GROWTH, EMPLOYMENT, POVERTY AND POLICIES IN ETHIOPIA: AN EMPIRICAL INVESTIGATION

BY

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ACRONYMS

AAU	Addis Ababa University
CSA	Central Statistical Authority
LDCs	Least Developed Countries
UNU	United Nations University
ER	Expenditure Reducing
ES	Expenditure Switching
EPRDF	Ethiopian People's Revolutionary Democratic Front
GDP	Gross Domestic Product
IMF	International Monetary Fund
LMS	Low and Medium-Scale manufacturing industries
MEDaC	Ministry of Economic Development and Cooperation
MOFED	Ministry of Finance and Economic Development
MSME	Medium, Small and Micro Enterprises
SAP	Structural Adjustment Program
TGE	Transitional Government of Ethiopia
UNECA	United Nations Economic Commission for Africa
UNCTAD	United Nations Conference for Trade and Development
WPE	Workers Party of Ethiopia
WMS	Welfare Monitoring Survey
HICES	Household Income, Consumption and Expenditure Survey
PRSP	Poverty Reduction Strategy Program

Preface

The experience of countries that succeeded in reducing poverty significantly indicates the importance of high rates of economic growth in achieving this. High growth, however, is not a sufficient condition for poverty reduction; the pattern and sources of growth as well as the manner in which its benefits are distributed are equally important from the point of view of achieving the goal of poverty reduction. And employment plays a key role in that context. Indeed, countries which attained high rates of employment growth alongside high rates of economic growth are also the ones who succeeded in reducing poverty significantly.

In view of the importance of employment as a route out of poverty, the ILO and SIDA agreed to collaborate in undertaking a series of studies to analyse the linkage between economic growth, employment and poverty reduction. The present study on Ethiopia along with studies on Bangladesh, Bolivia, Uganda and Vietnam forms part of this series; and its main purpose is to contribute to an understanding of the linkage mentioned above and to the identification of policies that could be used to engender higher rates of economic growth and employment generation, and thus achieve a faster reduction in poverty.

In the beginning of the 1990's Ethiopia embarked on a turbulent period of transition from a command to a market-oriented economy. Despite an initial fall in output, Ethiopia's economic performance improved significantly during the 1990's with GDP growth averaging 4.6% p.a. compared to an average of 2.3% p.a. during the pre-reform period of the 1980's. In spite of this strong recovery of the economy, employment growth did not keep pace with the growth of the labour force. And despite various policy reforms and strenuous efforts to boost agricultural production, the proportion of people living in poverty remains high having declined slightly from 45.5% in 1995/96 to 44.2% in 1999/2000. In fact, poverty has increased in urban areas. In terms of the sectoral composition of the economy there has been no substantial shift since the 1980's; the agricultural sector remains the dominant sector accounting for approximately 50% of GDP, providing employment for approximately 80% of the population.

In the empirical analysis the study states that the overall decline in employment during the post-reform years, in particular from 1994 to 1999, can be attributed mainly to a fall in employment in the agricultural sector, as well as the transport, storage and communication sectors. As for the manufacturing sector, the average employment growth rate during the 1990's was well below the rate needed in order to create sufficient employment opportunities for the fast growing population. However, the study points out that from a poverty reduction perspective economic growth which translates into a rise in productivity levels is just as important as increased employment, as the former is likely to lead to increased incomes. In the econometric analysis, the study focuses on modelling the determinants of consumption and poverty and identifying and quantifying the links between economic growth, employment, poverty and policies. One of the main messages arising from this analysis is that as household members move out of low-productivity agricultural activities to become engaged in higher-productivity industrial or service sector activities household consumption per capita rises and poverty of the household falls.

The study concludes that at current productivity levels, a pattern of growth favouring industry and services should reduce poverty. Yet considering the large employment share in the agricultural sector, a successful development strategy should envisage technological advancement in all sectors of the economy. Moreover, the study states that increasing the size of landholding and undertaking productivity-enhancing investments will reduce poverty. However, from the viewpoint of productive employment generation and injecting dynamism into the economy, the manufacturing sector should play a leading role. To this end a well-coordinated industrial strategy is required to strengthen the manufacturing sector's forward and backward linkages with the agriculture and service sectors ensuring sustainable growth, employment creation and thereby long-term poverty reduction.

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I. INTRODUCTION

Global advances in economic development and the progress achieved by developing countries as a whole have largely bypassed the least developed countries (LDCs). These countries continue to face appalling conditions of poverty and lack the capacity to break out of the vicious circle of low income, low investment and low growth. By and large, LDCs have not been able to gain economic and industrial momentum and trigger a sustainable development process (Magarinos, 2001).

The economic stagnation in most LDCs and their marginalized position are linked to the insufficient attention paid to the development of productive capacity in industry. It is industry more than any other productive sector that drives the process of economic growth and global integration. Indeed, linking agriculture with industry is the most powerful engine of progress. Industrial development contributes to alleviating poverty by raising productivity, creating employment, reducing risk exposure and enhancing the physical income generating assets of the poor.

The labour market is the main channel through which the linkage between economic growth, employment and poverty can be analysed. Theoretically, it is common to find a strong relationship between economic growth and changes in the level of poverty. This is so because the majority of the poor derive their main income from wage employment and hence wage income is the critical determinant of their living conditions (Yemtsove, 2001). As such, the labour market serves as the main transmission between economic growth and poverty in the sense that growth reduces poverty via increasing employment or reducing unemployment, and increasing labour productivity or rising real wages (O'Connell, 1999 and UNU/WIDER, 2000). The available evidence suggests that employment status is a strong correlate of poverty (Canagarajah and Mazumdar, 2001; Yemtsove, 2001; Berck et al., 2000).

Employment, by providing people with access to wages, constitutes one of the most important forces in improving economic equity. Without sufficient growth in employment opportunities, the ability of an economy to eradicate poverty and inequality is severely compromised. The International Labour Organization's latest employment report estimates that approximately 25% to 30% of the world's labour force is underemployed (Magarinos, 2001).

In Ethiopia, the size of the labour force continues to grow quicker than the ability of the economy to provide new employment opportunities. As a result, the poverty situation in the country is one of the worst in the world and shows no significant sign of improvement over time. According to a recent study, 45.5% of the total population lived below the absolute poverty line in 1995/96 (based on a minimum calorie intake of 2200 calories per day and provision for some basic non-food expenditure, i.e. equivalent to US$ 139 per capita income in aggregate). In spite of various policy reforms and strenuous efforts to boost agricultural production, the proportion of people living below the absolute poverty line remained 44.2% in 1999/2000 (MOFED, 2002). The changes between 1995/9 and 1999/2000 were not statistically significant. Poverty is also more widespread in rural than in urban areas.

It has been indicated that the Ethiopian labour market has remained unresponsive to policy reforms (Krishnan et al., 1998). The unemployment rate declined slightly with limited increase in private sector employment and self-employment between 1994 and 1997. Real wages stagnated in the private sector but increased slightly in the public sector over the same period. The records in the labour market contrast sharply with the strong recovery of the economy. Previous studies focused on the determinants of poverty, distribution of income or linkage between growth and poverty alone (Bigsten and Negatu, 1999; Yohannes Kinfu, 1996; Mekonnen, 1996; Goitom, 1996; and Abdulhamid, 1996) on urban areas and Krishnan and Dercon (1996), Dercon (1998, 2001), Bevan and Bereket (1996), Yohannes Benyam (1996), and Tassew (2002) on rural areas. Recent studies by Alemayehu et al (2003) and Bigsten et al. (2002) used data on rural and urban household surveys to assess the link between economic growth and poverty in rural and urban areas of Ethiopia. None of these studies address systematically the link between growth, poverty, employment and policies in the country. Hence, an in-depth investigation of poverty and its inter-linkage with economic growth and employment is required for informed decision-making and redirecting policies and strategies for economic growth in a more pro-poor direction.

1.1 Objectives of the study

It has been argued that employment serves as the principal channel through which the link between economic growth and poverty can be established. As a result, it is important to closely examine wages and earnings as they help us in assessing how economic growth and increased productivity get transmitted to the poor. The central objective of the study is, therefore, to establish a quantitative relationship between growth, employment, poverty and policies in the Ethiopian context. The specific objectives of the study are to:

- examine the trends of output, employment and other social indicators in Ethiopia.
- decompose the impact of growth into employment, productivity and multiple effects.
- quantify the likely impacts of alternative public policies on employment and poverty.
- suggest some policy recommendations.

1.2 Methodology of the study and data sources

In order to address the stated objectives, both descriptive and econometric techniques are employed. The main analytical tool is a type of macro-micro simulation model that is used to analyse the link between growth, employment, poverty and policies in Ethiopia. This method is outlined in section IV of this study.

The data for this study have come from various sources including National Income Account Statistics, rural and urban household surveys conducted by the Department of Economics of Addis Ababa University, report on Household Income, Consumption, and Expenditure surveys (1995/96 and 1999/2000), National Labour Force Survey (1999), Industrial Establishment Surveys (for various years), Welfare Monitoring Surveys, and Population Censuses.

1.3   Organization of the study

The study is organized in five sections. Section 2 provides growth, structure and poverty in Ethiopia. Section 3 presents the linkage between growth, employment and poverty. Section 4 is on modelling employment, poverty and labour market nexus in the country. Finally, conclusions and policy implications are presented in section 5.

II.   Economic Growth and Poverty

2.1   A brief review of policy regimes

Ethiopia is among the least developed countries in the world. Its per capita income, although it varies slightly from one source to another, is estimated at around $100 per annum. Almost half of Ethiopia's more than 60 million people can hardly afford the minimum basic food requirements.

The past regime, which ruled from the mid 1970s to the 1980s, followed a centrally planned economic policy system. The main objectives of the then government, also known as the *Derge,* in taking over the commanding heights of the economy were (i) to ensure that social justice and equity are promoted; (ii) to generate more resources required to accelerate economic development for improving the living standards of the people; and (iii) to expedite the construction and management of the economy via planning and in a resource allocation system that would ensure a steady progress in economic and social development (Eshetu and Mekonnen, 1992:9).

In order to achieve these broad objectives, a number of economic measures were taken including nationalization of all banks, insurance companies, industrial and commercial firms, and land reform which made all land the property of the state. Later on, the economic and social goals incorporated in the Workers Party of Ethiopia (WPE) were given as (i) accelerating the growth of the productive forces so as to build a strong and internally self-sustaining national economy free from the influences of capitalist market; (ii) expanding, strengthening and ensuring the dominance of the socialist production relations with a view to creating a conducive environment for the growth of the productive forces, and expanding socialist economic organizations and management; and (iii) accelerating sustained growth of the standard of living and cultural well-being of the working people (Ibid. 1992:10).

There was also no room for the participation of the private sector under the former government. This was clearly stated in the declaration of 1974 as follows; "resources that are crucial for economic development or are of such a character that they provide indispensable service to the community will have to be brought under government control or ownership" (Ibid, 1992:9). The ceiling on private investment was set at Birr 250,000 for a domestic investor and US$500,000 for a foreign investor. This kind of environment was not very conducive for the private sector as the economic principles and policies were derived from anti-market and anti-private ideological motivation.

By and large, the *Derge* regime presided over an economy that was progressively collapsing as a result of poor macroeconomic policies, economic mismanagement, protracted war and internal instability, and recurrent drought. These, coupled with a population growth rate of around 2.9 % per annum, led to a decline in the welfare of the society at large. The crisis of the 1980s called for substantial economic, political and institutional reform to reverse the retrogression.

Following the change of government in 1991, the then Transitional Government of Ethiopia (TGE), led by the Ethiopian Peoples Revolutionary Democratic Forces (EPRDF), adopted Stabilization and Structural Adjustment Programmes (SAP) that called for significant policy reforms. Stabilization policies emphasized the reduction

of the government budget deficit, credit control and the like while structural adjustment policies focused on removing constraints on the supply side and paying close attention to the production of export crops through depreciation of the real exchange rate and other incentives. A number of measures were introduced in the 1990s as part of SAP. These included, among others, devaluation of the domestic currency against US currency and inter-bank determination of exchange rate, abolition of interest rate ceilings, removal of subsidies, tax reform (lowering the marginal tax rates and broadening the tax base), reduction of tariffs and removal of non-tariff barriers, simplifying licensing procedures, reorganizing the customs authority, deregulation of prices, and privatisation of public enterprises.

The devaluation in September 1992 resulted in an exchange rate of Birr 5 for a US dollar, i.e. the Birr was devalued by about 58.6 percent. The administrative foreign exchange allocation was also replaced by an auction system. The commercial banks can now engage in retail trading of foreign exchange obtained through participation in the auction held by the National Bank. The exchange rate of the national currency against the US Dollar is thus determined by the daily auction undertaken between the commercial banks in order to encourage production for exports as well as properly managing the extent of imports. This system is considered as a transition from a fixed to a free-floating exchange rate system. While making significant advances towards liberalization in many respects, the government has also retained some policies of the former government. For instance, state ownership of rural land has remained in force, creating tenure insecurity among the farming community. Access to urban land is also secured through lease from the government, which has become bureaucratic and restrictive for private investors. The privatisation programme has also slowed down because of corruption.

2.2   Overall economic performance

2.2.1 Growth episodes and sectoral structure

The available evidence indicates that the rate of economic growth over the last three decades has been unsatisfactory. Regardless of the policy regimes, real total GDP, agricultural GDP, industrial GDP, and service GDP grew on average by 3.0%, 2.1%, 2.1%, and 4.4% per annum, respectively, during the period 1980/81-2000/2001. On the other hand, population has been growing on average by 2.9% during the same period, implying a 0.1% annual growth rate in per capita income.

Economic performance has improved in the 1990s, compared to the situation in the 1980s. The growth rate of real GDP, on average, increased from 2.3% in 1980/81-1991/92 to 4.6% in 1992/93-2000/01. The growth rates of agriculture, industry and services were, respectively, 1.4%, 0.02% and 2.8% during the 1980s, compared to 2.5, 5.3 and 7.5% in the 1990s (Table 2.1). But the improvements failed to be sustained as the economy continued to suffer from fluctuations in weather conditions. Figure 2.1 shows that the annual growth rates of GDP, agriculture (AGDP), industry (IGDP) and service (SGDP) sectors were subject to substantial fluctuations due to war, drought, mismanagement and policy failures.

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Table 2.1: Growth Episodes, 1980/81 - 2000/2001(percentages)

Sector/Year	1980/81-1991/92	1992/93-2000/01
GDP at constant factor cost	2.3	4.6
Agriculture	1.4	2.5
Industry	0.02	5.3
Services	2.8	7.5

Source: Own computation

Figure 2.1: GDP and Sectoral Growth Rates (at constant factor cost)
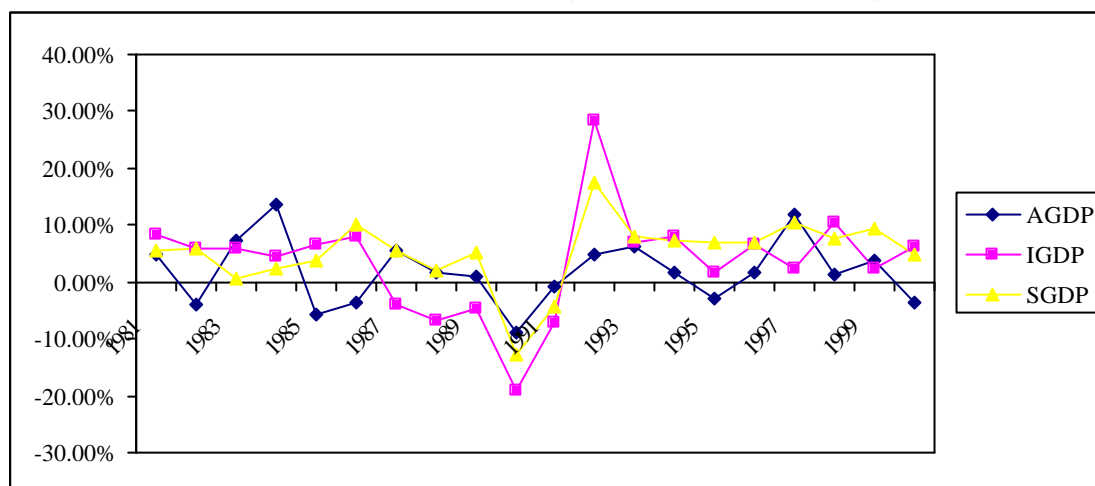
Source: Own calculation

With regard to the sector mix of the economy, agriculture takes the lion's share of the economy followed by the services and industrial sectors. Agricultural activities account for almost 50% of total GDP while industry and services have contributed, about 11% and 38% respectively to total GDP over the last two decades. The share of agriculture decreased slightly from 52.9% in the 1980s to 48.2% in the 1990s. The share of industry declined from 11.9% to 10.8% over the same period, whilst the share of services increased from 35.2% to 44.0% (Table 2.2).

Table 2.2: Sectoral Shares of GDP (Percentages)

Sector/Year	1980/81-1991/92	1992/93-2000/01
Agriculture	52.9	48.2
Industry	11.9	10.8
Services	35.2	44.0

Source: Own computation

It appears that the structure of the economy essentially remained the same, with the dominance of the subsistence agrarian sector showing no significant sign of declining (Figure 2.2). Commercial or modern farms belonging to the state or private investors are very few and account for less than 5% of the agricultural output. Since 1998/99, the share of the services, including trade, hotels and restraints, banking and insurance, transport and communication, and public administration, has been expanding. The service sector also includes very small and informal businesses that have been growing rapidly as a result of limited employment opportunities in the formal sector. The industrial sector consists of state owned large and medium scale manufacturing activities that rely on outdated technology and inefficient management. Most of these

companies have found it very difficult to compete in a liberalized market environment. Similarly, small-scale manufacturing and handicraft activities lack the capacity to compete with cheap and superior products imported from abroad.

Figure 2.2: Pattern of Sectoral Composition of GDP
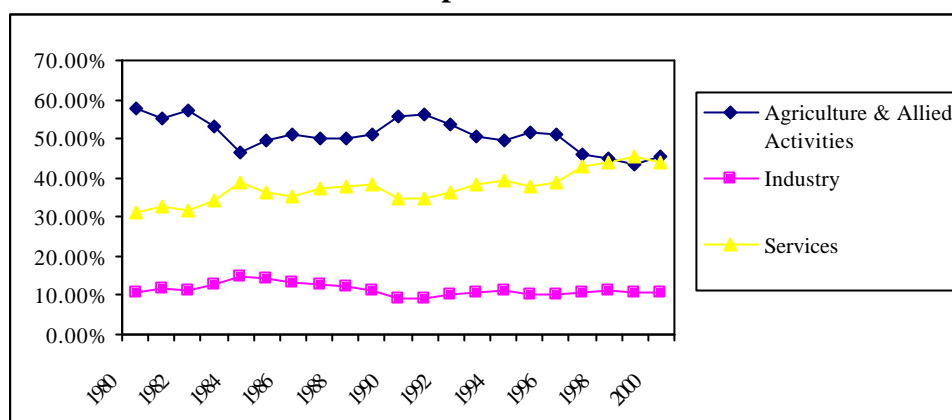
Source: Own calculation

2.2.2 Other macroeconomic indicators

Both gross domestic savings (GDS) and gross domestic investment (GDI) have shown improvements in the 1990s owing to policy reforms in almost all spheres of the economy. For example, the amounts of domestic private investment and foreign direct investment have increased albeit sluggishly (MOFED, 2002).

The available evidence suggests that inflation has never been out of control in Ethiopia. It has been checked within single digits, usually below 5% except in 1994/95 (MOFED, 2002). However, price movements in the country are highly correlated with agricultural production (especially food production). For instance, inflation rate was 0.9% in 1995/96 while it was 4.2% in 1999/2000 (see Table 2.3). The former period was characterized by favourable weather conditions and a bumper harvest, implying low food prices which is the major element determining the general price level. The period 1999/2000 was marked by drought with low agricultural production and relatively higher food prices. The national inflation rate was below zero (–7.2%) in 2000/2001 due to good weather conditions and a better performance of the food sub-sector.

Table 2.3: Trends in inflation (%)

	1997/98	1998/99	1999/00	2000/01
National	3.9	3.9	4.2	-7.2
Urban	4.3	4.8	5.7	-3.5
Rural	3.8	3.7	3.8	-8.1

Source: NBE, 2001

Ethiopia is also characterized by a very high rate of population growth. The total population more than doubled during the past three decades, increasing from 29.1million in 1972 to 67.2 million in 2002 (NOP, 2000). The sharp increase in the annual growth rate of population from 0.2% at the beginning of the century to 3% in the 1980s was mainly due to an increase in fertility rate and a decline in mortality.

The impact of rapid population growth on the labour force is twofold. First, a decline in mortality augments survival of the existing labour force. Second, it increases the size of the labour force by adding new entrants into the labour market. The labour force is not only determined by population growth but also by other factors such as sex, skill and locational composition of the population. The total labour force has increased from 14.7 million in 1984 to 26.5 million in 1994 (Table 2.4). The total labour force participation rate increased from 0.35 in 1984 to 0.50 in 1994. Both urban and rural labour force participation rates increased between the two census periods.

