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MACRO POLICY REFORM, LABOUR MARKET, POVERTY AND INEQUALITY IN URBAN ETHIOPIA: A MICRO-SIMULATION APPROACH[1]

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Abstract

Despite the liberalization program that Ethiopia embarked upon since 1992 aggregate indicators of poverty and inequality largely remained unchanged. This paper addresses why incomes and inequality largely remained stable at a time of fundamental changes in macroeconomic policy environment. We have used both data exploratory analysis as well as earning and occupational choice modelling, together with counterfactual simulation, to investigate this issue. The study showed that the absence of change in aggregate measure of poverty and inequality hides an enormous change that occurred across different income categories. This shows the importance of understanding the labour market to understand the policy propagation mechanism through which macro policy is expected to affect poverty. The study has show that although there seem to be limited change in poverty and inequality at aggregate level, there is significant change within and across categories of households. Thus different household are affected differently by the reform. The level and distribution of household incomes is found to depend on the structure of returns to labour and on the occupational choice the households made. Thus, policy effectiveness of poverty reduction policies could be achieved if we understand the workings of the labour market and how it affects both level and distribution of income across different categories of income & sector.

1.   Introduction

Governments in Africa and their development partners such as the World Bank and IMF are concerned with the issue of reducing poverty. Thus, since the 1980 they have deployed macro policy packages that are believed to help in addressing the challenge of reducing poverty. This took the form of Structural Adjustment Packages (SAP) in the 1980s and 1990s and now taking a 'new' form called Poverty Reductions Strategy Programs/Papers (PRSPs) or its new (or competitive version) 'the Millennium Development Goals' (MDGs). At the heart of these policy packages lie a set of macro polices, which can loosely be termed as 'liberalization and conservative monetary and fiscal policies' – or reform in short, that are believed to help the fight against poverty. One important analytical shortcoming of these efforts is lack of a link between macro policies employed and indicators of issues of poverty and inequality. In other words, we do not precisely know through which channels the deployed macro policies are supposed to affect poverty (perhaps the only exception being the presumption that stable macro environment is good for growth and hence for reducing poverty). One obvious channels through which macro polices may affect poverty is through its effect on the labour market and hence earnings form that market. Thus, characterization of the labour market in general and modelling how incomes are generated in this market in particular are key to understand the propagation mechanisms   through which macro polices may affect poverty and inequality. This paper is aimed at exploring this issue using the Ethiopian household data and a micro simulation technique.

The rest of the study is organized as follows. In the next section, we present a brief review of the macroeconomic performance in post-reform Ethiopia. In section three, we will analyze the structure of employment and household income in urban Ethiopia. This section provides a description of the state of affairs and evolution of key labour market indicators using two rounds of a household survey undertaken in 1994 and 2004. In section four we will specify the models employed in the study and estimate their parameters. Using these models we have made a micro-simulation analysis of the impact of the reform on poverty and inequality in the same section. Section five will conclude the paper.

2.   The 1992 macro policy reform and poverty

In 1991 the then-rebel forces (The Ethiopian People Revolutionary Democratic Front, EPRDF) overturned the 'socialist' military regime that ruled the country for a brutal 17

years. With the support of the Breton Woods Institutions, the new regime began to carry out a liberalization policy in a typical Structural Adjustment Programme (SAPs) fashion. In terms of economic policy, this period witnessed a marked departure from the 'Socialist' control regime of the military era – the '*Derg'* regime. The policy reform carried out includes:

a)   Financial sector and labour market liberalization
b)   Domestic and external trade liberalization
c)   Liberalization of the product market, in particular the agricultural sector
d)   Pursuing conservative fiscal and monetary policy: expenditure reduction and switching, tax reform, tight monetary policy, exchange rate and public sector reform.

Partly because of these policies and good weather outturn that is combined with a rising level of foreign aid, the growth performance in the post-reform period was much better than the previous regimes (see Table 1). Table 1 shows the evolution of major macro variables over the last four decades. The growth record is mixed but typically erratic and generally shows dismal performance of the economy although the post-*Derg* period fairs better. The only good thing that can be read from Table 1 is the low level of inflation that shows remarkable stability. This is largely attributed to price regulation in the pre-reform (pre-1991) period and to the good macro performance and excellent weather outturn in much of the post-reform period (see Alemayehu 2005).

Table 1: Evolution of major macro aggregates (1962-2000)

Gregorian Calendar	1962/66-1966/67	1967/68-1971/72	1972/3-1976/7	1977/78-1981/82	1982/83-1986/87	1987/88-1992/93	1992/93-1999/00
Ethiopian Calendar	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-1992
Real GDP Growth	4.7	4.0	1.3	2.3	3.7	-0.01	5.7
Investment % of GDP	13.5	12.6	9.7	11.0	14.3	13.4	15.9
Saving as % of GDP	11.4	11.0	9.0	4.7	6.5	7.1	5.3
Export & Import, % of GDP	24.1	22.1	26.5	29.1	26.0	20.2	37.8
Inflation*		1.7	11.4	10.7	3.4	11.8	3.8
Export as % of Imports	83.6	86.6	95.8	53.6	53.7	52.3	56.4

Source: Owen Computation based on Ministry of Finance and Economic Development (MOFED) and Central Statistical Authority (CSA) data, various years.
Based on mean of annual CPI rate.

In the wake of the 1992 reform, as shown above, the economy registered a real per capita income growth to the tune of about 3% per annum. For an economy recovering from prolonged civil war, drought and economic stagnation, this growth rate is miniscule. The latter is in particular true in the face of the colossal poverty the country

harbours and the expectations by its people. As a result, it is difficult to see much change in welfare of people in Ethiopia after ten years of intense economic reform. Unfortunately even some of the gains witnessed at the early stage of the economic reform were lost with the onset of the 'border' war with Eritrea that lasted for about two years (1997/98-1999/2000). Thus, one of the worries that should be kept in mind, as illustrated in the Table 2 below, is that of the fragility of the Ethiopian macroeconomic condition and the possibility of policy reversals that could be triggered by a host of unforeseen emergency situations such as war/conflict, cut in aid, famine or other calamities and their implication for poverty reduction.

Table 2: Macroeconomic policy stance of Ethiopia (1991-2000)

Policy Variable	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Per capita GDP growth rate	-8.3	9.8	-0.6	4	8.4	3	-2.7	4.5	2.2
Fiscal Policy									
Deficit/GDP (%)	-9.7	-7.5	-11.3	-7.3	-7.9	-5.1	-7.2	-12.2	-15.1
Revenue/GDP (%)	10.8	12.0	14.0	17.2	18.0	18.8	18.0	17.9	18.4
Monetary Policy									
Seignior age[*]	16.9	4.77	8.53	18.9	-1.97	0.28	13.9	-0.48	9.66
Inflation	21.0	10.0	1.2	13.4	0.9	-6.4	3.6	3.9	4.2
Exchange Rate Policy									
REER[**(%)]	na	77.1	-14.8	1.7	-8.2	1.2	-0.9	-1.0	-6.4
PMP (%)#	201.9	65.0	22.0	16.8	20.5	10.0	0.0	1.0	1.0

Note: REER = Real Effective Exchange Rate; PMP = Parallel Market Premium   *Estimated as the difference between broad money and real GDP growth rates.   **1979/80=100,
PMP=Parallel market premium
Sources: Authors computation based on MoFED and National Bank of Ethiopia data.

The above table gives some indication on the link between macroeconomic policy stance and economic growth. The latter in turn believed to be linked to poverty. In the period when the policy stance showed significant improvement (1994/95-1996/97), the per capita GDP growth rate was positive, more or less robust and stable. When the policy stance was weak, on the other hand, so was the growth rate in per capita GDP. In fact, the available evidence also indicates that poverty behaved in like manner during this period (See Bigsten *et al*, 2001, Alemayehu, Abebe and Weeks, 2002). Thus, there is some evidence suggesting that good macroeconomic policy stance is associated with good growth performance and hence reduction of poverty. However, we do not know the path or propagating channel through which macro policies does affect level of poverty. One possible channel is the labour market, which is the subject of this study and pursued at length in the rest of the

study. The concept of labour market is however problematic in the African setup and generally refers to the urban labour market. Our focus is thus on the urban labour market.

Most existing studies on the evolution of poverty and inequality focus on analysis of consumption. Hence, they tell us little about the mechanisms through which changes in the market and macro policy environment affect income. Alternative approaches such as static decomposition methodologies and dominance tests have important shortcomings too. First, decompositions on one dimension do not control for any other dimension/characteristics of households. Second, the decompositions are of scalar measures, and therefore "waste" information on how the entire distributions differ (along their support). Finally, even to the extent that one is prepared to treat inequality between subgroups defined, say, by age or education, as being driven by those attributes – rather than by correlates – the share of total inequality attributed to that partition tells us nothing of whether it is the distribution of the characteristics (or asset), or the structure of its returns that matters.

In this study, we adopt a micro-simulation methodology that does not suffer any of the aforementioned shortcomings. Using this methodology, we will analyze the evolution of poverty and inequality in urban Ethiopia using two sets of urban household surveys that covered 1500 households in each year and conducted by the Department of Economics of Addis Ababa University in seven urban centres in Ethiopia for the years 1994 and 2000[3]. Hence, we will be able to compare the effects of major policy changes that occurred in the 1990s by comparing the structure of household incomes in 1994 with the structure that prevailed 5-6 years later to detect and explain the major shifts in structure of incomes, which we have hypothesized to be linked with SAPs.

3.   The urban labour market, poverty and inequality in Ethiopia

We begin from the working hypothesis that changes in poverty and inequality is likely to be closely associated with changes in the labour market condition. Thus, understanding the labour market helps to identify the channels through which macro policies may affect earnings from the labour market which in turn affect conditions of poverty and inequality. The basic idea of the micro-simulation is to isolate the effect of each of the main determinants of the changes in poverty and inequality and associate these changes to the process of macroeconomic adjustment and stabilization, and to

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[3] See Bigsten and Shimeles (2005) about the methodology of the data collection and other related details.

the set of liberalization policies which we loosely termed as 'macro policy reform'. The methodology consists of creating a counterfactual in the form of labour market parameters representing, among other, the employment and remuneration structure, which would prevail if the labour market structure would be different than observed in the year that we take as a point of departure for the analysis (cf. Paes de Barros and Leite 1998; Paes d`e Barros 1999 cited in Vos and Taylor, 2002; Frenkel and González 1999, Vos and Taylor 2002). This counterfactual may be obtained by either model simulations to generate a case of 'with-and-without' or by taking the structure prevailing in another year and imposing it on another. Following the latter approach, we take the Ethiopian micro data of one year, 2000, and simulate what poverty and inequality would have been, had the labour market structure remained what it was in 1994. The two years are selected based on availability of household data in years close to the beginning of the reform period which is the year 1992 and as recently as possible so as to see the effect of these reforms on poverty and inequality.

3.2   The structure of employment and household income

Table 3 summarizes the major structural features of the labour market in urban areas in 1994 and 2000. The most notable point is the absence of any change in the unemployment rate, which had been about 33 percent in both years. The other important changes are the increase in the share of wage employment by about 4.5 percentage points, and the decline in the share of public sector employment by about 9.0 percentage points. The latter seems consistent with expenditure reduction aspect of the policy reform. The composition of the labour force and the employed population in terms of sex, age and educational composition had also been stable (see Table 4). The only exception is the decline in the share of persons with no education, by 3 percentage points in the labour force and 6 percentage points among the employed.

Table 3: Characteristics of the labour market: 1994 and 2000 (households)

	1994	2000
Percent able-bodied	61.81	65.88
Participation rate	57	53.72
Unemployment rate	33.03	32.93
Self-employment rate	19.34	14.87
of which Female HH.	37.97	37.27
Wage-employment rate	47.63	52.2
of which: Public sector	52.57	43.52

Table 4: Characteristics of the labour force: 1994 and 2000

	Economically Active		Employed	
	1994	**2000**	**1994**	**2000**
Education				
None	32.3	29.01	32.3	36.09
Primary	9.95	10.89	9.95	10.99
Junior secondary.	15.33	16.7	15.33	14.31
Senior secondary	29.94	32.39	29.94	25.3
Post-secondary	12.48	11.02	12.48	13.31
Age-group				
15 - 24	32.91	31.44	32.91	19.25
25 - 34	27.93	30.49	27.93	28.93
35 - 44	19.54	19.27	19.54	25.81
45 - 54	12.24	11.7	12.24	15.83
55 - 64	4.74	4.6	4.74	6.45
Sex				
Female	46.83	45.03	46.83	44.15
Male	53.17	54.97	53.17	55.85

Table 5 shows the distribution of households by source of income. The share of households that had income from wage employment increased from about 63 percent to about 68 percent, while the share that had self-employment income[4] declined from 36 percent to 25 percent. The share of households that received 'other' (non-labour) incomes increased from about 45 percent to 52 percent. The share of households that depended on income from 'wage-employment *only*' was about 32 percent in 1994 and about 34 percent in 2000, while the share of those that depended on income from self-employment only declined from about 15 percent to about 9 percent. The share of households that depended on 'other' incomes was about 13 percent in 1994 and 17 percent in 2000.

Share of households with members working in the wage sector shows almost no change. The share of households with no wage income is slightly lower in 2000 – 34 percent vis-à-vis 38 percent. The share of households with one wage-employed member is about 39 percent in 1994 and 42 percent in 2000, and that of households with two or more wage-employed members is about 24 percent in both years, respectively. Considering all sample households, median household income from wage employment was Birr 144 (per annum) in 1994 and 189 in 2000 and mean income 322 and 379, respectively (the average exchange rate during the period was

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[4] Self-employment income is defined as income that accrues to (i) employers/owners of private businesses; (ii) own-account workers; and (iii) those operating female household businesses. All other labour income is considered wage income.

about $1.00=Birr 8.60). Considering households with positive wage incomes only, median income from wage employment was 350.00 in 1994 and 393 in 2000. The inter-quartile range, an indicator of equality, changed from 471 in 1994 to 526 in 2000.

Table 5:   Sources of household income in 1994 and 2000 (percent of households)

	1994	2000
Wage-employment income	63.81	67.85
Wage-employment only	32.24	33.86
Self-employment income	35.52	25.43
Self-employment only	14.78	8.96
Other income	45.26	51.65
Other income only	13.27	16.47

Median household income from self-employment among households with self-employed members declined by about 39 percent – from Birr 200.00 in 1994 to Birr 123.00 in 2000. The decline was even larger in terms of mean household income from self-employment, which fell by half from Birr 2,476.00 in 1,994 to Birr 1,260.00 in 2,000. The distribution of self-employment income is more skewed to the right than that of wage income, and this concentration of incomes in the lower end increased in 2000. It seems reasonable to infer that the reform period has been strongly associated with negative outcome for self-employed households. We have examined the three categories of income in detail below.

(i)   Wage Income

Median wage income was unchanged between the rounds at about 250.00 Birr, while mean incomes changed from about Birr 331.00 to Birr 386. The stagnation in median incomes, however, hides the changes that occurred at the lower and higher ends of the wage distribution. A more disaggregated comparison of changes in income across the rounds indicates that the largest percentage change in wage income occurred in the first (lowest) and fifth (richest) quintiles, and the smallest change in the third quintile. This pattern of change has important implications for the evolution of indicators of poverty and inequality. Given the observed level of head-count ratios, larger changes in poverty indicators would have occurred if changes in incomes were concentrated around the middle of the distribution instead of the extremes. In simple words the growth occurred doesn't seem to be pro-poor or distributional neutral as can be read from Table 6 and Figure 1 below (see Alemayehu, Abebe and Weeks, 2002).

Inequality in individual-level wage incomes over the whole sample has changed only slightly. The change in inequality indicated by alternative indicators differed at this level of aggregation. A careful `comparison of the indicators showed that those that give greater weight to the left-hand side of the distribution indicated a decline, while others indicated no change or an increase in inequality. Further investigation of changes in inequality by levels of income shows that the aggregate results hide interesting patterns of change at different levels of income. Inequality has declined substantially at the lower end of the distribution, remained unchanged in the middle, and increased at the upper end. Inequality among the lower-earning 40 percent of wage-workers declined (Gini coefficient falling from 34 to 27) while it increased in the remaining 60 percent (Gini coefficient rising from 32 to 36). The changes were such that inequality among the lower-earning 40 percent has become lower not only relative to its level in 1994, but also relative to the higher-earning 60 percent. Consistency between different indicators is also achieved once the analysis is done with income disaggregated by levels (see Appendix Tables).

Table 6: Level and inequality of wage incomes: changes between 1994 and 2000

	Gini				Mean (Birr)				Median (birr)			
	1994	2000	Change	%	1994	2000	Change	%	1994	2000	Change	%
Q1	30.96	23.71	-7.25	-23.41	42.45	64.11	21.66	51.02	38.44	65.99	27.55	71.66
Q2	10.69	10.15	-0.54	-5.04	136.99	146.20	9.21	6.72	134.56	142.99	8.43	6.27
Q3	8.95	9.38	0.43	4.81	249.42	254.84	5.41	2.17	250.00	246.50	-3.50	-1.40
Q4	8.31	8.75	0.44	5.28	405.55	448.94	43.39	10.70	400.00	441.70	41.70	10.43
Q5	23.56	27.10	3.54	15.02	857.08	1025.08	168.00	19.60	689.70	759.49	69.79	10.12

Figure 1 (a) and (b): Changes in the distribution of wage income per month (1994-2000, by quintile)

Q1 is the poorest quintile and Q5 the richest.
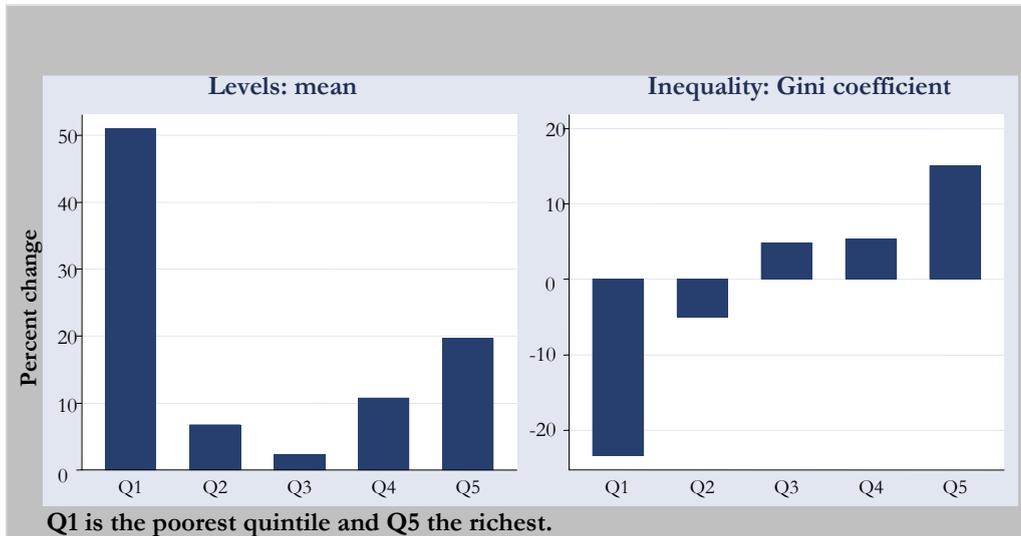
Figure 2(a) and (b): Kernel density estimates: Wage income (1994 and 2000)
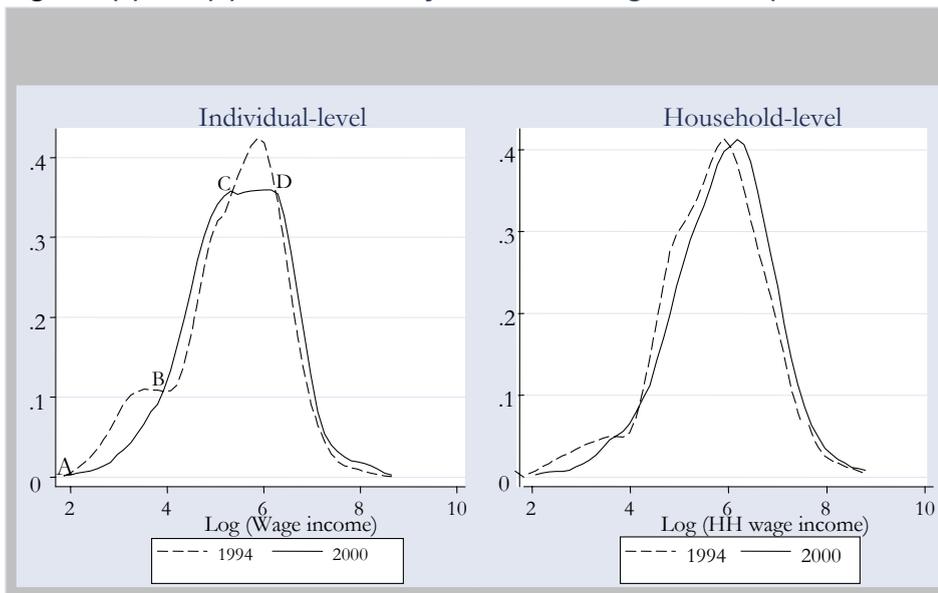
(ii)   Self-employment income

Median self-employment income declined by about 33 percent from Birr 218.33 in 1994 to 145.66 in 2000, while mean incomes declined by about 20 percent from Birr 1029.40 to 823.70. The share of individuals in self-employment who report losses has also declined from 15 percent in 1994 to 9 percent in 2000. This suggests that there was a compression of self-employment incomes –the possibility of getting large

profits as well as that of incurring large losses has fallen in 2000. This is confirmed by the fall in the standard deviation of self-employment income and its inter-quartile range, both indicators of inequality. The largest decline in mean/median incomes occurred at the centre of the distribution – the third quintile – in which average incomes in 2000 are less than a third of their level in 1994. The pattern of change differs greatly from that of wage income, in which income changed more in the extremes of the distribution and the change is upwards.

Table 7: Level and inequality of self-employment incomes: changes between 1994 and 2000

	Gini				Mean (Birr)				Median (Birr)			
	1994	2000	Change	%	1994	2000	Change	%	1994	2000	Change	%
Q1	32.99	33.98	0.99	3.00	27.55	23.58	-3.98	-14.43	29.89	20.73	-9.16	-30.64
Q2	15.23	9.21	-6.02	-39.51	102.49	73.97	-28.53	-27.83	100.00	79.66	-20.34	-20.34
Q3	14.91	13.30	-1.61	-10.81	248.89	154.09	-94.80	-38.09	227.37	148.36	-79.01	-34.75
Q4	15.38	24.62	9.24	60.04	642.66	524.57	-118.09	-18.38	614.48	468.51	-145.97	-23.76
Q5	50.10	37.95	-12.15	-24.24	4158.66	3406.88	-751.77	-18.08	1974.46	2294.10	319.64	16.19

Inequality in individual-level self-employment incomes over the whole sample has changed only slightly. Inequality seems to have declined in the middle and top; and increased in the bottom. Generally, however, it is stable. Combined with the decline in average income, this implies that the poor is getting poorer (see Figures 2 and 3).

Figure 3(a) and (b): **Changes in the distribution of self-employment income per month (1994-2000, by quintile)**
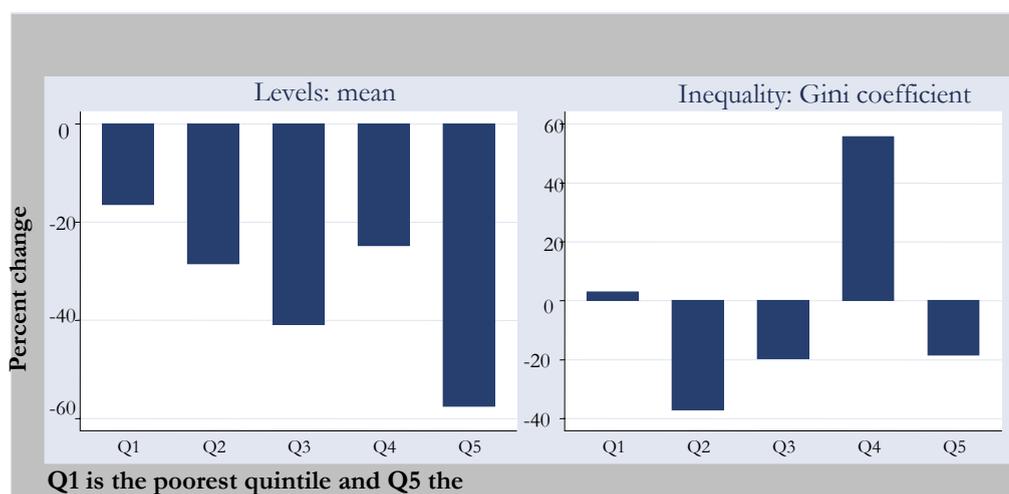
Figure 3(c) and (d): Kernel density estimates: SE income (1994 and 2000)
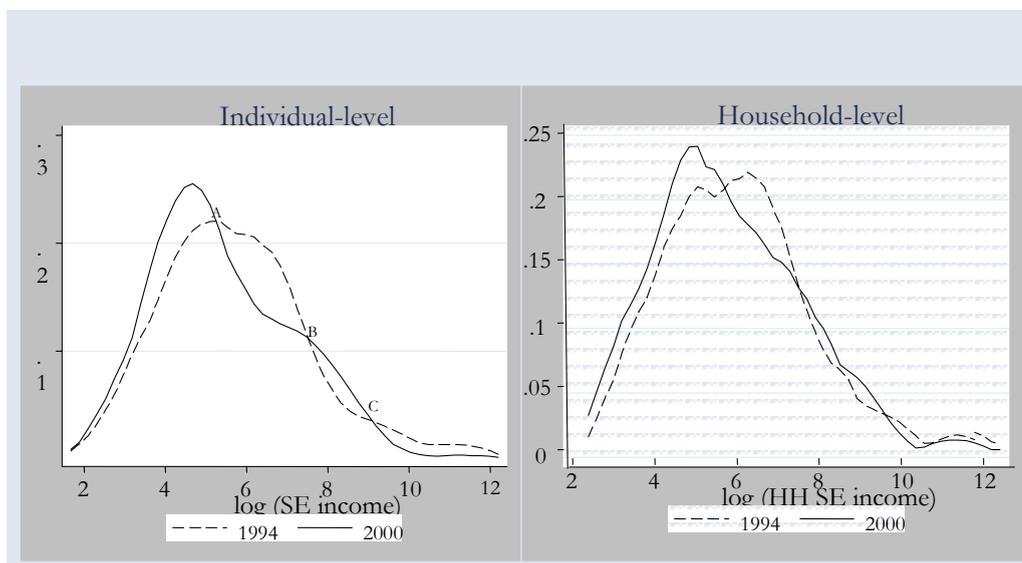
(iii)   Other income

Other income is defined as a residual category and includes income from assets (such as house rental), transfers, labour incomes from activities other than the main activity, and income from child labour. The share of households reporting income in this category increased from 44.1 percent to 49.9 percent. The level of 'other' income seems not to have changed much, with median 'other' income being 82.5 Birr in 1994 and 87.8 Birr in 2000 and mean 'other' income being 202.0 Birr in 1994 and 204.9 in 2000. Considering all sample households, mean 'other' income per household increased from 89.1 Birr in 1994 to 102.3 Birr in 2000. As mean 'other' income among households that have positive 'other' income is unchanged, the rise in mean income is largely explained by the 'participation effect'. Inequality in 'other' income has remained constant at Birr 60.58 and 59.01 in 1994 and 2000, respectively (see Table 8 and Figure 4).

