and who loses when there is economic recovery and growth thus remains an important question.

Table 4.9: Poverty mobility among rural households (%): 1994, 1995 and 1997

	Poor in 1997	Non-poor in 1997	Poor in 1995	Non-poor in 1995
Poor in 1994	22.0	20.0	23.3	18.7
Non-poor in 1994	13.5	44.5	14.4	43.6
Poor in 1995	14.5	23.2		
Non-poor in 1995	21.0	41.3		

Table 4.10: Poverty mobility among urban households (%): 1994, 1995 and 1997

	Poor in 1997	Non-poor in 1997	Poor in 1995	Non-poor in 1995
Poor in 1994	22.3	16.8	25.2	13.9
Non-poor in 1994	11.7	49.2	12.2	48.7
Poor in 1995	23.9	13.5		
Non-poor in 1995	10.0	52.6		

4.4.2 Determinants of Poverty Dynamics

Using the same independent variables as in the previous section, we estimated separate probit-equations on the attributes of rural and urban households moving out of or falling into poverty between 1994 and 1997. The estimates in Tables 4.11 and 4.12 show the results for rural households.

We would expect that factors increasing the chance of moving out of poverty would also decrease the risk of falling into it, and this is confirmed by the opposite signs of all the coefficients, except for *enset*-producing sites.

The only variable significant at the 5% level in both regressions was *chat*-production; households producing *chat* had a 0.59 mean predicted probability of moving out of poverty (compared to 0.54 for other) and a 0.09 mean predicted probability of falling into poverty (0.28 for others). As noted in the previous section, *chat*-producing households also have a higher chance of being non-poor. Hence, production of this cash-crop seems to play an important role in improving rural living-standards, which may explain its rapid expansion in areas not traditionally producing it.

The production of *teff* and coffee did not affect changes in status strongly as did the production of *chat;* in fact, households producing *teff* had a higher probability of falling into poverty, although the reverse effect was non-significant. Coffee-growers had a lower probability of falling into poverty; but the impact was not as strong as *chat*, and again the reverse effect was non-significant.

Just as we saw that the probability of being in poverty increased with the mean age of rural households, but at a declining rate, so the same was true for falling into poverty, and the reverse for getting out of poverty, though none of the effects were highly significant.

As in the static results earlier, the primary education of the household-head had no significant effect on the probability of falling into poverty, and it was only marginally significant (p=0.249, and positive) on the probability of getting out of poverty. Contrary to the static results, however, the wife's primary education had opposite effects, again highly non-significant for falling into poverty, but of some significance (p=0.14) for moving out of poverty.

Households engaged in off-farm activities had a smaller chance of getting out of poverty than those who did not work off-farm (the corresponding predicted probabilities were 0.51 and 0.56 respectively); they faced a slightly higher risk of falling into poverty (0.29 and 0.26). People with off-farm activities were poorer and it did not improve their chances of getting out of or remaining out of poverty.

Table 4.11: Probit estimates for rural households moving out of poverty, 1994–97

	Coefficient	Standard error	Z	P>|z|
Household size	-0.0786	0.0256	-3.066	0.002
Mean age	-0.0747	0.0478	-1.563	0.118
(Mean age)^2	0.0015	0.00085	1.875	0.061
Female-headed	-0.0569	0.1489	-0.382	0.702
Age of head	0.0033	0.0228	0.143	0.886
(Age of head)^2	-0.0001	0.0002	-0.290	0.772
Primary ed. of head	0.2938	0.2546	1.154	0.249
Primary ed. of wife	-1.0940	0.7407	-1.477	0.140
Teff	-0.1262	0.1573	-0.802	0.422
Coffee	0.0847	0.1841	0.460	0.645
Chat	0.6879	0.3096	2.222	0.026
Dependency ratio	-0.2656	0.3894	-0.682	0.495
North	1.1755	0.2401	4.896	0.000
Distance from town	0.0001	0.0000	3.066	0.002
Enset	1.2136	0.2610	4.649	0.000
Oxen	0.1503	0.0562	2.676	0.007
Size of cultivated land	0.0133	0.0945	0.140	0.888
Off-farm employment	-0.0477	0.1214	-0.393	0.694
Constant	0.0980	0.8036	0.122	0.903

Number of observations = 562; LR chi2(18) = 86.32; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.1110; Log likelihood = -345.7847

Source: Calculations based on household panel survey.

Table 4.12: Probit estimates for rural households falling into poverty, 1994–97

	Coefficient	Standard error	z	P>|z|
Household size	0.0395	0.0250	1.582	0.114
Mean age	0.0350	0.0285	1.229	0.219
(Mean age)^2	-0.0006	0.0004	-1.704	0.088
Female-headed	0.1263	0.1452	0.870	0.384
Age of head	-0.0088	0.0185	-0.472	0.637
(Age of head)^2	0.0001	0.0002	0.800	0.424
Primary ed. of head	-0.0017	0.1897	-0.009	0.993
Primary ed. of wife	0.0633	0.3191	0.198	0.843
Teff	0.2624	0.1313	1.999	0.046
Coffee	-0.5973	0.2020	-2.957	0.003
Chat	-0.8052	0.2399	-3.357	0.001
Dependency ratio	0.2273	0.3278	0.694	0.488
North	-0.2142	0.1738	-1.233	0.218
Distance from town	-0.0000	0.0000	-1.183	0.237
Enset	0.2252	0.2205	1.021	0.307
Oxen	-0.0385	0.0369	-1.044	0.297
Size of cultivated land	-0.1156	0.0991	-1.167	0.243
Off-farm employment	0.1514	0.1157	1.309	0.191
Constant	-1.1209	0.5857	-1.914	0.056

Number of observations = 767; LR chi2(18) = 61.01; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.0728; Log likelihood = -388.59066

Source: Calculations based on household panel survey.

Similar probit estimates for the urban households are shown in Tables 4.13 and 4.14. And again household size, which was significant at least at the 10% level in both regressions had the expected effects, reducing the chance of getting out of poverty and increasing the chance of falling into poverty. The dependency-ratio was also quite significant in both regressions, unlike the rural regressions. In urban areas having many non-working young or old clearly lowered a household's chances of getting out of poverty, or increased its chances of falling into it: mean household age and its square had the signs seen earlier, but with low significance.

Unusually, the coefficients for female household-head were positive in both regressions, but far from significant. The coefficients for age of the household-head were negative in both regressions, and highly significant for (reducing) the probability of getting out of poverty (but not significant for falling in). Age square was also highly significant for moving out of poverty (and positive), indicating a declining probability of getting out of poverty with age, but at a declining rate.

Unlike in the rural areas primary education of the household-head and his wife gave highly significant effects for both moving out of and falling into poverty: the mean predicted probability of getting out of poverty increased from 0.44 for household heads without primary education to 0.60 for those with, while the

probability of falling into poverty fell from 0.29 to 0.14. For the wife's education the mean predicted probability of moving out of poverty increased from 0.46 to 0.66, while that of falling into poverty decreased from 0.25 to 0.12.

Of the seven occupational classifications, only own-account worker was highly significant in both regressions; the mean predicted probability of escaping poverty increased from 0.50 to 0.55, while that of falling into poverty decreased from 0.23 to 0.18. Private business employers, as well as civil servants, also had a better chance of escaping and a smaller chance of falling into poverty. The creation of a better business environment after the introduction of economic reforms may be partially responsible. The chance of falling into poverty decreased from 0.25 to 0.08 for civil servants compared to all others. As expected, casual workers and the unemployed had a smaller (non-significant) chance of moving out of poverty, and a higher (more significant) chance of falling into poverty. The unemployed had a 0.40 mean predicted probability of falling into poverty (0.21 for others).

Households in regional capitals had a 0.53 mean predicted probability of moving out of poverty (0.42 in all other towns). They also had a slightly lower chance of falling into poverty (0.22 vs. 0.25). This can be due to recent decentralisation and accompanying expansion of some of the regional capitals.

Table 4.13: Probit estimates for urban households moving out of poverty, 1994–97

	Coefficient	Standard error	z	P>|z|
Household size	-0.0451	0.0259	-1.740	0.082
Mean age	0.0243	0.0264	0.921	0.357
(Mean age)^2	-0.0001	0.0003	-0.463	0.644
Female-headed	0.0747	0.1472	0.507	0.612
Age of head	-0.0456	0.0213	-2.146	0.032
(Age of head)^2	0.0005	0.0002	2.214	0.027
Primary ed. of head	0.2976	0.1519	1.959	0.050
Primary ed. of wife	0.5493	0.1889	2.908	0.004
Private business	0.6773	0.6269	1.080	0.280
Own-account worker	0.3844	0.1868	2.058	0.040
Civil servant	0.2229	0.2058	1.083	0.279
Public enterprise employee	-0.1986	0.3048	-0.652	0.515
Private sector employee	0.1993	0.4038	0.494	0.622
Casual worker	-0.0441	0.2121	-0.208	0.835
Unemployed	-0.0956	0.2631	-0.363	0.716
Dependency ratio	-0.9807	0.3236	-3.031	0.002
North	0.2776	0.1712	1.622	0.105
Capital city	0.3742	0.1731	2.161	0.031
Constant	0.4068	0.7521	0.541	0.589

Number of observations = 520; LR chi2(18) = 55.60; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.0782; Log likelihood = -327.63787

Source: Calculations based on household panel survey.

Table 4.14: Probit estimates for urban households falling into poverty, 1994–97

	Coefficient	Standard error	Z	P>|z|
Household size	0.0597	0.0247	2.418	0.016
Mean age	-0.0224	0.0284	-0.787	0.431
(Mean age)^2	0.0003	0.0004	0.722	0.470
Female-headed	0.0915	0.1412	0.648	0.517
Age of head	-0.0107	0.0172	-0.631	0.528
(Age of head)^2	0.0001	0.0002	0.703	0.482
Primary ed. of head	-0.3152	0.1394	-2.262	0.024
Primary ed. of wife	-0.2938	0.1521	-1.932	0.053
Private business	-0.9387	0.4712	-1.992	0.046
Own-account worker	-0.3476	0.1613	-2.156	0.031
Civil servant	-0.5642	0.2103	-2.683	0.007
Public enterprise employee	0.0426	0.2047	0.208	0.835
Private sector employee	-0.1447	0.2662	-0.544	0.587
Casual worker	0.3884	0.2656	1.462	0.144
Unemployed	0.3456	0.2607	1.325	0.185
Dependency ratio	0.5876	0.3300	1.781	0.075
North	-0.0975	0.1344	-0.726	0.468
Capital city	-0.2140	0.1192	-1.795	0.073
Constant	-0.3579	0.7007	-0.511	0.609

Number of observations = 810; LR chi2(18) = 82.31; Prob > chi2 = 0.0000;
Pseudo R^2 = 0.1041; Log likelihood = -354.2777

Source: Calculations based on household panel survey.

4.5 Summary and Conclusions

In the mid-1990s 40–45% of households could not meet their basic needs. This figure may seem low compared to figures reported for other countries in Sub-Saharan Africa, but Ethiopia still has one of the worst poverty situations in the world. Poverty was equally widespread in urban and rural areas, which complicated government policy options. Rural and urban levels of income inequality were similar. During the 1994–97 period of economic recovery, inequality in both increased sharply, reducing the poverty reducing impact of economic growth.

In the analysis of poverty profiles it was found that large households, those with a high dependency-ratio, and in the rural areas, those with a female head tended to be poor. In rural areas, the type of crop farmers grew also affected the probability of being poor. The mean predicted probability of poverty was higher for households producing *enset*, and lower for those producing cereals and especially cash crops. In urban areas, the probability of being in poverty was lowest for private business employers and for those in private or public sector employment, and highest among casual laborers, even higher than for the unemployed.

While a majority of households that were poor in 1994 were also poor in 1997, there was considerable mobility in and out of poverty, with more households generally escaping poverty than falling in, at least during this period.

Two important differences between the rural and urban areas relate to the effects of education and dependency-ratios. Education seemed to play a smaller role as a means of escaping rural poverty, which stands to reason, because farmwork does not require much education. The dependency-ratio also contributed more to the probability of poverty in the urban areas, probably because young children and the elderly can be more economically productive in rural areas.

Despite some mobility, generally there was considerable inertia, with the poor tending to remain poor and vice-versa. Coffee and *chat* growers were less likely to be poor in 1994 and had a lower probability of falling into poverty and a higher probability of escaping it. In the urban areas, casual workers and the unemployed were more likely to be poor in 1994 and had a higher probability of falling into poverty, and a lower probability of escaping it.

Poverty in Ethiopia is largely caused by structural factors, deeply entrenched in the economy, so that nothing short of structural transformation is likely to overcome the enormity of the problem. But there are interventions that can probably help to reduce poverty, such as investment in human capital, improved economic infrastructure, price incentives, and labour-market reforms.

References

Kakwani, N. (1990), "Poverty and Economic Growth with an Application to Côte d'Ivoire", LMS Working Paper 63, World Bank, Washington DC.

Central Statistical Authority (1999), *Household Income and Consumption Expenditure Survey.* Addis Ababa.

Datt, G. and M. Ravallion (1992), "Growth and Redistribution Components of Changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s", *Journal of Development Economics* 38: 275–295.

Ravallion, M. (1998). "Poverty Lines in Theory and Practice", AERC Working Paper Series 0001. Nairobi.

Welfare Monitoring Unit (1999), *Poverty Status Report: Poverty in Ethiopia*. Addis Ababa.

Appendix 4

Table A4.1: Real consumption expenditure per capita, 1994 and 1997, and survey site characteristics

No. of Households	Real per capita consumption expenditure (Birr per month)		Annual rate of growth in per capita consumption expenditure (%)	Location	Site	Characteristics
	1994	1997				
78	59.66	121.67	34.65	Tigray	Haresaw	Rural (poor and vulnerable); cereals
64	36.69	111.68	68.13	Tigray	Geblen	Rural (poor and vulnerable); cereals
83	65.91	91.73	13.06	N.Shoa	Dinki	Rural (badly affected in 1984/85 famine); millet & teff
173	112.39	193.26	23.99	N.Shoa	DebreBerhan	Rural (highland site, near town); teff, barley, beans
58	101.42	153.31	17.05	Gojjam	Yetmen	Rural (near town, ox-plough cereal farming system); teff, wheat and bean
133	127.94	106.51	-5.58	S.Wollo	Shumsha	Poor area; cereals
94	145.07	102.89	-9.69	Shoa	Sirbana Godeti	Rural (rich area; much targeted by agricultural policy; cereals)
93	130.50	150.42	5.09	Hararghe	Adele Keke	Rural highland site; chat, millet, maize, coffee
107	37.47	51.44	12.43	Arssi	Korodegaga	Rural poor cropping area in neighborhood of rich valley ;cereals
99	111.03	94.50	-4.96	S.Shoa	Turfe Kechemane	Rural rich area; wheat, barley, teff
65	55.63	82.92	16.36	Shoa (Gurage)	Imdibir	Rural (densely populated enset area)
74	98.56	128.60	10.16	Shoa (Kembata)	Aze Deboba	Rural(densely populated; coffee, enset, sorghum)
123	74.25	118.91	20.05	Sidamo	Adado	Rural (Rrch coffee producing area; coffee, enset)
94	45.00	59.30	10.59	Sidamo	Gara godo	Rural(densely packed enset-farming area)
65	80.32	85.79	2.27	Gamogofa	Doma	Rural (resettlement area; semi-arid; enset, maize)
Weighted average	89.15	114.00	9.29			
141	94.93	114.76	8.75	Shoa (central)	Addis Ababa	Urban (capital city)
29	113.33	104.22	-4.32	Sidamo (south)	Awasa	Urban (provincial town of the prosperous coffee belt)
10	96.84	139.48	20.52	Gojam (north)	Bahirdar	Urban (provincial town of Gojam)
12	91.96	80.50	0.65	Wollo (north)	Dessie	Urban (provincial town of Wollo)
19	95.85	114.86	12.32	Hararghe	Diredawa	Urban (charterd town)
20	110.42	127.93	3.80	Jimma	Jimma	Urban (provincial city town of the prosperous coffee belt)
20	117.27	123.95	12.07	Tigrai	Mekele	Urban (provincial town of Tigrai)
Weighted average	100.08	121.91	7.27			

Source: Household Panel Data.

Table A4 .2: Decile distribution of real per month expenditure per capita, 1994–1997 (Birr)

	1994			1995			1997		
	National	Rural	Urban	National	Rural	Urban	National	Rural	Urban
1	19	19.10	18.0	16.17	16.15	18.47	22.06	21.89	17.95
2	30.49	30.49	32.67	29.95	30.03	33.60	36.09	36.03	32.59
3	41.44	41.33	44.39	42.97	43.05	45.10	48.47	48.56	45.38
4	52.58	52.82	55.57	56.0	56.22	57.88	60.02	59.91	58.72
5	65.33	65.38	67.54	73.49	73.42	70.17	72.37	72.22	73.41
6	80.15	79.93	80.66	93.83	94.11	84.80	88.50	88.72	89.99
7	97.45	97.54	99.57	120.93	121.21	103.94	114.10	113.77	111.66
8	117.92	117.54	128.29	160.12	160.02	131.72	146.53	146.73	139.88
9	149.60	149.31	169.74	229.68	229.86	178.91	197.9	197.44	195.93
10	254.36	253.94	344.75	613	614.39	371.23	368.26	362.41	448.52
Mean	99.0	90.74	104.11	138.0	143.84	109.58	116.0	114.76	121.4

Source: Household panel survey, 1994–1997.

Table A4.3: Poverty profile by main administrative regions, 1995–96

Region	Per capita expenditure (Birr)	P_0(%)	P_1(%)	P_2 (%)
Tigrai	903.60	57.9	18.0	7.0
Affar	1105.62	51.8	16.0	6.0
Amhara	917.23	56.7	17.0	7.0
Oromia	1183.95	34.7	8.0	3.0
Somali	1166.42	34.6	8.0	3.0
Benshangul-gumuz	1026.81	47.6	14.0	5.0
Southern Region	945.48	56.5	18.0	7.0
Gambella	1223.47	41.8	12.0	5.0
Hararri	1459.68	29.1	2.0	3.0
Addis Ababa	1568.96	30.0	11.0	4.0
Dire Dawa	1397.00	24.6	9.0	2.0
Rural	1031.00	47.5	13.0	5.0
Urban	1411.00	33.2	10.0	4.0
National	1087.80	45.5	13.0	5.0

Source: Welfare monitoring Unit (1999).

5. Changes in Welfare and Poverty: An Application of Stochastic Dominance Criteria

Abebe Shimeles and Mekonnen Taddesse

5.1 Introduction

This chapter analyses changes in the levels of rural and urban per capita expenditure, income inequality, and poverty from 1994 to 1997 across regions. It particularly uses advances in the literature of stochastic dominance criteria for the comparison of income distributions to address the concept of poverty line. This is especially important in Ethiopia, where errors in the calculation of a poverty line are confounded by the prevalence of different prices in different regional markets, different units of measurement of quantities consumed; varying consumption patterns of households across regions; and other differences affecting welfare comparisons using an invariant measure.

As explained in Chapter 1, the data for this study came from two independent panel surveys – one urban and the other rural – conducted by the Department of Economics of Addis Ababa University, the former in collaboration with the Department of Economics, Göteborg University, and the latter with the Centre for the Study of African Economies of Oxford University and the International Food Policy Research Institute (IFPRI).

The next section briefly discusses the stochastic dominance literature as applied to comparisons of welfare and poverty, while Section 3 reports empirical results particularly on rank dominance and generalised Lorenz dominance-criteria. Section 4 summarizes and draws conclusions.

5.2 The Literature on Stochastic Dominance, Welfare, and Poverty

The literature on poverty measurement that has emerged since Sen's (1973) pioneering work, has been strongly influenced by the literature on measurement of inequality, largely based on the classic work of Atkinson (1970), who constructed some of the analytical links between statistical measures of income inequality and their welfare interpretations (see Hagenaars, 1987). Atkinson (1970) showed that such popular summary-measures of income distribution as the Lorenz curve and the Gini-coefficient reflect an underlying social welfare function meeting certain regularity conditions. Thus Atkinson invoking the stochastic dominance concept popular in the finance literature, showed that if two income distributions have the same mean, and if one Lorenz dominates the other, then

social welfare (which is quasi-concave in income) in that distribution is higher than in the other.

Sen (1973) demonstrated that if two distributions have unequal means, then Lorenz dominance does not yield that welfare inference. But Rothschild and Stiglitz (1973) argued that even with unequal mean comparison of welfare can be made on the basis of the income received by the k^{th} poorest people. Sapsonic (1983) proved this proposition, that rank dominance of absolute incomes of Lorenz curves is necessary and sufficient to generate welfare dominance, irrespective of mean incomes. This is known as first-degree stochastic dominance. Rank dominance utilises efficiency criteria alone in comparing distributions, since dominance follows if the income of individuals in each decile is higher than in the distribution being compared, regardless of the level of inequality within each distribution. To get around the problem of focussing only on efficiency, Shorrocks (1983) and Kakwani (1984) came up with a partial comparison of welfare based on the rank orders of the underlying Lorenz ordinates of any income distribution regardless of its mean. This came to be known as ordering on the basis of a generalised Lorenz curve (a Lorenz curve scaled by mean income). Thus, rank-dominance, where the cumulative incomes of one Lorenz curve lies above another for all ordinates of the Lorenz curve, is equivalent to first-degree stochastic dominance as in the finance literature, where expected returns on different investment opportunities are ranked.

The application of rank-dominance to income distribution was facilitated by the development and simplifications of distribution-free test-procedures in Beach and Davidson (1983), Beach and Richmond (1985), and Beach et al. (1994). Atkinson (1987) and Foster and Shorrocks (1988) proved that, for any additive poverty index, the dominance of a distribution within a given range of poverty lines is equivalent to the poverty ordering implied by any poverty-index based on a utilitarian social welfare function. Bishop et al. (1991a, 1991b, and 1993) and others then applied rank-dominance to the comparison of welfare on the basis of the ordinates of Lorenz curves.

As is well known, poverty measurement involves two distinct but related aspects; the identification of the poor, and the measurement of how poor they are. Both are determined by the setting of a poverty line, which divides the population into poor and non-poor. The conceptual and empirical basis of setting poverty lines has long been relegated to the background in the literature of poverty measurement. Emphasis has been given to the construction of aggregate poverty indices that meet certain ethically consistent criteria. However, in empirical application and in policy analysis as well, the estimation of the poverty line became increasingly a subject of great dissatisfaction.

Most studies approach the estimation of the poverty line without much concern as to how it can distort poverty-profiles and analysis (Ravallion, 1998, discusses this issue). When attention is given to detail in the construction of the poverty line, its sensitivity to household composition, tastes, prices, and other fac-

tors, is a constant challenge. This sensitivity and the difficulty of calculating poverty lines consistently in different circumstances have denied the poverty-indices the robustness needed for poverty-comparison.

Atkinson (1987) and Bourguignon and Fields (1997) questioned the instant change in status as income exceeds the poverty line by the slightest amount. While the distinction between poor and non-poor is of fundamental concern in poverty-analysis, such a drastic change can be seen as disruptive.[1] The application of dominance testing allows the use of a range of poverty lines for determining poverty-orderings. If for a specified range of poverty lines, one distribution rank-dominates another, then whichever way measured, poverty is higher in the rank-dominated distribution.

Formally, the stochastic dominance test-criterion can be described as follows:

suppose F(y) is distribution function or cumulative density function of income f (y) (so that $F(y)=\int(fy)dy$) where y is a vector of household income arranged in ascending order so that $y_1<y_2<,..,<y_n$. The inverse distribution function or quintile function, y(p):inf{ F(y)≥p}, pε[0,1], gives individuals' incomes in increasing order. If W_p denotes the class of anonymous increasing welfare functions, then following Sapsonic (1981), for two distributions X and Y, we have the theorem

X > R Y (X rank-dominates Y) iff w(X) > w(Y) ∀ *w*ε *Wp*.

Thus distribution X dominates distribution Y iff x(p)≥Y(p) ∀ pε[0,1]. If ∀ pε [0,1] X(p)=Y(P), then X and Y have the same income distribution. If X(p)>Y(p) for some p, and X(p)<Y(p) for some p, the distributions are non-comparable and cannot be ordered using the rank-dominance criterion.

As a corollary Atkinson (1987) and Foster and Shorrocks (1988) showed that: a) rank-dominance for all z, a set of poverty lines, means that the headcount ratio, the proportion of the population in poverty, is higher in one distribution than another in the range specified for the poverty line; b) rank-dominance implies higher-order dominance, including for additive poverty-indices, such as the Pα class defined as $P\alpha=\int\{z-f(y)/z\}^{\alpha} dy$, where α is a distributive parameter.[2]

Rank-dominance is thus sufficient for higher-order dominance, but not necessary, so the reverse in not true. Generally, rank-dominance, that is, a simple dominance-comparison of two Lorenz curves, is intuitively appealing, if the mean income in both distributions is the same. If that is not the case, then dominance-testing fails to account for the effect of higher mean income, which by itself is wel-

1. Sen (1981) noted that the behaviour of poverty indices around the poverty line does not adhere to the notion of declining marginal utility of income, which is an important assumption in social welfare analysis. As argued by critiques of Sen's index (notably Thon, 1979, 1981), the jump exhibited in Sen's index around the poverty line is one of its major drawbacks. Sen argued however that poverty indices around the poverty line should be highly elastic with per capita income because it is always very important to have one less poor person in a community.

2. See Foster et al. (1984) for the derivation of this class of poverty indices, known as Foster-Greer-Thorbecke indices.

fare-improving, given the same distribution. Thus Dasgupta, Sen and Starrett (1973) proposed the generalised Lorenz dominance criterion, further explored by Shorrocks (1983) and Kakwani (1984).

The generalised Lorenz dominance (called second-degree dominance, Bishop et al. 1993) means simply scaling up the ordinates of the ordinary Lorenz curve by mean income, which does not change the slope of the Lorenz curve. In terms of poverty measurement this is equivalent to comparing the poverty-gap measure (or the depth of poverty) between two distributions, regardless of the poverty line. Third-degree stochastic dominance is equivalent to comparing the severity of poverty in two distributions. Thus, if we have first-degree dominance for the relevant range of the poverty line, it means that the headcount ratio is significantly different in the two distributions. Second-degree dominance means that the depth of poverty in one distribution is higher than in another regardless of where the poverty line is fixed.

The extension to unequal mean incomes imposed stricter regularity conditions on the underlying social welfare functions, which have to be scur-concave and additive over individual income. Empirical results (e.g., Bishop et al. 1991a and 1991b) generally support the dominance of distributions with higher mean income because of the bias given to efficiency-considerations. This prompted Tam and Zhang (1996) to suggest a Lorenz dominance-criterion of the order β that makes allowance for equity considerations when the mean-incomes of two distributions are different.[1]

Following Beach and Davidson (1983), the statistics necessary to conduct normal dominance-testing are quite straightforward. Consider a situation where the individual incomes, y_i, in ascending order are divided into k groups p_1, p_2, ...p_k, which in the case of deciles is p_1=0.1, p_2=0.2,., p_{10}=1. Assuming that the mean and variance of the distribution exist and are finite, then an income group, ξ_p, corresponding to abscissa p ($0 \leq p \leq .1$) on a Lorenz curve is defined by $F(\xi_p)$, where F is monotonic. Thus, corresponding to a set of k-1 abscissa, $0<p_1<p_2<..,<p_{k-1}$, we have a set of k-1 population income groups, $\xi_{p1}<\xi_{p2}<,...,<\xi_{pk-1}$, and a set of k cumulative means, $\gamma_i \equiv E(Y \mid Y \leq \xi_{pi})$, for incomes less than or equal to ξ_{pi}. We can also define the conditional means, $\mu_i=E(y \mid \xi_{pi-1} <Y< \xi_{pi})$. The test procedure for dominance is based on these estimators. Until the paper by Beach and Davidson (1983), inference based on the

1.The generalised Lorenz curve is defined as $G(P)=\mu L(P)$, where L(p) is the ordinary Lorenz-curve. Notice that $L(p)=\int pd(p)/\mu$. Thus the ordinates of the generalised curve are given by the vector $Y:(p_1Y_1, p_2Y_{2,}....., p_kY_k)$. What Tam and Zang (1996) suggested is that, instead of multiplying the ordinates of the Lorenz curve by the mean of the total distribution, μ, we can use μ^β, where $0 \leq \beta \leq 1$, so that preference can be given to equity even in situations with unequal means. Scaling up the Lorenz curve by a constant does not change the relative inequality in a distribution. If β=1, then the β-order Lorenz-curve reduces to the generalised Lorenz-curve. If β <1, then a preference for equity is considered along with efficiency (that is, higher income is always better for given levels of inequality).

ordinates of the Lorenz curve had to rely on parameterised Lorenz functions, which are not sufficient for the joint test (mean income and Lorenz ordinates) of dominance. Beach and Davidson proved that the ordinates of any Lorenzcurve are asymptotically normal with mean zero and a variance–covariance matrix $\Omega=(w_{ij})$, where $w_{ij}=p_i\,[\lambda_i^2+(1-p_j)(\xi_{pi}-Y_i)\,(\xi_{pj}-Y_j)+(\xi_{pi}-Yi)\,(Y_j-Y_i)$ is the asymptotic variance of the k cumulative means. We also note that λ_i is the variance of the cumulative means. Beach et al. (1994) showed that the conditional means of the Lorenz ordinates can be used to test for dominance between two Lorenz curves (say distribution 1 and 2). The test statistics for large samples can be written as $T_i = (\mu_{i1}-\mu_{i2})/\{\sqrt{(\text{var}(\mu_{i1})/N1+\text{var}(\mu_{i2})/N2}\}$, where T_i can be treated as a t-ratio. The null-hypothesis is that the relevant income groups have equal conditional means. If this is true for the entire range of the distribution, then the two distributions are said to have equal welfare ranking regardless of the poverty line. There is dominance if there is at least one statistically significant dominant income group and all other groups have equal means. If the Lorenz curves cross, however, then a further criterion has to be imposed. Bishop et al. (1989, 1991a and b) assert that if two distributions cross, and the crossing is statistically significant, then with some welfare functions ranking the two distributions will not be possible. If there are two ordinates with different signs, which are statistically significant, then dominance testing cannot rank the distributions according to a criterion based on quasi-concave social welfare functions.

5.3 Results of Stochastic Dominance Tests

Table 5.1 shows urban and rural conditional mean of real monthly expenditure by decile (and overall) for 1994, 1995, and 1997. From 1994 to 1997 both urban and rural expenditure increased. The average annual increase was 9.2% in rural areas and 8.89% in urban areas.

The rural-urban difference is not so significant for 1994 or 1997, while the difference in 1995 was much larger and much more statistically significant. According to the rank-dominance criterion employed, urban poverty in 1994 and 1997 thus was not so different from rural poverty, for a fairly high poverty line. For 1995, however, the distributions crossed twice. If the poverty line was drawn at the level of consumption expenditure by the bottom ten percent, poverty in urban areas was lower than in the rural areas. Up to the tenth decile none of the distributions dominated the other. In short, then, urban and rural poverty or welfare was more or less the same.

Table 5.1: Rank dominance criterion: Rural vs urban expenditures per capita: Birr per month per person

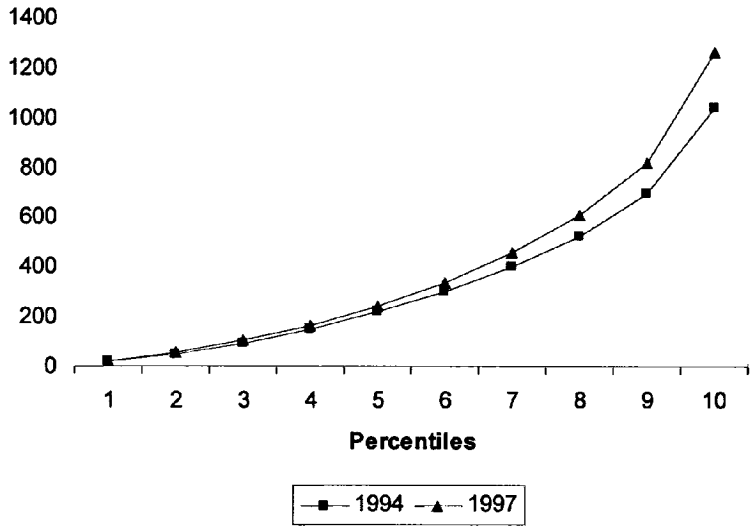
	1994				1995				1997			
Pi	Conditional Mean: Rural	Conditional Mean: Urban	Mean Difference	T-ratio*	Conditional Mean: Rural	Conditional Mean: Urban	Mean Difference	T-ratio*	Conditional Mean: Rural	Conditional Mean: Urban	Mean Difference	T-ratio*
0.1	18.9	18.28	-0.6	0.61	16.04	19.76	3.72	-3.33	22.28	20.54	-1.74	2.30
0.2	30.0	32.92	2.9	-1.62	29.92	34.82	4.9	-2.35	36.26	35.95	-0.31	0.13
0.3	40.6	44.74	4.2	-1.82	42.94	46.75	3.81	-1.49	48.7	48.45	-0.25	0.09
0.4	52.1	55.99	3.9	-1.27	56.19	58.43	2.24	-0.64	60.29	62.45	2.16	-0.63
0.5	65.2	67.37	2.2	-0.55	74.56	71.14	-3.42	0.67	72.53	75.97	3.44	-0.76
0.6	80.0	80.15	0.2	-0.03	96.21	85.64	-10.57	1.53	88.6	94.8	6.2	-0.92
0.7	97.4	99.05	1.6	-0.21	125.27	106.99	-18.28	1.80	112.01	121.29	9.28	-0.96
0.8	116.8	127.14	10.3	-0.97	167.71	137.13	-30.58	1.99	144.58	151.68	7.1	-0.52
0.9	147.1	170.38	23.3	-1.43	244.03	183.55	-60.48	2.37	197.8	204.19	6.39	-0.29
1	249.5	341.96	92.4	-3.19	654.99	350.09	-304.9	9.84	365.44	450.46	85.02	-3.23
Overall mean	90.0	103.8	13.8	-2.01	150.6	109.44	41.28	11.5	114.8	126.59	11.9	-2.3

*T≥ 2.8 is significant at 5% level of significant.

Source: Own calculations based on household panel data.

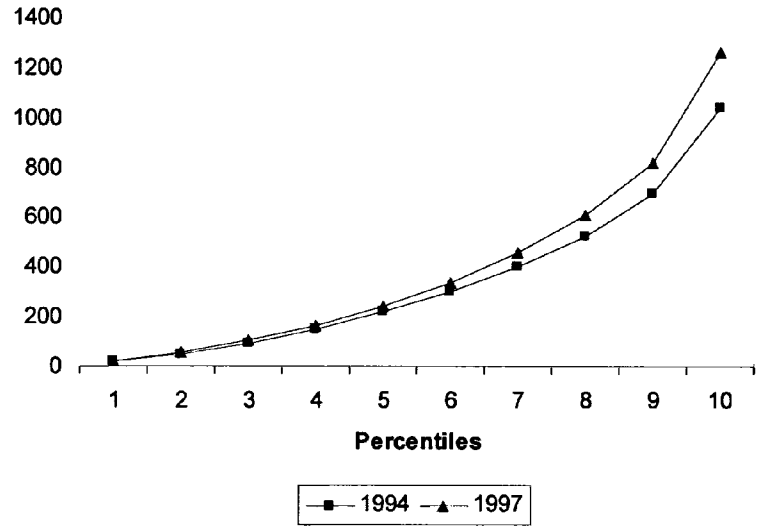
Statistical tests to compare welfare and poverty changes over time in rural and urban areas are subject to a methodological problem. As indicated in the preceding paragraphs, the statistical test used to compare income distributions is built on the strong assumption that the samples are drawn independently, but here successive rounds with the same panel are obviously not independent, leading to dependent sample problems.[1] But to get a feel of what did happen over time, we used the 1994 and 1997 distribution data to compare changes (see also Figures 1 and 2 below). In rural areas, poverty declined between 1994 and 1997 for a poverty line up to the mean expenditure of the fifth decile. In urban areas, the 1994 distribution dominated the 1997 one for the bottom decile, while differences then remained insignificant up to the income of the top decile. Rural poverty showed clear signs of decline, while urban poverty was largely unchanged. These findings are corroborated by the direct computation of poverty indices.

Figure 1: Rank dominance for rural households, 1994 and 1997



1. Davidson and Duclos (2000) constructed non-parametric test-statistics for when sample distributions are dependent.

figure 2: Rank dominance for urban households 1994 and 1997



As the figures show, growth did not make much difference for households at the lower ends of the income distribution, and in fact rural and urban income inequality increased.[1] Thus, regardless of the poverty line chosen, welfare did not change much for people at the lower end of the income distribution, though it improved considerably for the rich.

Results for rural and urban households using the generalized Lorenz dominance criterion, sometimes referred to as second-order dominance, are reported in Table (5.2). For 1994, rural–urban differences were statistically significant up to the fifth deciles, indicating more rural than urban poverty, at least for the second up to the fifth deciles, for poverty lines drawn in that range. That is, we could rank urban areas as having higher welfare by the generalised Lorenz dominance criterion up to that level of the poverty line. For 1997, just as for rank-dominance (Table 5.1), rural–urban differences were not statistically significant.

1. Chapter 4 demonstrates that the decline in urban poverty from 1994 to 1997 was not statistically significant (see also Bigsten et al., 2003).

Table 5.2: Generalised Lorenz dominance criterion between urban and rural households

	1994			1995			1997		
	Rural	Urban	T-ratios	Rural	Urban	T-ratios	Rural	Urban	T-ratios
0.1	1.9	1.8	6.06	1.6	2.0	-3.3	2.2	2.1	1.50
0.2	4.9	5.1	-4.92	4.6	5.5	-3.3	5.9	5.6	0.80
0.3	8.9	9.6	-5.61	8.9	10.1	-3.0	10.7	10.5	0.54
0.4	14.2	15.2	-4.64	14.5	16.0	-2.4	16.8	16.7	0.02
0.5	20.7	21.9	-3.38	22.0	23.1	-1.3	24.0	24.3	-0.40
0.6	28.7	29.9	-2.16	31.6	31.7	-0.1	32.9	33.8	-0.83
0.7	38.4	39.9	-1.63	44.1	42.4	1.1	44.1	45.9	-1.22
0.8	50.1	52.6	-1.94	60.9	56.1	2.2	58.5	61.1	-1.31
0.9	64.8	69.6	-2.63	85.3	74.4	3.6	78.3	81.5	-1.21
1	89.8	103.8	-4.61	150.8	109.4	5.9	114.8	126.6	-2.23

Source: Own calculations.

Meanwhile we compared welfare and poverty for urban areas by dividing them into three urban groups: the capital city, Addis Ababa with 3–4 million people; northern towns (Mekele, Dessie, and Bahir Dar); and southern towns (Jimma, Awassa, and Dire Dawa). The northern and southern towns are much smaller than Addis Ababa, the northern predominantly in the cereal-producing area, the southern in cash-crop producing areas.

The trends between 1994 and 1997 for these urban groups were consistent with the trend for all urban sites (see Tables A5.2–A5.7). Generally, poverty remained largely unchanged. The changes in mean income were not significant for the northern and southern towns, but for Addis Ababa there was a statistically significant increase in mean per capita income by about 10%.Yet, by the rank dominance criterion overall welfare remained unchanged for Addis Ababa. A generalised Lorenz dominance test was undertaken to explore the implications of higher mean income for overall welfare. It showed that welfare in general had increased between 1994 and 1997 because of the increase in mean income. It should be noted that the test procedure dictated by Lorenz dominance is biased towards efficiency as shown by Tam and Zhang (1996). Even if the increase in mean income is captured by the highest deciles, overall welfare is deemed to have increased despite the fact that income in the lowest deciles remained unchanged.

For the northern and southern regions there was no significant increase in mean incomes and no rank-dominance was observed. However, comparisons across regions gave some interesting results. Both southern and northern regions rank-dominated Addis Ababa in 1994, though neither dominated the other. This means that Addis Ababa in 1994 had more poor people for any poverty line than the two other urban regions. In 1995, southern towns dominated northern and Addis Ababa, and thus had a lower headcount-ratio, probably because of the coffee at that time. In 1997 no urban region dominated another, indicating similar poverty-levels.

So far, our effort to compare welfare and poverty changes has been based on rank and generalised Lorenz dominance criteria. We now attempt to provide

more insights by applying the β-dominance criterion introduced by Tang and Zhang (1996).

The generalized Lorenz dominance criterion suggests that welfare in Y is higher than in X if and only if

$$GL(Y,p) = \mu_y L(Y,p) \geq GL(X,p) = \mu_x L(X,p) \quad (1)$$

where μ_y and μ_x represent per capita income in income distribution Y and X. Recently, Tam and Zhang (1996) argued that the trade-off between economic growth (efficiency) and inequality (equity) is not well captured by the generalized Lorenz dominance criterion. One of their arguments is that the generalized dominance criterion identifies a welfare improvement if the incomes of all people, except for the richest person, remain unchanged and mean income increases as a result of an increase in the income of the richest person. In this case, it is obvious that *income share* of all people, except for the richest, has declined. Therefore they propose the β-dominance criterion, where generalized Lorenz dominance is a special case.

The β-criterion is based on Equation (1), which can be rewritten as

$$\frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} x_i} \geq 1 \quad (2)$$

Following 2, Tam and Zhang (1996) proposed a β-criterion as follows:

$$\frac{\sum_{i=1}^{n} y_i}{\sum_{i=1}^{n} x_i} \geq \tau^{1-\beta}, 0 < \beta < 1 \quad (3)$$

where $\tau=\mu_y/\mu_x$, and β is one's preference for efficiency. The higher β is, the higher is ones preference for efficiency and vice versa. If β=1, the β-dominance criterion reduces to the generalized Lorenz dominance criterion. From Equation 3, let β* be related to the quintile that registered the largest improvement between two pe-

riods (computed from columns 5 and 6 in Table 5.3).[1] Then we equate that ratio with the mean ratio for the two periods and get β*.We then apply the β-dominance criterion to compare welfare changes for Ethiopia in rural and urban areas for the period 1994–1997.

By construction $0 \leq \beta \leq 1$. $\beta^* < 0$ means that whatever the growth, welfare cannot increase because of the increase in inequality. That is, inequality increases so much that no amount of economic growth can compensate for it. If $\beta^* > 1$, welfare improves because of growth regardless of the level of inequality. For $0 < \beta^* < 1$ there is a trade-off between growth and inequality, which depends on one's preferences for efficiency and equity.