Table 2.4: Urban and Rural Labour Forces

Census year	Total population ('000')			Participation rate			Labour force ('000')		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
1984	4,869.3	37,747.6	42,616.9	0.308	0.352	0.346	1,499.9	13,292.6	14,742.5
1994	7,323.2	46,154.1	53,477.3	0.380	0.517	0.496	2,757.3	23,745.8	26,503.1

Source: CSA, 1984 and 1994

The urban labour force increased by an annual average of 6.4% between 1984 and 1994, compared to an average urban population growth rate of 2.3% per annum. The rural labour force, on the other hand, increased by an annual average of 6.0% over the same period.

As indicated in Table 2.5, the most important source of employment for the rural labour force is agriculture, hunting, forestry and fishing, followed by wholesale, retail trade and catering. Agricultural employment increased from 12.8 million in 1984 to 22.8 million in 1994, representing an average annual growth rate of 5.9%.

Table 2.5: Disaggregation of Employment in Urban and Rural Ethiopia

Sector	1984			1994		
	Urban	Rural	Total	Urban	Rural	Total
Agriculture, hunting, forestry and fishing	123,839	12,822,561	12,946,4000	303,735	22,812,222	23,115,957
Mining & Quarrying	4,228	5,688	9,916	7,603	7,600	15,203
Manufacturing	146,434	84,260	230,694	276,489	192,244	468,733
Construction	30,544	6,187	36,731	69,681	8,640	78,321
Electricity, Gas & Water Supply	9,419	817	10,236	19,550	2,068	21,618
Wholesale, Retail Trade & Catering	379,565	180,843	560,408	702,122	386,340	1,088,462
Transport & Related Worker	52,878	8,989	61,867	130,337	13,249	143,586
Bank, Insurance and Business Service	11,084	578	11,662	19,827	424	20,251
Public Adm., Social, Cultural, Recreational, Personal & Household Services	606,907	143,477	750,447	605,740	116,180	721,920

Source: CSA, 1984 and 1994

The trends of wage employment in the modern sector leave much to be desired in Ethiopia. Total wage employment increased from 90,070 (0.6% of the labour force) in 1983/84 to just 95,707 (0.4% of the labour force) in 1999/00. Total wage employment declined by 0.84% per annum during the period 1983/84-1991/92. In the reform period 1992/93-1999/00, total wage employment increased by 1.9% per year. However, the growth rate was well below the growth rate of the labour force and unemployment remained rampant in the urban areas.

According to the 1999 Labour Force Survey, the unemployment rate using the current status approach for the total country was found to be 8.0% in 1999. But the unemployment rate for the urban areas was 26.4%, about five times higher than in the rural areas (5.1%). The incidence of unemployment also varied by sex. In urban areas, unemployment among females was about 34%, compared to 18.3% among males. The same pattern holds true for rural areas, where 8.6% of females and 2.4% of males were reported to be unemployed.

2.3 Trends in poverty

Poverty reduction is a major national agendum in many developing countries. In Ethiopia, poverty reduction is the priority of development policy and a Poverty Reduction Strategy Paper (PRSP) has been prepared. This section presents the poverty profile based on the CSA's (Central Statistical Authority) 1995/96 and 1999/2000 household income, consumption and expenditure surveys (HICE), which were used in the preparation of the PRSP.

The 1995/96 HICE survey covered 11,441 households from eleven regions, eleven major urban centres, and one reporting level for other urban areas, while the 1999/2000 covered 17,332 households from eleven rural areas, fifteen major urban centres, and eleven other urban areas. Hence, there is a difference in the coverage and quality of the HICE surveys conducted in the two periods. Thus, caution must be taken in comparing and interpreting poverty levels for the two periods. The data was compiled and analysed in the report entitled 'Ethiopia: Sustainable Development and Poverty Reduction Program' (MOFED, 2002). Most of the tables in this section are from this particular source.

A much smaller sample size is used in the 1999/00 household survey of the Department of Economics of Addis Ababa University. The sample size for rural households consists of 1576 households in 18 different sites of the country. These sites are located in different regions and agro-ecological zones of the country. A sample of 1500 urban households was drawn from seven major urban centres of the country for the urban areas. The urban centres included Addis Ababa (capital city), Awassa, Bahir Dar, Dessie, Dire Dawa, Jimma, and Mekelle. The distribution of the sample households by the centers is given as 900 households from Addis Ababa, 125 from Dire Dawa, 75 from Awassa, and 100 from each of the other four towns.

2.3.1 Structure of income and consumption
The household income, consumption and expenditure surveys revealed that own agricultural enterprise was the main source of income for the rural population, while wages, salaries, bonuses, overtime payments and allowances were important sources of income for the urban households in 1999/2000 (MOFED, 2002). Agricultural income proxied by rural income per capita has decreased from Birr 1035.33 (US $159.04) in 1995/96 to Birr 994.71(US $121.31) in 1999/00 whereas urban income per capita has increased marginally from Birr 1411.32 (US $ 216.79) in 1995/96 to Birr 1452.54(US $177.14) in 1999/2000. Consistent with the low level of income, food accounted for a significant proportion of households' total expenditure. It accounted for, on average, 60% in 1995/96 and 65% in 1999/2000. Rural households spend a higher proportion of their income on food than their urban counterparts. For example, rural households spend 60% of their budget on food while urban households spend 56% of their budget in 1995/96 (see Table 2.6). The pattern showed no change in the 1999/2000 HICE survey, i.e. while rural households spent 67% of their budget

on food, urban households spent 56% of their budget (MEDaC, 1999; MOFED, 2002).

Table 2.6: Structure of household income and food consumption (percent)

Description\Year	1995/96		1999/2000	
	Income per capita (in Birr)	Food Consumption (%)	Income per capita (in Birr)	Food Consumption (%)
Rural households	1035.33 (US $159.04)	60	994.73 (US $ 121.31)	67
Urban households	1411.32 (US $216.79)	56	1452.54 (US $177.14)	56
National	1087.83 (US $167.10)	60	1056.71(US $ 128.87)	65

Source: MEDaC, 1999 and MOFED, 2002

The national per capita consumption expenditure in real terms was Birr 1088 (US$167.10) and Birr 1057 (US $ 128.87), in 1995/96 and 1999/2000, respectively. In other words, real per capita consumption expenditure has tended to decrease between 1995/96 and 1999/2000. Real per capita consumption expenditure in rural areas declined, compared to a marginal increase in urban areas. On the other hand, rural per capita food consumption increased while declining slightly in urban areas in 1999/2000 (Table 2.7). Nominal per capita consumption expenditures calculated using the University dataset are not very different from these figures (see section 4.4.2).

Table 2.7: Real annual consumption expenditure (in Birr)

Description	1995/96			1999/2000		
	Rural	Urban	National	Rural	Urban	National
Real food expenditure per capita	577	790	607	609	631	612
Real non-food expenditure per capita	466	625	488	392	830	451
Real total expenditure per capita	1035	1411	1088	995	1453	1057
Real food expenditure per adult	697	947	732	774	767	773
Real non-food expenditure per adult	561	750	588	495	993	562
Real total expenditure per adult	1250	1693	1312	1261	1751	1327
Kilo calorie consumed per day per adult**	1938	2050	1954	2723	1861	2606
Share of food in total expenditure (in %)	60	56	60	67	53	65
Gini coefficient (consumption)	0.27	0.34	0.29	0.26	0.38	0.28
Gini coefficient (income)	0.35	0.55	0.39	0.34	0.57	0.38

Source: MOFED, 2002

** The rural and the national calorie intake figures are well over and above the recommended level of 2200 in 1999/2000. Rural calorie intake appears to have increased by 41% in just 5 years (between 1995/96 and 1999/00). There seems to be an error in the data.

The national calorie intake has shown an increasing trend during the indicated period. But calorie intake in urban areas decreased in 1999/2000. This is in line with the decline in real per capita food consumption expenditure (Table 2.7).

The available evidence indicates that consumption inequality is low in Ethiopia. Consumption inequality at the national level, measured by the Gini coefficient, has remained more or less unchanged during the period under consideration. But consumption inequality has increased marginally in urban areas in 1999/2000 as compared to 1995/96. It increased from 0.34 to 0.38 in urban areas, while it decreased from 0.27 to 0.26 in rural areas (Table 2.7).

The Gini coefficients of income distribution are relatively higher, especially in urban areas. Income inequality in urban areas increased from 0.55 in 1995/96 to 0.57 in

1999/00. The corresponding figures were 0.35 and 0.34 in rural areas (Table 2.7). There is a need for a more pro-poor and employment-friendly growth pattern in urban areas.

The distribution of household income/consumption is reported in Table[1] 2.8 using the University dataset. On average, about 84% of the rural sample households and 65% of the urban sample households have an annual income per capita of less than Birr 1,800 (US $219.51) (a monthly income of less than Birr 150 (US $18.29) which is below the minimum wage rate in 1999/00). Only 7% of rural households have an income of more than Birr 2,300 (US $280.49), compared to 24% of urban households. Income/consumption inequality is relatively high in urban areas (0.53) as compared to rural areas (0.37) (Table 2.8).

Table 2.8: Distribution of annual income/consumption per capita (1999/00)

Income interval	Rural	Urban
286-786	39.73	32.73
787-1287	30.77	19.43
1288-1788	13.37	12.67
1789-2289	7.39	9.13
2290-2790	3.44	5.82
2791-3291	1.57	3.23
3292-3792	1.49	2.6
3793-4293	0.52	2.2
4294-4794	0.32	1.26
4795 or above	1.42	10.94
Gini Coefficient	0.37	0.53

Source: Own calculation from the University dataset

2.3.2 Poverty indices

As indicated earlier, poverty indices have been estimated based on the minimum calorie requirement for subsistence (i.e. 2200 kcal) and basic non-food expenditure which together amount to Birr 1075 (US $165.13) per annum, representing the absolute poverty index. The results show that, on aggregate, none of the indicators of poverty indices have shown any significant change between 1995/96 and 1999/2000 (Table 2.9). The head count poverty indices were 45.5% in 1995/96 and 44.2% in 1999/00 at the national level.

Table 2.9: Trends in poverty

Description	1995/96			1999/2000		
	Rural	Urban	National	Rural	Urban	National
Head count index (P_o)	0.475	0.332	0.455	0.454	0.369	0.442
Poverty gap index (P_1)	0.134	0.099	0.129	0.122	0.101	0.119
Squared poverty gap (P_2)	0.053	0.041	0.051	0.046	0.039	0.045

Source: MOFED, 2002

The head count, poverty gap and squared poverty gap indices decreased marginally in rural areas in 1999/00 as compared to 1995/96. However, this decline in poverty is not consistent with the performance of the agricultural sector. It is important to recall that

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[1] The data for urban and rural areas were separately collected in the University dataset. The sample size does not reflect the large proportion of the rural population (relative to the urban areas). Hence, it is impossible to merge the urban and rural data set to get a national picture.

real agricultural output increased by only 1.9% per annum between 1995/96 and 1999/00, compared to the increase of the rural population by about 3% per annum. This apparent decline in per capita output growth is also reflected in the decline of per capita rural income (Table 2.6). The University dataset also indicates that the level of poverty in 1999/00 is much higher than (see section 4.4.2) what is reported in Table 2.9 above (based on government data).

Table 2.9 shows that the head count and poverty gap indices increased while squared poverty gap index declined in urban areas over the same period. Nevertheless, the changes in all the indices are not statistically significant (even at 10%).

Regional disaggregation of poverty indices indicates that the head count, poverty gap and squared poverty gap indices increased in all regions in 1999/2000 except in Amhara, Southern Nations, Nationalities and Peoples (SNNP) and Harari (Table 2.10). The slight decline in the national poverty levels in 1999/00 is attributed to the significant decline in the two regions, namely Amhara and SNNP.

Table 2.10: Regional profile of poverty levels

Regions	Population 1999 (000)	1995/96			1999/2000		
		P_0	P_1	P_2	P_0	P_1	P_2
Tigray	3,593	0.561	0.169	0.071	0.614	0.187	0.074
Affar	1,188	0.331	0.100	0.041	0.560	0.163	0.064
Amhara	15,850	0.543	0.160	0.065	0.418	0.108	0.039
Oromiya	21,694	0.340	0.082	0.029	0.399	0.102	0.037
Somalie	3,602	0.309	0.069	0.023	0.379	0.083	0.028
Benshangul	523	0.468	0.131	0.052	0.540	0.159	0.064
SNNP	12,132	0.558	0.175	0.073	0.509	0.147	0.058
Gambella	206	0.343	0.090	0.033	0.505	0.137	0.052
Harari*	154	0.220	0.050	0.016	0.258	0.050	0.015
Addis Ababa*	2,424	0.302	0.087	0.035	0.361	0.096	0.036
Dire Dawa*	306	0.295	0.068	0.024	0.331	0.077	0.025
Total	61,672	0.455	0.129	0.051	0.442	0.119	0.045

* City states

Source: MOFED, 2002

Harari has the lowest incidence of poverty in both periods. Other city-states such as Addis Ababa and Dire Dawa also have lower levels of poverty than the other regions. The incidence of poverty is the highest in regions such as Tigray and Amhara where drought is a recurrent problem and land degradation is a major constraint to agricultural production. Poverty is also rampant in SNNP, the region with the highest population density. Oromiya, the most populous region in the country, has relatively more favourable natural resources. The Somalie and Afar regions are mostly inhabited by nomadic pastoralists living under very arid conditions.

According to MOFED, aggregate poverty among male headed households, measured by head count index, decreased from 0.461 in 1995/96 to 0.444 in 1999/2000. On the other hand, head count poverty index among female-headed families tended to increase (from 0.425 to 0.434) over the same period (Table 2.11). Surprisingly, the evidence indicates that the head count poverty index is slightly higher for male headed than female headed households in rural areas in both periods. It has been documented that customary laws and practices are patriarchal and have significantly constrained women's access to resources both within and outside the home. For instance, land is managed and administered at the village level by local officials that operate with traditional gender biases. The problem is compounded by the absence of women's

grassroots groups, due to both past experience under the former regime and cultural factors.[2]

Table 2.11: The gender dimensions of poverty

Description		1995/96			1999/2000		
		Rural	Urban	National	Rural	Urban	National
Head count index (P_o)	Male headed	0.477	0.329	0.461	0.455	0.339	0.444
	Female headed	0.460	0.337	0.425	0.447	0.492	0.434
Poverty gap index (P_1)	Male headed	0.135	0.09	0.131	0.123	0.086	0.120
	Female headed	0.129	0.106	0.123	0.118	0.134	0.115
Squared poverty gap (P_2)	Male headed	0.053	0.039	0.051	0.046	0.030	0.045
	Female headed	0.051	0.046	0.049	0.044	0.051	0.043

Source: MOFED, 2002

As expected, poverty is higher in households headed by farmers than non-farmers. About 48% and 45% of the farming households lived below the poverty line in 1995/96 and in 1999/00, respectively (Table 2.12). The corresponding proportion was 35% and 41% among the non-farming households during the period under review.

Table 2.12: The employment dimensions of poverty

	1995/96			1999/2000		
	P_0	P_1	P_2	P_0	P_1	P_2
Farmers	0.475	0.135	0.053	0.452	0.121	0.045
Non-farmers	0.348	0.024	0.104	0.405	0.112	0.043

Source: MOFED, 2002

2.4 Other basic welfare indicators

Apart from income or consumption, education, access to clean water, sanitation, mortality and fertility rates, and life expectancy are important components of welfare. It is widely accepted that human capital accumulation is the engine of socio-economic transformation or development in any country. It is in recognition of this fact that recent growth models incorporate human capital, proxied by skill acquired from education, as an important element of a production function, endogenous to the system. People in the economy accumulate human capital by spending time learning new skills (Jones, 2002). All available evidence indicates that there is an inverse relationship between education and poverty. In Ethiopia, for example, poverty indices are higher for illiterates than literates by 45% in rural areas and by 85% in urban areas (MOFED, 2002).

2.4.1 Illiteracy rate

Despite the critical importance of education, Ethiopia has one of the highest adult and youth illiteracy rates in the world as well as in sub-Sahara African countries (Table 2.13). The adult illiteracy rates for males and females were 57% and 68% in 1999/2000, respectively. The youth illiteracy rates for males and females were 46% and 48%, respectively. By contrast, the sub-Saharan adult illiteracy rates for males and females were 31% and 47%, respectively, while youth illiteracy rates for males and females were 18% and 27%, respectively, in 1999. According to MOFED (2002), the literacy rate amongst the rural population was only 21.8%, compared to 70.4% in urban areas.

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[2] Women's Affairs Office and The World Bank. 1998. Implementing the Ethiopian National Policy for Women: Institutional and Regulatory Issues, Washington D C.

Table 2.13: Country comparisons in education outcomes, 1999

Country	Adult Illiteracy Rate (Aged 15 and above)		Youth Illiteracy rate (Ages15-24)	
	Male	Female	Male	Female
Ethiopia	57	68	46	48
Kenya	12	25	4	6
Tanzania	16	34	7	12
Uganda	23	45	15	29
SSA	31	47	18	27

Source: World Development Indicators, 2000

2.4.2 School enrolment

Gross primary, secondary and tertiary enrolment rates in Ethiopia are also amongst the lowest in the world. The situation has not changed significantly even after the post-reform effort to expand enrolment.

(a) Primary Education

Primary enrolment increased from 496,334 in 1968 to 853,045 in 1973; from 961,580 in 1974 to 3,080,710 in 1990; and from 2,871,325 in 1991 to 7,401,473 in 2001. The enrolment rate in primary education registered a growth of 10.9%, 8.1% and 12% between 1968 and 1973, 1974 and 1990, and 1991 and 2001, respectively (Table 2.14). Enrolment has shown an upward trend in recent years: 58.9% for gross primary enrolment and 33.8% for net primary enrolment[3] in 1999/2000. Both gross enrolment and net enrolment rates were lower for rural areas (52.4% gross enrolment and 28.0% for net enrolment rates in 1999/2000) than for their urban counterparts (105.4% for gross enrolment and 74.5% for net enrolment rates). Similarly, females have lower enrolment rates than males in both rural and urban Ethiopia. The government has set out a goal of achieving universal primary education by the year 2015 (MEDaC, 1999).

Table 2.14: Trends in gross primary school enrolment in Ethiopia[4]

Year	Primary (1-8)	Year	Primary (1-8)
1968	496,334	1985	2,728,253
1969	570,899	1986	2,811,910
1970	653,660	1987	3,160,563
1971	728,548	1988	3,348,049
1972	796,064	1989	3,302,593
1973	853,045	1990	3,080,710
1974	961,580	1991	2,871,325
1975	1,084,406	1992	2,422,746
1976	1,226,124	1993	2,204,697
1977	1,326,765	1994	2,641,067
1978	1,287,087	1995	3,098,422
1979	1,538,579	1996	3,787,919
1980	1,997,040	1997	4,468,294
1981	2,341,437	1998	5,090,670
1982	2,623,116	1999	5,702,233
1983	2,789,107	2000	6,462,503
1984	2,800,695	2001	7,401,473

Source: Ministry of Education, Annual Education Statistics (various issues)

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[3] The net primary enrolment rate is the percentage of students in the primary school age to the total population in the relevant school age.
[4] To ensure consistency with the existing educational arrangement, junior secondary education, which includes grades 7 and 8 before the pre-reform period, is included in the primary category.

As shown in Table 2.15, the number of primary schools has increased from 9,847 in 1995/96 to 11,490 in 1999/2000, representing an average annual growth rate of 3.7 percent. Although the number of schools has been increasing, the growth in the number of students far exceeded that of schools during the post reform period, leading to increased pupil to teacher or section ratio. Accordingly, pupil to section ratio increased from 53 in 1995/96 to 66 in 1999/2000, representing an average annual growth rate of 4.5 percent. Finally, pupil to teacher ratio increased from 37 in 1995/96 to 56 in 1999/00.

Table 2.15: Basic indicators of primary education (1-8)

Indicators	1995/96	1996/97	1997/98	1998/99	1999/2000
Number of:					
Schools	9,847	10,394	10,752	11,051	11,490
Sections	71,865	78,178	85,137	89,937	97,315
Ratios:					
Pupil/Teacher	37	42	47	51	56
Pupil/ Section	53	57	60	63	66

Source: Ministry of Education, Annual Education Statistics Abstract (various issues)

(b) Secondary education

Secondary education in Ethiopia used to be divided into two phases, namely junior and senior secondary education, i.e. 2 years of junior and 4 years of senior secondary years. According to the new education policy, the 2 years of junior schooling have been made part of primary education. The new secondary education is divided into two cycles, with grade 9 and 10 considered as the end of general education while grade 11 and 12 are preparatory levels for tertiary education.

Gross secondary enrolment ratio was 15.5% while net secondary enrolment ratio was 11.5% in 1999/2000 (MOFED, 2002). Both gross and net enrolment ratios were lower for rural (5.9% for gross enrolment and 3.9% for net enrolment ratios) than for urban areas (61.6% for gross enrolment and 47.7% for net enrolment ratios). Females had lower enrolment ratios (13.8% for gross enrolment and 10.7% for net enrolment ratios) than their male counterparts (17.2% for gross enrolment ratio and 12.3% for net enrolment rate). There are also regional variations in terms of enrolment rates. For instance, Addis Ababa, Harari and Dire Dawa have the highest gross and net enrolment rates (68.15%, 49.85, and 41.77% for gross enrolment and 51.95%, 37.28% and 31.42% for net enrolment rates in that order in 1999/2000) (Table 2.16).