Table 8: Level and inequality of 'other' incomes: changes between 1994 and 2000[5]

	Gini coefficient				Mean (Birr)				Median (Birr)			
	1994	2000	Change	%	1994	2000	Change	%	1994	2000	Change	%
Q1	31.32	34.35	3.02	9.65	10.16	10.62	0.47	4.58	9.88	9.63	-0.24	-2.44
Q2	16.43	15.34	-1.09	-6.61	38.62	38.80	0.19	0.48	39.93	38.52	-1.42	-3.55
Q3	9.10	10.43	1.33	14.61	81.94	86.43	4.49	5.48	82.50	87.99	5.49	6.66
Q4	11.44	12.73	1.29	11.25	156.84	171.94	15.10	9.63	157.56	166.01	8.45	5.36
Q5	32.85	27.76	-5.10	-15.52	491.51	482.74	-8.77	-1.78	383.17	394.38	11.21	2.93

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[5] The results are calculated after the top and bottom 1 percent of observations are trimmed.

Figure 4(a) and (b): **Changes in the distribution of 'other' income per month (1994-2000, by quintile)**

Q1 is the poorest quintile and Q5 the richest.
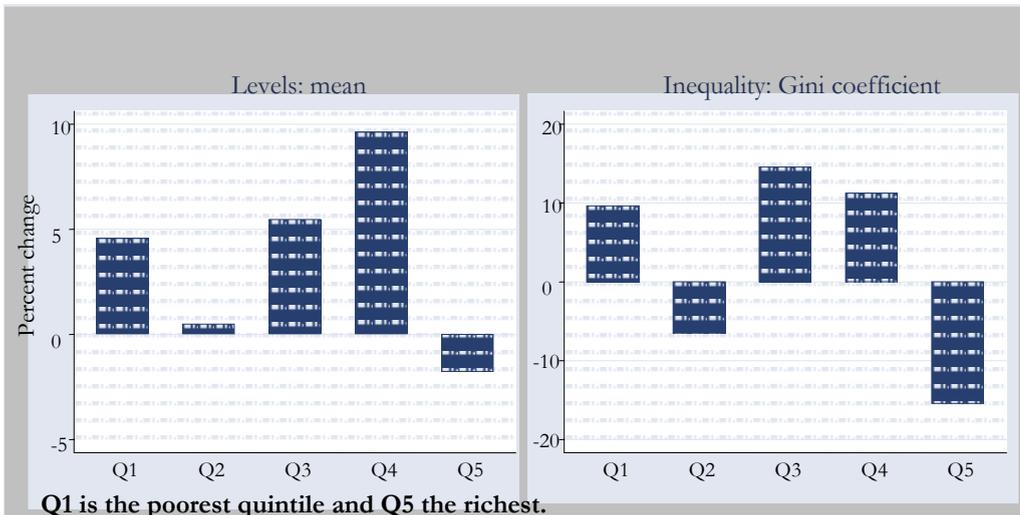
Figure 4(c): **Kernel density estimates: 'other' income (household-level)**
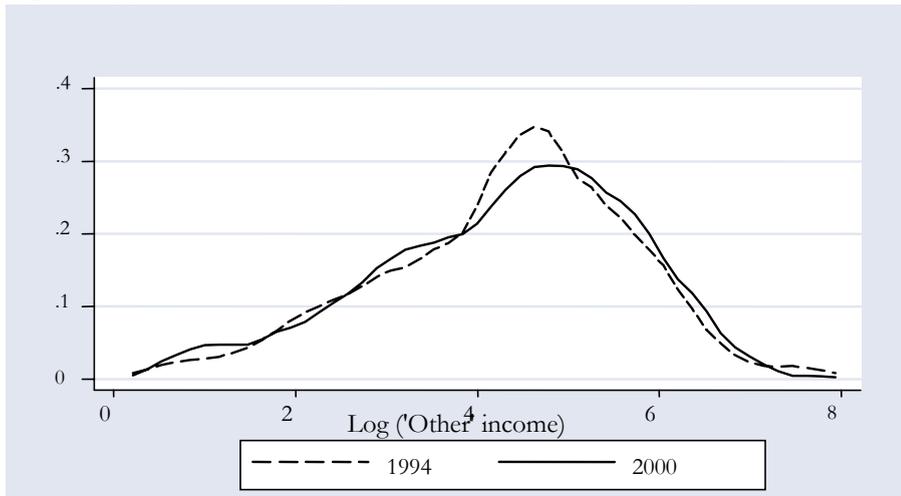
3.3 Changes in poverty and inequality

As this period was the aftermath of stabilization and launching of structural adjustment program, one would expect larger changes in income levels, poverty and inequality, especially in urban areas. This expectation, however, is not borne out by our data. Between 1994 and 2000, poverty headcounts declined only slightly from about 52 percent to about 47 percent. Since there was no change in mean per capita household income (which was about Birr 137.00 in both periods), the observed slight

decline in headcount ratios seems to be the results of redistribution that favoured lower income groups (see Table 8 and Figure 5). However, since the observed changes in mean and median incomes are statistically insignificant, we focus on explaining why incomes remained stable at a time of fundamental changes in macroeconomic policy/environment.

The absence of significant micro responses to macroeconomic policy change may reflect the absence of significant *real* changes in the opportunities and risks faced by households **or** inability to respond to changes in the macroeconomic environment. On the other hand, aggregate indicators might fail to reflect great upheavals in household fortunes if (i) changes in components of household income move in different directions and cancel out each other, or (ii) changes in incomes of different categories of households move in opposing directions and cancel out each other. Microeconomic simulation models, by virtue of their ability to model moments of distributions beyond the first moments, can shed more light on these issues. In the next section, we employ microeconomic simulation models to decompose changes in household incomes so as to explain changes in poverty (or lack thereof) in urban Ethiopia.

Table 9: Poverty and inequality in 1994 and 2000

Income levels (Birr)	1994	2000	Change	Inequality	1994	2000	Change
Mean	136.91	137.63	0.52	Gini coefficient	0.6069	0.5720	-5.75
P10	12.76	13.96	9.40	Gen entropy (ε=-1)	2.0472	1.6418	-19.80
P25	28.13	33.59	19.40	Gen entropy (ε= 0)	0.7572	0.6625	-12.50
P50	66.13	74.97	13.36	Theil index	0.6953	0.6039	-13.15
P75	152.51	157.87	3.52	Gen entropy (ε= 2)	1.2049	0.9779	-18.84
P90	320.30	319.52	-0.24	Std dev of loges	1.2776	1.2066	-5.55
Poverty levels				Coef of variation	1.5498	1.3946	-10.01
Headcount ratio	51.46	47.23	-8.20				
Poverty-gap ratio	28.23	24.63	-12.75				
FGT, α=2	19.23	16.44	-14.52				
Watts index	54.38	46.36	-14.75				
Sen index	36.17	32.10	-11.26				

Figure 5: Kernel density estimates of percapita household income (1994 & 2000
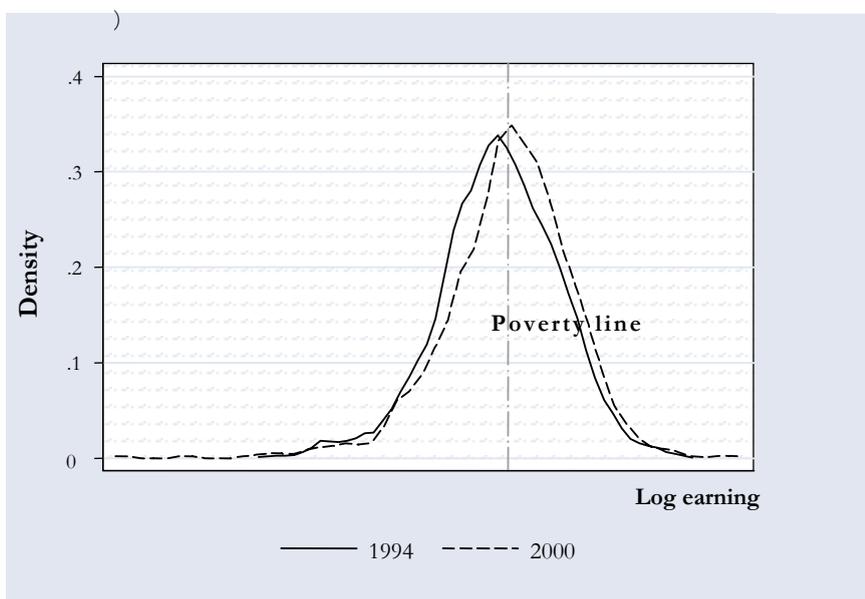
4. Modelling the urban labour market and micro-simulation results

4.1 The model

The analysis so far shows that although there seem to be limited change in poverty and inequality at aggregate level, there is significant change within and across categories of households. The distribution of household incomes depends on the structure of returns and on the characteristics of employed household members. To capture the effect of these, we draw on earning models. The distribution of household incomes also depends on their participation and occupational choices as well as on decisions concerning the size and composition of the family – labour market chrematistics. These will also need to be modelled. Modelling the latter will have the additional benefit of capturing the fact that changes in some personal characteristics, such as education, affect household incomes through more than one channel. We pursued this at two levels of modelling.

We began the modelling by aggregating income of all household members across sectors. We will first model and estimate participation and occupational choice parameters, parameters of earning determination in the labour market, and obtain estimates of unobserved earning determinants and their standard errors. That is, the first-level modelling comprises generating household income using the following equation:

$$y_{hi} = \frac{1}{n_{hi}} \left[\sum_{i=1}^{n_h} \sum_{j=1}^{J} I_{hi}^{j} y_{hi}^{j} + y_0 \right]$$ (1)

where I is an index function, j is activities, i is individuals, and h is households.

This equation simply adds up labour incomes for all household members, across the sectors into which we assume the labour market is segmented. These may comprise of a wage sector, a smallholder farm sector, non-farm self-employment sector and non-participation/unemployment. The final term, y_o, in equation (1) comprises all reported non-labour incomes accruing to the household. Having this, we will model income distribution using the following Mincerian earning equation:

$$\log y_{hi}^{j} = \alpha_j + \mathbf{x}_{hi}\beta_j + \varepsilon_i$$ (2)

These are a set of standard semi-logarithmic Mincerian earnings equations. The dependent variable is the logarithm of the monthly income *y* (before taxes and transfers), and the arguments (**x**) are human capital proxies, other personal characteristics, and some characteristics of the job. This is followed by modelling of participation and occupation choice using the following equation:

$$\Pr\{j = s\} = P^s(Z_{hi}, \lambda) = \frac{e^{Z_{hi}\lambda_s}}{e^{Z_{hi}\lambda_s} + \sum_{j \neq s} e^{Z_{hi}\lambda_j}}$$ (3)

Where Z and λ are personal and household characteristics, respectively.

Equations (3) models the choice of occupation (into wage employment, smallholder farming, non-farm self-employment, or inactivity) by means of a discrete choice model – specifically, a multinomial logit – which estimates the probability of choice of each occupation as a function of a set of regional, family and personal variables characteristics

4.2   Estimation results

Determination of earnings

The first set of equations in our model includes two standard semi-logarithmic Mincerian earnings equations, one for the self-employed and another for the wage employed – two categories found to have distinct pattern of change. The form of the earnings equations given as equation (2) above is used:

$$\log y_{hi}^{j} = \alpha_j + \mathbf{x}_{hi}\beta_j + \varepsilon_i$$

where log y is the logarithm of the monthly wage (before taxes and transfers) for wage workers and gross earnings for the self-employed, and **x** is a vector containing age, sex, level of education and whether person lives in Addis Ababa or not. In the wage equation, we have included a dummy indicating whether the person is employed in the public sector to capture the premium, if any, to public sector employment. In the equation for the self-employed, we included the number of paid workers as a proxy for the size of person's business. A dummy indicating whether the type of business is a female-household business – an informal sector activity that is said to be a coping strategy for the extremely poor – is also included. The estimated result of these are shown in Table 100. The coefficients in both equations and years have the expected signs. The first notable point that has important implications for our purpose is the direction of change in the mean minimum income (as represented by the constants): mean minimum income in the wage sector rose while it declined in the self-employment sector, this is consistent with the descriptive analysis in section two above.

In the wage sector, there has been a decline between the years in the premiums associated with being male, being a public-sector employee as well the premiums associated with experience and the level of education. This may relate to the lack of incentive-compatible pay system in public sector. In the self-employment sector, the disadvantages arising from operating being female household businesses have become bigger, while the premiums associated with larger business have increased substantially. The effect of being male, which was insignificant in 1994, had become positive in 2000. If female-headed business is a good proxy for the poor in the informal sector, the reform is associated with relative negative outcome for this group. The effect of residence in Addis Ababa turned insignificant in 2000 from having a negative effect in 1994.

Table 10: Returns to labour in self employment and wage employment

	Wage-employment		Self-employment	
	1994	**2000**	**1994**	**2000**
Constant	4.6634‡	5.2062‡	6.6882‡	5.3066‡
Age	0.0954‡	0.0830‡	0.0748*	0.0824*
Age-squared	-0.0009‡	-0.0008‡	-0.0007*	-0.0008*
Male	0.5017‡	0.4572‡	0.1378	0.7531*
Public sector	0.2537‡	0.2228‡	—	—
Fem. HH Bus.	—	—	-1.5246‡	-1.0382*

Addis Ababa	0.0320	0.0067	-0.4954**	-0.0442
Education				
Primary	0.3878‡	0.3111‡	0.5058**	1.4776‡
Junior secondary	0.5776‡	0.4116‡	0.7485**	0.7698
Senior secondary	0.9101‡	0.8775‡	1.1004‡	0.9232*
Post-secondary.	1.4559‡	1.3192‡	1.1310‡	1.4351**
Number of paid workers				
One	—	—	0.7387**	1.2175**
Two or more	—	—	0.9467**	1.5482**
Sample	1187	772	406	199
Pseudo R^2	0.5709	0.4607	0.3815	0.4576

Note *   p<0.05; ** p<0.01; ‡ p<0.001

Participation and occupational choice

The choice of occupation (into wage employment, smallholder farming, non-farm self-employment, or inactivity) is modelled by means of a discrete choice model – a multinomial logit – which is given as equation 3 above and reproduced here,

$$\Pr\{j = s\} = P^s\left(Z_{hi}, \lambda\right) = \frac{e^{Z_{hi}\lambda_s}}{e^{Z_{hi}\lambda_s} + \sum_{j \neq s} e^{Z_{hi}\lambda_j}}$$

Our occupational choice of able-bodied individuals is categorized into four: inactivity, unemployment, self-employment and wage employment. Since inactivity is considered as one choice, this approach models labour supply of household members as well. The comparison group for our occupational choice model is the able-bodied population that is not economically active. In terms of type of employment, we define non-wage employment as consisting of (i) employers/owners of private businesses; (ii) own-account workers; and (iii) those operating female household businesses. All others employment is considered wage employment.

Labour supply/occupational choice by members is modelled as a function of his/her personal characteristics and some household characteristics. Specifically, the sub-vector of Z containing personal characteristics includes sex, age, educational level, a dummy indicating whether the person is head of household or not, a dummy indicating whether the person is the spouse of the head of household or not, and a dummy indicating whether the person is a student or not. The household characteristics sub-vector contains a dummy indicating whether head of the household is employed or not and the share of employed household members (excluding the person). The resulting estimated equation is shown in Table 11. The

significance level and the sign of the coefficients in the two rounds are generally similar, but there is a difference in the magnitude of the coefficients. The result generally shows that the choice of wage employment is largely determined by educational characteristic. It can also be read from Table 11 that, once a household is in school he/she is engaged either in wage employment or is unemployed – showing the absence of limited relationship between schooling and self-employment.

Table 11: Occupational choice model – estimated coefficients

	Unemployment		Self-employment		Wage employment	
	1994	2000	1994	2000	1994	2000
Age	-0.0139	-0.0253	0.0464	0.0298	0.1027‡	0.1125‡
Age-Squared	-0.0004	-0.0004	-0.0006*	-0.0004	-0.0015‡	-0.0016‡
Sex	1.2136‡	2.0584‡	1.2080‡	1.8169‡	1.5555‡	2.1659‡
Is head	-1.0926‡	-1.1208‡	1.0249‡	0.5735	0.2004	0.0438
Is spouse	-3.5972‡	-2.9607‡	-0.8523‡	-0.9737**	-1.8907‡	-1.6492‡
Is student	-44.367	-41.524	-42.267	-39.756	-43.781	-40.553
Head is employed	-0.2791	-0.3006	-0.6985‡	-0.3579	-0.4665**	-0.1374
Education						
Primary	0.8880‡	0.5165	0.114	-0.1959	0.271	0.2317
Junior secondary	1.4798‡	1.1437‡	-0.2158	-0.0706	0.3358	0.5138*
Senior secondary	2.5881‡	1.8174‡	-0.154	0.297	1.0499‡	1.0989‡
Post-secondary.	3.3219‡	2.7007‡	1.2773**	1.5077**	3.2795‡	3.0549‡
Share employed members	-1.5685‡	-2.2822‡	-3.2163‡	-3.6714‡	-2.1735‡	-2.9214‡
Constant	0.4541	0.8517	-1.1918*	-1.3249	-0.9975*	-1.6558**
Statistics	**1994**	**2000**				
Sample	4372	2753				
Chi-square	4987.78	2888.9				

Pseudo R2	0.4476	0.4296

Note * p<0.05; ** p<0.01; ‡ p<0.001

4.3   Simulation results

The simulation involves computation of mean incomes and measures of inequality for the distribution obtained by replacing the estimated parameters of the Fourth Round Survey (2000) with those estimated from the First Round Survey (1994). Then we would compare the simulated values with the actual for the year 2000. The first set of simulations involves imposing the coefficients of the earning equations and the variance of error terms of the First Round on that of the Fourth Round. The results from this exercise done separately for wage and self-employment sectors and jointly for both sectors are reported below.

Simulation I: Effect of change in structure of returns

Let us first look at the impact of imposing the structure of returns from 1994 on the data of 2000. Imposing the 1994 structure (parameters) of returns in the wage sector leads to a fall in individual earnings, with mean earnings falling by about 13 percent and median incomes by about 15 percent. While this simulation leads to a decline in earnings for all earnings categories, the decline is higher in lower income categories, as can be seen from the decline of 20 and 18 percent in the 10th and 25th percentiles of individual earnings (see Table 12). This simulation also leads to an increase in inequality in wage earnings, with the magnitude of change in the alternative indices of inequality ranging from 3 to 14 percent. Thus, if the structure of returns observed in 1994 were to prevail in 2000, the levels of income in the wage sector would have been lower. This implies that growth that accompanied the reform was favouring this category of workers in general and the relatively poor within this category in particular – here the reform was pro-poor.

Imposing the structure (or parameters) of earnings in the self-employment sector from 1994 on the 2000 data has effects that are opposite to what was observed in the wage sector (see Table 12). If the structure of returns observed in 1994 were to prevail in 2000, the levels of income in the self-employment sector would have been higher – with mean income being about 24 percent higher and median income about 46 percent higher. Since relatively higher percentage increments of the self-employment sector occur at lower levels of income, inequality declines. Alternative indicators of inequality show a decline ranging between 2 and 15 percent, with indicators that are more sensitive to changes at the extremes declining by larger magnitudes. Thus, the reform and the accompanied growth were not pro-poor in the self-employment sector.

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While the statistics presented above help gauge the general directions of the differences between the counterfactual and actual distributions, they fall short of our goal of comparing the distributions throughout the range of values they take. To this end, we supplement the above with kernel density estimates. The Figures in 6 below show kernel density estimates of counterfactual and actual distributions of earnings in the two sectors. The graphs confirm what the summary statistics have shown: in the wage sector, the distribution of counterfactual earnings is at every point to the left of the actual distribution. That is, the counterfactual involves moving a slash of the actual distribution from the right half of the distribution (the high-income end) to the left half (the low-income end). This corresponds to the observation that imposing the 1994 structure of earnings in the wage sector in the year 2000 leads to declines in all quintiles of income. While the general picture is similar in self-employment, the conclusion is less-clear cut as the curves cross each other more than once, with the density of the counterfactual being higher at first, then lower, then higher, then again lower than the actual distribution (see Figure 6).