Table 5.3: Rural and urban Lorenz ordinates and ratios for Ethiopia, 1994 and 1997

Population Share	$\rho_{94rural}$ (1)	$\rho_{94urban}$ (2)	$\rho_{97rural}$ (3)	$\rho_{97urban}$ (4)	$\rho_{94rural}/\rho_{97rural}$ (5)	$\rho_{94urban}/\rho_{97urban}$ (6)
10	0.021	0.017	0.019	0.015	1.103619	1.169262
20	0.055	0.049	0.050	0.042	1.082922	1.169013
30	0.100	0.091	0.093	0.079	1.079998	1.155559
40	0.158	0.145	0.145	0.127	1.092652	1.135777
50	0.230	0.210	0.208	0.188	1.108507	1.115497
60	0.319	0.287	0.285	0.262	1.116912	1.095585
70	0.426	0.383	0.384	0.354	1.108524	1.081079
80	0.556	0.506	0.512	0.469	1.084732	1.078211
90	0.720	0.669	0.684	0.631	1.052491	1.060792
Gini Coefficient	39	43	44	48		

Source: Own calculations based on household panel data, Department of Economics, AAU.

We calculated the largest value of β* for rural and urban households to measure the welfare implications of the growth in per capita income. We found a β* value of about 0.44 for rural households and 1.03 for urban households. The interpretation is that the extent to which welfare improved in rural areas depends on one's preferences for equity. A person with a great weight for equity could argue that welfare did not increase, while one with a great emphasis on economic growth could argue that welfare did improve. For urban areas, even for an individual who is all for growth, our estimate suggests that welfare deteriorated since the value of β* is greater than one.

1.
$$\left[\frac{L(y_i,p)}{L(x_i,p)}\right] = \left[\frac{\mu_y}{\mu_x}\right]^{1-\beta^*} \Rightarrow \ln\frac{\left[\frac{L(y_i,p)}{L(x_i,p)}\right]}{\left[\frac{\mu_y}{\mu_x}\right]} = 1-\beta^*$$

5.4 Summary and Conclusions

In summary, comparison of rural and urban welfare and poverty came up with evidence of no clear difference, or that by some measures rural welfare was higher than urban. From 1994 to 1997 there was a remarkable improvement in rural welfare and poverty, but little if any change in urban areas. This is a disturbing finding.

There were some changes among the urban areas, however. In 1994, Addis Ababa had a higher incidence of poverty than other urban areas, but this changed to equal poverty-incidence in 1997. In 1995, the southern towns generally had lower poverty than other urban areas, probably due to the significant increase in incomes caused by the coffee boom, but that advantage had disappeared in 1997.

To draw attention to the threat of rising income inequality in a growing economy, we used Lorenz dominance criteria to compare welfare changes from 1994 to 1997 in rural and urban areas. The results for rural areas were ambiguous depending on one's preference for equity versus efficiency. Thus, despite increases in mean consumption expenditure per capita, there was no unambiguous improvement in welfare. Similarly for urban areas, by some criteria welfare actually worsened in spite of increased real income per capita.

References

Atkinson, A. (1970), "On the Measurement of Poverty", Journal *of Economic Theory* 2:244–66.

Atkinson, A. (1987),"On the Measurement of Poverty", *Econometrica* 55:749–64.

Beach, C.M. and R. Davidson (1983), "Distribution Statistical Inference with Lorenz Curves and Income Shares", *Review of Economic Studies* 723–35.

Beach, C.M. and J. Richmond (1985), "Joint Confidence Intervals for Income Share and Lorenz Curves", *International Economic Review* 26: 439–50.

Beach, C.M. et al. (1994), "Statistical Inference for Decile Means", *Economic Letters* 161–67.

Bigsten, A., B. Kebede, A. Shimeles and M. Taddesse (2003), "Growth and Poverty Reduction in Ethiopia: Evidence from Household Panel Surveys", *World Development* 31(1):87–106.

Bishop, J.A. et al. (1991a), "International Comparison of Income Inequality: Tests for Lorenz Dominance Across Nine Countries", *Economica* 58: 461–77.

Bishop, J.A. et al. (1991b), "Lorenz Dominance and Welfare: Changes in the US Distribution of Income 1967–1986", *Review of Income and Statistics* 73: 134–7.

Bishop, J.A., et al. (1993), "International Comparison of Welfare and Poverty", *Canadian Journal of Economics* 26(3):707–26.

Bourguignon, F. and G. Fields (1997), "Discontinuous Losses From Poverty, Generalized p-alpha Measures and Optimal Transfers to the Poor", *Journal of Public Economics* 63(2):155–76.

Dasgupta, P. et al. (1973), "Notes on the Measurement of Income Inequality", *Journal of Economic Theory* 6:180–87.

Davidson, R. and J.-Y. Duclos (2000), "Statistical Inferences for Stochastic Dominance and for the Measurement of Poverty and Inequality", *Econometrica* 68(6).

Foster, J. et al. (1984), "A Class of Decomposable Poverty Measures", *Econometrica* 52:761–66.

Foster, J.J. and A. Shorrocks, (1988), "Poverty Ordering", *Econometrica* 56(1):173–77.

Hagenaars, A. (1987), "A Class of Poverty Indices", *International Economic Review* 28(3):583–607.

Kakwani, N. (1984), "Welfare Rankings of Income Distributions", pp. 191–213 in R.L. Basman and G.F., Rhodes Jr (eds.), *Advances in Econometrics*. vol. 3.

Rothschild, M, and J. Stiglitz (1973), "Some Further Results on the Measurement of Income Inequality", *Journal of Economic Theory* 13**:**82–111.

Ravallion, M. (1998). "Poverty Lines in Theory and Practice", AERC Working Paper 1. Nairobi.

Sapsonic, R. (1981), "Rank Dominance in Income Distributions", *Public Choice* 36:147–51.

Sen, A. (1973), *On Economic Inequality*, Norton, New YoSen, A. (1976), "Poverty: An Ordinal Approach to Measurement", *Econometrica* 44(2):220.

Sen, A. (1981), *Poverty and Famines: An essay on entitlement and deprivation*, Oxford University Press, Oxford.

Shorrocks, A.F. (1983),"Ranking Income Distributions", *Economica* 50:3–17.

Tam, Mo-Yin and R. Zhang (1996), "Ranking Income Distributions: The Trade-off between Efficiency and Equality", *Economica*, 45:161–67.

Thon, D. (1979), "On Measuring Poverty", *Review of Income and Wealth* 35(4):429–40.

Thon, D. (1981), "Income Inequality and Poverty: Some Problems", *Review of Income and Wealth* 27(2):207–11

Appendix 5

Table A5.1: Urban real expenditure decile means and mean differences 1994–1997

Decile	Conditional mean 94 (μ_{94})	Conditonal mean 95 (μ_{95})	Conditional mean 97 (μ_{97})	μ_{95} -μ_{94}	t-ratio	μ_{97} -μ_{95}	t-ratio	μ_{97} -μ_{94}	t-ratio
1	20.76	21.46	21.05	0.7	0.539	-0.41	-0.217	0.71	0.36
2	37.4	37.56	37.33	0.16	0.073	-0.23	-0.15	-0.07	-0.031
3	50.84	50.96	50.42	0.12	0.042	-0.54	-0.259	-0.42	-0.146
4	63.49	63.53	64.85	0.04	0.012	1.32	0.559	1.36	0.373
5	76.55	76.93	79.23	0.38	0.081	2.3	0.665	2.68	0.553
6	91.06	93.32	98.33	2.26	0.354	5.01	1.091	7.27	1.046
7	112.57	115.5	125.62	2.93	0.262	10.12	1.572	13.05	1.102
8	144.27	148.51	157.18	4.24	0.281	8.67	0.881	12.91	0.84
9	192.89	197.71	209.91	4.82	0.227	12.2	0.784	17.02	0.771
10	378.6	367.04	442.12	-11.56		75.08		63.52	
Overall mean	116.75	117.16	128.52	0.41	0.295	11.36	2.33	11.77	2.33

Table A5.2: Urban real expenditure decile means and mean differences, Addis Ababa, 1994, 1995, and 1997

Decile	Conditional mean 94 (μ_{94})	Conditional mean 95 (μ_{95})	Conditional mean 95 (μ_{97})	μ_{95} -μ_{94}	t-ratio	μ_{97} -μ_{95}	t-ratio	μ_{97} -μ_{94}	t-ratio
1	18.95	21.33	21.05	2.38	1.508	-0.28	-0.161	2.1	1.277
2	32.78	35.92	36.55	3.14	1.206	0.63	0.23	3.77	1.421
3	43.57	47.66	48.28	4.09	1.29	0.62	0.178	4.71	1.392
4	54.86	58.99	62.38	4.13	0.926	3.39	0.729	7.52	1.392
5	67.17	69.45	75.69	2.28	0.424	6.24	1.044	8.52	1.555
6	78.56	83.6	93.33	5.04	0.711	9.73	1.131	14.77	1.436
7	95.73	103.27	119.33	7.54	0.701	16.06	1.303	23.6	1.796
8	127.18	133.15	150.7	5.97	0.343	17.55	0.933	23.52	1.939
9	176.92	186.62	206.5	9.7	0.342	19.88	0.648	29.58	1.285
10	366.63	354.94	464.27	-11.69		109.33		97.64	
Overall mean	106.35	109.49	127.81	3.14	0.563	18.32	2.781	21.46	3.176

Table A5.3: Urban real expenditure decile means and mean differences, northern towns, 1994, 1995 and 1997

Decile	Conditional mean 94 (μ_{94})	Conditional mean 95 (μ_{95})	Conditional mean 97 (μ_{97})	μ_{95} -μ_{94}	t-ratio	μ_{97} -μ_{95}	t-ratio	μ_{97} -μ_{94}	t-ratio
1	24.7	17.42	22.07	-7.28	-1.875	4.65	1.446	-2.63	-0.694
2	47.2	36.83	39.68	-10.37	-1.684	2.85	0.483	-7.53	-1.264
3	61.44	53.78	55.42	-7.66	-0.956	1.64	0.208	-6.02	-0.779
4	78.89	69.72	69.75	-9.17	-1.193	0.03	0.003	-9.14	-1.248
5	91.36	84.77	88.43	-6.59	-0.473	3.66	0.286	-2.93	-0.198
6	108.18	102.06	110.23	-6.12	-0.414	8.17	0.477	2.05	0.127
7	132.63	125.69	138.34	-6.94	-0.308	12.65	0.524	5.71	0.236
8	165.14	153.64	175.96	-11.5	-0.367	22.32	0.678	10.82	0.323
9	210.55	194.71	224.55	-15.84	-0.347	29.84	0.569	14	0.27
10	430.31	341.14	443.45	-89.17		102.31		13.14	
Overall mean	134.87	117.85	136.6	-17.02	1.655	18.75	1.844	1.73	0.168

Table A5.4: Urban real expenditure decile means and mean differences, southern towns 1994, 1995 and 1997

Decile	Conditional mean 94 (μ_{94})	Conditional mean 95 (μ_{95})	Conditional mean 97 (μ_{97})	μ_{95} -μ_{94}	t-ratio	μ_{97} -μ_{95}	t-ratio	μ_{97} -μ_{94}	t-ratio
1	27.84	27.03	21.16	-0.81	-0.204	-5.87	-1.993	-6.68	-1.741
2	49.9	47.29	37.84	-2.61	-0.408	-9.45	-1.518	-12.06	-2.015
3	65.11	62.82	52.8	-2.29	-0.305	-10.02	-1.396	-12.31	-1.659
4	79.8	78.83	67.05	-0.97	-0.093	-11.78	-1.154	-12.75	-1.347
5	95.9	95.74	83.4	-0.16	-0.013	-12.34	-0.996	-12.5	-1.028
6	113.54	116.08	101.2	2.54	0.147	-14.88	-0.793	-12.34	-0.697
7	133.58	143.1	133.59	9.52	0.413	-9.51	-0.379	0.01	-0.001
8	162.99	173.59	157.61	10.6	0.332	-15.98	-0.489	-5.38	-0.178
9	206.91	231.11	202.95	24.2	0.429	-28.16	-0.523	-3.96	-0.075
10	365.65	416.61	373.98	50.96		-42.63		8.33	
Overall mean	129.42	140.05	122.89	10.63	1.072	-17.16	-1.719	-6.53	-0.679

Table A5.5: Real expenditure decile mean differences, Addis Ababa and northern towns, 1994, 1995 and 1997

Decile	1994		1995		1997	
	μ_a - μ_n	t-ratio	μ_a -μ_n	t-ratio	μ_a -μ_n	t-ratio
1	-5.75	-1.641	3.91	1.395	-1.02	-0.359
2	-14.42	-2.84	-0.91	-0.18	-3.13	-0.617
3	-17.87	-2.797	-6.12	-0.919	-7.14	-1.055
4	-24.03	-4.601	-10.73	-1.366	-7.37	-0.913
5	-24.19	-1.905	-15.32	-1.571	-12.74	-1.265
6	-29.62	-2.589	-18.46	-1.394	-16.9	-1.218
7	-36.9	-1.958	-22.42	-1.191	-19.01	-0.966
8	-37.96	-1.397	-20.49	-0.768	-25.26	-0.927
9	-33.63	-0.846	8.09	-0.198	-18.05	-0.426
10	-63.68		13.8		20.82	
Overall mean	-28.52	-3.34	-8.36	-1.364	-8.89	-1.131

Table A5.6: Real expenditure decile mean differences, Addis Ababa and southern towns, 1994, 1995 and 1997

Decile	1994		1995		1997	
	μ_a - μ_s	t-ratio	μ_a -μ_s	t-ratio	μ_a -μ_s	t-ratio
1	-8.89	-2.567	-5.7	-2.28	-0.11	-0.046
2	-17.12	-3.635	-11.37	-2.248	-1.29	-0.278
3	-21.54	-3.662	-15.16	-2.691	-4.52	-0.784
4	-24.94	-3.265	-19.84	-2.349	-4.67	-0.619
5	-28.73	-3.067	-26.29	-2.713	-7.71	-0.773
6	-34.98	-2.84	-32.48	-2.315	-7.87	-0.509
7	-37.85	-2.24	-39.83	-2.092	-14.26	-0.681
8	-35.81	-1.496	-40.44	-1.475	-6.91	-0.262
9	-29.99	-0.681	-44.49	-0.983	3.55	0.082
10	0.98		-61.06		88.29	
Overall mean	-23.07	-2.865	-30.56	-3.65	4.92	0.556

Table A5.7: Real expenditure decile mean differences, northern and southern towns, 1994, 1995, 1997

Decile	1994		1995		1997	
	$\mu_n - \mu_s$	t-ratio	$\mu_n - \mu_s$	t-ratio	$\mu_n - \mu_s$	t-ratio
1	-3.14	-0.668	-9.61	-2.856	0.91	0.284
2	-2.7	-0.419	-10.46	-1.56	1.84	0.296
3	-3.67	-0.452	-9.04	-1.118	2.62	0.327
4	-0.91	-0.114	-9.11	-0.85	2.7	0.278
5	-4.54	-0.306	-10.97	-0.868	5.03	0.404
6	-5.36	-0.347	-14.02	-0.789	9.03	0.497
7	-0.95	-0.041	-17.41	-0.712	4.75	0.190
8	2.15	0.067	-19.95	-0.59	18.35	0.572
9	3.64	0.07	-36.4	-0.676	21.6	0.431
10	68.36		-120.47		69.47	
Overall mean	5.45	0.553	-22.2	-2.5	13.71	1.419

6. Perceptions of Welfare and Poverty: Analysis of the Qualitative Responses of Urban Households

Mekonnen Taddesse and Abebe Shimeles

6.1 Introduction

Decades of research have not resolved the major measurement issues involved in the analysis of welfare and poverty: There are still controversies surrounding the choice of welfare indicator, derivation of the poverty-line, and the choice of poverty-measures. Substantial progress has been made in developing aggregate poverty-measures with important desirable properties (e.g. Sen, 1976; Foster et al., 1984; Atkinson, 1987; Hagenaars, 1986; Foster and Shorrocks, 1988), when the determination of the poverty line in particular continues to be very thorny. The poverty line is defined theoretically as the expenditure- or income-level required to attain a utility level chosen to define poverty (see chapter 3 for details). This approach however does not provide a well-defined notion of poverty that allows identification of the reference utility level and hence the cost of attaining it. The methods employed in practice to set poverty lines are therefore often not explicitly expressed in terms of welfare theory. Approaches that reject utility as a metric of welfare prefer to base the measurement of poverty on some form of commodity deprivation.[1] However, there is no unanimity on the specific form of the commodity deprivation that could serve as the basis of measurement.

Another long-standing controversy is whether poverty should be viewed as a condition of absolute or relative deprivation.[2] Absolute poverty is defined as not meeting basic consumption needs, irrespective of the general standard of living. Relative poverty, on the other hand, is related to the general standard of living in a society and often identifies the poor as those falling below a certain fraction of average income (or expenditure) or below a specific percentile of the income (or expenditure) distribution. There are a number of conceptual and measurement problems with both definitions. With respect to absolute poverty, it is argued that basic consumption needs are not easy to define (Atkinson, 1975), and anchoring basic needs on food-consumption does not solve the problem, because it is im-

1. The capabilities approach proposed by Sen (1985) must be distinguished from command over commodities. Sen defines well-being as the ability to live long, being well nourished, being literate, and so on, and poverty as the lack of these capabilities. This concept has not been effectively operationalised and hence has seen virtually no empirical applications.

2. The concept of absolute poverty is widely applied in studies in developing countries where it may be more appropriate (Ravallion et al., 1991), whereas relative poverty is common in studies in Europe.

possible to determine one set of nutritional requirements: judgments have to be made regarding what constitutes basic nutritional requirement. There is no guarantee, however, that expert judgment will correspond with observed consumption behaviour, which is determined not just by nutritional requirements but also by social conventions. Choosing the basic non-food consumption allowance is even more arbitrary.[1] It is thus argued that any meaningful poverty line is inevitably influenced by contemporary living standards, and that poverty must be seen not as an absolute but as a relative concept (Atkinson, 1975; Citro and Michael, 1995; Foster, 1998). But relative definitions of poverty also do not escape from the problem of being based on exogenously set parameters: the poverty cut-off point of the income (or expenditure) distribution has to be chosen by the researcher.

Another approach contends that poverty cannot be meaningfully quantified in terms of objective criteria at all, and prefers instead to make subjective and qualitative poverty-assessments. An intermediate approach that has evolved in recent decades is referred to as the "subjective" poverty definition. It attempts to assess individuals' perception of their well-being and attempts to relate the subjective welfare levels to their actually observed incomes. The subjective welfare levels are themselves essentially based on some form of income-evaluation: individuals are asked what they consider to be an absolutely minimal income, or what incomes they think correspond to different category labels designed to represent different welfare rankings. These judgements are then related to actually observed income to define a subjective poverty-line (SPL), which the next section will define more formally.

Using such a subjective poverty-line has at least three advantages. First, whether poverty should be considered absolute, relative or somewhere in between is in some way determined from the data, like society's perception of welfare and poverty. Second, the actual parameters of the poverty-line are determined empirically, not set a priori. Finally, not much data is required, only on income, and responses to a qualitative income-evaluation question are sufficient. If more differentiated poverty-lines are desired, data on household size, composition, and other relevant characteristics may be required.

Despite these advantages, its application has been restricted mainly to poverty studies in Europe, almost none have been done in less developed countries,[2] part-

1. In the most commonly used procedures – the food-energy-intake (FEI) and cost-of-basic-needs (CBN) methods – a minimum caloric requirement is chosen a priori. In the FEI method this choice essentially determines basic non-food expenditure, which can be problematic because, for example, non-food needs may vary greatly between rural and urban areas. The various procedures used for determining basic non-food consumption in the CBN method have also been criticised for either arbitrariness or being biased (Ravallion, 1994).

2. Yohannes Kinfu (1995) applied SPL in his study of households in Dire Dawa, Ethiopia, a town also covered in this study. Pradhan and Ravallion (1997) used consumption-adequacy questions to derive the SPL for Jamaica and Nepal.

ly because income itself is hard to define in countries where monetisation of the economy, particularly in rural communities, is very low. There is no strong reason why it cannot be applied where cash-income is predominant and meaningful responses can be obtained, however.

We thus applied SPL in seven major urban centres in Ethiopia. Unlike most previous studies, the parameters of the model were estimated from a two-year panel of households Besides deriving the poverty-line, the model estimated was also used to examine whether the respondents perceived poverty as relative or absolute and to assess what factors influenced their welfare-evaluation and hence the poverty-line.

The next section reviews the major approaches used in measuring subjective poverty. Section 3 then discusses the data and the estimation procedures used in the study, while section 4 presents the results. Section 5 summarizes and draws conclusions.

6.2 Approaches to Measuring Subjective Poverty

The concept of subjective welfare and poverty starts from the premise that people are the best judges of their own situations and that their opinions should thus ultimately be the decisive factor in defining welfare and poverty. Subjective poverty measures are therefore derived from survey-responses to questions designed to solicit their opinions about their welfare.

Two approaches are commonly employed to evaluate individual perceptions: one of the approaches defines poverty on the basis of responses to what is called "the minimum income question", and the other on the basis of the "income evaluation question".

The minimum income question asks the respondent what after-tax income he/she would consider "absolutely minimal", the income level below which he/she thinks "would not be able to make ends meet".[1] The stated minimum income, designated Y_{min}, is interpreted as the value of the cost function at the welfare level "making ends meet" (Danziger et al., 1984), and thus taken as the individual poverty line. An individual is considered poor if his actual income, Y, is less than Ymin. Such a poverty-line may lead to inconsistent classification, however, as it is possible that individuals with the same standard of living may state different minimum requirements and may as a result be classified differently.

To impose consistency, it is postulated that the stated minimum income varies systematically with actual income, Y, and a vector of other individual characteristics, **x**, such as household-size and composition and reference-group income:

$$Y_{min} = f(Y, \mathbf{x}) \qquad (1)$$

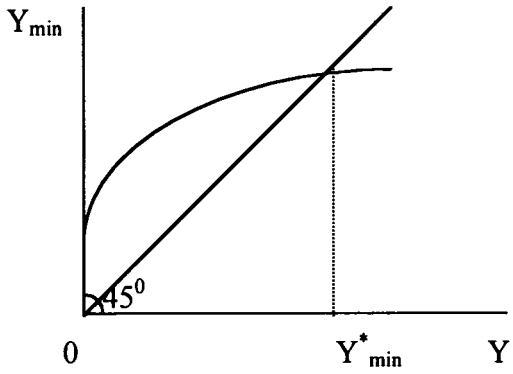
1. An early application of this version of the question is found in Goedhart et al. (1977). Other applications include van Praag et al. (1980) on data from the member countries of the European Community; Danziger, et al. (1984) and Colasanto et al. (1984) on US data; de Vos and Garner (1991) on data from the US and the Netherlands; and Stanovik (1992) on Slovene data.

The poverty threshold, called the subjective poverty line (SPL) is then defined as the solution of Equation 1 given the values of **x**, i.e.,

$$Y^*_{min} = f(Y^*_{min}, \mathbf{x}) \quad (2)$$

For given values of **x**, f can be assumed to be monotonically increasing in Y with an elasticity of α ($0 < \alpha < 1$), [1] so a unique solution Y^*_{min} exists as depicted in Figure 6.1a (the vertical axis represents Ymin and the horizontal axis represents Y, total income or consumption expenditure). Individuals whose actual income is less than Y*min are considered to feel that their income is not sufficient to make ends meet, while those whose actual income exceeds Y*min are considered to feel that it is sufficient. Hence Y*min is the income threshold or subjective poverty line that divides the poor from the non-poor.

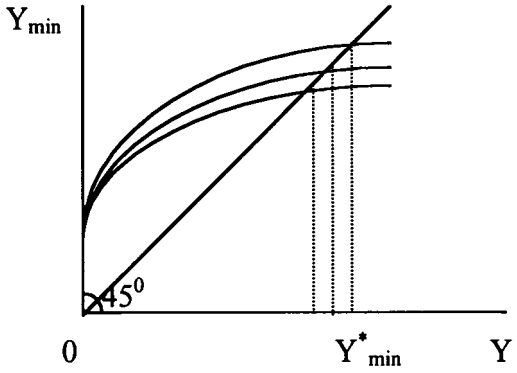
Fig 6.1a: Single subjective poverty line



The vector **x,** however, varies across individuals, so Equation 2 can be used to generate a set of poverty lines differentiated by the components of **x** as depicted in Figure 6.1b.

1. In line with this postulate, most of the cited studies have used a log-linear function for the relationship between minimum and actual incomes, with satisfactory results.

Figure 6.1b: Differentiated subjective poverty lines



The second approach is based on some variation of the income evaluation question (Kapteyn, et al., 1985): "Which after-tax monthly income would you, in your circumstances, consider to be very bad? And bad? Insufficient? Sufficient? Good? Very good?".

Assuming that the labels "sufficient", "good", etc., arouse the same feelings among all respondents and hence different individuals associate the same level of welfare with each label, then the survey-responses can be used to compare individual welfare-levels. This assumption is sufficient to make comparisons between welfare classes defined by the verbal qualifications without requiring any assumption regarding the precise relationship between welfare and income (Hagenaars, 1986:45). The assumption would also be sufficient to derive the poverty-line when the intention is to compare poverty within the broad welfare classes. The poverty-line can then be obtained either by simply averaging the incomes of just those people who say their income is "sufficient", or by locating the intersection of the actual income level with that associated with the answer "sufficient", in the same way as is done in the case of the minimum income question. Both procedures provide the poverty-line associated with the welfare level "sufficient".

To compare welfare levels within the broad classes the individual welfare function of income, denoted by U(y), is derived[1] from the responses to the income evaluation question. The welfare function of income is a version of the operationalisation of the cardinal utility function of income and describes how an individual evaluates different levels of income. Assuming that welfare is cardinally measurable, the verbal evaluations are converted into numerical values on the [0,1] interval by identifying them with equal quantiles. The relationship between

1. The concept of the welfare-function of income was introduced by van Praag (1968), and the income-evaluation question as a means of estimating the parameters of the function by van Praag (1971). It has been applied mainly to studies of poverty in Europe, including van Praag et al. (1980), van Praag et al. (1982), Kapteyn et al. (1985), Hagenaars (1986), and Kapteyn et al. (1988), and by Colasanto et al. (1984) on US data.

an income level y and its evaluation is then represented by the log normal distribution, Λ, considered to be a theoretically and empirically plausible approximation, i.e.

$$\mathbf{U(y) = \Lambda(y; \mu, \sigma) = N(\ln y; \mu, \sigma)} \quad (3)$$

where N is the normal distribution function. Thus the individual responses can be summarized by the estimated parameters of the log-normal distribution, μ and σ. Poverty is then defined as a situation of low welfare level and the poverty line as the income level, which yields that welfare level. Thus for a low welfare level represented by δ (0<δ<1), the poverty line, called the Leyden poverty line (LPL), is derived as a solution to

$$\Lambda(y\delta, \mathbf{i}; \mu_i, \sigma_i) = N((\ln y_{\delta,i} - \mu_i)/ \sigma_i; 0,1) = \delta \quad (4)$$

where δ is exogenously determined.[1] As a solution to Equation 4 we obtain:

$$\ln y_{\delta,i} = \mu_i + \sigma_i u_\delta \quad (5)$$

where u_δ is the δ-quantile of the standard normal distribution. The parameter μ is assumed to depend on the individual's actual income, Y, and the vector of other household characteristics, **x**, i.e., $\mu_i = f(Y, \mathbf{x})$. Thus we can write

$$\ln y_{\delta,i} = f(\ln Y, x) + \sigma_I u_\delta \quad (6)$$

Fixing σ_i at some value (usually at its value in the sample) and solving

$$\ln y_\delta^* = f(\ln y_\delta^*, \mathbf{x}) + \sigma u_\delta \quad (7)$$

gives the LPL. Just like the SPL, the LPL could also be differentiated on the basis of the components of **x**.

While the LPL is based on the underlying theory of the welfare function of income, a similar theory from which a model explaining the SPL is derived does not exist. If the SPL, Y^*_{min}, is interpreted as the income level corresponding to the welfare level "making ends meet" or "absolutely minimal", then the SPL reduces to the LPL apart from the fact that, in the former case, the associated welfare level is not exogenously determined but evaluated by the respondents themselves (Kapteyn et al., 1985). Both approaches, however, are based on the assumption that individuals associate the same level of welfare with the answers "making ends meet" in the former case, and "insufficient", "sufficient", etc., in the latter. It is argued that there is no guarantee that the minimum income question leads to consistent responses; individuals similar in all respects may provide different responses to the question. The income evaluation question, on the other

1. In the literature this is largely considered set by politicians, and hence the poverty line has been called a "politically determined poverty-line" (e.g. van Praag, et al, 1980). Since δ represents a certain level chosen to represent the poverty threshold, it could be set at a desired scale corresponding to the welfare levels given in the verbal responses to the income evaluation (see for example Hagenaars, 1986).

hand, is supposed to induce the respondent to be consistent by providing him the full scale of the welfare evaluation.

Both approaches, it is claimed, provide direct measures of welfare, unlike traditional demand analysis in which welfare comparisons are derived indirectly from observed market behaviour. This allows us to assess the effect of exogenous variables or variables fixed in the short run such as household-size, age, health-status, etc on the income level required to attain a given welfare. The welfare-function of income however cannot be used to make predictions on individual economic behaviour as it is itself the result of the individual's behaviour (Hartog, 1988). Moreover, as Hartog (1988, p. 264) argues the welfare-function of income is an *ex ante* evaluation in a world of limited information and not an *ex post* measure of realised welfare, and as a result cannot be integrated with standard consumer theory. Subsequent research (e.g. Kapteyn, 1994) has, however, shown that the income evaluation approach (as well as the minimum income question) provides a direct measurement of welfare, which can be used to identify household cost functions, thereby overcoming the well-known identification problem in demand analysis.

Despite their strong empirical content and limited data-requirement as compared for instance with the widely used consumption-based measures of welfare and poverty, the application of these approaches has been confined to the developed countries of the West. This is most probably because the concept of income in which the procedures are anchored is hard to define in a developing country context where rural income is predominant and largely subsistence. It would therefore be difficult if not altogether impossible to get meaningful responses on questions directly based on income. To overcome this problem, Pradhan and Ravallion (1997), have proposed a procedure for deriving the SPL on the basis of subjective evaluations of household consumption adequacy rather than income. Under this procedure households are asked to state whether they think their consumption[1] over a given period is inadequate, adequate, or more than adequate. Consistent with the definition discussed above, the poverty line is then defined as the expenditure level at which the subjective minimum is reached in expectation, for given household characteristics. The poverty line is estimated from an ordered probit regression of the responses to the consumption adequacy question on consumption expenditure and a vector of household characteristics. This poverty line could also be differentiated by the household characteristics as in the cases discussed above.

1. This could refer to the household's total consumption or to specific consumption categories: food, non-food, housing, clothing, health, education, etc. It is also possible to limit the question to the more specific consumption-items considered most important in determining welfare.

6.3 Data and Poverty Line Estimation Procedures

6.3.1 The Data

The data for this study was drawn from the Ethiopian Urban Socio-Economic Survey undertaken in 1994, 1995 and 1997 by the Department of Economics of Addis Ababa University, the first and last rounds in collaboration with Göteborg University and the second with Michigan State University. The survey is discussed in detail in Chapter 1.

In addition to gathering data on household demographic characteristics, employment and income, education and health status, consumption and expenditure, the survey also had a module in which three basic qualitative questions on welfare and welfare changes were asked. First respondents were asked to state whether they thought their general standard of living had deteriorated, improved or remained the same compared to the previous visit and what they thought might be the reason for change. The second question asked respondents to categorise themselves in a class; specifically whether they considered themselves as rich, middle class or poor. The third question, included only in the 1995 and 1997 surveys, was similar to the income evaluation question discussed above and was phrased as follows:

What income (net of taxes) would you, in your circumstances consider to be

Very low	Birr.....
Insufficient	Birr.....
Sufficient	Birr.....
Good	Birr.....
Very good	Birr.....

This chapter analyses the responses to this question. Since the responses depend upon the way the question was posed and how the respondent understood the labels, a few points about how the interviews were conducted are in order. The questionnaires were in English, but the interviews were done in local languages,[1] and to maintain uniformity commonly agreed translations were used. However, given the cultural diversity of the sample, the translations might not have exactly the same connotations in the different languages. Even without this complication, the standard problem with this kind of survey is that there is no guarantee that respondents attach the same welfare connotations to the qualitative terms used.

Questions were posed to the household head and responses therefore represent individuals' evaluations about the welfare of the entire household. A possible reservation against this procedure is that other members of the household might

1. Most of the interviews were conducted in Amharic, as it is the lingua franca in most parts of Ethiopia, particularly in urban areas. Other local languages were also used when respondents did not speak Amharic or preferred some other language.

have different opinions. This is probably not a serious problem in this case, however, since the head was usually the sole or main breadwinner.

Tables 6.1a and 6.1b provide some basic descriptive statistics on the sample and the responses to the income evaluation question. Without exception, the income-evaluations of those in each quintile (in both years) rose with the qualitative descriptions and this was also generally true for the individual respondents, indicating that they understood their intended ordinality. Furthermore, the evaluations increased with each quintile, as is usually hypothesised. The evaluations had shifted upwards in 1997 compared with 1995 and during the same period mean monthly expenditure increased in all urban centres.

Table 6.1a: Mean income evaluations, household-size and monthly total expenditure, by expenditure quintile, 1995

Quintile	Household size	Total expenditure	Very low	Insufficient	Sufficient	Good	Very good
1	4.67	145.58	131.07	216.90	338.57	458.95	649.17
2	5.66	299.27	170.39	268.48	423.24	595.56	862.31
3	6.36	452.97	234.15	360.28	623.40	844.80	1320.59
4	6.62	682.48	291.76	410.87	695.90	886.43	1223.06
5	7.59	1544.94	409.78	619.30	1014.25	1395.94	2197.86
Total	6.16	623.28	247.54	374.25	618.24	835.79	1248.79

Table 6.1b: Mean income evaluations, household-size and monthly total expenditure, by expenditure quintile, 1997

Quintile	Household size	Total expenditure	Very low	Insufficient	Sufficient	Good	Very good
1	4.42	129.75	140.33	214.58	342.15	502.12	777.46
2	5.24	283.73	178.34	278.58	443.84	656.67	881.18
3	5.46	435.98	250.77	365.15	581.14	842.66	1138.60
4	6.00	681.74	319.77	481.18	664.33	938.88	1293.40
5	6.82	1618.52	408.79	635.97	1028.71	1432.84	2055.69
Total	5.59	630.53	259.73	393.72	612.29	872.15	1226.88

6.3.2 Poverty Line Estimation

The responses to the income evaluation question were first analysed to identify factors that might have influenced them. The equation explaining the parameter μ was specified as

$$\mu_i = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln x_{2i} + \beta_3 x_{3i} \qquad (8)$$

where Y_i is the actual income of household i, x_{2i} is household-size, and x_{3i} is mean income in household i's reference group. We defined poverty as the welfare-level evaluated "sufficient" and substituted equation (8) into equation (5). Including other household-characteristics and adding a time-subscript t (t= 1,2) and an error-term ε gives

$$\ln y^s_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln x_{2it} + \beta_3 x_{3it} + \ldots + \beta_k x_{kit} + \varepsilon_{it} \qquad (9)$$

where y^s is the income level considered sufficient; the second term in equation (5) drops out because u_δ (the δ-quantile of the standard normal distribution) corresponding to the evaluation "sufficient" is zero in our case.[1]

We actually used consumption expenditure, which Lipton and Ravallion (1995) argue is a better indicator of long-term average welfare, because in our surveys we found that income had been substantially underreported compared with total expenditure) and it was therefore not a reliable measure of the current standard of living. Especially low-income households often have multiple irregular sources of income, available perhaps only during certain seasons, and therefore not reported at the time of the survey.

Equation 9 is first specified with log household size, log total consumption expenditure and log of reference group mean expenditure as explanatory variables and estimated as a random effects model by feasible generalised least squares. The latter variable was found to be extremely non-significant so it was subsequently dropped and the model was reestimated. Poverty-lines differentiated by household size were then obtained as solutions of the equation

$$Y^*_{suff} = \exp\{(\beta_0 + \beta_2 \ln x_2)/(1- \beta_1)\} \qquad (10)$$

where β_0, β_1 and β_2 are the estimated coefficients.

Then we estimated an expanded version of the equation with disaggregated household characteristics as explanatory variables.[2] To account for any reference-group effect, we included log of mean expenditure in each *woreda* (the second stage sampling area). Instead of household-size we used the proportion of household members other than the head in different age groups differentiated by sex. The age and age squared of the household-head, who in most cases served as our respondent, were included to allow for differences in perception as a result of age, different habits, and having different reference groups (de Vos and Garner, 1991). The sex of the head might also have an effect on the perception of welfare; females may perceive the sufficiency of income differently from males so we included a dummy variable to account for this. Two other possible determinants are the number of income-earners in the household and the education of the head, also included via dummies. Assets owned by the household, both housing and other durables, might have an effect; estimated values of the latter as provided by the respondents themselves, and a dummy variable for house-ownership, were

1. Following the equal-quantile assumption, the verbal labels "very low", "insufficient", "sufficient", "good" and "very good" can be represented by 0.1, 0.3, 0.5, 0.7, and 0.9, respectively. The standard score corresponding to "sufficient" is therefore zero. Note that we are defining the LPL at the welfare level δ=0.5 as sometimes recommended in the literature (e.g., Hagenaars, 1986). Note also that by choosing the income level evaluated by "sufficient" as the individual poverty threshold, we are not necessarily subscribing to the cardinality assumption, which underlies the derivation of the LPL.

2. Versions of the model with more variables have been estimated by Hagenaars (1986), and de Vos and Garner (1991).

included. Since most of the variables remain unchanged or do not change substantially over short time periods, the equation was estimated separately for each of the two years.

Once poverty-lines had been calculated from equation (10), individual poverty was computed and then aggregated using the most widely applied poverty-measures, incidence of poverty, P_0; depth of poverty, P_1; and severity of poverty, P_2; given jointly by:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{Y^*_{suff} - Y_j}{Y^*_{suff}}\right)^\alpha, \alpha = 0,1,2 \qquad (11)$$

where n is the sample size, q is the number of households with expenditures below the relevant subjective poverty-line. The regression estimates and the resulting poverty-lines and poverty-measures are discussed in the next section.

6.4 Regression and Poverty Estimates

6.4.1 Regression Results

Regression estimates for the basic and extended models are provided in Table 6.2. The coefficient β_1 measures the elasticity of the poverty-line with respect to total consumption expenditure, while β_2 can be used to derive household-size elasticity, given by $\beta_2/(1-\beta_1)$. The estimated expenditure-elasticity in the basic model (0.393) is significantly different from zero, indicating that the poverty-line is not independent of current consumption expenditure. This estimate is consistent with the results of other studies based on either the minimum income or the income evaluation questions. Danziger et al. (1984) obtained an estimate of 0.376; Colasanto et al. (1984) obtained 0.44; de Vos and Garner (1991) obtained 0.43, and 0.552 from an extended model; and Stanovnik (1992) obtained 0.52 and 0.71.

The estimated coefficient for household size is also significantly different from zero. Its value (0.092), however, is much lower than estimates from similar studies: Danziger et al. (1984) obtained a value of 0.35; Colasanto et al. (1984) an estimate of 0.244; and Stanovnik (1991) obtained 0.15 and 0.285. Pradhan and Ravallion (1997) also obtained much higher estimates, 0.37 for Nepal and 0.23 for Jamaica, though based on a different method. Our estimate implies a household size elasticity of 0.15, i.e., a 10% increase in household size entails only a 1.5% increase in the perceived poverty line, and hence suggests that there are substantial economies of scale in household-consumption. This may not be surprising in Ethiopia, where additional household members are often accommodated by sharing meals from the same pot and other consumer goods from existing stock, but it contradicts the widely held view that the majority of households in

less developed countries do not face significant economies of scale in consumption since private goods constitute the bulk of expenditure. In any case it substantially underestimates the consumption-requirements of having more people in the household.

The regression estimates for each year are similar. The estimated coefficient of log of mean expenditure was found to be non-significant for both years (Table 6.2, columns 2 and 3), suggesting that households perceive poverty in absolute terms, not relative to other people, when evaluating their welfare status. Equation (9) was also estimated including dummy variables for each urban centre, with and without log of mean expenditure, to see if factors such as the provision of publicly provided goods or differences in the cost of living, together with mean expenditure or separately, might affect the perception of poverty. The coefficients of all dummies (not reported here) were all found to be non-significant.

Older respondents are expected to state higher income-needs than younger ones and households with more children are generally expected to have higher costs, but surprisingly the coefficient of age of head and the other demographic composition variables were found to be highly insignificant. Households with higher proportions of adults tended to give higher income evaluations, as did those with more children, though the coefficients were smaller than for adults, and not necessarily significant.

Sex of the household head was significant in 1997, indicating that males generally give higher income evaluations than females, who were generally less educated, and widowed, divorced, or separated.

The education of the household head was also positive and significant at the college level, i.e., better educated individuals tended to perceive higher income needs. de Vos and Garner (1991) and Hagenaars (1986) argued with regard to similar findings that better educated individuals may "need higher incomes to reach higher welfare levels in anticipation of which they invested in their education. In countries like Ethiopia, education also tends to arouse more aspirations for the more expensive ways of modern life than are found among the uneducated, whose incomes are generally lower so their needs are largely limited to meeting the bare necessities of life. Moreover, better educated individuals often belong to reference groups with similar or higher levels of education and hence higher incomes, which might tend to influence them to have higher evaluations or perceived needs.

A similar representation was used for employment. Dummy variables were included for each of three categories of households: all members unemployed, one member working, and two or more members working. Contrary to what is expected, almost all coefficients of these variables are insignificant. The only exception is the negative and significant coefficient for households in which there is no working member. This result suggests that such households provide much lower income evaluations than the average consumption needs for the sample.

Of the dummies for employment only one was significant, for households with no one employed in 1997, and it was negative, indicating lower perceived income needs (or expectations).

Ownership of a house and the value of durables were both positive and significant. Generally, households with higher income are in a position to own houses as well as a larger number of valuable durable goods.

Table 6.2: Regression estimates

	Basic Model	Extended Model	
Y_{min}		1995	1997
Constant	3.639 (0.082)*	3.404 (0.476)*	4.048(0.366)*
ln (total expenditure)	0.393 (0.014)*	0.365 (0.023)*	0.335(0.021)*
ln (household size)	0.092 (0.023)*		
ln mean expenditure		0.020 (0.067)	-0.009(0.052)
Age of head		0.004 (0.007)	0.002(0.006)
Age of head squared		-0.0001 (0.00001)	-0.00004 (0.00006)
Proportion of children <5		0.129(0.203)	0.251(0.177)
Proportion of children 5 to 14		0.123 (0.122)	0.198(0.102)*
Proportion of female adults		0.446(0.134)*	0.398(0.114)*
Proportion of male adults		0.334(0.136)*	0.173(0.117)*
Proportion of elderly >59		-0.296(0.266)	0.287(0.211)
Sex of head		0.025 (0.039)	0.085(0.035)*
No person employed		0.037(0.075)	-0.147(0.067)*
One person employed		0.016(0.053)	-0.073(0.049)
Two persons employed		0.008(0.053)	-0.047(0.053)
No schooling		0.029(0.043)	-0.049(0.039)
Secondary education		0.074(0.072)	0.051(0.067)
College diploma		0.182(0.059)*	0.109(0.054)*
College degree		0.214(0.077)*	0.209(0.071)
Value of durables		0.00002(0.000001)*	0.000004(0.0000008)*
Ownership of housing		0.022(0.036)	0.057(0.033)*
R^2 /Adj R^2	0.322	0.313	0.363
F-ratio		29.54	35.37

Note: The figures in parenthesis are standard errors.
* Significant.