Table 2.16 Basic indicators of secondary education (9-12)

Indicators	1995/96	1996/97	1997/98	1998/99	1999/2000
Number of:					
Schools	346	369	382	386	410
Sections	6,358	6,520	6,860	7,258	7,635
Ratios:					
Pupil/Teacher	33	35	38	40	43
Pupil/ Section	63	65	68	71	75

Source: Ministry of Education, Annual Education Statistics Abstract (various issues)

The number of secondary schools has shown an average growth of 3.8% per annum during 1995/96-1999/2000. However, the growth in the number of secondary school teachers has not been commensurate with the growth rate in the number of schools

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and students. Hence, pupil to teacher ratios (PTR) increased from 33% in 1995/96 to 43% in 1999/2000. Similarly, pupil to section increased from 63% in 1995/96 to 75% in 1999/2000.

2.4.3 Access to basic services and other infrastructure and Life expectancy health

The health service coverage in Ethiopia is one of the lowest in the world. The potential health services coverage (PHSC), for instance, was limited to 51.2% of the population in 2000/01. There were only four physicians per 100,000 people in 2000. The average infant mortality rate per thousand was 106.1 and the total fertility rate was 6.8% (OECD, 2001). One in every six children dies before celebrating his/her fifth birthday, with 58% of these deaths occurring during the first year of life (EEA, 2000). Child malnutrition, measured by wasting and stunting, is also a very serious problem in the country. Wasting, which is a short-run indicator of child malnutrition, increased from 9.2% in 1995/96 to 9.6% in 1999/00. In rural areas, child wasting increased from 9.5% in 1995/96 to 9.9% in 1999/00. The figures for the urban areas were 6.8% in 1995/96 and 6.1% in 1999/00. On the other hand, child stunting, a long-run measure of child malnutrition, declined from 66.6% in 1995/96 to 56.8% in 1999/00. It decreased in both rural and urban areas (Table 2.17).

Table 2.17: Child wasting and stunting in Ethiopia (children aged between 6-59 months)

Location	Short-run child malnutrition		Long-run child malnutrition	
	1995/96	1999/00	199596	1999/00
Rural	9.5	9.9	68.4	57.9
Urban	6.8	6.1	55.9	44.5
National	9.2	9.6	66.6	56.8

Source: MOFED, 2002

The majority of the population does not have access to adequate health facilities. The average distance from the residence of a household to the nearest health centre was 7 kms in Ethiopia in 1999/2000 (Table 2.18). About 50% of the population in the country reside over 6 kms away from health centres.

Table 2.18: Average distance to reach health services, 1999/00

Household category	Percentile of individuals					Average
	5	25	50	75	95	
Rural	1	3	6	11	20	7.98
Urban	0	0	1	2	3.5	1.17
National	0	2.5	6	10	18	7.01

Source: MOFED, 2002

The average life expectancy at birth for Ethiopia was 52 years in 1984, compared to 51 years in 1994. Life expectancy has declined further in recent years because of the AIDS pandemic, especially among the working age group. According to the World Bank (World Development Report, 2003), life expectancy at birth was only 42 years in 2000. HIV/AIDS is now the major development challenge facing the country.

Access to economic infrastructure is very important for the welfare of the population. A person living in rural areas, on average, needs to travel 5.9 kms to reach a food market. The average distance to postal service, telephone booth, all weather roads, milling house, and cooking fuel is 21.2, 21.0, 11.4, 4.3 and 1.7 kms, respectively, (Table 2.19).

Table 2.19: Access to other economic infrastructure, average distance in kms, 1999/00

Type of infrastructure	All country	Rural	Urban
Food market	5.19	5.88	1.04
Post office	18.81	21.20	4.64
All weather road	9.77	11.35	0.30
Telephone booth	18.44	20.95	3.62
Milling house	3.74	4.31	0.32
Cooking fuel	1.49	1.66	0.43

Source: MOFED, 2002

Only 3 and 12 percent of the population have access to private and public tap water, respectively. Such safe water source is largely limited to urban areas: 81 percent in urban areas as opposed to just 5 percent in rural areas. The bulk of the rural population (81 %) depend on unprotected well/spring and river/lake/pond (Table 2.20).

Table 2.20: Source of drinking water in rainy season by percent of population, 1999/00

Type of infrastructure	All country	Rural	Urban
Private tap	3.14	0.23	21.16
Public tap	12.47	4.87	59.52
Protected well/spring	10.31	10.87	6.90
Unprotected well/spring	36.71	42.09	3.47
River/lake/pond	34.55	39.35	4.88
Others	2.82	2.60	4.07

Source: MOFED, 2002

To sum up, the socio-economic situations in Ethiopia reached alarming proportions in the 1980s. The golden years of the 1960s gave way to the uncertain 1970s and 1980s, often referred to as the lost decades for Ethiopia. Although the Ethiopian economy has shown improvements in the 1990s, growth has been erratic and uneven. Even if there are some improvements, employment opportunities have been inadequate, and the extent of poverty has remained very high. The rural areas of the country are the origins and sources of widespread poverty, rapid population growth and underemployment. Education and health indicators revealed that social infrastructure is the worst even by sub-Saharan standards.

III. INTER-LINKAGES BETWEEN ECONOMIC GROWTH, EMPLOYMENT AND POVERTY

Employment is expected to serve as the principal channel through which the link between economic growth and poverty can be established. In this regard, it will be important to closely examine wages and earnings as these factors help assess how economic growth and increased productivity get transmitted to the poor. To examine the link between employment and economic growth, it will be important to estimate employment elasticity of economic growth. It can be proposed that the higher employment elasticity of economic growth and productivity, the higher the probability of poverty reduction. In other words, an employment-intensive growth strategy accompanied by a rise in productivity is a key strategy in reducing the level of poverty via the income effect in the short run and through raising the productive capacity of the future workforce in the long run. This chapter attempts to empirically substantiate the nexus between economic growth, employment and poverty alleviation.

3.1. Employment-intensity of growth

The focus here is to investigate the trends in employment and output for various economic activities. Furthermore, sectoral shares of employment and output and their movements overtime will also be assessed. This would help assess if there has been a technological shift in the economy or otherwise. Finally, estimates of sectoral employment elasticities together with economy wide employment elasticities will be examined. Based on the estimates of employment elasticity of output and productivity growths, one can make a case for an employment-intensive growth strategy that is accompanied by a rise in productivity. This would help demonstrate the importance of such a strategy in reducing poverty overtime and also achieve higher economic growth in the future.

3.1.1 Trends in employment and output

(a) Employment trends

Employment in the economy had grown, on the average, by 5.9% from 1984 to 1994. Information obtained from the 1984 and 1994 Population and Housing Censuses were used to calculate sectoral and economy wide employment growth. An additional source of information on employment was the 1999 National Labour Force Survey conducted by the Central Statistical Authority (CSA). As per the Labour Force Survey, economy wide employment has declined, on average, by 0.6% per year since 1994. The decline in employment in 1999 as compared to the level of employment in 1994 might be explained by the fact that the 1994 population census data may not be comparable to the National Labour Force Survey. The focus of the labour force survey is employment while that of the population census is on the population growth and its distribution.

Assuming that the datasets are comparable and reliable, the decline in employment between 1994 and 1999, the period that may be regarded as the post-reform years, comes from the decline in employment in the agricultural sector of the economy. Besides, there was a decline in employment in the transport, storage and communication sector of the economy. On the other hand, it can be seen from Table 3.1 that there was a large increase in employment in the construction, trade and financial intermediation sectors of the economy during the post-reform period. The decline in employment in some sectors and an expansion in other sectors might reflect technological shift in the economy, but needs to be substantiated by the pattern of labour productivity and real wages growth

Table 3.1: Employment growth by major economic sectors, in percent

Sector	1984-1994	1994-1999
Agriculture, Hunting, Forestry & Fishing	6.0%	-2.9%
Mining & Quarrying	4.4%	0.8%
Construction	7.9%	24.2%
Electricity, Gas & Water Supply	7.8%	5.9%
Wholesale, Retail Trade & Catering	6.9%	17.2%
Transport, Storage & Communication	8.8%	-2.7%
Financial Intermediation	5.7%	37.3%
Other Services	2.2%	3.5%
Total	**5.9%**	**-0.6%**

Source: Computed based on data from 1984 & 1994 Population and Housing Censuses and Labour Force Survey

Employment trend in the manufacturing sector

Data on employment in the manufacturing sector is readily available from annual large and medium scale manufacturing industries survey. As can be seen from Table 3.2A, the average employment in this sector declined by about 1.4% on log-linear trend during the pre-reform years. Employment growths in economic activities such as wearing apparel, wood and products of wood, basic iron and steel, machinery and equipment, and furniture manufacturing sub-sectors are well above the population growth during the same period. In most of the sub-sectors of the manufacturing sector of the economy, employment growth was either negative or very low which shows that the manufacturing sector was weak in creating employment opportunities during the pre-reform period.

Table 3.2A: Pre-reform employment growth by industrial group in the manufacturing sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend
Food and Beverages	7.4%	4.9%	1.2%	1.4%	-12.9%	-1.6%	0.5%	-4.3%	-1.3%
Tobacco	-49.8%	9.4%	-16.8%	9.3%	-5.5%	-0.7%	2.1%	4.7%	-5.3%
Textiles	-10.7%	-0.2%	10.8%	4.1%	-22.3%	-2.1%	6.7%	-0.8%	-2.4%
Wearing Apparel, Except Fur Apparel	4.8%	2.2%	4.8%	-2.1%	39.4%	-5.0%	-6.1%	-9.7%	4.3%
Tanning and Dressing of Leather	5.9%	7.4%	-2.1%	12.7%	-3.1%	7.0%	-1.1%	-3.8%	3.0%
Wood and Products of Wood	-10.8%	1.3%	-2.5%	5.5%	78.2%	-11.5%	-8.8%	40.3%	8.9%
Paper, Paper Products and Printing	8.4%	5.3%	3.4%	4.3%	-4.5%	-2.3%	2.3%	-4.0%	1.2%
Chemical and Chemical Products	-9.3%	13.3%	2.1%	-3.9%	-57.7%	7.7%	-1.7%	0.7%	-12.9%
Rubber and Plastic Products	2.7%	-1.1%	7.6%	7.4%	-53.6%	3.2%	1.6%	1.4%	-9.7%
Other Non-Metallic Mineral Products	10.8%	4.1%	-4.8%	4.9%	-20.9%	-8.8%	3.2%	-7.7%	-4.2%
Basic Iron and Steal	2.0%	2.5%	9.0%	15.5%	5.7%	9.4%	-3.6%	2.0%	6.1%
Fabricated Metal Products	12.2%	0.1%	5.9%	3.2%	-53.6%	44.9%	6.3%	6.9%	-3.9%
Machinery and Equipment	2.1%	0.0%	14.4%	-0.9%	147.3%	-1.5%	7.1%	-3.5%	17.4%
Vehicles, Trailers and Semi-Trailers		14.8%	1.1%	5.2%	-14.5%	-3.0%	-1.7%	-9.5%	-2.4%
Furniture, Manufacturing N.E.C	7.0%	5.4%	7.3%	25.3%	13.8%	3.0%	-9.1%	-4.3%	7.1%
Total	**-1.8%**	**3.1%**	**4.6%**	**3.9%**	**-15.7%**	**-1.0%**	**1.9%**	**-1.6%**	**-1.4%**

Source: Computed using time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

The average employment growth in the manufacturing sector during the post-reform period was 1.8% on log-linear trend (Table3.2B), which is well below the average population growth rate. Average employment growth rates in economic activities such as chemical and chemical products, rubber and plastic products, other non-metallic mineral products, vehicles, trailers and semi-trailers, and furniture manufacturing are all well above the

population growth. The retrenchment programme of the reform might explain the decline in employment in 1992/93. A large employment growth in 1993/94 might be due to the reform programme that paved the way for private entrepreneurship. However, employment expansion slowed down after its peak in 1993/94, and the overall employment expansion during the post reform programme was also weak in creating sufficient employment opportunities for the fast growing population. Given the low rate of employment expansion in the manufacturing sector during the post-reform programme, it would be difficult to reduce the prevailing rampant poverty in the country.

Table 3.2B: Post-reform employment growth by industrial group in the manufacturing sector

Industrial Group	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	0.2%	6.9%	-1.6%	0.0%	1.2%	8.1%	4.3%	5.4%	3.0%
Tobacco	6.0%	0.9%	-0.6%	-0.5%	-3.0%	-5.8%	-2.8%	-2.2%	-2.3%
Textiles	-1.5%	2.4%	1.8%	-8.2%	-4.1%	-7.8%	2.2%	-7.5%	-3.7%
Wearing Apparel, Except Fur Apparel	-1.1%	5.7%	-2.3%	3.4%	12.2%	-8.4%	-8.3%	-2.4%	-0.1%
Tanning and Dressing of Leather	-0.2%	15.6%	-2.2%	10.7%	4.7%	-6.8%	-5.7%	-2.8%	1.3%
Wood and Products of Wood	-10.8%	-4.3%	-6.3%	-1.1%	-24.2%	-31.3%	-8.0%	-6.0%	-15.2%
Paper, Paper Products and Printing	0.7%	3.9%	8.4%	11.4%	-8.0%	8.7%	-0.8%	6.8%	3.7%
Chemical and Chemical Products	3.1%	17.4%	27.0%	5.4%	30.5%	11.9%	-4.5%	8.4%	12.8%
Rubber and Plastic Products	1.6%	13.0%	-1.0%	10.7%	8.9%	27.7%	-1.4%	3.6%	8.8%
Other Non-Metallic Mineral Products	3.6%	43.5%	15.2%	14.1%	10.3%	8.2%	-5.1%	6.0%	10.4%
Basic Iron and Steal	1.1%	-1.5%	5.6%	-5.2%	1.1%	0.4%	-1.8%	4.4%	0.1%
Fabricated Metal Products	1.9%	17.8%	13.1%	-2.1%	-6.6%	1.3%	6.0%	22.9%	4.3%
Machinery and Equipment	2.9%	1.4%	0.0%	60.6%	15.7%	-25.1%	10.9%	-34.5%	4.1%
Vehicles, Trailers and Semi-Trailers	-1.4%	5.8%	4.7%	76.5%	15.1%	10.2%	29.0%	48.7%	22.6%
Furniture, Manufacturing N.E.C	-1.3%	52.3%	5.2%	5.8%	53.8%	14.6%	-2.8%	-0.8%	15.4%
Total	**-0.6%**	**8.0%**	**2.0%**	**0.6%**	**2.2%**	**0.9%**	**0.4%**	**1.4%**	**1.8%**

Source: Computed using time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

(b) Output trends

Real output growth for the pre-reform programme, where output is taken to be gross domestic product at constant factor cost, was in the order of 2.3 percent per annum on a log-linear trend (Table 3.3A). The maximum output growth was attained in 1986/87, which was 14.1%, and the minimum output growth occurred during the 1984/85 drought. During the pre-reform years, the mining and quarrying sector attained the maximum output growth (7.8%) followed by the distributive and other services sector (6.3%). Real output growths were either negative or very low for most years in other economic sectors. The turbulent period of the transition from the command economy to the market-oriented economy in 1990/91-1991/92 was marked by a fall in real output.

Table 3.3A: Pre-reform growth rates of real output by major economic sectors, in %

Sector/Sub-Sector	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend
Agriculture & Allied Activities	-20.9%	16.0%	18.8%	-2.8%	1.0%	5.3%	5.2%	-2.7%	3.6%
Mining & Quarrying	30.3%	-1.3%	-11.9%	-21.4%	21.2%	-5.4%	171.4%	-25.2%	7.8%
Manufacturing	-5.6%	12.3%	10.4%	0.0%	-3.9%	0.4%	-32.0%	-5.5%	-3.0%
Electricity & Water	5.1%	7.3%	5.4%	6.2%	4.1%	2.4%	3.0%	3.9%	4.6%
Construction	20.8%	-1.4%	5.9%	-12.7%	-17.2%	-19.6%	-9.5%	-14.5%	-8.9%
Trade, Hotels & Restaurants	-2.6%	-1.1%	23.0%	1.9%	-10.4%	7.8%	-31.9%	-14.8%	-3.1%
Transport & Communications	8.7%	12.5%	1.2%	6.5%	4.4%	-1.4%	-7.5%	14.6%	3.7%
Banking, Insurance & Real State	-1.8%	3.8%	12.7%	6.5%	0.7%	1.5%	-6.4%	-5.1%	2.4%
Public Administration & Defence	6.5%	3.8%	3.7%	9.5%	12.9%	8.9%	-14.1%	-14.6%	3.4%
Education & Health	3.7%	1.9%	4.4%	3.0%	5.8%	2.4%	5.6%	4.5%	3.8%
Domestic & Other Services	6.6%	5.9%	5.6%	6.1%	6.9%	7.3%	7.4%	6.1%	6.3%
GDP at Constant Factor Cost	**-9.7%**	**9.9%**	**14.1%**	**0.0%**	**0.4%**	**4.1%**	**-4.3%**	**-3.7%**	**2.3%**

Source: Computed based on National Accounts Statistics from Ministry of Finance and Economic Development.

After the adoption of the structural adjustment programme, which called for substantial macroeconomic policy changes, sectoral output growth rates were fairly reasonable except for the crop failure in the agricultural sector in 1997/1998 and the slowdown in the output growth in 1998/99-1999/00 following the war with Eritrea. The average growth rate of real output during the post-reform years was in the order of 4.6% per annum (Table 3.3B).

Table 3.3B: Post-reform growth rates of real output by major economic sectors, in percent

Sector/Sub-Sector	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Agriculture & Allied Activities	6.1%	-3.7%	3.4%	14.7%	3.4%	-11.2%	3.8%	2.2%	1.9%
Mining & Quarrying	46.5%	-21.2%	8.9%	13.1%	13.0%	10.1%	9.4%	9.5%	7.5%
Manufacturing	36.1%	8.9%	9.0%	1.0%	5.6%	-1.2%	13.7%	3.4%	5.0%
Electricity & Water	5.9%	5.1%	5.5%	-7.3%	5.9%	3.7%	1.3%	3.9%	2.1%
Construction	26.9%	9.4%	7.5%	7.4%	8.7%	8.6%	1.5%	-4.5%	5.9%
Trade, Hotels & Restaurants	36.8%	6.5%	8.7%	8.5%	8.4%	4.5%	6.4%	3.9%	6.7%
Transport & Communications	7.1%	5.7%	3.4%	9.5%	6.8%	7.2%	-0.5%	12.8%	6.0%
Banking, Insurance & Real State	9.1%	10.3%	8.3%	8.6%	8.5%	5.1%	4.2%	9.4%	7.2%
Public Administration & Defence	30.2%	10.7%	9.4%	4.8%	6.6%	24.6%	15.7%	14.5%	11.3%
Education & Health	1.9%	7.6%	4.7%	4.1%	4.2%	6.7%	8.2%	5.6%	5.5%
Domestic & Other Services	6.1%	5.9%	5.3%	5.5%	5.0%	3.6%	4.0%	3.8%	4.6%
GDP at Constant Factor Cost	**12.0%**	**1.7%**	**5.4%**	**10.2%**	**5.1%**	**-1.4%**	**6.0%**	**5.3%**	**4.6%**

Source: Computed based on National Accounts Statistics obtained from Ministry of Finance and Economic Development

(C) Output trends in the manufacturing sector

Trends in output growths, where output in this particular case is meant to be value added at current factor cost, for the various economic activities in the manufacturing sector of the economy, are detailed in Table A3.1 of the annex. The pre-reform average growth was about 8.2% below zero on a linear trend. During this period, tobacco, tanning and dressing of leather and manufacture of furniture were the only activities that registered a positive growth. Most of the manufacturing activities had negative output growth before the structural adjustment programme was adopted in 1992/1993. The large fall in value added at current factor cost in the manufacturing sector in 1988/89 might be the result of the intensified civil war against the then military government. Similarly, a large fall in value added was registered in 1990/91-1991/92 following the political instability and the difficult transition from a command economy to a market oriented economy.

After the adoption of the structural adjustment programme in 1992/93, output growth turned out to be high for most of the activities in the manufacturing sector. The average annual growth during the post-reform programme was about 13.5% on a log-linear trend (TableA3.1). The high growth rate of 1992/93 was actually due to the recovery from a very low base. Growth in the manufacturing sector during the post-reform programme appeared to be satisfactory with the exception of the slowdown in 1996/97 and a fall in 1997/98. The fall in 1997/98 might be the result of droughts, (which led to a negative growth rate of 11.2% in agricultural GDP). However, manufacturing activities such as textiles, wearing apparel, and wood and products of wood registered a negative growth even after the reform programme

3.1.2 Sectoral shares of employment and output

(a) Employment share

The agricultural sector is the leading sector in terms of employment share. According to the 1984 and 1994 population and housing censuses, about 89% of the total population are engaged in agricultural activities. The manufacturing sector of the economy accounted for about 2% of employment while wholesale, retail trade and catering constituted about 4% of the employment. The employment share of domestic and other services sector of the economy stood at about 4% to 5% of total employment. The remaining sectors of the economy employed about 1% of the total workforce in the economy.