Table 12: Simulating effects of observable factors on individual earnings[6]

Earnings (Birr)	% change importing:		Inequality	% change importing:	
	β_W	β_S		β_W	β_S
Mean earnings	-12.6	23.51	Gini coefficient	3.15	-3.23
10th percentile	-20.36	46.21	Gen entropy (ε=-1)	14.45	-15.11
25th percentile	-17.61	49.95	Gen entropy (ε= 0)	8.3	-8.68
50th percentile	-14.79	46.11	Theil index	7.08	-9.82
75th percentile	-13.05	36.39	Gen entropy (ε= 2)	8.64	-18.44
90th percentile	-11.58	26.21	Std dev of loges	4.62	-2.72

Figure 6(a) and (b): **Kernel density estimates of earnings by sector of employment**

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[6] The columns "β_W" and "β_S" present results of simulation obtained by imposing estimated (year 1994) coefficients of earnings equations for the wage and self-employment sectors, respectively. The column labelled "β_{WS}" present results of simulation imposing estimated coefficients of earnings equations for *both* sectors.
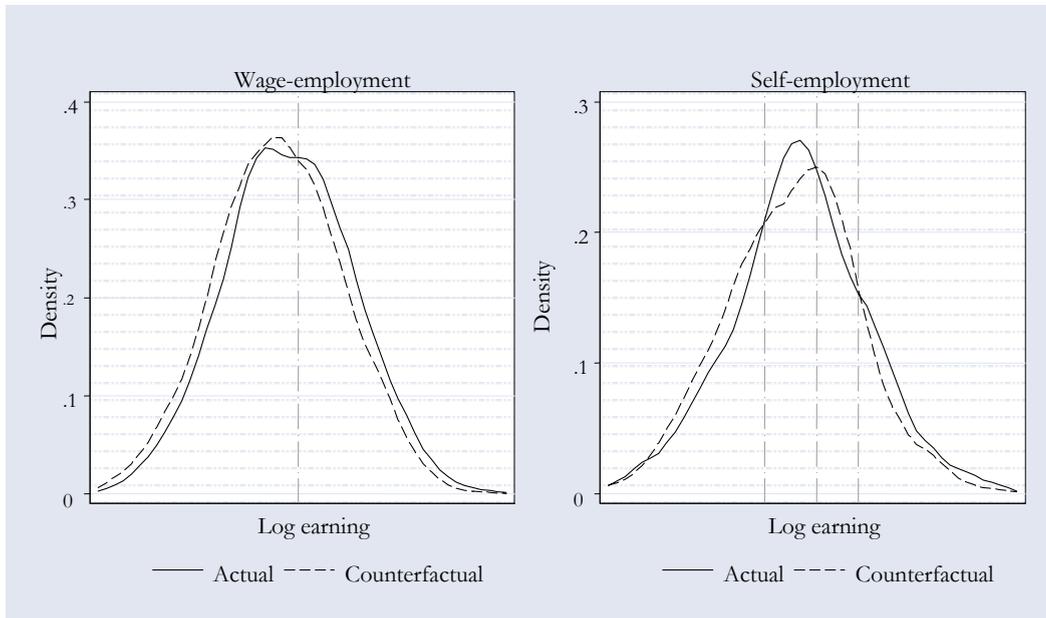
Figure 6(c): Kernel density estimates of percapita household income
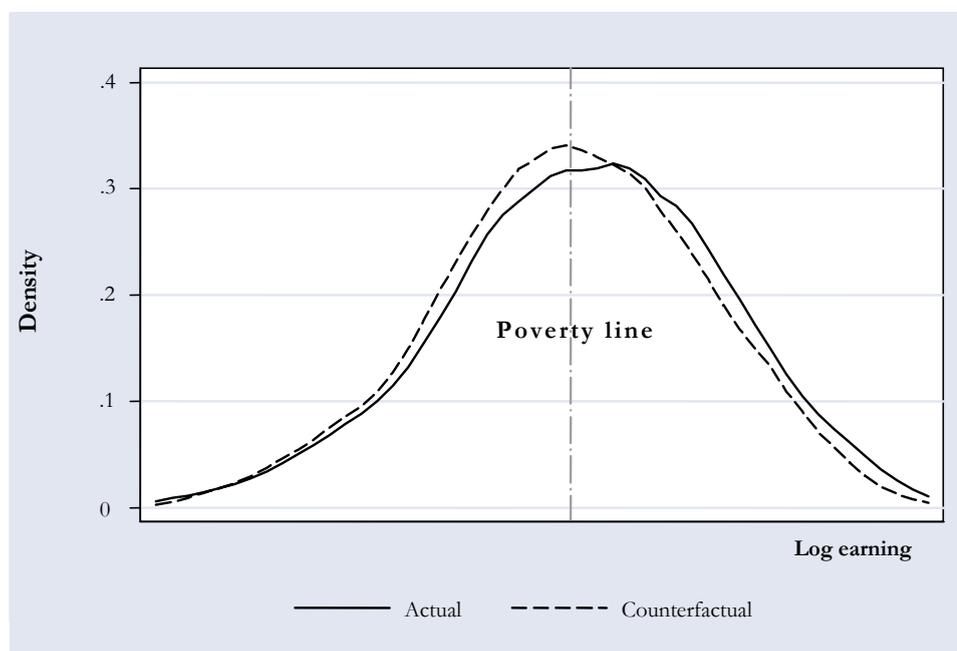
Table 13: Simulating observable determinants of earnings[7]

Earnings (Birr)	% changes importing			Poverty levels	% changes importing		
	β_W	β_S	β_{WS}		β_W	β_S	β_{WS}
Mean earnings	-7.8	8.45	1.21	Headcount ratio	7.81	-3.11	4.55
10th percentile	-6.73	6.09	-1.15	Poverty-gap ratio	9.05	-4.71	4.59
25th percentile	-8.6	5.3	-4.38	FGT, α=2	9.43	-5.78	4.01
50th percentile	-9.86	4.2	-5.87	Watts index	9.17	-6.06	3.45
75th percentile	-8.84	5.33	-3.8	Sen	8.6	-4.42	4.27
90th percentile	-9.09	7.88	-0.46				
Inequality							
Gini coefficient	1.24	1.96	3.83				
Gen entropy (ε=-1)	-1.5	0.62	1.43				
Gen entropy (ε= 0)	1.6	3.17	6.42				
Theil index	4.17	5.88	11.46				
Gen entropy (ε= 2)	9.98	12.32	22.98				
Std dev of loges	-0.46	0.15	0.43				
Coef of variation	4.79	5.87	10.8				

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[7] The columns "β_W" and "β_S" present results of simulation obtained by imposing estimated coefficients of earnings equations for the wage and self-employment sectors, respectively. The column labelled "β_{WS}" present results of simulation imposing estimated coefficients of earnings equations for *both* sectors.

The poverty and inequality profiles corresponding to the above two sets of simulations are shown in Table 13. The counterfactual distribution of household incomes provide poverty and inequality indicators consistent with the underlying (counterfactual) distribution of labour incomes. When the structure of returns from the wage sector is imposed *alone*, mean household incomes fall by about 8 percent and median incomes fall by about 10 percent. Correspondingly, the head count ratio rises by about 8 percent and the other indicators of poverty rise by similar magnitudes. The indicators of inequality did also show increasing inequality, though the magnitudes are smaller. When the 1994 structure of returns for observed factors in self-employment is imposed *alone*, the level of household incomes rise, indicators of poverty fall, and that of inequality rise.

As these two simulations led to changes in opposite directions, then their effects would cancel each other out if we execute them simultaneously. That is what is observed in the last column of Table 13. When the 1994 structure of returns for both wage and self-employment sectors is imposed on the data of the year 2000 simultaneously, the level of incomes declines, but by magnitudes less than when the structure of returns for the wage sector was imposed alone, since part of the negative effect is counteracted by the rise in (counterfactual) self-employment incomes. Poverty is higher, again by magnitudes less than when returns in the wage sector are imposed alone. The effect of changes in the wage sector dominates because wage employment accounts for a much larger share of employment and incomes (is about 60%, see Table 3). The implication for the impact of the liberalization policy is that it favoured the wage earners but not the self-employed, the aggregate effect overall being largely in line with the positive change observed in the wage-earning sector.

Simulation II: Effects of Unobservable Determinants of Earnings

The residuals in Mincerian earnings equations represent returns to labour accountable for unobserved factors that affect wages, and variance of the error terms represent inequality in wages due to these unobserved factors. Running simulations by importing residual variances from 1994 causes almost no change in the level of earnings. Relatively higher effects are observed on the indicators of inequality; with inequality being marginally lower in the counterfactual distribution, however. When the simulation is run using the returns to both observed and unobserved characteristics from 1994, it turns out that the effect of changes in observed characteristics is the dominant cause for any changes between 1994 and 2000. (see Table 16)

Changes in poverty and inequality associated with the above simulations are shown in Table 15. The marginal changes in individual incomes in the two sectors tend to cancel out each other such that the net effect on poverty is negligible. Though the

effect on inequality is relatively higher, it is much smaller than what was observed when we imposed the structure of returns for observed characteristics.

Table 15: **Effects of non-observables: Simulating the effects of non-observable determinants of earning[8]**

Earnings (Birr)	% changes imposing			Poverty levels	% changes imposing		
	$\sigma_{94,w}$	$\sigma_{94,S}$	$\sigma_{94,WS}$		$\sigma_{94,w}$	$\sigma_{94,S}$	$\sigma_{94,WS}$
Mean earnings	1.37	-1.76	-0.73	Headcount ratio	-0.25	-0.0910	-0.17
10th percentile	-0.67	0.24	-0.34	Poverty-gap ratio	0.06	-0.0268	-0.30
25th percentile	-0.08	0.58	0.55	FGT, α=2	0.20	-0.0394	-0.26
50th percentile	0.45	0.34	0.23	Watts index	0.10	-0.1425	-0.43
75th percentile	0.52	-0.77	0.04	Sen	-0.05	-0.0812	-0.22
90th percentile	2.57	-1.35	-0.19				
Inequality	$\sigma_{94,w}$	$\sigma_{94,S}$	$\sigma_{94,WS}$				
Gini coefficient	0.48	-1.0156	-0.70				
Gen entropy (ε=-1)	1.24	-3.35	-2.49				
Gen entropy (ε= 0)	1.12	-2.08	-1.40				
Theil index	0.57	-3.00	-2.33				
Gen entropy (ε= 2)	-1.20	-6.25	-5.38				
Std dev of loges	0.56	-0.67	-0.41				
Coef of variation	-0.55	-3.02	-2.60				

Combining the two simulations above, the first conclusion we draw is that changes in poverty are dominated by the effect of changes in observed characteristics (see Table 8). Second, the simulations lead to larger percentage changes in both wage and individual self-employment incomes. Yet, their effect on household-level income and poverty is not as strong as the changes in both categories of income, especially of the wage income, that result from the simulations. In terms of inequality, imposing the 1994 parameters of the wage sector led to slight increases in inequality. Imposing the 1994 parameters of the self-employment sector, on the other hand, led to a rise in inequality, which is larger magnitude. As a result, inequality changed along the change in the self-employment sector households (see Table 16).

A notable point that turns up at this juncture is the fact that incomes of the poorest deciles seems to have been affected the least by the changes in the structure of earnings (though this differs across wage and self-employed households). This is

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[8] The columns "σ_W" and "σ_S" present results of simulation obtained by imposing (year 1994) standard deviation of the error term of earnings equations for the wage and self-employment sectors, respectively. The column labelled "σ_{WS}" present results of simulation by imposing (year 1994) standard deviation of error terms of earnings equations for *both* sectors.

consistent with the literature that finds the poorest to be least able to adjust to changes in the economic environment. All other income groups seem to have been affected more or less uniformly, with their incomes declining roughly uniformly by about 8 percent when the structure of returns that prevailed in 1994 is imposed.

Table 16: **Effects of changes in returns to labour: Simulating total changes in structure of returns[9]**

Earnings (Birr)	% change importing			Inequality	% change importing		
	β,σ_w	β,σ_s	$\beta,,\sigma_{ws}$		β,σ_w	β,σ_s	B,σ_{ws}
Mean earnings	-8.4	9.34	1.43	Gini coefficient	0.95	2.43	4.08
10th percentile	-6.17	5.8	-0.94	Gen entropy (ϵ=-1)	-2.73	2.18	1.76
25th percentile	-8.3	5.23	-4.28	Gen entropy (ϵ= 0)	0.85	4.22	6.83
50th percentile	-9.98	4.25	-6.08	Theil index	3.65	7.39	12.66
75th percentile	-9.46	5.52	-4.23	Gen entropy (ϵ= 2)	9.62	15.55	26.43
90th percentile	-10.05	8.43	-1	Std dev of loges	-0.87	0.49	0.38
				Coef of variation	4.61	7.35	12.31
Poverty levels							
Headcount ratio	7.92	-3.15	4.68				
Poverty-gap ratio	8.9	-4.64	4.5				
FGT, α=2	9.1	-5.64	3.84				
Watts index	8.84	-5.89	3.31				
Sen	8.49	-4.37	4.25				

The second notable point is the fact that the magnitude of change has been very small. Though some fundamental changes in macroeconomic policies and performance are known to have occurred in the 1990's, their effect on the structure of returns, and hence household welfare, have been, on the average, quite marginal.

Simulation III: *The Effect of Participation and Occupational Choice*

Changes in the pattern of occupational choice (βoc) account for a decline of about 6 percent (or 2.79 percentage points) in headcount ratios. That is, if the pattern of occupational choice observed in 1994 was to prevail in 2000, headcount ratio of poverty would have been 44.44 percent instead of the observed level of 47.23 percent. Thus, the reform was strongly associated with a change in occupation choice that led to worsening poverty condition. This effect would have been strong had it not been to the positive gain

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[9] The columns labelled "β,σ_W" and "β,σ_S" present results of simulation obtained by imposing parameters (coefficients and standard deviation of error terms) from earnings equations for the wage and self-employment sectors, respectively. The column labelled "with β,σ_{WS}" present results of simulation obtained by imposing parameters of earnings equations for *both* sectors.

in earning by households in the wage earning category, showing only a less than half percent increase in poverty owing to the reform.(see Table 17).

Table 17:   Effects of changes in occupational choice: Simulating poverty and inequality in household per capita income

Earnings (Birr)	% change of imposing 1994:[10]				Inequality	% change of importing 1994:			
	βoc	With β,σ_W	With β,σ_S	With β,σ_WS		βoc	With β,σ_W	With β,σ_S	With β,σ_WS
Mean earnings	16.54	-2.83	9.89	11.64	Gini coefficient	4.51	0.59	-1.59	4.65
10th percentile	-1.29	-11.82	17.69	3.01	Gen entropy (ε=-1)	16.97	18.39	7.13	7.07
25th percentile	7.71	-4.67	11.31	-0.48	Gen entropy (ε= 0)	10.54	4.74	-1.92	8.24
50th percentile	9.18	-6.06	13.42	1.83	Theil index	13.23	-1.95	-6.56	11.03
75th percentile	13.57	2.01	13.87	3.57	Gen entropy (ε= 2)	24.45	-12.01	-15.82	13.16
90th percentile	7.93	-2.17	17.39	15.19	Std dev of loges	4.24	5.2	1.18	1.8
Poverty levels									
Headcount ratio	-5.91	4.15	-6.92	-0.44					
Poverty-gap ratio	-5.52	6.74	-7.71	-3.45					
FGT, α=2	-4.62	9.98	-9.12	-4.87					
Watts index	-4.29	11.52	-8.54	-4.92					
Sen	-5.2	7.07	-8.01	-2.59					

When parameters of occupational choice model (βoc) are imposed along with parameters of the earnings equation for the wage sector, then the direction of change is reversed and we observe a fall of about 6 percent in median incomes and a rise of 4 percent in head count ratios. When combined with the parameters of earnings equations for the self-employment sector, on the other hand, the direction of change is reinforced and we observe a larger increase in incomes and a larger decline in indicators of poverty.

When all estimated parameters of 1994 (occupational choice, returns to labour in the wage sector, and returns to labour in the self-employment sector) are impose on the data of the year 2000, the results are dominated by the (positive) changes in reducing poverty

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[10] The column labelled β_{oc} presents results of simulation by imposing (year 1994) estimated coefficients from the occupational choice model. The columns labelled "with β,σ_W" and "with β,σ_S" present results of simulation obtained by imposing parameters from earnings equations for the wage and self-employment sectors, respectively, in addition to parameters of the occupational choice model. The column labelled "with β,σ_WS" present results of simulation obtained by imposing parameters of earnings equations for *both* sectors *and* parameters of the occupational choice model.

in the wage sector.(see Table 17). The latter basically implies that the reform was largely associated with a decline in mean income and inequality, and an increase in poverty.

Simulation IV: Effect of Exogenous Variables

In this section, we will attempt to capture the effect of change in the distribution of variables in the right-hand side of the income-determination and occupational-choice equations. The variables are exogenous in the sense that they were not modelled in our set of equations in any structural sense. The first variable in this category is sector of wage employment – public versus private. One of the major concerns during periods of stabilization and structural adjustment involves the effect of lower public sector employment (re-trenchermen of workers) that is not matched by rising employment in the formal private sector. It has been argued that retrenchment in the public sector coupled with lack of alternative productive employment during stabilization and structural adjustment has led not only to higher unemployment but also to increasing 'informalization' of the economy. As a large part of the informal sector involves participation in low-productivity/low-remuneration activities, increasing 'informalization' is associated with rising poverty.

In an attempt to at least partially capture this effect, we obtained counterfactual year 2000 wage incomes by imposing the share of public-sector employment observed in 1994 on the year 2000's dataset. Two sets of simulations were undertaken. In the first set, we changed the share of public-sector employment to reflect the pattern observed in 1994 while keeping the structure of returns from 2000. In the second, we imported the share of public-sector employment as well as the structure of returns from 1994. The results are shown in Table 18.

The outcomes of the first set of simulations (Table 18) show that the first deciles of the distribution reaffirms the conventional wisdom that a decline in public-sector employment is associated with declining incomes. The outcomes also indicate a decline in incomes in the second- (higher) half of the distribution – the 75th and 90th percentiles that show a decline of about 5 and 4 percent, respectively. The 25th and 50th percentile would have seen a decline in their income had it not been for the change in the share of the public sector share associated with the liberalization. When this is combined with changes in earning conditions during the period, the situation is virtually reversed. This suggests that the rise in returns to labour during the ear of liberalization more than offset the impact of falling share of public sector employment. This can be the result of higher pay rises for higher income groups in the public sector, better opportunities in private sector employment for them, or both. The opposite directions of change above and below the median under the first set of

simulations led to a rise in inequality, with Gini coefficient rising by about 3 percent and other indicators by more. Headcount ratios as well as other indicators of poverty show a corresponding rise of about 2 percent in the simulation – indicating that liberalization is associated with a decline in both inequality and poverty owing to changes in sectoral share of employment as well as the return to labour (see Table 18).

Table 18: Effects of the structure of wage employment

| | Actual (2000) | Imposing 1994 share of public-sector: | | | |
| | | Only | | With β_W, & σ_W[11] | |
		Level	% change	Level	% change
Earnings (Birr)					
Mean earnings	137.63	142.88	3.81	133.02	-3.35
10th percentile	13.96	14.01	0.36	13.20	-5.44
25th percentile	33.59	32.55	-3.10	31.27	-6.91
50th percentile	74.97	72.12	-3.80	66.26	-11.62
75th percentile	157.87	166.28	5.33	136.68	-13.42
90th percentile	319.52	333.44	4.36	299.57	-6.24
Poverty levels					
Headcount ratio	47.23	48.17	1.99	51.29	8.60
Poverty-gap ratio	24.63	25.12	1.99	26.48	7.51
FGT, α=2	16.44	16.72	1.70	17.66	7.42
Watts index	46.36	47.01	1.40	49.71	7.23
Sen	32.10	32.70	1.87	34.69	8.07
Inequality					
Gini coefficient	0.5720	0.5891	2.99	0.5990	4.72
Gen entropy (ε=-1)	1.6418	1.7074	4.00	1.6665	1.50
Gen entropy (ε= 0)	0.6625	0.6998	5.63	0.7120	7.47
Theil index	0.6039	0.6488	7.44	0.6932	14.79
Gen entropy (ε= 2)	0.9779	1.1043	12.93	1.2645	29.31
Std dev of loges	1.2066	1.2247	1.50	1.2079	0.11
Coef of variation	1.3946	1.4871	6.63	1.5914	14.11

Note: β_W, & σ_W

The outcomes of the second set of simulations show that imposing the structure of returns from 1994 reinforces only the effect observed in the 25th and 50th percentile. Offsetting the effect on the other households. This shows the possibility of a decline in level of inequality and poverty in the year 2000 since the share of public-sector

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[11] β_W and σ_W stands for estimated coefficients and standard deviation of the error term in the wage determination equation. Hence, the results in these columns represent simulation results obtained by imposing parameters of the earnings equation for the wage sector.

employment has changed from 1994 following liberalization. The decline in incomes in the second set of simulations applies to every part of the distribution and the magnitudes of change are significantly higher. This shows that changes in the structure of returns in the wage sector in general are more important in explaining the changes in poverty than changes in the structure of public sector wage employment.

The other 'exogenous' variables we considered are those that describe the characteristics of the activities of the self-employed. These are the (i) share of female household businesses (FHB), which accounts for a substantial portion of self-employment; (ii) the share of self-employed people who reported zero or negative income (NSEI); and, (iii) the share of businesses with one or more paid workers (NPW), which is a proxy for the size distribution of self-employment activities (see Table 19).

Table 19: Effect of exogenous variables affecting self-employment income

| | Percent change of imposing the 1994:[12] | | | | |
	FHB	NSEI	NPW	β,σ_S	All
Earnings (Birr)					
Mean earnings	-1.03	5.96	-4.21	8.45	12.20
10th percentile	-10.82	-4.15	-2.58	6.09	12.75
25th percentile	-7.62	-5.72	0.33	5.30	2.26
50th percentile	-3.56	-3.56	-3.64	4.20	1.96
75th percentile	-2.63	-0.58	-1.22	5.33	3.31
90th percentile	-0.05	2.12	-2.94	7.88	17.92
Poverty levels					
Headcount ratio	3.13	1.40	3.71	-3.11	-0.76
Poverty-gap ratio	5.48	1.87	3.25	-4.71	-2.07
FGT, α=2	8.15	2.55	3.28	-5.78	-2.92
Watts index	7.40	2.52	4.62	-6.06	-3.30
Sen	5.58	1.99	3.55	-4.42	-1.81
Inequality					
Gini coefficient	1.78	5.17	-1.05	1.96	4.88
Gen entropy (ε=-1)	5.35	13.39	8.31	0.62	8.16
Gen entropy (ε= 0)	4.75	10.22	-1.01	3.17	9.25
Theil index	4.01	16.21	-4.07	5.88	12.04
Gen entropy (ε= 2)	6.69	33.07	-9.18	12.32	17.36
Std dev of loges	2.41	2.59	1.30	0.15	2.39
Coef of variation	3.65	15.76	-4.37	5.87	8.71

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[12] The column labeled FHB, NSEI and NPW present simulation results obtained by imposing the share of female household businesses, negative self-employment incomes, and businesses with one-or more paid workers observed in 1994. The column labeled β,σ_S presents results of imposing the parameters of the earning equation for self-employment sector from 1994. The last column labelled "All" presents results obtained when all four sets of parameters from 1994 are imposed.

As we noted before, the share of female household businesses was about 38 percent in 1994 and 37 percent in 2000. The share of self-employed people using paid labour was about 13 in 1994 and 12 in 2000, and the share of self-employed people reporting zero or negative income was about 1.0 percent in 1994 and 0.5 in 2000. The results from the simulations of imposing the 1994 parameters corresponding to these variables result in lower levels of income and higher poverty rates (Table 19). Thus, the net effect of the changes in these variables is to counteract the effect of the change in the structure of returns.

5.   Conclusions

This study noted that despite the deployment of macro policies to address problems of poverty and inequality in African countries in general and Ethiopia in particular, we know little about the channels through which the deployed macro policies are supposed to affect poverty and inequality. Ethiopia embarked in a comprehensive liberalization policy (the reform or SAPs) in 1992. In this study we hypothesized that these policies had an effect on poverty and inequality. We further considered that the effect of these policies could be inferred from the change in the structure of labour market as it is one of the most important channels through which macro polices may affect poverty and inequality. This underscores the need to examine the letter closely. We have used Ethiopian urban household survey data for the year 1994 and 2000 to address this issue.

As the year 1994 was the aftermath of the period that corresponds to the launching of structural adjustment program of the country, one would expect larger changes in income levels, poverty and inequality since then, especially in urban areas. This expectation, however, is not borne out by our data and aggregate indicators of poverty and inequality. Between 1994 and 2000, poverty headcounts declined only slightly from about 52 percent to about 47 percent. Since there was no change in mean per capita household income (which was about Birr 137.00 in both periods), the observed slight decline in headcount ratios seems to be the results of redistribution that favoured lower income groups. We also noted that since the observed changes in mean and median incomes are statistically insignificant, there is a need to focus on explaining why incomes remained stable at a time of fundamental changes in macroeconomic policy environment.

We have used both data exploratory analysis as well as earning and occupational choice modelling, together with counterfactual simulation, to investigate this issue. The study showed that the absence of change in aggregate measure of poverty and

inequality hides an enormous change when the analysis is carried across different income categories and sectors. Using micro simulation analysis, we noted that changes in incomes of different categories of urban households move in opposing directions and cancel out each other when an aggregate poverty and inequality indicator is computed. The study has show that although there seem to be limited change in poverty and inequality at aggregate level, there is significant change within and across categories of households. The distribution of household incomes is found to depend on the structure of returns to labour and on the occupational choice the households made.

The estimated result of the models used and the micro-simulation analysis conducted shows that. First, the mean minimum income in the wage sector rose while it declined in the self-employment sector; this is consistent with the exploratory analysis conducted that preceded the modeling work. However, in the wage sector, there has been a decline between the years in the premiums associated with being male, being a public-sector employee as well the premiums associated with experience and the level of education. This may relate to the lack of incentive-compatible pay system in public sector. In the self-employment sector, over the reform period, the disadvantages arising from operating being female household businesses have become bigger, while the premiums associated with larger business have increased substantially. If female-headed business is a good proxy for the poor in the informal sector, as can be inferred from the exploratory analysis in this study, the reform is associated with relatively negative outcome for this group.

Second, the simulation analysis which is conducted by imposing the estimated parameters from the 1994 survey on the data of the year 2000, revealed that the change in aggregate poverty and inequality indicators is smaller while it varies across the two sector identified – wage and self-employment sectors. The effect of changes in the wage sector dominates because wage employment accounts for a much larger share of employment and incomes. The implication for the impact of the liberalization policy is that it favored the wage earners but not the self-employed, the aggregate effect overall being largely in line with the positive pattern in reducing poverty observed in the wage-earning sector. Within the latter sector, those in the lower echelons of the income bracket benefited more – in this sense, the growth was pro-poor.

Third, when the simulation is run using the returns to both observed and unobserved characteristics of the labour market from 1994, it turns out that the effect of changes in observed characteristics is the dominant cause for any changes between 1994 and 2000. The simulations led to larger percentage changes in both wage and individual self-employment incomes. Yet, their effect on household-level income and poverty is

not as strong as the changes in both categories of income, especially of the wage income, that result from the simulations. In terms of inequality, imposing the 1994 parameters of the wage sector led to slight increases in inequality. Imposing the 1994 parameters of the self-employment sector, on the other hand, led to a rise in inequality, which is larger in magnitude. As a result, inequality changed along the change in the self-employment sector households.

Fourth, in terms of the effect of occupational choice, the micro-simulation exercise has shown that if the pattern of occupational choice observed in 1994 was to prevail in 2000, headcount ratio of poverty would have been 44.44 percent instead of the observed level of 47.23 percent. Thus, the reform was strongly associated with a change in occupation choice that led to worsening of the poverty condition. This effect would have been strong had it not been to the positive gain in earning by households in the wage earning category, showing only a less than half percent increase in aggregate poverty level as measure by head count ratio.

Finally, the study highlighted the possible impact of the reform on the public sector (and other exogenous variables) and poverty. The related simulation shows that changes in the structure of returns in the wage sector in general are more important in explaining the changes in poverty than changes in the structure of public sector wage employment or other exogenous variables.