6.4.2 Poverty Lines and Measures

Since most of the demographic estimates were insignificant, we used the results from the basic regression to derive the subjective poverty-lines (SPL), differentiated only by household size. This also facilitates comparisons with the consumption-based estimates.

Generally, the SPL and the poverty lines derived from consumption expenditure data[1] are close, although the former is much higher than the latter for small households and lower for large households. This is due to the very low size elas-

1. These poverty lines were derived by dividing the food poverty-line obtained using the basic needs approach by the food-share.

ticity of the SPL (0.15) obtained from the regression estimates, which is substantially lower than the elasticity implied by the consumption-based poverty lines (1.015). This is extremely high and seems to rule out economies of scale in consumption, but it follows from the fact that the poverty lines were estimated on a per capita basis.

Table 6.3: Subjective and consumption-based poverty lines, by household size 1995 and 1997, in Birr

Household size	1995		1997	
	SPL	Consumption-based poverty lines	SPL	Consumption-based poverty lines
1	361.66	90.99	361.66	87.73
2	434.92	184.60	434.92	173.94
3	462.40	276.05	462.40	254.01
4	482.96	364.69	482.96	342.75
5	499.53	456.52	499.53	428.02
6	513.49	546.62	513.49	508.93
7	525.59	638.77	525.59	594.12
8	536.30	734.16	536.30	690.99
9	545.94	835.88	545.94	772.94
10 and above	562.35	1021.40	561.47	943.99

The 6.4 shows headcounts (P_0) based on subjective and consumption-based poverty-lines for 1995 and 1997 by household size. While the SPL overestimates poverty among small households and underestimates it among large ones, the reverse is true for consumption-based poverty-lines. Again, however, the two approaches are reasonably close for moderately-sized households. The SPL results in extremely high incidence, depth, and severity of poverty for households with three or fewer members, much higher than the overall averages as well as the consumption poverty measures. On the other hand, it provides unduly low poverty estimates for households with eight or more members.

Table 6.4: Subjective and consumption-based poverty measured by household size (Birr)*

Household size	1995		1997	
	Subjective poverty P_0	Consumption poverty	SPL	Consumption poverty
1	0.795	0.205	0.80	0.28
2	0.831	0.407	0.648	0.239
3	0.759	0.527	0.691	0.432
4	0.605	0.449	0.585	0.47
5	0.558	0.487	0.543	0.482
6	0.553	0.599	0.503	0.509
7	0.516	0.65	0.553	0.60
8	0.481	0.677	0.542	0.635
9	0.528	0.692	0.526	0.705
10 and above	0.338	0.685	0.345	0.644
Total	0.565	0.569	0.566	0.506

Table 6.5 shows estimates of P_0, P_1, and P_2 for 1995 and 1997 by urban centre and overall. The overall results (based on SPL and consumption-based poverty-lines) agree rather well, for example in 1995, P_0; 56.5% vs. 56.9%; P_1: 25.0% vs. 27.4%; P_2: 14.5% vs. 14.1%. (1997 was not as close). The urban profiles are also not as close as overall results for 1995, but the patterns are the same using both types of poverty-lines. Apparently, the consumption-based (ultimately food-based) poverty-lines corresponded fairly well with what people subjectively felt to be sufficient. Since the consumption-based poverty-lines were more or less absolute, the correspondence between measures based on them and the SPL also reinforces the finding from the regression-estimates that for the most part households perceived poverty as an absolute phenomenon. The subjective poverty-line tries to identify the income level, which the individual thinks is sufficient to meet basic needs. Appropriate choices of the parameters of the consumption-based poverty-line and the basket of goods could lead to close correspondence between the two concepts and the implied poverty measures.

Table 6.5: Estimates of the incidence (P_0), depth (P_1), and severity (P_2) of subjective and consumption-based poverty by urban centre, 1995 and 1997

Urban centre	1995						1997					
	Subjective			Consumption			Subjective			Consumption		
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2
Addis Ababa	0.58	0.246	0.137	0.637	0.278	0.156	0.55	0.243	0.139	0.53	0.225	0.125
Awassa	0.508	0.227	0.121	0.508	0.238	0.135	0.459	0.22	0.14	0.443	0.227	0.148
Bahr Dar	0.462	0.208	0.134	0.434	0.188	0.11	0.487	0.235	0.147	0.372	0.16	0.09
Dessie	0.708	0.358	0.224	0.556	0.225	0.125	0.75	0.402	0.273	0.556	0.237	0.137
Dire Dawa	0.50	0.21	0.116	0.391	0.14	0.008	0.691	0.29	0.161	0.482	0.173	0.091
Jimma	0.522	0.241	0.143	0.456	0.197	0.11	0.556	0.285	0.183	0.478	0.222	0.126
Mekele	0.587	0.314	0.217	0.538	0.274	0.192	0539	0.219	0.119	0.474	0.178	0.096
Total	0.565	0.25	0.145	0.569	0.274	0.141	0.566	0.257	0.151	0.505	0.215	0.12

Table 6.6 shows how well the SPL and consumption-based poverty lines agreed in identifying individual households as poor or non-poor in 1995 and 1997. There is a very high correspondence between the two approaches: 81.4% and 83.8% of the sample households in 1995 and 1997 respectively, were identically classified by both methods. χ^2 –statistics also indicate very high correlation between the two methods. .

Table 6.6: Coincidence of subjective and consumption poverty

Year	Same households identified as poor or non-poor by both methods	Poor by SPL and non-poor by consumption poverty lines	Non-poor SPL and poor by consumption poverty lines	χ^2 static
1995	81.4	9.1	9.5	469.3
1997	83.8	11.2	5.0	542.3

There was even much higher agreement on households below the 20th percentile (91%) and below the 10th percentile (94%), i.e., the very poor. Thus the subjective poverty seems to provide quite robust results.

6.5 Conclusions

Studies of household welfare and poverty in the developing world are almost always based on "objective" measures derived from household budget surveys. In this chapter we have instead applied the subjective definition of poverty, based on a version of the income evaluation question, to analyse the perception of households about their welfare and to derive the poverty line. The results are encouraging, indicating that meaningful responses can be obtained to the income evaluation question.

The analysis suggests that households perceived welfare and poverty as an absolute not relative concept. Moreover, the perceptions were influenced by a host of household socio-economic characteristics, including household-size (especially the proportion of adults). Education raised perceived income needs as did ownership of housing and other assets. Male household heads reported higher income-needs than females.

The subjective poverty-lines and poverty-measures were similar to those derived from consumption expenditure data, so the poverty-profiles obtained from them are comparable, and they generally identify the same individuals as poor as well. Subjective poverty-lines could therefore be used for identifying the poor for poverty reduction programmes, and they are perhaps easier to calculate than consumption-based measures, since they require less data.

References

Atkinson, A. B. (1975), *The Economics of Inequality,* Clarendon Press, Oxford.

Atkinson, A.B. (1987), "On The Measurement of Poverty", *Econometrica* 55(4): 749–64.

Citro, C. and R.T. Michael (1995), *Measuring Poverty: A New Approach*, National Academic Press, Washington D.C.

Colasanto, D. et al. (1984), "Two Subjective Definitions of Poverty: Results from the Wisconsin Basic Needs Study", *Journal of Human Resources* 19(1):127–38.

Danzinger, S. et al. (1984), "The Direct Measurement of Welfare Levels: How much does it cost to make ends meet?", *Review of Economics and Statistics* 66(3): 500–05.

de Vos, K. and T.I. Garner, T.I. (1991), "An Evaluation of Subjective Poverty Definitions: Comparing results from the U. S. and the Netherlands", *Review of Income and Wealth* 37(3): 267–85.

Foster, J. et al. (1984), "A Class of Decomposable Poverty Measures", *Econometrica* 52(3):761–66.

Foster, J. and A.F. Shorrocks, A.F. (1988), "Inequality and Poverty Orderings", *European Economic Review* 32(2–3):654–61.

Foster, J. (1998), "Absolute versus Relative Poverty", *American Economic Review* 88(2):335–41.

Goedhart, T et al. (1977), "The Poverty Line: Concept and measurement", *Journal of Human Resources* 12(4):503–20.

Hagenaars, A.J.M. and B.M.S. van Praag (1985), "A Synthesis of Poverty Line Definitions", *Review of Income and Wealth*: 31(2):139–54.

Hagenaars, A.J.M. (1986), *The Perception of Poverty,* North Holland, Amsterdam.

Hagenaars, A.J.M. (1987) "A Class of Poverty Indices", *International Economic Review* 28(3): 583–607.

Hagenaars, A.J.M., and K. de Vos (1988), "The Definition and Measurement of Poverty", *Journal of Human Resources* 23(2):211–21.

Hartog, J. (1988), "Poverty and the Measurement of Individual Welfare: A review of A. J. M.

Hagenaars' The Perception of Poverty", *Journal of Human Resources* 23(2):243–66.

Kapteyn, A. (1994), "The Measurement of Household Cost Functions: Revealed preference versus subjective measures, *Journal of Population Economics* 7(4):333–50.

Kapteyn, A. et al. (1988), "Some Methodological Issues in the Implementation of Subjective Poverty Definitions", *Journal of Human Resources* 23(2): 222–42.

Kapteyn, A. et al. (1985), "The Impact of Changes in Income and Family Composition on Subjective Measures of Well-being", in David, M. and T. Smeeding (eds) *Horizontal Equity, Uncertainty, and Economic Well-being,* University of Chicago Press, Chicago.

Kinfu, Y. (1995) "Demographic Characteristics of Poor Households in Urban Ethiopia: The Case of Dire Dawa Town", *Ethiopian Journal of Economics* 4(2).

Lipton, M. and M. Ravaillon (1995), "Poverty and Policy", *Handbook of Development Economics,* vol 3A, North-Holland, Amsterdam.

Praag, B.M.S. van et al. (1980), "The Poverty Line – A pilot survey in Europe", *Review of Economics and Statistics* 62(3):461–65.

Praag, B.M.S. van et al. (1982), "Poverty in Europe", *Review of Income and Wealth* 28(3):345–59

Praag, B.M.S. van (1968), *Individual Welfare Functions and Consumer Behaviour – a Theory of Rational Irrationality.* North-Holland, Amsterdam.

Praag, B.M.S. van (1971), "The Welfare Function of Income in Belgium: an Empirical Investigation", *European Economic Review* 2:337–69.

Praag, B.M.S. van et al. (1982), "A Comparison between the Food Ration Poverty Line and the Leyden Poverty Line", *Review of Economics and Statistics* 64(4): 691–94.

Praag, B.M.S. van and N.L. van der Sar (1998), "Empirical Uses of Subjective Measures of Well-being: Household cost functions and equivalence scales", *Journal of Human Resources* 23(2):193–210.

Pradhan, M. and M. Ravallion (1997), "Measuring Poverty Using Qualitative Perceptions of Welfare", mimeo, World Bank, Washington D.C.

Ravallion, M. (1998), "Poverty Lines in Theory and Practice", AERC Working Papers CR-2-2.

Ravallion, M. (1994), *Poverty Comparisons*, Harwood Academic Publishers, Chur.

Ravallion, M., Datt, G., van de Walle, D. (1991), "Quantifying Absolute Poverty in the Developing World", *Review of Income and Wealth* 37(4):345–61.

Sen, A. (1976), "Poverty: An Ordinal Approach to Measurement", *Econometrica* 44(2): 219–31.

Sen, A. (1985), *Commodities and Capabilities*, North Holland, Amsterdam.

Stanovnik, T. (1992), "Perception of poverty and income satisfaction: An Empirical Analysis of Slovene households", *Journal of Economic Psychology* 13(1):57–69.

7. Intra-Household Distribution of Expenditures in Rural Ethiopia: A Demand Systems Approach

Bereket Kebede[1]

7.1 Introduction

In most poverty studies, as in this book, total or per capita income or expenditure of a household is used to categorise individuals as poor or non-poor. If the household is below the poverty line, all members are considered poor; there is no room for categorising some as poor and others as non-poor. This makes sense if the household is conceptualised as a unit of closely related and highly altruistic people, but with less than fully altruistic individuals, this representation loses some of its attraction. This framework implicitly assumes that what matters for the welfare of individuals is the total amount of resources available to the household; who controls the resources is not considered relevant. For instance, if a household is just at the poverty line, an additional unit of income earned by one member, will be considered to move all members out of poverty; the identity of the income-earner does not matter. "Unitary" household-models thus embody the simplifying assumption that a household functions as a single decision-making unit, with all household-income pooled.

Theoretical work has questioned this assumption and empirical work has now indicated that the welfare of household members is differentially affected depending upon who receives income. Theoretical models explicitly considering the utility of individual members of households and their interaction have been developed. In the empirical literature, evidence rejecting income-pooling and other predictions of the "unitary" model has accumulated. A robust result that emerges is that expenditure on children generally increases with the share of household-income accruing to mothers.

Even though complications due to intra-household distribution of resources are evident, identifying the decision-rule governing distribution is no easy matter. Most intra-household distribution is essentially unobservable. Some of the goods used in households have a public character, for example housing; the use by one

1. This chapter is based on work the author did as part of a PhD thesis. Thanks go to my supervisors at different periods of time: P. Collier, J. W. Gunning, P. Krishnan and M. Fafchamps. Comments of participants in workshops at the Centre for the Study of African Economies (CSAE), Oxford University, and at the African Economic Research Consortium (AERC), Nairobi, are also appreciated.

member does not exclude its use by others. Other goods are private goods; if used by one member they will not be available to others. There are many private goods like food that are consumed by all household members. But some private goods, known as exclusive goods, are consumed only by one member or a group of members. For example, in a household where not everyone smokes, cigarettes are exclusive goods. Any cigarette expenditures are attributable to the smokers. So intra-household expenditure for exclusive goods is directly observable. *Assignable goods*, on the other hand, are private goods consumed by many members of the household but in principle the amount each individual gets is observable. For instance, even though all members of the household consume food, a detailed nutrition survey can help us identify individual consumption.[1]

Due to the difficulties involved in gathering information on the individual consumption of assignable goods, most studies of intra-household distribution focus on exclusive goods. This chapter depends on the expenditure-information on exclusive goods to examine some aspects of intra-household distribution. Clothes are one category of goods that can be attributed to particular groups in the household. Girls', boys', women's, and men's clothes are exclusive goods used by the corresponding age/sex groups. Alcohol, an *adult item* not consumed by children, is another exclusive item.

This chapter focuses on the patterns of household expenditure (consumption-demand) in rural Ethiopia and how individuals are affected by changes in prices, incomes, and the demographic composition of households. A unified framework for analysing these effects is a demand-system approach incorporating demographic variables.

The analysis of demand-systems is one of the most developed areas in economics. Traditionally, the analysis of demand depended on the estimation of single equations without consistently relating it to utility-theory. But due to interdependence between different commodities, the importance of estimating demand-equations as part of a system became apparent. The modelling of demand-systems consistent with utility-theory gave a more consistent conceptual background for empirical studies. In addition, implications from utility-theory guided empirical work by imposing testable restrictions. With the growth of the literature, many demand-systems consistent with utility-theory have been developed.

This chapter uses the recently developed Quadratic Almost Ideal Demand System (QUAIDS) (Banks et al. 1997), which is an extension of the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980a and 1980b). Even though the literature on demand-systems is not necessarily related to intra-house-

1. The definition of goods as exclusive or assignable depends on the analytical problem at hand; there in no hard and fast distinction between them. For instance, all assignable items can be considered exclusive if we consider amounts consumed by each member of a household as a different good; ultimately all units of any item are consumed only by individuals.

hold issues, the focus on exclusive goods incorporates the intra-household dimension.

The analysis in this chapter marries some of the developments in the analysis of demand-systems with the "outlay-equivalence method" as developed by Deaton (1988) and Deaton et al. (1989). The "outlay-equivalence method" can be used, for example to examine the existence of discrimination between boys and girls in the allocation of household expenditures. Demand-equations for adult goods can also be estimated for that purpose, since the amount by which households decrease their expenditure on them given an additional boy or girl will give us an idea of the resources parents forego from their own consumption due to the additional child – an "income" effect. These magnitudes can be represented by "outlay-equivalence ratios". If decreases in expenditure on adult goods are systematically higher for boys than for girls, this gives an indication of gender discrimination in favour of boys. For this chapter, the "outlay-equivalence ratios" were derived from an estimated demand-system, thus anchoring the "outlay-equivalence method" in the analysis of demand-systems.[1]

By examining how changes in prices, income, and the demographic composition of households affect expenditures on exclusive goods, this chapter attempts to elucidate some relationships not illuminated by standard poverty analysis. With variations in prices, income, and composition, households adjust expenditures in a way that may affect individual members differently. Parameters from an estimated demand-system using information from expenditures on exclusive goods will shed light on these intra-household adjustments.

The next section goes further into the theoretical background for the study by outlining the QUAIDS and the "outlay-equivalence method". Section 7.3 then summarises the main empirical results, while section 7.4 draws conclusions.

7.2 Demand-Systems and Demographic Effects: Theoretical Framework

This section briefly presents the main theoretical approaches used in the empirical analysis. As mentioned in the introduction, the analytical framework used in this chapter combines recent developments in the analysis of demand-systems with the "outlay-equivalence method". Hence, first the theoretical and empirical reasons for using the Quadratic Almost Ideal Demand System (QUAIDS) will be discussed. Then, the main ideas from the "outlay-equivalence method" will be presented.

Most of the pioneering work in demand-analysis depended on the estimation of single demand-equations. At least two limitations in the use of single demand equations can be pointed out. First, interdependence between demands for different commodities is ignored. For instance, the budget-constraint imposes re-

1. Other studies using the "outlay-equivalence method" have not incorporated it into an overall demand-system.

strictions on the change in total demand, and these are not consistently dealt with. Second, cross-equation restrictions from utility-theory cannot be tested with demand-equations estimated separately. Examples include the adding-up property and Slutsky-symmetry. Due to the recognition of these limitations, many demand-systems consistent with utility-theory have been developed. One of the most popular and extensively used demand-systems in empirical studies is the Almost Ideal Demand System (AIDS) developed by Deaton and Muellbauer (1980a, 1980b).

The AIDS can be derived as a second-order approximation to any arbitrary utility-function. It satisfies the axioms of utility-theory and can be aggregated over consumers without imposing parallel Engel curves as in the case of the Linear Expenditure System. All these characteristics make the AIDS quite general and consistent with underlying utility-theory.

The demand-equations for AIDS in budget-form are

$$W_j = \alpha_i + \Sigma_k \gamma_{jk} \ln p_k + \beta_j \ln (X/P) \qquad (1)$$

W_j is the budget-share of item j, p_k is the price of item k, X is total expenditures and P is a price-index. The other Greek letters, α_j, γ_{jk}, and β_j are parameters to be estimated. More complicated forms of the price index can be used, but for simplicity Deaton and Muellbauer (1980a) suggested using the Stone price index, the logarithm of which is given by the $\Sigma_k W_k \ln p_k$, where W_k is the budget-share as above. With the substitution of Stone price index for P in equation (1), the budget-share of commodities becomes a *linear* function of the logarithm of real expenditures. In other words, the demand for a particular commodity is affected by all prices of goods consumed by households and real income.

Utility-theory imposes the following within- and cross-equation restrictions: $\Sigma_j \alpha_j = 1$; $\Sigma_j \gamma_{jk} = 0$; $\Sigma_k \beta_j = 0$; $\Sigma_k \gamma_{jk} = 0$; $\gamma_{jk} = \gamma_{kj}$. The first restriction indicates that the demand for all commodities adds up to total expenditure; or in budget-share terms, the sum of the budget shares must be equal to one. The second, third, and fourth restrictions indicate homogeneity of degree zero in prices and total expenditure; in other words, if all prices and total expenditure increase by one percent, the changes in the budget-shares will exactly offset each other. The final restriction is due to Slutsky-symmetry implying that the compensated cross-price effects must be equal.

Empirical work has persistently showed the importance of non-linear relationships in the demand-curves of at least some commodities. For example, Banks et al. (1997) found that the Engel-curves for clothes and alcohol in the U.K. are non-linear in the logarithm of expenditures. As noted, AIDS is linear in the logarithm of expenditures, but these empirical findings suggest the need for a demand-system that incorporates non-linearity. The Quadratic Almost Ideal Demand System (QUAIDS) developed by Banks et al. (1997) gave firm theoretical ground for this empirically driven requirement for non-linear demand-curves.

The empirical evidence suggests using the general Engel-equation

$$W_i = A_i(p) + B_i(p) \ln x + C_i(p)\, g(x) \quad (2)$$

where, p is a vector of prices; x is real expenditure; and $A_i(p)$, $B_i(p)$, $C_i(p)$ and g(x) are differentiable functions of prices and real expenditure. The last term in equation (2) g(x) allows for non-linearity in the demand-curves.

Gorman (1981) proved that the maximum rank of an exactly-aggregable demand-system is three. In other words, if additional terms are included in equation (2) they will be linearly dependent on the terms that are already included, $A_i(p)$, $B_i(p)$ and $C_i(p)$. This means that there is nothing to be gained by adding additional terms, because the additional columns in the matrix of coefficients would be linearly dependent on the others.

Dropping the g(x) term would ignore the non-linearity in Engel curves observed empirically. But when including it, it must take a form that will make the demand-equation consistent with utility-theory. Banks et al. (1997) showed that all rank-3 exactly-aggregable utility-derived demand-systems in the form of (2) have g(x) equal to $(\ln x)^2$.

The QUAIDS in budget-share form is

$$W_j = \alpha_j + \Sigma_k \gamma_{jk} \ln p_k + \beta_j \ln [X/a(p)] + [\lambda_j/b(p)]\{\ln [X/a(p)]\}^2 \quad (3)$$

where X and p_k are nominal expenditures and prices as in the previous cases, a(p) is a price index and b(p) stands for a Cobb-Douglas price aggregator

$$b(p) = \Pi_i p_i^{\beta j} \quad (4)$$

The QUAIDS gives a theoretical justification for the empirically-supported flexibility of non-linear Engel curves while retaining integrability (Jones and Mazzi, 1996). In addition, it has the same degree of price-flexibility as the AIDS; it is as close to linearity as theoretical considerations allow; it nests the AIDS within it; and it introduces only a few additional parameters (Banks et al. 1997).

The budget- and price-elasticities computed from the parameters of the demand-system show the adjustments in demand due to changes in income and prices. Since the classification of household expenditure focuses on exclusive goods, the elasticities directly relate to goods consumed by particular age/sex groups inside the household. In other words, the elasticities indicate the changes in intra-household distribution of expenditure when incomes and prices change.

The basic demand-system summarises the relationship between total expenditures and prices. In order to examine the impact of changes in demographic composition on the structure of household demand, the QUAIDS is augmented additively with variables for the number of men and women (over 16) and the number of boys and girls in the household.

The "outlay-equivalence method" examines the effects of demographic changes on demand. Its theoretical foundations are in the long-established literature on equivalence-scales and child-costs. When children are born, unless they

have a trust-fund for their expenses, the family budget must adjust to accommodate them. Given this, cutbacks on some expenditures are inevitable. The amount of expenditure needed to take the family back to its original level of welfare indicates the cost of the child.

Deaton (1988) and Deaton et al. (1989) used this method to examine intra-household distributions, particularly focussing on adult-goods. Starting from the Engel-curve

$$p_i q_i = f(X, D, O, u) \quad (5)$$

relating expenditure on a particular commodity, $p_i q_i$, to total household expenditure, X, demographic characteristics, D, other variables, O, and unobservable taste variations, u; suppose the demographic characteristics can be divided into those associated with adults, D_a, and children, D_c. Consider the demand for adult goods: adults influence the demand for those goods directly, while children are expected to have only an income-effect unless there is a direct effect of the child on the demand of adults for adult-goods.[1] An additional adult will consume those commodities – there will be a substitution towards them – but since now more people are being supported by the same level of total household expenditure, they also become poorer and must also consume less – an income effect as well. Using the demographic characteristics of children and adults, the demand function for adult-goods, ignoring Z and u, can be written as

$$p_i q_i = f\,[\phi(X, D_a, D_c), D_a] \quad (6)$$

where ϕ can be understood as representing the real income available to the household. Characteristics related to children affect demand for adult-goods only through the ϕ-function. Equation (6) summarises the condition Deaton et al. (1989) termed "demographic separability"; when item i (in this case an adult item) is demographically separable from demographic group c (here, children).

Suppose n_r represents the number of people in demographic group r. The change in demand for item i due to a change in n_r is represented by $\partial(p_i q_i)/\partial n_r$ and the marginal propensity to spend on item i is equal to $\partial(p_i q_i)/\partial X$. The ratio between the two indicates the change in demand due to the change in n_r expressed in terms of the marginal propensity to spend. This can be divide by the total outlay per capita, X/n, to get the "outlay-equivalence ratio" for item i and group r,

$$\pi_{ir} = \{[\partial(p_i q_i)/\partial n_r]/[\,\partial(p_i q_i)/\partial X]\}^* n/X \quad (7)$$

The ratios between the two marginal changes are proportional to each other if group r is demographically separable from commodity i. A change in the demo-

1. For example, parents may decrease the number of cigarettes they smoke when a child is born not only because of the income-effect but also because it affects the health of the child. To examine the importance of these direct effects, tests for separability using fixed-effects estimators are used. It turns out that controlling for the direct effects does not change the results.

graphic group has only an income-effect, proportional to the marginal propensity to spend which also is an income-effect. This ratio must be the same for all goods separable from the demographic group. Formally,

$$\partial(p_i q_i)/\partial n_r = \theta_r^* [\partial(p_i q_i)/\partial X] \quad (8)$$

where the factor of proportionality θ_r measures the magnitude of the income-effect which is independent of the item i. For instance, with adult-goods, if θ_r is higher in absolute terms for boys than for girls, this is an indication that budget-adjustments are made in favour of boys.

To summarise, while budget- and price-elasticities (own as well as cross-price) of exclusive goods reflect adjustment of intra-household distribution of expenditures due to changes in incomes and prices, "outlay-equivalence ratios" for adult-goods give information on expenditure-adjustments to changes in demographic composition, which adds another dimension to standard poverty analysis. The welfare of individuals in poor households may differently be affected by changes in incomes, prices, and demographic composition. The members who absorb most of the adverse effects from these changes are the most vulnerable. Even some members of non-poor households may be very vulnerable to negative income, price and demographic changes.

7.3 Estimation and Main Results

Households' total expenditures are classified into nine categories, mainly exclusive goods either consumed by only adults or by only male or female members. Five groups of adult-goods were:

1. alcohol, cigarettes/tobacco, and *chat*[1] (referred to as "alcohol")
2. coffee, soft drinks, and *karibo*[2] ("coffee")
3. transport, and eating out ("transport")
4. men's clothes; and
5. women's clothes.

Adults of both sexes use the first three. Two additional exclusive goods used by children – boys' and girls' clothes – are considered. Remaining expenditures were classified as "food" and "other non-food". The QUAIDS in budget-share form was estimated simultaneously for these nine categories, using three-stage-least squares. Due to linear dependence between the demand-equations, the one for non-food expenditures is dropped. Random- and fixed-effects regressions were estimated and specification-tests support the fixed-effects estimation; all the results reported in this chapter are from the fixed-effects estimates. Table 7.1 presents the budget and own-price elasticity estimates.

1. *Chat* is the leaf of a mildly intoxicating plant consumed in some parts of Ethiopia.
2. *Karibo* is a locally brewed non-alcoholic drink.

Table 7.1: Budget and own-price elasticities for the whole sample

Commodity group	Budget- elasticity	Own-price-elasticity
Food	0.98	-1.06
Coffee	0.78	1.16
Transport	0.93	-0.52
Alcohol	1.24	-0.56
Men's clothes	1.33	-0.56
Women's clothes	1.08	-1.22
Boys' clothes	1.22	-0.99
Girls' clothes	0.73	-0.66

The estimated budget-elasticity for men's clothes was the highest of all categories and the elasticity for boys' clothes was statistically significantly higher than for women's and especially for girls' clothes. In other words, goods consumed exclusively by males were more sensitive to changes in income than those consumed by females.[1] The implication is that income-risks were more absorbed by males than females, which does not mean that the effects are always negative; it depends on whether income was increasing or decreasing. For instance, macroeconomic figures supported by household-expenditure data indicate that the economy was growing in the mid-1990s. The higher budget-elasticities for men's and boys' clothes imply that a disproportionate amount of the benefit may have been enjoyed by males.

The estimated own-price elasticities indicate a different picture. That for women's clothes was not only statistically significantly larger than that for men's, but it was also the highest of all categories. The price-elasticity for boys' clothes was higher than that for girls', however. Women were thus more exposed to price-fluctuations than men, while boys were more exposed than girls. So low prices benefit women and boys more, but they would also bear most of the brunt of inflation.

Demand is also influenced by the prices of other commodities, the sensitivity of which is captured by cross-price elasticities (Table 7.2 below). If cross-price-elasticity of two commodities is positive increases in the price of one increase the demand for the other; the goods are substitutes for each other (for example, alcohol and coffee). On the other hand, if the elasticity is negative, prices and demand change in opposite directions; the goods are complements (for example, coffee and food). Boys' and girls' clothes, except in relation to women's clothes, are consistently either substitutes or complements to all the other categories. And in all cases the elasticities are higher (in absolute terms) for girls' clothes. This is just the opposite of the pattern in relation to own-price-elasticities; compared to boys',

1. The per capita expenditures on women's and men's clothes were not statistically different from each other, nor those on boys' and girls' clothes, so, the higher budget-elasticities of males' clothes are not coupled with higher per capita expenditures.

girls' clothes are less sensitive to changes in own-price but they are more sensitive to changes in the prices of other commodities. Hence, in cases where general prices are changing these own- and cross-price effects have counteracting influences.

Table 7.2: Cross-price elasticities

	Food	Coffee	Transport	Alcohol	Men's Clothes	Women's Clothes	Boys' Clothes
Coffee	-0.45						
Transport	-0.02	-0.00					
Alcohol	-0.14	0.90	0.11				
Men's clothes	0.04	-0.30	0.11	-0.26			
Women's clothes	0.01	0.16	-0.15	0.11	-0.10		
Boys' clothes	-0.10	0.62	0.10	0.50	-0.10	0.07	
Girls' clothes	-0.19	1.16	0.16	0.98	-0.30	-0.03	1.02

To summarise, while males seemed to absorb most income-risks, women and boys were more affected by own-price changes. In addition, the cross-price effects may not necessarily operate in a similar way. Ultimately, the net effect depends on the type of income and price changes and whether they happened simultaneously. To illustrate let us consider two examples.

Suppose food prices increased by 1% as household-income decreased by 1%, which could happen in times of famine. The increase in food-price would affect expenditure on clothes through cross-price elasticity, while the income effect is captured by budget-elasticities. The combined decrease in income and increase in food-price would decrease expenditure on men's clothes by 1.29%;[1] women's by 1.07%; boys' by 1.32%; and girls' by 0.92%. Expenditures on boys' and men's clothes would thus be affected more than women's and girls'.

Suppose instead that the prices of all commodities increased by 1% while the income decreased by 1%, a general inflationary situation with falling incomes. Here effects through budget-, own-price, and cross-price elasticities matter. Expenditures on men's clothes would decrease by 2.82%; women's by 2.24%; and boys' by 0.11%; while girls' clothes increased by 1.11%. Here, children – particularly girls – seem to be protected from the income- and price-shocks.

"Outlay-equivalent ratios" (Table 7.3, below) show the response of household demand to changes in demographic composition. All ratios are negative as expected except for coffee and one for alcohol. A consistent pattern indicating sex discrimination does not appear, but households seemed to adjust expenditures on adult-goods in a commodity-specific way: girls seemed to affect expenditures on men's clothes more, while boys affected women's clothes more. To get an idea of the total decrease in expenditure on adult-goods due to an additional girl or boy,

1. A percentage decrease in income decreases the demand for men's clothes by 1.33% (budget elasticity). A percentage rise in food-price increases the same demand by 0.04% (cross-price elasticity). Hence, the net effect is a decrease by 1.29% (-1.33+0.04).

the ratios can be added. The total for boys (-1.81) is statistically significantly higher than that for girls (-0.63); households thus seemed to be adjusting their expenditures more in favour of boys as compared to girls.

Table 7.3: Outlay-equivalence ratios

Commodity group	Girls	Boys
Coffee	0.19	0.11
Transport	-0.39	-0.35
Alcohol	0.55	-0.34
Men's clothes	-0.87	-0.42
Women's clothes	-0.11	-0.81
Total	-0.63	-1.81

7.4 Conclusions

The results thus indicate that households responded to different types of changes in a more complicated manner than usually assumed. Different types of shocks seemed to be absorbed by different household members. Males were more affected by income-changes, women and boys more by price changes. The "outlay-equivalence ratios" for individual adult-goods did not reveal any systematic sex discrimination between boys and girls, but the sums of the ratios for all adult goods indicate that households probably adjust their overall expenditure in favour of boys.

The fact that price- and income-changes affected different members suggests that the households were probably pooling risks, but this does not mean that risks were completely pooled so that every individual would face the same risk. The effects differed depending on the type, combination and magnitude of changes.

Understanding why the households behaved as described in this chapter would require detailed information on the management of household activities. The division of labour inside the household may be a contributing factor.

The result that budget-elasticities for goods consumed by men and boys were higher than those for women and girls may have an important bearing on the effect of economic growth on poverty-alleviation; the concern is reinforced by the higher total "outlay-equivalence ratios" for boys. The current economic policy of the Ethiopian government emphasises poverty-alleviation through economic growth, which requires more income-growth for poor households. If more of the benefits from growth go to males than females, then gender inequality may worsen.

References

Banks, J et al. (1997), "Quadratic Engel Curves and Consumer Demand", *Review of Economics and Statistics* 79(4):527–39.

Deaton, A. (1988), "The Allocation of Goods within the Household: Adults, Children and Gender", LSMS Working Paper No. 39, Population and Human Resource Department, World Bank, Washington DC.

Deaton, A. (1997), *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*- World Bank, John Hopkins University Press, Baltimore and London.

Deaton, A. and J. Muellbauer (1980a), *Economics and Consumer Behaviour*. Cambridge University Press, Cambridge.

Deaton, A. and J. Muellbauer (1980b), "An Almost Ideal Demand System", *American Economic Review* 70(3):312–26.

Deaton, A. et al. (1989), "The Influence of Household Composition on Household Consumption Patterns: Theory and Spanish Evidence", *Journal of Political Economy* 97(1):179–200.

Gorman, W.M. (1981), "Some Engel Curves", in Deaton A. (ed.), *The Theory and Measurement of Consumer Behaviour*. Cambridge University Press, Cambridge.

Jones, A. and M.G. Mazzi (1996), "Tobacco Consumption and Taxation in Italy: An Application of QUAIDS Model", *Applied Economics* 28(5):595–603.

Rothbarth, E. (1943), "Note on a Method of Determining Equivalent Income for Families of Different Composition", Appendix 4 of Madge C. (ed.), *Wartime Patterns of Saving and Spending*. Occasional Paper No. 4, National Institute of Economic and Social Research, London.

8. Dynamics of Income Distribution in Urban Ethiopia 1994–1997

Arne Bigsten, Karin Kronlid and Negatu Makonnen

8.1 Introduction

We noted in Chapter 4 that there is unusually widespread poverty even in urban areas in Ethiopia. It is therefore essential to understand the process of urban income determination. The aim of this chapter is to look at the urban economy from the income side rather than the consumption side. This chapter analyses the pattern of income change in urban Ethiopia during the period 1994–1997, which was a period of economic adjustment and recovery. Per capita national income grew by almost 14% between the first and the last survey,[1] and it is likely that the urban growth rate was at least as high. We present estimates of incomes for the total urban sample as well as for the different urban centres covered. We particularly focus on differences in growth rate of income between different categories, and also on investigating the extent of income mobility over the three years. The extent to which there is mobility out of the bottom income category, that is, the poorest 20% of the population, is particularly important. Generally, transitory poverty is a less severe problem than permanent. We look at the changes in the levels of incomes, the sources and structure of incomes, and at income inequality. The data used are the household panel data from urban Ethiopia collected in 1994, 1995, and 1997, when 1,500 households were interviewed.[2]

The analysis in this chapter complements that in previous chapters. First, using income rather than consumption, we can compare with results based on expenditure estimates. Second, since we have collected information on the structure of income from all sources, we can analyze changes in the structure of income of different groups, which makes it easier to link the discussion of changes in welfare to changes in economic policy and development.

The next section provides some background information about the Ethiopian economy, while Section 8.3 describes the survey and the income definitions used.

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1. The first survey was conducted in November 1994 and the last one in February 1997. To get a rough estimate of the growth between these two dates we took 2/3 of the recorded GDP growth in 1994/95, all of that in 1995/96, and 2/3 of that in 1996/97 (see Table 1 for data), yielding an estimated GDP growth of 19.5%. If we deduct population growth for two and a quarter years at an annual rate of 2.1% we get an estimated per capita income increase of 14.5% between November 1994 and February 1997.

2. Bigsten and Makonnen (1999) analysed data for the first cross-section of urban households (from 1994).

In Section 8.4 we will look at changes over the three surveys in monthly household income, while Section 8.5 focuses on income mobility. Section 8.6 analyzes changes in the structure of income, while Section 8.7 presents estimates of inequality indexes. Section 8.8 summarizes and draws conclusions.

8.2 Economic and Political Background

Ethiopia had a socialist military dictatorship under Mengistu Haile Mariam, which came to an end in 1991, after a long-lasting civil war. When resources were shifted to the army under Mengistu, the rule of law deteriorated, the cost of enforcing contracts increased, and the security of property rights was eroded. Civil liberties were suppressed, which reduced the effectiveness of public expenditures. Since the civil war the new government has tried to create an environment for economic recovery. One of the major endeavours of the post-Mengistu government has been to create political stability, democracy and respect for property rights. There still remains a lot to be done before one could consider the country fully democratic.

The new government has also undertaken extensive reforms of the economy. Stabilisation and adjustment policies in the standard structural adjustment mould were initiated, aiming to create a market economy with an increasing role for private enterprise. The macroeconomic stance improved over the period of study, and as noted in Chapter 2 the economy recovered under the new regime. To some extent this was a peace dividend, but economic reforms certainly also contributed.

8.3 The Household Survey Data, and Income Definitions

8.3.1 Data

The data used in this study came from three waves of the Ethiopia Urban Socio-economic Survey,[1] conducted in 1994, 1995, and 1997; 1500 households from seven major urban areas were covered. From all towns with a population over 100000, these areas were selected to be representative in terms of population and cultural diversity, major economic activity of the towns and their catchment areas, and administrative importance. The number of households drawn from each was proportional to the area population to make up a sample of 1,500 households. Addis Ababa (900 households) is the capital and Ethiopia's largest city with a wide array of socio-economic groups. Awassa (73) and Jimma (100) are situated in the main coffee-producing areas; Awassa also represents the enset-culture and the different socio-economic groups in the southern part of Ethiopia. Dire Dawa (126) is a trade centre in the eastern chat- and coffee-producing part of the country. Dessie (101) and Mekele (100) represent poorer cereal-producing areas that

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

are often hit by droughts and famine. Finally, Bahir Dar (100) is located in the richer cereal-producing areas in the north.

Within the towns, the sample was distributed over all *woredas* (districts) in proportion to the woreda population. Half of the *kebelles* (urban dwellers' associations, the lowest administrative units) in each woreda were selected randomly, and among those the sample was distributed in proportion to population.

For analyzing welfare and poverty issues a problem with the data is that the poorest of the poor – the homeless – were excluded. To be included in the survey, households had to have a permanent residence in 1994, and to remain in the sample it had to be possible to trace them in the following years. This was obviously not the case for the homeless. Recent immigrants from rural areas might also have been excluded.

8.3.2 Attrition

In constructing a panel to cover the three survey years, attrition was a problem. Some households had to be dropped since they moved and could not be traced, and some refused to participate again after having been interviewed in one or two rounds. Observations were also lost because of non-response to one or more questions concerning income or household characteristics. Finally, there were matching problems due to data-entering errors.[1]

To increase comparability over time, the analysis here is confined to the 1345 households interviewed in all three years of the sample, and specifically the 1137 households which had usable income information.

Appendix 8A compares variables for the households that dropped out in rounds two and three with those for the remaining households, which constituted the panel. The 95 households that dropped out in round 2 had a higher average income than those who remained (their mean monthly per adult-equivalent income was 68% higher, while the difference in median was 21%), as did the 61 dropouts in round 3 (30% higher mean, 33% higher median). Households in Addis Ababa dropped out disproportionately in the second round, and the second-round dropouts were on average better educated and had fewer household members than the remaining households.

Since the remaining panel thus had lower incomes than the full sample, and since the incomes seemed to rise somewhat more for higher income categories, our panel may under-estimate income-changes.

8.3.3 Household Composition and the Adult-Equivalent Scale

Table 8.1 below compares household composition over the three rounds of interviews. There was a substantial drop in the average number of children between

1. Each household is assigned a household-number, consisting of four numbers, based on its location and each individual in the household gets an additional individual identification number. For the correct information to be associated with the correct individual, all these five numbers have to be correct in the data files; if not, there are matching problems.

the first two rounds and the third round, which is hard to understand. The drop between 1995 and 1997 is partly matched by an increase in the number of adults (children aged 13 and 14 in 1995 were adults in 1997). But one would still expect approximately the same number of children since the survey asks for any births in the household since the last survey round.

A possible reason for the drop, to some extent in 1995, but mainly in 1997, is matching problems for new births reported. Another reason in 1997 is the longer gap since the previous survey, which can lead to recall problems (see for instance Duncan, 1992 and Kalton et al., 1989). When asked if any new births had occurred since the previous survey, the respondent might mistake a baby's birth as having been before the previous survey and not report it as new. It remains to be verified whether the number of children in urban Ethiopian households is really decreasing. Studies in Côte d'Ivoire (Coulombe and Demery, 1993) show that household size in repeated cross-sectional data appeared to be decreasing faster than it was in reality, although it was in fact also decreasing.[1]

Table 8.1: Household size and composition, n=1137

Variable	Year	Mean	Median	Std Dev	Min	Max
Children (younger than 15)	1994	2.02	2	1.72	0	8
	1995	1.89	2	1.64	0	8
	1997	1.57	1	1.48	0	7
Elderly (55 or older)	1994	0.47	0	0.65	0	3
	1995	0.22	0	0.46	0	2
	1997	0.21	0	0.47	0	4
Adults	1994	4.15	4	2.08	1	13
	1995	4.12	4	2.09	1	13
	1997	4.25	4	2.13	1	14
Total household size	1994	6.17	6	2.71	1	19
	1995	6.01	6	2.69	1	15
	1997	5.82	6	2.66	1	14

1. In 1995, there were 77 births, with the child still alive, reported by the panel households, while only 66 were reported in 1997 survey. How would per adult equivalent income be affected by a possible under-recording of births? If we, for example, assume that some new-born children were also missing from the data for 1995 and that the average numbers of children in the households were the same in 1995 and 1997 as in 1994, we would have missed 148 surviving newborns ((2.02-1.89)*1137) between 1994 and 1995, or 0.13 per household. The adult-equivalent weight of a newborn is 0.328, so the average household size as measured by adult equivalents would increase by 0.043 in 1995 with a correction. For 1997 the impact of the same children on average adult-equivalent household size would increase to 0.072 (using the weight of two-year-olds of 0.54), and to this we have to add the impact on household size of the assumed non-reported new-borns for that year, which is 0.105. Assuming that the drop in number of children over the years is due to underreporting of new-born children, we underestimate the average size of the households as measured by adult-equivalents by 0.043 in 1995 and 0.177 in 1997. This leads to an overestimation of mean per adult-equivalent income by one Birr per month (0.85%) for 1995 and by 5.5 Birr per month (3.75%) for 1997.

