The urban labour market during structural adjustment: Ethiopia 1990-1997

Pramila Krishnan[*], Tesfaye Gebre Selassie[N] and Stefan Dercon[*+]

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Centre for the Study of African Economies
Institute of Economics and Statistics
University of Oxford
St Cross Building
Manor Road
Oxford OX1 3UL

* Centre for the Study of African Economies
[N] Economics Department, Addis Ababa University
[+] Katholieke Universiteit Leuven

Correspondence: pramila.krishnan@economics.ox.ac.uk

Abstract: The paper examines the effects of reform and structural adjustment on the urban labour market in Ethiopia using a combination of cross-section and panel data based on surveys conducted both pre- and post- reform. During this period Ethiopia has seen impressive growth in GDP but little in the way of private investment. Meanwhile, the labour market has remained remarkably unresponsive to the pressures of reform despite the growing queues of the educated unemployed. While the public sector has contracted over the period, real wages have been re-adjusted to almost pre-reform levels; furthermore, real wages have grown in the private sector, while returns to education have remained largely unaffected.

1. Introduction

This paper examines the response of the labour market to a period of structural adjustment. Since 1992, Ethiopia has undertaken a programme of reform and structural adjustment. We ask what the effect has been on the allocation of the labour force in different sectors, on the response of real wages and on returns to education. We use a combination of cross-section and panel data based on three surveys conducted in 1990, 1994 and 1997. Our findings suggest that little has changed and that the labour market has been unresponsive to the pressures of reform.

Most previous research has been based on cross-sectional analysis which implicitly assumes that the markets for education and educated labour are permanently at equilibrium. By examining the changing patterns of employment and returns to education over time, we are able to relax this assumption and examine the effect of transition to a market economy on education and the labour market. In doing so, we ask how allocation into work and in particular, into public, private or self-employment has been affected over this period. Structural adjustment is likely to affect the allocation of labour in two ways: privatisation and tighter budgets should dampen public employment, while the improved incentives to the private sector ought to encourage employment there. It is also likely to affect the wages across sectors. Formal sector wage employment remains the most important source of income in urban Ethiopia and therefore, the evolution of real wages over this period will matter both for labour market functioning and living standards. We ask whether returns to education have changed over this period for the reforms have been accompanied by changes in wages. Examining the changes in returns is important for it might have feedback effects on the household's demand for education and affect participation in the labour market[1]. Since returns, both pecuniary and non-pecuniary differ by sex, we estimate sex-specific returns to education.

In previous work using the data from 1990 (Appleton et al., 1995) private, monetary returns to primary education are found to be low (and insignificant) for men in urban Ethiopia in both the private and the public sectors and for women in the public sector. Substantial returns exist in secondary education in both sectors. In other words, it only appears to pay if an individual has at least a few years of secondary education before there are significant returns to education. Consequently, from the point of view of returns to investment into schooling, it seems rational for parents to send their children to primary school if they have sufficient funds to sustain the child in school well into secondary school. Given the extent and level of poverty and imperfect credit markets, few households will find it optimal to send their children, particularly their daughters, to school. This is exactly what appears to be happening: Ethiopia has one of the lowest gross enrolment rates in the world (about 20 percent), especially for girls. We now extend the study to examine returns to education for the subsample 15-29 years of age in 1994 and in 1997, in order to compare returns over this period.

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[1] Conventional estimates of the returns to primary education are generally high relative to that of secondary and tertiary education (Psacharopoulos, 1994). The World Bank (1988) obtains estimates of private returns, on average, at 31%. More recent studies dispute this finding, particularly for Sub-Saharan Africa (Bennell (1996), Knight et al. (1992)). In part, the critique of the earlier studies is on grounds of method and quality of the data. However, while private returns are often thought to be lower than those obtained in earlier studies, there are undoubtedly pressing reasons to think that non-pecuniary returns are high for various reasons: the beneficial externalities such as the impact on the health and nutritional status of mothers and children, the enhanced productivity of the population via `copying' effects, the importance of intergenerational effects in the acquisition and transfer of human capital.

We use data on a cohort of 15-29 year olds from 1990 (pre-reform) and compare this evidence with data culled from two waves of an urban household survey conducted in November 1994 and March 1997. The last two surveys form a panel, following 1361 households over the period, allowing us to use panel data econometric techniques in this investigation. For the comparison with the 1990 data, we use the same cohorts from the later surveys to obtain a reliable comparison. In the section 3 we discuss the data sources used. Section 4 describes the evolution of wages and employment in this period. In section 5, the methodology used for the econometric analysis is described. In section 6, the allocation into the labour force and into different jobs is discussed. Earnings functions and returns to education are analysed in this section as well. Section 7 concludes. In the next section, we provide some general background on the functioning of the labour market in Ethiopia and compare it with other countries.

2. Labour markets and economic reform in Ethiopia

During the 1980s, the Ethiopian economy was characterised by a strict control regime. This had been established in the aftermath of the fall of the Emperor in 1974. The government (usually referred to as the Derg), implemented a highly regulated and controlled economy, on the early Soviet model. By the late 1970s, free trade of agricultural commodities was severely restricted and taxed, while in urban areas nationalisation and controls limited the activities of the private sector. Private sector investment dropped and labour markets subjected to considerable controls. In principle, formal sector labour allocation in both government and parastatal companies occurred via a labour exchange, 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 after the collapse in the aid-flows from the Soviet and other friendly governments. A reform plan to establish a 'mixed' economy was approved, in which private sector involvement was encouraged with liberalisation in some agricultural and non-agricultural sectors of the economy. By 1991, however, the Derg was defeated by the rebel and the new government set out the Economic Recovery and Reconstruction programme to rehabilitate the economy. It built largely on the economic reforms of the previous government. The emphasis has been on encouraging and enhancing the role of the private sector. The state has gradually been allowing domestic private capital to play a more dominant role in trade and other activities. In 1992, the Birr was devalued by 143 percent and further reforms were instituted leading to a donor-funded structural adjustment programme, with privatisation, liberalisation of the private sector and international trade and a move to an auction system for the currency. These policy changes in Ethiopia, as it moves from a highly regulated and centralised economy to liberalisation offer a unique opportunity to study the impact of reform on the behaviour of urban households.