Perhaps the most important policy lesson from this study is the importance of understanding issue of distribution of income across income and occupational category in the context of drawing poverty reducing macro policies. Policy effectiveness with regard to poverty reduction could be achieved if we understand the workings of the labour market and how it affects both level and distribution of income. This is especially true since inequality is generally found to be positively associated with rising poverty. This study has offered such information.

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THE DEMAND FOR KEROSENE AND PER CAPITA INCOME IN ETHIOPIA[1]

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Abstract

The demand for kerosene is growing at the rate 5.6% per annum. Per capita income and population growth are determining factor that can directly affect the demand for household kerosene fuel in Ethiopia. Kerosene consumption is a log log (double logarithm) non linear function of per capita income through time. It is an ideal demand function. The demand for total kerosene consumption is income elastic and the elasticity coefficient is 8.9 in Ethiopia. This indicates that as income increase kerosene consumption increases, a 1% increase in per capita income will result in 8.9% increase in total kerosene consumption, i.e. more than a proportionate increase in demand for kerosene. Urban population is a limiting factor for kerosene consumption in Ethiopia. Urban population is growing rapidly. It is estimated that urban population growth at the rate of 4.1% per annum during the last 15 years.

The study tries to forecast demand for kerosene in 2005–2020. Between 1991– 2004, household kerosene demand has been growing at the rate of 5.9% per annum. Forecasting of the demand for kerosene was based on econometric model. The total urban kerosene demand will be 275,470 m^3 in 2006, 346,900 m^3 in 2010, 457,190 m^3 in 2015 and 594,166 m^3 in 2020. The Addis Ababa kerosene demand will be 111,420 m^3 in 2006, 134,930 m^3 in 2010, 168,400 m^3 in 2015 and 204,030 m^3 in 2020. This study attempts to overview the demand and supply of household fuels in Ethiopia, in general, and commercial fuels, in particular. We will also compare and contrast nominal prices and the amount of energy per unit cost for important fuels. Even though fuel wood has the lowest quality, it is the cheapest energy source among household fuels and that is why poor households preferred to consume it. Kerosene becomes the most expensive fuel than wood as well as charcoal. We look at the demand elasticity of price and income and analyse the effect of change in price and income on consumption of different household fuels.

Key words: Kerosene demand; per capita income; income elastic; population growth; kerosene demand projection;

1.   Background

The study provides a brief overview of kerosene demand in Ethiopia. The country has experienced many changes in its energy consumption patterns both in quantity and qualitative terms since the introduction of kerosene as household fuel. This can be explained using two factors. The first factor is based on population growth and demographic changes in household size and age groups. The second factor is the change per capita income and in economic development. Household kerosene energy consumption is expected to increase as economy develops, rise in per capita income and change in life style. The pattern of household energy consumption represents the stage of economic development. In Ethiopia, energy consumption per capita is much lower than many developing countries. As economy develops, more and clean energy is consumed. It is natural for people to pursue a better life, which often means improve their proper cooking, heating and lighting source of energy to modern commercial fuels.

In addition to population growth and economic development, household also change their choice of energy source due to different reasons, such as rise in energy price, availability and convenience. Energy consumption of individuals also increases with increase in disposable income. Households with better income consume greater quantity and more convenient forms of energy.

The recent rise in kerosene price is the largest shift in price which have occurred during the last 20 years, before kerosene was not that much popular as household energy fuel in Ethiopia. Recently kerosene price has increased by 37 percent over the past few years to 4.12 (Ethiopian Birr) ETB per litre from its recent price of 3.00 ETB per litre. The increase was made in two consecutive periods. Initially it has increased by 5 percent and in the second round adjustment was made by increasing 32% to 4.12 ETB per litre on August 27, 2006.

The first impact on the households is it reduces real income. Further higher inflation rate will lower the purchasing power of the poor who have fewer instruments to hedge against the kerosene price increase. The biggest impact will be on poor households, which used kerosene for cooking and lighting. It is not well known whether the pressure of higher price will lead to significant switch in energy consumption from kerosene to biomass (fuel wood, crop residue and dung). High energy prices should be viewed as a signal to reduce the heavy reliance on kerosene and make use of alternate clean energy resources. And more substitutions are likely if it continues its upward shift.

The primary factors which influence modern energy consumption in Ethiopia are levels of per capita income and population growth. However, a significant change in kerosene consumption has occurred as a result of change in urbanization and population growth.

1.1   Objective of the study

The main aim of this study is to forecast the demand for urban kerosene consumption based on per capita income. Most of the data used in subsequent analysis is based on population census and population forecasted by Central Statistics Authority (CSA). Based on population growth, it is estimated that kerosene demand in Ethiopia will grow at the rate of 5.6 % annually from 2006–2020.

The study does not take into account the use of commercial energy mix. However, local production of alternative fuels like ethanol has been recommended as a substitute fuel for kerosene.

1.2   Methodology

Kerosene demand has been projected using econometric models. Econometric models are based on observed relationships between actual kerosene consumption and explanatory variables. Time series of kerosene consumption has been sourced from Ethiopian Petroleum Corporation (EPC).

Kerosene consumption is a log log (double logarithm) non-linear function of per capita income through time as indicated above. Such fitting represents higher explanation power of the demand on population. The kerosene demand extrapolation equations are presented below for urban and Addis Ababa, respectively.

$$Ln\,(KeroUrban\,)_t = a + bLn\,(percapitai\;ncome\,)$$

$$Ln\,(KeroAA\,)_t = c + dLn\,(percapitai\;ncome\,)$$

where, a, b, c and d are parameters to be estimated by the model. Ln is the natural logarithm function, t is time, Kerourban and KeroAA is the urban and Addis Ababa kerosene household consumption, and per capita income in urban and Addis Ababa population, respectively. The above extrapolation equations explain that as per capita income increases the demand for kerosene increases.

In forming econometric model, macro-economic indictors like Gross Domestic Product (GDP) per population has been taken to be the primary explanatory variable. An increase in per capita income will lead to an increase in the demand for kerosene. Urban population structure reflects the degree of urbanization. Similarly an increasing rate of urbanization will lead to an increase in demand for kerosene. These variables are technically referred as robust variables. They indicate the pace and composition of economic progress. They also capture the underlying structural changes in the various economic sectors of the economy. The demand for kerosene projection has been developed based on assumption regarding the future path of the Ethiopia economy. In the extrapolation, GDP is assumed to grow at the rate of 6% per annum.

2.   Overview of household energy consumption in Ethiopia

The most striking feature of the Ethiopian energy sector is over consumption of low grade traditional energy sources and under consumption of high quality modern fuels (electricity, liquid petroleum gas (LPG) and kerosene). Despite the poor documentation on production and consumption of wood fuel, (EFAP 1994) estimated that wood provided 78% while dung and crop residue provided 16% of household energy requirement in 1992. The country's fuel energy is heavily dependent on traditional biomass. Biomass provides more than 94% of the total energy consumption in the country and only 6% of household energy is dependent on commercial fuels in 1992.

Household fuel consumption is significantly dependent on location. There is a difference in energy consumption between rural and urban households. In urban areas energy expenditure constitutes a significant portion of the total household expenditure. Growth in kerosene consumption is essentially linked to urban population growth rather than rural population. Almost 95% of kerosene consumption is in urban areas. EFAP (1994) estimated that kerosene replaced woody biomass mainly for cooking in urban areas, which used to be only 8% in 1992 (see Table 1). Urban households still rely on non-commercial energy, biomass fuels. Wood provided 62% while dung and crop residues provided 27% of the energy requirement in 1992. Electricity constituted 3% of the household energy requirement in 1992 and it is mainly used for household light energy.

The forecast of urban household energy use in 2014 is very surprising; almost 35% of biomass, which is low grade household energy (wood, dung and crop residue) will be replaced by commercial energy sources. Kerosene and electricity are grouped under modern energy. The share of kerosene was the least among other energy sources in

1992, however, its demand has expected to rise tremendously and replace lower grade energy sources in the future. Kerosene consumption will reach 20% of the total energy consumption and the use of electricity will grow to 15% in 2014. There is a very significant achievement in terms of substituting low grade traditional energy sources to more modern and commercial energy sources. This indicates that as urbanization increases kerosene consumption is growing faster than biomass.

Rural households rely largely on non-commercial energy, bio-fuels. EFAP (1994) estimated that in rural areas fuel wood provided 66% while dung and crop residues provided 34% of energy requirement in 1992 (see Table 1). The importance of biomass energy in rural sector will continue at least in the near future and it is unlikely to provide significant amount of modern energy to rural areas of Ethiopia. It is projected that wood fuel provided 68% while dung and crop residues provided 20% of the energy required in rural areas in the year 2014. The percentage consumption of fuel wood forecast as well as commercial fuels in 2014 does not show much change in rural areas, however, there will be a significant increase in the consumption of modern fuels and increase in power investment for a new installation of electricity in rural areas. Projected consumption of modern energy in rural areas is still very low compared to biomass; in the year 2014 the consumption of electricity and kerosene is 5% and 2%, respectively. The forecast of kerosene and electricity in rural areas is mainly used for light energy.

Table 1: Household fuel energy consumption in Ethiopia

Source of energy	Urban (%)		Rural (%)	
	1992	2014	1992	2014
Wood /charcoal	62	42	66	68
Dung	16	8	20	13
Crop residue	11	5	14	7
Electricity	3	15	0	5
Kerosene	8	20	0	2
Other	0	10	0	5
Total	100	100	100	100

Source: EFAP (1994).

The household sector accounts for 90% of overall energy consumption in Ethiopia. This indicates that Ethiopia is at low level of industrial development and country's industrial kerosene consumption is still lower than the household energy consumption for kerosene. Strong correlation exists between energy consumption and per capita income as well as population growth, the development of infrastructure and the availability of biomass energy in the area.

2.1   Biomass fuel

Almost more than 95 % of the fuel wood is consumed in rural areas. It is estimated that total per capita energy consumption is 2.1 kg of wood fuel equivalent per person per day (CEPPE 1987). In 1990, Amibara Irrigation Project II estimated similar result and consumption of fuel wood was 15 kg/household per day or 2.5 kg/person per day.

About 24 million m^3 of wood is produced annually of which 90% is used for household fuel consumption and only 10% is used for industrial and building purposes (EFAP 1994). Fuel wood is mainly consumed for cooking and heat. In addition to these uses, there are also villages where fuel wood is also used as light. Such villages let fuel wood burning continuously during the night to avoid darkness. Per capita consumption of fuel wood differs from place to place both in rural and urban. The average estimated consumption of fuel wood per household was 440 kg per annum Consumption of firewood energy in the household mainly depends on household size. There is a high positive correlation between household size and total domestic fuel use.   Fuel wood consumption for cooking and making '*injera*' is very common in Ethiopian cities and peri-urban areas. In big towns where electricity is available, significant households use kerosene for cooking and electricity for making '*injera*' substituting fuel wood.

The projection of sustainable fuel wood supply from all forest types is 8.8 million m^3 without any intervention but the projected supply will reach 21.8 million with intervention scenario by 2014 (EFAP 1994). The woody supply from trees outside forests is mainly fuel wood for the rural population, wood for fencing and construction. The supply of fuel wood from farm homesteads was estimated at 80 thousand tonnes per year (FAO 2001).

The available supply of forest does not exceed more than 14 million hectares in Ethiopia. From this about 5 million hectares is shrub land and other 5 million hectares is bush land. Wood land and plantation cover only 2000 and 255 hectares, respectively (EFAP 1994).

The wood supply from woodlot land mainly derived from two major sources, i.e. farm forestry and the woody vegetation patches. The average volume per hectare for closed high forest is estimated to range from 30–120 m^3 per hectare and up to 50 m^3 per hectare for open forest. The annual incremental yield from all available forest was estimated at 14.4 million m^3 while the demand was 47.7 million m^3 for the year 1992 (EFAP 1992).

Fuel wood shortage is becoming a serous problem in Ethiopia. The main cause of this shortage is population pressure. In 1984 the population of Ethiopia was 42.2 million and growing at 2.95 per annum. In 1990 it was estimated at 50.6 million out of which 89% lived in rural areas. It grew to 61.7 million in 1999 out of which 85% lived in rural areas (CSA 1998). Fuel wood collection took an hour or two a generation ago while today it takes the whole day (Eckholm 1975). The forest resource that was used to cover 16% of the land area in the early 1950s were reduced to 3.6% in the early 1980s and further declined to 2.7% in the early 1990s (FAO 2001). FAO (2001) compiled forest assessment report and indicated the forest resource available for fuel wood supply remains only 14 million hectares. The total area of natural forest is expected to decline at the rate of 62 thousand hectares per year (FAO 1990).

This condition can be easily described using the trend observed between fuel wood supply and demand. The fuel wood demand and supply projections documented by EFAP (1994) indicated that the demand for fuel wood was 58 million m^3 whereas the supply was 11 million m^3 indicating the deficit was more than four times the supply. The same document had shown a deficit projection of 55 million m^3 in 2004, 65 million m^3 in 2008 and 80 million m^3 in 2014. The projection made for the year 2020 indicated that the demand will reach to 100 million m^3 against a supply projection of 7.7 million m^3 envisaging a deficit of 92.3 million m^3 (EFAP 1994).

The wood scarcity is a manifestation of much deeper and rooted problem of poverty. Actually, firewood is an important input to household consumption from which household cannot easily substitute (Loughram and Pritchett 1996). If fuel wood is substituted by dung and crop residue, there is a trade off between using crop residue and dung as inputs for agriculture and burning as a fuel. This alternative energy sources may have substantial financial costs as well as opportunity costs. Dung is used for cooking in rural parts of Ethiopia but it is also an important source of fertilizer, and using it for fuel can have adverse effects on soil fertility. That is why such energy sources will vanish in their energy use through time. If wood is substituted by modern and commercial energy, poor households may not afford such fuels.

2.2   Commercial household fuels in Ethiopia

Modern household fuel consumption in Ethiopia is dominated by kerosene. This change in energy consumption pattern can be more easily understood if one looks closely at fuel switch by end use. The cooking energy source has gradually changed since kerosene is introduced in Ethiopia. With rapid urbanization, kerosene as household fuel has been expanded rapidly and now it dominates commercial cooking fuel.

In Ethiopia, the major part of commercial energy is consumed in urban areas. The per capita modern fuels consumption in Ethiopia is about 0.02 tonnes of oil equivalent (TOE) or 20 kg/year (UNDP 1995), among the lowest modern energy consumption in the world. The low level of modern energy consumption is caused by both supply and demand side problems. On the supply side, low electricity generation, shortages in foreign exchange, inefficiency of service providers, imperfections in energy markets and lack of infrastructure are some of the problems. On the demand side, low purchasing power of the poor is the main problem.

A more profound examination of the potential for increasing the consumption of modern fuels requires an understanding of the overall energy demand of urban households. As the population moves from rural communities to increasingly crowded urban cities, their energy use patterns change towards modern fuels (Barnes 1995). Most of the potential additional demand for modern energy in urban households will come from substituting for biomass fuels.

The consumption of commercial energy and the standard of living are positively and non-linearly correlated (Goldenberg and Johannson 1995). This implies that with economic growth, especially at the lower level of development, we expect rapid growth in the demand for commercial energy. Accessibility and affordability of modern fuels will be still in question and affected by costs, especially for poor households.

Many researches indicate that the pattern of urban energy demand generally reflects the prediction from the 'energy ladder' hypothesis that states share of traditional fuels use decreases with economic development while those of modern fuels increase. This implies electricity and kerosene replaces wood as the primary cooking fuels. The three stone fire is abandoned and charcoal and kerosene stoves and LPG cook stoves become the cooking devices of choice. The population growth in urban areas not only triggers changes in the type and form of energy used but also implies a much higher demand for energy. Per capita use of energy increases significantly as the population moves from rural communities to urban (Karekezi 1999).

Energy prices in general and the relative prices of different fuels in particular are important determinants of demand. Prices may be depressed by subsidies. Due to the subsidized prices of electricity and kerosene in Ethiopia, consumption was increased tremendously. Poor households generally expend proportionally more on energy than richer households and hence higher energy costs will have a larger budgetary implication for the poor (Bereket et al. 2002). Compared to the poor, the non-poor households expend relatively more on modern forms of energy and less on traditional forms.

2.3   Kerosene

Kerosene is used as a main source of cooking fuel in urban areas and used as a source of light in rural areas. Ethiopians cook tea, vegetable soup or '*wat'* to eat with '*injera'*, as well as boil water, make coffee and other purpose several times a day. Many urban dwellers cook '*wat'* with kerosene or charcoal stove and bake *injera* on an open fire or electric stove. Kerosene is becoming a primary source of fuel energy for cooking in urban areas although wood and charcoal continue to be widely used. Daily household energy consumption in Addis Ababa estimated at 63.8 mega joule (MJ) and the daily per capita energy consumption amounts to 11.5 MJ or 0.81 kg air-dried wood equivalent (CEPPE 1985). The frequent use of different fuels in Addis Ababa is presented in Table 3. In 1985, kerosene was used as a backup fuel by 37% of the household in case fuel wood is not available while wood was used frequently. However, in 1994, the situation became different; kerosene has become a primary source of cooking fuel. Kerosene was used as cooking fuel in 80.2% of households in Addis Ababa.

The frequent use of charcoal and wood has declined in the same time period. In 10 years period kerosene has displaced 43% of biomass users and obliged to switch their energy consumption to commercial fuel. This shows a significant growth in supply of kerosene between 1985–1994. Like wise, 10% of households switched their energy source to electricity. This also leads to a steady growth in demand for electric stove in Addis Ababa.

Table 3: Change in Addis Ababa household energy demand and frequency of use for cooking during 1985 and 1994

Fuel	% use in 1985	% use in 1994	Difference
Kerosene	37.1	80.2	43.1
Charcoal	91.4	79.0	-12.4
Wood	93.5	64.7	-28.8
Electricity	21.0	31.1	10.1
LPG	13.1	9.6	-3.5
Others	0	2.4	2.4

Source: EELPA (1987); EPC (1995).

There is close correlation between income level and energy consumption. A study reveals that poor households are the least consumers of modern energy and shows that total energy increases with income (Sonkona 2005). Households with higher socio-economic status and level of education consume more energy and are better in

a position to acquire modern energy such as electricity. Energy source serves as an indicator of the level of poverty of the household.

The evolution of kerosene consumption in Addis Ababa is quite interesting. The average per capita household energy consumption was 21.4 MJ in 1978. Wood was a primary source of fuel in Addis Ababa and it was providing 65% of fuel consumption in 1978. Modern fuels were only providing 16.2%. Kerosene was providing quite very low proportion and it was only 6.6% of energy consumption in Addis Ababa. The average per capita household energy consumption in 1986 dropped to 12.1 MJ after wood fuel has become increasingly unavailable and expensive in Addis Ababa. In 1986, the dominance of biomass fuel is slightly reduced and the introduction of commercial fuels has been increased from the level of 16.2% to 20.6% in Addis Ababa (see Table 4). At this time charcoal was a primary source of cooking fuel in Addis Ababa. In 1986, charcoal consumption is slightly higher as compared to kerosene (17.3% and 14.3%). Kerosene took the place of charcoal as primary source of cooking fuel in 1988.

Table 4: Average per capita household energy consumption in Addis Ababa

Fuel type	Consumption 1978* MJ	Share in % 1978	Consumption 1986** MJ	Share in % 1986
Biomass				
Wood	13.9	64.9	4.2	34.7
Charcoal	3.4	15.9	2.1	17.3
Wastes	0.6	3.0	3.2	26.4
Modern fuels				
Kerosene	1.4	6.6	1.8	14.3
Electricity	0.6	2.8	0.8	6.3
Others	1.4	6.7	0	0
Total	21.4	100.0	12.1	100.0

Source: * CSA (1985); ** CEPPE (1987).

In 1991, kerosene constitutes 46.6% of household energy demand for cooking in Addis Ababa. The total share of commercial fuels is close to 58% of energy demand for cooking. Charcoal is the second source of cooking fuel particularly used for coffee making and occupies 22% of the total energy demand for cooking in Addis Ababa in 1991 (Table 4). Kerosene consumption grew to 48.5% while electricity for *injera* making grew to 14.6% in 1994. This shows that total substitution effect of commercial fuels for cooking household energy has reached to 63% in 1994. The effect of substitution is very fast and the diffusion is much higher in the latter years.

Kerosene displaced over 455 thousand tonnes of woody biomass in 1992 (EPC 1995). Kerosene's substitution effect grew to over 640 thousand tonnes of woody biomass in 1994, an increase of 50%. Fuel switching is equivalent to yield of 288 thousand m3 of wood, representing the sustainable yield of 19 thousand hectares of prime eucalyptus plantation. This represents a major source of fuel substitution in urban areas which undoubtedly has reduced pressures on woody biomass in the country side.

Table 5: **Change in Addis Ababa household energy demand and use for cooking during 1991 and 1994**

Fuel use	1991	1994	% share in 1991
Bio-*injera*	147,432	183,441	15.1
Electric-*mitad*	111,137	194,024	11.3
Charcoal	215,458	248,141	22.1
Kerosene	455,400	642,192	46.6
Others	47,130	56,342	4.8
Total	976,557	1,324,139	100.0

Source: EPC (1995).

This positive environmental effect has been one of the major reasons for importing kerosene and substituting it for domestic use since 1980s. The major rationale underpinning kerosene imports was to offset woody biomass demand and reduce deforestation. Petroleum imports that were close to 142 million ETB in 1991 grew to 1.4 billion ETB in 1996, and climbed to 2.174 billion ETB in 2000. Petroleum import was close to 2.674 billion ETB in 2003. In the beginning of 1990s, Ethiopia spends over USD 20 million per annum on household kerosene compared to USD 3 million in 1986. Kerosene imports for household use continue to rise dramatically and imports represent 125 thousand tonnes which cost over USD 35 million in 1994.

In Ethiopia, the proportion of households which consume kerosene is higher in the middle income class. As income increases to higher level, the consumption of kerosene declines. Electricity accounts for a larger share of energy requirement as income increases. In Ethiopia, Kebede (2001) classified urban households into five income groups and found that 47.7% of the households were very poor and poor, and control only 15% of the overall urban household income. On the other hand, 41.2% of the rich and very rich households controlled up to 77.7% of the urban household income. Typical activities of the average urban resident is usually more modern and energy intensive than the activities of a rural resident. Consequently, the ongoing rural–urban demographic shift is expected to result in a large increase in modern energy consumption (Karekezi 2002).

In rural household, kerosene consumption is very low as compared to urban. This is because fuel wood is more available and cheapest source of energy in rural areas. Kerosene is not yet being introduced in countryside as a source of fuel for cooking. However, 73% of the household use kerosene for lighting, only 0.7% from electricity and 26.3% use other traditional lighting mechanism mainly 'Chakma' seed[3] in the northern part of Ethiopia in 1996.

More options exist in urban areas even for the poor as compared to their rural counterparts. For instance, while the budget share of electricity is the highest for the non-poor; firewood occupies that position for poor households. As a more efficient source of heat compared to firewood, policy may have to take charcoal as an important energy source for urban poor in the short run. Moreover, poor households expand the same amount of their energy budget on kerosene as on charcoal underscores the possibility that kerosene is realistic substitute for biomass fuels even for the poor in urban areas in the long run.

2.4   Electricity

Electrification is at an infant stage of development throughout the country and largely used in association with larger urban areas for residential use and manufacturing. Only 57.4% and 2.7% of urban households used electricity for lighting and cooking in 1996, respectively. While only 0.7% of rural households used electricity for lighting, none cooked with it. Apart from this inefficiencies, the reliability and availability of existing installed electricity system is very low. However, national figures show considerable regional variation in both supply and consumption demand patterns of electric power. This could be due to the varying demand in the regions and costs of supplying alternative energy sources which also have large influence on the consumption pattern and the level of energy consumption in the regions. Another reason could be the level of investment projects undertaken in the regions.

Electricity is the primary source of light in urban areas. Electricity accounts for a larger share of energy requirement as income increases. Mostly the upper income class consumes electricity for cooking.

More than 98% of electric power is generated through hydropower energy while 2% from thermal energy. The main hydropower energy sources are Finchaa power station which accounts for 48.9% of the total electric power generation and the two Tis Abay stations generate 25.6%, the three Awash stations 10% and the Melka

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[3]. Chakima is a seed of 'Gloziet' tree and used for light purpose in rural areas. The seed contains oil like substance after extraction and has similar characteristics like that of kerosene.

Wakena station 15.5% (NBE 2002). The supply of hydroelectricity is somewhat constrained by capacity limitations for many years in 1980s and 1990s and supply has now started to increase after 2000.

Table 6: Electric power generation in Ethiopia in 2000–2003

Year	Electric power (× 10^6 kwh)	Urban population (× 10^3)	Total population (× 10^3)	Kwh per person (× 10^3)	Total per capita (× 10^3 kwh/person)
2000/1	1,992	9,473	54,022	200	36.8
2001/2	2,130	9,886	55,458	215	38.4
2002/3	2,142	10,307	56,913	207	37.6
2003/4	2,311	10,747	58,382	215	39.6

Source: National Bank of Ethiopia (NBE).