We will present income both per household and, the generally preferred alternative, per adult-equivalent. To adjust household income to adult equivalents means that the same weight is not placed on the needs of each household member. The adult-equivalent scale here, shown in Table 8.2 below, is a nutrition-based scale developed for East Africa by the WHO.[1] An implication of using this scale is that a household consisting of a single female, or of a single male older than 60, will have a larger per adult-equivalent income than total household income because the weight associated with the individual is lower than one.

Table 8.2: Adult equivalence scale

Age in years	Weight	
	Male	Female
<1	0.328	
1	0.46	
2	0.54	
3–4	0.62	
5–6	0.74	0.70
7–9	0.84	0.72
10–11	0.88	0.78
12–13	0.96	0.84
14–15	1.06	0.86
16–17	1.14	0.86
18–29	1.04	0.80
30–59	1.00	0.82
60–	0.84	0.74

Source: Taddesse, 1998.

8.3.4 The Income Variable

For each individual income was computed separately for each source, namely wages, business, female household business, remittances,[2] children's work, and farm and livestock (the latter only measured separately in 1994). When there were two sources of the same type of income (e.g. primary and secondary wage-employment), the incomes were added together. Individual income of each type was then converted into monthly income.

When the data was insufficient to create the individual monthly income variable (e.g., if the period during which income was received was missing, or if business revenues but not costs were given), then we imputed monthly income using a method proposed by Buck (in Little and Rubin, 1987). Basically, we ran a separate regression for each of the income types (with log of income as dependent variable) and then used the coefficients to estimate incomes where missing. If the

1. One can test different equivalence scales to see if they result in very different adult weighted household-sizes and whether this has any substantial impact on the analysis pursued (for example, on the poverty of different groups), but this has not been done in the present study (for a discussion using data from industrialized countries, see Buhmann et al., 1997).

2. Remittances include domestic and foreign remittances, food aid, rent, dowry, and gifts.

income variable is normally distributed as assumed, then the data imputed will have a reasonably correct mean, although variances and covariances will be underestimated (Little and Rubin, 1987).

For each year of the survey, total income from all sources for each individual was added up to give total monthly household income each year. A panel of 1143 households had income in all three years, but four with a monthly income above 14,000 Birr in any year were deleted, leaving 1139.[1] Of the individuals in the 1139 households, 3084 reported wage income in one or more years (see Appendix 8B.2); 970 reported business income (8B.3); 682 reported female household business income (8B.4); 142 reported children's income (8B.5); 47 households reported farm and livestock income (8B.6); 1945 reported individuals received remittances (8B.7). For most observations, this total income is made up of primary income only, and for some it consists of primary and secondary income.

8.4 Changes in the Distribution of Monthly Household Incomes

Table 8.3 shows how average household income and per-adult equivalent income have changed. Since there may be a few extreme cases in the sample, we also report median incomes. Mean household income increased by over 4% from 1994 to 1997, while per adult-equivalent income increased by over 15%. However, median per adult-equivalent income did not change, and median household income fell, which suggests that the increase in incomes was concentrated to the higher ranges of the distribution as shown in Table 8.4 for household income over the three years. Only the highest income quintile's income grew (10%) over the three years, while the lowest quintile fell by 7.7%. The aggregated income of the poorest quintile was just 3% of the aggregated income of the richest in 1994, but had fallen almost to 2.5% by 1997.

1. These four households reported such a high income only in one of the years, while incomes during the other two years were more normal. We therefore assumed that the high reported incomes were due to measurement errors and dropped these four households. One could also consider deleting households which reported very low incomes in any one year. For example, if households with an income below 10 Birr in at least one year had been dropped, the panel-size would have been reduced to 1085 households. However, we decided to accept that households could have very low incomes in one year, as long as income in the other years was more normal.

Table 8.3: Household and per adult equivalent real income, n=1137

Variable	Year	Mean	Median	Std dev	Min	Max
Total household income	1994	653	364	951	1	9073
	1995	552	305	798	2	8140
	1997	681	356	1079	0	9941
Per adult equivalent income	1994	130	76	178	0	1970
	1995	113	62	155	0	1747
	1997	150	76	307	0	6903

Note: CPI-adjusted using CPU for Addis Ababa with 1994 as the base year.[1]

Table 8.4: Total real household income in each quintile

	Household income		
Quintile	1994	1995	1997
1	14219	12859	13124
2	45288	37606	43013
3	83422	72673	82840
4	150176	122541	145097
5	449336	382088	494718
Total	742441	627767	778792

Table 8.5 shows the distribution of total monthly household income by income brackets in the various towns.[20] Nationwide (all towns) there have been no dramatic changes over the three years. Addis Ababa, which of course provided 58% of the observations, looks very similar to the whole urban sector (all towns) for the entire period. So the capital was generally not better off than other urban areas, contrary to what one might have expected.

Awassa was generally better off, and Dire Dawa had been in 1994, but had deteriorated by 1997, when it had many more households in the three bottom income brackets (up to 199 Birr per month), and many fewer in the four top brackets (450+). This deterioration after the economic liberalisation is probably explained by the reduced importance of contraband-trade, for which the city was earlier a centre. Income mobility will be discussed further in the next section.

Increased household income does not necessarily mean improved household welfare, because the extra money could be earned by new household members moving in. Therefore it is important to study size and composition corrected income figures as well. Table 8.6 shows the distribution of real per adult-equivalent monthly income by income brackets. Nationwide the highest income groups

1. This procedure for deflating income was followed throughout this chapter. Price-indexes – 1994, 167.1; 1995, 183.9; 1997, 168.1 (source: International Monetary Fund, 1998).

2. No adjustment for different price levels in the towns has been made so far. Using regional price indexes to deflate income can cause changes in the comparison of income-distribution over income-brackets between the cities.

(Birr 200+) increased from 18% in 1994 to 21% in 1997, with a corresponding decrease in the middle-income group (Birr 100–199); the share below 100 Birr remained unchanged (60%). Again the deterioration in Dire Dawa stands out: households with less than 100 Birr increased from 35% to 54%, while those with middle income (100–199 Birr) fell by 13 percentage points, and the highest by 5 points. The high-income group increased in Addis Ababa, Awassa, Bahir Dar, Dessie, Jimma, and Mekele: the low-income group shrank in Addis Ababa, Bahir Dar, Dessie, and Jimma. Section 8.7 includes Gini-coefficients for the towns and other categories.

Table 8.7 shows mean and median total monthly household incomes by town and year. Addis Ababa started (1994) just above the national (all towns) average, but ended in 1997 with a mean income just below it. Jimma and especially Awassa started out above the national average and rose even further. Bahir Dar rose far above it, almost to Jimma's level. And Dire Dawa as we have seen earlier, fell on hard times, with mean income down 36%, from the highest in 1994 to below average in 1997, although its median remained above the average.

Table 8.8 shows mean and median of per adult-equivalent monthly income by town and year. Addis Ababa was just below the national levels to start with (1994) and fell further back. Awassa was above the national mean and median, while Jimma started just below and ended just above. Bahir Dar again started well below the national mean (again only Dessie was lower, though Bahir Dar's median was higher than the national level), and Bahir Dar ended well above the national levels. Dessie's mean even ended far above the national level, though its median did not, while conversely Mekele's median improved to above the national level, although its mean did not. And finally, despite falling severely, both Dire Dawa's mean and median remained above the national levels.

Table 8.5: Number and percent of households in different income groups, using real total household income

	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997
Income	All towns			Addis Ababa			Awassa			Bahir Dar			Dessie			Dire Dawa			Jimma			Mekele		
-50	95	96	101	58	56	65	1	2	3	12	7	10	11	7	8	0	6	6	4	5	2	9	13	7
	8%	8%	9%	9%	9%	10%	2%	4%	5%	15%	9%	13%	14%	9%	10%	0%	5%	5%	5%	6%	2%	13%	20%	11%
50–99	84	120	99	47	72	56	2	5	4	7	5	2	11	11	13	2	13	8	7	7	7	8	7	9
	7%	11%	9%	7%	11%	9%	4%	9%	7%	9%	6%	3%	14%	14%	17%	2%	12%	7%	8%	8%	8%	12%	11%	13%
100–199	158	199	165	101	110	96	9	6	4	7	11	11	10	18	11	7	25	18	13	16	16	11	13	9
	14%	18%	15%	15%	17%	15%	16%	10%	7%	9%	14%	14%	13%	23%	14%	6%	23%	16%	16%	19%	19%	16%	20%	13%
200–299	148	150	133	84	90	80	10	8	3	8	11	8	9	10	10	17	13	14	11	8	12	9	10	6
	13%	13%	12%	13%	14%	12%	17%	14%	5%	10%	14%	10%	12%	13%	13%	15%	12%	13%	13%	10%	14%	13%	15%	9%
300–449	165	163	165	97	86	90	7	11	10	12	14	11	13	10	12	18	18	21	11	17	11	7	7	10
	15%	14%	15%	15%	13%	14%	12%	19%	17%	15%	18%	14%	17%	13%	15%	16%	16%	19%	13%	20%	13%	11%	11%	15%
450–599	115	111	118	65	66	64	8	3	10	5	8	8	6	9	9	19	12	14	10	8	7	2	5	6
	10%	10%	10%	10%	10%	10%	14%	5%	17%	6%	10%	10%	8%	12%	12%	17%	11%	13%	12%	10%	8%	3%	8%	9%
600–799	106	84	108	57	52	62	4	8	7	9	7	9	8	1	3	15	10	11	7	4	9	6	2	7
	9%	7%	10%	9%	8%	9%	7%	14%	12%	11%	9%	11%	10%	1%	4%	14%	9%	10%	8%	5%	11%	9%	3%	11%
800–1499	161	135	124	81	78	71	9	10	7	17	11	12	7	8	4	21	12	13	14	10	9	12	6	8
	14%	12%	11%	12%	12%	11%	16%	17%	12%	21%	14%	15%	9%	10%	5%	19%	11%	12%	17%	12%	11%	18%	9%	12%
1500–	105	79	124	69	49	75	8	5	10	3	6	9	3	4	8	12	2	6	7	9	11	3	4	5
	9%	7%	11%	11%	7%	11%	14%	9%	17%	4%	8%	11%	4%	5%	10%	11%	2%	5%	8%	11%	13%	5%	6%	8%
n	1137			659			58			80			78			111			84			67		

Table 8.6: Number and percent of households in different income groups, using real per adult equivalent income

Income	All towns			Addis Ababa			Awassa			Bahir Dar			Dessies			Dire Dawa			Jimma			Mekele		
	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997
-24	203	221	187	129	140	129	7	7	8	19	13	12	16	17	15	0	15	7	13	10	3	19	19	13
	18%	19%	16%	20%	21%	20%	12%	12%	14%	24%	16%	15%	21%	22%	19%	0%	14%	6%	15%	12%	4%	28%	28%	19%
25-49	209	237	212	136	145	129	13	14	6	10	10	10	20	13	16	6	25	18	15	18	22	9	12	11
	18%	21%	19%	21%	22%	20%	22%	24%	10%	13%	13%	13%	26%	17%	21%	5%	23%	16%	18%	21%	26%	13%	18%	16%
50-99	273	293	280	159	159	151	12	12	15	18	23	19	17	24	18	33	28	36	23	27	27	11	20	14
	24%	26%	25%	24%	24%	23%	21%	21%	26%	23%	29%	24%	22%	31%	23%	30%	25%	32%	27%	32%	32%	16%	30%	21%
100-149	152	139	136	74	78	74	3	7	7	15	14	12	14	11	11	22	16	14	13	9	8	11	4	10
	135	12%	12%	11%	12%	11%	5%	12%	12%	19%	18%	15%	18%	14%	14%	20%	14%	13%	15%	11%	10%	16%	6%	15%
150-199	94	79	84	46	41	45	10	6	2	5	7	10	3	5	3	17	9	10	5	5	7	8	6	7
	8%	7%	7%	7%	6%	7%	17%	10%	3%	6%	9%	13%	4%	6%	4%	15%	8%	9%	6%	6%	8%	12%	9%	10%
200-249	60	55	63	32	35	35	6	6	6	4	3	3	4	0	4	8	5	7	5	4	4	1	2	4
	5%	5%	6%	5%	5%	5%	10%	10%	10%	5%	4%	4%	5%	0%	5%	7%	5%	6%	6%	5%	5%	1%	3%	6
250-299	42	28	57	22	14	34	1	1	4	2	2	4	1	3	2	8	4	5	5	2	4	3	2	4
	4%	2%	5%	3%	2%	5%	2%	2%	7%	3%	3%	5%	1%	4%	3%	7%	4%	5%	6%	2%	5%	5%	3%	6%
300-499	61	53	73	40	31	38	5	1	8	4	6	5	0	2	6	8	7	10	2	6	4	2	0	2
	5%	5%	6%	6%	5%	6%	9%	2%	14%	5%	8%	6%	0%	3%	8%	7%	6%	9%	2%	7%	5%	5%	0%	3%
500-	43	32	45	21	16	24	1	4	2	3	2	5	3	3	3	9	2	4	3	3	5	3	2	2
	4%	3%	4%	3%	2%	4%	2%	7%	3%	4%	3%	6%	4%	4%	4%	8%.	2%	4%	4%	4%	6%	5%	3%	3%
n	1137			659			58			80			78			111			84			67		

Table 8.7: Mean and median of real total household income by town and year

Town	Year	Mean	Median	Std Dev	Min	Max
Addis Ababa n=659	94	666	350	1019	2	9073
	95	568	303	819	2	8140
	97	676	345	1057	0	9905
Awassa n=58	94	743	440	829	8	3638
	95	690	374	897	34	5358
	97	876	540	1058	5	6471
Bahir Dar n=80	94	533	402	578	1	3900
	95	657	361	1074	3	7246
	97	806	393	1431	5	9941
Dessie n=78	94	399	286	457	7	2760
	95	435	233	645	4	4008
	97	532	257	931	4	6903
Dire Dawa n=111	94	848	500	1125	50	8962
	95	414	276	452	4	3336
	97	543	368	744	4	6586
Jimma n=84	94	673	356	935	10	6857
	95	634	358	878	11	4922
	97	818	395	1387	17	9257
Mekele n=67	94	534	255	768	4	5194
	95	400	201	541	9	2935
	97	644	323	1004	7	6837
Total n=1137	94	653	364	951	1	9073
	95	552	305	798	2	8140
	97	681	356	1079	0	9941

Table 8.8: Mean and median of real per adult equivalent household income by town and year

Town	Year	Mean	Median	Std Dev	Min	Max
Addis Ababa n=659	94	125	69	188	1	1970
	95	108	59	151	0	1747
	97	134	67	230	0	3781
Awassa n=58	94	133	84	128	8	629
	95	142	64	186	4	879
	97	195	98	325	1	2263
Bahir Dar n=80	94	116	77	132	0	675
	95	133	81	171	1	1210
	97	179	89	279	2	1775
Dessie n=78	94	99	59	141	2	870
	95	112	61	165	3	976
	97	211	70	785	2	6903
Dire Dawa n=111	94	198	134	199	27	1221
	95	127	78	169	1	1380
	97	163	94	235	0	2097
Jimma n=84	94	128	74	169	3	1080
	95	121	61	143	2	812
	97	152	79	209	10	1357
Mekele n=67	94	118	59	148	2	775
	95	87	53	111	2	606
	97	133	78	187	2	1117
Total N=1137	94	130	76	178	0	1970
	95	113	62	155	0	1747
	97	150	76	307	0	6903

8.5 Income Mobility

We allocated households by quintiles in each year and cross-tabulated to see how individual households were affected by changes in income. Tables 8.9a and 8.9b show the changes from 1994 to 1997 (the periods 1994 to 1995 and 1995 to 1997 are reported in Appendix 8D).

If there were no changes in the relative position of households, all would end up on the diagonal; the more change there is, the higher the proportions off the diagonal. Poverty is particularly severe (persistent poverty) if those at the bottom (quintile 1) are always the same.

Table 8.9a: Mobility between total household income-quintiles in number and percent, 1994 to 1997

		1997					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1994	Quintile 1	118 52%	56 25%	33 14%	13 6%	9 4%	229 101%
	Quintile 2	56 25%	78 34%	58 25%	26 11%	10 4%	228 99%
	Quintile 3	29 13%	48 21%	62 27%	64 28%	23 10%	226 99%
	Quintile 4	11 5%	29 13%	48 21%	70 31%	69 30%	227 100%
	Quintile 5	13 6%	16 7%	28 12%	54 24%	116 51%	227 100%
	Total	227 101%	227 100%	229 99%	227 100%	227 100%	1137

Note: The columns and rows do not always sum to 100% due to rounding.

Table 8.9b: Mobility between per adult-equivalent income-quintiles in number and percent, 1994 to 1997

		1997					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1994	Quintile 1	104 46%	65 29%	37 16%	10 4%	11 5%	227 100%
	Quintile 2	64 28%	71 31%	53 23%	24 11%	16 7%	228 100%
	Quintile 3	27 12%	50 22%	66 29%	56 25%	28 12%	227 100%
	Quintile 4	20 9%	28 12%	44 19%	80 35%	56 25%	228 100%
	Quintile 5	12 5%	13 6%	28 12%	58 25%	116 51%	227 99%
	Total	227 100%	227 100%	228 99%	228 100%	227 100%	1137

Note: The columns and rows do not always sum to 100% due to rounding.

There was considerable income mobility from 1994 to 1997: using household income (Table 8.9a) only 52% of those in Q1 in 1994, the poorest, remained in Q1 in 1997; a few had even moved up to the top quintile.[1] At the other end of the distribution is a similar pattern; only 51% of Q5 in 1994 remained in Q5 in 1997, and a few hade even moved down to the bottom quintile. Mobility between quintiles was even higher in the middle ranges, and the same pattern holds, even more so, for per adult-equivalent income. Perhaps the urban economy had not yet stabilised from the long period of civil strife and chaos, although some mobility is of course related to the normal pattern of life cycle changes in income.

Using per adult-equivalent income, we also calculated the number of households that remained in the same quintile all three years: 62 (26.3%), which means that they had per adult-equivalent monthly income less than approximately 30

1. This high mobility between low and high-income quintiles can of course be due to data problems, but using consumption expenditure data instead of income gives approximately the same results.

Birr per adult equivalent for over three consecutive years; 83 (35.2%) in Q5 with per adult-equivalent monthly income of about 200 Birr or more.

8.6 Changes in the Sources and Structures of Incomes

Investigation of how income structures have changed over time may make it possible to relate change in the distribution of household income and related income-mobility to changes in the policy environment and in the economy at large.

Table 8.10 shows the main sources of household income by town and year.[1] Nationwide (all towns) the sources of income remained little changed from 1994 to 1997, with the exception of "remittances" – including domestic and foreign remittances, food aid, rent, dowry, and gifts – which went from the main source of income for 17% of households to 22% in 1997. As a share of household income (Table 8.11 below) they jumped correspondingly from 19% to 25%. At least partly this was explained by the relaxation of foreign exchange controls and travel restrictions, resulting in Ethiopians living abroad remitting more money to their families back home. Female household business – normally part of the survival strategy of poorer households – went from being the main source of income for 10% of households, and supplying 11% of total household income in 1994, to 12% of households and 13% of income as incomes sagged in 1995; but as incomes grew from 1995 to 1997, female household business fell back to being the main source of income for only 9% of households, supplying only 10% of income.

In Addis Ababa, wages fell both as a main source of income and as a share of income, while remittances rose in both respects. This pattern was repeated in Jimma as well, but in addition business income rose in both respects while female household business fell, yet children's income emerged as a main source of income for 2% of the households (0% before). Children's income also emerged as a main source of income in 2–3% of households in Awassa, Dessie, and Mekele, though its share of income was smaller /1–2%). In Awassa, contrary to the pattern in Addis and Jimma, wages rose in both respects while remittances fell, as did business and female household business. In Bahir Dar, Dessie, and Dire Dawa, business fell in both respects, while remittances rose. Female household business also fell in Dessie. Finally, in Mekele female household business rose spectacularly, while remittances sank precipitously.

1. Farm and livestock income is included in business income in 1995 and 1997, so this income should also therefore be added to business income in 1994 to get a more correct picture of the development.

Table 8.10: Number and percent of households by main source of income, town, and year

Source	Alltowns, n=1136			Addis Ababa, n=659			Awassa, n=58			Bahir Dar, n=80			Dessie, n=78			Dire Dawa, n=111			Jimma, n=84			Mekele, n=67		
	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997	1994	1995	1997
Wages	586	554	555	368	336	344	23	27	28	44	39	42	29	29	27	50	57	50	46	40	40	26	26	24
	52%	49%	49%	56%	51%	52%	40%	47%	48%	55%	49%	53%	37%	37%	35%	45%	51%	45%	55%	48%	48%	39%	39%	36%
Business	223	248	212	118	130	114	17	16	19	14	23	13	17	20	15	26	22	15	18	21	22	13	16	14
	20%	22%	19%	18%	20%	17%	30%	28%	33%	18%	29%	16%	22%	26%	19%	23%	20%	14%	21%	25%	26%	19%	24%	21%
Female household business	116	135	105	60	72	53	4	5	2	12	8	10	14	10	10	10	15	11	11	11	6	5	14	13
	10%	12%	9%	9%	11%	8%	7%	9%	3%	15%	10%	13%	18%	13%	13%	9%	14%	10%	13%	13%	7%	7%	21%	19%
Remittances	191	195	254	102	117	144	10	10	8	8	10	15	16	19	24	24	17	35	9	12	14	22	10	14
	17%	17%	22%	15%	18%	22%	17%	17%	14%	10%	13%	19%	21%	24%	31%	22%	15%	32%	11%	14%	17%	33%	15%	21%
Children's income	4	5	11	4	4	4	0	0	1	0	0	0	0	0	2	0	0	0	0	0	2	0	1	2
	0%	0%	1%	1%	1%	1%	0%	0%	2%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	2%	0%	1%	3%
Farm and live–stock income	17	0	0	7	0	0	4	0	0	2	0	0	2	0	0	1	0	0	0	0	0	1	0	0
	2%	0%	0%	1%	0%	0%	7%	0%	0%	3%	0%	0%	3%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%

Table 8.11: Share of household income from different sources, by town and year

		All towns, n=1137		Addis Ababa, n=659		Awassa, n=58		Bahir Dar, n=80		Dessie, n=78		Dire Dawa, n=111		Jimma, n=84		Mekele, n=67	
Source	Year	Mean	Std Dev,	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Wages	1994	0.49	0.45	0.53	0.45	0.39	0.42	0.56	0.47	0.37	0.44	0.42	0.43	0.51	0.43	0.36	0.44
	1995	0.46	0.45	0.48	0.45	0.42	0.42	0.48	0.45	0.34	0.42	0.47	0.46	0.45	0.44	0.36	0.45
	1997	0.47	0.45	0.50	0.45	0.49	0.45	0.50	0.45	0.31	0.43	0.43	0.43	0.48	0.45	0.36	0.43
Business	1994	0.18	0.36	0.17	0.35	0.28	0.42	0.15	0.34	0.20	0.38	0.21	0.38	0.20	0.38	0.18	0.37
	1995	0.22	0.37	0.20	0.36	0.33	0.42	0.27	0.38	0.25	0.38	0.19	0.36	0.24	0.39	0.24	0.41
	1997	0.18	0.35	0.17	0.34	0.29	0.42	0.16	0.33	0.20	0.37	0.13	0.30	0.23	0.39	0.18	0.35
Female household	1994	0.11	0.28	0.09	0.26	0.07	0.23	0.15	0.33	0.17	0.35	0.11	0.26	0.12	0.30	0.10	0.25
business	1995	0.13	0.29	0.12	0.29	0.08	0.22	0.10	0.27	0.15	0.31	0.14	0.31	0.12	0.27	0.23	0.39
	1997	0.10	0.26	0.09	0.25	0.05	0.18	0.13	0.30	0.13	0.29	0.12	0.29	0.08	0.21	0.16	0.30
Remittances	1994	0.19	0.34	0.18	0.34	0.19	0.31	0.11	0.26	0.23	0.37	0.26	0.36	0.14	0.28	0.34	0.42
	1995	0.19	0.34	0.19	0.35	0.16	0.31	0.15	0.28	0.26	0.35	0.19	0.33	0.18	0.34	0.16	0.34
	1997	0.25	0.37	0.24	0.37	0.15	0.30	0.21	0.35	0.34	0.39	0.32	0.38	0.20	0.35	0.28	0.34
Children's income	1994	0.01	0.06	0.01	0.08	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.02	0.01	0.04	0.00	0.01
	1995	0.01	0.06	0.01	0.07	0.01	0.04	0.00	0.00	0.00	0.01	0.00	0.03	0.01	0.06	0.01	0.07
	1997	0.01	0.08	0.01	0.07	0.01	0.08	0.00	0.00	0.02	0.09	0.00	0.00	0.01	0.08	0.02	0.13
Farm and livestock	1994	0.02	0.10	0.01	0.09	0.06	0.20	0.03	0.12	0.03	0.15	0.01	0.06	0.01	0.06	0.02	0.12
income	1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1997	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8.12 shows shares of household income from different sources, by quintile and year. In the poorest quintile, female household business and remittances dominate. As one moves up the income levels both of these generally decline in importance, as does children's income. Wages and business correspondingly increase across the income levels, although in 1995 and 1997 business was less important in Quintile 4 than in Quintile 3. Wages peak as a share in Quintile 4 and then fall back; to reach the highest levels probably requires business income, although even in Quintile 5 wages dominate (as they did in every other except Quintile 1). Farm and livestock income in 1994 (later recorded with business income) was also highest in Quintile 5.

Table 8.12: Share of household income coming from different sources by quintile and year

Source	Year	Quintile 1		Quintile 2		Quintile 3		Quintile 4		Quintile 5		Total	
		Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Wages	1994	0.18	0.37	0.52	0.46	0.64	0.42	0.65	0.41	0.49	0.43	0.49	0.45
	1995	0.14	0.33	0.45	0.45	0.54	0.44	0.63	0.42	0.53	0.42	0.46	0.45
	1997	0.17	0.36	0.48	0.45	0.52	0.43	0.66	0.42	0.52	0.43	0.47	0.45
Business	1994	0.07	0.26	0.14	0.33	0.12	0.31	0.19	0.37	0.39	0.43	0.18	0.36
	1995	0.10	0.28	0.20	0.37	0.23	0.38	0.19	0.35	0.37	0.42	0.22	0.37
	1997	0.05	0.22	0.14	0.32	0.21	0.38	0.14	0.32	0.33	0.42	0.18	0.35
Female	1994	0.27	0.41	0.13	0.29	0.07	0.21	0.04	0.17	0.02	0.10	0.11	0.28
household	1995	0.30	0.43	0.13	0.28	0.09	0.23	0.07	0.21	0.03	0.14	0.13	0.29
business	1997	0.27	0.41	0.10	0.25	0.04	0.16	0.05	0.18	0.03	0.11	0.10	0.26
Remittances	1994	0.44	0.46	0.20	0.33	0.15	0.28	0.10	0.22	0.07	0.19	0.19	0.34
	1995	0.43	0.47	0.22	0.35	0.12	0.26	0.10	0.22	0.07	0.18	0.19	0.34
	1997	0.48	0.46	0.28	0.38	0.21	0.33	0.15	0.29	0.12	0.23	0.25	0.37
Children's	1994	0.02	0.12	0.01	0.04	0.01	0.05	0.00	0.02	0.00	0.01	0.01	0.06
income	1995	0.02	0.10	0.00	0.03	0.01	0.08	0.00	0.03	0.00	0.00	0.01	0.06
	1997	0.03	0.16	0.01	0.05	0.00	0.03	0.00	0.01	0.00	0.01	0.01	0.08
Farm and	1994	0.02	0.14	0.00	0.05	0.01	0.06	0.01	0.11	0.03	0.14	0.02	0.10
livestock	1995	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1997	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8.13 shows the extent to which households rely on multiple sources of income.[1] Multiple income sources are not as widespread in urban Ethiopian households as one has seen in some other African urban areas. More than half of the households relied on just one source of income, with wages dominant. However, reliance on only one source seemed to be decreasing over time. Only the share of households relying solely on remittances increased from 1994 to 1997. In 1994, a quarter of the households had remittances as well as income from wages, female household business, or business, and this had increased to 30% by 1997. Wage

1. Here we do not discuss the number of income earners in each household. It could very well be that a household classified as having only wage income could have several wage earners. The important thing here is to what extent the household diversifies into different kinds of income.

earners, who increase their share over time, dominated the category. About 10% combined two income generating activities, excluding remittances, with the most common combination being wages and business income.

Table 8.13: Number and percent of households with different income combinations by year

	Source	1994	1995	1997	Total
One source	Wages only	348	291	301	940
		31%	26%	26%	28%
	Business only	110	133	97	340
		10%	12%	9%	10%
	Female household business only	67	79	58	204
		6%	7%	5%	6%
	Remittances and pensions only	141	132	174	447
		12%	12%	15%	13%
	Total one source	666	635	630	1931
		59%	57%	55%	57%
One source + remittances	Wage and remittances	183	159	227	569
		16%	14%	20%	17%
	Business and remittances	45	65	58	168
		4%	6%	5%	5%
	Household female business and remittances	58	48	58	164
		5%	4%	5%	5%
	Total one source + remittances	286	272	353	911
		25%	24%	30%	27%
Two sources	Wage and business	54	66	49	169
		5%	6%	4%	5%
	Wage and household female business	30	57	25	112
		3%	5%	2%	3%
	Business and household female business	7	24	20	51
		1%	2%	2%	2%
	Total two sources	91	147	94	332
		9%	13%	8%	10%
Other combinations		94	83	70	247
		8%	7%	6%	7%
Total		1137	1137	1137	3411

8.7 Income Inequality

Table 8.15 shows Gini coefficients for real per adult–equivalent income by town and year. Income inequality increased between 1994 and 1997 in all towns, but most in Awassa, Dire Dawa, and especially Dessie (Appendix 8E shows corresponding Lorenz curves). None of the Lorenz curves cross, for any of the towns or for urban Ethiopia as a whole, which means that the direction of change in inequality is clear. Increasing inequality in Dire Dawa, together with falling mean per adult-equivalent income (Table 8.13), means that poverty was increasing there.

Table 8.14: Gini coefficients and means for per adult-equivalent income by town and year

	1994	1995	1997
Addis Ababa	0.577	0.562	0.590
N=659	(125)	(108)	(135)
Awassa	0.487	0.569	0.579
N=58	(133)	(143)	(196)
Bahir Dar	0.537	(133)	(180)
N=80	(116)		
Dessie	0.551	0.561	0.727
N=78	(99)	(112)	(211)
Dire Dawa	0.440	0.525	0.525
N=111	(198)	(127)	(163)
Jimma	0.536	0.531	0.547
N=48	(128)	(121)	(154)
Mekele	(118)	0.553	0.566
N=84		(87)	(133)
Total	0.556	0.556	0.596
N=1137	(130)	(113)	(150)

Inequality was somewhat higher in female-headed than in male-headed households (Table 8.15), and mean per adult-equivalent income was 27% lower in female-headed households in 1997, an increase of 5 percentage points. The greater inequality among female-headed households may be due to "true" and "pseudo" types: In the "true" female headed household, the woman is divorced, separated, or a widow, and the husband and his income are totally absent. In the "pseudo" female-headed household, however, the husband may be working somewhere else and sending money home. These households may thus have a much larger income, when the man's remittances are added to the woman's earnings.

Table 8.15: Gini-coefficients and means for real per adult-equivalent income by head of household's gender and year

	1994	1995	1997
Female	0.568	0.557	0.606
	(110)	(87)	(122)
	n=418	n=446	n=468
Male	0.545	0.545	0.582
	(142)	(130)	(169)
	n=719	n=691	n=669
Total	0.556	0.556	0.596
	(130)	(113)	(150)
	n=1137	n=1137	n=1137

Table 8.16 shows income inequality by households' main source of income, wages, business, or remittances. Business here includes female household business, farm and livestock, and children's income. Households with wages as the main source of income had considerably less inequality than either of the other categories. The number of households in this group shrank from 1994 to 1997, but mean per adult-equivalent income increased. For households relying on primarily business income, there was a huge increase in inequality, the number of households also decreased, but mean income went up. The group of households with remittances as the main source of income went up by almost a third with increasing mean income, while inequality went down somewhat.

Table 8.16: Gini-coefficients and means for real per adult-equivalent income by household's main source of income and year

	1994	1995	1997
Wage	0.475	0.468	0.475
	(131)	(105)	(145)
	n=585	n=552	n=557
Business*	0.601	0.622	0.696
	(158)	(129)	(205)
	n=361	n=393	n=329
Remittances	0.635	0.581	0.604
	(73)	(60)	(89)
	n=191	n=192	n=254
Total	0.556	0.556	0.596
	(130)	(113)	(150)
	n=1137	n=1137	n=1140#

* Includes business income, female household business, children's income, and farm and livestock income.
# The number 1140 instead of 1137 households is due to computation of main source of income. Three households with equal shares of income from two different sources in 1997 ended up in both groups.

Table 8.17 shows how inequality varied within income quintiles, along with incomes.

Table 8.17: Gini-coefficients and means for per adult-equivalent income, by quintile and year

	Year	Gini	Mean income
Lowest quintile	1994	0.312	15
n=227	1995	0.283	16
	1997	0.336	15
Quintile 2	1994	0.113	41
n=228	1995	0.103	40
	1997	0.107	43
Quintile 3	1994	0.088	76
n=227	1995	0.086	70
	1997	0.091	77
Quintile 4	1994	0.109	136
n=228v	1995	0.116	128
	1997	0.118	145
Highest quintile	1994	0.305	382
n=227	1995	0.307	370
	1997	0.371	473

8.8 Concluding Remarks

During the period studied Ethiopia was recovering from a long civil war and was undertaking economic reforms to become more market oriented. These reforms were reasonably successful: the World Bank and other donors looked at Ethiopia as one of the successful cases of economic reform in Africa, at least until the outbreak of war with Eritrea.

Per capita incomes grew rapidly during the study period, 1994-1997. The aim of this chapter has been to show how different segments of the urban population benefited from general economic growth.

Real incomes in the urban areas did in fact increase as our estimates of household income indicate. Unadjusted household income increased by 5% from 1994 to 1997, while per adult-equivalent income increased as much as 16%. There may be an underestimate of the number of children in the last round, however, so that may be an overestimate. Perhaps the real figure is closer to our adjusted estimate of 11.5%.

The major finding of the paper is that income growth between 1994 and 1997 was very uneven across income classes ranging from a decline of 7.7% for the bottom quintile to an increase of 10.1% for the top quintile using total household income. Using unadjusted per adult-equivalent income all groups improve, from 2.2% in the bottom quintile to 23.8% in the top. Growth has primarily benefited the better off households, and had not trickled down much to the poorer households as of 1997.

We also note that households in the capital were generally not better off than the urban average, perhaps because there has been a large influx of poorer households to Addis Ababa. Instead it was Awassa and Dire Dawa that had the highest incomes, although the position of Dire Dawa deteriorated substantially over the period studied.

An important concern is income mobility, that is, whether individual households can move up or down the income ladder. Our results indicate that there was very extensive income mobility in urban Ethiopia. To some extent this result may be due to measurement problems, but even so there seems to have been considerable movement. Almost half of those in the bottom quintile moved up over the three years, which suggests that low income is a transitory phenomenon for quite a few. This needs to be investigated further, however, before we draw too far-reaching conclusions.

We also investigated changes in the pattern of income and noted considerable stability; it is hard to discern any major changes in the aggregate, although there were large swings in individual cities. The decline of Dire Dawa as a commercial centre is visible in the declining share of business income there.

Considering the pattern of incomes by quintile, the poorest quintile relied heavily on female household business and remittances (as well as children's income). At the high end of the spectrum incomes from regular business were very important. The income growth of the top quintile probably depended on the increased scope for business in the more liberalised economy.

Relatively few depended on multiple incomes. Because of the economic crisis the economy has undergone, one might have thought that households would have shopped around for any kind of income opportunity there might be, but this does not appear to have been the case. This may reflect continued constraints and controls in Ethiopia, even after years of reforms.

Changes in the Gini-coefficients over the three years studied reveal a considerable increase in inequality, which confirms that although there was an increase in average incomes, it was concentrated to the top, while large segments of the population have seen only limited or no improvements in income.

Among those primarily dependent on business income, income dispersion has increased very much. This again seems to confirm that specific types of households managed to reap the benefits of the new opportunities opened up by reforms after the civil war.

References

Bigsten, A. and N. Makonnen (1999), "An Anatomy of Income Distribution in Urban Ethiopia", *African Development Review* 11(1):1-30.

Buhmann, B. et al. (1997), "Equivalence scales, Well-Being, Inequality, and Poverty: Sensitivity Estimates across Ten Countries Using the Luxembourg Income Study (LIS) Database", *Review of Income and Wealth* 43(3):319-34

Coulombe, H. and L. Demery (1993) "Household Size in Côte d'Ivoire: Sampling Bias in the CILSS", LSMS Working Paper 97, World Bank, Washington, D.C.

Duncan, G.J. (1992), "Household Panel Studies: Prospects and Problems", Working Papers of the European Scientific Network on Household Panel Studies No 54, University of Essex, Colchester.

Kalton, G. et al. (1989), "Nonsampling Errors in Panel Surveys", in, Kasprzyk, D. et al. (eds), *Panel Surveys*. Wiley and Sons, New York.

Little, R.J.A. and D.B. Rubin (1987), *Statistical analysis with missing data.* Wiley and Sons, New York.

IMF (1998a), "Ethiopia Enhanced Structural Adjustment Facility. Medium Term Economic and Financial Policy Framework Paper, 1998/99-2000/01", Washington, D.C.

IMF (1998b), *Financial Statistics Yearbook 1998*. Washington, D.C.

Taddesse, M. (1998), "Consumption Patterns and Ownership of Durables", in *Descriptive Report on the Panel Socio-Economic Survey of Major Urban Centres in Ethiopia*. Departments of Economics, University of Addis Ababa and Göteborg University.

Appendix 8A.1: Sample attrition in 1995 and 19997

Table 8A.1: Characteristics of panel households and dropout using 1994 values

		Households remaining all three years		Households dropping out in 1995		Households dropping out in 1997	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Variable		n=1345		n=95		n=61	
Income	Total household*	630 (329)	1057	956 (403)	1545	582 (305)	702
	Per adult equivalent*	124 (70)	177	208 (85)	361	161 (93)	231
Average household income from	Wages	301	535	446	776	272	357
	Business	233	905	315	1184	188	622
	Female household business	23	89	21	81	37	138
	Children's income	1	11	0	1	0	0
	Remittance	56	231	122	603	58	134
	Farm and livestock	15	133	52	370	27	209
City of residence	Addis Ababa	0.59	0.49	0.75	0.44	0.61	0.49
	Awassa	0.05	0.21	0.05	0.22	0.11	0.32
	Bahir Dar	0.07	0.25	0.08	0.28	0.05	0.22
	Dessie	0.07	0.25	0.02	0.14	0.11	0.32
	Dire Dawa	0.09	0.29	0.02	0.14	0.02	0.13
	Jimma	0.07	0.26	0.02	0.14	0.02	0.13
	Mekele	0.07	0.25	0.05	0.22	0.08	0.28
Head's activity	Business	0.20	0.40	0.17	0.38	0.21	0.41
	Hhold female business	0.10	0.30	0.08	0.28	0.16	0.37
	Civil servant	0.24	0.43	0.23	0.42	0.18	0.39
	Int. org. employee	0.01	0.09	0.03	0.18	0.02	0.13
	Priv. org. employee	0.05	0.22	0.05	0.22	0.03	0.18
	Casual/ domestic	0.08	0.26	0.15	0.36	0.07	0.25
	Farming	0.00	0.06	0.00	0.00	0.00	0.00
	Pensioner	0.15	0.36	0.12	0.32	0.10	0.30
	Unemployed	0.05	0.22	0.02	0.14	0.10	0.30
	Not at paid work	0.12	0.32	0.15	0.36	0.13	0.34
Head's highest education	No education	0.47	0.50	0.40	0.49	0.54	0.50
	Primary	0.17	0.37	0.15	0.36	0.13	0.34
	Secondary	0.27	0.44	0.28	0.45	0.20	0.40
	Technical/ college	0.07	0.26	0.11	0.31	0.10	0.30
	University	0.03	0.16	0.06	0.24	0.03	0.18
Other household characheristics	Number of children	2.05	1.75	1.64	1.50	1.70	1.67
	Total hhold size	6.17	2.79	5.85	2.72	5.43	3.00
	Hhold years of educ.	29.70	21.92	32.83	24.50	25.79	19.71
	Female headed hhold	0.37	0.48	0.36	0.48	0.44	0.50
	Head married	0.60	0.49	0.61	0.49	0.56	0.50

* Median in parenthesis.
Note: For the first column, the households remaining in the sample all three years, the income variables are calculated for the 1137 panel-households.

Appendix 8B: The income variable

8B.1 Introduction

Incomes from each source and for all years were first computed at individual level. Then all types of incomes were converted into monthly incomes according to reported period of accounting. Individual monthly incomes of household members were finally added to give household monthly income.

8B.2 Conversion into monthly income

We estimated the number of working days per year at 300, which gives 25 working days per month (300/12), and 5.76 working days per week (300/52), and 4.34 weeks per month (25/5.76). Thus:

Yearly income / 12 = Monthly income
Weekly income * 4.34 = Monthly income
Daily income * Days worked previous week * 4.34 = Monthly income
Hourly income * Hours worked per day * Days worked previous week * 4.34 = Monthly income.

Other periods of accounting used were fortnight, 6 months, 1-3 days (we used the average, 2 days), and 1-3 months (we used the average, 2 months), which were all similarly converted into monthly income. Unusable accounting periods, were ”as convenient”, ”after selling all goods”, etc.

8B.3. Imputing

When the data was insufficient to create the monthly income variable (that is, time of accounting, or one of the variables creating (business) income, was missing or given as ”Don't know”), we imputed monthly income. We ran a separate regression for each of the income sources, and then we used the coefficients to estimate income for the missing ones (Little and Rubin, 1987).