A few studies have tried to address the issue of 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 be eroded, avoiding the need for large scale retrenchment. Lindauer et al. (1986) analyse the experience of four countries (Ghana, Tanzania, Sudan and Malawi) in the 1970s and 1980s. They find that governments typically tried to protect the public sector wages of the lower skilled workers so that real wage erosion mainly resulted in a declining wage dispersion in the public sector relative to the dispersion in the private sector. Also, the gap between public and private sector wages narrowed considerably. 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 Cote d'Ivoire. Among the results relevant for the present study, they find changes not just in the sectoral allocation of workers, but also in participation rates during adjustment periods. The main shift observed was from formal to informal sector employment. They find that female participation rates increased, while for those skill levels for which labour demand is weak, there is a clear retreat out of the labour force. They also note significant increases in self-employment during 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. Canagarajah and Thomas (1997) review some aspects of the experience of labour markets in Ghana between 1987-92. They find a reduction in male unemployment and an increase in female unemployment in this period. They also suggest that there is an increase in informal sector employment at the cost of formal sector employment.

The Ethiopian experience is similar to that of other African countries in some respects. As in many African countries, the role of the public sector increased substantially in the 70's, particularly in terms of employment. Establishments were often pressurised to have more employees than their needs dictated in order to find jobs for relatives, supporters and others who attached themselves to senior officials and politicians (Survey of Current Economic Conditions in Ethiopia, 1993). The Ministry of Labour and Social Affairs survey of public and private sector establishment employing more than 10 workers suggested that in 1983 the public sector employed 73 percent of those in wage employment. The reforms also started with increased pressure on public sector employment, with the end to guaranteed jobs for university graduates and other restrictions on hiring in the sector.

Unlike many African countries, however, Ethiopia experienced very little inflation in the 1980s. This is explained by prudent government budgets and a rather restrictive financial policy. Inflation remained quite low, with inflation rarely in double digits in the 1980s. The Ethiopian birr remained stable, with only a small premium in the black market which in turn meant that public sector wages remained stable. However, the vulnerability of capital goods and the disruption of trade and movement of labour during the civil war are likely to have discouraged private sector activity considerably, in demanding high risk premiums, resulting in lower employment and earnings (Collier and Gunning, 1994).

At the end of the war, inflation picked up substantially, with inflation at 35 percent in 1991 and about 11 percent in 1992, which resulted in real wage changes in some sectors. As in other African countries with relatively successful programmes of adjustment, Ethiopia has experienced substantial growth at about 5 percent per year in the period 1994 to 1997. While increases in output or real wage adjustments are suggestive, they do not in itself show whether the economy has been responding to the changed incentives following the reforms. The evidence on allocation between sectors and speed of re-allocation is a better guide. We can only provide limited evidence on the movements between tradable and non-tradable sectors and concentrate on the division between public and private. In this context, it is discouraging that there is little sign of extensive new private investment, either domestic or foreign[2].

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[2] The Financial Times (March 2, 1998), in a special survey of Ethiopia 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 projects approved between 1992 and 1997 actually in operation. Furthermore, foreign direct investment remains a fraction of the total investment, much of it controlled by a single conglomerate. As David Styan points out, the government appears to be sending contradictory signals in its bid to attract investors. The

3. A description of the data sources

The first survey used 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. It covers 4148 individuals between the age of 15 and 29 years of age. The data were collected in a large number of towns using random stratified sampling. One shortcoming of the survey is that it collected only very limited information on the households to which the young people belong: apart from information on parental education and occupation and the quality of housing, little is known about the household.

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 town. The total number of households covered was 1500. The number of adults between 15 and 64 years of age, used for the analysis, was 5043. In February 1997 a third round took place, with allowing a comparison with conditions in 1994. Attrition was not particularly high, at just over 5 percent, mainly due to the unwillingness of some households to be re-interviewed. Note that the number of individuals (i.e. members of the households) successfully traced and linked between the rounds was smaller, with individuals leaving households, dying or not available for interviews for a variety of reasons. During the third round in 1997, an attempt was made to rerandomize the sample, by replacing households which dropped out by 'similar' households in terms of household composition, location, type of house etc. The total 1997 sample consisted of 1444 households, with 1361 panel households. Although this procedure is not without its own problems, it allows us to analyse the changes in allocation and returns in terms of a larger cross-section for both periods.

For the comparison between the 1990 and the 1994/1997 surveys, we focus on the same cohort as covered in the 1990 survey, i.e. the age-group between 15 and 29 years. This also provides us with evidence on the labour market experience of the young and relatively new entrants to the labour market. To the extent that tenure and labour market experience generally increase the probability of having a job and influences earnings, we would expect younger people to be more sensitive to and be more affected by the changing opportunities in the labour market.

4. Labour market participation and employment: 1990-1997

We begin with a discussion of Table 1 where summary statistics on activity and real wages by sex, are presented, using the cross-section for the entire sample of adults between the ages of 15 and 64 for 1994 and 1997. The table provides the sectoral allocation of the sample and of the labour force by public, private and self employment. The public sector consists of civil servants and those employed by public sector enterprises or local government. The private sector is a heterogenous category: it includes the larger private enterprises, cooperatives, casual workers and domestic workers. Own account and family workers and employers are in the group of self-employed. Together with the unemployed they form the labour force. The unemployment rate is

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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.