However, the 1999 National Labour Force Survey of CSA suggests that the structure of sectoral employment has changed significantly. According to this survey, the agricultural sector accounted for about 80% of the employment followed by wholesale, retail trade and catering sectors of the economy, which stood at about 10%. The manufacturing sector, which accounted for only about 2% in 1984 and 1994, had an employment share of 4.4% in 1999 (Table 3.4). It seems that there is a shift of employment from the agricultural sector of the economy to the wholesale, retail trade and catering services.

Table 3.4: Employment share by major economic sectors, in percent

Sector	1984	1994	1999
Agriculture, Hunting, Forestry & Fishing	88.6%	89.3%	79.6%
Mining & Quarrying	0.1%	0.1%	0.1%
Manufacturing	1.6%	1.8%	4.4%
Construction	0.3%	0.3%	0.9%
Electricity, Gas & Water Supply	0.1%	0.1%	0.1%
Wholesale, Retail Trade & Catering	3.8%	4.2%	9.6%
Transport, Storage & Communication	0.4%	0.6%	0.5%
Financial Intermediation	0.1%	0.1%	0.4%
Other Services	5.1%	3.6%	4.4%
Total	**100%**	**100%**	**100%**

Source: Computed based on data from the 1984 and 1994 Population and Housing censuses and the 1999 National Labour Force Survey.

The trend of employment, according to the Annual Survey of Large and Medium Scale Manufacturing Industries, reveals that the employment share of the various sub-sectors of the manufacturing sector remained almost the same for seventeen

years, from 1983/84 to 1999/00, signalling the absence of any structural shift within the manufacturing sector. Among the fifteen manufacturing activities, food and beverages had an average employment share of about 28% during the pre-reform period and this share declined to 27% in the post-reform period. On the other hand, textiles accounted for an average employment share of about 37% during the pre-reform period and about 30% in the post-reform period. Altogether these two sub-sectors constituted about 65% of total employment in the manufacturing sector during the pre-reform period, compared to 57% during the post-reform period (Table A3,2).

(b) Output share

The agricultural sector, which accounted for an average share of about 52% during the pre-reform period, was the largest contributor to the gross domestic product. The next largest contributing sector to GDP (measured at constant factor cost) was the trade, hotels and restaurants sector, which accounted for an average share of about 9.2%. Over the same period, the public administration and defence sector was the third largest contributor to GDP, with a share of 8.7%. The dominance of agriculture has continued after the reform programme in 1992/93 when the average share of the sector was about 49%, but has since declined to about 44% in 1999/00.

The share of trade, hotels and restaurants averaged 8.3%, compared to 9.2% during the pre-reform period. The output share of the public administration and defence sector surprisingly started to rise after the reform programme in 1992/93. The average output share of the sub-sector stood at 11.7%, against an average share of 8.7% during the pre-reform period. A significant rise in the output share of the public administration and defence sector was registered after the boarder conflict between Ethiopia and Eritrea. This sub-sector was the second largest contributor to GDP during the post-reform period (Table3.5).

Within the manufacturing sector, the food and beverages sub-sector accounted for about 31% during the post-reform period. The second largest contributor was the chemicals and chemical products followed by textiles. These two activities accounted for about 34% of the manufacturing output.

Between 1994 and 1999, the employment share of the agriculture sector declined from about 89% to about 80%. At the same time, the output share of this sector declined from about 50% to about 44%. These facts taken together may be an indicative of a slight sectoral shift from occupations with lower productivity to relatively high-paying economic activities. The employment share of the trade and catering sector of the economy, for example, rose to 9.6% in 1999, compared to 4.2% in 1994. But the rise in the output share of trade and catering was marginal (from 8% to 9%) over the same period.

In general, given the trends in sectoral shares of employment and output before and after the reform programme, one can easily conclude that there was no structural shift in the economy. The agricultural sector has remained the source of livelihood for the majority of the working labour force and the largest contributor to GDP.

Table 3.5: Percentage distribution of gross domestic product by industrial sector at 1980/81 constant factor cost, in percent

Sector/SubSector	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Average	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	Average
Agriculture & Allied Activities	53.3%	46.7%	49.3%	51.3%	49.9%	50.3%	50.9%	55.9%	56.5%	51.7%	53.5%	50.7%	49.7%	51.7%	50.9%	45.9%	44.9%	43.6%	48.6%
Mining & Quarrying	0.2%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.5%	0.4%	0.3%	0.5%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.4%
Manufacturing	7.2%	7.6%	7.7%	7.5%	7.5%	7.2%	6.9%	4.9%	4.8%	6.8%	5.9%	6.3%	6.5%	5.9%	6.0%	6.0%	6.4%	6.3%	6.2%
Electricity & Water	1.3%	1.6%	1.5%	1.4%	1.5%	1.6%	1.5%	1.6%	1.8%	1.5%	1.7%	1.7%	1.7%	1.5%	1.5%	1.5%	1.5%	1.5%	1.6%
Construction	4.0%	5.3%	4.8%	4.4%	3.9%	3.2%	2.5%	2.3%	2.1%	3.5%	2.3%	2.5%	2.6%	2.5%	2.6%	2.9%	2.7%	2.5%	2.6%
Trade, Hotels & Restaurants	9.9%	10.7%	9.6%	10.4%	10.6%	9.4%	9.8%	7.0%	6.2%	9.2%	7.5%	7.9%	8.1%	8.0%	8.3%	8.8%	8.8%	8.7%	8.3%
Transport & Communications	4.5%	5.4%	5.5%	4.9%	5.2%	5.4%	5.1%	5.0%	5.9%	5.2%	5.7%	5.9%	5.8%	5.7%	5.8%	6.3%	6.0%	6.4%	6.0%
Banking, Insurance & Real State	5.8%	6.3%	5.9%	5.9%	6.2%	6.3%	6.1%	6.0%	5.9%	6.0%	5.7%	6.2%	6.4%	6.3%	6.5%	7.0%	6.8%	7.1%	6.6%
Public Administration & Defence	7.7%	9.1%	8.6%	7.8%	8.5%	9.6%	10.0%	9.0%	8.0%	8.7%	9.3%	10.1%	10.5%	10.0%	10.1%	12.8%	14.0%	15.2%	11.7%
Education & Health	2.9%	3.3%	3.1%	2.8%	2.9%	3.0%	3.0%	3.3%	3.6%	3.1%	3.3%	3.5%	3.4%	3.2%	3.2%	3.5%	3.6%	3.6%	3.4%
Domestic & Other Services	3.3%	3.9%	3.7%	3.4%	3.6%	3.9%	4.0%	4.5%	5.0%	3.9%	4.7%	4.9%	4.9%	4.7%	4.7%	4.9%	4.8%	4.8%	4.8%
GDP at Constant Factor Cost	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Computed based on the National Accounts data from the Ministry of Finance and Economic Development

Table 3.6: Share of value added by industrial group in the manufacturing sector

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Average	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	31.1%	33.1%	30.0%	22.1%	25.1%	36.1%	35.9%	40.5%	33.9%	30.8%	26.9%	30.7%	37.4%	41.2%	39.4%	34.3%	46.7%	44.1%	39.3%
Tobacco	3.6%	5.9%	3.5%	5.0%	4.0%	6.2%	7.7%	10.9%	11.7%	5.9%	6.8%	4.8%	4.2%	4.8%	3.9%	6.5%	6.8%	6.6%	5.6%
Textiles	18.9%	12.7%	13.7%	15.7%	15.4%	18.2%	17.3%	13.3%	14.9%	15.6%	18.5%	16.7%	12.3%	9.8%	8.3%	8.1%	6.0%	5.7%	9.5%
Wearing Apparel	2.1%	2.4%	2.0%	1.3%	1.3%	2.7%	4.5%	3.6%	2.2%	2.3%	2.6%	1.8%	1.1%	1.0%	0.9%	0.4%	0.6%	0.6%	1.0%
Leather	3.8%	3.4%	3.1%	4.1%	6.9%	9.8%	9.2%	7.9%	6.1%	5.7%	11.2%	10.6%	10.0%	9.1%	10.6%	6.8%	7.1%	4.4%	8.2%
Wood	1.7%	1.2%	1.5%	0.9%	1.3%	1.9%	2.1%	2.0%	1.7%	1.5%	1.7%	2.4%	2.4%	2.0%	1.5%	1.1%	0.7%	0.5%	1.4%
Paper and Printing	6.2%	6.4%	6.2%	5.4%	4.6%	6.6%	5.9%	7.2%	10.6%	6.2%	8.3%	7.6%	5.6%	6.6%	5.6%	7.1%	5.4%	5.7%	6.3%
Chemicals	21.5%	20.4%	26.3%	34.2%	26.8%	3.4%	3.6%	2.6%	4.2%	18.7%	5.9%	5.3%	4.3%	3.2%	4.9%	10.0%	3.8%	5.0%	5.2%
Rubber and Plastic	4.1%	4.8%	5.0%	4.0%	4.5%	3.0%	3.7%	2.5%	4.6%	4.1%	4.8%	4.6%	3.8%	3.3%	4.5%	5.2%	4.9%	4.4%	4.4%
Other Non-Metallic Mineral	2.5%	3.3%	2.7%	1.6%	3.0%	4.3%	3.9%	3.4%	5.0%	3.1%	5.2%	6.2%	8.3%	9.5%	11.1%	12.2%	8.7%	8.7%	9.1%
Iron and Steal	1.4%	1.2%	0.5%	1.0%	1.6%	1.7%	0.7%	2.0%	1.5%	1.2%	2.4%	3.6%	4.6%	3.3%	3.5%	2.8%	1.8%	2.1%	2.9%
Fabricated Metals	2.2%	2.7%	2.6%	2.4%	2.2%	1.4%	2.0%	1.1%	-0.3%	2.0%	1.6%	1.9%	1.7%	2.0%	1.8%	1.4%	1.3%	1.4%	1.6%
Machinery and Equipment	0.1%	0.2%	0.1%	0.1%	0.1%	0.3%	0.3%	0.1%	-0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.2%
Vehicles	0.0%	1.4%	1.9%	1.3%	2.4%	2.7%	1.5%	1.3%	1.7%	1.6%	2.8%	1.9%	2.5%	2.4%	1.7%	1.0%	4.2%	8.7%	3.6%
Furniture	0.8%	0.8%	0.9%	0.7%	0.9%	1.6%	1.8%	1.7%	2.4%	1.2%	1.3%	1.5%	1.6%	1.5%	2.0%	2.8%	1.9%	1.7%	1.9%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Computed based on from Annual Survey of Large and Medium Scale Manufacturing industries.

3.1.3 Employment intensity of output

Estimation of employment intensity of output can be carried out either econometrically or using the method of arc elasticities.

(a) Arc elasticities

The estimated arc employment elasticities of output do fluctuate from period to period for most of the sectors of the economy, reflecting the variability in employment and output growths. During the time span of 1984-1994 (the period which approximates the pre-reform years), agriculture, manufacturing, and trade, hotels and restaurants sectors of the economy were the most employment intensive sectors of the economy. In these three sectors, a one percent increase in output led to about 2%, 5% and 16% increase in employment in agriculture, manufacturing, and trade, hotels and restaurants, respectively. On the other hand, during the time period of 1994-1999 (post-reform period), a one percent increase in output in agriculture, manufacturing, and trade, hotel and restaurant sectors led to a 1.2% fall, 3.9% and 2.5% rise in employment, respectively (Table 3.7). This shows that arc employment elasticities of output were very volatile during the two periods. The estimated arc employment elasticities of output for the whole time span of 1984-1999 lie between the estimated employment elasticities of output for the periods 1984-1994 and 1994-1999 with the exception of the estimate for the construction sector. A very high but negative estimate of the arc employment elasticity of output for the construction sector during the time span of 1984-1999 is due to the fact that the sector's output growth declined marginally while the corresponding employment growth was very large.

The estimated elasticities for major economic sectors of the economy suggest that investment in agriculture, manufacturing, and trade, hotel and restaurant sectors would create higher employment opportunities, thereby reducing the prevailing poverty in the country. However, this employment expansion was not accompanied by a rise in labour productivity as the estimated arc elasticities for these sectors were all above unity. An employment expansion that is not accompanied by a rise in productivity cannot be claimed to help reduce poverty. The only sectors in which employment expanded together with a rise in productivity were the mining and quarrying, transport, storage and communications, and domestic and other services (Table3.7). Interventions and investments in these sectors can be regarded as worthwhile in reducing poverty. As can be seen from Table 3.7, the sectoral arc elasticities were falling over time, which may be a sign of revival in output growth after the adoption of the structural adjustment programme.

Most of the estimated sectoral arc elasticities showed that labour productivity has been falling over time in those sectors for which employment elasticities of output were more than unity. Theoretically, employment elasticities are expected to fall gradually over time as the country becomes more developed and relatively less labour abundant. However, the fall in overall and sectoral employment elasticities of output from the 1984-1994 period to the 1994-1999 period may be a sign of unreliable data (obtained from the 1984 and 1994 population censuses and the 1999 National Labour Force Survey), not an indication of economic maturity.

Table 3.7: Arc elasticity of employment by major economic sectors

Sector	Arc Elasticity		
	1984-1994	1994-1999	1984-1999
Agriculture, Hunting, Forestry & Fishing	2.02	-1.21	1.06
Mining & Quarrying	0.54	0.07	0.35
Manufacturing	5.06	3.86	4.28
Construction	-2.66	4.45	-54.56
Electricity, Gas & Water Supply	1.60	3.83	1.91
Wholesale, Retail Trade & Catering	16.18	2.53	4.07
Transport, Storage & Communication	1.86	-0.44	0.92
Financial Intermediation	1.64	5.30	3.30
Other Services	0.41	0.37	0.40
Total	**1.91**	**-0.23**	**0.94**

Source: Own estimates

(b) Econometric estimates

The econometrically estimated employment elasticity of output for the manufacturing sector contrasts sharply with the arc employment elasticity of output.[5] The estimate based on the latter approach is 3.86 for the period 1984-1999, compared to 0.1 using the former estimate (Table 3.8). This further signifies the volatility of the estimated arc employment elasticity of output.

Employment elasticities of output were econometrically estimated for all the fifteen sub-sectors of the manufacturing sector, and all the estimated elasticities are below 0.5 and some are even negative with the exception of the furniture manufacturing sub-sector, which stood at about unity. The estimated elasticities show that the manufacturing sector of the economy is not as labour intensive as the arc employment elasticities suggest. However, the manufacturing sector could potentially be labour intensive depending on the choice of technology.

Econometrically estimated employment elasticities of output for the various sub-sectors of the manufacturing sector suggest that employment expansion in most of the activities was accompanied by productivity growth which is the necessary condition for reducing the prevailing poverty via increased real wages and earnings. Investment in those economic activities for which the employment elasticity of output is lower than unity is potentially capable of reducing poverty, which help households to spend more on education and skill formation of their children. This in turn would help raise the productive capacity of the future workforce, and thus generate higher economic growth and productivity in the future.

The estimates of employment elasticities of capital intensity for the various sub-sectors of the manufacturing sector and the overall estimate indicate that, on the average, the higher the growth in capital intensity the lower the growth in employment, which shows an inverse relationship between growth in employment and growth in capital intensity

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[5] It should be noted that such econometric elasticities couldn't be determined for the other sectors due to lack of time-series data.

Table 3.8: Econometrically Estimated Sectoral Elasticities[6].

Industrial Group	Employment Elasticity of output	Employment Elasticity of capital Intensity
Food and Beverages	-0.02*	0.18
Tobacco	-0.11*	-0.05
Textiles	0.09	0.10*
Wearing Apparel, Except Fur Apparel	0.05*	-0.14
Tanning and Dressing of Leather	0.07	-0.06*
Wood and Products of Wood	0.19*	-0.52
Paper, Paper Products and Printing	0.05*	0.10
Chemical and Chemical Products	0.26	0.16
Rubber and Plastic Products	0.45	-0.10
Other Non-Metallic Mineral Products	0.39	-0.02*
Basic Iron and Steal	-0.06	-0.10
Fabricated Metal Products	0.38	0.04*
Machinery and Equipment	0.47	0.43
Vehicles, Trailers and Semi-Trailers	0.30	0.58*
Furniture, Manufacturing N.E.C	0.97	-0.20
Manufacturing Sector	**0.07**	**-0.65**

Source: Own estimates based on time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

- Refers to estimates that are not statistically different from zero at 10% level of significance.

3.2   Employment, productivity, real wage earnings and poverty

This section is devoted to the discussion of the inverse relationship between employment growth and productivity, sources of output growth, trends in real wage earnings and poverty. In this connection, employment and productivity effects as sources of output growth for the various sectors of the economy will be assessed. Furthermore, attempt will be made to estimate agricultural productivity and income as well. Finally, the nexuses between economic growth, employment expansion and poverty reduction will be assessed.

3.2.1   Sources of Output Growth

During the pre-reform period of 1984/85-1991/92, sectoral as well as economy-wide output growths were mainly due to employment expansion rather than productivity growth with the exception of mining and quarrying, construction, trade hotels and restaurants, and domestic and other services sectors. During the same period,

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[6] Labour productivity, output and employment growths can be related to employment elasticity of output as follows: Let P = Labour Productivity, Y = Output and N = employment, and P = Y/N. Then,

$$\frac{dP}{dt} = P(g_y - g_n) \quad \text{where } g_y \text{ represents output growth and } g_n \text{ denotes employment growth}$$

$$g_p = g_y\left(1 - \frac{g_n}{g_y}\right) \quad \Leftrightarrow \quad g_p = g_y(1 - e_n)$$

where g_p denotes productivity growth and e_n is employment elasticity of output

construction and trade, hotels and restaurants experienced a negative employment effect showing that output expansion in these sectors was caused by productivity effect rather than employment expansion (Table3.9).

The economy-wide output expansion during the post-reform period, 1992/3-1999/00, was largely driven by productivity growth, which was accompanied by the decline in economy- wide employment expansion. But the pattern of growth varied from one sector to another. Some of the sectors experienced productivity growth while others faced employment expansion. The sources of output expansion for the agricultural and electricity and water sectors were mainly employment expansion with negative productivity effect. Over the same period, the source of output growth for the remaining sectors of the economy was productivity rather than employment effect. Productivity-led growth in these sectors, with the exception of construction, trade, hotels and restaurants, and domestic and other services where employment had been slightly rising, was not accompanied by employment expansion as compared to the pre-reform period (Table 3.9). As a result, the growth path during the post-reform period has not helped reduce the widespread poverty in the country.

Table 3.9: Decomposing output (value added at constant factor cost) growth by major economic sectors

Sector	Productivity Effect		Employment Effect		Multiple Effect	
	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform
Agriculture & Allied Activities	0.39	-0.20	0.62	1.21	0.24	-0.24
Mining & Quarrying	0.71	0.70	0.29	0.30	0.21	0.21
Electricity & Water	0.52	-0.08	0.49	1.09	0.25	-0.08
Construction	1.25	0.63	-0.25	0.38	-0.31	0.24
Trade, Hotels & Restaurants	1.71	0.67	-0.72	0.33	-1.23	0.22
Transport & Communications	0.39	0.63	0.61	0.38	0.24	0.24
Banking, Insurance & Real State	0.06	0.69	0.95	0.31	0.06	0.22
Public Administration & Defence	0.35	0.80	0.66	0.20	0.23	0.16
Education & Health	0.42	0.60	0.59	0.41	0.25	0.24
Domestic & Other Services	0.65	0.52	0.36	0.49	0.23	0.25
Total	**0.18**	**0.51**	**0.98**	**0.49**	**0.18**	**0.25**

Source: Own estimates

(a) Sources of output growth for the manufacturing sector

The sources of output growth for the manufacturing sector were assessed for two periods, before and after the adoption of the structural adjustment programme. Before the adoption of the structural adjustment programme (1983/84-1991/92), the sources of output growth for the manufacturing sector, with the exception of furniture manufacturing, were mainly due to productivity growth instead of employment expansion (Table 3.10). During the pre-reform period, food and beverages, textiles, chemicals and chemical products, rubber and plastic products, and fabricated metal products manufacturing experienced productivity growth accompanied by employment expansion. Over the same period, the employment effect was negative for most of the economic activities of the manufacturing sector, indicating that output growth was not accompanied by employment expansion.

After the adoption of the structural adjustment (1992/93-1999/00), the sources of output growth for the manufacturing sector were largely due to the productivity effect and employment expansion was minimal in all the manufacturing activities. The rise in labour productivity as a source of output growth was not accompanied by a rise in employment for most of industrial groups under the manufacturing sector. Of the fifteen industrial groups, productivity growth in twelve economic activities was the main source of output expansion during the post-reform period. Thus, it can be claimed that the post-reform period is characterized by improvement in economic efficiency as shown by the rise in productivity effect. On the other hand, this period, to some extent, is also characterized by employment contraction, which is an indication of the inverse relationship between employment expansion and productivity growth (Table 3.10.[7]).