The total electric power supply was 1,992 million kwh in 2000/01 and grew to 2,311 million kwh in 2003/04, indicating 16% increase in supply between 2000–03. This electric power generation has met only 1.791 million urban households' energy requirement. Per capita modern energy consumption has been increasing over the last few years in Ethiopia and it is expected to increase further as investment in hydropower generation increases in the future. However, the current per capita power generation is very low in Ethiopia compared to other least developing countries. The average per capita power generation is close to 38 thousand kwh/annum per person between 2000–04. If the per capital power generation is calculated only for urban population, it amounts to 209 thousand kwh/annum per person. This is very low compared to other developing countries.

The use of kerosene, wood and charcoal seems to predominate in areas without adequate access to electricity. Introduction of electricity tends to change the energy consumption pattern as demonstrated after connection to electricity, the use of kerosene, wood and charcoal decreased, with the largest drop being in the use of wood because it is also used for cooking *injera* and lighting.

2.5 Liquidized petroleum gas (LPG)

LPG is used mainly for cooking in the urban household. The demand for LPG has declined over the last ten years (1994–2004). This is because LPG is becoming the most expensive cooking fuel in Ethiopia. The supply of LPG also dropped significantly due to decline in demand. The highest total LPG supply was 8,227 m^3 in 1994 and

now dropped to the level of 700 m^3 in 2000. Over the same period, LPG demand declined at the rate of 23% per annum.

Unlike kerosene, the demand for LPG is price elastic for higher income groups. This implies an increase in price would persuade customers to alter their behaviour towards other source of energy. Since the major LPG consumers are higher income group, they switched to electricity.

3.   Household kerosene demand projection

3.1   Trend analysis

Kerosene supply in Ethiopia has more than tripled over the period between 1991–2004. During the same period kerosene supply[4] grew at the rate of 6.8% per annum. The total supply of kerosene was 71,634 m^3 in 1991 and has increased to 244 thousand m^3 in 2004. While the international price of kerosene doubled within the last five years, the price of kerosene which was USD 269/m^3 in 2002/03 it is USD 418/m^3 in 2004/05.

The household sector remains the dominant kerosene consumer in Ethiopia and most of the future demand growth comes from the household sector. Household kerosene demand in Ethiopia has also tripled over the period 1991–2004. Between 1991–2004, household kerosene demand[5] has been growing at the rate of 5.9% per annum. The total household demand for kerosene was 100,668 m^3 in 1992 and has reached 219,605 m^3 in 2004. Non-household consumption of kerosene was insignificant during the period 1991–99 and below 5% of the total consumption. Major non-household kerosene consumers are construction, agriculture, EELPA and defence sector. We have noticed that non-household kerosene consumption has increased to 10% during the period 2000–04. This is due to an increased investment in the construction sector. EELPA has also significantly increased kerosene consumption during the last five years. Industry has reduced its kerosene consumption by 80% and probably it may have been switched its energy consumption to other alternative sources.

The demand for kerosene has significant variation in regions and location appears to be as an important determinant. Only three regions consume 75% of the total household supply in Ethiopia. Addis Ababa, Central and Eastern part of Ethiopia have

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[4]. Kerosene supply follows an exponential trend and can be represented by a regression equation: $Y = e^{(-123.1 + 0.068t)}$, where, Y and t are kerosene supply and time, respectively.
[5]. Kerosene demand follows an exponential trend and can be represented by a regression equation:
 $X = e^{(-106.6 + 0.059t)}$, where, X and t are kerosene demand and time, respectively.

consumed 40, 21 and 14% of the total household consumption in the period 1996–1999, respectively.

Moreover, the regional distribution of kerosene consumption in the country has shown significant shift. Kerosene retail sales across regions show 61.8, 17.5 and 9.8% of kerosene was consumed in Addis Ababa, Oromia and Southern Nations and Nationalities People (SNNP) in 1992, respectively. In 1996, the share of Addis Ababa declined to 49% .On the other hand, the share of Oromia, Amhara and Southern Peoples' Regions increased to 25.7, 11.6 and 11.5%; respectively, in 1996.

The supply of household kerosene has been growing at the rate of 4.9% per annum in the last 15 years in Addis Ababa. Kerosene supply has almost doubled in the period 1991–2004. The available supply was only 41,572 m^3 in 1991. It grows to close to 98 thousand m^3 in 2004. The trend analysis shows the supply of kerosene has been close to 60% of the total household supply in early 1990s and has slowly dropped to 40% in late 1990s. Indicating the share of other regions has increased significantly.

Available kerosene supply in central Ethiopia has shown significant growth in the last 15 years. Kerosene supply was close to 15% of the total household supply in 1991 and has slowly grown to 22% in 1998. On the average, kerosene supply in central Ethiopia accounts for 21% of the total household supply in the period 1996–99. The supply of household kerosene has been growing at the rate of 8.6% per annum in the last 15 years. Kerosene supply is estimated to be 51,200 m^3 in 2004.

Available kerosene supply in Eastern Ethiopia has also shown significant increase in 1991–2004. The supply of household kerosene has been growing at the rate of 9.5% per annum in the last 15 years. The supply was close to 5.8% of the total household supply in 1991 and has slowly grown to 15% of the total supply in the late 1990s. On average, kerosene supply in Eastern Ethiopia accounted for 14% of the total household supply between 1996–99. Kerosene supply has reached the level of 34 thousand m^3 in 2004.

3.2   Household kerosene demand projections

The total urban kerosene consumption is divided into household and non-household consumption. The total household kerosene consumption accounts for almost 90–99% during 1991–2004 depending on a particular year. The highest proportion of kerosene consumption was in 1997 which was 99.2% of the total consumption and the lowest was in 1998 and amounts to 90%.

The demand for kerosene is highly correlated with urban population. The rate of urban population growth in Ethiopia is higher than the national population growth. This rapid growth in the urban population has major implications on the consumption of energy, particularly modern energy. The total kerosene demand projection is highly dependent on urban population rather than rural. This is because rural population consumes kerosene only for light and the amount of kerosene consumption for light purpose is less than 5% of the total consumption. Therefore we only extrapolate the projection of household consumption particularly used for cooking in urban areas.

The population of Ethiopia is growing fast at the rate of 3.0% per annum and reached over 72 million in 2003. The urban population alone is expected to reach over 21 million in 2020 from the current 11.6 million. There has been a change in the annual population growth rate from 2.18% between 1955 and 1960 to 2.43% between 1975 and 1980. Even if it is not included in our model, income, prices, and household size, other socio-economic characteristics of households may also affect the demand for kerosene. Habtamu (2001) analysed determinants of kerosene consumption in Ethiopia and shows that family size of the household, education level of the household head and electricity consumption affected kerosene consumption and these factors were positively correlated with kerosene consumption, both at the national and urban level scenarios.

The result of kerosene demand regression is presented in Table 7. A regression was fitted based on kerosene supply data collected from Ethiopian Petroleum Corporation (EPC) and per capita income . The specification of the demand equations is non-linear and log log function as many literatures indicated. Both Addis Ababa and urban demand regressions are well behaved and the proportion of explained variation or coefficient of determination (R^2) is high: 0.88 and 0.75 for Addis Ababa and urban demand regressions respectively. The t-value for per capita income demand elasticity coefficients is highly significant at 99% confidence probability. The standard errors of the coefficients are very small and indicating reliable.

Table 7: Regression results of kerosene demand in urban and Addis Ababa

Variables/	Coefficients	Std error	t-value	Significance	R^2
Urban					
Constant	-48.3	15.3	-3.2***		
LN (Per capita income)	8.9	2.3	3.9***	0.002	0.75
Addis Ababa					
Constant	-38.2	7.7	-5.0***		
LN (Per capita income)	7.3	1.1	6.4***	0.000	0.88

* Significant at 1% probability level.

The projection and extrapolation of kerosene was done based on the CSA urban population projection from 2005–2020. There is a difference in growth rate of urban population from town to town depending on the rate of urbanization. The rate of growth of total urban population growth is less than the Addis Ababa population. In general, the urban population has grown on the average at the rate of 2.7% while Addis Ababa population has grown at the rate of 4.1% per annum during 1991–2005. The projection of household demand for kerosene for Addis Ababa has computed separately from the total urban towns because of their difference in population growth.

Kerosene consumption is a log log (double logarithm) non linear function of per capita income through time as indicated below. Such fitting represents higher explanation power of the demand on population. The kerosene demand extrapolation equations are presented below for urban and Addis Ababa, respectively.

$$Ln(KeroUrban)_t = -48.3 + 8.9 Ln(percapita\,income)$$

$$Ln(KeroAA)_t = -38.2 + 7.3 Ln(percapita\,ncome)$$

Where, *Ln* is the natural logarithm function, *t* is time, *kerourban* and *KeroAA* is the urban and Addis Ababa kerosene household consumption, and per capita income. The above extrapolation equations explain that the demand for kerosene is log log function of population and as population increases the demand for kerosene increases, correspondingly. The demand for total kerosene in Ethiopia is income elastic and the elasticity coefficient is 8.9. This indicates that 1% increase in per capita income will result in 8.9% increase in total kerosene consumption in Ethiopia, i.e. more than a proportionate increase in demand for kerosene. The demand for kerosene in Addis Ababa is also income elastic. The elasticity of demand for kerosene is 7.3 and 1% increase in Addis Ababa population will result in 7.3% increase in kerosene consumption. This shows that the major consumption of kerosene is Addis Ababa. Such result can be confirmed by calculating the exponential growth rate of kerosene consumption in Addis Ababa and urban areas as a whole. The exponential growth rate of the demand for kerosene in urban areas is 5.9% whereas the growth rate of the demand for Kerosene in Addis Ababa is 4.9% per annum.

Total urban and Addis Ababa kerosene demand projection has conducted based on EPC kerosene supply data and CSA population projection. The result of projection estimate is presented in Table 8. The total urban kerosene demand will be 275,472 m^3 in 2006, 346,902 m^3 in 2010, 457,190 m^3 in 2015 and 594,166 m^3 in 2020.

The predicted kerosene demand is quite impressive in terms of its accuracy and reliability. The total Addis Ababa kerosene demand will be 111,416 m^3 in 2006, 134,929 m^3 in 2010, 168,393 m^3 in 2015 and 204,028 m^3 in 2020.

Table 8: Ethiopian urban and Addis Ababa household kerosene demand projections for 2005–2020 (m^3)

Year	Urban	Addis Ababa
2005	259,854.4	106,000.8
2006	275,472.0	111,416.2
2007	291,991.0	116,942.0
2008	309,403.6	122,709.6
2009	327,733.4	128,725.8
2010	346,902.3	134,928.6
2011	367,066.5	141,180.7
2012	388,041.5	147,834.5
2013	410,055.3	154,540.8
2014	433,097.2	161,442.9
2015	457,190.4	168,393.2
2016	482,284.1	175,310.0
2017	508511.4	178,540.9
2018	535,782.4	189,643.1
2019	564,466.9	196,821.6
2020	594,166.1	204,027.8

Source: Based on extrapolation and regression results.

We have also able to project regions kerosene demand for 2005–2020 based on regions' kerosene supply information obtained from EPC in the period 1991–2000. This result has presented in Table 9. Such projection could have been improved much better if current information on regions' supply of kerosene and GDP forecast data were available. Despite lack of current information on regional consumption, kerosene demand projection for regions are quite remarkable in terms of its consistency with total urban and Addis Ababa demand figures. It is also quite important information for business decision making in the future. Generally, the central part and Eastern regions should be given the highest priority next to Addis Ababa for kerosene distributions and investment.

Table 9: Regions household kerosene demand projections for 2005–2020

Year	Kerosene demand projections in regions inm^3				
	Central	**Eastern**	**Southern**	**Northern**	**Western**
2005	54,569.4	36,379.6	25,985.4	20,788.3	18,189.8
2006	57,849.1	38,566.1	27,547.2	22,037.8	19,283.0
2007	61,318.1	40,878.7	29,199.1	23,359.3	20,439.4
2008	64,974.8	43,316.5	30,940.4	24,752.3	21,658.3
2009	68,824.0	45,882.7	32,773.3	26,218.7	22,941.3
2010	72,849.5	48,566.3	34,690.2	27,752.2	24,283.2
2011	77,084.0	51,389.3	36,706.7	29,365.3	25,694.7
2012	81,488.7	54,325.8	38,804.1	31,043.3	27,162.9
2013	86,111.6	57,407.7	41,005.5	32,804.4	28,703.9
2014	90,950.4	60,633.6	43,309.7	34,647.8	30,316.8
2015	96,010.0	64,006.7	45,719.0	36,575.2	32,003.3
2016	101,279.7	67,519.8	48,228.4	38,582.7	33,759.9
2017	106,787.4	71,191.6	50,851.1	40,680.9	35,595.8
2018	112,514.3	75,009.5	53,578.2	42,862.6	37,504.8
2019	118,538.1	79,025.4	56,446.7	45,157.4	39,512.7
2020	124,774.9	83,183.3	59,416.6	47,533.3	41,591.6

Source: Based on extrapolation and regression results.

3.3 kerosene price and price elasticity

All fuels own-price elasticities are negative except that for LPG. The demands for firewood, charcoal and kerosene are price elastic, the one for charcoal being with the highest value. The demand for crop residue, dung cakes and electricity is inelastic. The higher price elasticity for traditional fuels like firewood and charcoal imply that their demand will significantly decline if their prices rise. Rise in the price of kerosene can lead to significant declines in consumption because of the high price elasticity. An increase in the price of traditional fuels is usually considered as one important reason pushing households towards the use of modern fuels. Cross-price elasticities indicate that an increase in the prices of firewood implies increase in the demand for electricity while that of charcoal does not affect it.

Bereket et al. (2002) own-price elasticities of firewood and charcoal are high implying that the demand for them will significantly decline with a rise in their prices. But the demand for electricity is price inelastic. This implies electricity price increase will not change consumers' behaviour. The recent increase in electricity tariff was not drastically decrease the demand for electricity. The computed cross-price elasticities indicate that firewood and electricity are substitutes for each other while kerosene

and electricity are complementary. The substitution between electricity and firewood is mainly explained by fuel used for *injera* preparation.

We must have a fair understanding of the substitutability and complementarities of modern and biomass fuels, in order to gauge the potential for the expansion of the former. The main factors influencing demand for fuel are income, own price and cross-price elasticities. Bereket et al. (2002) a 1% increase in the price of kerosene decreases the consumption of charcoal and electricity by 0.05% and 0.84%, respectively and increases that of firewood by 1.14%. This indicates that kerosene is a substitute fuel for firewood and implies that households move mainly towards firewood; a percentage increase in the price of kerosene increases mean household firewood expenditure by ETB 2.00 Bereket et al. (2002). A removal or decrease of kerosene subsidy implies increased demand mainly for firewood. The argument for keeping the subsidy on kerosene to arrest deforestation by suppressing demand for firewood gives sense in this context. But the rise in the price of kerosene will increase that of charcoal and depress the demand for electricity; a percentage increase in price of kerosene decreases mean household expenditure on electricity by ETB 1.02. A 1% increase in the price of electricity increases the demand for firewood by 0.36% while decreasing that of charcoal and kerosene by 0.23% and 2.14%, respectively. In terms of the absolute magnitudes of the effects, kerosene will be affected most; with a percentage increase in the price of electricity, mean household expenditure on kerosene decreases by ETB 1.93. The recent increase in electricity tariff probably decreases the consumption of kerosene while increasing that of firewood.

Habtamu (2001) indicated that consumption of charcoal is negatively correlated with kerosene and electricity consumptions, implying that these fuels are used as substitutes for charcoal. However, the correlation estimate for fuel wood was found to be positive suggesting that charcoal and fuel wood are not substitutes; they rather seem to be complements. A percentage increase in the price of charcoal decreases the consumption of firewood and dung cakes by 0.61% and 6.95%, respectively, while increasing that of kerosene by 2.53%; the consumption of electricity is not affected. When charcoal becomes more expensive, households mainly shift towards kerosene; a percentage rise in the price of charcoal increases mean household expenditure on kerosene by ETB 2.28.

Bereket et al. (2002) showed a percentage increase in the price of firewood increases the demand for charcoal and electricity by 3.10% and 0.59%, respectively, while decreasing that of kerosene by 0.63%. Since both the budget share as well as the elasticity of charcoal is relatively high, the results suggested that as the price of firewood increases households mainly shift towards charcoal; and while the mean budget share of other fuels is changed by less than one ETB, that of charcoal

increases by ETB 2.68 for a percentage increase in the price of firewood. The budget share of charcoal is much higher than kerosene. The elasticities also indicate that the effects on the modern fuels, kerosene and electricity, is quite different result; an increase in the price of firewood encourages the consumption of electricity but discourages the use of kerosene.

The pricing policy has an important bearing effect on patterns of energy demand by changing relative energy prices. Particularly electricity and kerosene are the two energy resources with active government interventions in Ethiopia. Subsidized fuels are made cheaper relative to unsubsidized ones encouraging the use of the former. Energy prices are subsidized either to give access to the poor or for other purposes like slowing down the rate of deforestation. Kerosene was also explicitly subsidized but the subsidy become beyond the capacity of the government and recently the price has increased towards international market price. The price of electricity was below long run marginal cost in Ethiopia, however, recently the tariff has increased significantly.

Bereket et al. (2002) showed alternative costs of using electricity are significantly higher than other fuels of mean energy expenditures for urban poor households. Mean energy expenditure of poor and non-poor households is only 14% and 35% of the cost of using electricity compared to other sources. This result is an indication that electricity is by far too expensive for the average urban poor household. LPG is a more expensive fuel as compared to kerosene. Kerosene not seems to be affordable by all urban households including the poor.

3.4   Energy per unit of cost

The choice of kerosene depends, among other things, on its relative cost, their availability and convenience. The availability of evidence indicates that kerosene prices have been rapidly increased as a result of international oil price crisis. In the past, fuel wood prices were almost comparable to those of modern fuels. Ethiopia was experiencing kerosene fuel price rises in excess of general inflation rate.

The demand for fuels depends on their nominal price. However, 1 kg of fuel wood produces a lot less energy compared to the equivalent quantity of kerosene and such condition will entail comparison of prices based on their energy content rather than nominal prices. Low-quality fuels (e.g. firewood) that burn less efficiently when used, and so more is required to perform the same task. The purpose of evaluating the energy content per unit cost is to standardize the true value of household fuels.

In order to standardize the price to common unit we need to convert nominal price to energy content in MJ per unit of cost (MJ per ETB). Conversion factors used to calculate energy content per unit of weight for each source of fuel is given below.

Basic density of wood = 500 kg/m^3
Energy content of fuel wood (air-dried) ≡ 14.5 MJ/kg
Energy content of fuel wood ≡ 7250 MJ/m^3
Energy content of charcoal ≡ 29 MJ/kg
Energy content of kerosene ≡ 36.7 MJ/litre

Table 10 indicates that kerosene is becoming more expensive fuel than charcoal and fuel wood. Despite its inconvenience, fuel wood has highest energy content per unit of cost. The low energy costs that the poorer households spend on charcoal and fuel wood indicate its less cost relative to commercial fuel such as kerosene, which have low energy content per unit of cost. The amount of energy the household received per unit of ETB is declining over time in Ethiopia. In 2006 the household received 8.91 Mega Joule per unit cost of one ETB (see Table 10).

Table 10: Nominal and energy content price of fuels in Addis Ababa

Year	Nominal price (in ETB)			Mega Joule(MJ) per ETB		
	Firewood per m^3	Charcoal per kg	Kerosene per litre	Firewood	Charcoal	Kerosene
2001	79.88	1.00	2.00	90.8	29.0	18.4
2002	92.76	1.06	2.00	78.2	27.4	18.4
2003	102.65	1.45	2.00	70.6	20.0	18.4
2004	112.85	2.15	2.00	64.2	13.5	18.4
2005	130.21	2.10	3.00	55.7	13.8	12.2
2006	-	-	4.12	-	-	8.91

Source: CSA (2001–2005), except for EBF price.
* User changed nominal price to energy content per unit cost using conversion factors.

Quality of fuels increases from firewood, charcoal, kerosene, LPG, to electricity. But, the nominal price of kerosene has been increasing since last year. The local kerosene price has increased by 37% in 2006 due to current oil price crisis in international market. Within 2001–2005 the nominal price of wood and charcoal has increased by 63% and 110%, respectively. Energy content per unit cost of fuels declined as we go from firewood, charcoal, to kerosene. Fuel wood has the highest energy content per unit cost, charcoal the second and kerosene the lowest.

In general, energy content per unit cost has declined over the last five years for all fuels. It has declined for the last five years for fuel wood, charcoal and kerosene by 39, 52 and 52%, respectively. The highest decline observed is for kerosene and charcoal. Kerosene now becomes more expensive than fuel wood as well as charcoal. However, the amount of energy received per unit cost is becoming smaller over time for charcoal and kerosene. The closest gap observed was at 2005. After 2006 Kerosene become the most expensive fuels among wood, charcoal and kerosene. Even if fuel wood has the lowest quality, it is the cheapest energy source among these fuels and that is why poor households preferred to consume it.

4.   Recommendation

The demand projection has quite important information for business decision-making in the future. Generally the central part and Eastern regions occupy the highest market share next to Addis Ababa and should be given the highest priority for kerosene distributions and investment.

The demand for kerosene is growing proportionally with per capita income. Kerosene is highly income elastic commodity. Kerosene is becoming the most expensive commercial fuel. Kerosene is also price elastic, implying price increase will lead to a significant reduction in demand for kerosene.

Ethiopia is heavily dependent on petroleum import. The country imports all of its petroleum fuels requirements. Oil security is a matter of key concern to policymakers because kerosene price is strictly increasing in the international market. The opportunity cost of increasing kerosene imports needs to be carefully examined in light of alternatives energy sources (e.g. renewable energy). Kerosene fuel began in the early 1980s as a long term means to address urban energy demand and to relief pressures on biomass supplies shortage has now become one of the Ethiopian major foreign exchange expenditure. The pattern of future demand for kerosene should be modified by economic measures taken to reduce the severe cost burden on the balance of payment without affecting the advantage of kerosene to arrest the rate of deforestation. In this regard, renewable energy resources should be given the highest priority for investment. One of such investment area is ethanol production from sugar factories.

The opportunity cost of continued high kerosene imports needs to be carefully examined in light of alternatives (e.g. renewable energy). Renewable energy resources should be given the highest priority. The pattern of future demand for kerosene should be modified by practical and economic measures taken to reduce

the severe cost burden of imported oil in the balance of payment and to arrest the rate of deforestation of forests.

The development of commercial fuels is highly capital intensive. And energy enters into all productive sectors of the economy as a universal input. Efficient use of resources and long term sustainability are the two important issues of economic panning. Besides, future growth in the energy sector has to be environmentally sustainable. At the same time, over all energy intensity of the economy should be designed on the account of progressive substitution of primary non-commercial biomass energy by efficient commercial sources. There should be a room for substitution of biomass by other products such as electricity, natural gas and other renewable source of energy.

Ethiopia is reasonably well endowed with energy resources, particularly hydro-electricity and other renewable energy sources. There are extensive rivers and tributaries that could provide a large hydro-electric power. These resources can play a catalytic role in sustaining Ethiopia's energy development. The country, however, faces difficulties with commercial energy supplies, particularly electricity supply.

The government's subsidy on kerosene has gradually eroded through its consecutive increase in price. The government may also consider the use of other fiscal mechanisms in order to increase access to modern energy services especially to the poor and to satisfy future energy use goals. However, this will be done with care to avoid introducing structural distortions into the market. Measures should also be taken to ensure that modern energy sources are readily available in rural areas.

The entry of multiple players into the market should be encouraged. Distribution of kerosene shall be fully open to the private sector. Investment shall be based on economic and financial criteria considering open access to the network, balanced domestic supply and environmental impacts.

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MANAGING GROWTH OF MICROFINANCE INSTITUTIONS (MFIS): BALANCING SUSTAINABILITY AND REACHING LARGE NUMBER OF CLIENTS IN ETHIOPIA[1]

By Wolday Amha[2]

Abstract

The overriding objective of MFIs in Ethiopia is to provide a broad range of microfinance services to large numbers of poor households. This is realized by developing capable and sustainable MFIs. A large number of MFIs have achieved significant progress in terms of both outreach and sustainability. As of June 2005, the twenty six deposit taking MFIs had an active loan portfolio of about 1.5 billion Birr (173 million USD) delivered to 1,211,305 active clients. They mobilized about 501million Birr (58 million US dollars) in savings. The Ethiopian MFIs attained such a significant outreach in a brief period of time. Between 2001 and 2005, the number of clients, volume of loan portfolio and savings increased by 263%, 479%, and 206%, respectively. In 2004, 12 out of the 15 MFIs were operationally sustainable, while 5 were financially sustainable. The majority of the MFIs increased their efficiency and productivity indicators as a result of expansion or increase in outreach. Out of the 15 MFIs, eleven had less than 5% portfolio at risk, which was encouraging. Out of the 13 MFIs which registered significant growth in outreach, 9 showed a remarkable decline in their portfolio at risk. As a result of the increased outreach, many of the MFIs maintained and some improved their portfolio quality.

A careful balancing of increasing outreach and sustainability; with a parallel focus on institutional capacity; reducing costs and risks; and improving efficiency, profitability and portfolio quality, is needed to address the financial demand millions of unbanked people in Ethiopia. The specific interventions to increase the growth and sustainability of MFIs include: (a) Improving the institutional capacity of the MFIs by the implementing an efficient organizational structure, (changes in organization culture, structure and systems, for instance, decentralized lending decisions) with appropriate staff incentive and reward system, improvement of the skill of human resource, good governance, introduction of innovative financial products, and the increase of geographic expansion; (b) creating an enabling legal, regulatory and policy environment; (c) improve access to capital; (d) selective government and donor support; and (e) improving the demand side of the equation.