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. 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. However, 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 1 (Central Statistical Authority (1997)).

The results show an increase in labour force participation by women but a reduction in participation by men between the two years. There is a sharp drop in the unemployment rate, particularly for women, explained largely by the shift into self-employment. There is a slight increase in employment in both public and private sectors. Unlike in other adjusting countries (see Horton et al. (1994)), there is little sign of a large expansion of informal sector activity for men. If anything, fewer men are involved in this sector, while there has been an increase in the participation of women in this sector, mainly in household-based food processing. Table 2 provides the breakdown of employment by sector. Manufacturing and food processing firms, probably most readily defined as tradable sectors in Ethiopia, register a slight fall in employment over this period with the increase in employment coming from increased activity in construction and in local government. The public sector remains the single most important sector of employment in urban Ethiopia, with more than 40 percent of those in work. There has been little structural change here in this period, despite the talk of reform.

The second part of the table 1 provides summary data on monthly wages and hourly wages for formal wage activities and an estimate of self-employment earnings. Incomes, apart from wages, were collected at the level of the household. It is difficult to attribute them to individual household members for our purposes. The figures in the table are total household income from family business activities divided by the number of family members involved in these activities. (A measure of profits could not be obtained: the business income data suffers from missing information on costs incurred in the business, making it difficult to obtain any measure of net earnings). The median income in self-employment is reported, to avoid the problem of outliers. All earnings are 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 in 1994 was 74.5 percent, while between the survey period in 1994 and 1997 there was little inflation and the CPI stood only 2.5 percent higher by February 1997.

On average, monthly and hourly wages increased in this period. The increase in hourly wages is 9 percent for men and 12 percent for women. Hourly wages increased in both sectors and for both sexes, but the apparent change in hours worked - (an apparent reduction in the private sector for both men and women and a slight increase in hours in the public sector)- resulted in far larger monthly wage increases for public sector workers than for those in the private sector. The upward revision of public sector pay-scales in 1995 means that men and women in the public sector obtained about 17 percent higher wages than in 1994; men in the private sector had virtually unchanged total monthly earnings, while women gained in real terms by about 6 percent[3]. Growth in the formal sector economy in this period translated into higher

[3] In the questionnaire, in questions about earnings first the relevant payment period and then the amount was asked. 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, the hourly

earnings for some, but not into higher employment levels. Self-employment earnings appear to have fallen considerably. Average earnings in the public sector remain systematically higher than in the private sector, and the gap appears to have grown: monthly earnings for men in the public sector were 8 percent higher in 1994, but this increased to 26 percent in 1997; for women the gap is even larger[4]. Of course, such comparisons and changes over time have to be looked at in the context of the skill composition of the workers in both sectors and this point will be taken up below . First, however, we expand this picture of change over time by looking at the changes since 1990 for the cohort, 15 to 29 years of age.

wages had to be derived from two different answers in most cases. Consequently, these data may be more liable to measurement error than the monthly wages reported. The change in hours worked may therefore not necessarily be of significance, while the change in monthly earnings is likely to be genuine.

[4] A t-test of differences of the mean assuming independent sample and unknown variance suggests that these differences between private and public sector wages are significant in 1997 for both men and women and only significant for women in 1994.

Table 1: Unemployment and Employment in urban Ethiopia: 1994-1997

Allocation	1994			1997		
% (in brackets, percentage of labour force)	Men	Women	All	Men	Women	All
Unemployment (rate) (% of lab 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 (% of lab 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 (% of lab 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 lab 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 (as % of sample)	68.3	42.0	55.8	62.7	51.9	57.2
Sample size	2293	2750	5043	3047	3179	6226
Earnings (birr)						
Median revenues per family worker in self-employment (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 public sector (in 1990 prices)	1.52	1.17	1.37	1.64	1.28	1.49
Hourly wages private sector (in 1990 prices)	1.07	0.89	1.02	1.17	0.87	1.04

Source: First and third round of the Ethiopian Urban Household Survey. 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 2: Employment by sector: 1994-1997

	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
Manufactures (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 3: The cohort 15-29 years: Employment and Unemployment 1990-1997

Allocation	1990			1994			1997		
% (in brackets, perc. of labour force)	Men	Women	All	Men	Women	All	Men	Women	All
Unemployment (rate) (% of lab 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 (54.3)
Public (% of lab 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 (% of lab 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 (% of lab 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
Sample size	1535	2614	4148	1332	1554	2886	1598 (48.2%)	1720 (51.8%)	3318
Earnings (birr)									
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), 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 3 provides similar statistics for the age group 15-29 years, between 1990 and 1997. The focus on the younger cohort in the data sheds some light on how the changes in labour market allocation came about. Between 1994 and 1997, we observe a large reduction in participation by young men but not the increase in participation by women observed in the entire sample. In short, the increase in the participation rate by women is confined to the older cohort, while the reduction in participation by men is linked to young men. Recall from table 1 that the increased participation by women translated into increased self-employment, with further entry into this sector by the unemployed. This influx of older women in self-employment may be the result of more incentives for entrepreneurial activities after adjustment but more likely is an added worker effect: the need for more family income to tide families over the period of adjustment and the reduced ability by women to wait for formal sector wage employment.

The reduction in participation rates for young men also needs explanation. It can be best understood when looking at the evolution of the participation rate from 1990 onwards. Participation rates increased between 1990 and 1994 for both men and women. Non-participation for men in this age group was due to continuation in full-time education[5]. The strong increase in participation between 1990 and 1994 is closely linked with 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 school enrolments increased by 76 percent between 1982 and 1989 (Collier et al., 1997). By the beginning of the 1990s, a large collapse occurred in school enrolment, probably linked to the uncertainty surrounding the end of the civil war, the increase in army recruitment and the virtual collapse of public service provision in some areas around 1991. Senior secondary school enrolment in the country declined by 21 percent between 1989/90 and 1993/94. Combined with the inflationary shock putting pressure on the earnings of some households, this resulted in a large increase in participation in the labour market. By 1997, it appears that enrolments in schools appear to be recovering, in part due to a recovery in education service provision (Collier et al., 1997) but perhaps also due to the increase in open unemployment.