Table 3.10: Decomposing output growth by industrial group in the manufacturing sector

Industrial Group	Productivity Effect		Employment Effect		Multiple Effect	
	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform
Food and Beverages	0.94	0.74	0.10	0.06	-0.04	0.20
Tobacco	3.52	1.22	-0.76	-0.06	-1.76	-0.16
Textiles	0.86	24.16	0.29	-18.31	-0.15	-4.84
Wearing Apparel, Except Fur Apparel	1.20	0.92	-0.48	0.10	0.28	-0.02
Tanning and Dressing of Leather	1.76	0.54	-1.18	0.40	0.42	0.06
Wood and Products of Wood	1.46	46.80	-1.73	-17.69	1.27	-28.11
Paper, Paper Products and Printing	1.72	0.55	-0.94	0.26	0.22	0.18
Chemical and Chemical Products	0.87	0.10	0.60	0.77	-0.47	0.14
Rubber and Plastic Products	0.04	0.35	0.98	0.38	-0.02	0.27
Other Non-Metallic Mineral Products	10.86	0.32	-7.60	0.28	-2.26	0.40
Basic Iron and Steal	1.36	0.96	-1.04	0.01	0.68	0.02
Fabricated Metal Products	1.00	0.42	0.06	0.32	-0.06	0.26
Machinery and Equipment	0.82	0.94	-1.40	0.03	1.58	0.02
Vehicles, Trailers and Semi-Trailers	0.00	0.13	0.00	0.40	1.00	0.47
Furniture, Manufacturing N.E.C	-0.08	0.16	1.13	0.55	-0.05	0.29
Total	**0.91**	**0.80**	**0.16**	**0.07**	**-0.07**	**0.13**

Source: Own estimates based on time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

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[7] The symbolic decomposition of output growth into (a) employment effects, (b) productivity effect and (c) multiple effects is as follows. Let Y = Output, N = Employment and P = Productivity, then

Y = N*P. Hence change in output can be written as:

$\Delta Y = P\Delta N + N\Delta P + \Delta N*\Delta P$

Dividing the above equation by ΔY we obtain the following:

(a) Employment Effects $= P\dfrac{\Delta N}{\Delta Y}$

(b) Productivity Effect $= N\dfrac{\Delta P}{\Delta Y}$

(c) Multiple Effect $= \dfrac{\Delta N.\Delta P}{\Delta Y}$

3.2.2 Trends in income, productivity and poverty

This section assesses the trends in income, productivity and poverty. It has been hypothesized that, during the course of development, there is an inverse relationship between labour productivity and employment growth. To this end, an attempt will be made to assess the relationship between productivity and employment growth using the data for the various sectors of the economy. Four different scenarios can be considered regarding the relationship between productivity and employment growth. First, there may be a positive growth in productivity accompanied by employment expansion, indicating a healthy economic growth. The second scenario is a situation where there may be low or even negative growth in both employment and labour productivity, a sign of sectoral recession or slowdown of economic activities. The third scenario refers to a situation where there may be low or negative productivity growth accompanied by employment expansion, leading to sectoral stagnation – a characteristic of a refugee sector. The last scenario refers to a case where there may be negative employment expansion and a positive productivity growth, indicating the occurrence of technological shift in the sector. The link between sectoral and economy-wide employment expansion and output growth will be examined to establish which of the different scenarios apply to the Ethiopian case.

Inter-temporal variations in real wages will be examined for employees in the various activities of the manufacturing sector for which sufficient time series data are available. Time series data on wages and earnings in the manufacturing sector are obtained from the annual large and medium scale manufacturing surveys of the CSA.

3.2.2.1 Real wage earnings and productivity in the non-agricultural sector

The average economy-wide real labour productivity growth during the pre-reform period was found to be only 0.4% per annum on a linear trend, with the smallest productivity growth of 11.7% below zero registered for the year 1984/85 (the drought year) and the highest productivity growth of 11.6% recorded in 1986/87. The lower and upper bounds on the economy wide real labour productivity growth indicate that the growth in labour productivity was highly fluctuating during the pre-reform period. In terms of average real labour productivity, mining and quarrying (5.6%) followed by the domestic and other services (4.1%) were the sectors that registered the highest real labour productivity growth. Employment expansion in these two sectors during the pre-reform period was found to be 4.4% for the mining and quarrying and 2.2% for the domestic and other services. High employment expansion accompanied by high productivity growth in these two sectors indicates a healthy economic expansion. These growth rates are well above the growth in the labour force and if such growth rates were sustained for a longer period of time they would have helped reduce the prevailing poverty to some extent. During the pre-reform period, the trade, hotels and restaurants, and construction sectors of the economy registered average real labour productivity growths of negative 11.1% and 5.4%, respectively. The corresponding sectoral employment expansion stood at 7.9% and 6.9% per annum. A very low or negative labour productivity accompanied by a high employment expansion is a characteristic of a sector that stagnates or serves as a refugee

sector. Hence, based on the available data, it would be possible to claim that trade, hotels and restaurants, and construction served as refugee sectors (Table3.11A).

Table 3.11A: Pre-reform real labour productivity growth by major economic sectors**

Sector/SubSector	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Average
Agriculture & Allied Activities	-22.6%	13.5%	16.2%	-4.9%	-1.2%	3.0%	2.9%	-4.9%	1.4%
Mining & Quarrying	27.5%	-3.5%	-13.8%	-23.1%	18.5%	-7.5%	165.4%	-26.8%	5.6%
Electricity & Water	2.8%	5.0%	3.1%	3.9%	1.8%	0.2%	0.8%	1.6%	2.4%
Construction	18.1%	-3.6%	3.6%	-14.6%	-19.0%	-21.4%	-11.5%	-16.3%	-11.1%
Trade, Hotels & Restaurants	-4.7%	-3.3%	20.3%	-0.3%	-12.3%	5.4%	-33.4%	-16.6%	-5.4%
Transport & Communications	6.3%	10.0%	-1.1%	4.1%	2.1%	-3.6%	-9.5%	12.1%	1.4%
Banking, Insurance & Real State	-3.9%	1.5%	10.2%	4.1%	-1.5%	-0.8%	-8.4%	-7.2%	0.1%
Public Administration & Defence	4.2%	1.5%	1.4%	7.1%	10.4%	6.5%	-16.0%	-16.5%	1.2%
Education & Health	1.4%	-0.3%	2.1%	0.7%	3.5%	0.2%	3.3%	2.2%	1.6%
Domestic & Other Services	4.3%	3.6%	3.3%	3.7%	4.6%	4.9%	5.1%	3.8%	4.1%
Average Labour Productivity	**-11.7%**	**7.5%**	**11.6%**	**-2.2%**	**-1.9%**	**1.8%**	**-6.4%**	**-5.8%**	**0.4%**

Source: Own estimates

** Since there are no time-series employment data, all values are computed based on projections using the 1984 and 1994 census data.

The average economy-wide real labour productivity growth during the post-reform period was found to be about 2.3% per annum on a linear trend. This was accompanied by a fall in employment expansion by about 0.6% per annum, implying a technological shift in the economy. The highest real labour productivity growth of 8.4% was registered in 1995/96, while the lowest real labour productivity was registered at 3.6% below zero in 1997/98. This fall in real labour productivity was mainly due to crop failure in 1997/98, which led to a fall in agricultural labour productivity by about 13%. The average real labour productivity of the agricultural sector fell by about 0.4% during the post-reform period. At the same time, agricultural employment declined by about 2.9%, indicating a slowdown or a recession in agricultural activities. In terms of average real labour productivity, public administration and defence sector followed by mining and quarrying sector were the sectors that registered the highest labour productivity (Table 3.11B). Employment expansion in the mining and quarrying sector was about 0.8%. This indicates a technological shift in the mining and quarrying sector of the economy. Most of the economic sectors experienced a healthy expansion and the source of output growth was mainly due to productivity growth rather than employment expansion during the post-reform period.

Table 3.11B: Post-reform real labour productivity growth by major economic sectors**

Sector/Sub-Sector	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Agriculture & Allied Activities	3.7%	-5.8%	1.1%	12.2%	1.2%	-13.1%	1.5%	0.0%	-0.4%
Mining & Quarrying	43.3%	-22.9%	6.5%	10.6%	10.5%	7.6%	7.0%	7.1%	5.3%
Electricity & Water	3.5%	2.8%	3.2%	-9.4%	3.5%	1.4%	-0.9%	1.7%	-0.2%
Construction	24.1%	7.0%	5.1%	5.0%	6.3%	6.2%	-0.7%	-6.6%	3.7%
Trade, Hotels & Restaurants	33.8%	4.2%	6.3%	6.2%	6.0%	2.2%	4.0%	1.6%	4.5%
Transport & Communications	4.7%	3.4%	1.1%	7.1%	4.4%	4.8%	-2.7%	10.3%	3.8%
Banking, Insurance & Real State	6.7%	7.9%	6.0%	6.2%	6.1%	2.8%	1.9%	7.0%	5.0%
Public Administration & Defence	27.3%	8.3%	7.0%	2.5%	4.3%	21.9%	13.2%	12.0%	9.1%
Education & Health	-0.3%	5.2%	2.4%	1.8%	2.0%	4.4%	5.8%	3.3%	3.3%
Domestic & Other Services	3.8%	3.6%	3.0%	3.2%	2.7%	1.3%	1.7%	1.5%	2.4%
Average Labour Productivity	**8.3%**	**-1.0%**	**2.8%**	**8.4%**	**2.8%**	**-3.6%**	**3.2%**	**3.2%**	**2.3%**

Source: Own estimates
** Since there are no time-series employment data, all values are computed based on projections using the 1984 and 1994 census data.

The average real labour productivity growth during the pre-reform period for the manufacturing sector was found to be about 11.3% below zero (on log-linear trend), while the sector's employment growth stood at 1.4% below zero (on a linear trend) (Table 3.12A). The low level of average real labour productivity was due to the deficiency of productive capital relative to labour as reflected in the low growth rate of capital intensity of employment, which averaged about 1.7% per annum. A very low employment expansion accompanied by a very low labour productivity growth is a sign of sectoral recession or slowdown of the economic activities in the manufacturing sector.

Table 3.12A: Pre-reform real labour productivity growth by industrial group in the manufacturing sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend
Food and Beverages	-22.1%	-9.7%	4.2%	1.6%	-0.4%	-2.4%	-21.1%	-48.8%	-9.6%
Tobacco	200.0%	-45.8%	94.0%	-39.5%	1.3%	13.7%	-1.6%	-35.1%	0.8%
Textiles	-24.9%	18.2%	24.0%	-14.0%	-1.5%	-0.9%	-43.6%	-27.5%	-8.5%
Wearing Apparel, Except Fur Apparel	11.0%	-14.2%	-24.0%	-5.6%	-3.5%	78.1%	-33.8%	-57.5%	-8.6%
Tanning and Dressing of Leather	-17.1%	-6.3%	62.7%	34.4%	-4.6%	-10.8%	-31.4%	-48.7%	-1.1%
Wood and Products of Wood	-29.5%	21.0%	-29.3%	11.3%	-48.0%	11.7%	-27.5%	-60.4%	-22.7%
Paper, Paper Products and Printing	-6.2%	-1.3%	1.7%	-29.4%	1.4%	-14.0%	-0.7%	13.7%	-7.4%
Chemical and Chemical Products	-1.1%	21.6%	43.4%	-29.0%	-81.3%	-4.0%	-37.4%	10.1%	-31.5%
Rubber and Plastic Products	-6.6%	10.1%	0.0%	-6.7%	-11.8%	14.3%	-52.7%	11.4%	-8.6%
Other Non-Metallic Mineral Products	-0.7%	-15.7%	-17.7%	59.3%	9.2%	-3.7%	-40.0%	-3.1%	-2.5%
Basic Iron and Steal	-28.0%	-59.2%	156.8%	15.5%	-38.3%	-65.7%	128.3%	-57.0%	-16.2%
Fabricated Metal Products	-9.7%	0.3%	18.9%	-23.5%	-14.3%	-8.0%	-63.3%	-115.1%	-15.1%
Machinery and Equipment	37.0%	-40.4%	32.3%	-12.0%	-38.1%	-8.9%	-78.4%	-156.8%	-24.9%
Vehicles, Trailers and Semi-Trailers		22.0%	-12.7%	61.1%	-20.8%	-45.3%	-36.6%	-10.4%	-14.4%
Furniture, Manufacturing N.E.C	-3.7%	8.8%	-7.0%	-7.9%	1.4%	5.6%	-17.2%	-5.1%	-3.2%
Total	**-9.1%**	**1.5%**	**17.5%**	**-12.0%**	**-21.4%**	**-1.7%**	**-27.7%**	**-36.5%**	**-11.3%**

Source: Own estimates based on time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

Real labour productivity in the manufacturing sector rose at the rate of 9.6% during the post-reform period (Table 3.12B), while employment expanded at 1.8% per annum. Hence, the performance of the manufacturing sector during the post-reform period was much better than the performance during the pre-reform period. A positive productivity growth accompanied by employment expansion is an indication of a healthy economic development, although the rate of employment expansion was not as fast as the growth in labour force. During the post-reform period, average real labour productivity had been rising for all manufacturing activities with the exception of wearing apparel, machinery and equipment, and vehicle, semi-trailers and trailers manufacturing activities. Employment expansion had also been taking place in most of the manufacturing activities.

Table 3.12B: Post-reform real labour productivity growth by industrial group in the manufacturing sector

Industrial Group	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	55.4%	75.4%	18.6%	30.8%	-1.1%	-28.2%	63.9%	0.2%	12.9%
Tobacco	17.9%	16.3%	0.0%	27.1%	-14.8%	58.2%	39.6%	14.2%	16.6%
Textiles	71.7%	59.9%	-17.3%	0.6%	-11.5%	-0.5%	2.8%	25.7%	1.2%
Wearing Apparel, Except Fur Apparel	66.1%	17.4%	-28.1%	-2.7%	-15.5%	-49.0%	113.7%	30.5%	-6.0%
Tanning and Dressing of Leather	150.2%	49.6%	9.6%	-4.5%	10.5%	-34.7%	56.6%	-21.4%	2.5%
Wood and Products of Wood	141.1%	143.5%	19.5%	-5.6%	2.6%	-4.0%	-12.0%	-6.0%	6.4%
Paper, Paper Products and Printing	31.2%	25.5%	-24.8%	22.0%	-5.6%	1.5%	-0.4%	8.9%	1.2%
Chemical and Chemical Products	148.9%	25.4%	-29.6%	-20.3%	-1.1%	81.7%	-29.1%	41.1%	1.2%
Rubber and Plastic Products	96.2%	40.3%	-17.4%	-7.2%	31.0%	-20.0%	22.7%	-0.7%	2.8%
Other Non-Metallic Mineral Products	93.0%	37.5%	15.0%	18.1%	11.0%	-8.7%	-3.5%	6.4%	8.0%
Basic Iron and Steal	210.6%	153.8%	20.1%	-11.3%	11.0%	-29.1%	-17.7%	28.2%	3.4%
Fabricated Metal Products	-1137.2%	66.8%	-19.7%	42.1%	2.3%	-30.5%	9.7%	-1.9%	2.5%
Machinery and Equipment	-447.3%	132.2%	-38.8%	9.2%	-7.8%	-21.2%	-18.3%	46.9%	-3.9%
Vehicles, Trailers and Semi-Trailers	216.0%	5.8%	25.7%	-37.0%	-34.4%	-54.1%	333.9%	59.0%	-1.6%
Furniture, Manufacturing N.E.C	-25.5%	39.9%	12.5%	7.8%	-14.8%	15.8%	-1.7%	11.1%	6.0%
Total	**75.0%**	**55.8%**	**2.4%**	**16.1%**	**0.3%**	**-10.8%**	**31.4%**	**12.4%**	**9.6%**

Source: Own estimates based on time-series data obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

(a) Wages and earnings

During the pre-reform period, real wages and earnings of the labour force employed in the manufacturing sector had grown by about 1.8% per annum. Growth rates of real wages and earnings vary markedly, with an average growth rate of 18.6% below zero for employees in the chemicals and chemical product manufacturing industries, but as large as 20.2% on log-linear trend for employees in the machinery and equipment industries. The majority of the economic activities in the manufacturing sector registered a fairly high growth in real wages and earnings during the pre-reform programme period (Table 3.13A.[8]).

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[8] Time series data on wages and earnings in the manufacturing were all measured in current prices and hence real wages and earnings were obtained by deflating nominal wages by the consumer price index of Addis Ababa - the only available time series data on consumer price index.

Table 3.13A: Pre-reform real wages and salaries growth by industrial group in the manufacturing sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend
Food and Beverages	11.5%	1.7%	7.0%	9.1%	-11.2%	1.3%	6.1%	2.1%	2.4%
Tobacco	-46.2%	-43.5%	100.9%	-4.2%	-3.5%	45.2%	7.0%	-13.5%	3.8%
Textiles	-1.9%	8.0%	16.7%	4.9%	-16.0%	6.4%	-11.1%	8.7%	1.1%
Wearing Apparel, Except Fur Apparel	10.9%	6.9%	15.1%	20.9%	17.4%	26.1%	-20.1%	-13.5%	9.3%
Tanning and Dressing of Leather	8.0%	1.5%	25.0%	12.1%	9.2%	7.0%	7.2%	9.6%	9.9%
Wood and Products of Wood	-1.6%	0.4%	0.5%	11.7%	44.2%	1.8%	-8.6%	-5.0%	6.8%
Paper, Paper Products and Printing	11.9%	5.6%	19.1%	8.5%	-7.7%	3.6%	-3.0%	20.1%	5.4%
Chemical and Chemical Products	4.1%	-2.6%	4.0%	5.6%	-71.3%	5.3%	-1.1%	0.9%	-18.6%
Rubber and Plastic Products	1.1%	21.9%	15.1%	11.4%	-48.2%	-1.6%	9.3%	6.9%	-3.5%
Other Non-Metallic Mineral Products	23.8%	13.2%	-4.6%	-8.1%	-28.1%	2.8%	8.4%	5.4%	-3.1%
Basic Iron and Steal	-8.0%	19.5%	11.0%	34.3%	-0.8%	22.7%	-20.9%	15.5%	9.2%
Fabricated Metal Products	11.7%	5.4%	8.4%	12.0%	-46.2%	65.3%	10.6%	-3.5%	2.6%
Machinery and Equipment	13.5%	4.5%	0.0%	18.8%	126.6%	14.1%	0.6%	4.1%	20.2%
Vehicles, Trailers and Semi-Trailers		10.1%	12.5%	1.1%	-23.6%	-3.6%	7.2%	-9.0%	-2.9%
Furniture, Manufacturing N.E.C	-0.3%	13.4%	13.7%	19.9%	9.1%	11.3%	-4.6%	0.5%	8.9%
Total	**6.1%**	**4.9%**	**11.9%**	**7.6%**	**-16.9%**	**6.8%**	**-2.1%**	**4.8%**	**1.8%**

Source: Own estimates based on time-series data on nominal wages and earnings obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

The average growth rate of real wages and earnings for the labour force employed in the manufacturing industries during the post-reform period was 7.5% per annum on log-linear trend (Table 3.13B). Real wages and earnings registered an average growth rate of 5.3% below zero for employees of the wood and products of wood industries, as opposed to the average growth rate of 20.7% for employees of vehicles, trailers and semi-trailer industries. Year-to-year fluctuations in the growth rate of real wages and earnings for the manufacturing sector were also sizable. The largest growth in real wages and earnings was registered in 1992/93 and the lowest in 1997/98.

Table 3.13B: Post-reform real wages and salaries growth by industrial group in the manufacturing sector

Industrial Group	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	17.5%	15.8%	7.6%	11.0%	8.7%	8.6%	12.6%	9.5%	9.7%
Tobacco	25.7%	36.7%	35.5%	3.8%	36.4%	-25.7%	8.4%	0.3%	9.4%
Textiles	24.0%	15.8%	-1.3%	-8.9%	-2.3%	-3.1%	0.9%	11.4%	-0.6%
Wearing Apparel, Except Fur Apparel	24.9%	5.6%	-5.9%	7.8%	20.4%	5.3%	-6.7%	4.5%	4.8%
Tanning and Dressing of Leather	19.1%	22.0%	9.8%	17.9%	-2.6%	-4.4%	16.0%	-0.3%	6.7%
Wood and Products of Wood	14.5%	44.5%	-2.1%	4.9%	-24.0%	-15.0%	0.1%	-9.2%	-5.3%
Paper, Paper Products and Printing	20.5%	10.8%	17.5%	14.3%	-1.1%	13.3%	1.3%	5.2%	8.2%
Chemical and Chemical Products	25.1%	21.7%	18.3%	20.5%	28.8%	12.0%	11.9%	9.7%	16.6%
Rubber and Plastic Product s	21.2%	15.9%	13.2%	-4.5%	40.2%	10.1%	8.1%	10.3%	12.3%
Other Non-Metallic Mineral Products	25.7%	49.8%	20.6%	39.4%	17.2%	-0.5%	13.2%	15.5%	17.9%
Basic Iron and Steal	26.0%	4.6%	3.5%	12.4%	10.5%	14.8%	0.0%	11.4%	8.2%
Fabricated Metal Products	19.4%	11.2%	12.0%	3.3%	-7.9%	9.1%	1.2%	27.4%	5.3%
Machinery and Equipment	20.1%	4.9%	6.6%	28.4%	10.4%	-43.9%	20.8%	-29.3%	-2.9%
Vehicles, Trailers and Semi-Trailers	15.0%	10.7%	21.8%	20.3%	26.2%	20.4%	25.3%	38.7%	20.7%
Furniture, Manufacturing N.E.C	19.3%	39.0%	12.8%	1.0%	48.3%	36.2%	6.2%	0.6%	18.6%
Total	**20.9%**	**18.0%**	**7.0%**	**7.2%**	**7.1%**	**4.2%**	**8.2%**	**9.1%**	**7.5%**

Source: Own estimates based on time-series data on nominal wages and earnings obtained from Annual Survey of Large and Medium Scale Manufacturing Industries.