1.   Introduction

1.1   Background

Poverty in Ethiopia is a manifestation of complex factors such as high population growth, environmental degradation, high unemployment, drought, low level of literacy, limited access to resources, health and education services, etc. Since poverty in Ethiopia is a national crisis caused by multi-dimensional problems involving multiplicity of actors, there is no single guaranteed approach to its eradication. The solutions to poverty are as multifaceted as its causes.

Addressing poverty has been the subject of many development programs in Ethiopia. Delivering financial services to poor households, by increasing employment, income, consumption and empowerment of disadvantaged groups, has been viewed as one of the antipoverty tools of development programs. Improving financial access to the poor also facilitates economic growth by easing liquidity constraints, and providing capital to startup new production related activities or adopt new technologies.

Yet, microfinance is not a panacea for poverty and related development challenges. Microfinance alone cannot improve roads, housing, water supply, education, and health services. However, it can play an important role in making the above interventions be more fruitful. It is a means to empower and build the confidence and self-esteem of the poor and the disadvantaged groups.

In order to provide microfinance services to poor households through sustainable microfinance institutions (MFIs), the government of Ethiopia issued its first microfinance legislation in 1996. The main objective of the microfinance institutions is the delivery of micro-loans, micro-savings, micro-insurance, money transfer, etc to large number of productive but resource-poor people in rural and urban areas, including micro and small entrepreneurs in a cost-effective and sustainable way. At the end of the day, the interventions of MFIs should contribute to positive and measurable impacts on the wellbeing of millions of households in Ethiopia. Thus, increasing the outreach in the delivery of financial services is very critical for Ethiopian MFIs in their effort of reducing poverty, ensuring food security and contributing to economic growth.

Delivering microfinance services to large number of households would not be sustainable unless the microfinance institutions adhere to sustainability, efficiency and productivity objectives. Although the Ethiopian MFIs have increased their outreach, efficiency, sustainability and improved portfolio quality in a short span of time, the relationship between the growth in outreach and performance indicators of

MFIs need to be properly studied. To the knowledge of the author, there are hardly such studies which examined the above relationships. The objective of this study is to fill the gap in research and study the relationship and factors that affect growth of outreach and performance variables in the Ethiopian MFIs.

1.2   Objectives

The objectives of the study are to:
1)   Assess the performance of the MFIs in Ethiopia in terms of the growth of outreach;
2)   Study the relationship between growth of outreach of MFIs and the performance indicators (financial, efficiency, and productivity) indicators
3)   Examine the factors that affect growth of MFIs; and
4)   Identify the interventions required to manage growth of outreach.

1.3   Research questions

This study attempts to respond to the following key questions which MFIs in Ethiopia are confronted with in their effort of increasing outreach, efficiency, productivity, and improve portfolio quality. These include: (i) What are the challenges of rapid expansion of MFIs in Ethiopia? (ii) Is rapid growth an illusion, unsustainable and costly to MFIs? (iii) Do MFIs need expansion? (iv) What are the factors that determine growth of MFIs? (v) What is the relationship between growth, productivity, sustainability, efficiency and portfolio quality? And (vi) How do MFIs manage growth?

1.4   Data

The data set for this study is collected from the Performance Monitoring Unit of the Association of Ethiopian Microfinance Institutions (AEMFI); and secondary information collected from various research reports and surveys.

1.5   Organization of the paper

The paper is organized in six sections. Section two describes the conceptual framework. Section three reviews the development of the microfinance industry in Ethiopia. Section four analyses the relationship between growth of outreach and financial viability, efficiency and portfolio quality indicators. Section five presents factors affecting the growth of outreach of MFIs. Section six concludes by summarizing the main findings of the study, policy implications and recommendations.

2.   Conceptual framework

Finance is one of the key elements in addressing development issues. It is even considered to play a leading role in guiding development interventions. Whatever development strategies or programs (poverty reduction strategy, rural development strategy, industrial development strategy, food security strategy, etc.,), we may propose for Ethiopia, there will always be a need for finance and financial systems to implement them.

The provision of finance contains two basic elements: (i) capital, the funds which are being provided; and (ii) financial system, the process of providing them and the institutions involved in this process (Krahnen and Schmidt, 1994). If the objective is to deliver financial services to rural and urban households, we need to have both the capital, and well-functioning financial systems and institutions. In order to increase outreach, efficiency and sustainability, MFIs[3] require interventions at the level of the whole economy (such as the structural adjustment program), at the level of the financial sector (such as the financial sector reform), and interventions focused on individual financial institutions or, as the case may be, on their customers (Krahnen and Schmidt, 1994).

In the Ethiopian context, at least in the short-run, there are banks with excess liquidity. Currently, even if the minimum saving interest rate declined from 6% to 3% in the last three years, the saving deposits of banks increased significantly. To convert these savings into investment, we need sustainable and capable financial institutions that can mobilize savings and at the same time provide loans to urban and rural households.

2.1   Historical development of finance and development

The objective of this section is to review the development of finance and development, with particular emphasis on the delivery of financial services to the unbanked. The review of the historical development of finance and development will provide useful information on how to increase growth of outreach using sustainable financial systems and institutions. Starting with theoretical concept might be irrelevant for practitioners. However, we must recognize that theory has shaped policies to a much larger extent in this field than in many other fields of development. According to Krahnen and Schmidt (1994), there are four views on the role of finance for development.

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[3] Financial institutions, in the broader sense include all actual providers of financial services and the interactions with their customers.

(i)   Traditional approach (50s-60s)

According to the traditional approach, investment is a necessary prerequisite for growth that requires the availability of capital. The role of finance is explained as part of growth theory and capital. Finance is the determinant of growth. Moreover, underdevelopment is the result of a vicious circle of poverty, i.e., poor people are poor because their income is so low that they cannot save, and thus can not invest. No doubt that investment is important for growth (which could be generated through local or foreign saving mobilization), the issue lies on the mechanism of transforming savings into investment (collecting and allocating savings). However, local income, saving and investment is low, thus foreign savings have to augment local savings and close the "saving gap". The real-asset transfers to the developing countries will bring positive linkage effects. Underlying this approach was the notion that a policy of targeted investment in large-scale industry and infrastructure would in the final analysis lead to a broad-based and socially balanced process of economic development: 'trickle-down" was the phrase that summed up the essence of this policy, which included the provision of loans at low interest rates with long maturities as a core element. This has been a complete failure. Contrary to the expectations of the time, the injection of external capital had exacerbated the existing social and economic inequalities and led to widespread poverty instead of socially balanced growth (Schmidt and Zeitinger, 1996).

(ii)   Target-group-oriented approach (era of specialized development banks) (60s-80s)

In the 70s, the growth theory (trickle down approach), particularly the impact of the infusion of capital into big development projects on increasing income of poor households were questioned. There was a change towards worldwide social policy aiming at income generation, poverty alleviation, employment creation and similar objectives. The new approach focused on specific target groups such as commercial farmers, smallholder farmers, small entrepreneurs, etc. The basic understanding of finance remained the same as before, only the recipients changed (farmers and small businesses instead of big business and public institutions). Finance was viewed as just providing credit and the financial system did not matter for development. However, this approach provided better attention to finance in the sense of financial systems development. Development planners were looking for methods of distributing credit to poor farmers, small businesses, etc. This led to the development of institutions such as specialized development banks in Africa, Asia and Latin America. However, development banks proved to be costly (needed huge subsidy), unprofitable, inefficient and failed to reach the target groups. There were also attempts to identify new institutions such as

NGOs and cooperatives which started using new methods as group financing, but the experiments were only a drop in the bucket.

(iii) Financial systems development (70s-80s)

The approach advocates that the financial systems of developing countries is misused and repressed (policy of financial repression) which need to be liberalized and strengthened. It focused on financial intermediation which is the essence of a financial system. The three main propositions of the advocates of this approach included:

(a) The quantity and quality of financial intermediation that is available in a given society is a very important determinant of development,

(b) The quantity and quality of financial intermediation is determined nearly exclusively by the economic policies pursued by respective governments and

(c) The best policy is a policy of drastic deregulation of financial system.

(iv) Finance, institutions and incentives (80s-90s)

This approach holds that economic development depends more on the availability of efficient institutions than on anything else, and the most important institutional prerequisite is the existence of sustainable and capable financial sector. Although the third approach rightly stressed on the importance of the financial markets, a financial system which is not repressed would not, by itself, function optimally. This particular approach focused on information and incentive problems in the development of financial sector (Stigiltz 1989).

2.2 Paradigm shift in the delivery of financial services to the poor

In the last 20 years, there is a growing worldwide understanding on how microfinance institutions could deliver financial services to large number of households in a sustainable way. As indicated earlier, there had been an emphasis on rural credit schemes through government projects, development banks, cooperatives and NGOs, aimed at promoting agricultural production and increasing incomes among smallholder farmers. Such schemes were characterized by over emphasis on outreach and heavily subsidized lending interest rates. Saving products for the poor and sustainability of the institutions were entirely ignored. The results of these interventions were very poor repayment rates and frequently low impact. Ironically the

subsidy element was often highly attractive to the non-poor and more powerful and sometimes the original target groups were excluded.

The 'microfinance revolution' which emerged in the 1990s resulted in a significant paradigm shift focusing on the provision of financial services (loans, savings, insurance, money transfer, etc) on a sustainable basis. Contrary to the earlier assumption, there has been a growing awareness that the poor do not need subsidized credit. Rather what is required is sustained access to financial services. The origin of this change in paradigm can be traced to both the disillusionment with the subsidized rural credit model and a better understanding of the informal sector activities through which many of the rural and urban poor across developing countries derive their incomes. With low transaction costs, the marginal rates of return on capital in the informal finance are found to be extremely high. This implied that the major problem of poor households has been mainly availability of flexible financial services on a sustainable manner.

Under the new paradigm, microfinance is based on creating sustainable institutions using innovative methodologies and systems which can deliver financial services efficiently, including the recovery of loans at low cost. It is through the creation of such institutions that the financial frontier can be pushed forward – reaching very large number of the poor beyond the frontier of the formal financial system. Notable success in creating sustainable microfinance institutions around the world has convincingly demonstrated the viability of expanding the frontier.

Microfinance institutions consist of agents and organizations that engage in relatively small financial transactions using specialized, character-based methodologies to serve low-income households, micro enterprises, small farmers, and others who lack access to the banking system. Microfinance services may be delivered through informal, semi-formal (that is, legally registered but not under central bank regulation), or formal financial intermediaries. However, there is a need to incorporate microfinance activities into countries' financial development strategies and financial system to expand the scope and raise the efficiency of financial intermediation, either directly intermediating by mobilizing deposits or on-lending or raising finance on a wholesale basis through financial markets. The intention is to ensure that access to financial services by rural households, micro entrepreneurs, women and disadvantaged groups improves sustainability over time.

3. Review of the development of microfinance services in Ethiopia

The potential demand for micro-credit in Ethiopia is enormous. For example, if we assume that there are 15 million households in Ethiopia, targeting one person per household who require micro-credit and also assuming half of the households are able poor, then over 7.5 million active clients will require micro-credit. However, there is very limited supply of financial services to the poor households. The major sources of loans or financial services in Ethiopia are as follows:

i) Commercial banks;
ii) Microfinance institutions (MFIs);
iii) Cooperatives (savings and credit cooperatives and multipurpose cooperatives);
iv) NGOs which are involved in the delivery of financial services;
v) Government projects and programs involved in providing loans;
vi) Semi-formal finance (Iqqub, Iddir, Mahiber, etc.); and
vii) Informal finance (money lenders, traders, suppliers credit, friends, relatives, etc)

The capacity of the conventional banking sector in Ethiopia has been too weak to serve the needs of the poor. The Commercial Bank of Ethiopia (CBE), Development Bank of Ethiopia (DBE) and Construction and Business Bank have only 174, 32 and 26 branches in the whole country, respectively. As of June 2005, the private banks together, had 162 branches. The newly established Cooperative Bank of Oromia had 5 branches. Most of the branches of the commercial banks are concentrated in urban areas. Many of the Woredas in Ethiopia do not have such services. For example, only 25% of the Woredas (districts) in the Amhara Region have branch banks. Even if there are banks in these Woredas, due to high collateral requirements (land or physical assets), the poor have limited access to conventional banks.

Currently, with the exception of the indirect interventions in fertilizer and improved seed credit, conventional banks in Ethiopia consider the poor as credit risks and unbankable. According to the discussions with the commercial banks in Ethiopia, a loan size below 100,000 Birr is not attractive and profitable. Thus, MFIs and savings and credit cooperatives should be designed to respond to the failure of the commercial and development banks to serve the financial needs of small farmers and MSE operators. The delivering financial services to the poor requires financial systems that reach the poor and an innovative targeting methodology and a credit delivery mechanism that helps identify and attract only the poor who can initiate and sustain productive use of loans.

The poor in Ethiopia have low income that leads to low investment, which in turn leads to low productivity and income. Access to institutional credit that contributes to an increase in investment is very limited in the country. The majority of the poor get access to financial services through informal channels such as moneylenders, Iqqub, Iddir, friends, relatives, traders, etc. (Bezabih, et al 2005). The share of informal finance in terms of borrowers and loan size is estimated to reach 69 percent and 61 percent. respectively. Among the borrowers from the informal sources, 35 percent borrowed from friends and relatives, 48 percent from private lenders, 15 percent form Iddir and two percent from Iqqub. Only 3 percent of them borrowed from both relatives and other informal sources. Moreover, 10 percent of the borrowers borrowed from multiple informal financial sources. The informal lenders are able to enforce loan contracts, have high loan recovery rates and flexible loan terms. However, the interest rates are very high and the government, through the support of cooperatives and MFIs, is making efforts to curb their roles.

The semi-formal lending institutions such as Iqqub (Rotating Savings and Credit Associations), Iddir, Mahber, etc are the dominant and sustainable traditional institutions that meet the financial and social needs of the poor. Iqqub which is popular both in urban and rural areas is the dominant form of savings and credit associations in Ethiopia. It is not a permanent club; it could be continued or dissolved after its members have each a turn. A member can attend Iqqub meeting weekly, or bi-weekly, or monthly to collect fixed sum of payments.

The other major financial services' outlet is the savings and credit cooperatives and multi-purpose cooperatives. According to the information of the Federal Cooperative Commission, by the end of June 2004, there were 2,146 savings and credit cooperatives (1,854 urban and 292 rural) with 155,120 members, 8,233,002 Birr of equity/share capital and mobilized 496,101,082 Birr of savings. They have a total asset of 530,587,219 Birr and an outstanding loan of 7,352,782 Birr. Although there was a continuous increase in the number of savings and credit cooperatives and members, rural areas are relatively excluded. About 86% of the savings and credit cooperative members were employees with fixed monthly salary and urban-based. Moreover, about 29% of the registered savings and credit cooperative members in the country were situated in Addis Ababa.

NGO and donor funded projects in Ethiopia have been delivering relief and development services such as emergency food, health, education, water, etc since the 1970s. In terms of the delivery of financial services to the poor, NGOs were directly funding micro-credit activities as part and parcel of their poverty alleviation programs. As the delivery of microfinance activities grew, the question of operational and financial sustainability has been raised. Initially the NGOs in the country had

positive impact in developing flexible methodologies that fit the needs of beneficiaries and tested various innovative ideas in their development programs. However, the NGO initiated micro-credit programs, before the issuance of the microfinance legislation, faced several problems of mixing social and financial objectives.

The ACDI/CEE study (1995) revealed that financial schemes of NGOs and institutions that do not follow sound and sustainable financial principles might cause more harm than good because they do not encourage financially responsible behavior. The micro-credit initiatives before the issuance of the microfinance legislation (pre 1996) had the following features:

a)   The entire orientations of the micro-credit initiatives or activities in Ethiopia (pre 1996) were geared towards a project concept. The NGOs involved in micro-credit programs and government projects were not interested in establishing sustainable financial institutions that deliver diversified financial services to the poor.

b)   Subsidized NGOs' micro-credit programs in Ethiopia (pre 1996), with subsidized lending interest rates, and created a problem in building sustainable financial institutions. The real interest rates (the actual interest rates deflated by the annual rate of inflation) in these programs were negative. As a result, the loans were gifts instead of loans that should be strictly repaid regularly. The micro-credit programs were not able to cover their operational costs and required permanent and heavy subsidy.

c)   The very high default rates faced commercial banks, NGOs and government projects were mainly the result of borrowers seeing the lending organizations as donor or government funded projects that provided financial services for a fixed period of time for humanitarian reasons.

d)   The lending institutions and employees were not seriously committed and did not enforce financial discipline, provided donor funds kept on flowing.

e)   The micro-credit programs focused entirely on the provision of loans to beneficiaries. Saving products were forgotten in the delivery of financial services to the poor. Policy makers, development experts, researchers from academics, including practitioners, believed that poor people are too poor to save and are unbankable. Savings were not considered as sources of loanable capital. Donors were considered as the only source of loan fund, which encouraged dependency. The low lending interest rates were also discouraging the saving products of the institutions. As a result, the micro-credit programs in Ethiopia were unsustainable and failed to promote saving culture.

The Agricultural and Industrial Development Bank (AIDB), NGOs and cooperatives which delivered financial services to the urban and rural poor before the issuance of regulatory microfinance legislation in 1996 were not real financial intermediaries, but

rather tools of distributing donor or government funds to a target population in order to increase agricultural production and productivity. The study of ACDI/CEE (1995) recommended that the government should develop national standards for NGO credit schemes or programs. Another study by Pischke et al. (1996) also recommended that NGOs offering credit and other financial services should be subject to national standards, and that the adoption of appropriate standards could improve their performance.

Given the above problems of AIDB, NGOs and the collapse of the service cooperatives in Ethiopia, it was time for the policy makers and individuals involved in development activities to rethink and redesign new strategies for the delivery of financial services to poor households through sustainable financial institutions. This required a redefinition and reorientation of the mission, vision and objectives of the lending institutions that usually provided only micro-credit services. The most important change in direction was building a sustainable financial service delivery system followed by mobilizing savings; charging market interest rates on loans sufficient to cover operational costs; applying strict financial discipline through strict loan recovery procedures; developing proper lending methodologies; reducing transaction costs and increasing outreach. The experiences of some sustainable microfinance institutions in Asia, Latin America, and Africa were also useful in directing the changes in the delivery of financial services to the poor in Ethiopia.

The need to promote more sustainable microfinance institutions in Ethiopia necessitated a regulatory framework. This need brought the activities of the MFIs under Ethiopia's monetary and financial policy framework. Proclamation No. 40/1996 indicates the requirements of licensing microfinance institutions by empowering the NBE to take charge of this and supervising them (see Wolday Amha, 2005 for the details).

There are currently 26 microfinance institutions registered under the NBE. Although illegal as per the law of the country, some NGOs, donors and government departments, still deliver financial services to the poor through various projects and programs which distort the markets. A good example is the micro-credit program which promotes micro-enterprises through the regional trade and industry bureaus.

Delivering financial services to the rural and urban households through sustainable financial institutions in Ethiopia has been based on the best practices around the world. Some of the key elements or factors which are required in establishing sustainable and efficient microfinance institutions include increasing outreach, operational and financial sustainability, development of demand driven financial products, institutional capacity and the capacity to mobilize resources. These are discussed in the following sections.

4.   The relationship between growth of outreach and financial and productivity indicators of the Ethiopian microfinance institutions

Outreach measures the extent to which an MFI has succeeded in reaching its target clients and met the demand of clients for financial services (Yaron, 1992). The scale of outreach is the number of clients reached by MFIs, while the depth of outreach gives the type of clients and the level of poverty of the clients reached. Growth of outreach of the MFIs involves: (i) a permanent increase in the size, scale, and complexity in activities and the various results being achieved by MFIs overtime. This includes increases in number of clients, outstanding loan portfolio and turnover, size of savings, etc. (ii) the changes in character of the finance providers. This would mean the transformation of the institution (graduation of a financial provider to become a regulated financial organization), improving and upgrading the capacity of an institution and obtaining improved levels of sustainability.

Growth of outreach is desirable as it would reduce poverty and attain its operational and financial sustainability MFIs. Although growth of outreach has risks (unless planned and managed very well), it has also positive implications for financial institutions. In general growth in outreach

- enables the MFIs to reach large number of clients and it is the key to make sound impact on reducing poverty,
- reduces average operating cost of MFIs by reducing/eliminating losses, and not by increasing lending interest rates;
- improves operational and financial sustainability.
- helps MFIs to satisfy their client's need through various services.
- gives better image of MFIs to attract loanable fund from banks for their expansion; and
- increases the borrower's willingness to repay.

Growth in outreach is one of the prime objectives of Ethiopian MFIs. However, unless it is well organized and planned, rapid growth may have negative implications such as

- increase in loan arrears due to rapid growth in new borrowers, who are more risky than well-established borrowers and difficulties in credit monitoring;
- mismatch between organizational and skill capacity and rapid expansion;
- decline in portfolio quality
- incompatibility between the objective of reaching the poorest and increasing the number of clients.

Moreover, the scattered settlement of the rural households and the problem of accessing them for communication have negative effect on growth.

4.1   Growth of outreach of Ethiopian MFIs

Outreach is measured in terms of the number of active clients (with outstanding loan), loan size, number of saving clients, volume of savings, percentage of loans to clientele below poverty line, percentage of female clients, range of financial and non-financial services offered to the poor, the level of transaction costs levied on the poor and the extent of client satisfaction with respect to financial services. In the last ten years, the MFIs in Ethiopia have shown a remarkable progress in terms of outreach and performance. However, the twenty six MFIs meet only less than 20 percent of the demand for financial services of the active poor. This indicates that there is significant unmet potential demand for microfinance services in Ethiopia.
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Currently, some of the MFIs are at the startup stage where their clients are less than five thousand and require sound support to build their capacity so that they can increase their client base. There are also emerging MFIs with clients between 5,000 and 20,000, where their emphasis is on consolidating their activities to improve the quality of portfolio, performance and increase outreach. There are also MFIs that deliver financial services to 20,000 to 50,000 clients. These are MFIs that are growing and with the right support, they could become mature and sustainable MFIs. Mature sustainable MFIs, in the Ethiopian context, would typically have more than 50,000 clients. Four of the largest MFIs in Ethiopia are in this category (see the details in Annex 16).

As of June 2005, the twenty six MFIs registered under the National Bank of Ethiopia had an active loan portfolio of about 1.5 billion Birr (173 million USD) delivered to 1,211,305 active clients (Figure 1). This does not include the loans delivered to purchase fertilizer and improved seeds by the two largest MFIs. They also mobilized about 501million Birr (58 million US dollars) of savings (Annex 16). The clientele served by the MFIs in Ethiopia are mainly the rural poor. About 38 percent of the clients of the MFIs are female. The average loan size is about 1000 Birr (116 USD), which reveals that MFIs in Ethiopia focus on the active poor. The MFIs have attained significant growth in outreach in a brief period of time. Between 2001 and 2005, the number clients, volume of loan portfolio and savings increased by 263%, 479%, and 206%, respectively (Figure 1 and 2)

**Figure 1: Number of clients in the 21 MFIs in Ethiopia, 2001-2005**
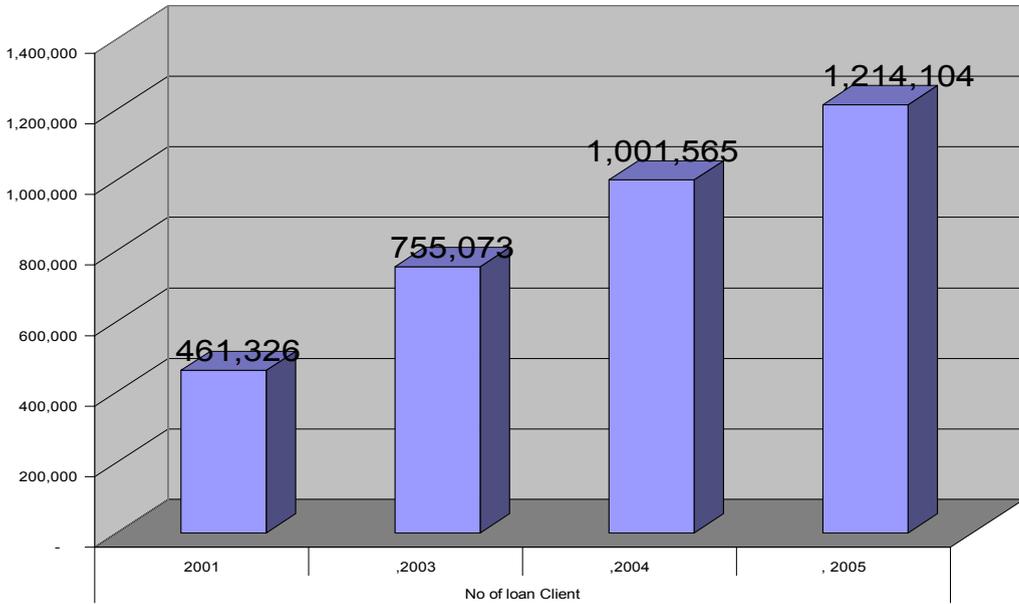
Figure 2: Value of loan portfolio and savings of the 21 MFIs in Ethiopia, 2001-2005.
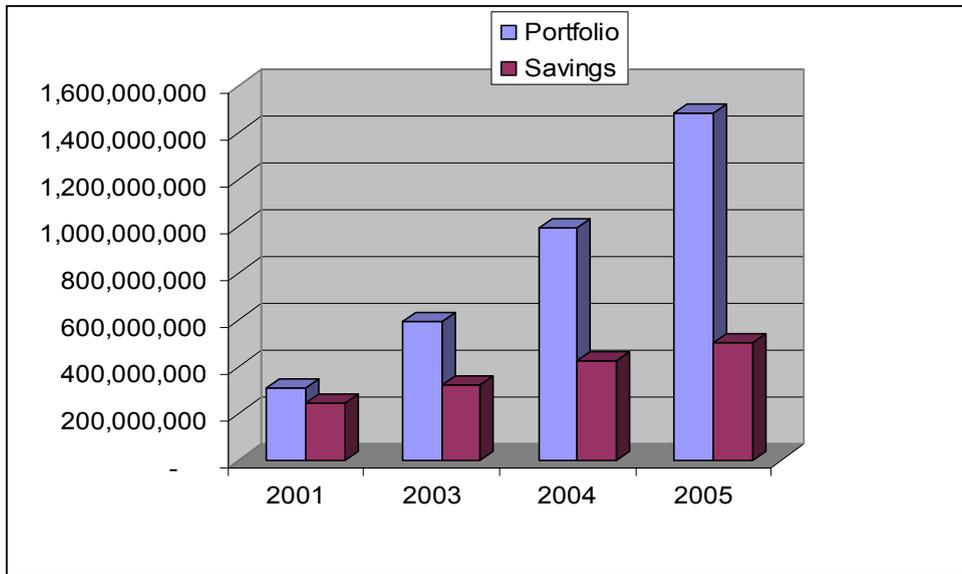
The lending interest rate of MFIs in Ethiopia varies between 9 percent per year-declining rate-to 24 percent-flat rate. The lending interest rates of MFIs in Ethiopia are relatively lower than in other Sub-Saharan countries. In fact, the lending interest rates of some of the MFIs are so low to cover their operation costs. This affects their sustainability negatively. The financial reports of some branches and sub-branches of MFIs reveal that they are operationally sustainable. These sustainable branches and sub-branches even question why they should subsidize unprofitable branches and sub-branches of an MFI, which is normal in the Ethiopian MFIs. It is clear that MFIs that focus on poverty reduction and targeting the rural poor do have high operational costs that reduce their profit margin. This issue has emerged as one of the challenges of the MFIs in Ethiopia. It must be noted that the financial sustainability objective of MFIs complements the social objectives.