8B.4. Secondary income

We calculated secondary income for the individuals who reported having such (who had two jobs). If secondary income was reported as missing, the observation was deleted. If secondary income was reported to exist, while it was impossible to construct (missing period of payment), we imputed it. Missing secondary income was substituted by the median of secondary income by sector and year.

8B.5. Total individual income

We now have total individual income from each source. For most observations, this total income is made up of primary income only, for some it consists of primary and secondary income, and for a small minority, it consists only of secondary income. This is due to problems in computing primary income, but not secondary, for an individual. Adding up these incomes for an individual leads to total individual incomes, and adding up total individual incomes of all household members gives us total household income.

8B.6. Income panel

A household panel was created with all those households having an income all three years, 1143 households. The households with a monthly income above 14 000 Birr in any year were deleted, leaving 1139 households. The 4 households with an income above 14000 Birr per month only experience it in one year; the other 2 years their income is normal.

8B.7. Wages

Over the three years, 3829 individuals reported wages as their primary source of income.

No taxes were deducted; that is gross monthly wage income was used.

For the 125 individuals who reported wage income but did not report the amount, it has been imputed. The sector of employment; occupation; whether employed by private or public enterprise, co-operative, international organisation, or as a casual or domestic worker; years of experience at the current job, were all used as explanatory variables.

The mean of imputed wages was considerably lower than for those reported directly, but the medians were closer (251 Birr for directly reported, 209 for imputed).

In total, wage income was obtained for 3772 individuals, of which 82 were imputed. We were unable to impute income for 57 individuals, for whom there were missing values for the explanatory variables in the regression.

112 individuals report having secondary income. For 104 of these we calculated the median secondary income by sector and year. For 7 of the remaining 8 individuals we imputed income by using the medians; one individual reported no sector.

In the 1139 panel households, 3084 had primary wage income, of which 48 were imputed, and 92 also had secondary income.

8B.8. Business income

Over the three years, 1334 individuals in the 1500 sample households reported business income as their primary source of income; 1200 gave enough information to derive amount.

Non-labour costs and labour costs (for employees) were deducted from sales revenues; then converted into monthly income as above. Negative values were dropped as unusable, as were monthly incomes above 10 000 Birr. It was possible to calculate monthly business incomes for 887 individuals.

For the remaining 313, monthly business income was again imputed by regressions using the following explanatory variables: whether the business had employees or not; whether it had family workers or not; its location (city); in which sector it operated; the value of the business as perceived by the owner; and finally, which year (1994, 1995, or 1997). The mean of imputed income was again lower than for directly calculated business incomes, but the median was higher (349 Birr compared to 303 for the original).

Secondary income was reported by 74 of these individuals, of whom 69 provided enough information to calculate monthly amounts. For them we again calculated the median secondary income by sector and year, and imputed incomes for the other 5 individuals.

We then added the secondary incomes to primary business incomes to obtain total business income for 1208 individuals.

Of the individuals in the household panel, 970 had primary business income, of which 242 were imputed amounts, and 58 of them also had secondary income.

8B.9. Female household business

Over the three years, 922 individuals reported female household business. Non-labour costs were deducted from sales revenues, then converted into monthly income as above. If both variables were reported as missing or "don't know" the observation was deleted, leaving 854 cases. It was possible to calculate monthly female household income directly for 670 individuals.

For the remaining 184, we again used a regression to impute monthly income from female household business. Explanatory variables were: whether the business employed family workers or not; the nature of the activity; the year; the city; and size of monthly non-labour costs. The mean of imputed incomes was again lower for directly calculated incomes, but the medians were almost identical (66 and 65 Birr respectively).

Secondary income was reported by 62 individuals, of whom 55 provided enough information to calculate monthly secondary income. If secondary income was reported as missing, the observation was deleted. For them we calculated the median income and then imputed incomes for two of the others where there was sufficient information.

Primary and secondary monthly incomes were then added to give total female household income for 858 individuals.

In the 1139 panel households, 682 have individuals who had female household business income, of which 137 were imputed amounts, and 43 also had secondary income.

8B.10. Children's income

Over the three years, 172 individuals reported children's income as main income. If revenue was missing we deleted the observation. Costs were subtracted from revenues, giving a positive income for 151 individuals. Then we derived median income by type of activity and year, which were used to impute income for 10 individuals for whom we could not construct income as above. In total, 161 children had incomes.

Of the children in the household panel, 142 had income. None were imputed.

8B.11. Farm and livestock income

Farm and livestock income was reported separately from other business activities only in 1994. In the following years, it was included in business income.

In 1994, 84 households reported farming activity among which we are able to calculate farm income for 81 households.

Annual costs were deducted from the value of the previous year's production, and divided by 12 to arrive at monthly farm income.

In 1994, 123 households reported owning livestock or poultry, of which we were able to calculate income for 34 households.

No imputations were attempted.

In total, positive farm and livestock income is derived for 55 households. Negative incomes were dropped.

Of the households in the household panel, 47 had positive farm and livestock income.

8B.12. Remittances and pension income

Over the three years, 2394 individuals reported remittance and pensions income. Cash and in-kind remittances are added up for each individual, and divided by 12 to find monthly amounts.

No imputations were attempted.

Of the individuals in the household panel, 1945 had remittances.

Appendix 8C: Income by Household Size and Composition

Table 8C.1 shows that all size groups experienced income increases between 1994 and 1997, except for the largest household size. The increase was the largest for households with 5-8 members. Between 1994 and 1997 their total household incomes increased monthly by 27%. Table 8C.2 shows mean and median household income by household composition and sex of head of household for the three years.

Table 8C.1: Mean and median of real total household income by household size and year, all towns

Household size		All towns					
	Year	Number	Mean	Median	Std Dev	Min	Max
1-2	94	93	269	153	359	2	2002
	95	105	233	116	356	4	2865
	97	123	304	155	679	3	6903
3-4	94	236	443	260	691	2	6817
	95	251	360	197	509	3	3464
	97	258	453	246	840	4	9905
5-6	94	297	609	375	832	1	9073
	95	302	523	301	633	8	4879
	97	314	737	401	1051	1	7605
7-8	94	296	750	400	1096	5	8962
	95	274	642	384	902	2	7247
	97	262	908	435	1367	5	9941
9+	94	215	977	600	1173	5	7945
	95	205	874	454	1127	3	8140
	97	180	861	497	1095	0	7477

Table 8C.2: Mean and median of real total household income by household composition and year, all towns

Household	Year	Male-headed households				Female-headed households			
composition		n	Mean	Median	Std Dev	n	Mean	Median	Std Dev
1 adult only	94	11	487	636	357	22	99	71	88
	95	15	409	290	387	28	77	55	68
	97	19	735	262	1550	31	101	65	92
1 adult,	94	1	580	580	.	10	140	120	118
1–2 children	95	0	.	.	.	7	189	138	242
	97	3	742	696	105	12	78	26	84
1 adult,	94	1	399	399	.	10	239	125	222
3+ children	95	1	282	282	.	6	154	158	71
	97	1	107	107	.	3	80	84	71
2 adults only	94	20	474	233	559	29	207	82	266
	95	22	359	274	263	33	210	91	489
	97	22	499	366	454	36	171	107	147
2 adults,	94	19	311	217	328	26	300	115	440
1–2 children	95	16	437	371	410	24	172	104	172
	97	18	517	312	469	23	186	93	175
2 adults,	94	50	382	299	422	17	381	211	423
3+ children	95	38	575	364	593	11	324	69	518
	97	24	452	452	251	7	405	295	427
3+ adults only	94	99	888	510	1098	82	611	344	1007
	95	100	799	435	1064	82	424	265	446
	97	123	926	582	1183	107	577	278	1329
3+ adults,	94	265	824	521	1044	157	554	277	910
1–2 children	95	267	613	391	719	186	399	231	521
	97	274	792	436	941	194	706	346	1197
3+ adults,	94	253	777	450	1095	65	538	339	697
3+ children	95	232	774	407	1065	69	475	213	1037
	97	185	855	450	1324	55	391	274	494

Appendix 8D: Income Mobility 1994 to 1995 and 1995 to 1997

Table 8D.1a: Mobility between total household income quintiles in number and percent, 1994 to 1995

		1995					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1994	Quintile 1	122 54%	57 25%	23 10%	18 8%	9 4%	229
	Quintile 2	50 22%	86 37%	54 23%	24 11%	14 6%	228
	Quintile 3	25 11%	50 22%	79 34%	50 23%	22 10%	226
	Quintile 4	18 8%	20 9%	44 19%	78 35%	67 30%	227
	Quintile 5	13 6%	19 8%	30 13%	51 23%	114 50%	227
	Total	228	232	230	221	226	1137

Table 8D.1b: Mobility between per adult-equivalent quintiles in number and percent, 1994 to 1995

		1995					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1994	Quintile 1	105 46%	57 25%	35 15%	17 7%	13 6%	227
	Quintile 2	56 25%	76 33%	51 22%	29 13%	16 7%	228
	Quintile 3	32 14%	53 23%	70 31%	48 21%	24 11%	227
	Quintile 4	21 9%	25 11%	41 18%	79 35%	62 27%	228
	Quintile 5	14 6%	16 7%	30 13%	55 24%	112 49%	227
	Total	228	227	227	228	227	1137

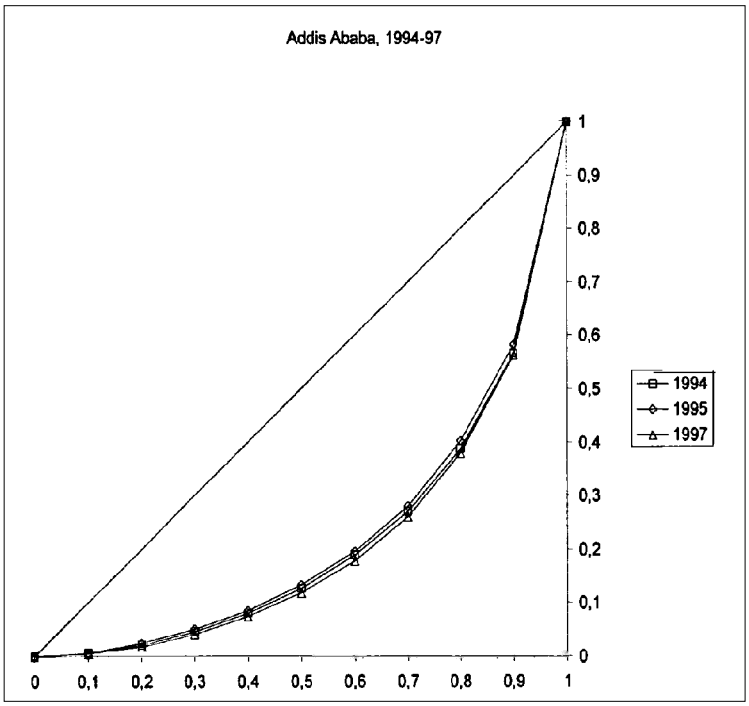
Table 8D.2a: Mobility between total household income quintiles in number and percent, 1995 to 1997

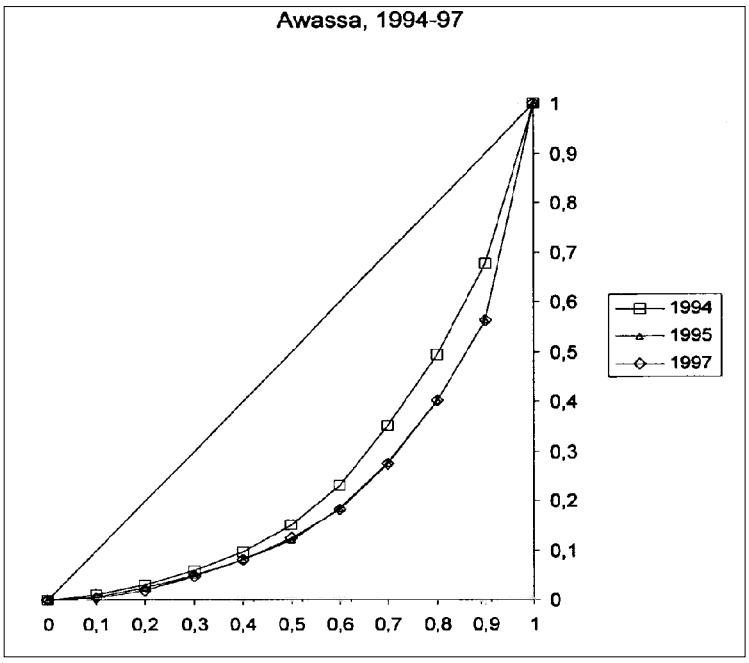
		1997					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1995	Quintile 1	119 52%	58 26%	24 10%	18 8%	9 4%	228
	Quintile 2	50 22%	94 41%	52 23%	22 10%	14 6%	232
	Quintile 3	36 16%	36 16%	82 36%	43 19%	33 15%	230
	Quintile 4	13 6%	21 9%	43 19%	96 43%	48 21%	221
	Quintile 5	9 4%	18 8%	28 12%	48 21%	123 54%	226
	Total	227	227	229	227	227	1137

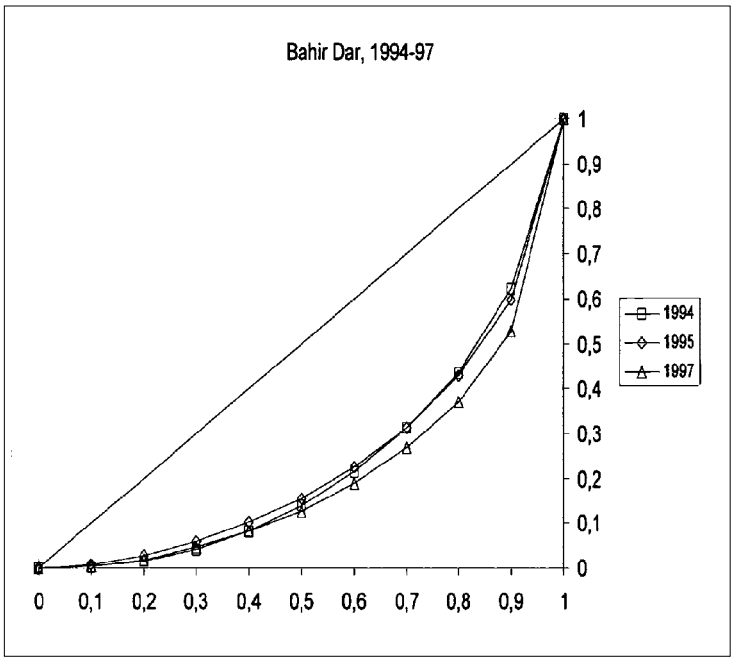
Table 8D.2b: Mobility between per adult-equivalent quintiles in number and percent, 1995 to 1997

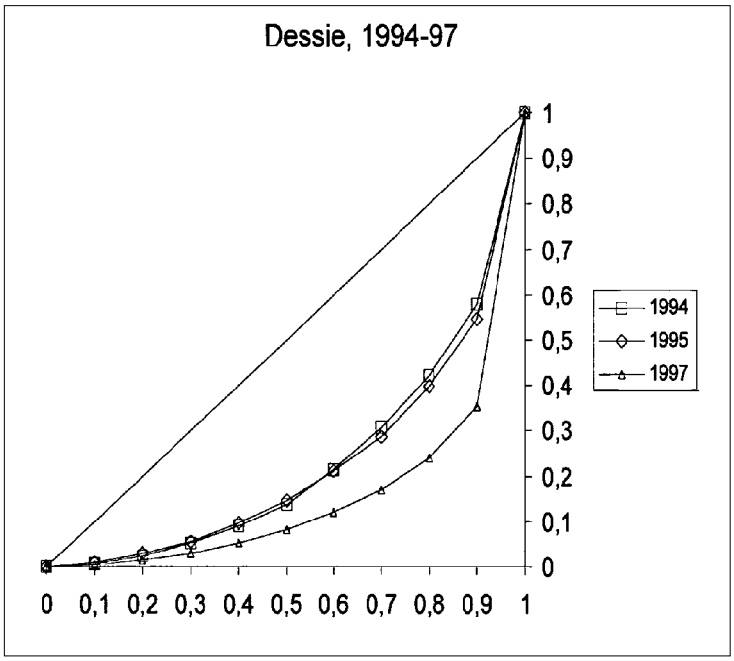
		1997					
		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
1995	Quintile 1	105 46%	60 26%	36 16%	17 7%	10 4%	228
	Quintile 2	53 23%	82 36%	57 25%	17 7%	18 8%	227
	Quintile 3	29 3%	44 4%	71 6%	58 5%	25 2%	227
	Quintile 4	30 13%	23 10%	46 20%	80 35%	49 22%	228
	Quintile 5	10 4%	18 8%	18 8%	56 25%	125 55%	227
	Total	227	227	228	228	227	1137

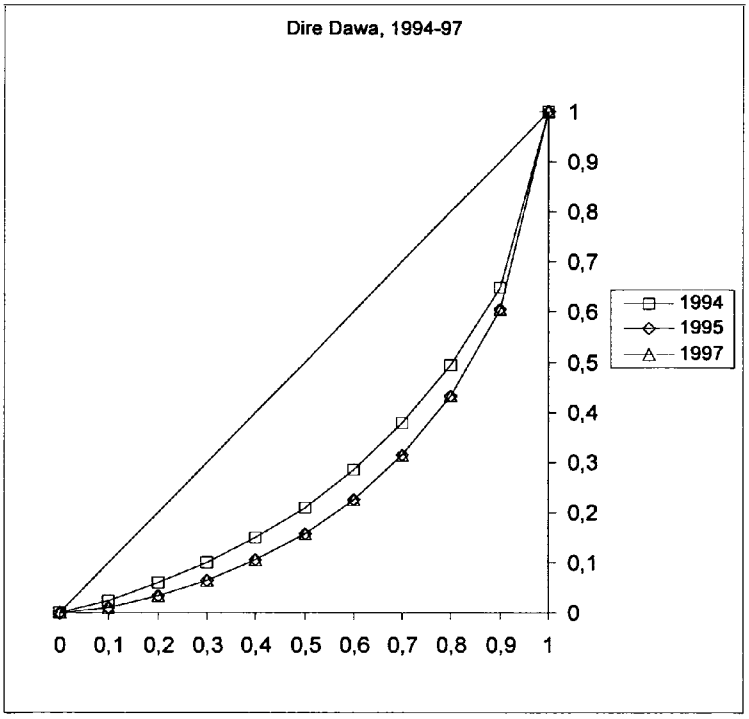
Appendix 8E: Lorenz Curves for Ethiopian Towns 1994–1997

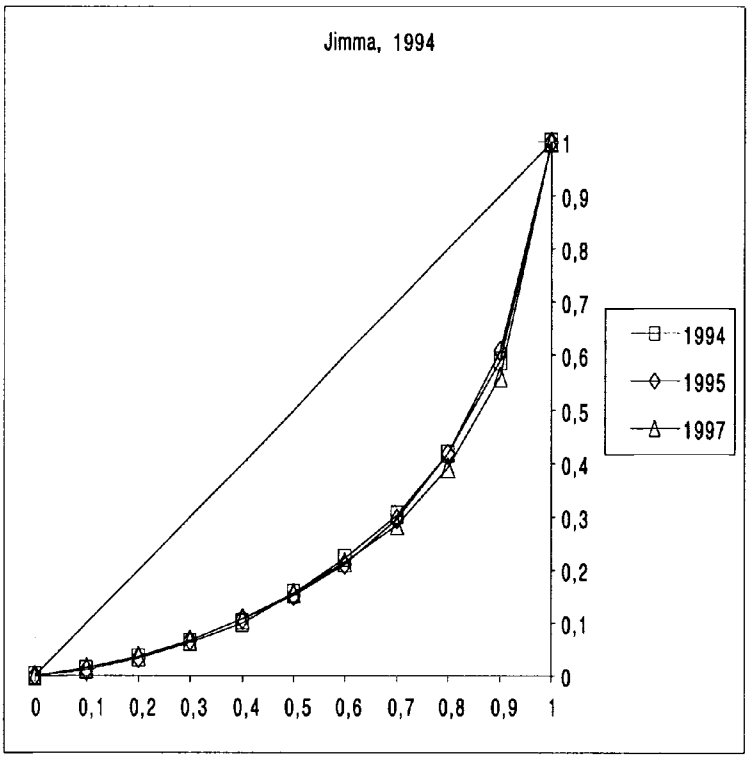


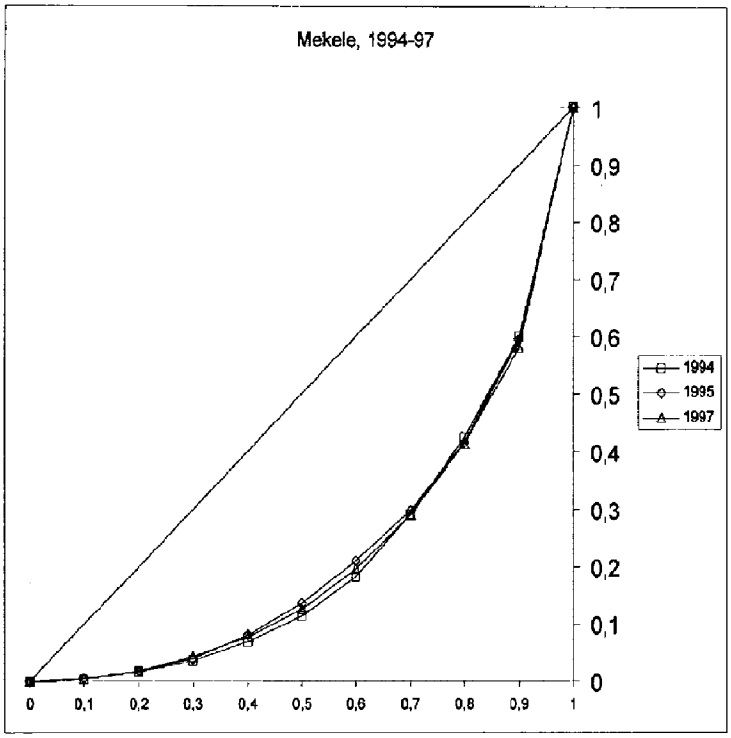


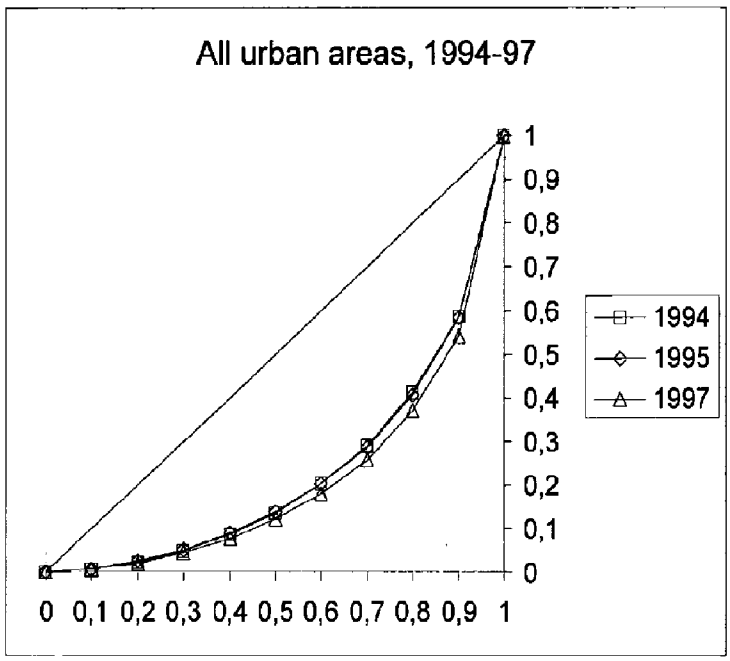

Bahir Dar, 1994-97
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997


Dessie, 1994-97
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997


Dire Dawa, 1994-97
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997


Jimma, 1994
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997


Mekele, 1994-97
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997


All urban areas, 1994-97
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1
1994
1995
1997

9. The Urban Labour Market during Structural Adjustment in Ethiopia 1990–1997

Stefan Dercon, Tesfayi Gebre Selassie and Pramila Krishnan

9.1 Introduction

Since 1992, the Ethiopian economy has undergone reforms and structural adjustment. This chapter examines the effects of reforms, using a combination of cross-section and panel data based on three surveys conducted in 1990, 1994 and 1997, on the allocation of the labour force to different sectors and the consequent response of real wages and returns to education. We find that little has changed and that the labour market has been unresponsive to the reforms.

Most previous research has been based on cross-sectional analysis alone, which implicitly assumed that the markets for education and educated labour are permanently in equilibrium. We avoid such assumptions by using panel data to examine the changing patterns of employment and returns to education over time. In doing so, we ask how allocation into work and in particular, into public, private or self-employment has been affected. Structural adjustment is likely to affect the allocation of labour in two ways: Privatisation and tighter budgets should have dampened public employment, while the improved incentives to the private sector ought to have encouraged employment there. Structural adjustment is also likely to affect the wages across sectors. Employment in the formal sector remains the most important source of income in urban Ethiopia, so changes in real wages will affect both labour market functioning and living standards. Furthermore, they will also affect the returns to education, which in turn have feedback effects on the household's demand for education and participation in the labour market too.[1] Since returns, both monetary and non-monetary differ by sex, we estimate sex-specific returns to education.

Appleton et al., (1995) use the data from 1990 to estimate the private, monetary returns to primary education and find them to be low (and statistically in-

1. Conventional estimates of the returns to primary education are generally high relative to those of secondary and tertiary education (Psacharopoulos, 1994). The World Bank (1988) obtains estimates of average private returns at 31%. More recent studies dispute this finding, particularly for Sub-Saharan Africa (Bennell, 1996, Knight et al., 1992). The critique is based in part on questionable methods and on quality of the data. However, while private returns may thus be lower than earlier thought, there are undoubtedly pressing reasons to think that non-pecuniary returns are high, because of: beneficial externalities on the health and nutritional status of mothers and children; enhanced productivity of the population via 'copying' effects; and intergenerational effects in the acquisition and transfer of human capital.

significant) for men in urban Ethiopia in both the private and the public sectors and for women in the public sector. Substantial returns were found to secondary education in both sectors and for both sexes. From the point of view of returns to educational investment, it thus seems rational for parents to send their children to primary school only if they anticipate having sufficient funds to sustain the child well into secondary school. Given this structure of returns to education, combined with high levels of poverty and imperfect credit markets, few households would find it optimal to send their children to school. And this is exactly what appears to be happening: Ethiopia has one of the lowest gross enrolment rates in the world (about 20 percent), lower for girls. This chapter also extends the Appleton et al. (1995) study by examining the returns to education for the sub-sample 15–29 years old in both 1994 and in 1997, in order to compare returns to this age group in each of these periods.

The next section describes the Ethiopian labour market and the reforms, while section 3 provides a description of the data and section 4 describes the evolution of wages and employment in this period. Section 5 presents the econometric methods used and section 6 describes the allocation into the labour force and provides estimates of earnings functions and returns to education. Section 7 summarises the evidence and draws conclusions.

9.2 Labour Markets and Economic Reform in Ethiopia

Throughout the 1980s the Ethiopian economy had strict controls, on the early Soviet model, established after the fall of the Emperor in 1974 by the new government, usually referred to as the Derg. Already, by the late 1970s, trade in agricultural commodities had been severely restricted and taxed, while in urban areas nationalisation and controls on markets limited the private sector and private sector investment dropped. In principle, formal sector labour was allocated via a labour exchange in both government and parastatal companies, an administrative procedure controlled by a government ministry. Job guarantees were established for all university graduates.

By 1990 the economic, fiscal, and military position of the Derg became untenable with the collapse of aid-flows from the Soviet Union and other friendly governments. A reform plan was approved to establish a 'mixed' economy in which private sector involvement was encouraged through liberalisation of some agricultural and non-agricultural sectors.

In 1991 when the Derg was defeated, the new rebel government adopted an Economic Recovery and Reconstruction Programme, built largely on the reforms of the Derg, to rehabilitate the economy. The emphasis has since been on encouraging and enhancing the role of the private sector, with the state gradually allowing domestic private capital to play a larger role in trade and other activities. In 1992 the Birr was devalued by 143%, and further reforms were instituted leading to a donor-funded structural adjustment programme, with privatisation, lib-

eralisation of the private sector and of international trade, and the setting-up of a currency auction system. These policy changes, as Ethiopia liberalises its highly regulated and centralised economy, offer a unique opportunity for studying the impact of such reform on the behaviour of urban households.

A few studies have analysed changes in African labour markets under structural adjustment using micro-level data. Mazumdar (1989) suggests that most African countries faced with government cutbacks in the 1980s allowed real public sector wages to erode, thus avoiding large-scale retrenchment. Lindauer et al. (1988) analysed the experience of four countries (Ghana, Tanzania, Sudan and Malawi) in the 1970s and 1980s. They found that governments typically tried to protect the wages of the lower skilled public sector workers, so that the wage gap within the public sector fell, as did the gap between public and private sector wages.

Horton et al. (1994) provide a review of the existing studies covering the 1980s, presenting evidence on 12 countries, including three African countries, Ghana, Kenya and Côte d'Ivoire during periods of structural adjustment. Real wages in Ghana fell dramatically between 1980 and 1984 and recovered in part by 1986, while Kenya saw a wage decline in the public sector with private sector wages holding their own. There were changes not just in the sectoral allocation of workers, but also in participation rates. The main shift observed was from formal to informal employment: female participation increased, while for those skill levels for which labour demand was weak, there was a clear retreat out of the labour force. They also noted substantial increases in self–employment during adjustment.

Canagarajah and Thomas (1997) review labour markets in Ghana between 1987–92. They find a reduction in male unemployment but an increase in female unemployment in this period. They also suggest that there was an increase in informal sector employment while formal sector employment fell.

The Ethiopian experience has been similar to that of many other African countries in some ways. The public sector grew in the 70s: establishments were often pressurised to have more employees than they needed to accommodate relatives, supporters and party members (Survey of Current Economic Conditions in Ethiopia, 1993). The Ministry of Labour and Social Affairs survey of public and private sector establishments employing more than 10 workers indicates that in 1983 the public sector employed 73 percent of those in wage employment. The reforms meant that public sector employment fell, with the end to guaranteed jobs for university graduates and placing other restrictions on hiring in the public sector.

Unlike many African countries, however, Ethiopia experienced very little inflation in the 1980s because of prudent government budgets and restrictive financial policy. The Ethiopian Birr remained stable, with only a small premium on the black market, which in turn meant that public sector wages were stable. However, the vulnerability of capital goods to capture and the disruption of trade and free movement of labour during the civil war probably discouraged private sector

activity considerably by requiring high risk premiums and other measures resulting in lower employment and earnings (Collier and Gunning, 1995).

Inflation picked up substantially after the war, with inflation at 35% in 1991 and about 11% in 1992, which resulted in real wage changes in some sectors. As in other African countries with relatively successful adjustment programmes, Ethiopia has experienced substantial growth, about 5% per year from 1994 to 1997. But while increases in output and real wage adjustments are suggestive, they do not mean the economy has been responsive to the changed incentives following the reforms. Evidence on allocation between sectors and on the speed of re-allocation is a better guide. We can only provide limited evidence on movements between tradable and non-tradable sectors, but concentrate on the division between public and private.[1]

9.3 A Description of the Data Sources

The first source of data is the Survey of Adolescent Fertility, Reproductive Behaviour and Employment Status of the Youth in Urban Ethiopia, conducted by the Ministry of Labour in 1990, which included 4,148 individuals aged 15–29. Data were collected in a large number of towns using stratified random sampling. Unfortunately, the survey collected limited information about the household beyond information on parental education and occupation and the quality of housing.

In November 1994 the Economics Department of Addis Ababa University started a panel data survey in urban Ethiopia. For practical reasons, the coverage was limited to the seven largest towns in the country and a random sample of households was taken from each, totalling 1,500, with 5,043 adults aged 15–64. In February 1997, another round of data was collected allowing comparison with 1994. Attrition was not high, at just over 5%, mainly due to the unwillingness of some households to be re-interviewed. However, some individuals had left households, died, or were not available for interviews for a variety of reasons. Hence, an attempt was made to re-randomise the sample, replacing households that dropped out with households similar in composition, location, type of house and so on. The total 1997 sample consisted of 1,444 households, of which 1,361 were

1. It is discouraging, however that there is little sign of extensive new private investment, either domestic or foreign. In a special survey of Ethiopia, the Financial Times (March 2, 1998), suggests that the principal test of reform will be the country's ability and willingness to attract foreign investment. To date the record has been poor, with only one-fifth of those projects approved between 1992 and 1997 actually in operation. Furthermore, foreign direct investment remains a small fraction of total investment, much of it controlled by a single conglomerate. As David Styan points out in the survey, the government, in its bid to attract investors, appears to be sending contradictory signals. The barriers to investment include a poorly-developed financial sector and the fact that all land remains under state control, but the government has also displayed some evidence of opening up previously closed areas such as energy and telecommunications to foreign investors.

panel households. Despite its imperfections, this re-randomisation allowed us to analyse changes in labour allocation and in returns to education for a larger cross-section for both dates. For the comparison between the 1990 survey and the 1994/1997 surveys, we focussed on the same cohort as covered in 1990, i.e., those aged 15–29 years. This also provided us with evidence on the labour market experiences of young and relatively new entrants to the labour market. To the extent that labour market experience generally increases the probability of having a job and affects earnings, we would expect the younger and less experienced to be more sensitive to, and be more affected by, changing opportunities in the labour market.

9.4 Labour Market Participation and Employment 1990–1997

Table 9.1 below shows statistics on activity and real wages by sector of employment and sex for adults aged 15–64 in the 1994 and 1997 surveys. The public sector consists of civil servants and those employed by public enterprises or local government. The private sector is heterogeneous, including the larger private enterprises, cooperatives, casual workers and domestic workers while own-account, family workers and employers are considered self-employed. The unemployment rate is calculated as the number of persons who reported themselves as being out of work and currently looking for work, expressed as a percentage of the labour force.[1] In comparison, the 1994 Census reports the unemployment rate in Addis Ababa as 35% on average for both sexes, which is in line with the figures in Table 8.1 (Central Statistical Authority (1996)).

Labour force participation by women had increased from 42% to 52% by 1997, while participation by men fell from over 68% to under 63%. There was a sharp drop in unemployment, particularly for women, explained largely by the shift into self-employment, largely in food processing. In contrast to other adjusting countries (see Horton et al., 1994), there was little sign of an expansion in informal sector activity by men. Table 8.2 shows the breakdown of employment by sector and industry. Manufacturing and food processing firms, probably most readily defined as tradable sectors in Ethiopia, register a 9% fall in employment over this period. The increase in employment was mainly in construction and local government. The public sector remains the single most important source of employment in urban Ethiopia, with more than 40% of the employed. There has been little structural change here in this period, despite the talk of reform.

Incomes in self-employment were collected at the level of the household, so it is difficult to attribute them to individual household members. The figures in the

1. The International Labour Organisation defines the unemployed as those who have not been in work in the previous week and have looked for work in that period. The percentages reported here are not with reference to any period: consequently, they might be an overestimate of the current unemployment rate by the definition used.

table are total household revenues from family businesses, divided by the number of family members involved in these activities.[1] Median revenues rather than means are reported, to avoid the problem of outliers. Earnings in Table 9.1 have been deflated by the Consumer Price Index (CPI) as calculated for urban Ethiopia by the Central Statistical Office and expressed in 1990 real prices. The increase in the CPI between the months of data collection in 1990 and 1994 was 74.5%, but only 2.5% by February 1997.

Overall, real wages rose more in the public sector (monthly wages, 15% and hourly wages, 9%), than in the private sector (monthly wages, 0.5%, hourly wages, 2%). This, however, disguises the difference in effects by sex. Men's hourly wages in both sectors grew substantially, with hourly wages in the private sector rising by 9%, while women's wages in private work actually fell, by 2% hourly and 8% monthly. Both monthly and hourly wages in the public sector grew by about the same for both sexes. The fact that monthly public sector wages rose more than hourly wages presumably indicates that hours worked rose there while the opposite held in the private sector.[2]

Self-employment earnings appear to have fallen considerably. Average earnings in the public sector remained systematically higher than in the private sector, and the gap appears to have grown: monthly earnings for men in the public sector were 7% higher in 1994, but this gap increased to 17% in 1997; for women the gap is even larger, rising from 18% to 48%.[3] Of course, such comparisons of differences and changes over time must account for the skill composition of the workers in each sector, a point that is taken up below.

1. A measure of profits could not be obtained: the business income data was missing information on costs.

2. Regarding earnings, the questionnaire first asked about the relevant payment-period and then the amount. Hours worked per day and per week were also asked. For those not reporting hourly wages directly, they were calculated using the hours and earnings data. Since most workers reported earnings per month, hourly wages were usually derived from two different answers. Consequently, these data may be more liable to measurement error than the monthly wages reported. The change found in hours worked may therefore not be valid, while the change in monthly earnings is likely to be genuine.

3. A t-test of differences of the means assuming an independent sample and unknown variance, suggests that these differences between private and public sector wages were statistically significant in 1997 for both men and women, but only for women in 1994.

Table 9.1: Unemployment, Employment and Earnings in Urban Ethiopia, 1994 and 1997

Allocation	1994			1997		
	Men (n=2293)	Women (n=2750)	All (n=5043)	Men (n=3047)	Women (n=3179)	All (n=6226)
Unemployed (% of labour force)	23.1 (33.8)	19.8 (47.8)	21.3 (39.0)	17.4 (27.7)	16.8 (32.4)	17.1 (29.9)
Public sector employment (% of labour force)	18.1 (26.4)	9.7 (23.2)	13.5 (25.0)	18.3 (29.3)	12.3 (23.7)	15.3 (26.7)
Private sector employment (% of labour force)	14.3 (21.0)	5.8 (13.8)	9.7 (17.9)	15.7 (25.0)	8.6 (16.5)	12.0 (21.1)
Self-employment (% of labour force)	12.8 (18.8)	6.7 (16.0)	9.5 (17.6)	11.3 (18.0)	14.2 (27.4)	12.8 (22.3)
Participation rate (% of sample)	68.3	42.0	55.8	62.7	51.9	57.2
Median revenues per self-employed family worker (1990 prices)	258			113		
Monthly wages public sector (in 1990 prices)	247	181	221	287	210	254
Monthly wages private sector (in 1990 prices)	230	153	208	246	141	209
Hourly wages in public sector (in 1990 prices)	1.52	1.17	1.37	1.64	1.28	1.49
Hourly wages in private sector (in 1990 prices)	1.07	0.89	1.02	1.17	0.87	1.04

Source: First and third rounds of the Ethiopian Urban Household Survey (1994, 1997). The first column of the allocation figures gives the percentage of the total sample. In brackets we give the percentage of the labour force.

Table 9.2: Employment by sector for men and women 1994 and 1997

	1994			1997		
	Men	Women	All	Men	Women	All
Primary sector - agriculture, forestry, mining	4.0	4.8	4.3	3.8	3.8	3.8
Food processing	4.5	5.3	4.7	3.4	5.3	4.2
Manufacturing (textiles, wood, paper, chemicals, metals)	19.9	15.5	18.3	16.9	15.1	16.2
Construction	9.2	5.3	7.8	11.8	8.0	10.3
Financial services & transport	28.9	16.5	24.4	29.0	19.2	25.2
Household, social and community services	18.0	35.3	24.3	14.4	27.2	19.4
Government administration	14.5	15.0	14.7	16.5	19.8	17.8
Other	1.0	2.5	1.6	4.2	1.5	3.1

Table 9.3: The cohort 15–29 years: Employment, Unemployment and Earnings, 1990–1997

Allocation	1990			1994			1997		
	Men	Women	All	Men	Women	All	Men	Women	All
	(n=1535)	(n=2614)	(n=4148)	(n=1332)	(n=1554)	(n=2886)	(n=1598)	(n=1720)	(n=3318)
Unemployed (% of labour force)	12.8 (34.3)	12.4 (40.5)	12.5 (37.8)	30.3 (55.4)	29.0 (63.5)	29.6 (59)	24.5 (51.4)	26.6 (57.2)	25.3 (4.3)
Public sector (% of labour force)	15.9 (42.7)	9.5 (31.0)	11.9 (35.9)	7.1 (12.9)	5.7 (12.5)	6.3 (12.7)	6.6 (13.8)	6.6 (14.6)	6.6 (14.2)
Private sector (% of labour force)	5.2 (14.0)	7.0 (22.8)	6.3 (19.1)	10.6 (19.4)	5.6 (12.3)	7.9 (15.9)	11.6 (24.4)	7.4 (16.4)	9.5 (20.3)
Self-employed (% of labour force)	3.4 (9.1)	1.8 (5.9)	2.4 (7.2)	6.8 (12.4)	5.4 (11.8)	6.0 (12.1)	4.9 (10.4)	5.4 (11.9)	5.2 (11.1)
Participation rate (% of sample)	37.3	30.3	33.1	54.8	45.7	49.8	47.7	45.5	46.5
Monthly wages public (1990 prices)	238	175	207	174	157	169	204	183	193
Monthly wages private (1990 prices)	119	65	87	173	159	168	233	135	193
Hourly wages public (1990 prices)	1.52	1.16	1.35	1.08	1.04	1.06	1.15	1.02	1.09
Hourly wages private (1990 prices)	0.59	0.34	0.46	0.67	0.88	0.74	1.02	0.77	0.91

Source: Survey of Adolescent Fertility, Reproductive Behaviour and Employment Status of the Youth in Urban Ethiopia (1990) and Ethiopian Urban Household Survey (1994, 1997). The first column of the allocation figures gives the percentage of the total sample. In parentheses we give the percentage of the labour force.

We now turn from the sample aged 15–64, to a younger cohort aged 15–29 between 1990 and 1997. This sheds some light on how the changes in labour market allocation came about.From 1994 to 1997, there was a large reduction in participation by young men but not the increase in participation by women observed in the entire sample so the increase in the participation by women is confined to the older cohort, while young men drive the reduction in participation. Table 9.1 showed that the increased participation by women (and the unemployed) was in self-employment. This influx of older women may have been the result of better incentives for entrepreneurial activities after the reforms but is more likely to have been an added worker effect: the need for more family income to tide families over the period of adjustment, and the reduced ability of women to wait for formal sector wage employment.

The reduction in participation rates for young men from 1994 to 1997 also needs explanation. Although employment fell for women in this period and that for men remained flat, participation rates for both men and women increased over 1990–1994. Men in this age group were not in the labour force mainly because they were in full-time education.[1] The strong increase in participation between 1990 and 1994 is thus closely linked to a general crisis in enrolment in education in this period. During the 1980s, primary, secondary, and tertiary school enrolment in Ethiopia had increased considerably, especially in urban areas. For example, senior secondary enrolment increased by 76 percent between 1982 and 1989 (Collier et al., 1997). At the beginning of the 1990s, enrolment fell sharply for a number of reasons: uncertainty surrounding the end of the civil war, the increase in army recruitment and the virtual collapse of public service provision in some areas. Senior secondary enrolment in the country declined by 21 percent between 1989/90 and 1993/94. This, combined with the inflationary shock putting pressure on the earnings of some households, resulted in a large increase in labour market participation. By 1997, enrolments seemed to have bounced back, in part due to a recovery in education service provision (Collier et al., 1997), but perhaps also due to the rise in unemployment.