3.2.2.2 Agricultural productivity and income

The agriculture sector attained an average real labour productivity of only 0.5% per annum on a linear trend. Labour productivity declined by 20% in 1984/85, the year of catastrophic drought, and by more than 10% in 1997/98 (see figures 3.1 and 3.2). A high degree of volatility, induced by weather, is a major feature of Ethiopian agriculture.

Agriculture registered an employment expansion of 2.9% during the period 1984/85 to 1999/00. Low productivity growth accompanied by employment expansion suggests a sectoral stagnation, a typical feature of a refugee sector. This is also an indication of underemployment and falling real incomes/wages. As pointed out in Section 2, agricultural income proxied by rural income per capita has decreased, reflecting low earnings and/ or falling real wages.

Figure 3.1: Trends in real labour productivity and output growth before the reform program
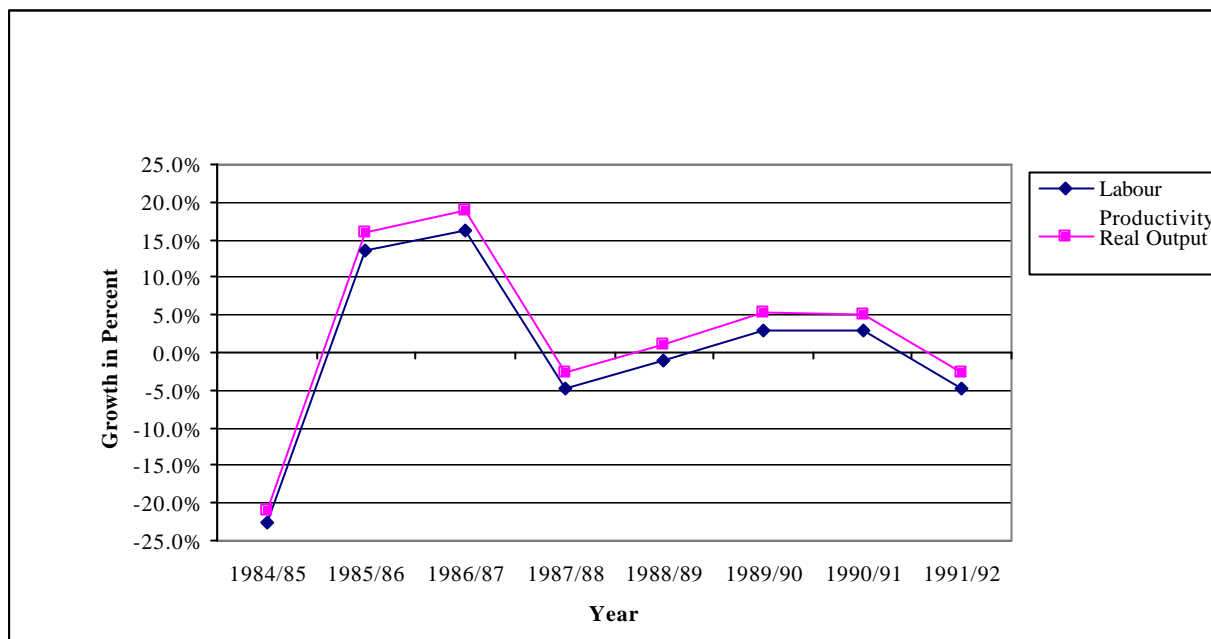
Source: Computed from MOFED data and CSA, 1984, 1994 and 1999

Figure 3.2: Trends in real labour productivity and output growth after the reform program
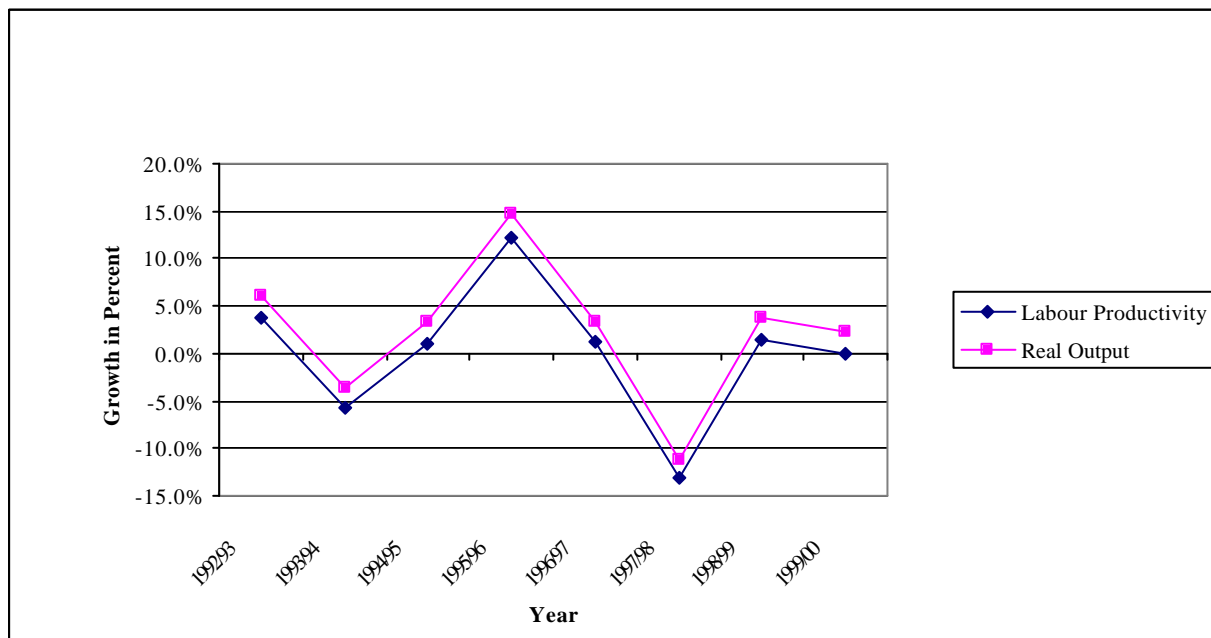
Source: Computed from MOFED data and CSA, 1984, 1994 and 1999

Although both labour productivity and output growth were volatile, the trend is declining during the pre and post reform periods. Low labour productivity in the agriculture sector might be due to loss of soil fertility, land fragmentation and declining farm size. It has been documented that yields have not changed despite increased use of fertilizers mainly due to severe soil degradation (Mulat and Bekele, 2003).

By way of summary, the performance of the Ethiopian economy, during the past seventeen years, has shown an average employment expansion of 3.7%, real labour productivity growth of 1.1% and real output growth of 3.3% per annum. The level of real output growth attained during this period was almost close to the level of population growth of 2.9%, showing stagnation and/ or recession of the economy. This stagnation and/ or recession of the economy provides clear empirical evidence of the existence of massive poverty in the country. As indicated earlier, the magnitude of rural poverty has declined slightly, according to the government report. This is rather a statistical myth since the growth rate of real agricultural per capita output has been negative and real per capita rural income has declined (from Birr 1035 in 1995/96 to Birr 943 in 1999/00, Table 2.6). The manufacturing sector has failed to play its dynamic role in the Ethiopian economy as it is characterized by capital intensive, outdated technology, dependence on external resources, and weak linkages with other sectors of the economy. Unless growth in the different sectors (especially in the agricultural and manufacturing sectors) is accompanied by productivity growth, it is difficult to bring about self-sustaining and internally generated economic development that can overcome the widespread poverty.

IV. MODELLING POVERTY-EMPLOYMENT-LABOUR MARKET NEXUS

This section will focus on modelling the determinants of consumption or poverty. In the process of modelling the determinants of poverty, attempts will be made to identify and quantify the link between economic growth, employment, poverty and polices in the Ethiopian context. Simulations will also be carried out to gauge the impact of some socio-economic factors on poverty.

4.1 Specification of the empirical model

Two approaches can be distinguished in modelling the determinants of poverty. The first approach in modelling the determinants of poverty could be described as a two-step procedure, with the first step involving modelling the determinants of log of consumption at household level.[9] The simplest specification of such a model could be given as:

$$\ln(C_j) \quad = \quad \boldsymbol{b}' X_j + \boldsymbol{e}_j \tag{1}$$

where C_j stands for per capita consumption of household j, X_j denotes a vector of household characteristics or other determinants of consumption, and e_j is a random disturbance term, which is assumed to be normally, independently and identically distributed with mean 0 and variance s^2.

The second step defines poverty in terms of the household's per capita consumption level, where the poverty measure for household j can be estimated by:

$$\hat{P}_{q,j} \quad = \quad \left[\max\left(\left(\frac{Z - \hat{C}_j}{Z} \right), 0 \right) \right]^q \quad , \quad \boldsymbol{q} \geq 0 \tag{2}$$

where $\hat{P}_{q,j}$ is the estimated poverty measure of household j, Z denotes the poverty line and ? is a non-negative parameter taking integer values 0, 1 and 2.

Aggregate poverty of a given population is simply the weighted mean of the above poverty measure, where the weights are given by households' size. When ? takes a value of 0 the aggregate poverty measure corresponds to the incidence of poverty or head-count index. Similarly, when ? assumes values of 1 and 2, the aggregate poverty measure corresponds to the poverty gap and the squared poverty gap indices respectively.[10]

The second approach, which is known as the direct modelling of the household level poverty measure, is given by:

$$P_{q,j} \quad = \quad \boldsymbol{b}'_q X_j + \boldsymbol{e}_j \tag{3}$$

This direct approach to modelling the determinants of poverty has been popular and often used by several researchers in poverty analysis. Despite its popularity, there are several reasons why modelling household consumption is preferable to modelling household poverty levels directly. The following are among the major reasons:

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[9] The logarithm of consumption is estimated because its distribution more closely approximates the normal distribution than does the distribution of the consumption levels. In other words, this assumption implies that households' consumption level follows a lognormal distribution.

[10] These three measures of poverty belong to the Foster-Greer-Thorbecke (FGT) class, introduced by Foster, Greer and Thorbecke in 1984.

(a) Using data on only $P_{?,j}$ is inefficient in the sense that it involves a loss of information as information on households living above the poverty line is intentionally suppressed. This is to say that all non-poor households are treated alike, as censored data.

(b) There is an inherent arbitrariness about the exact level of the absolute poverty line. Hence, different poverty lines would imply that household consumption data would be censored at different levels, and the estimated parameters of poverty model given in equation (3) would change with the level of poverty line used. As the consumption model estimates are independent of the chosen poverty line, it is potentially attractive to model household consumption level, and then link it to household poverty level in the subsequent step, rather than modelling household poverty levels directly.

(c) Estimation of the consumption model avoids strong distributional assumption that may be required by the probit or logit model estimation, which are commonly used in modelling household poverty levels directly.

For the reasons mentioned above, the approach used in this study is to model the logarithm of household consumption levels as given in equation (1) and then employ equation (2) to make the required inferences or predictions regarding household and aggregate poverty levels.

Consumption-based rather than income-based measure of individual welfare is used in this study. This is motivated by the fact that income of individuals can be interpreted as a measure of welfare opportunity while consumption is regarded as a measure of welfare achievements by households. If one is concerned with the realized, rather than potential welfare, consumption is arguably a more relevant measure of welfare. Furthermore, it is well known that consumption fluctuates less than income, as there is consumption smoothing performed by households, that is, not all current consumptions are financed out of current income. Households respond to fluctuations in income by saving during good periods and dis-saving during lean periods to smooth their consumption. There can be practices like taking credits and receiving transfers by households to perform consumption smoothing. The other reason for preferring consumption as a better measure of welfare is that there is a belief that households are more willing to reveal their consumption behaviour than they are willing to reveal their income.

In estimating equation (1) specified above, consumption is expressed in real terms by normalizing the nominal per capita consumption using the spatial cost of living index. Normalization of the per capita consumption is justifiable on the ground that the class of poverty measures considered in this study is homogeneous of degree zero with respect to mean consumption and poverty line. This is because of the fact that the class of poverty measures that we deal with depends on the ratio of per capita consumption to poverty line (C_j to Z). Hence, instead of defining poverty measures in terms of nominal consumption per capita and nominal poverty lines for different regions of the country, we express them directly in terms of real consumption per capita and a poverty line expressed in the same real units. In the regression analysis,

an attempt is made to allow for rural-urban heterogeneity by estimating separate models.

4.2 Selection of explanatory variables of the model

The set of variables that is hypothesized to determine the level of consumption, and hence poverty, may be categorized into household and community characteristics. Among the set of potential determinants of poverty, an attempt is made to choose those variables that are arguably exogenous to current consumption. For instance, variables such as current school attendance by children are omitted from the regression for the reason that such variables are outcomes, rather than determinants of current living standards. The set of determinants of consumption may broadly be classified into the following categories:

Demographic characteristics: Included in this category are household size and its composition. Four age groups are distinguished: under 7 years, 7-17, 18-64 and 65 years of age and above. The number of adults in the age group 18-64 years is further split by gender as the marginal returns may differ. To allow for non-linearities in the relationship between consumption and household size, a quadratic term (in household size) is introduced in the regression model. The other demographic characteristics of households are age and sex of the household head. The other household characteristic that may loosely be categorized as a demographic variable is the number of adults with any physical or metal deficiency in the household.

Education: Several measures pertaining to different levels and dimensions of educational attainment by household members are included in the regression. The number of adult household members who can read and write and the number of adult household members with primary or higher level of education are among variables hypothesized to influence consumption. Assuming that returns to male and female education may be different, the numbers of household members with primary or higher level of education is differentiated by gender.

Employment: Employment characteristics are related to occupations of household members. In this connection, three employment categories are distinguished: agriculture, industry, and distributive and other services. And the number of unemployed persons is included as an explanatory variable for urban areas. To examine the hypothesis that multiple income sources may bring higher income and hence lower risks, a variable related to income diversification within households is included. This variable is constructed by counting the number of income earners of household members from different sources.

Agriculture, land and livestock: Holding size, whether households irrigated their land, used inputs such as fertilizers, pesticides, etc., and a dummy variable to indicate the relative security of land tenure are included as the determinants of rural household consumption. If land was acquired through an informal means or on a rental basis, then the tenure is considered as relatively insecure. In addition, the type of crops grown, i.e. food crops, horticulture and cash crops are included. A dummy variable indicating

households' possession of livestock is also included.[11] Moreover, the number of residential rooms in urban areas is also included.

Access to Infrastructure: There are a number of potential variables that reflect access to services. Variables related to infrastructure include the presence of a bank, market, agriculture-livestock extension centre, a post office, a public telephone, participation in the new extension programme and a paved or improved dirt road in the village. And variables that indicate access to health facilities include the presence of a doctor, nurse, midwife, health centre and health or sanitary post. As there is no information on most of these variables, participation in the new extension programme is taken as a measure of access to infrastructure.

4.3   Estimation of the model

4.3.1 Description of dataset

The dataset used in the estimation of the model is obtained from the Ethiopian Rural and Urban Household Survey that was conducted by the Department of Economics of Addis Ababa University in 1999/2000 (The household income, consumption and expenditure survey data produced by the Central Statistical Authority could not be made available). The rural and urban surveys provide data on a wide spectrum of socio-economic variables including household composition and structure, education, household assets, employment and income, consumption expenditure, health status and other welfare indicators.

The regression model of the determinants of rural poverty is estimated based on 1339 rural households, while the determinants of urban poverty are estimated based on a sample size of 1271 urban households. [12] The major estimation issues have to do with missing values and outliers in the data set particularly for adult equivalent real consumption per capita. Households with no information on consumption expenditure are excluded from the data set. Households whose consumption per capita is below Birr 300 (US$35) per year are also excluded, as it is impossible to survive on such low level of income.

There can be some concerns regarding potential bias in parameter estimates due to either endogenous or omitted variables. For instance, agro-ecological factors that determine the productivity of land may be excluded from the regression model, hence implicitly subsumed under the error term of the model. If these factors are significant in determining the living standards of the households, the error term of the model will not converge to zero in probability limit, and hence the parameter estimates of the explanatory variables included in the model will be inconsistent. Similarly, if some explanatory variables (for instance, household cultivates horticultural crops or

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[11] Possession of substantial livestock, in this particular case, is defined as households that possessed above mean possession for all types of livestock.
[12] The actual sample size used in the regression model was lower than the total sample size as some of the households with missing information were excluded.

commercial crops) depend on the omitted variables, these explanatory variables will be correlated with error term. The correlation of explanatory variables with error term will give rise to inconsistent parameter estimates.

A set of regional and district level dummy variables has been included in order to solve the problems of endogenous or omitted variables. The introduction of dummy variables into the model is to control differences in agro-ecological factors of regions and districts.

4.3.2   Results and discussions

The initial parameter estimates were subjected to a limited pruning by deleting the interaction terms that are not statically significant at 10% level of significance. In addition to the interaction terms, regional and *woreda* (district) dummy variables that are found to be statistically insignificant or collinear with other explanatory were also excluded from the regression model.

4.3.2.1 Determinants of consumption and poverty in rural areas

Table 4.1 presents the parameter estimates, t-rations and 95% confidence interval for the rural determinants of real consumption per capita. For a cross-sectional data, the fit of the regression model is good, with R^2 of 0.364. The statistical significance of the different variables varies widely; some are statistically significant at 5% level of significance while others are not significant even at 10% level of significance. Non-significant variables (at 10% level of significance) were retained for the reason that they are relevant for the purpose of policy simulation.

With only a few exceptions, the signs on the variables are as expected, and the relative magnitudes are also reasonable. It should be noted that the dependent variable of the model is the natural logarithm of real consumption per capita, and hence the estimated regression coefficients measure the percentage change in real consumption per capita for a unit change in the dependent variable.

(a)   Demographic variables

From the estimated regression model, it can be seen that there is a strong negative relationship between real consumption per capita and household size. This is true for the five variables measuring the number of people in the household, disaggregated by age and sex. As expected, there is a negative relationship between consumption per capita and household size, but it is surprising that the estimated coefficients are more negative for adults in the household than they are for children, which suggests that, other things remaining the same, an additional adult in the household will reduce consumption per capita more than an additional child in the household. This result seems to be counterintuitive, if seen from the dimension of dependency ratio.

The estimated coefficient of the quadratic term of the household size is found to be positive and statistically significant, suggesting a U-shaped relationship between consumption per capita and household size. The age of head of household does not have a significant effect on consumption per capita at 10% level of significance. However, it does have an effect at 20% level of significance. On the other hand, sex of head of

household does not have a significant effect even at 20% level of significance; hence, the variable is excluded from the set of regressors.

The number of disabled persons in the household was anticipated to have a negative effect on consumption per capita. However, the variable was not significant, and hence it is excluded from the set of explanatory variables.

(b)   Education

Among adult education variables, male adult literacy and the number of adult males who completed primary education have a positive association with consumption per capita as expected. However, the impact of male adults who have completed primary education was not statistically significant in influencing consumption per capita.

(c)   Employment and income sources

The signs of the three variables for the number of persons employed in agricultural, industrial and service sectors of the economy are as expected. The positive signs of adult employment in different economic sectors indicate that, other things being equal, adult employment of any kind leads to a higher level of consumption per capita than unemployment. The incremental gain in per capita consumption is the smallest for those employed in the agricultural sector and the largest for those employed in the industrial sector of the economy. The coefficients of employment in the agricultural and industrial sectors of the economy are not statistically significant. The variable that stands for the diversification of income sources is positive and is statistically significant as expected.

(d)   Agriculture and livestock

Among the agriculture and livestock related variables, ownership of relatively more number of farm animals, size of landholding and expenditure on assets have the expected signs and are statistically significant. The effects of landholding size on consumption per adult equivalent is small, with a one percent increase in landholding being associated with only 0.10 percent increase in consumption per adult equivalent. The effect of all other agriculture and livestock related variables (on consumption per capita) are not statistically significant.

(e)   Access to infrastructure

Participation in the new extension programme is constructed as a binary variable taking a value of 0 if the household does not participate and 1 if the household participates in the new extension programme. Participation in the new extension programme has a positive effect on consumption per adult equivalent, but it is not statistically significant (at10% level). The estimated regression model of the determinants of rural poverty in Ethiopia is given in Table 4.1.