Ethiopia has a clear regulatory framework where the MFIs are allowed to mobilize savings starting from day one of their registration or after receiving their license from the National Bank of Ethiopia. The experience of Ethiopian MFIs in mobilizing savings is encouraging. As of June 2005, gross savings as percentage of the loan outstanding was about 33 percent. Another indicator of good performance of MFIs is the high repayment rates which varied from 85 to 100 percent. The average repayment rate of MFIs is 96 percent. There is a reasonable client/loan portfolio to field staff ratio, however this varies from one MFI to another (see annex 1-15).

4.2 Growth in outreach of MFIs vis-a-vis financial sustainability, productivity and portfolio quality indicators

Although increasing the growth of outreach to reach large number of clients and make sound impact on poverty reduction is the overriding objective of MFIs in Ethiopia, it does not make sense if these institutions are unstable, unsustainable, unprofessional and inefficient. If an MFI is not sustainable due to its entire emphasis on social objectives, it will break down and foster unhealthy messages to the entire microfinance industry and distort the financial market. Poor people will learn that it is foolish to repay a loan, and they will be hesitant to deposit their savings in such institutions (Krahnen and Schmidt, 1994). Thus, an MFI must be structured and run in such a way that it can survive on its own. This implies that the growth in outreach of MFIs should be examined against profitability, efficiency, productivity, and portfolio quality.

Sustainability, which shows the ability of the MFIs to cover their total expenses from their own financial service operations, has not been a major objective of MFIs in

Ethiopia at the initial stage. However, currently, a large number of MFIs in Ethiopia have achieved significant progress in terms of sustainability. In 2004, 12 out of 15 MFIs were operationally sustainable (Annex 1-15), while 5 out of the 15 were financially sustainable. It is safe to conclude that MFIs in Ethiopia are in transition from subsidized poverty reduction lending to commercially oriented lending. On top of the financial and operational sustainability, we need to consider institutional sustainability which includes efficiency of service delivery, capacity to manage qualified, motivated and innovative staff, good governance, in-built efficient systems, etc.

Table 1: Growth of outreach and sustainability, 2003 - 2004

MFIs	% Change in outreach			% Sustainability	
	Number of active borrowers	Gross loan portfolio	Savings balance	Operational self-sufficiency	Financial self-sufficiency
Meklit	10%	38%	41%	24%	-9%
AVFS	69%	32%	63%	-19%	-3%
Wasasa	140%	136%	155%	4%	9%
Buusa	-7%	0%	63%	-4%	-7%
Eshet	48%	91%	85%	49%	48%
Peace	43%	48%	62%	89%	78%
Gasha	26%	109%	52%	19%	11%
SFPI	19%	34%	10%	-2%	-2%
Sidama	-12%	10%	18%	45%	38%
AdCSI	123%	369%	108%	21%	-10%
Wisdom	63%	60%	39%	30%	12%
OMO	7%	28%	24%	20%	27%
OCSSCO	40%	38%	46%	60%	47%
ACSI	21%	49%	34%	30%	14%
DECSI	49%	103%	17%	19%	31%

Source: AEMFI, 2005

Table 1 shows that MFIs in Ethiopia have been registering significant growth in outreach, in terms of number of active borrowers (ranging from -7% in Bussa MFI to 140% in Wasasa MFI), gross loan portfolio (from 0% in Bussa MFI to 369% in ADCSI) and mobilization of savings (17% in DECSI to 155% in Wasasa MFI). Most of the young MFIs grew quickly which is partly the result of the drive to get their operations to optimal size quickly, so that they can reap the benefits of economies of scale. The growth in outreach was accompanied by a significant increase in operational self-sufficiency (12 out of the 15 MFIs) and financial self-sufficiency (10

out of 15 MFIs). Thus, there was a substantial growth in outreach and improvement of operational and financial sustainability within one year (2003-2004).

Table 2: Growth of outreach and efficiency 2003 - 2004

MFIs	% Change in outreach			% Change in efficiency	
	Number of active borrowers	Gross loan portfolio	Savings balance	Operating expense/ loan portfolio	Personnel expense/ loan portfolio
Meklit	10%	38%	41%	7.70%	-2.30%
AVFS	69%	32%	63%	-11%	-12%
Wasasa	140%	136%	155%	6%	10%
Buusa	-7%	0%	63%	-5%	1%
Eshet	48%	91%	85%	-41%	-39%
Peace	43%	48%	62%	-15%	-12%
Gasha	26%	109%	52%	-41%	-43%
SFPI	19%	34%	10%	-15%	-9%
Sidama	-12%	10%	18%	-16%	-15%
AdCSI	123%	369%	108%	-44%	-41%
Wisdom	63%	60%	39%	-4%	12%
OMO	7%	28%	24%	17%	17%
OCSSCO	40%	38%	46%	-16%	-13%
ACSI	21%	49%	34%	-18%	-20%
DECSI	49%	103%	17%	-37%	-38%

Source: AEMFI, 2005

Efficiency measures the cost incurred by MFIs to carry out their financial services. The ratio of operating expense to loan portfolio indicates how much an MFI costs to keep 1 Birr of the portfolio out in the hands of clients (a declining ratio is an improvement in efficiency). Since salary and salary related expenses represent a significant percentage of the operating costs of MFIs, a decrease in personnel expense to loan portfolio will have a positive impact on financial sustainability. As MFIs mature and adopt best practices in operational and financial management techniques, efficiency will increase. However, in the initial stages of a strong growth phase, efficiency can be expected to worsen as an MFI incurs new expenses, such as building offices, training cost and additional salary expenses.

Ethiopian MFIs reach more clients at lower cost as is reflected by the ratio of operating expense to loan portfolio which varied from 41.8% in Bussa Gonoffa MFI to 3.8% in Dedebit Credit and Saving Institution (2004). This could be partly explained by the group lending methodology applied almost in all MFIs. In the same year, the personnel expense to loan portfolio varied from 21.9% in Bussa Gonoffa MFI to 2.3% in Dedebit it and Saving Institution (Annex 1-15). The results in Annex 1-15 indicate

that the larger an MFI is in terms of outreach, the lower will be its efficiency ratio. Table 2 reveals that, with the exception of three MFIs, there were consistent declines in operating expense to loan portfolio ratio as a result of significant increase in outreach. Similar trend was observed in the personnel expense to loan portfolio ratio, that is, with the exception of four MFIs, the ratio declined as a result of increased outreach.

Table 3: Growth of outreach and productivity 2003 - 2004

	% Change in outreach			% Change in productivity	
	Number of active borrowers	**Gross loan portfolio**	**Savings balance**	**Borrowers per staff member**	**Borrowers per loan officer**
Meklit	10%	38%	41%	-10%	-17%
AVFS	69%	32%	63%	35%	27%
Wasasa	140%	136%	155%	24%	29%
Buusa	-7%	0%	63%	-17%	-11%
Eshet	48%	91%	85%	25%	23%
Peace	43%	48%	62%	8%	-14%
Gasha	26%	109%	52%	21%	26%
SFPI	19%	34%	10%	-2%	-2%
Sidama	-12%	10%	18%	-9%	-8%
AdCSI	123%	369%	108%	49%	41%
Wisdom	63%	60%	39%	10%	-18%
OMO	7%	28%	24%	1%	1%
OCSSCO	40%	38%	46%	39%	372%
ACSI	21%	49%	34%	8%	14%
DECSI	49%	103%	17%	15%	36%

Source: AEMFI, 2005

As an MFI builds up its staff and its lending experience, the productivity of its lending operations is likely to grow rapidly. Each loan officer can administer a progressively larger loan portfolio with more clients and larger loans, and overhead costs can be spread over a larger portfolio for an MFI. In 2004, the ratio of borrower per loan officer varied from 214 in Gasha MFI to 518 in PEACE MFI. In the same year, the ratio of borrower per staff member varied from 89 in Sidama MFI to 388 in DECSI (Annex 1-15).

Table 3 indicates that out of the 13 MFIs which showed significant increase in the number of clients, 9 of them registered significant increase in the ratio of borrower per loan officer. The majority of the MFIs increased their productivity indicators (borrower per staff and borrower per loan officer) as a result of expansion or increase in outreach.

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The critical question in the performance of MFIs is whether they will be able to significantly expand outreach and maintain the quality of portfolio. The portfolio at risk measures the percentage of the adjusted outstanding gross loan portfolio that is at risk (a decreasing ratio is an improvement in quality). This ratio is the most accepted indicator of portfolio quality. It shows the portion of the portfolio that is contaminated by arrears and therefore at risk of not being repaid. Best practice uses the 30 days cut-off. In 2004, the portfolio at risk of the 15 MFIs varied from 0.1% in PEACE and Wasasa MFIs to 26.2% in Sidama MFI (Annex 1-15). Out of the 15 MFIs, eleven had less than 5% portfolio at risk, which was encouraging. However, the four MFIs with large portfolio at risk should take immediate actions to reduce the portfolio at risk to an acceptable percentage.

Table 4 reveals that out of the 13 MFIs which registered significant growth in outreach, 9 showed remarkable decline in their portfolio at risk. The results reveal that, even though many MFIs increased outreach, they still maintained or even improved their portfolio quality. However, given the same amount of arrears, if an MFI increases its loan disbursement significantly and writes-off its non-performing loans, there could be an improvement in the portfolio at risk which might not show the real picture of improvement in the quality of its portfolio. Thus, the results regarding portfolio quality in Table 4 should be interpreted with care.

Table 4: Growth of outreach and portfolio quality 2003 - 2004

MFIs	% Change in outreach			% Change in portfolio quality	
	Number of active borrowers	Gross loan portfolio	Savings balance	Portfolio at risk> 30 days	Write-off ratio
Meklit	10%	38%	41%	82%	18%
AVFS	69%	32%	63%	-80%	-77%
Wasasa	140%	136%	155%	-98%	275%
Buusa	-7%	0%	63%	-32%	-62%
Eshet	48%	91%	85%	80%	
Peace	43%	48%	62%	-50%	
Gasha	26%	109%	52%	-75%	-25%
SFPI	19%	34%	10%	66%	160%
Sidama	-12%	10%	18%	-10%	
AdCSI	123%	369%	108%	164%	-44%
Wisdom	63%	60%	39%	-34%	-18%
OMO	7%	28%	24%	-51%	-1%
OCSSCO	40%	38%	46%	-36%	
ACSI	21%	49%	34%	-70%	-31%
DECSI	49%	103%	17%	-62%	-42%

Source: AEMFI, 2005

5. Factors affecting the growth or outreach of MFIs

There are a number of factors that affect the growth of MFIs in Ethiopia. These include institutional capacity, availability of loanable funds, policy and regulatory environment, macro, meso and micro level economic performance, demand side problems related with the sustainability of clients of MFIs and donor support. The following section attempts to review the factors affecting growth by relating them to the Ethiopian context.

5.1 Institutional capacity of MFIs

Institution building, being the key factor for growth of MFIs, is a process which ranges from a minimum of interference or modification to far-reaching measures to restructure, transform and build entirely new institutions. There are three basic elements that should be considered in building sustainable MFIs: Firstly, MFIs must be permanently oriented towards the delivery of financial services to the majority of the unbanked households. Secondly, MFIs must be viable over the medium-to-long term period. This includes the ability to cover their costs. If they are to achieve cost-coverage, they must charge prices for the services they provide which the clients can afford to pay and which are also sufficient to cover the full costs of running the institutions. Thirdly, MFIs should be able to keep their costs – which they will pass on to their clients via the prices they charge them - as low as possible (Schmidt and Zeitinger, 1996).

One of the main objectives of institution building is to upgrade MFIs so that they increase their capacity and reach large number of clients on a sustainable basis. This has two components, namely growth and qualitative transformation. It is important that MFIs grow rapidly in order to expand the scope of their operations and acquire expertise in lending, thus allowing them to reduce their costs to the extent that they become acceptable to pass them on, in full, to borrowers. Transformation partly refers to changes in the legal status of MFIs (say from an MFI to rural bank or from NGO to licensed depositing MFI), or changes in the relationship between an MFI and the mother NGOs, or changes in the internal structure, as well as the kinds of financial services, which they offer to clients. The major factors that need to be addressed in building the institutional capacity of MFIs include the following:

(a) Good governance

Good governance plays an important role in increasing outreach, improving transparency, accountability, sustainability, profitability, efficiency, effectiveness,

responsibility and responsiveness of MFIs to changing environments. Effective governance depends on both forms- the structures and processes of control, and content-and the specific individuals involved, particularly in the leadership. For example, board members are expected to have skills as leaders, visionary thinkers, and managers. They should have independent mind, genuine commitment, technical expertise and experience relevant to manage MFIs (financial, legal, marketing, etc), and willingness to set time to participate in the activities of an MFI. Moreover, although the formal institutional (legal) context determines the broad framework for the governance structure – for example, the roles and responsibilities of directors of MFIs – it rarely appears to play the major role of good governance.

In principle, private ownership in combination with an unrestricted profit orientation appears to be the basis for securing an efficient provision of financial services as long as banking supervision functions properly and competition ensures that no single institution is in a position to charge monopolistic prices. In a company for-profit, shareholders own the assets and a board of directors has a fiduciary responsibility to those shareholders for the effective use and protection of those assets. The board's competency in exercising that fiduciary role can be measured relatively easily in terms of the financial performance of the institution. Where performance is unsatisfactory, owners will be expected to take action, with the ultimate sanction of dismissing the board. There are two key points here: First, in a company for-profit, there is generally a performance framework which is readily understood by senior management, the board and others. Second, the owners of the assets are empowered to take action where performance is unsatisfactory. However, in many of the MFIs in Ethiopia which are not-for-profit organizations, ownership is often unclear. Although public money is invested in most of the MFIs, there are not clearly definable owners of the assets who can take action where performance is poor. Moreover, the performance criteria of these MFIs are often both poorly defined and difficult to measure. This is especially the case where different stakeholders who may be represented on a board have diverging objectives.

Some argue against private ownership of MFIs in Ethiopia stating that although granting credit to poor borrowers may turn out to be a profitable business in a liberalized financial system over the medium term, financial entrepreneurs are likely to find out market niches to be more profitable than small and micro enterprise lending. This might lead them to turn to other groups of customers and thus give up the delivery of financial services to the poor households and marginalized areas.

The issue of governance and ownership in the Ethiopian MFIs is a serious issue which needs to be addressed immediately. With the exception of one MFI, the shareholders are not real shareholders who share the benefits of the operation of an

MFI. The issue of accountability and fiduciary responsibility is questionable. MFIs in Ethiopia are not interested in selling shares and attracting other shareholders. Since board members are predominately NGO staff or government employees, there is a tendency to promote and share the vision and mission of the mother-NGO and government development interventions. The law prohibits foreign organizations and non-Ethiopians in participating as shareholders in the sector. According to the study by Itana et al., (2003), there are no regular board meetings and self-evaluation of boards in many of the MFIs. Moreover, board members have limited knowledge and capacity to support management and monitor the performance of MFIs.

(b)   Human resource

Microfinance institutions are highly labor intensive. Labor costs, very often, account for more than half of their total cost of administration. A crucial element of an MFI's capacity therefore depends directly on the effectiveness of its staff. The direct productivity in terms of the size of portfolio and number of clients which can be handled effectively by a front-line loan officer is enormously important for its sustainability. Although productivity depends on many factors, the performance of the individual officer is a major determinant. The ability to train, motivate and effectively manage its lending officers is at the core of its capacity. The capacity building process should involve training and re-training of all staff including the board of directors. Thus, appropriate career development programs, with on-going training and support, are essential ingredients of the business plan of a successful MFI.

A comprehensive training need assessment for sub-branches, branches, head office, clients and board members of the MFIs was conducted in 2003 with the support of the Rural Financial Intermediation Program (RUFIP). The findings revealed that there is huge gap in terms of staff training needs in the industry to ensure growth and sustainability. The training needs identified in the study are aimed at addressing the challenges of lending methodologies, understanding the community, product development, financing agriculture, saving mobilization, internal control and audit, MIS, financial management, gender sensitization and governance. Detailed training modules and training programs were prepared for various categories of staff (RUFIP and AEMFI, 2003).

Moreover, a system of incentives (performance-based remuneration such as profit sharing, collection fees, etc and efficiency wages as compatible) should be introduced to meet the objectives of financial sustainability and increasing outreach. This includes fixed salary plus a bonus or incentive payments that is a function of some observable variable or performance indicators, such as profits or loan installments recovered. However, in the Ethiopian context, although MFIs complain

about the high turnover of senior staff, there has not been a concerted effort to address the issue of staff incentives.

(c)   Systems

Effective systems underpin both the efficient implementation of innovative methodologies and the management of an MFI. Significant reduction in transaction costs can be achieved through the use of innovative lending methodologies, ensuring good client service, maintaining the integrity of the operations to ensure accuracy and prevent fraud (through an appropriate internal and external control system) and generating the information necessary to mange the portfolio. The availability of accurate, relevant and timely information is essential for both front-line staff and the varying levels of management to be able to take effective actions.

Information technology (IT) has a potential role in increasing outreach and improving sustainability of an MFI. Efficiency achieved through the use of information technology has an immediate bearing on transaction costs and potentially rendering new markets or product. Beyond its use in portfolio tracking (the ability to detect and follow-up rapidly on loan defaults) and accounting, IT can also be used to support products directly. Nevertheless, it does not appear that the full computerization of an MFI operation is a prerequisite for the sustainability in all contexts. There are cases in Bangladesh, India, Ethiopia and others, where much of the loan tracking is carried out manually without apparently undermining sustainability. However, it is clear that IT provides better management information which can significantly improve managerial decision making at various levels. Although there are efforts by some MFIs in Ethiopia to apply software such as TMS, Loan Performer, and Emerge to track financial and operational information, there is a need in the industry to address the issue holistically.

In the context of Ethiopian MFIs, technology has served to mange information (MIS), that is, primarily on the back end. This has helped MFIs to standardize their operations, produce timely and transparent financial reports on their operations and otherwise needed. However, there are huge opportunities where Ethiopian MFIs can use new technologies in the front end. Among the technologies that available to be used in the front end include: magnetic stripe and chip (smart) cards, point of sales devices, ATMs, cell phones, satellite communications, the internet, credit scoring, data mining, biometric recognition and more. These technologies will require MFIs to redesign their business models and educate their employees and customers to master new ways to deliver and receive services. Such changes will not always be easy, but the benefits will be dramatic.

5.2   Developing demand driven financial products and methodologies

MFIs need to increase their scope and operation by searching for new markets and deepen their penetration by broadening the range of financial services offered to households. We believe that the poor in both the rural and urban areas are lucrative customers worth wooing for MFIs. The microfinance providers should shift from the traditional supply-driven financial products to demand-driven products which involve market research and new product development. Households are not homogeneous and within one group, different segments appear with different needs. For example, micro enterprise operators in urban and rural areas have different financial needs at different times. Using a product development process that is client centered allows meeting both the financial and social goals of an MFI. Focusing on what is of value to the client influences the operational efficiency as well as product design, increases client satisfaction and retention, and profitability of MFIs. Products tailored to client's financing needs have greater impact in helping them manage the volatility inherent in the sector within which they work. Designing product terms tied to client cash flow also improves the repayment capacity and allows the MFIs to sustain their operation.

The major factors which affect product development in the Ethiopian MFIs include:

(a)   the regulatory framework which restricts MFIs to limited financial products;
(b)   huge demand for microfinance services leading to little incentive for MFIs to develop new products or modify existing ones;
(c)   lack of competition in the industry;
(d)   donor and government intervention influencing the type of financial products; and
(e)   limited technical skill and financial resources to test new products (Wolday, 2002).

As indicated earlier, one of the critical issues in product development is the weak capacity of MFIs, MFI's failure to establish the necessary institutional setup to develop financial products and professional skills for their staff in the area of market research, product development and risk management, could limit their capacity to identify and respond to changes in the market and limit their growth. There is a consensus in the industry to develop innovative lending methodologies and financial products which match the needs of rural and urban households. Underpinning all methodologies for delivering microfinance services is the need to minimize transaction costs. A wide variety of mechanisms exist but many can be seen to belong to the following three broad categories

(a)   Group lending methodology

The solidarity group based lending approach, often associated with the Grameen Bank in Bangladesh, is an innovative lending methodology which minimizes transaction costs (in the process of screening clients). It also addresses the problems of physical collateral requirement of conventional banks through intra-group guarantees and reduces the cost of administration by addressing the loan needs of clients collectively. In order to obtain a loan, members of a group cross guarantee one another's borrowing, as they would have reliable personal knowledge of their fellow group members. Actually, the group lending methodology is mainly based on peer group pressure (social capital). When a borrower defaults on a loan, the lender will look first to the guarantees from the members of the group. Frequently the cross-guarantees, which members of the group provide towards one another, will be supported by compulsory savings. This is the dominant lending approach used by almost all MFIs in Ethiopia. Although the group lending methodology has been a very useful tool in expanding the growth in outreach of MFIs in Ethiopia, clients have complaints on the methodology.

(b)   Individual lending

There is no "one size fits all" approach in microfinance. An MFI can use a combination of various lending methodologies which match with the needs and economic activities of its clients. As indicated earlier, there are complaints on the group lending methodology in Ethiopia, for instance, why should clients be penalized for a colleague who defaulted, it excludes the poorest households, it encounters difficulties as the size of the loan increases and does not necessarily fit to the needs of MSE operators and others who need relatively larger loan size, etc.

In response to the above problems and the needs identified by market research, MFIs have been developing individual lending methodologies based on traditional and non-traditional collateral. Non-traditional collateral includes household and business assets such as radio, TV, bicycle, sewing machine, etc. The conventional approach used by commercial banks to screen borrowing proposals, based on analysis of historical performance and business plans are usually inappropriate for microfinance. Clients of MFIs hardly keep reliable records and are unable to produce meaningful business plans.

The efficacy of the individual lending methodology depends on various factors such as strength of the legal system in enforcing contracts, the ability of an MFI to enforce the lending agreements in the case of defaults, information flow in the community and other socio-cultural issues. Ethiopian MFIs are recently introducing individual lending

methodology to provide loans to MSE operators who require larger loans (above 5,000 Birr). Some MFIs such as DECSI have also reduced the group size from five to three.

(c)   Community based or user-owned/managed lending

There is a very significant potential for lowering transaction costs through financial organizations which are both owned and managed by communities. These include the Savings and Credit Cooperatives (SACCOs), Credit Unions, Village banks, Rotating Savings and Credit Cooperatives (ROSCAs), burial societies, etc. Such organizations are able to draw directly on both local knowledge about borrowers and social capital to reduce the transaction costs and the associated risk. Since the above organizations are locally owned, the potential loss of social capital in the event of default can represent a powerful disincentive to default. Transaction costs associated with the administration of financial products are reduced due to the geographic proximity of the organization to its clients and the lower labor costs by using local staff or members themselves.