The biggest shock in the allocation of the labour force appears to have happened before 1994. The unemployment rate among young people shot up dramatically by about 60 percent for both men and women. In this context, the reduction in 1997 appears marginal. 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 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. The change in government and the large reduction in public sector activity in the first few years of the reforms hit the young in different ways: retrenchment perhaps, but also a large reduction in new hires and a removal of job guarantees graduates of tertiary education. Some of the job losses in the public sector appear to have been compensated by increases in private sector wage employment for men and self-employment for both men and women. But these were not sufficient to avoid a large increase in unemployment for this age group, which seems in turn to have fallen slightly by 1997.

Earnings for this young cohort follow a similar pattern as for the entire sample between 1994 and 1997 with increases in real monthly earnings by more 15 percent for both men and women in the public sector and smaller increases in the private sector. However, for public sector

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[5] For women this reason ranks with withdrawal from work after marriage as a reason for non-participation.

wages, this was simply a reversal of the large loss in earnings between 1990 and 1994. Wage increases had not kept up during this period when the CPI rose by 75% by 1994[6]. Men lost more than a quarter in real terms, while for women, earnings fell by about 10 percent. Following the revision of the public sector scales at the end of 1995, by 1997 the losses were reversed for women, and partially reversed for men. Private sector earnings on the other hand, did not decline in this period. Initial reforms and the end of the war seem to have increased not just employment in the private sector, but also earnings: rising by 50% for men and even more for women. The increased profitability of private sector activities encouraged labour absorption, but it remains remarkable that the wage increases by 1994 and in subsequent years were as high, despite the large increase in unemployment by 1994 and its persistence afterwards. A consequence of the evolution of relative real wages between 1990 and 1994 is that the public sector premium has fallen - as observed in other countries (Mazumdar (1989)). The increases in public sector pay by 1997 have started to widen the gap again, although it is now much smaller than it was in 1990. However, these changes obscure the variation across educational levels and sectors.

Table 4: Education of workers across sectors (percentages) (1997 data, full sample)

	Males					Females				
	Unem-ployed	Public sector	Private sector	Self-employed	Out of labour force	Unem-ployed	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.

Table 4 gives the frequency distribution of educational levels for 1997 by sector. Public sector workers are generally better educated, with a relatively high proportion of those with secondary and university education in the public sector. The unemployed are also relatively highly educated with about half of them having completed secondary education. Those without primary education are mainly self-employed - very few in this group have secondary education: self-employment does not seem to attract the educated. Finally, those out of the labour force have low levels of education as well. Tables 5 and 6 provide average wages by level of education and by sector of employment, for the entire sample and for the cohort under 30 years of age (t-tests were

[6] Note that this experience of the 1980s makes Ethiopia stand out in comparison to other African countries. While in most East-African and other African economies, the 1980s saw a large erosion of public sector pay, (Lindauer et al. (1986), 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. The erosion occurred quite quickly, but was, contrary to many other countries, partially reversed by 1997.

implemented to test whether the differences between the wages paid for different educational levels were significant). While in each sector and for each sex, there are increasing wages for higher educational levels on average, the high variance in wages for each level of education implies that only at the higher levels of education (tertiary or secondary), are the wages significantly higher. Wages for those with primary education are not significantly higher than wages for those with less than primary education, except for men in the public sector and for women in the private sector in 1994. These findings suggest low or zero returns to education at lower levels of education and high returns at higher levels. Also, the wage dispersion between levels of education is far larger in the private sector than in the public 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. To avoid the problem, we do not distinguish between those with some primary education and those who have completed primary education[7]. In general however, it appears that between 1994 and 1997 those with lower levels of education gained relatively more, especially men and women in the public sector and women in the private sector. However, between 1990 and 1994, men with lower levels of education had lost most, while among women the more educated lost relative to the less educated. These findings suggest that returns to education for certain groups may have changed over time.

[7] It appears that in the young sample, education levels are higher on average and hence the group with little or no education is very small.

Table 5: Monthly wages in wage employment by sex and level of education in urban Ethiopia: 1994-1997 (in real 1990 prices)

	Public sector wages for men				Private sector wages for men				Public sector wages for women				Private sector wages for women			
	less than primary	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: definition of education levels: < Prim = less than primary education; Prim=primary completed; Second=higher secondary (high school) completed; Tertiary=: completed higher education. All results have been tested usinga 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 percent; **=significant at 1 percent. (Source: First and third round of the Ethiopian Urban Household Survey)

Table 6 : Monthly wages in wage employment by sex and level of education in urban Ethiopia for age-group 15-29:1990-1997 (real wages in 1990 prices)

	Public sector wages for men			Private sector wages for men			Public sector wages for women			Private sector wages for women		
	<= 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: definition of education levels: <= 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 percent; **=significant at 1 percent.
Source: Survey of Adolescent Fertility, Reproductive Behaviour and Employment Status of the Youth in Urban Ethiopia (1990), Ethiopian Urban Household Survey (1994, 1997).

5. Modelling allocations and calculating returns to education

The changes in the patterns of employment and the changes in earnings over the period studied can be better understood by a careful modelling of the factors explaining allocation and earnings. We will focus on two questions. First, has allocation changed, i.e. have the effects of exogenous variables on allocation into the different sectors changed over the period? Secondly, has anything changed in factors determining wages in the public and private sector, and in particular, have returns to education been affected?