The biggest shock to labour force allocation happened before 1994. The unemployment rate among the young shot up by 60% for both men and women. The increased participation is part of the reason, but the halving of public sector employment for this age group is remarkable. Although overall the public sector remains the largest sector of employment for those in work (table 9.1), for the younger cohort this has changed: a fall from about 65 percent of men in public sector work in 1990 to about 30 percent in 1997, and a similar decline for women. Employment in the public sector fell from 36% in 1990 to 14% in 1997 with a strong dip in 1994. The male share, which had been higher than the average in 1990, was below the average by 1997. Although there may have been some re-

1. For women this ranks with withdrawal from work after marriage as the main reason for non-participation.

trenchment in this age group with the reforms and the contraction of the public sector under the new government, the removal of job guarantees for university graduates and the general reduction in public sector hiring probably account for these results. Some of the job losses in the public sector seem to have been compensated by increased private sector employment for men and by increased self-employment for both men and women. However, these changes were not sufficient to avoid a large increase in unemployment in this period.

Earnings for this cohort follow a pattern similar to that of the entire sample from 1994 and 1997, with increases in real monthly wages of more than 15 percent for both men and women in the public sector and smaller increases in the private sector. However, for the public sector this was largely a reversal of the loss in earnings from 1990 to 1994 for wages did not keep up while the CPI rose by 75% by 1994.[1] Young men lost 27% in real terms, while young women saw falls of 10 percent. After the revision of the public sector wage scales in 1995, by 1997 the losses were reversed for women with wages up by 6% over 1990, and partially reversed for men. Private sector earnings by contrast, increased between 1990 and 1994 by 45% for young men and 145% for young women. Initial reforms and the end of the war seem to have increased not just employment in the private sector, but also earnings. Increased profitability in the private sector activities encouraged labour absorption, but the increases in earnings are hard to reconcile with the greatly increased unemployment in 1994 and its persistence afterwards.

A consequence of these changes is that the public sector premium has fallen as also observed in other countries (Mazumdar (1989)). The increases in public sector pay by 1997 have started to widen the gap again, although the gap is now much smaller than it was in 1990. However, these changes obscure the variation across educational levels and sectors.

Table 9.4: Education of workers by employment sector, in percent, 1997 (full sample)

	Men					Women				
	Unemployed	Public sector	Private sector	Self-employed	Out of labour force	Unemployed	Public sector	Private sector	Self-employed	Out of labour force
Less than primary	19.1	19.7	36.8	49.9	39.4	21.8	24.0	58.5	72.8	50.3
Complete primary	24.9	23.3	35.9	27.1	51.7	21.5	20.5	16.9	19.2	43.7
Complete secondary	48.4	25.9	17.5	15.7	4.8	51.7	30.4	16.5	5.5	4.3
Complete tertiary	7.6	31.1	9.8	7.3	4.1	5.0	25.1	8.1	2.4	1.7

Source: Ethiopian Rural Household Survey round 3.

1. This experience of the 1980s makes Ethiopia stand out from other African countries. While elsewhere the 1980s saw a large erosion of public sector pay (Lindauer et al., 1988; Horton et al., 1994), in Ethiopia inflation stayed low until the months preceding the fall of the government in 1991, so that the pay-differential was still very large in 1990. Erosion then occurred quite quickly but, contrary to many other countries, was partially reversed by 1997.

Table 9.4 shows the frequency distribution of educational levels for 1997 by sector. Public sector workers were generally the best educated. Far more secondary and university graduates were employed there than any other sector. The unemployed are also relatively highly educated, with well over half of them having completed secondary education. Those who had not completed primary education were mainly self-employed, in the private sector or out of the labour force.

Table 9.5 shows average wages by highest level of education, sector of employment, sex and year for the entire sample, and Table 9.6 for those less than 30 years of age (t-test results indicate whether the differences in wages by education were significant). While wages were increasing by education, the high variance in wages meant that only at the highest level of education were wages demonstrably (statistically) different. These findings suggest low or zero returns to education at lower levels of education and higher returns at higher levels. The wage dispersion between levels of education is far larger in the private sector. The pattern of changes over time for different levels of education for the younger cohort is not always very clear and rarely significant, partly due to the small sample size within each cell for which means are calculated.[1] From 1990–1994, average monthly real wages fell regardless of educational level for men in the public sector, and for all except the least educated women. In the private sector, the changes were more positive except for men with only secondary education. From 1994–1997, everyone in the public sector gained except the highest educated men. This was also true for men in the private sector while only secondary educated women gained there. These findings suggest that returns to education for certain groups may have changed over time.

1. In the sample aged less than 30, education levels were higher on average, and the group with little or no education was very small so we combined the lowest levels used in the previous table.

Table 9.5: Monthly wages in wage employment by sex and level of education in urban Ethiopia 1994 and 1997 (in 1990 prices)

	Public sector wages for men				Private sector wages for men				Public sector wages for women				Private sector wages for women			
	<=Prim	prim.	second	tertiary	less than primary	prim.	second	tertiary	less than primary	prim.	second	tertiary	less than primary	prim.	second	tertiary
Nov/Dec 1994	137	165*	231**	377**	183	190	187	566**	123	113	166**	279**	71	108*	194*	329*
Febr/March 1997	231	210	257*	415**	209	204	291	513*	171	166	189	321**	104	101	203*	241

Note: <= Prim: less than or equal to primary education complete; Prim: primary completed; Second: higher secondary (high school) completed; Tertiary: completed higher education. All results were tested using a t-test of the difference in the mean of a particular group compared to the mean of the group with an educational level that is one group lower. T-test assuming different variances. * = significantly different at 5%; ** = significantly different at 1%.
Source: First and third round of the Ethiopian Urban Household Survey (1994, 1997).

Table 9.6 : Monthly wages in wage employment by sex and level of education in urban Ethiopia for age group 15–29 in 1990, 1994, and 1997 (in 1990 prices)

	Public sector wages for men			Private sector wages for men			Public sector wages for men			Private sector wages for men		
	<= Prim	Secondary	Tertiary	<= Prim	Secondary	Tertiary	<= Prim	Secondary	Tertiary	<=Prim	Secondary	Tertiary
June 1990	225	185	387**	94	157*	-	96	195**	304**	57	90*	-
Nov/Dec 1994	100	155**	276**	179	128	263*	106	124	237**	107	180*	234
Feb/March 1997	160	186	262*	225	252	244	141	155	275**	76	203*	213

Note: <= Prim: less than or equal to primary education complete; Secondary : higher secondary (high school) completed; Tertiary: completed higher education. All results have been tested using a t-test of the difference in the mean of a particular group compared to the mean of the group with an educational level that is one group lower. T-test assuming different variances. * = significantly different at 5%; ** = significantly different at 1%.
Source: Survey of Adolescent Fertility, Reproductive Behaviour and Employment Status of the Youth in Urban Ethiopia (1990), Ethiopian Urban Household Survey (1994, 1997).

9.5 Modelling Labour Allocations and Calculating Returns to Education

Changes in the patterns of employment and earnings can be better understood through careful modelling of the factors determining both allocation and earnings. We focus on two questions. First, have the effects of exogenous variables on allocation changed? Second, have the effects of factors determining wages changed, and in particular, have returns to education been affected?

Estimates of returns to education were obtained as the (selectivity-corrected) coefficient on the education variables in a Mincerian formulation of the wage function. The simplest formulation – a semi-logarithmic function of human capital variables with controls for taste variations would probably yield biased estimates of the returns to education because it ignores the selectivity problem raised if those not in paid work have different characteristics from those who are, and if those in different sectors of work differ as well. In order to correct for these problems, we estimated a multinomial logit model of selection into work into the public or private sectors, self-employment, or unemployment relative to being out of the labour force. The selection function was assumed to be a function of personal characteristics, parental characteristics, human capital variables, and some variables related to residency and assets. Monthly earnings equations were then specified as linear functions of personal characteristics, human capital variables, residency, and a Lee-Heckman correction for selectivity.[1]

Yet another problem is caused by omitted or unobserved variables or those poorly measured. For instance, the quality of education is unmeasured because it is difficult to do so and the data set does not offer a suitable proxy. Furthermore, if women do not have access to the same quality of education as men, their returns to education might be understated. If the quality and quantity of education were correlated so that those attending better schools also attended for a longer time, the returns would likely be biased upward. People may also choose to obtain more or less education depending upon their unmeasured ability, which again is likely to lead to an over-estimate of returns to education. Since no direct controls were available, little can be done to correct for these problems in a cross-section data set. However, we tested the robustness of the results by estimating a fixed effects model using the1994–1997 panel.

The standard Gronau-Heckman econometric model was extended to include three sectors of work, plus unemployment and non-participation. The allocation function was denoted by L, with L_{ij} discrete variable taking on the value j if individual i was in sector j, (j=0,1,2,3,4). The latent variable in the model, L_{ij}^{*}, denotes the indirect utility for individual i being in sector j. S_i is a vector of education variables, Z_i is a vector of other characteristics (personal, household,

1. Contrary to some approaches, we did not use occupations in the selection and wage equation, since this variable is endogenous in this context. However, when occupational dummies were included in the selection and wage equations, the substance of the results remained unchanged.

etc.); and u is an error term. The relationship between the variables can then be expressed as:

$$L_{ij} = j \quad \text{if } L_{ij}^{*} = \text{Max } (L_{i1}^{*}, L_{i2}^{*}, L_{i3}^{*}, L_{i4}^{*})$$
$$L_{ij} = \quad 0 \text{ otherwise} \qquad (1)$$

where $L_{ij}^{*} = a_j.S_i + b_j.Z_i + u_{ij}$ and u_{ij} are i.i.d. with a Type I extreme value distribution.

We also estimated an earnings function for each sector, consequent upon allocation. As is common, we used the semi-logarithmic formulation, with W_{ij} as the log of earnings per month. X_i is a set of household and individual characteristics, (a sub-set of Z) and e_{ij} is an error term. W_{ij} was only observed if L_{ij} equaled j', where j' is now restricted to sectors of wage employment, so a correction term for sample selection, λ_{ij}, was included.

$$W_{ij} = r_j.S_i + c_j.X_i + d_j.\lambda_{ij} + e_{ij} \qquad \text{if } L_{ij} = j' \qquad (2)$$

Estimates of the "direct" or "Mincerian" (marginal) returns or earnings premia, were obtained from the coefficients from equation (2), and expressed as percentage changes using the Kennedy (1981) correction for dummy-variable effects in semi-logarithmic formulations.

Our main interest in the earnings regressions was whether there were changes over time in returns to education, we tested this within the 1994–1997 panel. Suppose that the way earnings are determined changed, over time, even though the individual characteristics, including education had not changed, i.e. suppose the coefficients in (2) were time-dependent as in:

$$W_{ij} = r_{jt}.S_i + c_{jt}.X_i + d.\lambda_{ij} + e_{ij} \quad \text{if } L_{ij} = j' \qquad (3)$$

Estimating this model in first differences on the individual and education variables reveals any changes in the coefficients: significant coefficients on education imply a change in the returns over time. If there were individual fixed effects, i.e., constant unobservable characteristics of the individual correlated with other variables in the regression, any resulting bias is also avoided in this differenced fixed effects model, and so problems such as ability bias can be avoided. This method thus gives a robust estimate of the change in returns.

A panel was only available for part of the study period (1994 to 1997). To compare the estimated returns in the cross-sections, other methods were needed. We tested whether the coefficients in the earnings equation were different across periods using a bounds test proposed by Kobayashi (1986) for the case where the disturbance variances are unequal.[1] We also implemented a nested test of changes in returns, using a pooled sample of 1990, 1994 and 1997.

9.6. Allocation into Work and Estimated Returns to Education

In examining allocation into work, we considered five groups: the public sector, the private sector, the self-employed, unemployed, and those out of the labour force. The multinomial logit model of allocation was assumed to be a function of age; marital status; the number of very young (below 5 years of age) or old (above 65) dependants; total family size; whether head of the household or not; whether migrated in recently or not; ethnicity; highest level of education completed; parental background (i.e., whether the father or mother had completed primary school and whether the father had previously had a public sector job); town of residence; and, finally, a measure of support from the family (whether or not still living with parents)[1] and a measure of support in the form of remittances. The last two variables, together with the number of dependants, might be thought of as proxying the reservation wage.

Allocation equations were estimated for the full sample in 1994 and 1997, covering all adults aged 15–64, and also separately for men and women. For those aged 15–29, data was also available for 1990, so equations were estimated for all three years for the same age cohort. Since the 1990 data is somewhat less comprehensive, however, fewer variables were used in those regressions. The results are reported in Appendix Table 9A.1 for the full sample in 1994 and 1997, Table 9A.2 for the young adults for 1990, 1994 and 1997. The marginal effects are reported (and their statistical significance level), not the regression coefficients themselves. We also tested whether the regressions could be pooled over time to see if there had been any changes in the factors determining labour market allocation.

For the full sample (Table 9A.1), for both men and women between 1994 and 1997 there is very little difference in the coefficients. The effects of household and individual characteristics are generally consistent with other studies. Married men and women were less likely to be unemployed and married women were also more likely to be out of the labour force entirely. Living with parents and receiving support in the form of remittances (which we interpret as high reservation wages) were positively related to being unemployed. Ethnicity also mattered: Tigrayan, Gurage and Amhara men were all more likely to be unemployed (by about 6 to 8%), compared to the base group, mainly Oromos. Amhara men were

1. Kobayashi proves that the difference between sets of estimated coefficients from different linear regressions with different variances can be tested using a test-statistic, which under the null hypothesis of equality of coefficients, is bounded by the critical values of two F-distributions, multiplied by the number of regressors. The null hypothesis can be rejected when the test-statistic lies above the upper critical-value; but can neither be accepted nor rejected when the test-statistic falls between the lower and upper critical-values. In large samples, the two critical-values converge, giving much narrower inconclusive regions.

1. In the Ethiopian context, this variable is unlikely to be endogenous since private housing is difficult to come by, and moves out of the parental house often occur with a substantial lag after employment.

most likely to be in the public sector, about 7% more likely than Tigrayan men. Amharas and Tigrayans were less likely to be self-employed by about 3 to 6 percent relative to Oromos, and somewhat less likely to be in the private sector. Gurage men and women were very likely to be self-employed, up to 9% more likely than Oromos, and Gurage men were very unlikely to be found out of the labour force. These results are all consistent with expectations.

Education seems to have had a substantial effect on allocation between sectors. For example, having completed primary education increases the probability of entering the public sector by 3 to 6 percent relative to having no education. Having at least secondary education also increased the probability of being in the public sector for both men and women by about 15%. However, it also increased the probability of being unemployed by 15–30%. Education is clearly linked with an intention to work: having at least secondary education strongly reduced the probability of being out of the labour force. Educated men were 6–13% less likely to be found in the private sector and self-employment. These results suggest either that educated men may have skills that are not so useful for the private sector or self-employment (no labour demand) or that they tend to remain unemployed rather than enter into these sectors, in order to queue for public sector jobs.

The association of unemployment with secondary school education may well be a recent phenomenon, linked to the reforms, and again we may gain some understanding of the underlying dynamics by looking at the experiences of the young (Table 9A.2 in the Appendix). From 1990 to 1997, allocation of the young into work and into different sectors has changed. The signs and significance of many of the variables determining allocation are the same, but some effects are clearly different. A Lagrange-multiplier test of whether the coefficients in the allocation equation for 1990 and 1997 are the same was convincingly rejected at 1% for both men and women. In particular, the role of the education variables, especially for secondary education, appears to have changed considerably. In 1997, one was much more likely to be unemployed if one had at least completed secondary education, which was not the case in 1990, while the probability of being in the public sector had gone down, at least for men, and the probability of being in the private sector or self-employment had not risen substantially.[1] However, there is relatively little sign of change in the allocation via education into the private sector or into self-employment since 1990. Reforms since 1991 do not appear to have resulted in an increased absorption of skilled

1. The large change in the effect of secondary education on unemployment is well illustrated by the descriptive statistics of the allocation of those with secondary education across the sectors. In 1990, two-thirds of young men aged 15-29 were in school and out of the labour force, in 1997 only 12%. Few of them had been absorbed by the labour market in the interim. The unemployment rate for those with secondary education had increased from 44% to 67% in this period. These effects appear mainly confined to this particular educational group; for other groups, there was relatively little change in this period.

workers into the private sector or self-employment, but retrenchment and reduced recruitment of the secondary- and tertiary-educated into the public sector, as well as greater participation, resulted in a substantial rise in unemployment among the educated.

The earnings regressions are also reported in the Appendix (Tables 9A.3 and 9A.4). Here, we limit ourselves to a discussion of the returns to education and to tests of the changes in the returns over time. Pooling tests between 1990 and 1997 and the estimates from the panel regressions for 1994 and 1997 are used to examine the robustness of the estimates (see Table 9A.5 and Table 9A.6 in the Appendix). To investigate whether returns to education have also changed, we ran standard earnings regressions for the different sectors and age groups by sex to explain the logarithm of total real earnings per month. Variables used were: work experience since leaving full-time education, and its square;[1] whether or not the person is married; whether or not migrated in the last five years; the highest level of education obtained and towns of residence. A Lee-Heckman correction term for sample selection was included as well. Tables 9A.3 to 9A.6 (in the Appendix) give the full results.

Tables 7 to 12 (below) show the estimated returns to education for men and women by sector and the F-test of the statistical significance of changes in the returns over time. Returns are given as the percentage increase from complete education up to the particular level of education (rather than the additional return compared to the level below). Tables 7 and 8 show the returns for young men and young women (using estimates from Table 9A.4). Returns to education were statistically insignificant for primary and secondary education and only statistically significant for tertiary education in both the private and public sector.[2] In the pubic sector, these fell considerably (and faded into insignificance for men) by 1997. However, the F-test suggests that the change across the years is insignificant (a consequence mainly of the large standard errors of estimates in 1997). The pattern is similar for men in the private sector, but women in the private sector appear to have seen considerable fluctuation in their returns – with returns to secondary education falling dramatically between 1990 and 1994, only to restore themselves by 1997. For sector and sex, we also report a t-test of the null hypothesis of equality of returns based on the pooled sample from 1990 and 1997 (re-

1. The data did not allow for the exact calculation of job experience so, as is common, the variable was proxied by the age of the person minus six minus the number of years of full-time education. We also tried using age rather than experience but it made little difference.

2. After 1994 the sample contained far too few of those with less than full primary education so that only total returns for the secondary and tertiary educated groups could be obtained. Similarly, the 1990 sample contained no observations for the tertiary educated in the private sector.

gression estimates in Appendix Table 9A.5).[1] They confirm the results from the F-tests.

Tables 9 and 10 (based on Table 9A.3 in the Appendix) show the estimated returns to education for the full sample of adult men and women for 1994 and 1997. Only for men in the public sector were there statistically significant returns to primary education, but returns for both sexes in both sectors were consistently considerably higher for higher levels of education, which was also true of the younger sub-sample just discussed. Returns to education for men in the public sector were statistically significant at all levels of education, for women only for higher levels of education in 1994, and in the private sector only at higher levels of education for both men and women in both years, but there was no statistically significant change in returns. The apparent collapse in tertiary returns for the young in the public sector disappears for men in the full sample. If there was a change, men older than 29 must have been sheltered from it. The collapse is more apparent for women, however, and in secondary returns as well. Men appear to have actually experienced slightly higher returns to secondary and tertiary education, not only in the public sector but in the private sector as well, whereas women also experienced a fall in tertiary returns in the private sector. Again, however, F-tests show none of these changes as statistically discernible.

Tables 9.11 and 9.12 provide a test of the robustness of the previous estimates (and the changes) using panels of men and women who worked in the same sector of work in both 1994 and 1997. The tables first report the returns and the F-test of differences based on cross-sectional estimates, followed by the implied changes in returns based on fixed effects estimation (Table 9A.6). The implied (fixed effects) changes are often similar, in one case identical, to the changes based on cross-sectional estimates. Individual fixed characteristics, which may affect estimated returns using cross-sectional data, do not appear to have affected the changes implied by these estimates. Furthermore, the fixed effects estimates confirm that the changes were not statistically significant, particularly for secondary and tertiary education.[2] This is a surprising result, in a period when the private sector was supposed to be freer to respond to market forces, including in the labour market. The private sector seems to have responded with keeping returns to

1. Contrary to the bounds test, this test restricts all coefficients, except for the education dummies, to being the same in both 1990 and 1997. Since the estimates were used on very few observations in each group, we do not report the t-test for differences in the return to primary education. Nevertheless the evidence in Table 9A.5 suggests no change for returns to primary education in the public sector, and a decline in the private sector, statistically significant at 10%.

2. The exception is an apparent decline in returns in the private sector for men with primary education compared to those without education. This suggests that the private sector had devalued primary education. This is not easily understood in the context of the labour market pressures. Although unemployment among the primary educated increased during this period by 15 percent of the labour force, this increase was well below the increase experienced by secondary and tertiary educated groups (23 and 25 percent respectively).

education unchanged, including for secondary educated, the group that is most unemployed and whose share of the unemployed had increased strongly.

It may be useful to compare these returns with those obtained for Ghana for 1987 and 1991 (Canagarajah and Mazumdar, 1997), a period of adjustment there. Pooling private and public employees, they found no discernible returns to primary education at all, but there were positive returns to secondary education and rose these substantially. Furthermore, a selectivity-corrected regression for 1991–92 found the returns to education much higher in the private sector than in the public, which they interpreted as indicating the increasing importance of education in the private sector. Furthermore, the narrowing of earnings-differentials between the private and public sectors by 1991 reduced the returns to education in the public sector.

There is little evidence that the recovery and reforms in Ethiopia since 1992 have affected returns to education as in Ghana. Despite some similarities, such as the initial collapse in public sector wages and the narrowing of the public-private wage-differential, the public sector in Ethiopia remained the dominant employer, and the queues of secondary graduates made little impact on the private sector's pattern of remuneration. This suggests that, at least as of 1997, the labour market in Ethiopia was quite unresponsive to the reforms. The key difference between the Ghanaian and Ethiopian experience may have been the low rate of open unemployment in Ghana.

Table 9.7: Returns to education for men aged 15–29 by sector, 1990, 1984, and 1997

	Public sector							Private sector						
		Young men		F-test for testing cross-sectional differences			t-test pooled sample		Young men		F-test for testing cross-sectional differences			t-test pooled sample
	1990	1994	1997	90–94	94–97	90–97	90–97	1990	1994	1997	90–94	94–97	90–97	90–97
primary	-0.06	-	-					0.17	-	-				
secondary	0.11	0.17	-0.07	0.00	0.06	0.04	-0.25	0.83*	0.00	0.49+	0.59	1.95	0.27	-0.70
tertiary	1.37*	1.09*	0.16	0.04	0.50	0.79	-1.42	-	1.07*	0.87*		0.06		

Note: Returns are given as the percentage increase from complete education up to a particular level, not per year. Returns are corrected using Kennedy (1981). The full regression results are shown in regressions in table 9A.4 and for pooled sample, in table 9A.5. Differences between returns were tested using Kobayashi (1986) on the regression estimated coefficients and the standard errors of the respective regressions. Critical values for rejecting equality of returns between periods are 6.8 (at 1%), 3.9 (at 5%) and 2.7 (at 10%). ** = significant at 1%; * = significant at 5%; += significant at 10%.

Table 9.8: Returns to education for women aged 15–29 by sector, 1990, 1994, and 1997

	Public sector							Private sector						
		Young women		F-test for testing cross-sectional differences			t-test pooled sample		Young women		F-test for testing cross-sectional differences			t-test pooled sample
	1990	1994	1997	90–94	94–97	90–97	90–97	1990	1994	1997	90–94	94–97	90–97	90–97
primary	-0.02	-	-					0.68**	-	-				
secondary	0.82+	-0.11	-0.07	2.52	0.04	1.85	-0.82	1.46**	0.19	1.49**	10.99**	3.04*	0.00	0.07
tertiary	2.15**	0.83**	0.86+	1.49	0.02	0.84	-0.47		0.84**	2.38**		2.42		

See note under Table 9.7. ** = significant at 1%; * = significant at 5%; + = significant at 10%.

Table 9.9: Returns to education for men aged 15–64 by sector, 1994 and 1997

	Public sector			Private sector		
			F-test for testing cross-sectional differences			F-test for testing cross sectional differences
	1994	1997	94–97	1994	1997	94–97
primary	0.33**	0.31**	0.01	0.06	0.04	0.02
secondary	0.95**	1.08**	0.12	0.28+	0.71**	1.56
tertiary	2.15**	2.34**	0.10	2.00**	2.15**	0.04

See note under Table 9.7. Results based on table 9A.3. **=significant at 1%; *=significant at 5%; += significant at 10%.

Table 9.10: Returns to education for women aged 15–64 by sector, 1994 and 1997

	Public sector			Private sector		
			Testing differences F-test			Testing differences F-test
	1994	1997	94–97	1994	1997	94-97
primary	0.02	-0.07	0.04	0.36	-0.03	0.75
secondary	0.44+	0.09	0.16	1.58**	1.60**	0.00
tertiary	1.67**	0.90	0.22	3.03**	2.52**	0.07

See note under Table 9.7. Results based on Table 9A.3.** = significant at 1%; * = significant at 5%; + = significant at 10%.

Table 9.11: Returns to education for men aged 15–64 (percentage earnings increase from complete education up to the particular level). Individuals in panel.

	Public sector				Private sector			
			Testing differences F-test	Implied change fixed effects			Testing differences F-test	Implied change fixed effects
	1994	1997	94-97	94-97	1994	1997	94-97	94-97
primary	0.66**	0.69**	0.01	0.07	1.08**	0.23	2.97+	-0.85*
secondary	1.53**	1.21**	0.31	-0.18	2.01**	0.93*	1.34	-0.76
tertiary	3.27**	2.74**	0.31	-0.28	3.97**	2.73**	0.45	-1.07

**=significant at 1%; *=significant at 5%; += significant at 10%.
See note under Table 9.7. Panel individuals include those with complete information in 1994 and 1997 and who stayed in the same sector. The first two columns in each sector are the returns based on cross-section estimates for the sample in each year. Differences are tested using the bounds test described above. Fixed effects results are implied changes in returns relative to 1994 values, through adding to 1994 coefficients the estimated change to obtain 1997 figure. These implied coefficients were transformed into returns and the column gives the implied difference in returns. Significance tests are based on the original coefficients. The regression results are in table 9A.6.

Table 9.12: Returns to education for women aged 15–64 (percentage earnings increase from complete education up to the particular level). Panel individuals.

	Public sector				Private sector			
			Testing differences F-test	Implied change fixed effects			Testing differences F-test	Implied change fixed effects
	1994	1997	94-97	94-97	1994	1997	94-97	94-97
primary	-0.21	-0.11	0.17	0.14	0.25	-0.27	0.94	-0.08
secondary	-0.03	-0.16	0.01	-0.05	0.09	1.60*	1.60	-0.54
tertiary	0.74+	0.50	0.01	-0.16	0.36	1.03+	1.03	-0.60

**=significant at 1 percent; * = significant at 5%; + = significant at 10%.
See notes under Tables 9.7 and 9.11.

9.7 Summary and Conclusions

This chapter has reviewed some of the changes that took place in the Ethiopian urban labour market between 1990 and 1997. The civil war ended in 1991 with a change of government and the introduction of public sector reforms within a structural adjustment and reform programme. Growth of GDP then averaged an impressive 7% from 1992 to 1997. However, the country saw little foreign or domestic investment and remained dependent on a combination of good weather, aid and debt relief. The slow pace of privatisation and the contradictory signals to investors also meant that the private sector remained marginal, particularly in terms of employment.

The public sector contracted over this period. There is evidence of a large re-allocation of labour out of the public sector between 1990 and 1994, and an increase in unemployment. After 1994, unemployment declined slightly, with a limited increase in private sector employment, and in self-employment. Real wages in the public sector declined from 1990 to 1994, largely following an inflationary shock in 1991/92, which as of 1997 had not been fully compensated for, despite an upward revision of public sector pay scales in 1995. In the private sector, wages and especially earnings generally rose over the period, narrowing the gap with public sector pay.

Overall returns to education in the public sector do not appear to have changed much from 1990 to 1997. Private sector wages and earnings have been rising, and returns to secondary and tertiary education were generally unaffected despite high unemployment levels. These results were confirmed by the estimates using the 1994–1997 panel data, suggesting that they are robust to possible unmeasured or missing variables that usually bedevil such analyses.

The pattern of allocation into work, particularly into the public sector, does appear to have changed from 1990 to 1997. Those with secondary education were substantially less likely to be in the public sector and more likely to be unemployed. Clearly, dropping the job-guarantee for those with post-secondary education had mattered; however, given the rigidity of wages and returns in the public sector, this had made little impact on the re-allocation of the educated into private employment. The unemployed appeared to be queuing for work, primarily in the public sector. These findings suggest imbalances and rigidities in the urban labour market and that the transition to an equilibrium may take considerable time.

References

Appleton, S. et al. (1995), "Does the Labour Market Explain Low Female Schooling? Evidence from three African countries", Queen Elizabeth House Development Studies Working Paper no. 83, Oxford University.

Bennell, P. (1996), "Rates of Return to Education: Does the conventional pattern prevail in Sub-Saharan Africa", *World Development*, 24(1): 183–99.

Canagarajah, S. and S. Thomas (1997), "Ghana's Labour Market: 1987–92´" World Bank Policy Research Paper 1752, World Bank, Washington, DC.

Canagarajah, S. and D. Mazumdar (1997), "Employment, Labour Markets and Poverty in Ghana: A study of changes during economic decline and recovery", World Bank Policy Research Paper 1853, World Bank, Washington, DC,

Central Statistical Authority (1996), *The 1994 Population and Housing Census of Ethiopia: Results for Addis Ababa*. Abridged Statistical Report.

Central Statistical Authority (1996), *Ethiopia Statistical Abstract 1995.*

Collier, P., et al. (1997), "Social Sector Review – Executive Summary", Report for the Ministry of Finance, Ethiopia. Centre for the Study of African Economies, Oxford University.

Collier, P., and J.-W. Gunning (1995), "War, Peace and Private Portfolios", *World Development*, 23(2): 233–41.

Financial Times Survey (1998), *Ethiopia*, Monday, March 2.

Griliches, Z. (1977). "Estimating the Returns to Schooling: Some econometric problems", *Econometrica*, 45: 1–22.

Horton, S et al. (eds) (1994), *Labour Markets in an Era of Adjustment*, Vols. 1 and 2, World Bank EDI Development Studies, World Bank, Washington, DC.

Kennedy, P. (1981), "Estimation with Correctly-Interpreted Dummy Variables in Semi-Logarithmic Equations ", *American Economic Review* 71: 801.

Knight, J. et al. (1992), "Is the Rate of Return to Primary Education Really 26%?", *Journal of African Economies* 1(2): 192–205.

Kobayashi, M. (1986), "A Bounds Test of Equality Between Sets of Coefficients in Two Linear Regressions When Disturbance Variances Are Unequal", *Journal of the American Statistical Association* 81(394): 510–13.

Krishnan, P. (1996). "Family Background, Education and Employment in Urban Ethiopia", *Oxford Bulletin of Economics and Statistics* 58(1): 167–84.

Lindauer, D.L., (1986), "Government Wage Policy in Africa: Summary findings and policy issues", CPD Discussion Paper 86-24, Country Policy Department, World Bank, Washington, DC.

Lindauer, D.L. et al. (1988), "Government Wage Policy in Africa – Some findings and policy issues", *World Bank Research Observer* 3(1): 1–24.

Maddala, G.S. (1983), *Limited Dependent and Qualitative Variables in Econometrics*. Cambridge University Press, Cambridge.

Mazumdar, D. (1989), "Microeconomic Issues of Labour Markets in Developing Countries: Analysis and Policy Implications", Economic Development Institute Seminar Paper No. 40, World Bank, Washington, DC.

Ministry of Finance (1993), *Survey of Current Economic Conditions in Ethiopia*. Addis Ababa.

Psacharopoulos, G. (1994), "Returns to Investment in Education: A global update", *World Development,* 22(9).

World Bank (1988), *Education in Sub-Saharan Africa.* World Bank, Washington, DC

Appendix 9: Further Estimates

Table 9A.1: Allocation into wage employment, self-employment, unemployment, and out of the labour force in urban Ethiopia, 1994 and 1997

Sample of adults between 15 and 64 years of age. Multinomial logit. Marginal probabilities and significance levels.

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Allocation into sectors	Men		Women	
Adults (15–64 years)	1994	1997	1994	1997
	n= 2293	n=3047	n=2750	n=3179
UNEMPLOYED				
Constant	t-0.365	-0.562 **	-0.673 **	-0.748 **
family size	-0.002	-0.003	-0.007 **	-0.004 *
married	-0.116 **	-0.098 **	-0.320 **	-0.292 **
age	0.028 **	0.039 **	0.045 **	0.051 **
age squared	0.000 **	-0.001 **	-0.001 **	-0.001 **
dependent elderly	-0.047 **	-0.009	0.004	-0.009
dependent children	0.032 **	-0.001	0.023 *	0.020 **
living with parents	0.091 **	0.024 *	0.047 **	0.010
value remittances	0.109 **	0.042 *	0.041	0.046 *
migrated	0.019	0.010	0.031	0.068 **
head of household	-0.198 **	-0.285 **	-0.164 **	-0.091 **
primary educated	0.002	-0.055 **	0.000	-0.031 *
at least secondary educated	0.191 **	0.151 **	0.296 **	0.194 **
mother has primary	-0.060 **	-0.048 **	-0.025	0.010
father has primary	0.046 **	0.003	-0.065 **	-0.049 **
father in public sector	-0.014	-0.039 **	-0.009	0.005
Tigrayan	0.066 *	0.049 *	-0.059 +	-0.048 *
Gurage	0.067 **	0.050 **	0.036	0.029 +
Amhara	0.078 **	0.054 **	0.028 +	0.018
Dire Dawa	0.149 **	0.149 **	0.007	0.012
Mekele	-0.023	-0.053	0.078 +	-0.017
Jimma	0.031	0.053 *	0.005	-0.003
Bahar Dar	0.066 **	0.052 *	-0.006	0.009
Dessie	0.089 **	0.090 **	0.001	-0.003
Awassa	0.077 **	0.146 **	0.002	0.035 +
PUBLIC SECTOR				
Constant	-1.059 **	-1.069 **	-0.664 **	-0.781 **
family size	-0.005 **	-0.003 **	-0.001 +	0.000
married	0.058 **	0.036 **	-0.029 **	-0.033 **
age	0.054 **	0.054 **	0.032 **	0.036 **
age squared	-0.001 **	-0.001 **	0.000 **	0.000 **
dependent elderly	-0.009 *	0.019 *	0.004	-0.032 **
dependent children	-0.009 *	0.011 **	-0.006 +	0.004
living with parents	-0.012 *	-0.016 **	0.001	-0.009
value remittances	-0.176 **	0.005	-0.030 **	-0.003
migrated	0.014	0.041 **	0.001	0.043 **
head of household	0.075 **	0.013	0.008	0.018 +
primary educated	0.031 **	0.009	0.060 **	0.061 **
at least secondary educated	0.161 **	0.121 **	0.151 **	0.175 **
mother has primary	0.011 +	-0.017 *	-0.006	0.010
father has primary	0.032 **	0.018 **	-0.004	-0.021 **
father in public sector	-0.042 **	-0.037 **	-0.006	-0.006
Tigrayan	-0.046 **	0.010	-0.017 +	-0.021 +
Gurage	-0.021 **	-0.009	0.002	-0.009
Amhara	0.025 **	0.037 **	0.007	0.019 **
Dire Dawa	0.034 **	0.004	0.004	0.006
Mekele	0.031 *	0.034 *	-0.005	-0.002
Jimma	0.077 **	0.089 **	0.009	0.005
Bahar Dar	0.093 **	0.038 **	0.036 **	0.045 **
Dessie	0.002	-0.007	-0.021 +	-0.035 **
Awassa	0.072 **	0.061 **	0.037 **	0.031 **

Table 9A.1 contd.

Allocation into sectors	Men		Women	
Adults (15–64 years)	1994	1997	1994	1997
	n= 229	n=3047	n=2750	n=3179
PRIVATE SECTOR				
Constant	-0.157 **	-0.772 **	-0.252 **	-0.494 **
family size	-0.005 **	-0.011 **	-0.001	-0.003 *
married	0.076 **	0.091 **	-0.069 **	-0.099 **
age	0.023 **	0.055 **	0.013 **	0.026 **
age squared	0.000 **	-0.001 **	0.000 **	0.000 **
dependent elderly	0.012 +	0.052 *	0.003	-0.013
dependent children	-0.001	0.025 **	-0.006	0.021 **
living with parents?	-0.127 **	-0.041 **	-0.045 **	-0.014
value remittances	-0.144 **	-0.062 **	-0.043 **	-0.013
migrated	0.026 +	0.011	0.074 **	0.062 **
head of household	0.077 **	0.007	-0.002	0.037 +
primary educated	-0.118 **	-0.064 **	-0.029 **	-0.045 **
at least secondary educated	-0.131 **	-0.085 **	0.065 **	0.087 **
mother has primary	0.022 *	-0.024	-0.035 **	-0.020
father has primary	-0.086 **	-0.037 *	0.004	-0.029 *
father in public sector	0.017 *	0.010	-0.007	-0.005
Tigrayan	0.015	-0.011	-0.052 **	-0.041 *
Gurage	-0.005	0.033 +	-0.023 *	-0.016
Amhara	-0.034 **	0.002	-0.014 *	0.001
Dire Dawa	-0.092 **	-0.100 **	-0.004	-0.010
Mekele	-0.097 **	-0.020	0.046 **	0.052 +
Jimma	-0.121 **	-0.128 **	-0.086 **	-0.031
Bahar Dar	-0.164 **	-0.192 **	-0.018	-0.054 **
Dessie	-0.067 **	-0.130 **	-0.025 *	-0.089 **
Awassa	-0.083 **	-0.058 *	-0.067 **	-0.097 **
SELF-EMPLOYMENT				
Constant	-0.405 **	-0.650 **	-0.315 **	-0.756 **
family size	0.012 **	0.010 **	0.004 **	0.000
married	0.003	-0.022	-0.113 **	-0.067 **
age	0.018 **	0.027 **	0.015 **	0.037 **
age squared	0.000 **	0.000 **	0.000 **	0.000 **
dependent elderly	0.012 **	-0.003	0.024 **	0.031 +
dependent children	0.000	0.018 **	0.003	0.032 **
living with parents?	-0.036 **	-0.008	-0.063 **	-0.060 **
value remittances	-0.180 **	-0.080 **	-0.055 **	-0.062 **
migrated	0.040 **	-0.003	0.051 **	0.060 **
head of household	0.191 **	0.173 **	0.021 +	0.160 **
primary educated	-0.091 **	-0.079 **	-0.039 **	-0.027 *
at least secondary educated	-0.107 **	-0.069 **	-0.006	-0.011
mother has primary	-0.052 **	-0.027 **	0.009	0.033 *
father has primary	-0.039 **	-0.048 **	-0.005	-0.067 **
father in public sector	0.071 **	0.077 **	0.003	0.012
Tigrayan	-0.029 *	-0.025 *	-0.007	-0.015
Gurage	0.090 **	0.078 **	0.022 *	0.032 *
Amhara	-0.058 **	-0.036 **	-0.026 **	-0.051 **
Dire Dawa	-0.012	-0.015 +	0.072 **	0.046 **
Mekele	-0.030 +	0.056 **	-0.023	-0.008
Jimma	-0.004	0.038 **	0.000	0.075 **
Bahar Dar	-0.027 *	0.037 **	0.014	0.116 **
Dessie	0.032 *	0.043 **	0.020	0.043 *
Awassa	0.025 *	0.005	-0.007	0.027

Table 9A.1 contd.

Allocation into sectors	Men		Women	
Adults (15–64 years)	1994	1997	1994	1997
	n=2293	n=3047	n=2750	n=3179
OUT OF LABOUR FORCE				
Constant	1.986 **	3.052 **	1.903 **	2.779 **
family size	0.000	0.007	0.006	0.008
married	-0.021	-0.008	0.531 **	0.491 **
age	-0.122 **	-0.174 **	-0.104 **	-0.150 **
age squared	0.002 **	0.002 **	0.001 **	0.002 **
dependent elderly	0.033	-0.060	-0.036	0.023
dependent children	-0.022	-0.054 *	-0.013	-0.078 **
living with parents	0.084 **	0.040	0.060	0.074 +
value remittances	0.392 **	0.095	0.087	0.031
migrated	-0.099 +	-0.058	-0.158 *	-0.233 **
head of household	-0.145 +	0.091	0.137 *	-0.124
primary educated	0.176 **	0.189 **	0.008	0.042
at least secondary educated	-0.115 *	-0.118 *	-0.506 **	-0.446 **
mother has primary	0.079 +	0.116 *	0.056	-0.033
father has primary	0.046	0.064	0.070 +	0.166 **
father in public sector	-0.032	-0.010	0.019	-0.006
Tigrayan	-0.007	-0.023	0.136 *	0.124 +
Gurage	-0.131 **	-0.151 **	-0.036	-0.037
Amhara	-0.011	-0.057	0.005	0.012
Dire Dawa	-0.079 +	-0.037	-0.079	-0.053
Mekele	0.119	-0.017	-0.095	-0.025
Jimma	0.017	-0.053	0.071	-0.046
Bahar Dar	0.033	0.066	-0.026	-0.116 +
Dessie	-0.056	0.004	0.025	0.084
Awassa	-0.091	-0.154 *	0.035	0.004
Chi-squared joint sign.	2092.358 **	3166.670 **	1769.569 **	2666.462 **

** = significant at 1%; * = significant at 5%; + = significant at 10%

Table 9A.2: Allocation into wage employment, self-employment, unemployment, and out of the labour force for young adults (15 to 29 years of age) in urban Ethiopia, 1990, 1994 and 1997

Multinomial logit. Marginal probabilities and significance levels.