While member-owned institutions are prevalent in many rural and urban areas, including remote areas, and serve poorer segments of the population in Ethiopia, they have limitations in becoming the prime financial intermediaries. Since they are self-managed, an appropriate form of governance needs to be developed for each type to ensure sustainability.

5.3   Mobilizing loanable funds

Significant investment capital is needed to develop new or moving existing institutions to increase outreach. The balance sheet of an MFI must have sufficient strength to absorb losses which can arise within long-term business cycles, without threatening its ability to meet its liabilities. Securing appropriate investment capital for growth of outreach of MFIs is not merely a question of the availability of funds, but the form of funding. The loanable funds of MFIs in Ethiopia are primarily from six sources:

(a)   Mobilizing savings: Ethiopian MFIs have proved that the poor have a high propensity to save when provided with safe, accessible and convenient mechanisms. Access to saving facilities is as important as credit for the poor. Moreover, it increases the autonomy of an MFI and is one of the reliable funding sources for MFIs to finance growth and expansion. Thus, MFIs should develop business plans that would allow them to capture savings from clients and non-clients.

(b)   Equity: To get license and operate in microfinance activities, MFIs in Ethiopia are required to have a minimum of 200,000 Birr (23,000 USD) as paid-up capital. The equity investment of MFIs is very limited. There are very limited initiatives to sell equity and increase their loanable fund.

(c)   Loan from formal banks: Although over liquid, the formal banks in Ethiopia were not interested in lending to MFIs. On the other hand, due to the sweet money obtained from donors, MFIs in Ethiopia were initially reluctant to access loan from banks at market rate. However, recently some MFIs have shown keen interest to take loan from banks through the support of regional governments, NGOs and donors by introducing credit guarantee schemes.

(d)   Rural Financial Intermediation Program (RUFIP): This particular program is financed by IFAD, ADB and the Ethiopian government to support MFIs and Saving and Credit Cooperatives (SACCOs). Out of the total fund of the program (87 million USD), 81% is allocated for loanable fund, for MFIs and rural SACCOs, and the remaining 19% for capacity building. Those MFIs, which fulfill the minimum performance requirements of the program, are eligible to take loan at 6% lending interest rate. RUFIP has been very successful in providing loanable fund, build capacity, promoting growth of their activities, improving efficiency, and enforcing the regulatory framework.

(e)   Donation: MFIs have been obtaining donations and grants as seed money (start-up capital) or funds for expansion from their mother NGOs. However, many of the MFIs are realizing that funding sources from NGOs and donors are becoming scarce.

(f)   Income from lending activities: Although some MFIs are currently expanding their activities from own income, the interest income and fees from lending activities or operations of many MFIs in Ethiopia were not large enough to cover operational costs and finance expansions. Thus, a significant expansion of the operations of MFIs would require outside sources of funding.

5.4   Enabling policy, legal and regulatory environment

An enabling policy environment is important to achieve substantial outreach and attain operational and financial sustainability of MFIs. The sectoral and development policies, the commitment of governments at various levels, the performance of the macro economy (the state of the real economy related to improving the efficiency in agriculture, industry commerce, etc), the performance of the financial sector policies, the efficiency of the legal and regulatory system, fiscal and monetary system, and political system affects the growth of outreach of MFIs.

It is argued that a dynamic economy and comparatively stable macroeconomic and political environment offers an enabling climate to the success of the MFIs. This dynamism is expected to result in high and growing demand for financial services. Stable macroeconomic conditions and low inflation do support the growth of MFIs. However, macroeconomic stability, although important, is not by itself, a sufficient condition. There are poorly performing MFIs in countries with stable macro economic conditions. If we take the example of DECSI, although the region where this MFI is operating is one of the poorest regions (with stagnant economy) in Ethiopia, its performance in the last ten years has been remarkable by all standards. This is partly due to political commitment, political stability, high degree of social cohesion and traditional social structures that facilitated the enforcement of contracts, increase outreach and efficiency.

The various policies and the commitment of the governments at various levels to support microfinance activities have direct impact on outreach and viability of MFIs. The government, to promote the industry, should have a clear microfinance strategy which will be reflected in all the development and sectoral policies. In the Ethiopian context, the government is committed to promote the delivery of microfinance services to poor households. Microfinance is considered by government as its own tool to fight poverty. This is reflected in the poverty reduction program, food security strategy, rural development program, industrial policy, etc. The effectiveness of the monitory and fiscal policies has also a direct influence on the success of microfinance activities measured in terms of outreach, productivity, efficiency and sustainability. As indicated earlier, the government of Ethiopia has implemented the Rural Financial Intermediation Program (RUFIP) by taking a loan of 87 million USD from IFAD and ADB to support the microfinance activities. This shows the real commitment of the government to promote the industry. However, although the microfinance industry needs the support of the government at various levels, this does not mean that it should involve directly in the delivery of financial services to the poor. Actually, in the Ethiopian context, this is prohibited by law.

Regulatory environment affects growth, efficiency, productivity and sustainability of MFIs. The regulatory framework of microfinance institutions in Ethiopia has played a positive role in increasing outreach and mobilizing public saving. However, the directives and the microfinance legislation (40/96) in Ethiopia need to be revised to accommodate the dynamic growth and innovations in the microfinance industry (Wolday, 2005). On the other hand, there are positive and encouraging developments in Ethiopia, where the general managers of all MFIs regularly meet with the governor of the National Bank of Ethiopia (NBE) and senior staff to discuss the problems of the microfinance industry.

The legal framework in Ethiopia is very weak in enforcing loan contracts. Without the foreclosure legislation (which gave power to commercial banks to foreclose the property of a borrower in 30 days, if he/she defaults), the banking sector in Ethiopia would have collapsed long ago. MFIs, through their network, Association of Ethiopian Microfinance Institutions (AEMFI), have requested the National Bank of Ethiopia to revisit and amend the foreclosure legislation to include both banks and MFIs. The weak legal environment has discouraged MFIs from developing financial products focusing on individual lending methodology.

5.5   Donor support

The support of donors to MFIs takes mainly four dimensions, namely, (i) provision of loanable capital as grant, soft loan, etc, (ii) building the capacity of MFIs by providing training, computers, office equipment, vehicles, MIS, communication equipment, etc, (iii) advisory services, and (iv)contribute in developing and piloting innovate products that meet the needs of poor households.

It is clear that MFIs need seed money in the first year and soft loans in the second year, however, in the third year; the MFI should access loans at market interest rate. When financial self-sufficiency is attained, the institution should be transformed into a formal financial institution which is characterized by a marked increase in portfolio volume, productivity and a concomitant decline in average lending costs.

Donors in Ethiopia have been supporting almost all MFIs (with the exception of Agar Microfinance Institution) in building their capacity. Unlike many African countries, there are restrictions on the interventions of donors in the microfinance industry which include: (a) MFIs should be owned by Ethiopians, (b) donors cannot be shareholders in an MFI, and (c) if MFIs access loans from donors or foreign banks, they are not allowed to pay the interest and the principal in hard currency. Since these restrictions have direct impact on the growth of MFIs, we need to revisit the regulatory framework. On the other hand, although donors can play a positive role in increasing outreach and efficiency of MFIs, they could also distort the financial markets by injecting subsidized funds in the system. The MFIs in Ethiopia complain that some donors such as the World Bank are distorting the financial markets through its food security program.

5.6   Demand side

Growth in outreach of MFIs is affected by factors affecting the efficiency and productivity of active and potential clients. The education and skill of potential clients; availability of markets and working places; and growth and performance of the real sector affects the growth, portfolio quality, efficiency and productivity of MFIs. According to Geberhiwot and Wolday (2004), the most important constraints of micro and small enterprise operators were mainly related to access to markets and finance. Among the top three problems experienced in starting up their business were capital constraint, inadequate premise, demand shortage and inadequate skill. About 72 percent of the micro and 65 percent of the small enterprise operators reported lack of markets as their major constraint. Government institutions at various levels, donors, NGOs and other development partners should play a key role in addressing the demand side problems of clients.

Governments at various levels, NGOs and other development partners should also play an active role in providing non-financial services such as Business Development Services (BDS). The results of the study by Wolday and Geberhiwot (2004) indicated that there were very few BDS providers offering limited services to few MSE operators (very low outreach). MSE operators had very limited vocational and technical training (before starting business), received few short-term training, extension and counseling, and marketing services.

6.   Conclusion recommendations

Many of the MFIs in Ethiopia have been focusing on addressing rural poverty. As rural finance providers for poor households in remote areas, MFIs have been dealing with seasonality issues, high covariant risk, low average returns, inadequate information infrastructure, large risks due to drought and others, irregular cash flows, difficult terrain, remote and illiterate clients, highly diversity, and sparse population. The performance of MFIs, in Ethiopia, be it in terms of outreach or sustainability, should be evaluated against this tough environment.

As of June 2005, the twenty six microfinance institutions registered under the National Bank of Ethiopia had an active loan portfolio of about 1.5 billion Birr (173 million USD) delivered to 1,211,305 active clients. They mobilized about 501million Birr (58 million US dollars) of savings. The clientele served by the MFIs in Ethiopia are mainly the rural poor. The Ethiopian MFIs have attained significant outreach in a brief period of time. Between 2001 and 2005, the number of clients, volume of loan portfolio and savings increased by 263%, 479%, and 206%, respectively.

A large number of MFIs in Ethiopia have achieved significant progress in terms of sustainability. In 2004, 12 out of the 15 MFIs were operationally sustainable, while 5 were financially sustainable. There was a substantial growth in outreach and improvement of operational and financial sustainability within one year (2003-2004). There was also a consistent decline in operating expense to loan portfolio ratio as a result of significant increase in outreach. The majority of the MFIs increased their productivity indicators (borrower per staff and borrower per loan officer) as a result of expansion or increase in outreach. Out of the 15 MFIs, eleven had less than 5% portfolio at risk, which was encouraging. Out of the 13 MFIs which registered significant growth in outreach, 9 showed a remarkable decline in their portfolio at risk. As a result of increased outreach, many of the MFIs maintained and improved their portfolio quality.

The prospect for growth of MFIs in Ethiopia is bright, particularly when growth promoting forces are put on the ground and when microfinance institutions are allowed to do what finance is supposed to do. The whole objective of microfinance should be on developing institutions that can create and provide the broad range of microfinance services that will support millions of poor people in their efforts to improve their own and their children's prospects. This is realized through development of capable and sustainable MFIs. Efforts should be made to increase the efficiency of MFIs financially. They should also be made organizationally stable and more professional in order to be able to deliver financial services to millions of unbanked people permanently. This should also include the provision of financial services to pastoralist areas that currently have little or no access to microfinance services.

Managing and planning growth of MFIs in Ethiopia will require deliberate actions and strategies designed by policy makers and industry leaders. This requires careful balancing of increasing outreach and sustainability; with a parallel focus on institutional capacity; reducing costs and risks; and improving efficiency, profitability and portfolio quality. The specific interventions to increase the growth of MFIs include: (i) improving the institutional capacity of the MFIs by introducing an efficient organizational structure, (changes in organization culture, structure and systems, for instance, decentralized lending decisions) with appropriate staff incentive and reward system, improved skill of human resource, good governance, introduction of innovative financial products, and an increase of geographic expansion; (ii) creating an enabling legal, regulatory and policy environment; (iii) selective donor support; and (iv) improving the demand side of the equation.

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Annex 1: Amhara Credit & Savings Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	351,163	288,681
Gross Loan Portfolio	308,934,727	206,745,388
Savings Balance	172,797,599	128,649,147
Profitability		
Operational Self-Sufficiency	231.8%	178.4%
Financial Self-Sufficiency	156.0%	137.0%
Efficiency		
Operating Expense/ Loan Portfolio	6.2%	7.6%
Personnel Expense/ Loan Portfolio	4.2%	5.3%
Productivity		
Borrowers per Staff Member	210	195
Borrowers per Loan Officer	335	293
Portfolio Quality		
Portfolio at Risk> 30 Days	0.5%	1.7%
Write-off Ratio	1.5%	2.2%

Annex 2: Addis credit & savings institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	31,841	14,271
Gross Loan Portfolio	41,016,579	8,734,856
Savings Balance	6,215,161	2,982,394
Profitability		
Operational Self-Sufficiency	103.0%	84.9%
Financial Self-Sufficiency	54.0%	60.4%
Efficiency		
Operating Expense/ Loan Portfolio	7.9%	14.3%
Personnel Expense/ Loan Portfolio	5.2%	8.9%
Productivity		
Borrowers per Staff Member	215	144
Borrowers per Loan Officer	388	274
Portfolio Quality		
Portfolio at Risk> 30 Days	20.6%	7.8%
Write-off Ratio	3.3%	5.9%

Annex 3: Africa village financial services

Indicators	2004	2003
Outreach		
Number of Active Borrowers	4,867	2,866
Gross Loan Portfolio	2,943,430	2,221,793
Savings Balance	1,077,809	658,421
Profitability		
Operational Self-Sufficiency	73.2%	91.3%
Financial Self-Sufficiency	63.1%	64.9%
Efficiency		
Operating Expense/ Loan Portfolio	18.5%	21.0%
Personnel Expense/ Loan Portfolio	12.9%	14.8%
Productivity		
Borrowers per Staff Member	125	92
Borrowers per Loan Officer	304	239
Portfolio Quality		
Portfolio at Risk> 30 Days	2.3%	11.6%
Write-off Ratio	14.3%	0.6%

Annex 4: Bussa Gonofa MFI

Indicators	2004	2003
Outreach		
Number of Active Borrowers	5,571	5,999
Gross Loan Portfolio	2,116,415	2,133,046
Savings Balance	749,178	458,880
Profitability		
Operational Self-Sufficiency	100.4%	104.1%
Financial Self-Sufficiency	80.2%	86.6%
Efficiency		
Operating Expense/ Loan Portfolio	41.8%	40.0%
Personnel Expense/ Loan Portfolio	21.9%	21.6%
Productivity		
Borrowers per Staff Member	151	182
Borrowers per Loan Officer	232	261
Portfolio Quality		
Portfolio at Risk> 30 Days	3.9%	5.8%
Write-off Ratio	2.1%	5.6%

Annex 5: Dedebit Credit & Savings Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	336,733	225,996
Gross Loan Portfolio	377,726,250	186,012,798
Savings Balance	153,776,824	131,346,540
Profitability		
Operational Self-Sufficiency	215.5%	180.4%
Financial Self-Sufficiency	125.3%	95.7%
Efficiency		
Operating Expense/ Loan Portfolio	3.8%	6.1%
Personnel Expense/ Loan Portfolio	2.3%	3.7%
Productivity		
Borrowers per Staff Member	388	336
Borrowers per Loan Officer	1,840	1,345
Portfolio Quality		
Portfolio at Risk> 30 Days	2.3%	6.2%
Write-off Ratio	7.1%	12.4%

Annex 6: Eshet Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	9,728	6,540
Gross Loan Portfolio	7,343,034	3,826,461
Savings Balance	850,800	456,596
Profitability		
Operational Self-Sufficiency	155.0%	103.8%
Financial Self-Sufficiency	119.7%	80.8%
Efficiency		
Operating Expense/ Loan Portfolio	14.7%	24.7%
Personnel Expense/ Loan Portfolio	8.6%	14.3%
Productivity		
Borrowers per Staff Member	191	152
Borrowers per Loan Officer	278	226
Portfolio Quality		
Portfolio at Risk> 30 Days	0.9%	0.1%
Write-off Ratio	0.0%	0.1%

Annex 7: Gasha Microfinance institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	8,121	6,423
Gross Loan Portfolio	5,772,922	2,751,235
Savings Balance	3,212,941	2,110,068
Profitability		
Operational Self-Sufficiency	72.5%	60.8%
Financial Self-Sufficiency	45.2%	40.6%
Efficiency		
Operating Expense/ Loan Portfolio	25.0%	42.5%
Personnel Expense/ Loan Portfolio	15.7%	27.9%
Productivity		
Borrowers per Staff Member	110	90
Borrowers per Loan Officer	214	169
Portfolio Quality		
Portfolio at Risk> 30 Days	4.6%	18.6%
Write-off Ratio	18.9%	25.2%

Annex 8: Meklit Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	3,939	3,577
Gross Loan Portfolio	2,550,718	1,839,088
Savings Balance	1,886,385	1,332,872
Profitability		
Operational Self-Sufficiency	110.3%	88.7%
Financial Self-Sufficiency	69.3%	76.3%
Efficiency		
Operating Expense/ Loan Portfolio	15.3%	14.2%
Personnel Expense/ Loan Portfolio	8.6%	8.8%
Productivity		
Borrowers per Staff Member	146	163
Borrowers per Loan Officer	328	397
Portfolio Quality		
Portfolio at Risk> 30 Days	17.7%	9.7%
Write-off Ratio	14.8%	12.5%

Annex 9: OMO Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	75,439	70,590
Gross Loan Portfolio	30,807,793	23,940,625
Savings Balance	25,969,672	20,882,518
Profitability		
Operational Self-Sufficiency	106.4%	88.7%
Financial Self-Sufficiency	62.5%	49.1%
Efficiency		
Operating Expense/ Loan Portfolio	16.4%	14.0%
Personnel Expense/ Loan Portfolio	9.6%	8.2%
Productivity		
Borrowers per Staff Member	211	209
Borrowers per Loan Officer	254	252
Portfolio Quality		
Portfolio at Risk> 30 Days	5.5%	11.4%
Write-off Ratio	26.0%	26.3%

Annex 10: Oromia Credit & Savings s.c

Indicators	2004	2003
Outreach		
Number of Active Borrowers	86,998	62,150
Gross Loan Portfolio	87,981,405	63,397,462
Savings Balance	28,477,428	19,469,477
Profitability		
Operational Self-Sufficiency	152.3%	94.9%
Financial Self-Sufficiency	94.8%	64.4%
Efficiency		
Operating Expense/ Loan Portfolio	9.0%	10.8%
Personnel Expense/ Loan Portfolio	5.4%	6.2%
Productivity		
Borrowers per Staff Member	185	133
Borrowers per Loan Officer	1,208	256
Portfolio Quality		
Portfolio at Risk> 30 Days	5.0%	7.8%
Write-off Ratio	0.0%	0.0%

Annex 11: Poverty Eradication & Community Empowerment

Indicators	2004	2003
Outreach		
Number of Active Borrowers	7,766	5,428
Gross Loan Portfolio	7,696,972	5,192,843
Savings Balance	1,921,456	1,185,314
Profitability		
Operational Self-Sufficiency	152.5%	80.4%
Financial Self-Sufficiency	120.2%	67.4%
Efficiency		
Operating Expense/ Loan Portfolio	17.5%	20.6%
Personnel Expense/ Loan Portfolio	8.4%	9.6%
Productivity		
Borrowers per Staff Member	127	118
Borrowers per Loan Officer	518	603
Portfolio Quality		
Portfolio at Risk> 30 Days	0.1%	0.2%
Write-off Ratio	0.0%	0.0%

Annex 12: Sidama Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	9,891	11,346
Gross Loan Portfolio	9,216,374	8,375,810
Savings Balance	2,906,440	2,448,583
Profitability		
Operational Self-Sufficiency	83.1%	57.2%
Financial Self-Sufficiency	50.8%	36.6%
Efficiency		
Operating Expense/ Loan Portfolio	16.4%	19.2%
Personnel Expense/ Loan Portfolio	8.6%	10.2%
Productivity		
Borrowers per Staff Member	89	98
Borrowers per Loan Officer	267	291
Portfolio Quality		
Portfolio at Risk> 30 Days	26.2%	29.2%
Write-off Ratio	0.0%	0.0%

Annex 13: Specialized Financial & Promotional Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	11,430	9,552
Gross Loan Portfolio	9,900,830	7,384,358
Savings Balance	4,284,237	3,868,522
Profitability		
Operational Self-Sufficiency	103.7%	106.1%
Financial Self-Sufficiency	80.6%	79.3%
Efficiency		
Operating Expense/ Loan Portfolio	15.8%	18.5%
Personnel Expense/ Loan Portfolio	9.2%	10.1%
Productivity		
Borrowers per Staff Member	176	180
Borrowers per Loan Officer	408	415
Portfolio Quality		
Portfolio at Risk> 30 Days	1.5%	0.9%
Write-off Ratio	3.9%	1.5%

Annex 14: Wasasa Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	8,949	3,728
Gross Loan Portfolio	5,331,693	2,250,997
Savings Balance	1,475,239	577,488
Profitability		
Operational Self-Sufficiency	145.2%	139.9%
Financial Self-Sufficiency	118.4%	107.7%
Efficiency		
Operating Expense/ Loan Portfolio	17.9%	16.9%
Personnel Expense/ Loan Portfolio	11.3%	10.3%
Productivity		
Borrowers per Staff Member	160	129
Borrowers per Loan Officer	344	266
Portfolio Quality		
Portfolio at Risk> 30 Days	0.1%	5.9%
Write-off Ratio	4.5%	1.2%

Annex 15: Wisdom Microfinance Institution

Indicators	2004	2003
Outreach		
Number of Active Borrowers	19,912	12,151
Gross Loan Portfolio	18,710,578	11,626,351
Savings Balance	5,633,654	4,043,453
Profitability		
Operational Self-Sufficiency	115.5%	88.6%
Financial Self-Sufficiency	88.0%	78.8%
Efficiency		
Operating Expense/ Loan Portfolio	19.9%	20.8%
Personnel Expense/ Loan Portfolio	9.9%	8.8%
Productivity		
Borrowers per Staff Member	133	120
Borrowers per Loan Officer	262	320
Portfolio Quality		
Portfolio at Risk> 30 Days	3.5%	5.3%
Write-off Ratio	5.6%	6.9%

Annex 16: MFIs Outreach Growth

MFIs	No of loan client				Outstanding loan portfolio				Client savings balance			
	Dec. 2001	Dec. 2003	Dec. 2004	June 2005	Dec. 2001	Dec. 2003	Dec. 2004	June 2005	Dec. 2001	Dec. 2003	Dec. 2004	June 2005
ACSI	152,601	288,681	347,981	394,374	93,159,799	210,355,000	312,823,000	385,274,000	84,874,800	128,649,000	172,798,000	183,475,000
ADCSI	6,906	22,500	44,000	58,000	7,774,861	26,792,000	61,412,000	118,076,000	994,620	3,940,000	12,643,000	39,703,000
Aggar	-	-	1,153	1,590	-	-	2,646,216	2,554,878		-	1,186,693	1,597,236
Asser	311	654	938		754,484	672,891	635,488		90,070	127,500	198,704	
AVFS	606	2,866	4,867	5,306	654,304	2,233,602	3,274,012	3,710,772	194,104	611,992	1,012,384	1,255,350
Benishangul	1,319	2,968	9,172	10,822	441,743	2,116,087	4,607,921	8,018,941	162,163	547,146	1,768,067	2,399,462
Bussa Gonofa	3,030	5,999	5,571	5,257	908,912	2,150,122	2,129,246	2,927,992	82,986	477,584	773,636	639,540
DECSI	158,689	225,996	336,733	417,290	111,169,239	204,345,291	399,790,899	657,886,106	121,997,984	131,346,540	147,429,324	162,986,226
Eshet	2,337	6,540	9,728	11,348	748,473	3,829,215	7,346,132	9,773,762	100,794	456,595	850,800	1,327,058
Gasha	4,381	6,423	8,556	9,773	2,446,939	3,425,646	6,892,131	10,935,686	1,187,993	2,108,831	3,300,993	4,583,479
Meket	2,484	1,964	2,291	2,492	224,525	580,059	1,355,948	1,308,495	116,273	198,079	165,480	174,948
Meklit	1,952	3,577	3,667	3,701	899,530	2,458,345	2,739,670	3,119,237	293,357	995,440	1,845,180	1,910,780
Metemamen	385	1,501	3,286	4,081	78,563	478,300	916,300	1,280,900		202,600	246,800	321,300
Ocssco	38,186	70,753	83,188	125,782	28,225,379	65,954,270	94,940,712	138,672,524	15,539,030	21,693,765	36,805,101	50,784,649
Omo	58,058	70,590	78,836	87,645	38,867,168	29,487,833	36,321,356	67,631,727	10,287,455	20,912,337	25,944,098	29,073,204
PEACE	3,367	5,428	7,766	10,605	2,114,868	5,192,837	7,697,556	11,047,385	436,416	1,185,308	1,921,456	2,471,215
SFPI	6,526	9,552	11,430	13,013	3,925,422	7,047,200	9,893,560	12,101,870	1,824,221	3,744,009	4,515,117	5,352,194
Shashemene	1,081	1,850	1,531	1,677	823,341	1,610,212	1,361,742	1,228,920	155,155	449,668	480,348	471,716
Sidama	7,891	11,346	12,010	13,121	5,748,224	11,347,876	12,906,200	10,938,715	1,407,828	2,703,778	3,269,857	3,577,894
Wassasa	1,457	3,728	8,949	11,007	731,514	2,275,726	5,523,196	7,826,140	189,195	637,380	1,574,570	1,770,396
Wisdom	9,759	12,157	19,912	24,421	8,890,302	11,626,351	18,708,012	23,364,479	3,356,387	4,041,118	5,629,932	6,770,148
Total	**461,326**	**755,073**	**1,001,565**	**1,211,305**	**308,587,589**	**593,978,863**	**993,921,297**	**1,477,678,529**	**243,290,831**	**325,028,670**	**424,359,540**	**500,644,795**