The estimates of returns to education are obtained as the (corrected) coefficient on the education variables in a Mincerian formulation of the wage function with appropriate corrections for selectivity. The simplest formulation of wage functions - a semi-logarithmic function of human capital variables with controls for taste variations is likely to yield biased estimates of the returns to education for several reasons. The first is that it ignores the problem of selectivity which arises if those not in work have different characteristics from those in paid work. A second and related problem is that selection into sectors of work differs as well. The private sector worker might be utterly unlike the public sector worker or the self-employed. In order to correct for these problems, we estimate a multinomial logit model of selection into work in public and private sectors, self-employment and unemployment relative to being out of the labour force. This multinomial logit model of allocation is assumed to be a function of personal characteristics, parental characteristics, human capital variables and some variables related to residency and assets. Monthly earnings equations are then specified as linear functions of personal characteristics, human capital variables, residency and a Lee-Heckman correction for selectivity [8].

The third set of problems relates to omitted variables or variables unobserved or difficult to measure. For instance, the quality of education available to men and women is unmeasured because it is difficult to do so and the data set does not offer suitable proxies. If women do not have access to the same quality of education as that of men, the returns to female education might be understated. If the quality of education is correlated with the quantity of education so that those attending better schools also have more education, the returns are likely to be biased upward. Another problem is that people may choose to obtain more or less education depending upon their unmeasured ability. This is likely to lead to an overestimate of the returns to education. No direct controls are available to control for ability or quality of education so little can be done to correct for this problem in the cross-section. However, we are able to test the robustness of the results by using the panel 94-97 and estimating a fixed-effects model.

With these caveats, we calculate the returns to education as the estimated coefficient on the education variables, which gives the marginal increase in wages obtained by an individual worker from a particular level of schooling[9]. The econometric model is the standard Gronau-Heckman model extended to take account of the different sectors of work. The allocation or

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[8] Contrary to some approaches we do not use occupations in the selection and wage equation since this variable is endogenous in this context. However, even if occupational dummies are included in the selection and wage equation the substance of the results discussed below remains unchanged.

[9] This is not the same as the marginal increase in average earnings since schooling alters the composition of those in employment and might increase their chances of employment. If schooling does not actually increase earning potential or productivity but merely operates as a screen, it will lower the average earnings of those already employed. This effect is particularly important where selectivity effects matter.

participation function is denoted by L. Let L_{ij} be a discrete variable which takes on the value j if the individual I is in sector j, (j=0,1,2, ..., k), where k denotes the number of sectors. L_{ij}^{*} is the latent variable of the model, denoting the indirect utility associated with being in the sector j. S is a vector of schooling variables, Z is a vector of other characteristics (personal, household, etc.) and u is the error term. The relationship between the variables is expressed in equation (1).

$$\begin{aligned} &L_{ij} = j \qquad \text{if } L_{ij}^{*} = \text{Max } (L_{i1}^{*}, L_{i2}^{*}, ..., L_{ik}^{*}) \\ &L_{ij} = 0 \qquad \text{otherwise} \end{aligned} \tag{1}$$

$$\begin{aligned} &\text{where } L_{ij}^{*} = \beta S_j + \gamma Z_j + u_{ij} \\ &\text{and } \quad u_{ij} \text{ are i.i.d. with a Type I extreme value distribution} \end{aligned}$$

We also estimate a wage function for each sector, consequent upon allocation. As is common, we use the semi-logarithmic formulation, so that W is the log of the wage per month. X is a set of household and individual characteristics, (a sub-set of Z) and ϵ is an error term. It is only observed if L_{ij} equals j, where j denotes a sector of wage-employment. Therefore, in estimating the wage function, a correction term for sample selection, i.e. λ_{ij}, is entered in equation (2).

$$W_{ij} = r.S_i + \alpha.X_i + \theta.\lambda_{ij} + \epsilon_{ij} \qquad \text{if } L_{ij} = j \tag{2}$$

We present estimates of the 'direct or Mincerian returns'. The direct (marginal) returns or wage premia are obtained by using the coefficient in the semi-logarithmic regression of education (measured as a dummy variable) on wages and expressing it as a percentage change using the Kennedy (1981) correction for dummy variable effects in semi-logarithmic formulations[10].

Our main interest in the earnings regressions is whether there are changes over time in the returns to education. We can test this within the panel. Suppose that over time, the way earnings are determined changes, even though the individual characteristics, including schooling do not change, i.e. the coefficients in (2) are time dependent as in (3):

$$W_{ij} = r_t.S_i + \alpha_t.X_i + \theta.\lambda_{ij} + \epsilon_{ij} \qquad \text{if } L_{ij} = j \tag{3}$$

By estimating this model in first differences on the individual and schooling variables, we can determine the changes in the coefficients. Significant coefficients on schooling would imply a change in the returns over time. Note that if there are individual fixed effects, i.e. constant unobservable characteristics of the individual, correlated with other variables in the regression, then the resulting bias would be avoided in the differenced fixed effect model. Problems such as ability bias might be avoided. This method provides a robust estimate of the change in returns.

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[10] Using this correction, the direct return ρ is obtained as follows, with r is the coefficient on the education dummy and σ_r is the estimated standard error :

$$\rho = e^{r - \frac{\sigma_r^2}{2}} - 1$$

A panel is only available for part of the period considered (1994 to 1997). For the comparison between the estimated returns in the cross-sections other methods are needed. We conduct a test of whether the coefficients in the earnings equation are different across the periods by using a bounds test proposed by Kobayashi(1986), for the case where the disturbance variances are unequal[11]. We also implement a nested test of changes in returns, using a pooled sample.