Table 4.1: Determinants of Rural Poverty in Ethiopia

Logarithm of real consumption per capita (Dep. Variable)	Coef.	Robust Std. Err	T	P>|t|	[95% Conf,Interval]	
Age of head of household	0.002	0.001	1.264	0.206	-0.001	0.004
Persons 0-6 years old	-0.061	0.017	-3.550	0.000	-0.095	-0.027
Persons 7-17 years old	-0.115	0.015	-7.844	0.000	-0.144	-0.086
Males 18-64 years old	-0.190	0.022	-8.572	0.000	-0.233	-0.146
Females 18-64 years old	-0.114	0.026	-4.415	0.000	-0.164	-0.063
Persons aged 65 or older	-0.153	0.029	-5.344	0.000	-0.210	-0.097
Number of persons in agricultural sector	0.002	0.022	0.076	0.939	-0.041	0.044
Number of persons in industrial sector	0.064	0.062	1.029	0.304	-0.058	0.185
Number of persons in service sector	0.036	0.016	2.284	0.023	0.005	0.067
Number of literate adult males	0.122	0.034	3.573	0.000	0.055	0.189
Number of literate adult Females	-0.014	0.032	-0.427	0.670	-0.077	0.049
Number of adult males who completed primary education	-0.086	0.051	-1.671	0.095	-0.199	0.015
Number of adult females who completed primary education	0.029	0.044	0.654	0.513	-0.058	0.115
Highest level of education of any adult in the household	-0.004	0.003	-1.357	0.175	-0.010	0.002
Number of income sources	0.081	0.015	5.504	0.000	0.052	0.110
Use of any modern agricultural inputs (0/1)	0.004	0.042	0.107	0.915	-0.078	0.087
Security of land tenure (0/1)	0.006	0.083	0.070	0.944	-0.157	0.169
Cultivate food crops (0/1)	-0.022	0.107	-0.204	0.838	-0.233	0.189
Cultivate horticultural crops (0/1)	0.163	0.042	3.863	0.000	0.080	0.245
Cultivate cash crops (0/1)	0.049	0.052	0.951	0.342	-0.052	0.150
Ownership of substantial livestock (0/1)	0.076	0.033	2.270	0.023	0.010	0.141
Presence of markets	-0.107	0.037	-2.863	0.004	-0.180	-0.034
Participate in the new extension programme	0.075	0.048	1.562	0.118	-0.019	0.169
ln of landholding size	0.100	0.020	4.963	0.000	0.061	0.140
ln of expenditure on assets	0.028	0.007	4.018	0.000	0.014	0.042
Adult equivalent household size squared	0.003	0.000	7.499	0.000	0.003	0.004
Dummy variable for Amhara region	0.325	0.073	4.422	0.000	0.181	0.469
Dummy variable for Oromiya region	-0.349	0.075	-4.640	0.000	-0.496	-0.201
Dummy variable for Haressaw district	0.174	0.088	1.965	0.050	0.000	0.347
Dummy variable for Debreziet district	1.053	0.091	11.628	0.000	0.875	1.230
Dummy variable for Adel Tike district	0.661	0.081	8.212	0.000	0.503	0.819
Dummy variable for Sodere district	0.586	0.094	6.240	0.000	0.402	0.770
Dummy variable for Shashemene district	0.562	0.092	6.101	0.000	0.381	0.742
Dummy variable for Bako district	0.329	0.094	3.507	0.000	0.145	0.514
Dummy variable for Endibr district	-0.142	0.091	-1.569	0.117	-0.321	0.036
Dummy variable for Durame district	-0.219	0.071	-3.063	0.002	-0.359	-0.079
Constant term	6.767	0.123	54.837	0.000	6.525	7.009

Regression with robust standard errors

Number of obs = 1339
F(36, 1302) = 21.54
Prob > F = 0.000
R-squared = 0.364
Root MSE = .480

4.3.2.2 Determinants of consumption and poverty in urban Areas

Table 4.2 portrays the results from the estimation of the urban models of the determinants of real consumption per capita. With only few exceptions, the signs on the parameters are as expected. Note that variables that appeared to be insignificant are retained for simulating the impact of different policies on poverty and economic growth.

(a) Demographic determinants

From the regression results, it is clear that there is a strong negative relationship between real consumption per capita and household size. All indicators of household size appeared to be statistically significant at 1% level of significance. The estimated coefficient of the quadratic term of the household size is found to be positive and statistically significant, suggesting a U-shaped relationship between consumption per capita and household size. This implies that, other things being equal, the addition of a person to the household generally reduces per capita, but at a decreasing rate.

Sex of household head has a significant effect on consumption per capita at 5% level of significance. In other words, households headed by males enjoy greater consumption per capita than households headed by females. Other things remaining the same, the consumption per capita of an urban male-headed household is about 18.0% higher than that of its female counterparts. This result is also consistent with the results of the study by MOFED (2002).

(b) Education

Among the education variables, literate adult males, literate adult females, and number of male and female adults who completed secondary education have a positive association with consumption per capita. Except adult males who completed secondary education, the rest have a positive and significant coefficient at 10% level of significance.

(c)   Employment and Income Sources

The signs of the employment variables for the number of persons employed in the service sectors are positive, except for the case of employment in the industrial sector. This is not to say that employment in the industrial sector is not important but the number of people engaged in the industrial is very small. Only 25.4% of the sample urban households are employed in the industrial sector. Income diversification has a positive and significant effect on per capita consumption. Multiple income sources reduce the risk of consumption volatility.

Other variables that determine consumption per capita are interaction variables, which are literacy versus employment in different economic sectors. The interaction terms in each case show the differential effect of being a literate employee of a given sector. Of these variables, male literate employees in the agriculture and service sectors, and female literate employee in the services sector appear to be significant in influencing consumption per capita. The coefficient of the interaction term of male literate employees in the industry shows that consumption per capita of literate adult male employees in industry is 0.08% lower than those illiterate adult male employees in the same. But consumption per capita of literate adult male employees in the service sector would be 1.4% lower than those illiterate adult male employees in the same sector. Similarly, consumption per capita of literate adult female engaged in service sector would be 5.5% lower than those illiterate adult female employees in the same sector. This indicates that the simultaneous presence of the two attributes, i.e. literacy and employment reinforce and modify the individual effects of these attributes considered individually.

Table 4.2: Determinants of urban poverty in Ethiopia

Logarithm of consumption per capita (Dependent Variable)	Coef.	Robust Std. Err.	T	P>|t|	[95% Conf. Interval]	
Constant	7.321	0.159	45.952	0.000	7.009	7.634
Age of head of household	-0.004	0.002	-2.057	0.040	-0.007	0.000
Sex of head of the household	0.115	0.049	2.362	0.018	0.019	0.211
Persons 0-6	-0.184	0.044	-4.159	0.000	-0.271	-0.097
Persons 7-17	-0.282	0.041	-6.811	0.000	-0.364	-0.201
Adult male18-64	-0.326	0.049	-6.687	0.000	-0.422	-0.231
Adult female 18-64	-0.320	0.043	-7.413	0.000	-0.405	-0.235
Persons 65 and above	-0.232	0.058	-4.023	0.000	-0.345	-0.119
Household size squared	0.013	0.003	4.198	0.000	0.007	0.018
Number of rooms	0.098	0.010	9.634	0.000	0.078	0.117
Number of unemployed persons	-0.044	0.024	-1.833	0.067	-0.091	0.003
Employment in industry	-0.055	0.084	-0.652	0.514	-0.220	0.110
Employment in service sector	0.223	0.067	3.328	0.001	0.091	0.354
Number of income sources	0.055	0.018	3.099	0.002	0.020	0.090
Number of disabled persons	0.026	0.027	0.965	0.335	-0.027	0.078
Number of literate adult males	0.069	0.042	1.628	0.104	-0.014	0.151
Number of literate adult females	0.114	0.042	2.726	0.007	0.032	0.196
Number of adult males who completed primary education	-0.036	0.031	-1.149	0.251	-0.097	0.025
Number of adult males who completed secondary education	0.011	0.048	0.228	0.820	-0.082	0.104
Number of adult males who completed postsecondary education	-0.060	0.111	-0.542	0.588	-0.277	0.157
Number of adult females who completed primary education	-0.075	0.030	-2.526	0.012	-0.134	-0.017
Number of adult females who completed secondary education	0.083	0.046	1.783	0.075	-0.008	0.174
Number of adult females who completed postsecondary education	-0.252	0.097	-2.608	0.009	-0.442	-0.063
Highest level of education	0.035	0.011	3.127	0.002	0.013	0.057
Male Literacy* employment in industry	0.008	0.021	0.392	0.695	-0.032	0.048
Female Literacy* employment in industry	0.001	0.019	0.054	0.957	-0.037	0.039
Male Literacy* employment in service sector	-0.014	0.016	-0.861	0.390	-0.046	0.018
Female Literacy* employment in service sectors	-0.055	0.014	-3.852	0.000	-0.083	-0.027
Dummy for Awassa (D1)	0.226	0.090	2.520	0.012	0.050	0.402
Dummy for Bahr Dar (D2)	-0.164	0.091	-1.795	0.073	-0.343	0.015
Dummy for Dessie (D3)	-0.118	0.109	-1.087	0.277	-0.331	0.095
Dummy for Dire Dawa (D4)	0.171	0.088	1.935	0.053	-0.002	0.344
Dummy for Jimma (D5)	0.099	0.093	1.059	0.290	-0.084	0.282
Dummy for Mekele (D6)	-0.197	0.102	-1.936	0.053	-0.397	0.003

Regression with robust standard errors

Number of observations =1271
F (33,1237) = 10.63
Prob>F =0.0000
R-squared =0.220
Root MSE =0.784

4.4   Poverty simulation

4.4.1 Simulation methodology

After estimating the consumption models specified earlier for rural and urban households, an attempt will be made to generate predictions of poverty. Using the estimated parameters ($\hat{b}$) of the model, predictions of consumption per capita for each household j can be generated as:

$$\hat{C}_j \quad = \quad e^{\hat{b}'X_j}$$

(4)

Corresponding to every predicted level of consumption, the probability of a household to be poor ($P_{?,j}$) is given by:

$$P_{q,j} \quad = \quad \int_0^Z \left(\frac{Z-C_j}{Z}\right)^q f(C_j) d C_j$$

(5)

Where $f(C_j)$ is the probability density function of per capita consumption of household j and Z is the poverty line.

Under the assumption that the random disturbance term of the consumption model in equation (1) is normally, independently and identically distributed with mean 0 and variance s^2, the distribution of per capita consumption follows a log normal distribution. Hence, the probability density function of the per capita consumption is given by

$$f(C_j) \quad = \quad \frac{1}{C_j s \sqrt{2\Pi}} \exp\left\{-\frac{1}{2s^2}\left(\ln(C_j) - b'X_j\right)^2\right\}$$

(6)

When ? takes a value of 0, the poverty measure boils down to the head-count index, which is given by:

$$P_{0,j} \quad = \quad \int_0^Z \frac{1}{C_j s \sqrt{2p}} \exp\left\{-\frac{1}{2s^2}\left(\ln(C_j) - b'X_j\right)^2\right\} dC_j \quad = \quad \Phi\left(\frac{\ln(Z)-b'X_j}{s}\right)$$

Corresponding to the above equation, the estimated probability of a household being poor, measured by the head-count index, is then given by

$$\hat{P}_{0,j} \quad = \quad \Phi\left(\frac{\ln(Z)-\hat{b}'X_j}{\hat{s}}\right)$$

(7)

Where F is the standard normal distribution function, s is the standard error of the regression, and ^ indicates estimated values.

Based on the predicted level of consumption, given by equation (4), one could readily construct a binary variable to classify a household as poor or non-poor with reference to

the stated poverty line. However, the predicted consumption is just a point estimate with its own prediction or forecast error. Furthermore, even if predicted consumption were above the poverty line for a given household, there would be a nonzero estimable probability that the true value of that household's predicted consumption is below the poverty line. Therefore, it is preferable to compute the probability of being poor associated with any given level of predicted consumption, rather than classifying households as being poor or non-poor depending on the level of predicted consumption relative to the poverty line. Finally, a weighted average of the household probabilities of being poor gives the predicted national head-count index. [13]

Corresponding to every predicted level of consumption, the probability that a household would be deeply poor, measured by the poverty gap index ($P_{1,j}$) or depth of poverty, is given by:[14]

$$P_{1,j} = \int_0^Z \left(\frac{Z-C_j}{Z}\right) \frac{1}{C_j \boldsymbol{s} \sqrt{2\boldsymbol{p}}} \exp\left\{-\frac{1}{2\boldsymbol{s}^2}\left(\ln(C_j) - \boldsymbol{b}' X_j\right)^2\right\} dC_j$$

$$= \Phi\left(\frac{\ln(Z) - \boldsymbol{b}' X_j}{\boldsymbol{s}}\right) - \frac{1}{Z}\exp\left(\boldsymbol{b}' X_j + \frac{1}{2}\boldsymbol{s}^2\right)\Phi\left(\frac{\ln(Z) - \boldsymbol{b}' X_j}{\boldsymbol{s}} - \boldsymbol{s}\right)$$

The estimated probability that a household being deeply poor, measured by poverty gap index ($\hat{P}_{1,j}$), is then given by:

$$\hat{P}_{1,j} = \Phi\left(\frac{\ln(Z) - \hat{\boldsymbol{b}}' X_j}{\hat{\boldsymbol{s}}}\right) - \frac{1}{Z}\exp\left(\hat{\boldsymbol{b}}' X_j + \frac{1}{2}\hat{\boldsymbol{s}}^2\right)\Phi\left(\frac{\ln(Z) - \hat{\boldsymbol{b}}' X_j}{\hat{\boldsymbol{s}}} - \hat{\boldsymbol{s}}\right)$$

(8)

Similar to the head-count and poverty gap indices, there is a probability of a household to be severely poor, measured by squared poverty gap index ($P_{2,j}$) or severity of poverty which is stated as:

$$P_{2,j} = \int_0^Z \left(\frac{Z-C_j}{Z}\right)^2 \frac{1}{C_j \boldsymbol{s} \sqrt{2\boldsymbol{p}}} \exp\left\{-\frac{1}{2\boldsymbol{s}^2}\left(\ln(C_j) - \boldsymbol{b}' X_j\right)^2\right\} dC_j$$

$$= \Phi\left(\frac{\ln(Z) - \boldsymbol{b}' X_j}{\boldsymbol{s}}\right) - \frac{2}{Z}\exp\left(\boldsymbol{b}' X_j + \frac{1}{2}\boldsymbol{s}^2\right)\Phi\left(\frac{\ln(Z) - \boldsymbol{b}' X_j}{\boldsymbol{s}} - \boldsymbol{s}\right)$$

$$+ \frac{1}{Z^2}\exp\left(2\boldsymbol{b}' X_j + 2\boldsymbol{s}^2\right)\Phi\left(\frac{\ln(Z) - \boldsymbol{b}' X_j}{\boldsymbol{s}} - 2\boldsymbol{s}\right)$$

The estimated probability that a household being severely poor, measured by the squared poverty gap index ($\hat{P}_{2,j}$), is then given by:

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[13] Household size is the weight used in computing the average probabilities of being poor.
[14] For the sake of convenience the complete derivations of the measures of poverty, namely, the head-count, the poverty gap, and the squared poverty gap indices are deliberately left out from the text. However, we believe that a clear procedure of the derivation of the three measures of poverty is well outlined in the paper.

$$\hat{P}_{2,j} = \Phi\left(\frac{\ln(Z) - \hat{b}'X_j}{\hat{s}}\right) - \frac{2}{Z}\exp\left(\hat{b}'X_j + \frac{1}{2}\hat{s}^2\right)\Phi\left(\frac{\ln(Z) - \hat{b}'X_j}{\hat{s}} - \hat{s}\right)$$

$$+ \frac{1}{Z^2}\exp\left(2\hat{b}'X_j + 2\hat{s}^2\right)\Phi\left(\frac{\ln(Z) - \hat{b}'X_j}{\hat{s}} - 2\hat{s}\right)$$

$$(9)$$

Predicted national measures of the depth and severity of poverty are finally obtained as the weighted averages of the estimated household probabilities of being poor corresponding to every predicted per capita consumption levels.

4.4.2 Results of the simulations

The purpose of these simulations is two-fold. The first is to illustrate the impact the changes in the determinants of poverty have on the consumption per adult equivalent and poverty levels. In a situation where explanatory variables are intrinsically related to one another, it may be difficult to trace the relationship between a determinant and the outcome variable by examining the coefficients of the regression model alone. These complications are avoided by assuming that a change in a given explanatory variable will not lead to changes in other explanatory variables. The second purpose of the simulation is to demonstrate the effects that various government policies can have on consumption per adult equivalent and poverty levels. In this respect, our focus will be on altering variables that are amenable to changes, at least to some degree, through public policy.

Before running the simulation, it is necessary to establish a reference point or a base simulation against which comparisons can be made. As empirical model of the determinants of poverty cannot be perfect predictors of consumption per adult equivalent or poverty level, it would not be correct to compare the actual consumption per adult equivalent and poverty level with that of the simulated level. Instead, the correct reference for consumption per adult equivalent is the mean of the predicted values of consumption per adult equivalent obtained from the determinate regression, using the actual vales of the regressors as given in equation (4) above. Similarly, the correct reference point for the poverty level is the mean values calculated using equations (7), (8) and (9) and the actual value of the explanatory variables denoted by X_j. Table 4.3 presents the comparison of the actual consumption per adult equivalent and poverty level with the results of the base simulation, or reference point. As can be seen, the predicted mean consumption per adult equivalent and the three poverty measures are close to the actual values calculated from the rural and urban household survey data collected by the Department of Economics of Addis Ababa University.

The rural and urban per capita consumption expenditures, based on the University dataset, are presented in Table 4.3. The average per capita consumption expenditure was Birr 1092.45 (or US$127.47) in rural areas and Birr 1889.49 (or US$220.48) per year in urban areas in 1999/2000[15]. The head count poverty indices for the rural and urban areas

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[15] These average per capita consumption expenditures are only slightly higher than those indicated in the government's poverty reduction strategy document. Similarly, the majority of rural households have lower per capita than their urban counterparts.

of the country are 63.07% and 49.18%, respectively, in 1999/2000. These figures are greater than the official poverty statistics of the country (MOFED, 2002), which stood at 45.4% for the rural and 36.9% for the urban areas (See section 2.3). There is consistency with the government figures in the sense that poverty is more rampant in rural than in urban areas. However, the incidence, depth and severity of poverty are clearly much higher than what is reported in government statistics. The discrepancy could be ascribed to differences in sample size (the national statistics are based on a larger or national sample), measurement problems (believed to be lower in the University survey because of the smallness of the sample size and closer supervision), and differences in the price used to determine absolute poverty line. It should be reiterated that there are indications of data problems in the government reports. One clear problem is the unbelievable calorie figures for the rural areas in which it has increased from 1938 in 1995/96 to 2723 in 1999/00, representing an average growth rate of 41%.

Table 4.3: Comparison of the actual measures of well-being with base simulation

Statistic	Rural		Urban	
	Actual	Base Simulation	Actual	Base Simulation
Mean Adult Equivalent per capita consumption per year[*]	1092.45	959.15	1889.49	1453.10
Poverty headcount Index	63.07	61.68	49.18	45.27
Poverty Gap Index	24.25	23.55	20.42	19.22
Squared Poverty Gap Index	11.87	11.73	10.47	10.83

[*] Expressed in Birr at temporally and spatially adjusted 1996 constant prices.

Table 4.4 shows the change in mean real consumption per adult equivalent resulting from the simulated changes in the explanatory variables, the changes in the three measures of poverty corresponding to changes in consumption per adult equivalent. The poverty measures capture the distributional effects of the change in consumption per adult equivalent from the simulated changes in the set of explanatory variables.

One result that is common to all simulations is that the percentage change in squared poverty gap index is generally greater than the percentage change in poverty gap index, and the percentage change in poverty gap index is in turn generally larger than the percentage change in headcount index. This is, at least in part, because many of these simulations raise the consumption levels of the poor, but they do not move the poor above poverty line in all cases, as the increase in consumption is small or because the household is far below the poverty line. However, improving the well-being of those households living below the poverty line is an important consideration, especially in poor countries like Ethiopia. When examining the simulations, it is worthwhile to keep in mind the quantitative relationship between the determinants of poverty and consumption per adult equivalent.