	Men - allocation into sectors			Women - allocation into sectors		
	1990	1994	1997	1990	1994	1997
	n=1535	n=1332	n=1598	n=2614	n=1554	n=1720
UNEMPLOYMENT						
Constant	-2.344 **	-3.099 **	-3.925 **	-2.314 **	-4.932 **	-4.187 **
married	-0.040	-0.190		-0.214 **	-0.405 **	-0.342 **
age	0.200 **	0.250 **	0.318 **	0.197 **	0.427 **	0.338 **
age squared	-0.004 **	-0.005 **	-0.006 **	-0.004 **	-0.009 **	-0.007 **
live with parents	0.011	0.040	-0.021	0.020 +	0.050 +	-0.030
migrated	-0.011	0.037	0.053	0.001	0.045	0.106 **
primary complete	-0.060 +	-0.045	-0.161 **	0.006	-0.094 *	-0.118 **
secondary at least	-0.034	0.312 **	0.175 **	0.069 **	0.340 **	0.254 **
mother primary	0.040	-0.106 **	-0.076 *	0.011	-0.041	0.023
father primary	-0.007	-0.029	-0.061 *	-0.025 +	-0.113 **	-0.103 **
father public sector	0.013	0.042	0.029	0.030 *	0.045	0.046 +
Tigrayan	0.084 *	0.008	0.056	0.007	-0.161 **	-0.130 **
Gurage	-0.016	0.087 +	0.095 **	-0.016	0.043	0.074 *
Amhara	-0.013	0.088 **	0.079 **	-0.009	0.028	0.031
Addis Ababa	-0.079 *	-0.113 **	-0.066 *	-0.031 *	-0.043	-0.053 *
Dire Dawa	0.012	0.105 *	0.112 **	0.075 **	-0.019	-0.022
PUBLIC SECTOR						
Constant	-1.833 **	-0.570 **	-0.365 **	-1.107 **	-0.415 **	-0.428 **
married	0.096 **	0.043 **		-0.025 *	-0.008	-0.015
age	0.132 **	0.037 **	0.019 **	0.081 **	0.022 **	0.019 *
age squared	-0.002 **	-0.001 **	0.000	-0.002 **	0.000 *	0.000
live with parents	-0.033 **	-0.013 **	-0.005 *	-0.004	0.002	-0.008 **
migrated	0.048 **	0.007	0.033 **	0.003	0.008	0.015 **
primary complete	0.082 **	0.008 +	-0.007 +	0.051 **	0.008 *	-0.003
secondary at least)	0.088 **	0.042 **	0.028 **	0.077 **	0.048 **	0.063 **
mother primary	0.029 +	-0.003	-0.007 *	0.006	0.000	0.011 *
father primary	0.006	0.005 +	-0.003	-0.017 **	-0.007 *	-0.014 **
father public sector	0.015	0.004	0.001	0.023 **	0.010 *	0.003
Tigrayan	0.020	-0.002	-0.008 +	0.003	-0.028 **	-0.020 **
Gurage	-0.025	0.004	0.002	0.002	0.004	-0.005
Amhara	0.007	0.001	-0.001	0.011 *	0.012 **	0.016 **
Addis Ababa	-0.017	-0.015 **	-0.012 **	-0.018 **	0.004	-0.006
Dire Dawa	0.008	-0.030 **	-0.023 **	0.044 **	0.000	-0.004
PRIVATE SECTOR						
Constant	-0.530 **	-0.584 **	-1.438 **	-0.352 **	-0.497 **	-0.565 *
married	0.027 +	0.135 **	0.404	-0.084 **	-0.066 **	-0.052 *
age	0.041 **	0.038 *	0.096 **	0.030 **	0.031 **	0.027
age squared	-0.001 **	0.000	-0.002 *	-0.001 **	0.000 +	0.000
live with parents	-0.020 **	-0.079 **	-0.057 **	-0.051 **	-0.032 **	-0.032 **
migrated	-0.003	0.020	0.020	0.028 **	0.075 **	0.053 **
primary complete	-0.028 +	-0.132 **	-0.061 **	-0.041 **	-0.058 **	-0.072 **
secondary at least	-0.073 **	-0.116 **	-0.045 *	-0.074 **	-0.002	-0.001
mother primary	-0.014	-0.018	-0.067 **	0.012 +	-0.020 **	0.003
father primary	0.007	-0.039 **	-0.037 **	-0.011 *	0.003	-0.052 **
father public sector	0.024 **	0.007	0.031 **	0.005	0.016 **	0.058 **
Tigrayan	-0.030 *	0.012	0.007	0.028 **	-0.055 **	-0.043 **
Gurage	0.041 **	0.026 +	0.035 +	-0.022 **	-0.020 *	0.007
Amhara	-0.002	-0.017 +	0.010	0.012 **	-0.010 +	0.001
Addis Ababa	-0.009	0.085 **	0.071 **	0.024 **	0.028 **	0.015
Dire Dawa	0.037 **	0.039 *	0.014	0.020 *	0.022 *	0.005

Table 9A.2 contd.

	Men - allocation into sectors			Women - allocation into sectors		
	1990	1994	1997	1990	1994	1997
	n=1535	n=1332	n=1598	n=2614	n=1554	n=1720
SELF-EMPLOYMENT						
Constant	-0.165 **	-0.419 **	-0.417 **	-0.089 **	0.129	-0.091
married	0.013 *	0.059 **	0.103	-0.015 **	-0.114 **	-0.056 **
age	0.012 **	0.033 **	0.026 *	0.006 **	-0.020 *	-0.005
age squared	0.000 *	-0.001 **	0.000 +	0.000 **	0.001 **	0.000 +
live with parents	-0.005 *	-0.032 **	-0.012 **	-0.004 **	-0.040 **	-0.030 **
migrated	-0.006 *	0.030 **	0.013	-0.004 **	0.042 **	0.022 *
primary complete	-0.012 **	-0.065 **	-0.033 **	-0.001	-0.057 **	-0.014 +
secondary at least	-0.023 **	-0.054 **	-0.017 *	-0.016 **	-0.029 **	-0.023 **
mother primary	0.003	-0.010	-0.020 **	0.006 **	0.013 *	0.005
father primary	-0.005 +	-0.028 **	-0.029 **	0.001	-0.015 **	-0.022 **
father public sector	0.004	-0.032 **	-0.003	0.001	-0.004	-0.041 **
Tigrayan	-0.167 **	-0.067 **	-0.031 **	-0.084 **	-0.024 **	-0.024 *
Gurage	0.011 **	0.032 **	0.030 **	0.003 +	0.011	0.004
Amhara	-0.005 *	-0.054 **	-0.024 **	-0.006 **	-0.032 **	-0.025 **
Addis Ababa	-0.040 **	0.009 +	-0.004	-0.006 **	0.005	-0.045 **
Dire Dawa	0.007	-0.014	-0.017 *	-0.009 **	0.073 **	-0.011
OUT OF LABOUR FORCE						
Constant	4.873 **	4.672 **	6.145 **	3.861 **	5.714 **	5.271 **
married	-0.097	-0.047	1.268	0.338 **	0.593 **	0.465 **
age	-0.384 **	-0.358 **	-0.458 **	-0.315 **	-0.460 **	-0.379 **
age squared	0.008 **	0.006 **	0.008 **	0.007 **	0.009 **	0.006 **
live with parents	0.047	0.084 +	0.094 *	0.039 +	0.021	0.100 *
migrated	-0.028	-0.093	-0.119	-0.028	-0.170 *	-0.196 **
primary complete	0.018	0.234 **	0.262 **	-0.014	0.201 **	0.206 **
secondary at least	0.042	-0.185 *	-0.140 +	-0.056 *	-0.356 **	-0.293 **
mother primary	-0.056	0.138 *	0.170 **	-0.034	0.048	-0.041
father primary	-0.002	0.091 +	0.130 *	0.052 *	0.132 **	0.191 **
father public sector	-0.056	-0.020	-0.058	-0.059 *	-0.068	-0.066
Tigrayan	0.094	0.049	-0.024	0.046	0.267 **	0.218 **
Gurage	-0.010	-0.149 *	-0.162 *	0.033	-0.038	-0.080
Amhara	0.013	-0.018	-0.064	-0.008	0.001	-0.022
Addis Ababa	0.145 **	0.034	0.011	0.031	0.006	0.090 *
Dire Dawa	-0.063	-0.100	-0.086	-0.129 **	-0.075	0.032
Chi-squared joint sign.	812.150 **	977.130 **	1248.049 **	1278.600 **	1129.83 **	1212.496 **

** = significant at 1%; * = significant at 5%; + = significant at 10%.
Note: Pooling test allocation model for 1990 and 1997: Lagrange Multiplier test.
Test-statistic is under null hypothesis of pooling between 1990 and 1997. Chi-squared distributed with 60 degrees of freedom. Test-statistics: Men: 264.02; Women : 438.68. Pooling rejected.

Table 9A.3: Wage regressions for men and women aged 15–64 by sector, 1994 and 1997 (left hand side = log of real wage per month) with sample selection

Adults (15 to 64 years)	Men				Women			
Returns	Public sector		Private sector		Public sector		Private sector	
	1994	1997	1994	1997	1994	1997	1994	1997
Constant	4.811**	3.807**	3.225**	3.521**	4.500**	4.853**	4.004**	2.063+
married	0.029	-0.245**	0.035	-0.005	0.055	0.064	0.209	-0.080
migrated	0.134	0.447**	-0.148	-0.182	0.263	0.220	-0.238	0.642
experience	0.007	0.079**	0.076**	0.056**	0.022	0.017	0.012	0.054*
experience squared	0.000	-0.001**	-0.001**	-0.001*	0.000	0.000	0.000	-0.001+
primary educated	0.291**	0.276*	0.072	0.047	0.015	-0.032	0.338	0.012
secondary educated	0.676**	0.746**	0.257	0.552**	0.360	0.186	0.979**	0.995**
tertiary educated	1.155**	1.219**	1.115**	1.172**	0.969**	0.761	1.428**	1.313**
Awassa	0.074	0.144	-0.732	-0.442	-0.067	0.335		-0.738**
Bahar Dar	-0.073	-0.017	-0.850**	-0.444**	0.100	0.216	0.203	-0.462*
Dessie	-0.113	-0.028	-0.042	-0.118	0.137	0.042	-0.419+	-0.775**
Jimma	-0.068	0.001	-0.690**	-0.902**	0.138	0.139	-0.497+	-0.672**
Mekele	0.005	-0.270	-0.370	0.157	-0.171	-0.069	-0.232	-0.221
Dire Dawa	0.099	-0.076	-0.073	0.024	0.230*	-0.002	0.200	0.048
Lambda (selection)	-0.373**	0.004	0.567**	0.402+	-0.175	-0.235	0.001	0.882′
Number of observations	401	336	269	249	256	248	101	125
Adjusted R-squared	0.52	0.33	0.29	0.17	0.47	0.30	0.36	0.24

** = significant at 1%; * = significant at 5%; + = significant at 10%.

Table 9A.4: Wage regressions for men and women aged 15–29, 1990, 1994, and 1997

(left hand side = log of real wage per month) with sample selection.

	Men aged 15–29					
	Public Sector			Private Sector		
	1990	1994	1997	1990	1994	1997
Constant	5.139 **	4.868 **	5.952 **	3.332 **	3.845 **	3.887 **
married	-0.166	0.028	-0.379	-0.028	-0.050	0.081
migrated	-0.116	0.256	-0.347	-0.279	-0.599 **	-0.386
experience	0.045	0.087	-0.106	0.100 **	0.100 *	0.001
experience squared	-0.002	-0.005	0.005 *	-0.003 *	-0.003	0.002
primary school	-0.036			0.184		
secondary education	0.232	0.179	0.045	0.672 *	0.008	0.435
tertiary education	0.937 *	0.775 **	0.317		0.767 **	0.672 *
Addis Ababa	0.232 *	-0.031	0.207	-0.088	0.224	0.325
Dire Dawa	0.194	-0.005	-0.282	0.079	0.365	0.228
Lambda (selection)	-0.433 *	-0.351	-0.373	0.298	0.116	0.190
Number of observations	244	92	64	73	114	96
Adjusted R-squared	0.36	0.38	0.19	0.18	0.10	0.01

	Women aged 15–29					
	Public Sector			Private sector		
	1990	1994	1997	1990	1994	1997
Constant	4.721 **	5.231 **	5.860 **	3.493 **	5.421 **	3.249 **
married	0.163 +	-0.018	-0.380	-0.090	0.494 +	-0.168
migrated	0.079	0.584 **	0.077	0.163	-0.752 +	0.456
experience	0.029	-0.004	0.014	0.063 +	0.049	0.054
experience squared	-0.001	0.001	0.000	-0.001	-0.004	-0.001
primary educated	-0.004			0.531 **		
secondary educated	0.593	-0.089	-0.012	0.929 **	0.223	0.948 **
tertiary educated	1.146 **	0.637 *	0.703 +		0.643 *	1.263 **
Addis Ababa	0.153	0.081	-0.444	-0.016	-0.103	-0.053
Dire Dawa	0.144 *	0.026	-0.761 *	-0.434 **	0.055	0.219
Lambda	-0.374	-0.412 *	-0.518	-0.086	-0.422	0.263
Number of observations	245	84	73	83	54	60
Adjusted R-squared	0.39	0.48	0.25	0.47	0.08	0.22

** = significant at 1%; * = significant at 5%; + = significant at 10%.

Table 9A.5: Wage regressions for men and women aged 15–29 by sector, 1990–1997 (pooled sample)

(left hand side = log of real wage per month) with sample selection.

	Men		Women	
	Public	Private	Public	Private
Variable	Coefficient	Coefficient	Coefficient	Coefficient
Constant	5.201 **	3.848 **	5.044 **	3.403 **
dummy 1997	-0.236	1.001 +	0.425	0.334
married	-0.255 *	-0.004	0.122	-0.074
migrated	-0.116	-0.334 +	0.060	0.200
experience	0.012	0.040	0.016	0.070 *
experience squared	0.000	-0.001	-0.001	-0.001
primary educated	0.101	0.200	-0.096	0.565 **
secondary educated	0.359	0.551 +	0.443	1.006 **
tertiary educated	1.045 **	n.a.	0.969 *	
primary * dummy 97	0.034	-0.504 +	0.258	-0.618 *
secondary * dummy 97	-0.074	-0.261	-0.280	0.024
tertiary * dummy 97	-0.472	0.554 +	-0.181	1.325 **
Addis Ababa	0.249 **	0.085	0.085	-0.053
Dire Dawa	0.110	0.140	0.035	-0.231
Lambda 90	-0.510 **	0.154	-0.443 **	-0.092
Lambda 97	-0.300 +	-0.248	-0.668 *	-0.090
Number of observations	308	172	320	150
Adjusted R-squared	0.32	0.07	0.35	0.33

** = significant at 1%; * = significant at 5%; + = significant at 10%.

Note: Separate sample selection regressions were done (see Table 9A.2). Over-specified for education variables (interaction terms with year dummy for 1997). Significance of interaction terms implies changes in returns to education.

Table 9A.6a: Wage regressions for men and women aged 15–64 by sector, 1994 and 1997, and first differences 97–94

(left hand side= log of real wage per month) with sample selection. Panel estimation fixed effects (i.e. first differences) on sample of adults in 1994 and 1997.

	Men aged 15–64					
	Public Sector			Private Sector		
Variable	1994	1997	97–94	1994	1997	97–94
Constant	3.962 **	4.108 **	0.006	3.168 **	2.577 **	0.442
marriage	0.144	0.141	0.028	0.398 +	0.146	-0.303
experience	0.031 +	0.043 **	0.017	0.056 **	0.088 **	0.012
experience squared	0.000	-0.001 *	-0.001 +	-0.001	-0.001 **	0.000
migrated	0.084	0.261 *	0.168	-0.369 *	-0.327	-0.029
primary educated	0.519 **	0.537 **	0.039	0.757 **	0.228	-0.509 *
secondary educated	0.939 **	0.808 **	-0.074	1.138 **	0.695 *	-0.281
tertiary educated	1.464 **	1.335 **	-0.066	1.647 **	1.364 **	-0.232
Awassa	0.174	-0.001	-0.159	-0.375	-0.871 **	-0.231
Bahar Dar	-0.087	0.020	0.148	-0.361	-0.630 *	-0.094
Dessie	-0.252 +	-0.059	0.210	0.635	0.678 *	0.031
Jimma	-0.007	0.073	0.108	-0.231	-0.417	0.007
Mekele	-0.434 **	-0.397 **	0.041	-0.596 *	0.536 *	1.029 **
Dire Dawa	0.022	-0.017	-0.025	0.713 **	0.071	-0.587 **
Lambda 94	-0.090		-0.057	0.051		-0.263
Lambda 97		-0.090	0.137		0.704	0.453
Number of observations	191	191	191	86	86	86
Adjusted R-squared	0.53	0.46	0.02	0.33	0.30	0.02

	Women aged 15–64					
	Public Sector			Private Sector		
Variable	1994	1997	97–94	1994	1997	97–94
Constant	5.084	5.428 **	0.365	5.711 **	4.474	3.099
marriage	0.118	-0.028	0.040	-0.240	0.095	0.152
experience	0.010	0.020	-0.017	0.073	0.053	0.038
experience squared	0.000	0.000	0.000	-0.002 *	-0.001	-0.001
migrated	0.692 **	0.006	0.097	-0.783	0.088	-0.180
primary educated	-0.216	-0.079	0.165	0.303	-0.241	-0.063
secondary educated	0.023	-0.037	-0.055	0.271	1.043 *	-0.529
tertiary educated	0.610 +	0.538	-0.091	0.453	0.796 +	-0.484
Awassa	0.009	0.415	0.342			
Bahar Dar	-0.059	0.098	0.084			
Dessie	0.020	0.133	-0.055			
Jimma	0.104	0.172	-0.056			
Mekele	-0.194	-0.036	0.035			
Dire Dawa	0.246	0.127	-0.103	0.599	0.709	-1.111 *
Lambda 94	-0.322 +	-0.558	-0.190	-0.781 +		-0.889 *
Lambda 97			0.186		-0.566	-0.561
Number of observations	140	140	140	29	29	29
Adjusted R-squared	0.46	0.35	0.01	0.33	0.01	0.01

** = significant at 1%; * = significant at 5%; + = significant at 10%.
Note: Separate sample selection regressions were done (see table 9A.1). Over-specified to allow for changes in coefficients on education and other variables. Columns for 1994 and 1997 give cross-sectional results for each year on sample. 97–94 gives the results from the over-specified first difference panel model, in which significance of coefficients on education implies changes in returns to education.

10. Household Welfare and Education in Urban Ethiopia

Karin Kronlid

10.1 Introduction

The Ethiopian economy responded positively to the economic reforms implemented from the early 1990s. But the per capita income is still only about USD 110, compared to the Sub-Saharan average of USD 550, and about half of the Ethiopian population is still considered poor, with poverty concentrated in the rural areas. There is evidence that poverty decreased in rural areas from 1994 to 1997, but there was no clear-cut trend for urban poverty. The goals of the Ethiopian government remain to improve the living standard of its population and to reduce poverty, among others. To better understand the links between measures aimed at improving living standards and the economic welfare of households, the relationship between a household's characteristics and its welfare needs to be explicated. This chapter thus aims to correlate household characteristics, and especially education, with household income adjusted by household size and deflated by a regional price index.

Private household returns to education will be analysed by looking at how education affected total household income, not through standard individual earnings functions (among others Krishnan et al., 1998, is an Ethiopian example of such an application). Instead we used a variety of household characteristics, including some (education) for the main income-earner and the second income-earner, or if there is no income-earner, for the most educated of the remaining household members.[1] Most studies have used the characteristics of the household head, usually the oldest male, or his spouse (if he is absent) or widow, who is assigned to this position by the household and has the role of decision-maker. But the income-earners' characteristics seemed more likely to be correlated with income. A household with a retired head, without any income, could still have income generating younger members.[2]

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

2. We also found that stated and actual activity often diverged in the data. The group of non-working households, as classified by their main income earner's stated activity, shrank considerably when we switched to actual income-generating activity of the main income-earner as the basis for the classification.

The data came from three waves of the Ethiopia Urban Socio-Economic Survey. The next section briefly discusses background literature and statistics. Section 10.3 presents the model used, while Section 10.4 gives results. Finally, Section 10.5 summarizes and draws conclusions.

10.2 Background

Two standard techniques are used to analyse income (or consumption expenditures) using household characteristics as explanatory variables. One is to estimate the probability of being poor using logit or probit techniques. Another, which we followed, is to estimate household welfare functions with OLS. Both are helpful in understanding poverty and its causes. Grootaert et al. (1997) used panel survey-data from both urban and rural households in Côte d'Ivoire and found that, for urban households education was the most important factor determining income-levels and income-changes over time. When average households experienced losses, better-educated households achieved higher incomes. Taddesse (1997) applied the same technique to urban Ethiopia,[1] and found that well-educated households had the best chance of improvement, while households with many dependants did worse. Grootaert (1997) used data from Côte d'Ivoire and concluded that the way households used their endowments was crucial. A way out of poverty for urban households was to obtain wage-jobs and increase the wage-share of their income. Coulombe and McKay (1996) analysed determinants of poverty in Mauritania and found that recent urban migrants were more likely to be in the upper income-quintiles, and that unemployment did not seem to be correlated with standard of living. They concluded that in urban areas, lack of education and high dependency-ratios had negative effects, though households in the main centres were better off than others. Mwabu et al. (2000), on urban and rural data for Kenya, found that mean household education and literacy were strongly correlated with per capita consumption expenditures, while household-size was negatively correlated.

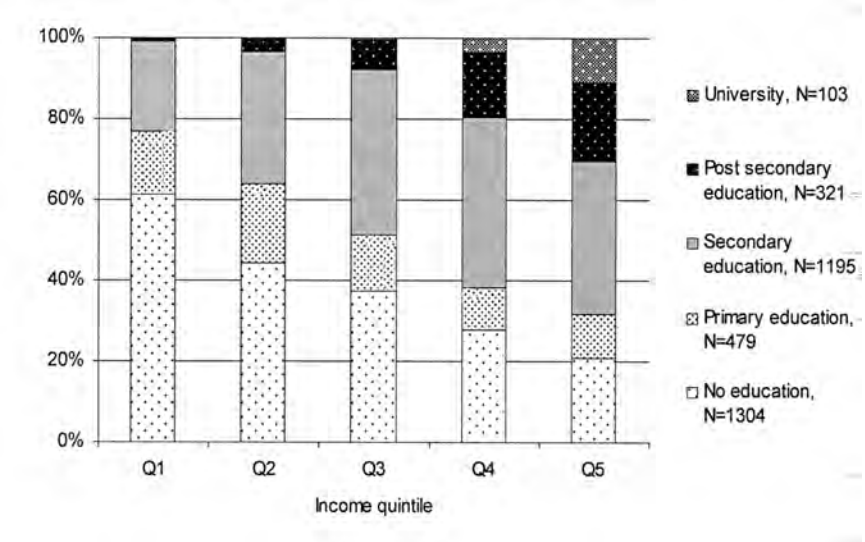
All these studies stressed the importance of education.[2] A majority of households in the lowest income-quintile (Q1) in urban Ethiopia had no education, while about 15% had completed primary education (about 25% in Q2, see Figure 10.1 below). While households in higher income-quintiles had progressively more education, even in Q5 about 20% of households had no education and only 10% had completed primary school. Households with very low or no education were thus found in all income quintiles. Overall, about a third of the no education households were in the lowest income quintile, but about a quarter were in the two top quintiles. Households with only primary education were most likely to be in Q2, and around two thirds were in the lowest three quintiles. Households

1. Taddesse used consumption expenditure.

2. Measured by main income earner's education.

with university education were most likely by far to be in the top income quintile. Education alone was thus not a good predictor of household income, except for those few who had a university degree.

Figure 10.1: Percent of households by main income-earner's education and by real per adult-equivalent income-quintiles, n=3402



10.3 Modelling Correlates of Household Welfare

The methods used in this chapter are directly derived from the standard household utility maximisation model (Deaton and Muellbauer, 1980). Applying the standard methods discussed in the introduction we can only, as Glewwe (1991, p. 312) points out, show the possible impact of government policies on household income conditional on past decisions on capital accumulation within the households, but not how policies affect the accumulation process itself. The log of real household per adult-equivalent monthly income was used as the dependent variable in the model with exogenous household endowments and characteristics as explanatory variables:

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

where I_i = the log of real income of household I;
A_i = the number of adult equivalents in household I;[1]
C_i = exogenous characteristics of household I;[2]

1. A nutrition based adult equivalent scale for East Africa was used, see Taddesse (1998).

2. In a life-cycle perspective, those and the follwing may not be exogenous (Coulombe and McKay, 1996). In the long run, household-size and location, for instance, are probably determined by a household's income-opportunities. Since we are analysing correlates of income at a point in time, however, we considered them exogenous.

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

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

1) household composition and size (C_i),
2) area of residence (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 like tools, land, and cattle matter in the household's production; in urban areas, one could argue that for some self-employed households house-ownership may assume the same role.[1] Community characteristics were not collected in the data used. Size and household composition (number of dependants) were included in the analysis as control variables, as they should negatively affect income. Towns of residence were also included as controls, as were ethnic groups. The human-capital variables (education and age) were expected to positively affect income (the latter non-linearly).

Another household characteristic of interest is migrant status, of which the effect was uncertain: if migrants lack income-generating skills or resources, the effect on income might be negative; but if they have special skills with a high payoff in the new area of residence, the effect on income might be positive (Coulombe and McKay, 1996). Besides running simple OLS on all the data using the model above, we also tried several variations: panel models with both random and fixed effects, and an enlarged OLS-model.

We assume that there is a household welfare function and that the household's objective is to maximise it. This assumes away intra-household issues, although a strand of the literature has shown that inequality among household-members can be important (Behrman, 1988; Haddad and Kanbur, 1990; and Thomas, 1990). But when analysing household welfare, an important issue is what to measure, and how. We followed Deaton and Muellbauer (1980) in using money-metric utility, which we limited further to only include marketed goods and services. Other goods, such as free health care, clean air, or children were not included. Though a number of other indicators have been discussed (Chaudhuri and Ravallion, 1994), the main choice of a money metric welfare indicator is between consumption-expenditure and income.

Lipton and Ravaillion (1995) discusses this choice. It can be argued that due to consumption-smoothing consumption-expenditure better reflects the long-

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

term average living standard of the household. At least among the poor, income varies more over the years, and between seasons, than does consumption. Using income for particularly rural households requires several re-interviews at different times, or the use of recall questions, both of which can be problematic (Deaton, 1997). Calculating an income for a subsistence household could also be difficult. Deaton argues that there is no support for the lifetime-consumption hypothesis in the short run in developing countries, because the poor face constraints on borrowing as well as on saving, but he argues that the practical arguments tip the scales against the use of income anyway. However, 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), then income can be better in times of economic change such as Ethiopia has been experiencing. In addition, we are dealing with an urban population living mainly on wage- or business-income, or, to a lesser extent, on unearned income. Consumption of own-produced goods is limited; the household economy is monetised to a larger extent than is the case in rural areas. Since we are not attempting to say anything about the long-term but rather to give a snapshot of the current situation, household income corresponds to the needs of our analysis.[1]

10.4 Correlates of Household Income

OLS

First we ran an OLS regression with the log of per adult-equivalent monthly household income as the dependent variable, and with household and main income earner's characteristics as explanatory variables.[2] Table 10.1 shows the results from the basic OLS estimation. Large households and households with many children had lower per adult-equivalent incomes. Households with female main income earners averaged almost 21% lower income (looking at the marginal effect). A household with a married female main income earner had 3–4% higher income than a household with a married male income earner, though its income was still lower than households with a non-married male income earner. The interaction-term probably catches the effect of absent spouses sending money. The age effect of the main income earner implies that income peaks at age 61. Migration had a positive and significant effect: households that had migrated after 1984 had 12% higher income, indicating that it is the more able households which migrate to urban areas, confirming the findings of Coulombe and McKay (1996).

1. In Figures 10A.1–2 in Appendix 10.A, the frequencies of the logged income-variables are plotted against a normal distribution; Table 10A.1 shows the result of normality tests.

2. In order to present a general picture of the conditions for urban Ethiopian households, we pooled the data across main household activities. Other studies separately analyse wage-employees, the self-employed, etc. One could also imagine separate analyses, for example, for male- and female-headed households.

The average education of other adults in the household had a negative effect, reaching bottom at 5 years of education, and becoming positive at about 10 years (almost completed secondary education). It is possible that household members with relatively high education are still in school and thus not contributing to income, but this could also be a result of the labour-market structure in urban Ethiopia. To gain access to better-paid jobs (wage-employment), it might be necessary to have at least secondary education.

Table 10.1: OLS results, dependent variable= log of per adult-equivalent monthly income

	Coefficient	Std. Err.	Marginal effect (c)
Constant	3.7211**	0.1805	40.3103
D 1995	-0.1014*	0.0418	-0.0964
D 1997	0.0636	0.0420	0.0657
Number 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 M.I.E.(a)	-0.2320**	0.0663	-0.2070
Married M.I.E.	-0.1643**	0.0601	-0.1515
Female M.I.E.*Married M.I.E.	0.2172*	0.0859	0.2426
Age M.I.E.	0.0363**	0.0071	0.1710
Age M.I.E. 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 hh female business	-1.0396**	0.0745	-0.9279
Share of household income from unearned income	-1.0795**	0.0583	-0.8595
Share of household income from self employment	0.4326**	0.0531	0.4730
M.I.E. primary education	0.1411*	0.0547	0.1515
M.I.E. secondary education	0.4520**	0.0482	0.5714
M.I.E. post secondary	0.8819**	0.0713	1.4156
M.I.E. university	1.4967**	0.1093	3.4670
S.I.E. primary education (b)	-0.0157	0.0677	-0.0156
S.I.E. secondary education	-0.1048*	0.0427	-0.0995
S.I.E. post-secondary	0.2260**	0.0719	0.2536
S.I.E. 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		

**, *, and # mean significant at the 1%, 5%, and 10% level respectively
Note: M.I.E = Main incmome earner, S.I.E. = Second income earner. For continuous variables, marginal effect: are evaluated at variable-means; for dummy variables, using the interpretation in Kennedy (1996), on per adult- equivalent income.
Reference household had a male main income earner, who had lived at the current residence for more than 10 years in 1994, lived in Addis Ababa, main and second income earner had no education, worked in the public sector, and was of Amharic origin.

The larger the share of unearned income or of female household-business income for a given share of wage income, the lower the total household income. Households relying on these income sources probably had no access to more remunerative activities. Though not as large, the effect was positive for self-employment income, which might reflect improving business opportunities as a result of the economic reforms.

For 1995, there was a negative time effect of 10%. The drop is 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 the GDP growth was higher in 1995/96 than in 1994/95. Households in Awassa, Bahir Dar, Dire Dawa, and Jimma were 40–90% better off than those in the capital. Households with Tigrayan or Gurage main income earners were 13–16% better off than households with an Amharic main income earner.

Education can give access to better-paid jobs, and it can increase the main income from a given job. Here, the two effects are mixed together. In any case, all levels of main income earner's education had positive and significant effects on household income. Households with a primary educated main income earner had 14% more income, and the further increase from secondary education was another 36% (see Table 10.2), another 54% for completing post-secondary education, and another 184% for university. Primary education of the second income earner had no discernable effect on income, but secondary education reduced household income by 10%, whereas post-secondary and university education had positive effects on household income (though much lower than for the main income earner).

Table 10.2: Marginal effects of main income-earner's education on household income and household returns to education, OLS model

Marginal effects	M.I.E.	S.I.E	Returns to education (a)	M.I.E.	S.I.E.
Primary education	0.1411*	-0.0157	Primary versus no	15%	-2%
Secondary education	0.4520**	-0.1048*	Secondary versus primary	36%	-9%
Post-secondary education	0.8819**	0.2260**	Post-secondary versus secondary	54%	39%
University education	1.4967**	0.3193*	University versus secondary	184%	53%

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

Panel Models

Since the data was collected by interviewing the same households three times, there might have been unobservable household characteristics fixed over time that affected income, i.e. unobserved heterogeneity. We controlled for that by comparing random effects and fixed-effects with panel-model methods[10] with the

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

same dependent and explanatory variables as in the OLS. The random-effects model rests on the assumption that the household-specific effect was uncorrelated with the other explanatory variables in the model, which can be checked with a Hausman test. The coefficients from the random- and fixed-effects models are compared, and if the household-specific effect is uncorrelated, the coefficients should not differ systematically. The results are shown in Table B.10.1 in Appendix 10.B. The hypothesis of no systematic differences can be rejected and thus the random effects model as well. The fixed-effects model uses deviations from the means of each household variable to explain that household's deviations of income from that household's mean. However, the fixed-effects estimation yielded very low statistical significance for the coefficients, because most of the explanatory variables did not vary very much over time for the same household. The education variables in particular were constant for more than three-quarters of the households (see Table B.10.2 in Appendix 10.B). Panel-models thus did not seem appropriate.

Another issue limiting the usefulness of panel-methods was raised by Deaton (1997, p. 108): if regressors are measured with some error, then difference and within estimators will not be consistent in the presence of unobserved individual fixed-effects, and the biases will not necessarily be less than those of the uncorrected OLS-estimator. This could also explain the limited explanatory power of the panel estimates.

Enlarged OLS

Yet, our hypothesis was that there could be unobserved heterogeneity. An alternative to modelling it at household-level, as in the panel-models, is to model it groupwise. Therefore, we introduced into the original OLS-model extra control-variables for the household's socio-economic group as well as family background (see Table 10C.1 in Appendix 10C). It is important to control main sources of income for the possibility that a household which has managed to get a public sector job could be better off than comparable households in self-employment, casual or domestic work. The reasoning behind the introduction of family background variables is that there could be unobservable characteristics affecting the household income, which might be correlated with the education variables. Parental characteristics are likely to be a good control for the unobservable characteristics. In rural Ethiopia, Weir (2000) found that higher parental education reduced the likelihood of children starting school later than normal, which could also influence actual achievement in school.

Table 10.3 shows the results from the enlarged OLS (the extra variables are shown in Table 10C.1 in Appendix 10C).[1] [2] The introduction of main sources of income and parental education did not change the sign or significance of most coefficients, though absolute magnitudes fell. Main income earner's marital status was not significant, nor were the variables for being Tigrayan and secondary income earner's education. Migrant households still had about 11% higher income than non-migrant households. Households with female main income earners had 22% lower incomes than households with male main income earners, but only 2% less if the female main income earner was married. The negative effect from having a female main income earner thus persisted even when activity variables were included: no matter what income-generating activity the female-led households were involved in, their income was lower than for male-led households.

The shares of household income coming from different sources remained highly significant, although their absolute magnitudes were a bit smaller, probably because employment variables picked up some of the same effect. For instance, if the main income earner was self employed, the household had 32% more income than if the main income earner was employed in the public sector, which would likely reduce the effect from the share of income from self employment. Similarly, a household with an unemployed main income earner had 24% lower income (see Appendix Table C.10.1), which would likely reduce the effect from the share of income from unearned income variable.

The marginal effect of having a main income earner employed in the private sector was +15%, whereas the marginal effect from having a main income earner in casual or domestic employment was the same as from having an unemployed main income earner -23% (Appendix Table 10C.1). It appears that some households could "afford" to have an underemployed main income earner while others could not. For the second income earner, all other forms of employment gave a

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

2. As expected multicollinearity was detected, both in the original model and in the enlarged one. However, the large sample-size and the relatively good overall fit of the model reduces the seriousness of the potential problems associated with multicollinearity (fluctuating parameter-estimates with negligible changes in sample-size; "wrong" signs of coefficients; important coefficients that turn out not to be statistically significant; and inability to determine the relative importance of collinear variables) (see for instance Mason and Perreault, 1991, on the issue of multicollinearity). Omitting the variables that cause multi-collinearity, a common solution, would lead to omitted-variable bias if the true coefficients of the omitted variables were not zero, and this could be a more serious problem. We chose to keep the variables in the model, since their true coefficients, as predicted by our theory, are not zero.

lower household income compared to being in the public sector. Households which were well established in the labour market, as well as successful entrepreneurs, enjoyed the highest incomes and welfare levels.

Table 10.3: Results of full OLS-model: dependent variable = log of per adult-equivalent monthly income

	Coefficient	Std. Err.	Marginal effects (c)
Constant	3.9815**	0.1939	52.5966
D 1995	-0.0817*	0.0409	-0.0785
D 1997	0.0735#	0.0407	0.0762
# 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 M.I.E.(a)	-0.2519**	0.0652	-0.2227
Married M.I.E.	-0.0971	0.0591	-0.0926
Female M.I.E.*Married M.I.E.	0.1835*	0.0842	0.2015
Age M.I.E.	0.0370**	0.0072	0.1790
Age M.I.E. squared	-0.0003**	0.0001	-0.0002
Average hhold education	-0.0504**	0.0165	-0.0392
Average hhold education squared	0.0049**	0.0014	0.0060
Share of household income from female hh business	-0.9444**	0.1086	-0.8517
Share of household income from unearned income	-0.9421**	0.0818	-0.7722
Share of household income from self employment	0.2565**	0.0902	0.2704
M.I.E. primary education	0.1209*	0.0532	0.1285
M.I.E. secondary education	0.3664**	0.0489	0.4426
M.I.E. post-secondary	0.6844**	0.0732	0.9825
M.I.E. university	1.2943**	0.1084	2.6485
S.I.E. primary education (b)	0.0062	0.0669	0.0062
S.I.E. secondary education	-0.0150	0.0441	-0.0149
S.I.E. post-secondary	0.1263#	0.0715	0.1347
S.I.E. 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	0.6140**	0.0593	0.8478
Jimma	0.5151**	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		

**, * and # mean significant at the 1%, 5%, and 10% level respectively
Note: Only those variables shown that were included in original model, for control variables, see Table 10C.1 in Appendix 10C. M.I.E. = Main income earner; S.I.E. = Second income earner. For continuous variables: evaluated at variable means; for dummy variables: using the interpretation in Kennedy (1996), on per adult equivalent income.
The reference household had a male main income earner; had lived at the current residence for more than 10 years in 1994; lived in Addis Ababa; the main and second income-earner had not completed primary education and both worked in the public sector; they were of Amharic origin; and the father and mother of the main income-earner had no education and worked or had worked as farmers.

In the original OLS regression, the variables for main and second income earners' education had absorbed the effects from other possible variables.

Introducing the parents' education into the model (Table 10.3 and 10C.1) reduced the effect of the main and second income earners' education on household income (summarized in Table 10.4), most strikingly at the higher levels of education.[1] All levels of the father's education had a positive and significant effect on household income (Appendix Table 10C.1), while the mother's education had a positive and significant effect only for primary education, with a slightly larger effect than the father's. None of the employment variables of the father had a significant effect, whereas mother-employed had a significantly negative effect. It thus seems likely that it was the education rather than the employment of the parents that had a positive effect on their children's income.[2]

Table 10.4: Marginal effects of main income earner's education on household income and returns to education at household level; reduced and full OLS model

Marginal effects	Original OLS		Full OLS	
	M.I.E.	S.I.E	M.I.E.	S.I.E
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#

Returns to education	Original OLS		Full OLS	
	M.I.E.	S.I.E.	M.I.E.	S.I.E
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: Returns to education = exp(b2-b1)-1.

1. In F-tests of the main income earner's education-coefficients against each other, the differences were all statistically significant at the 1% level (see Table 10C.2 in Appendix 10C).
2. In joint F-tests of the education variables for each individual (main income-earner, second income-earner, parents of main income-earner) the differences were statistically significant at the 1% level for the main income-earner and father of the main income-earner; at the 10% level for mother of the main income-earner; but not significant for the second income-earner (see Table 10C.2 in Appendix 10C). Jointly F-testing the activity-variables showed statistical significance at the 1%-level for the main as well as for the second income-earner, while mothers' and fathers' activity-variables were each non-significant.

Other studies

Other studies from urban Sub-Saharan Africa have found similar results on the importance of education to household income (for instance, Coulombe and McKay, 1996, Glewwe, 1991, Krishnan et al., 1998, and Wambugu, 2001). Table 10.5 summarizes the results. In urban Mauritania, returns to primary education for those employed were 50–100%; in Kenya 25–57%; in urban Côte d'Ivoire 46% for men. Thus the results found here, 13% in the enlarged OLS, are rather low, which could reflect lower educational quality in Ethiopia. Krishnan et al. (1998) – number 5 in the table – show much higher returns for men. But these are individual, not household returns. Although those reported here are based on per adult-equivalent income, they are nevertheless household-based, and besides this 40% of our households were female-led, and only half had wage-employment. Krishnan et al. in contrast are specifically reporting returns of those in public or private wage-employment, after having controlled for the effect of education on selection into wage-employment, so their results and ours may not be so out of line. The returns to university education found here are much higher than in any of the other studies, even those that only looked at the returns for wage-employees. Very few of the main income earners in our study (only 3%) had university education. Krishnan et al. (1998) reported similar figures for individual data on men in the public sector in 1994, but much lower in 1997, and in the private sector. And again, we would have expected individual-based returns to be much higher than household-based ones.

Table 10.5: Returns to education in various African countries, by sector or sex or both, in percent

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**	
Completed 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 (M.I.E)**	**Full OLS (M.I.E)**	**Full OLS (S.I.E)**	**Full OLS (M.I.E. + .S.I.E.)**
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**	
	1994	**1997**	**1994**	**1997**
Public sector				
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#

**, * and #, mean statistically significant at the 1%, 5%, and 10% levels, respectively
Notes: Returns to each level of education are compared to the level below, calculated as exp(b2-b1)-1(a) compared to secondary education.
Own calculations based on the following sources:
(1) Coulombe and McKay (1996), Table 4, household survey data from 1990, OLS after multinomial logit on household-allocation into sectors, using education of household head.
(2) Wambugu (2001), Tables 5.2-4: national representative household survey data from 1995-96, separate OLS on each sector.
(3) Glewwe (1991), Table 2: household survey data from 1985-86, OLS using education of most educated male and female.
(4) This study, Table 10.4.
(5) Krishnan et al. (1998), Table A6: household survey data from 1994-97, OLS after multinomial logit on allocation into wage employment, individual returns for 15-64 year-olds.

Implications

The results show that education is important for household income in urban Ethiopia, as expected. Yet a large proportion (39%) of the main income earners in the households had not even completed primary education. According to our results their households' per adult-equivalent income would be 13% higher if they had done so (using the coefficient for primary education from the full OLS model). The effect on per adult equivalent income in the entire sample, however, would be lower, about 2.9%, and raising the education level of all adults in the household to at least primary level would reduce this positive income effect to 2.3%, because of the lower positive effect on income from second income-earner's

primary education, and the negative income-effect from other adults' education (up to 10 years of education).

As mentioned earlier, OLS-regression combines two effects of education on income, access to better-paid jobs as well as the higher wage paid. This means that in order to achieve these positive results, there would also have to be openings in the labour market so that better-educated individuals could find jobs corresponding to their education.

Not only compared to the other studies discussed above, but also compared to estimates of *social* returns to investment in primary education (Psacharopoulus 1994, provides an overview), the figures reported here for private household returns to education are low. This could imply that public investment in primary education based on its profitability for the society, might not lead to higher enrolment rates, unless ways can be found to raise private returns.

Table 10.6 below gives descriptive statistics for the households by main income earner's education. Households with the least educated main income earners were smallest on average, had fewer adults, but more children, and were much more likely to have female main income-earners. These households were also more dependent on unearned income and female household business income, while the share of household income from wages was the smallest. Per adult-equivalent income was lowest, only 75% of those with completed primary education, and only 24% of those with university education. Thus, female-led households with many children would be the prime beneficiaries of universal primary education, if this increased education had the same pay-off as currently. Per adult-equivalent income for this group would increase from 91 Birr to 103 birr per month.