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 is assumed to be a function of own and household characteristics, parental characteristics, human capital variables, ethnicity and controls for the different towns. Own and household characteristics include age, marital status, the number of very young (below five years of age) or old (above 65 years of age) dependants, total family size, whether head of the household, whether migrated in recently and ethnicity. Also included are human capital variables, represented by the highest levels of education completed; parental background (i.e. whether father and mother have completed primary school and whether the father has had a public sector job); and finally, some measure of support from the family (whether still living with parents)[12] or other sources 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 regressions were estimated for the full sample in 1994 and 1997, covering all adults between 15 and 64. They were estimated separately for men and women. For the younger cohort (15-29), data were also available for 1990, so the allocation regressions were run for this year, as well as on the same age-cohort for the other two years. Since the 1990 data are somewhat less comprehensive, a smaller number of variables is used in the allocation model in all regressions focusing on the younger cohort. The results are reported in the annex (table A.1 for the full sample in 1994 and 1997 and table A.2 for the young adults for 1990, 1994 and 1997)[13]. Note that we give the marginal effects of the multinomial logit and their significance; not the regression coefficients themselves. We also test whether the regressions can be pooled over time in order to test whether there has been a change in the factors determining labour market allocation.

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[11] He 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 is rejected when the test statistic lies above the upper critical value; and 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.

[12] 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 occur with a substantial lag after employment.

[13] The questionnaires in the 1994 and 1997 rounds were virtually identical, but the 1990 questionnaire collected more limited information at the household level. The allocation and returns equations in this paper were specified in exactly the same way to allow comparability over time using all the regressors available in each round. Running the regressions on a more general specification using all information available in each round provided a better fit and slightly different results for some of the marginal effects. When estimating the wage equations, we used however in each period as many of the variables mentioned available for that period.

The earnings regressions are also reported in the annex (tables A.3 and A.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 A.5 and table A.6 in the annex)..

First, we focus on the allocation of the full sample of adults (table A.1). In general, there is very little difference in the coefficients for both men and women between 1994 and 1997. The effects on household and individual characteristics are generally consistent with effects usually found elsewhere. Married men and women are less likely to be unemployed and married women more likely to be out of the labour force. Living with parents and receiving support in the form of remittances are positively related to being unemployed; high reservation wages contribute to being unemployed. Ethnicity also matters: Amhara, Tigrayan and Gurage men are all more likely to be unemployed, compared to the base group, who are mainly Oromos. Amhara men and women have the highest probability of being in the public sector; Amharas and Tigrayans are less likely to be self-employed and to a lesser extent in the private sector; Gurage men and women are very likely to be self-employed; Gurage men are very unlikely to be found out of the labour force. These patterns are definitely consistent with expectations.

Education seems to have a substantial effect on allocation. Men with primary education are more likely to be out of the labour force. Presumably this means that those who are young and have completed primary education are still in education, while those older with only primary education may have dropped out of work. For women, who have lower education levels on average than men, primary education helps them into the public sector, relative to men. Secondary education has larger effects to enter the public sector for both men and women. It has, however, an even larger marginal effect on being unemployed. This effect is the largest marginal effect for both men and women: having at least secondary education increases the marginal probability of being unemployed by between 15 and 30 percentage points in this period. Education is clearly linked with an intention to work: secondary education has a strong negative effect on being out of the labour force.

The educated are rarely found in the private sector and self-employment. For men, primary and secondary education reduces the probability of being in the private sector by 6 to 13 percentage points in this period; similar percentages apply for self-employment. These results suggest that educated people may have skills which are not useful for the private sector and for self-employment (no labour demand for their skills) or that they rather remain unemployed than enter 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. Table A.2, focusing on the young between 1990 to 1997 sheds some light on this. In general, it was found that allocation into different sectors and into work has changed in this period: a Lagrange-multiplier test on whether the coefficients in the multinominal logit model 1990 and 1997 are the same was convincingly rejected at 1 percent for both men and women. While broadly speaking, the signs and significance of many of the variables determining allocation are the same, some effects are clearly different in both periods. In particular, the role of the education variables, especially for secondary education, appears to have changed considerably. The large effect of secondary education in the selection into unemployment was not present in 1990, while the marginal probability of being selected into public sector for

educated people has clearly gone down over this period for men[14]. 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 workers into the private sector or self-employment. The retrenchment since 1990 and the reduced recruitment of the secondary- and tertiary- educated by the public sector has resulted in a substantial rise in unemployment among the educated.

To investigate whether returns to human capital have responded to this change in labour market allocation, we ran standard wage regressions for the different sectors and age groups by sex to explain the logarithm of the real wage per month. Variables used were work experience since leaving full-time education and its square[15], whether the person is married and whether he/she migrated in the last five years, dummies for the highest level of education obtained and controls for towns. A Lee-Heckman correction term for sample selection was included as well. Tables A.3 to A.6 in the annex give the full regression results.

Tables 7 to 12 give the estimated returns and the bounds test of the significance of changes in the returns over time for men and women. The value of the returns is the total percentage return from completing up to the particular level of education (rather than the marginal effect). We begin with a comparison of tables 7 and 8, which provide the returns over time for young men and women, 1990-1997 (using table A.4). Returns to education for this age group are insignificant in the private sector and only significantly different from zero for tertiary education[16]. The significant point estimates of returns to tertiary education for both men and women in the public sector fall (and fade into insignificance for men) considerably by 1997. Clearly, the apparent fall in returns to the tertiary-educated translates into some gains for those with primary education or less. However, the bounds 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 90 and 94, only to restore themselves by 1997. For each group, we also report a t-test of the null hypothesis of equality of returns based on the pooled sample from 1990 and 1997 (as in table A.5)[17]. They confirm the results from the bounds tests.

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[14] 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 these young men were out of the labour force, in school. In 1997, this fraction was only 12 percent. Few of them were absorbed by the labour market: the unemployment rate for those with secondary education increased from 44 to 67 percent in this period. These effects appear mainly confined to this particular educational group; for other groups, there was relatively little change in this period.

[15] The data did not allow for the exact calculation of job experience so this variable was, as is common, proxied by the age of the person minus six minus the number of years of full-time education. We also tried age rather than experience but it made little difference.

[16] The sample contained far too few of those with less than primary education after 94 so that only total returns for the secondary and tertiary educated could be obtained. Similarly, the 1990 sample contained no observations for the tertiary educated in the private sector.

[17] Contrary to the bounds test, this test restrict all coefficients, except for the education dummies, to be the same in both 1990 and 1997. We do not report the t-test on differences in the return to primary education, since the estimates were used on very few observations in each group. Nevertheless, the evidence in table A.5 suggests no change for returns to primary education in the public sector and a decline in the private sector, significant at

We now turn to the full sample and examine changes between 1994 and 1997, comparing tables 9 and 10 (based on table A.3). Returns for men in both sectors are consistently considerably higher for higher levels of education. Returns to education for men in the public sector are significant at all levels of education; in the private sector, returns to primary education are not significantly different from zero. But here, there is no suggestion of any change in returns. The apparent collapse in point estimates of tertiary returns in the public sector for the young disappears when the older cohort is included: if there is a change, the older cohort has been sheltered from it. If anything, the point estimates suggest a slight increase in returns to secondary education in both sectors and little evidence of returns at the primary level in the private sector. It must be emphasised that these changes are not statistically significant. Tables 11 and 12 provide a test of the robustness of the estimates (and the changes) using the panel of men and women who stayed in the same sector of work. We first report the returns and the bounds test of differences using cross-section estimates for each year for these panel individuals, followed by the implied change in returns using the fixed effects estimation (table A.6). It is striking that the point estimates of the change (the last column for each sector) are almost identical to the actual change in observed coefficients. Individual fixed characteristics, which may affect the estimated return to education, do not appear to affect the implied changes in returns over time based on cross-section estimation techniques. Furthermore, the fixed effects estimates confirm that the changes are not significant, particularly for the secondary and tertiary educated[18].

This is a surprising result, in a period in which the private sector supposedly should have had more incentives to respond to market forces, including in the labour market. Indeed, table 6 seems to show that real wages at all levels of education, including primary and secondary, have in fact increased between 1990 and 1997. Furthermore, the private sector which might be thought of as likely to respond to market signals appears to have responded with higher wages (and unchanged returns) to the better educated - precisely the group that largely make up the unemployed, and whose share in the total number of unemployed had increased strongly during this period.

It is useful to compare these returns with those obtained for Ghana for 1987 and 1991 (Canagarajah and Mazumdar, 1997), marking a period of adjustment there. The estimates of returns by level of education (pooling private and public employees), reveals that there are no discernable returns to primary education, but over the period, returns to secondary education climbed substantially. Furthermore, a selectivity-corrected regression for 1991-92 finds the return to schooling is much higher in the private sector, compared to the public sector. The authors interpret this as the increasing importance of human capital in the private sector. Furthermore, the narrowing of wage differentials, by 1991, between the private and public sectors reduced the returns to education in the public sector. This comparison suggests that the labour market in Ethiopia has proved to be extremely rigid and unresponsive to the reforms. The key difference between the Ghanaian and Ethiopian experience must be the low rates of open unemployment in Ghana compared to Ethiopia. There has been little evidence that the recovery and reforms since

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10 percent.

[18] The exception is an apparent decline in returns in the private sector for men with primary education relative to those without education. This suggests that the private sector values primary education increasingly less. Note that this is not easily understood in the context of the pressures from the labour market: although unemployment among primary educated increased during this period increased by 15 percents of the labour force, this increase was well belowthose experienced by secondary and tertiary educated (23 and 25 percent respectively).

1992 in Ethiopia have affected the returns to human capital in the fashion observed in Ghana. Despite some similarities, such as initial collapse in public sector wages and the narrowing of the public-private wage differential, the fact remains that the public sector remains the dominant employer and the queues of secondary-school leavers have made little impact on the private sector's pattern of remuneration.

Table 7 Returns to education for young men (15-29 years)

	Public sector							Private sector						
	Young men 15-29 years			Testing differences F-test			t-test pooled sample	Young men 15-29 years			Testing differences F-test			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 percentage increase from complete education up to particular level, not per year. Significance tests are t-tests on regression coefficients. Returns are corrected using Kennedy (1981). Regressions in table A.4 and for pooled sample, in table A.5. Differences between returns are tested using Kobayashi (1986) on the regression estimated coefficients and standard errors of the respective regressions. Critical values for rejecting equality of returns between periods are 6.8(at 1 percent), 3.9 (at 5 percent) and 2.7 (at 10 percent). **=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent

Table 8 Returns to education for young women 15-29 years of age

	Public sector						t-test pooled sample	Private sector						t-test pooled sample
	Young women 15-29 years			Testing differences F-test				Young women 15-29 years			Testing differences F-test			
	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 7.

**=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent

Table 9 Returns to education for men 15-64 years of age (percentage earnings increase from complete education up to the particular level) Full sample

	Public sector			Private sector		
	Men 15-64 years		Testing differences F-test	Men 15-64 years		Testing differences F-test
	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 7. Results based on table A.3. **=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent

Table 10 Returns to education for women 15-64 years of age

	Public sector			Private sector		
	Women 15-64 years		Testing differences F-test	Women 15-64 years		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 7. Results based on table A.3.
**=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent

Table 11 Returns to education for men 15-64 years of age (percentage earnings increase from complete education up to the particular level). Individuals in panel.