Table 10.6: Descriptive statistics of households by main income-earner's education

	No education		Primary education		Secondary education		Post-secondary education		University education	
	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
# of male adults	1.63	1.38	1.96	1.39	1.92	1.32	2.15	1.33	2.10	1.27
# of female adults	2.22	1.25	2.26	1.24	2.25	1.36	2.55	1.31	2.53	1.38
# of children	2.16	1.87	2.10	1.68	1.99	1.64	1.63	1.42	1.74	1.38
# of elderly	0.33	0.54	0.42	0.62	0.22	0.51	0.29	0.55	0.26	0.61
Age of M.I.E.	48.17	13.84	48.82	15.49	35.76	11.34	37.06	10.22	40.12	9.87
Female M.I.E.	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 hh 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 wages	0.30	0.41	0.37	0.44	0.60	0.43	0.76	0.35	0.83	0.29
Share of income from self-empl.	0.24	0.39	0.31	0.43	0.17	0.34	0.10	0.26	0.06	0.19
Share of income from fem. hh bus.	0.20	0.36	0.12	0.29	0.05	0.18	0.01	0.03	0.01	0.05
Share of income from 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*		*1195*		*321*		*103*

10.5 Discussion and Conclusions

The aim of this chapter has been to elucidate the income-determinants of urban Ethiopian households, specifically the effect of education. The analysis was based on income-data and approximated household characteristics by the characteristics of the main income-earner (instead of the household head).

Large households and those with many children had lower incomes, especially those with female main income-earners, even after controlling for the activity of the main income earner. The education of adults in the household other than the main and second income-earner affected household income negatively below about 10 years of school, perhaps because of the educational requirements of entering into wage-employment.

A quarter of the households with no education were found in the two top income-quintiles. However, the education of the main income-earner turned out to be important in explaining income, and the returns to higher education in urban Ethiopia appear to be high compared to other Sub-Saharan African coun-

tries, perhaps because the education-level in Ethiopia is in general extremely low even by Sub-Saharan standards, so the few who have higher education are well compensated for it. Family-background variables reduced the measured importance of education. The importance of parental education could indicate that educated parents add value to their children's education, either by choosing a better school or by encouraging the children to do better, both of which might affect income.

According to our estimates, if all main income earners had at least primary education, the income of those who currently have no education would be 13% higher, while the entire sample's income would be 2.9% higher. Education is important for household income. However, there may be other ways to improve living conditions for Ethiopia's urban households 40% of which, and a majority of those without primary education, were female-led. Improving women's access to formal wage-employment would be another way of helping them generate income and improving the lives of Ethiopia's urban poor.

References

Behrman, J.R. (1988), "Nutrition, Health, Birth Order and Seasonality: Intrahousehold Allocation among Children in Rural India", *Journal of Development Economics* 28(1):43–62.

Chaudhuri, S. and M. Ravallio (1994), "How Well Do Static Indicators Identify the Chronically Poor?", *Journal of Public Economics*, 53(3):367–94.

Coulombe, H. and A. McKay (1996), "Modeling Determinants of Poverty in Mauritania", *World Development* 24(6):1015–31.

Deaton, A. (1997), *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy.* John Hopkins University Press, Baltimore.

Deaton, A. and J. Muellbauer (1980), *Economics and Consumer Behaviour.* Cambridge University Press, Cambridge.

Glewwe, P. (1991), "Investigating the Determinants of Household Welfare in Côte d'Ivoire", *Journal of Development Economics* 35(2):307–37.

Grootaert, C. et al. (1997), "The Dynamics of Welfare Gains and Losses: An African Case Study", *Journal of Development Studies* 33(5):635–57.

Grootaert, C. (1997), "The Determinants of Poverty in Côte d'Ivoire in the 1980s", *Journal of African Economies* 6(2):169–96.

Haddad, L. and R. Kanbur (1990), "How Serious Is the Neglect of Intra-Household Inequality?" *Economic Journal* 100:866–81.

Kennedy, P. (1996), *A Guide to Econometrics*. 3rd edition. Blackwell Publishers, Oxford.

Krishnan, P. et al. (1998), "The Urban Labour Market during Structural Adjustment: Ethiopia 1990–1997", CSAE Working Paper 98–9, Centre for the Study of African Economies, Oxford University.

Lipton, M. and M. Ravallion (1995), "Poverty and Policy", pp. 2551–2657 in J. Behrman and T.N. Srinivasan (eds), *Handbook of Development Economics. Volume 3B in Handbooks in Economics, Vol. 9*, Elsevier, Amsterdam, New York, and Oxford.

Mason, C. H., and W.D. Perreault, Jr, (1991), "Collinearity, Power, and Interpretation of Multiple Regression Analysis", *Journal of Marketing Research* 28(August):268–80.

Mwabu, G. et al. (2000), *Poverty in Kenya: Profiles and Determinants*. University of Nairobi and Kenya Ministry of Finance and Planning, Final Report to the African Economic Research Consortium Poverty Project.

Psacharopoulus, G. (1994), "Returns to Investment in Education: A Global Update", *World Development* 22(9):1325–1343.

Scott, C. and B. Amenuvegbe (1990), Effect of Recall Duration on Reporting of Household Expenditures: An Experimental Study in Ghana, World Bank, Washington, DC.

Taddesse, M. (1997), Determinants and Dynamics of Urban Poverty in Ethiopia, mimeo, Addis Ababa University.

Taddesse, M. (1998), "Consumption Patterns and Ownership of Durables", in *Descriptive Report on the Panel Socio-Economic Survey of Major Urban Centres in Ethiopia*. Departments of Economics, Addis Ababa University and Göteborg University.

Thomas, D. (1990), "Intra-household Resource Allocation: An Inferential Approach", *Journal of Human Resources* 25(4):635–64.

Wambugu, A. (2001), "Education and Household Earned Income in Kenya", mimeo, Department of Economics, Göteborg University.

Weir, S. (2000), "Intergenerational Transfers of Human Capital: Evidence of Two Types of Education Externalities", CSAE Working Paper 200–15, Centre for the Study of African Economies, Oxford University.

Appendix 10A: Income Distributions

Figure 10A.1: Frequency of log of income by type, normal distribution line added

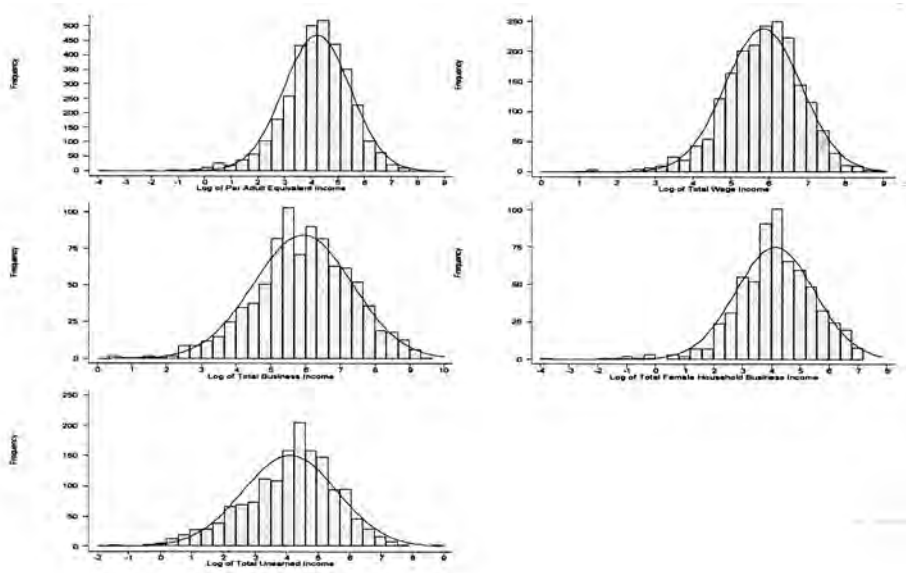


Figure 10A.2: Frequencies of log of per adult-equivalent household-income by activity of main income-earner, normal distribution line added

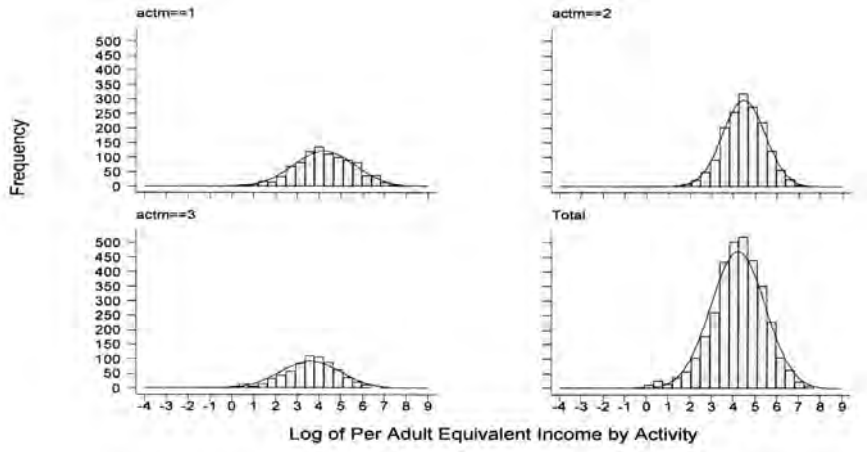


Table 10A.1. Normality tests of logged income variables

	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Joint 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
Female hh business-income	0.000	0.000	.	0.0000
Unearned income	0.000	0.001	53.06	0.0000

Note: Skewness/Kurtosis tests for Normality (STATA 7).

Appendix 10B: Other Models

Table 10B.1: estimates from random and fixed-effects models, with Hausman test (dependent variable=log of per adult-equivalent monthly household-income)

	Random effects		Fixed effects (within)		
	Coefficient	Std. Err.	Coefficient	Std. Err.	Difference
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
# 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 M.I.E. (a)	-0.1808**	0.0686	-0.0877	0.0907	0.0931
Married M.I.E.	-0.1141#	0.0655	-0.1230	0.1082	-0.0089
Female M.I.E. * Married M.I.E.	0.1103	0.0901	-0.1792	0.1231	-0.2895
Age of M.I.E.	0.0336**	0.0077	0.0230*	0.0113	-0.0107
Age of M.I.E. squared	-0.0003**	0.0001	-0.0003*	0.0001	0.0001
Average household education	-0.0517**	0.0180	-0.0323	0.0249	0.0194
Average household education squared	0.0051**	0.0015	0.0016	0.0022	-0.0036
Share of hh income from female hh business	-0.9137**	0.0790	-0.5587**	0.1090	0.3550
Share of hh income from unearned income	-1.0446**	0.0621	-0.9565**	0.0859	0.0881
Share of hh income from self-employment	0.4459**	0.0582	0.5083**	0.0870	0.0624
M.I.E. completed primary education	0.1118#	0.0622	-0.0328	0.1173	-0.1445
M.I.E. completed secondary education	0.4305**	0.0543	0.0695	0.1025	-0.3610
M.I.E. completed-post secondary	0.8295**	0.0802	0.0472	0.1602	-0.7823
M.I.E. university degree	1.3891**	0.1232	0.4443#	0.2300	-0.9448
S.I.E. primary education (b)	0.0457	0.0705	0.1157	0.1025	0.0699
S.I.E. secondary education	-0.0832#	0.0442	-0.1535*	0.0652	-0.0702
S.I.E. post-secondary	0.2323**	0.0762	-0.1368	0.1225	-0.3691
S.I.E. 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:
chi2(27) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re) = 104.15 Prob>chi2 = 0.0000

Note: (a) M.I.E. = main income-earner, (b) S.I.E. = second income-earner.
**, * and # mean significant at the 1, 5 and 10% level respectively.

The reference household had a male main income-earner; had lived at the current residence for more than 10 years in 1994; lived in Addis Ababa; the main and second income-earners had no education; had main income-earner who worked in the public sector; and was of Amharic origin.

Table 10B.2: Means and standard deviation of and percentages of households with changes in explanatory variables (variable-value year 2 less variable-value year 1), 1994–1995, and 1994–1997

	1994–1995			1995–1997		
	Mean	Std. Dev.	Change (%)	Mean	Std. Dev.	Change (%)
# 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 M.I.E. (a)	0.0353	0.4144	17.3	0.0018	0.4243	18.0
Married M.I.E.	0.0115	0.2983	8.9	-0.0265	0.3076	9.5
Female M.I.E. * Married M.I.E.	0.0265	0.3018	9.2	0.0132	0.3319	11.0
Age of M.I.E.	1.0026	12.5602	99.7	-2.1226	12.4113	99.7
Age of M.I.E. squared	90.5917	1121.0470	99.7	-183.8316	1100.9910	99.7
Average household education	-0.1024	2.8710	59.4	0.0253	3.3362	67.7
Average household education squared	-1.3642	31.1168	59.4	1.4951	37.4253	67.7
Share of hh inc from hh female business	0.0209	0.2684	24.1	-0.0287	0.2665	25.3
Share of hh inc from unearned income	-0.0019	0.3158	49.7	0.0612	0.3450	55.1
Share of hh inc from self employment	0.0188	0.3255	34.3	-0.0418	0.3248	34.4
M.I.E. completed primary education	0.0018	0.2556	6.5	-0.0123	0.2621	6.9
M.I.E. completed secondary education	-0.0018	0.3614	13.1	0.0362	0.3752	14.2
M.I.E. completed post-secondary	-0.0062	0.1947	3.8	-0.0088	0.2013	4.1
M.I.E. university degree	-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 the mean absolute change in the variable between the years.

Appendix 10C: The Full OLS-Model

Table 10C.1. Means, coefficients, standard errors, and marginal effects of control variables from full OLS model

	Means	Coefficient	Std. Err.	Marginal effect (d)
M.I.E. self-employed (a)	0.19	0.2803**	0.0877	0.3235
M.I.E. female hh business	0.10	0.0138	0.1027	0.0139
M.I.E. private employee	0.09	0.1402*	0.0670	0.1505
M.I.E. casual/domestic worker	0.10	-0.2655**	0.0678	-0.2332
M.I.E. unemployed	0.04	-0.2708**	0.1018	-0.2372
M.I.E. not working (c)	0.18	-0.0918	0.0778	-0.0877
S.I.E. self-employed (b)	0.05	-0.2724**	0.0883	-0.2384
S.I.E. female hh business	0.05	-0.4088**	0.0904	-0.3355
S.I.E. private employee	0.04	-0.0368	0.0915	-0.0361
S.I.E. casual/domestic worker	0.07	-0.1193	0.0778	-0.1125
S.I.E. unemployed	0.19	-0.6163**	0.0568	-0.4601
S.I.E. not working (c)	0.39	-0.4134**	0.0477	-0.3386
Father of M.I.E. completed primary educ.	0.21	0.1295**	0.0450	0.1383
Father of M.I.E. completed secondary educ.	0.06	0.2496**	0.0809	0.2835
Father of M.I.E. higher education	0.02	0.2688#	0.1452	0.3084
Father of M.I.E. self-employed	0.11	0.0306	0.0584	0.0310
Father of M.I.E. civil servant	0.12	0.0778	0.0606	0.0809
Father of M.I.E. other wage-employment	0.04	-0.0574	0.0893	-0.0558
Father of M.I.E. not working	0.07	0.1104	0.0720	0.1168
Mother of M.I.E. completed primary educ.	0.07	0.1515*	0.0715	0.1636
Mother of M.I.E. complete secondary educ	0.02	-0.0275	0.1411	-0.0271
Mother of M.I.E. higher education	0.00	0.4341	0.2777	0.5436
Mother of M.I.E. any job	0.17	-0.0896#	0.0481	-0.0857

Note: (a) M.I.E. = main income earner; (b) S.I.E. = second income earner; (c) Not-working includes housewife, pensioner, not employed but not looking for job, etc.; (d) continuous variables were evaluated at the means; dummy variables were evaluated using the interpretation in Kennedy (1996) on per adult-equivalent income.
**, * and #, means significant at the 1% 5% and 10% level respectively

Table 10C.2: F-tests of education and activity variables from full OLS model

H0:	M.I.E	S.I.E	Father of M.I.E.	Mother of M.I.E.
All individual's education variables jointly zero	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
All individual's activity variables jointly zero	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
Primary education = Secondary education	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
Secondary education = post-secondary education	F(1, 3343) = 24.44 Prob > F = 0.0000	F(1, 3343) = 4.75 Prob > F = 0.0293		
Post-secondary education = university education	F(1, 3343) = 30.61 Prob > F = 0.0000	F(1, 3343) = 0.67 Prob > F = 0.4126	F(1, 3343) = 0.03	F(1, 3343) = 2.06
Secondary education = higher education			Prob > F = 0.8640	Prob > F = 0.1515

11. Conclusions and Policy Implications

Arne Bigsten, Bereket Kebede and Abebe Shimeles

11.1 Changes in Poverty and Economic Policy

Poverty (measured by the headcount ratio) declined from 1994 to 1997 (Chapter 4), a period that saw a reversal of the secular decline in income per capita. But growth was accompanied by worsening income inequality, as demonstrated by an increased Gini-coefficient and the results from analysis of poverty-dynamics (Chapter 8). If inequality had not increased, there would have been a greater decline in poverty. It is difficult to know whether the increase in inequality reflects a long-run trend or resulted from idiosyncratic shocks, but either way it is a concern for policy design.

One surprising empirical result is that the amount of land cultivated by rural households did not have a significant effect on poverty. This result might be biased because we did not control for the quality of land. But oxen-ownership significantly affected poverty. The two results might imply that land was not the most binding constraint for farmers; complementary inputs like ox draught-power may be crucial. Unlike elsewhere in Africa, all land is still owned by the state, so the use-rights are somewhat insecure, which is probably not conducive to productivity-enhancing investments in agriculture. Nor can land be used as collateral, which may reduce the efficiency of the credit market. The focus of public policy will have to be more on providing complementary inputs, such as credit facilities and improving security of tenure.

Reforms in trade and the exchange-rate regime, coupled with market-liberalisation, have helped farmers producing marketable crops, but they still have major infrastructural constraints to grapple with. Access to markets creates opportunities for the poor to improve their standard of living; rural households who resided near a market were less likely to be poor. Farmers producing marketable crops in general, and exportables in particular (especially *chat*), had a better chance of escaping poverty. *Chat* has become an important export, and domestic demand has increased as well. The effect of coffee production was less clear. Rural households in remote areas may also be constrained in consumption goods, not because they cannot afford them, but because the goods are not available.

Compared to elsewhere in Africa, the availability of rural off-farm employment remains limited. In remote areas, there are few non-agricultural opportunities apart from traditional crafts. Poor rather than rich rural households were more involved in off-farm employment, so the provision of employment in the form of food-for-work or similar programmes with appropriate remuneration rates may be successful in targeting them, perhaps playing a role similar to infor-

mal sector activities in urban areas. Their importance may even increase over time as population growth increases the pressure on cultivable land.

The decline in rural poverty from 1994 to 1997 was statistically significant, but urban poverty barely changed, even though growth among "urban-based" sectors of the economy was higher than in agriculture; and urban expenditure per capita was increasing.[1] The benefits of more rapid urban growth did not "trickle down" to the urban poor, while the impact of growth in rural areas was more pro-poor, partly because agriculture is more labour-intensive. The labour-intensive urban informal sector, which is smaller and less developed in Ethiopia than in many other African countries, needs encouragement and support.

Even though urban poverty overall did not decline significantly from 1994 to 1997, headcount ratios did decline consistently for Addis Ababa, Awassa and Bahir Dar. There was a large increase in Dire Dawa, however, because of the decline of contraband trade for which the city had been an important entry-point. This decline was a result of successful liberalisation in the external trade and foreign exchange regimes, but the urban economy of Dire Dawa could not immediately provide sufficient alternative sources of livelihood. The same thing happened in other areas where labour released from declining black market and rentier activities due to economic reforms was not sufficiently absorbed by other sectors. Restructuring takes time, but focused efforts to help affected groups can also be useful.

Education was associated with lower poverty, particularly in urban areas, where employment is more "education-intensive" than is agriculture. Possibly a revised curriculum more attuned to the rural needs, including vocational/technical training, would encourage small-scale and informal enterprises and contribute to poverty reduction. More vocational/technical training might help in urban areas as well.

Urban returns to secondary education were higher than to primary education (Chapter 9), but increased secondary education will require improvements in primary education to reduce the drop-out rate. Unemployment after completing secondary education has also become a major social problem, however, and will continue to be so unless further employment opportunities are created.

The link between economic policy and poverty is controversial, but it is clear that good economic policy can promote and sustain economic growth. How economic policy influences incomes and growth in Ethiopia is not so clear, however. Ethiopia has never had sectorally disaggregated data that would allow the use of general equilibrium models to analyze the impacts of policy changes, but it does seem clear that the reform measures introduced since 1992 influenced the price structure of the economy, and thus the incomes and expenditures of households.

1. In 1996–99 agriculture grew by an average annual rate of 3.6%, while non-agricultural sectors grew by 7.5% (IMF, 1999).

As reported in Chapter 2, the economy showed significant improvement from 1994 to 1997, at the same time that major macroeconomic indicators improved, which suggests that the policy stance may have helped the economy to perform better. Per capita consumption expenditure improved strongly in both urban and rural areas. At an average annual rate of 8.3%, while poverty declined 4.1% per annum. The average elasticity of poverty with respect to growth was thus only about 0.5. So even if economic policy helped the economy to grow, the effect on poverty was not so impressive.

It thus seems unlikely that the international development target of reducing poverty by half by 2015 can be achieved in Ethiopia. Given the relationship

$$\frac{dp}{p} = \alpha \frac{d\mu}{\mu} \tag{1}$$

which says that the annual rate of change in poverty equals the gross-elasticity of poverty with respect to per capita income growth times annual per capita income growth. It may be illustrative to decompose the overall change in poverty into the effects of growth and changes in inequality by noting that a poverty index can be written as

$$P = P(z, \mu, G) \tag{2}$$

where z is the poverty line, μ is per capita consumption expenditure, and G is a measure of income inequality, such as the Gini-coefficient. By totally differentiating (2) and rearranging we get

$$d \ln P = \alpha \, d \ln \mu \quad + \quad \beta \, d \ln G \tag{3}$$

where α and β are elasticities of poverty with respect to growth and income distribution. Equation (3) is a decomposition of the change in poverty over time into components of growth and distribution with the residual assumed to be zero. To estimate α and β we ran a regression of the log of the headcount ratio on the log of the per capita income and the Gini-coefficient for 15 rural survey sites (villages) and seven urban areas for the three periods. The result is reported in equation (4).

$$\ln P_{it} = \underset{(9.03)}{1.93} - \underset{(-23.00)}{1.38} \ln \mu_{it} + \underset{(10.5)}{1.46} \ln (G_{it}) + \underset{(3.33)}{0.073} D_1 \tag{4}$$

Adjusted R^2=89, n=66

where terms in brackets are t-statistics. The last term in equation (4) is a dummy for rural areas. The results match the elasticities derived earlier based on growth and poverty spells. The value of income elasticity is –1.38, while the elasticity of change in inequality is 1.46 per cent for a one per cent increase in income inequality. This means that the poverty reducing effect of a one per cent general in-

crease in expenditure, would be almost exactly counteracted by a one per cent increase in the Gini-coefficient (see also Bigsten and Shimeles, 2003).

Given our estimated elasticity, Ethiopia would need an average rate of growth in per capita GDP of over 8% until 2015 to achieve the target. A rough estimate of the incremental capital-output ratio for Ethiopia is about six (ECA, 1999), so to attain 8% growth, Ethiopia would need to invest 48% of GDP every year, whereas in fact it has been about 14% (World Bank, 1998). Yet, even if the international development target cannot be reached, much can be done to reduce poverty in Ethiopia.

Poverty-reduction requires the coordination of a whole range of policies. Generally analysts have advocated a three-pronged strategy (see World Bank, 1990) with labour-demanding growth complemented by public investment in basic education, health, and infrastructure, plus social safety-nets for those unable to take advantage of the first two.

Although growth must be a top priority for the Ethiopian government, the ambition should be that it benefits the poorest segments of the population. Since the bulk of the poor are in agriculture, rural development must be particularly emphasised, including improved rural infrastructure and modernisation of agriculture as well as measures to improve the quality of life of the poor directly, such as provision of health-care, water, and education.

In the short term, measures to support agriculture, such as investment in roads, should receive top priority. Rural people need access to markets for inputs and output, and access to government services, including extension advice. Small-scale irrigation and agricultural research can also be important. Another short-term priority for both rural and urban areas is reduction and simplification of the maze of regulations constraining entrepreneurs. Informal activities seem to be expanding, while formal employment is stagnating.

In the long term, the top priority is probably education, including both regular education and adult education. The latter is particularly relevant in Ethiopia where the overall educational status of the population is especially low.

In the following sections we will discuss some of the policy-tradeoffs facing the government.

11.2 Infrastructure for Poverty Reduction

Rural development is crucial for poverty reduction, and the development of agriculture is crucial for rural development. But developing agriculture also creates demand for urban services and industrial products, while providing inputs for those sectors; there is thus a two-way mutually supporting rural-urban linkage. Generally smallholders in Africa diversify extensively into other activities, but as we have noted, there is much less of this in rural Ethiopia, where there is little scope for side-incomes. To open up for income diversification as well as improvements within agriculture itself, rural infrastructure must be improved.

Roads

Good rural roads can have a major impact on agricultural output, possibly greater than that of prices. Without better access to the rest of the economy rural communities will not be able to sell their produce (or will only get low prices after allowing for transport costs). Feeder roads are particularly important in this context. A good transport network is also a prerequisite for locating banks and other supporting commercial infrastructure in a rural area.

The major policy question is to what extent road construction and road maintenance can be locally based. It would be desirable for many reasons to decentralise them, but that would require an effective institutional structure in rural areas, which is a major problem, with most of the skilled administrators engaged in central government, while the regions suffer from low skill levels. We would therefore argue against trying to do too much at one time. It would be better to concentrate on a few strategic components, one of which is building roads. Roads should receive high priority in a poverty oriented development programme.

It is fairly easy to build roads, but the maintenance of the network requires more organisation. By basing the maintenance of local roads on local authorities, one would generate local employment. The issue of supervision is then crucial, and it might also be easier for local authorities to do this than for more distant central authorities.

Local communities should also have a say in decisions on local road investments; Asian experience suggests that this increases utilisation of local resources and improves supervision of construction and maintenance. The actual construction and maintenance can be contracted out to private firms.

Extension Services

A comprehensive system of good agricultural advice is important, teaching appropriate spacing, timing, and other aspects of cultivation, and there are already some extension packages in Ethiopia, including that of the Group of 2000, a Japanese NGO, but so far such extension services only reach a minority of farmers. There is a general reluctance in the government to use NGOs, but given the lack of government resources and the willingness of NGOs to help, there may be gains from collaboration. In March 1999 a code of conduct was agreed upon between the government and the NGOs operating in Ethiopia.

Input Supplies in Agriculture

The supply of fertiliser has improved somewhat, but only a minority of farmers actually use it. A more extensive and effective supply network is required. So far co-operatives and state agencies have been mainly involved, but the private sector will need to play a greater role; the government does not have the financial or administrative capacity to manage a nation-wide system. The government and do-

nors could provide training for the private sector, however. Development and supply of improved seeds would also help.

Water and Electricity

In some areas a round-trip for water may take six hours, to fetch wood eight hours. Both are considered women's work. It is estimated that 30-40% of agricultural work is also done by women. Hadera (1999, p. 4) notes that women were working longer hours then men, because of the time needed to fetch water and collect fuelwood, cook, clean, care for children etc., plus the time spent in direct production. An important measure to ease this workload would be establishment of a water supply nearby. This would also ease the workload of girls, freeing up time so they could attend school.

Electrification of Ethiopia has barely started, about 5% of the rural population is covered so far. For the emergence of a more diversified rural economy, electrification is essential.

Credit

Credit to small-scale agricultural producers may have an important role to play in generating growth and combating poverty in Ethiopia. Although experiences with credit to agriculture in Africa have often been bad, what is most feasible is probably seasonal credit, and that is also what is needed most immediately. Longer-term loans require collateral, and since land cannot be used in Ethiopia, most smallholders lack enough assets to borrow.

Some institutions are lending on the basis of other types of business assessments. NGOs have established micro-finance schemes in urban areas, and an edict on this has come out from the government. There is a need to establish them in rural areas as well. The UNDP has a special credit fund designed particularly for poor rural women. Loans typically are given for investments in dairy farms and in small-animal production such as goats, sheep, and poultry. Beneficiaries can also be given training in bee-keeping, nutrition, and improved agricultural technologies (Hadera, 1999, p. 7). Non-agricultural credit can also be important in rural areas. Since most Ethiopian women have no formal education, they typically engage in informal sector activities such as petty trading, food-preparation, etc., which they can start with limited capital or skills and at the same time combine with family obligations.

According to a 1997 survey by the Central Statistical Authority, about 1.3 million people in Ethiopia were engaged in cottage/handicraft manufacturing industries, 58% in the rural areas and 65% were women. Here again there is need for micro-credit.

11.3 Human Capital Development

Education and Training

The Education and Training Policy of 1994 aimed to restructure and expand the education system to make it more relevant to the present and future needs and to attain universal primary education by the year 2015 (Hadera, 1999, p. 11), because it is generally believed that investment in education is a prerequisite for increased economic growth. But many LDCs have grown fast without much investment in education, while others that have made substantial educational investment have grown more slowly. The link between education and growth is thus not simple.

Bigsten and Makonnen (1999) found the urban rate of return to primary education in Ethiopia to be only 6.6%. Returns to primary education in Kenya have also fallen to very low levels in recent decades (Appleton et al., 1999). Estimates of Mincerian returns to primary education in Ethiopia were only 3.3% in a state firm (Wolday, 1998). It is also not clear that education always raises farm productivity in Africa (Bigsten, Kayizzi-Mugerwa, 1995).

The problem could be related to supply and demand conditions. For example, in Kenya demand has not kept up with supply, which has driven down returns. It thus seems obvious that education by itself will not generate growth, if the environment is not otherwise conducive.

Low adult literacy (only about 25%) and low school enrolment rates in Ethiopia, suggest that here there has not been a drop in returns to education due to oversupply as in Kenya. The problem in Ethiopia could thus relate to the education system itself. It is generally perceived that educational quality has gone down due to the conflicts that have ravaged the country and lack of resources. It may also be that the type of education provided is inappropriate. It has been shown, for example, that girls do better and stay longer in school if women teach them. Enrolment of girls has increased, but is still only 35.7%, 42.5%, 41.5%, and 14% of total enrolment in primary, junior secondary, senior secondary, and higher education respectively. In rural areas parents tend to be uncomfortable about their daughters' security if they have to travel long distances. Since girls are often involved in household duties, such as caring for younger siblings, food preparation, fetching water, and collecting firewood, the opportunity cost is also a hindrance. Many households, particularly in rural areas, give priority to girls' future role, as wives and mothers, rather than sending them to formal schooling. This also affects persistence and performance even when the girls are in school.

Some NGOs have experimented with alternative forms of education. Action Aid, for example, has launched a feeder-school programme called ACCESS (appropriate, cost-effective centres for education within the school system), focusing on grades 1–4 (Ahmed, 1997). The aim is to improve initial access to education, especially for girls, and thus to support the regular school-system. The teachers are called facilitators, and the teaching methods are simple, as are the physical fa-

cilities. The programme is meant to be taken over by local communities in the future. It is still of limited scale, but the approach may provide a short cut to expansion.

It will be a long time before the bulk of the population has basic education, so development strategies, such as labour-intensive manufacturing for export growth, which require educated labour, will not be viable in the short run. Development strategies must thus make use of those without education, which may require a focus on food production, since food can be produced fairly efficiently even by the poorly educated. Yet, for long-term growth and long-term poverty reduction it is hard to imagine anything more important than education; it will be impossible to achieve broad-based sustainable growth without a literate population.

Health

Per capita expenditure on healthcare in Ethiopia is among the lowest in the world ($1.4 per year per capita), and the health status of Ethiopians is low. Rural clinics especially are few and far between, and they often lack drugs and equipment. A survey done in 1995 showed that more than a quarter lacked a refrigerator, and more than half lacked more than a quarter of what are considered essential drugs (Collier et al., 1997, p. 6).

Nevertheless, there were some improvements in the 1990s: Infant mortality was 124 per thousand in 1990, but had fallen to 109 in 1996, while under-five mortality fell from 196 to 177 (World Bank, 1998). And life-expectancy at birth had increased from 46.5 to 49.5, in contrast with some other African countries where it has declined again in recent decades.[1]

Yet, the needs for improvement are vast, while resources are highly constrained. Government strategy has been to invest in new facilities, intending to double the number of clinics. But the increase in the capital budget, has squeezed the non-salary recurrent budget.

Collier, Dercon, and Mackinnon (1997) used a large-scale survey of rural households to analyse healthcare behaviour, and found that usage of clinics was much more sensitive to their quality than to the distance to them. They drew the conclusion that it would be much more cost-effective to raise the quality of existing facilities than to continue building more. Indeed, they argue that the same level of coverage could be achieved at a fifth of cost, and there would also be other health benefits from improved quality apart from the increase in use.

1. The HIV/AIDS epidemic has reached Ethiopia as well: it is estimated that 2.5 million are affected (Hadera, 1999, p.16), including 18% of pregnant women, which is going to strain the healthcare system even further.

User-fees used to increase quality have been suggested, but many would find it very hard to pay. One would need a system to exempt the poorest from the fee, but adequate information and institutional capacity for this are lacking.

The choice is thus basically between capital and recurrent expenditures. The Ministry of Development and Economic Cooperation controls the capital budget, while the Ministry of Health controls the recurrent budget, which complicates the issue. Donors also prefer to finance facilities, leaving the government to finance recurrent costs. There is therefore a double bias towards expansion in the number of facilities, although expansion actually aggravates the problem by increasing the need for recurrent expenditures without increasing resources available for the purpose.

11.4 Social Safety-Nets and Targeting

Two types of safety nets are required. First, the destitute need long-term support, while others need support when exposed to negative shocks. Since there are so many chronically poor in Ethiopia, it is difficult to imagine a system of general individual transfers that could effectively help them. Moreover, many of them are subsistence farmers, not helped in the short run by changes in urban-rural terms-of-trade. To help them one must raise their productivity and/or improve their market-access, as well as their access to social services.

Given the high concentration of poverty in some regions and the recent administrative decentralisation, there is scope for regional targeting, allocating budget-resources across regions, although fiscal transfers to the poorest regions may be politically difficult, given Ethiopia's history. Such targeting would of course require that the regional administration be able to effectively deliver services, including improved infrastructure, to the poor. Within the overall framework of regional targeting, there is also need for local targeting. The elderly and children, particularly orphans, especially need help, as do the sick and disabled. Regional targeting can be done on a governmental level, but such local targeting of households requires much more detailed local knowledge.

One thing that would help is a system to help guarantee food-security, since the government estimates that 52% of the population is food-insecure. Ethiopia is unusually exposed to the vagaries of nature, and there have been several famines in recent decades, which typically mean that farmers lose effective purchasing power (Sen, 1981). A system to help famine-stricken households would have to put purchasing power in their hands, which can be done in various ways. One approach is the provision of public works, through which poor households earn money that can be used to buy food.[1] Public works schemes should be used to create and maintain local infrastructure, with labour hired at a low wage. Only

1. The World Food Programme is still active in Ethiopia.

those with low alternative incomes would apply for such jobs, thus achieving self-selection (Ravallion, 1991).

A system exists for collecting information about the need for food-aid, developed during the Dergue-period in response to famines then. Information flows up from the *wereda*-level through the bureaucratic structure to a national Disaster Prevention and Preparedness Commission, which determines the regional allocation, which is then sent back through the system to the *weredas*, where the allocation of food aid to households is the responsibility of the *wereda*-administration assisted by community representatives such as the Peasant Associations. It is PA-leaders who finally implement the plan.

Based on a national sample for 1996, Jayne, Strauss, and Yamano (1999) analysed the targeting of food-aid in rural Ethiopia, investigating whether food-aid, either through free distribution or as food-for-work, actually reached the targeted poor communities and households. The policy has been that about 80% of the funds should be allocated in the form of food-for-work, but in fact it has been less than half, and food-for-work wages have been above rather than below market wages, defeating the aim of self-selection of the poor.

The authors found that there had been some targeting of the poor, but that major allocations had gone to areas not among the poorest, either because they were chronically needy, or because of fixed costs in setting up distribution systems, leading to inertia in the location of food-aid programmes. Regression analysis tended to support the latter explanation. The single most important determinant of whether a *wereda* or a household got food-aid was whether they had been recipients earlier. Equally poor communities in Tigray also had a much higher probability of being selected, suggesting a political bias. There was an inverse, but not very strong, correlation between per capita income and the probability of receiving either or both types of food aid, and even relatively high-income households had a good chance of being recipients. The probability of getting food-aid was weakly responsive to weather shocks, but the amounts were not. Thus, high fixed programme costs, plus successful political lobbying, seem to explain much of the existing allocation of food-aid. It is difficult to achieve effective targeting in a poor and politically unstable environment.

11.5 Conclusion

Fiscal prudence and openness are basic ingredients in a growth-strategy. Within this framework, however, growth in a country like Ethiopia should preferably be based on agriculture, since this is where the bulk of the poor are.

Ethiopia is very poorly developed, with large needs and limited resources. Poverty interventions therefore need to be as cost-effective as possible. Since the restoration of peace, Ethiopia has adjusted public sector resources towards the poor. Yet, it is the better-off who have reaped most of the rewards of growth; trickle-down has been limited. The government therefore needs to sharpen its fo-

cus on poverty further, which will require good micro-information. The situation in this respect has improved somewhat, but large information gaps obviously remain.

We have discussed a range of areas which we believe are particularly important for the poor in Ethiopia. The points raised are not new, but it is more important to get the basic interventions rights than to try new fancy ideas. Thus, we first emphasised the importance of transportation and other infrastructure. Top priority should be given to improving the rural road-network, but also to the provision of electricity and water. These things will help agriculture, but they need to be backed up by an appropriate credit system, extension services, and a functioning supply of agricultural inputs.

The human capital situation in Ethiopia is very bad. New community-based educational methods need to be used to get a quick increase in school enrolment, which is at present very low. The cost-effective option for healthcare is to improve the quality of the existing facilities rather than building new ones.

Ethiopia cannot be a full-fledged welfare-state. Social assistance will have to be provided mainly by the extended family or the local community. But the food-aid and food-for-work safety nets for the completely destitute, and for famine-relief need to be strengthened, probably with help from donors and NGOs.

Poverty reduction has to be based on economic growth. The preservation of a growth-friendly macro-environment is therefore crucial, which means that taxation cannot be too much out of line with that of other similar countries. The scope for direct poverty-intervention will thus remain tightly constrained. The types of measures proposed here could absorb large resources over time, but their expansion will have to be limited to what is feasible. The dismantling of the socialist system and the restoration of peace have made it possible to substantially expand activities relevant to the poor.

References

Addison, T. (1998), "Underdevelopment, Transition and Reconstruction in Sub-Saharan Africa", Research for Action 45, WIDER, Helsinki.

Ahmed Ali (1997), "ACCESS: An Alternative Route to Basic Education for Children in Ethiopia", paper presented at the ACCESS Workshop organised by ACTIONAID-Ethiopia for Tigrai and Amhara Regions, November, Mekele.

Appleton, S. et al. (1999), "Educational Expansion and Economic Decline: Returns to Education in Kenya, 1978–1995", WPS 1999/6, Centre for the Study of African Economies, Oxford University.

Bigsten, A. and S. Kayizzi-Mugerwa (1995), "Rural Sector Responses to Economic Crisis in Uganda", *Journal of International Development*, 7(2):181–209.

Bigsten, A. and N. Makonnen, N. (1999), "An Anatomy of Income Distribution in Urban Ethiopia", *African Development Review* 9(1):1–30.

Bigsten, A. and A. Shimeles (2003) "Prospect for a 'Pro-Poor' Growth Strategy in Africa", paper presented at the WIDER Conference on Poverty, Income Inequality and Wellbeing, Helsinki, May.

Collier, P. (1999), "On the Economic Consequences of Civil War", *Oxford Economic Papers* 51(1):168–183.

Collier, P. et al. (1997), "Density versus Quality in Health Care Provision: The Use of Household Data for Budgetary Choices in Ethiopia", mimeo, Centre for the Study of African Economies, Oxford University.

Departments of Economics, Universities of Addis Ababa and Göteborg (1998), *Descriptive Report on the Panel Socio-Economic Survey of Major Urban Centres in Ethiopia*. Göteborg and Addis Ababa.

ECA (Economic Commission for Africa) (1999), *Economic Report on Africa 1999: The Challenges of Poverty Reduction and Sustainability.* Addis Ababa.

Getahun, Taffesse (1998), Poverty. Draft Outline, Ministry of Economic Development and Cooperation, Addis Ababa.

Hadera Tesfay (1999), *Country Gender Profile: Ethiopia*. Sida, Addis Ababa.

Hansson, G. (1995), *The Ethiopian Economy 1974–1994: Ethiopia Tikdem and After*, Routledge, London and New York.

Hansson, G. (1997), *Ethiopia 1996 – Government Legitimacy, Aid and Sustainable Development*, Macroeconomic Report 1997:5, Sida, Stockholm.

Jayne, T.S et al. (1999), "Targeting of Food Aid in Rural Ethiopia: Chronic Need or Inertia?", mimeo, Department of Agricultural Economics and Department of Economics, Michigan State University.

Kanbur, R. (1998), "Income Distribution and Development", mimeo, World Bank, Washington DC.

Mekonnen T et al. (1998), "Economic Reform, Growth and Poverty in Ethiopia: Evidence from Household Panel Data", Report to the AERC, Nairobi.

Ministry of Development and Economic Cooperation (1999a), *Report on Macroeconomic Development in Ethiopia*. Report No. 42, Addis Ababa.

Ministry of Development and Economic Cooperation (1999b), *Poverty Situation in Ethiopia*. Welfare Monitoring Unit, Addis Ababa.

Ravallion, M. (1991), "Reaching the Rural Poor through Public Employment: Arguments, Experience and Lessons from South-East Asia", *World Bank Research Observer* 6(2):153–175.

Sen, A.K. (1981), *Poverty and Famines: An Essay on Entitlements and Deprivation*. Clarendon Press, Oxford.

Senait, Seyoum and Alemayehu, Seyoum (eds) (1998), *Human Resource Development in Ethiopia*, proceedings of the seventh Conference on the Ethiopian Economy, Ethiopian Economic Association and Department of Economics, University of Addis Ababa.

Tekie, Alemu (1999), "Insecure Land Tenure Regimes and Soil Conservation", mimeo, Department of Economics, Göteborg University.

UNDP (1997), *Human Development Report 1997*. Oxford University Press, New York and Oxford.

Wolday, Amha (1998), "Return to Schooling in Ethiopia: The Case of the Formal Sector", in Senait Seyoum and Alemayehu Seyoum (eds).

Wolday, Amha et al. (1997), *Small-Scale Enterprise Development in Ethiopia. Proceedings of the Sixth Annual Conference on the Ethiopian Economy.* Addis Ababa.

World Bank (1990), *World Development Report 1990*, Oxford University Press, Oxford.

World Bank (1998), *World Development Indicators*, CD-rom, Washington DC.

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