	Public sector				Private sector			
	Men 15-64 years		Testing differences F-test	Implied change (fixed effects)	Men 15-64 years		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

See note under table 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, by 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 A.6. **=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent

Table 12 Returns to education for women 15-64 years of age (percentage earnings increase from complete education up to the particular level). Panel individuals.

	Public sector				Private sector			
	Women 15-64 years		Testing differences F-test	Implied change fixed effects	Women 15-64 years		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

See note under table 7 and table 11. **=significant at 1 percent; *=significant at 5 percent; += significant at 10 percent.

Conclusions

This paper reviews some of the changes that have taken place in the Ethiopian urban labour market between 1990 and 1997. During the first part of the period analysed, the civil war had ended with a change of government and the introduction of public sector reforms within a structural adjustment and reform programme. During this period growth rates of GDP have been impressive, averaging 7% since 1992. However, the country has seen little foreign or domestic investment and remains dependent on a combination of good weather and aid and debt relief. The slow pace of privatisation and the contradictory signals to investors have also meant that the private sector remains marginal, particularly in terms of employment.

However, we do find that the public sector has contracted over this period. There is evidence of a large reallocation of labour out of the public sector between 1990 and 1994, and an increase in unemployment. After 1994, unemployment declined slightly, with limited increase in private sector employment and in self-employment. Real wages in the public sector declined between 1990 and 1994, largely following an inflationary shock in 1991/92 which was not fully compensated for despite an upward revision of the public sector pay scales in 1995. In the private sector, wages generally rose over this period, narrowing the gap with public sector pay.

Although returns in the public sector do not appear to have changed much since 1990, they fluctuate considerably. Overall, there is little evidence of changes in returns in the public sector even if point estimates of returns for young men and women seem to be lower by 1997. Private sector wages have been rising and returns to secondary and tertiary education unaffected despite high unemployment levels. These results are confirmed by the estimates using the panel of data for 1994-1997 and suggest that the results are robust to possible problems of unmeasured or missing variables that usually bedevil such conclusions.

The pattern of allocation into work, particularly into the public sector does appear to have changed since 1990. In particular, those with secondary education are substantially more likely to be found in the ranks of the unemployed and the probability of being in the public sector has fallen for this group as well. Clearly, the change in policy of reserving places for those with post-secondary education has mattered; however, given the rigidity of wages and returns in the public sector, this has made little impact on the re-allocation of the educated into private employment. The unemployed appear to be queueing for work, primarily in the public sector. These findings suggest there are imbalances in the urban labour market and that the transition to an equilibrium level may take considerable time. It must be concluded that the labour market in Ethiopia has remained rigid and unresponsive to either the pressures of reform or the growing queues of the educated unemployed.

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Annex

Table A.1 Allocation in wage employment, self-employment, unemployment and out of the labour force in urban Ethiopia in 1994 and 1997.

Sample of adults between 15 and 64 years of age. Multinomial logit. Marginal probabilities and significance levels. **=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

Allocation into sectors	Men		Women	
Adults (15-64 years)	1994	1997	1994	1997
Variable	n= 2293	n=3047	n=2750	n=3179
UNEMPLOYED				
Constant	-0.365 **	-0.562 **	-0.673 **	-0.748 **
family size	-0.002	-0.003	-0.007 **	-0.004 0
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	0.020 **
living with parents?	0.091 **	0.024 0	0.047 **	0.010
value remittances	0.109 **	0.042 0	0.041	0.046 0
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 0
at least secondary	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	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 **
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	-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	-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
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	-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 **

Table A.2 Allocation in wage employment, self-employment, unemployment and out of the labour force for young adults (15 to 29 years of age) in urban Ethiopia in 1990, 1994 and 1997.

Sample of adults between 15 and 64 years of age. Multinomial logit. Marginal probabilities and significance levels. **=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

	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
Variable						
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
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 **

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 A.3 **Wage regressions** (left hand side= log of real wage per month) with sample selection. Sample of adults in wage employment (15 to 64 years of age). **=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

Adults (15 to 64 years)	Men				Women			
Returns	Public Sector		Private Sector		Public Sector		Private Sector	
	1994	1997	1994	1997	1994	1997	1994	1997
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
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 **
Tertiarty 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

Table A.4

Wage regressions (left hand side= log of real wage per month) with sample selection. Sample of young adults in wage employment (15 to 29 years of age). **=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

Young Men:1990-1997

Wage regressions	Public Sector	Young men		Private Sector	Young men	
Variable	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

Young Women:1990-1997

Wage regressions	Public Sector	Young women		Private sector	Young women	
	1990	1994	1997	1990	1994	1997
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Constand	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

Table A.5

Wage regressions (left hand side= log of real wage per month) with sample selection. Pooled sample of young adults in wage employment (15 to 29 years of age) in 1990 and 1997. Separate sample selection regressions (see table A.2). Overspecified for education variables (interaction terms with year dummy for 1997). Significance of interaction terms implies changes in returns to education.

**=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

Pooled 1990-97	Men		Women	
Young (15 to 29 yrs)	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 * dummy97	-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

Table A.6.

Wage regressions (left hand side= log of real wage per month) with sample selection. Panel estimation fixed effects (i.e. first differences) on sample of adults (15 to 64 years of age) in 1994 and 1997. Separate sample selection regressions (see table A.1). Overspecified to allow for changes in coefficients on education and other variables. 1994 and 1997 columns give cross section results for each year on sample. 97-94 gives overspecified first difference panel model. In this difference model, significance of coefficients on education implies changes in returns to education. **=significant at 1 percent; *=significant at 5 percent; +=significant at 10 percent.

	Public Sector			Private Sector		
Men - Panel	1994	1997	97-94	1994	1997	97-94
Variable						
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 - Panel Variable	Public Sector 1994	1997	97-94	Private Sector 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