Table 4.4: Total changes in consumption and poverty levels (simulation results)

S NO	Description	Percentage Change in Real Consumption Per Capita			Percentage Change in Poverty Headcount Index			Percentage Change in Poverty Gap Index			Percentage Change in Squared Poverty Gap Index		
		Rural	Urban	National	Rural	Urban	National	Rural	Urban	National	Rural	Urban	National
1	Increase by 1 the number of adult males who are literate	13.0%	8.1%	11.5%	-12.8%	-7.7%	-10.3%	-18.9%	-10.3%	-14.6%	-22.8%	-11.9%	-17.1%
2	Increase by 1 the number of adult females who have completed primary education	2.9%	-1.1%	0.8%	-3.0%	5.5%	-0.06%	-4.6%	-6.2%	-0.1%	-5.7%	5.3%	-0.1%
3	Increase landholdings by 0.5 hectare (all holders)	4.6%	n.a	2.1%	-5.1%	n.a	-2.8%	-9.1%	n.a	-4.6%	-11.8%	n.a	-5.5%
4	Increase landholdings by 1 hectare (those with = 2 hectares)	6.6%	n.a	3.0%	-7.4%	n.a	-4.0%	-13.0%	n.a	-6.5%	-16.8%	n.a	-7.8%
5	Households with = 1 hectare adopt modern agricultural inputs	0.1%	n.a	0.0%	-0.1%	n.a	-0.1%	-0.2%	n.a	-0.1%	-0.3%	n.a	-0.1%
6	Households with = 2 hectare adopt modern agricultural inputs	0.1%	n.a	0.0%	-0.1%	n.a	-0.1%	-0.2%	n.a	-0.1%	-0.3%	n.a	-0.1%
7	Households with any land adopt modern agricultural inputs	0.1%	n.a	0.1%	-0.1%	n.a	-0.1%	-0.3%	n.a	-0.1%	-0.3%	n.a	-0.1%
8	Households with = 1 hectare participate in the new extension programme	2.6%	n.a	1.2%	-3.0%	n.a	-1.6%	-5.4%	n.a	-2.7%	-7.0%	n.a	-3.2%
9	Households with = 2 hectare participate in the new extension programme	4.2%	n.a	1.9%	-4.6%	n.a	-2.5%	-7.4%	n.a	-3.8%	-9.4%	n.a	-4.3%
10	All households participate in the new extension programme	6.1%	n.a	2.8%	-6.2%	n.a	-3.4%	-9.3%	n.a	-4.7%	-11.4%	n.a	-5.2%
11	Food crops producing households start growing horticultural crops	10.2%	n.a	4.6%	-10.2%	n.a	-5.5%	-15.5%	n.a	-7.8%	-19.1%	n.a	-8.8%
12	Food crops producing households start growing commercial crop	3.4%	n.a	1.6%	-3.3%	n.a	-1.8%	-4.3%	n.a	-2.2%	-4.9%	n.a	-2.2%
13	Move on person from the agricultural sector to the industrial sector	5.8%	n.a	2.7%	-5.8%	n.a	-3.2%	-8.9%	n.a	-4.5%	-11.0%	n.a	-5.1%
14	Move on person from the agricultural sector to the services sector	3.2%	n.a	1.5%	-3.2%	n.a	-1.7%	-5.0%	n.a	-2.6%	-6.2%	n.a	-3.0%
15	Increase by 1 the number of income sources	8.5%	15.3%	9.1%	-8.5%	-5.1%	-7.4%	-12.8%	-6.8%	-10.7%	-15.6%	-7.9%	-12.8%
16	Add one child to the household	-5.9%	17.5%	11.8%	6.1%	19.2%	12.3%	10.1%	27.8%	19.3%	12.7%	33.6%	24.6%
17	Add one adult male to the household.	-17.3%	27.9%	21.6%	18.3%	32.5%	23.8%	32.4%	49.2%	39.6%	42.5%	60.8%	51.3%
18	Add one adult female to the household	-10.8%	27.5%	18.6%	11.3%	31.9%	19.5%	19.1%	48.3%	31.7%	24.5%	59.6%	41.0%

(a) Education

The effects of increased educational levels on consumption per adult equivalent and the three poverty measures are presented in simulations 1 and 2 of Table 4.4. Simulation 1 focuses on basic literacy, that is the implication of whether a person reads / writes or not on poverty. On the other hand, simulation 2 examines the effect of higher rates of primary school completion. In simulation 1, the number of adult males in the household who can read or write is increased by one. This change applies to households where there is an adult male who cannot read or write. For the rural and urban households, increasing the number of adult males in the household who can read or write by one raised mean adult equivalent consumption per capita by 13% and 8.1%, respectively, and reduced all poverty indictors. For the entire population, mean consumption per capita increased by about 12%.

Simulation 2 is almost similar to simulation 1 except that it models the effect of increasing educational attainment (completion of primary school). As can be seen from Table 4.4, increasing the number of adult females in the household who have completed primary school by one resulted in a rise in rural consumption per capita by about 3% and reduced headcount index by 3%, the poverty gap index by about 5% and the squared poverty gap index by about 6%. The effect of increasing the number of adult females in the household who have completed primary school by one on urban consumption per capita is negative although very marginal. Mean consumption per capita increased by about 0.8% for the whole sample.

(b) Agriculture and livestock (for rural households)

Simulations 3 and 4 are concerned with an increase in the cultivated area per household by 0.5 hectare for all holders and by 1 hectare for households with less than or equal to two hectares. These simulations resulted in a rise in rural household consumption per capita by 4.6% and 6.6%, respectively. Accordingly, the headcount poverty index declined by 2.8% when area per household increased by 0.5 ha for all holders and by 4% when farm size increases by 1 ha for households with less than or equal to two hectares.

In simulations 5, 6 and 7, the effects of adopting modern agricultural inputs by households with less than or equal to one hectare, with less than or equal two to hectares, and households with any holding size are examined. All these simulations have a marginal effect on per capita consumption or poverty measures.

Simulations 8, 9 and 10 are all concerned with the effects of participating in the new extension programme by households. Participating in the new extension programme by all households with less than or equal to one hectare raised rural households consumption per capita by 2.6%, and reduced the rural headcount poverty index by 3%. The effect on households with less than or equal to two hectares raised consumption per capita by 4.2% and reduced the headcount poverty index by 4.6%.

In simulations 11 and 12, growing horticultural and commercial crops are examined. These simulations raised rural household consumption per capita by 10.2% and 3.4% and reduced rural head count poverty index by 10.2% and 3.3%, respectively.

Simulations 3 through 12 are not applicable to urban households. The national figures for these simulations are computed by assuming that these simulations have no effect on urban households and taking the urban base simulations.

(c)   Employment and income sources

Simulations 13 and 14 examine the effects of sectoral shift in the distribution of the labour force, particularly movement of workers from the agricultural sector to the industrial and services sectors of the economy. Simulation 13 models moving one adult from the agricultural sector to the industrial sector, whereas simulation 14 considers the movement of one adult from the agricultural sector to the services sector. Moving one adult from the agricultural sector to the industrial sector for households with one or more adults raised rural household consumption per capita by 5.8% and reduced the rural headcount poverty index. Similarly, moving one adult from the agricultural sector to the services sector raised rural household consumption per capita by 3.2% and reduced rural headcount poverty index by the same amount (Table 4.4). These indicate that staying in agriculture does not help in terms of reducing poverty.

Simulation 15 tries to examine the impact of diversifying income sources on rural household consumption per capita. Increasing the number of income sources by one raised consumption per capita by 9.1% and reduced both rural and urban headcount poverty indices.

(d)   Demographic changes

Simulations 16 through 18 examined the effects demographic changes on consumption per capita. In simulation 19 the effects of adding one child on consumption per capita was examined. Adding one child to a household reduced rural and urban household consumption per capita by 5.9% and 17.5%, respectively, which raised rural and urban headcount poverty indices by 6.1% and 19.2%, respectively. Simulations 17 and 18 examined the effects of adding one adult male and female to the household. In both cases, rural households consumption per capita declined by 17.3% and 10.8% and the corresponding raise in headcount indices were 18.3% and 11.3%, respectively. The impact of these simulations on urban households is also significant, i.e. consumption per capita declined by about 28% and headcount index increased by 33% (Table 4.4).

4.5 Implications of the Simulations of Economic Growth and Poverty Reduction

Human capital development can be considered as one of the most important ingredients of the process of development, and hence poverty reduction. This section attempts to detour from the potential determinant of economic growth and raise the question of how much potential does economic growth, whatever its sources, hold for poverty reduction in rural as well as urban population of Ethiopia. It should be noted that the central strategic choice has been between poverty reduction via faster economic growth and reduction through redistribution, though the two may be complementary (Dagdeviren et al, 2001). Poor countries such as Ethiopia need to accelerate their economic growth so that the capital stock grows more rapidly than the rapidly growing labour force.

Based on the national accounts statistics, average real GDP growth (after the reform programme) is estimated at about 5% per annum while the population growth stood at

about 3% per annum, giving real GDP per capita growth of about 2% per annum. The question that may be posed now is what will be the level of poverty five years from the year 1999/00 if the living standards of the population grow at the same rate as the real GDP per capita, assuming that there will be no change in the relative inequalities among the population. This is equivalent to simulating a distribution-neutral growth scenario where adult equivalent consumption per capita is assumed to increase proportionately by the same real GDP growth factor.

Table 4.6 below summarises the findings of this analysis for rural households. It can be seen that a 2% distribution-neutral growth in real consumption per capita results in a decline of headcount poverty index by about 10% in five years time. This is to mean that such growth could have resulted in a decline in the rural incidence of poverty by about 10% and a decline in the rural depth and severity of poverty by about 15% and 20% in five years time respectively. In scenario 2 of Table 4.6, the effects of a 3% distribution-neutral growth in real adult equivalent consumption per capita were examined. Such a growth could lead to a decline in the rural incidence of poverty by 14.7% and a decline in rural depth and severity of poverty by 22.4% and 28.2% in five years time respectively. Scenarios 3 and 4 of Table 4.6 explore the effects of faster distribution-neutral real consumption per capita growth rate of 5% and 7% respectively. These growth rates in real consumption per capita would imply a decline in rural incidence of poverty by 27.6% and 40.3% in five years time respectively. The percentage declines in the rural depth and severity of poverty (as a result of such growth rates) are far larger than the decline in the incidence of poverty. These simulations indicate that faster economic growths have a significant effect of reducing the prevailing rampant poverty among the rural households.

Table 4.6: Implications of future economic growth for rural poverty reduction

Hypothetical Economic Growth Rate	1999-00	2004-05 Simulated	Percentage Change over 5 years
Scenario1: 2% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1092.45	1206.15	10.4%
Headcount Index	63.07	56.84	-9.9%
Poverty Gap Index	24.25	20.54	-15.3%
Square Poverty Gap Index	11.87	9.55	-19.5%
Scenario2: 3% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1092.45	1266.45	15.9%
Headcount Index	63.07	53.80	-14.7%
Poverty Gap Index	24.25	18.81	-22.4%
Square Poverty Gap Index	11.87	8.52	-28.2%
Scenario3: 5% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1092.45	1394.27	27.6%
Headcount Index	63.07	48.03	-23.8%
Poverty Gap Index	24.25	15.60	-35.7%
Square Poverty Gap Index	11.87	6.67	-43.8%
Scenario4: 7% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1092.45	1532.21	40.3%
Headcount Index	63.07	40.84	-35.2%
Poverty Gap Index	24.25	12.77	-47.3%
Square Poverty Gap Index	11.87	5.10	-57.0%

Table 4.7 summarises the findings of the simulations for the urban households. A 2% distribution-neutral growth in real consumption per capita results in a decline of headcount poverty index by about 8% in five years time. In other words, such growth could result in a decline in the incidence of poverty by about 8% and a decrease in urban depth and severity of poverty by about 14% and 18% in five years time, respectively. In scenario 2 of Table 4.7, the effect of a 3% distribution-neutral growth in real adult equivalent consumption per capita was simulated. Such a growth could be followed by a decline in the incidence of poverty by 13% and a decline in depth and severity of poverty by 20% and 26% in five years time, respectively. Scenarios 3 and 4 of Table 4.7 explore the effects of a faster distribution-neutral real consumption per capita growth rate of 5% and 7%, respectively. These growth rates in real consumption would imply a decline in urban incidence of poverty by 20% and 29% in five years time, respectively. The percentage decline in the urban depth and severity poverty as a result of such growths is larger than the decline in the incidence of poverty. In short, these simulations indicate that faster economic growths have a significant effect on reducing the prevailing poverty among the urban households, although the effects may not be as strong as in the rural areas.

Table 4.7: Implications of future economic growth for urban poverty reduction

Hypothetical Economic Growth Rate	1999-00	2004-05 Simulated	Percentage Change over 5 years
Scenario1: 2% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1889.49	2086.15	10.4%
Headcount Index	49.183	45.16	-8.2%
Poverty Gap Index	20.42	17.62	-13.7%
Square Poverty Gap Index	10.47	8.59	-18.0%
Scenario2: 3% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1889.49	2190.43	15.9%
Headcount Index	49.183	43.05	-12.5%
Poverty Gap Index	20.42	16.29	-20.2%
Square Poverty Gap Index	10.47	7.73	-26.2%
Scenario3: 5% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1889.49	2411.52	27.6%
Headcount Index	49.183	39.59	-19.5%
Poverty Gap Index	20.42	17.78	-32.5%
Square Poverty Gap Index	10.47	6.18	-41.0%
Scenario4: 7% per annum growth in real consumption per capita, Distribution-neutral			
Mean Adult Equivalent real consumption per capita per year	1889.49	2651.10	40.3%
Headcount Index	49.183	34.90	-29.0%
Poverty Gap Index	20.42	11.45	-43.9%
Square Poverty Gap Index	10.47	4.83	-53.9%

The above simulations indicate that growth is a precondition for reducing poverty in Ethiopia. The analysis of growth and employment structure reveals that both productivity growth and employment expansion were low in the past two decades or so. In other words, the tempo of economic growth was too low to have an impact on poverty and hence, a significant proportion of the population could not afford the minimum necessities and mass poverty persists. Only a sustained and accelerated employment expansion and productivity growth can remove the scourge of poverty in Ethiopia.

V. CONCLUSION AND POLICY IMPLICATIONS

The main objective of this study was to examine a quantitative relationship between growth, employment, poverty and policies in the Ethiopian context. Specifically, the study assessed the sources of output growth and attempted to quantify the likely impacts of alternative public policies on employment and poverty in the country.

Socio-economic situations in developing countries have reached alarming proportions. Appalling conditions of poverty and lack of the capacity to break out of the vicious circle of low income, low investment and low growth have undermined the prospects of rapid development. Poor countries such as Ethiopia have not been able to gain economic and industrial momentum and trigger a sustainable development process.

The Ethiopian economy grew on average by 2.3 % and 4.6% during the 1980s and 1990s, respectively. However, employment (excluding manufacturing sector) expanded by 5.9% during the period of 1984-94, compared to a decline by 0.6% in 1994-99. It has also been shown that output growth of the 1980s was driven by employment expansion that more than offset the negative effects of productivity. The employment expansion was at the cost of productivity and hence, the growth of the economy performed very badly during the 1980s. On the other hand, output growth of the 1990s was achieved through higher productivity that outweighed the negative effects of employment. Increased productivity was not accompanied by an expansion in employment during the 1990s.

Sectoral growth structure is very important in explaining the growth process of the Ethiopian economy. Manufacturing output declined by 3.0% in the 1980s, but increased by 5.0% in the 1990s. Similarly, employment decreased by 1.4% in 1984-91, but increased by 1.8% in 1992-99. It should be noted that the rate of employment growth was very much below the population growth even in the post reform period. On the other hand, the source of output growth in the manufacturing sector was mainly productivity growth during both the 1980s and 1990s. The productivity effect outweighed the employment effect and hence, growth was mainly productivity-led in the manufacturing sector. However, the productivity effect was low (less than 1%) in both periods. A very low employment expansion was accompanied by a very low labour productivity growth indicating sectoral recession or slowdown.

Agricultural real output increased by 3.6% between 1984/85 and 1991/92, compared to 1.9% in 1992/93-1999/00. Employment in the agricultural sector increased by 6.0% in 1984-1994 according to the 1984 and 1994 census of the Central Statistical Authority (CSA). This contrasts sharply with the decline in 1994-99 (by 2.9%) as per the data of the 1994 census and the 1999 labour force survey. Although the reliability of the datasets can be questioned, the trend is one of declining agricultural employment over time. The source of output growth in the agricultural sector was mainly employment effect in the 1980s, but productivity effect in the 1990s. A negative productivity effect was accompanied by employment expansion, exhibiting a typical feature of a refuge sector. As a result, there had been underemployment and falling real incomes/wages in the 1980s. The situation in the 1990s changed with a slight increase in productivity but declining employment effect. This could be a reflection of a shift in employment from agriculture to other sectors of the economy during the post reform period. For instance, employment in the other sectors, particularly in the service sector, has dramatically increased during the 1990s. Except in the transport, storage and communication and other services, all service activities experienced a negative productivity growth with significant expansion in employment. Services have become the refuge sector for the rapidly growing labour force.

In Ethiopia, the size of the labour force continues to grow quicker than the ability of the economy to provide new employment opportunities. As a result, the poverty situation in the country is one of the worst in the world and shows no significant sign of improvement over time. According to government reports, 45.5% of the total population lived below the absolute poverty line in 1995/96 (based on a minimum calorie intake of 2200 calories per day and provision for some basic non-food expenditure, i.e. equivalent to US$ 139 per capita income in aggregate). In spite of various policy reforms and strenuous efforts

to boost agricultural production, the proportion of people living below the absolute poverty line remained 36.92% in urban and 45.4% in rural areas in 1999/2000, according to the government report. However, the level of poverty was found to be much greater using the database of the Department of Economics of Addis Ababa University: the proportion of the rural population living below the poverty line was found to be 63.1%, and the figure for the urban areas was also much higher (49.2%). The available evidence clearly indicates that the poverty situation has worsened between 1995/96 and 1999/2000. Poverty is also more widespread in rural than in urban areas as reflected in the head count index and per capita income.

One of the main messages of the study is that there is strong relationship between demographic characteristics and the probability of a household being poor. In other words, households with larger family size and older heads of households are more likely to fall into poverty than those households with smaller family size and younger heads of household.

The results of the study indicate that measures used to reduce dependency at household level will help reduce poverty. This is due to the fact that the addition of one more child increases the incidence of poverty. In addition, reducing fertility will have a beneficial impact on women's health, labour force participation, and productivity.

The other key message of the analysis is that education is important in bringing about sustained growth and reduces poverty in the country. The impact of education in alleviating poverty is significant in both rural and urban areas of the country, i.e. households with higher levels of literacy are less likely to fall into poverty than those households with lower levels of literacy. Investing in education should be one of the key elements in reducing poverty in the country.

The analysis also points to the importance of economic growth for poverty reduction. Economic growth does hold the promise of significant poverty reduction in the future. For example, a sustained annual economic growth rate of 7% in real per capita terms over the next five years has the potential of reducing the incidence of poverty by about 32% at national level. The effect of such growth on rural areas is also much greater than in urban areas.

It should be noted that the sectoral pattern of growth is very important in the alleviation of poverty. At present productivity levels, a pattern of growth favouring industry and services will reduce poverty. However, it will also be important to increase agricultural productivity. The analysis shows that transferring labour from agriculture to industry and services sectors will reduce poverty. The relatively high levels of poverty in the agricultural sector reveal low level of productivity and releasing labour from the agricultural sector to other sectors is expected to lead to an increase in higher income for the rural population. A successful development strategy should envisage technological advancement in all sectors of the economy including agriculture.

The results of this study also support the argument that increasing the size of landholding will reduce poverty, and the reduction in poverty will be greater if it is accompanied by productivity-enhancing investments such as modern inputs.

It is argued that the shift away from agricultural employment is a basic result of increased productivity in other sectors. Agriculture has been the source of volatility in employment and national output. The performance of Ethiopian agriculture is heavily influenced by weather conditions, which have increasingly become unpredictable over the years. Agricultural production soars when the rains are favourable (e.g. 1995/96 and 2000/01) only to be followed by a sharp decline when the weather gets drier (e.g. 1993/94, 1997/98 and 2002/03). Hence, the employment strategy of the future should look into sectors other than agriculture. The central focus in agriculture should be to stabilize production using irrigation and other technologies and boost agricultural productivity to reduce rural poverty.

The manufacturing sector has to play the leading role to inject dynamism into the economy. It should be a leading sector from the viewpoint of productive employment generation. However, increasing levels of inequality in urban areas suggest that growth in the non-agricultural sector has not led to poverty reduction. High rates of unemployment in the cities, estimated as 38% in Addis Ababa or 26% in urban areas in general by the 1999 Labour Force Survey, appear to have depressed wages and contributed to rising income and consumption inequality. Hence, the primary focus of the revival strategy in industry should be to ensure that growth is sufficiently employment friendly and pro-poor. The promotion of vocational and technical training and better financial and infrastructural services for the more labour intensive small and medium enterprises should constitute important elements of the effort to create an enabling environment. At the same time, the large and medium-scale manufacturing sector, where the bulk of the industrial output is generated, should receive due attention to withstand competition from imports. A well-coordinated industrial strategy is required to make the sector the engine of growth and strengthen its forward and backward linkages with the agriculture and service sectors to ensure sustainable growth.

Finally, the service sector is significant in terms of both national output and employment. The centrepiece of growth and employment generation strategy should be to increase the productivity of the service sector. With improvement in transport and communication infrastructure, modernization of the marketing and trade sector and promotion of the tourism industry, the service industry should be able to generate more productive employment.

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Appendix 1.

1.   One US Dollar a Day Method of Poverty Measurement: The World Bank Perspective

The World Bank defines its international poverty lines in terms of the purchasing power that a given US$ had in the United States in a particular base year (Pogge and Reddy, 2002). In order to make this line comparable across countries and regions, the World Bank follows a two-step procedure. First, the purchasing power parity conversion factors (PPPs) are used to estimate the amount of local currency needed to have real income equal in purchasing power to that of $1 in the US in a given period. Second, country-specific price indices are used to determine country-specific poverty lines for other years that are deemed equivalent to the base year national poverty lines. In fact, the World Bank uses a $ 1 a day poverty line to compare the level of poverty across different countries or regions.   This approach is based on household income, consumption and expenditure surveys. In order to compare consumption levels across countries, the Bank uses purchasing power parity (PPP) and consumption purchasing power parity. These estimates are based on new price data generated by the International Comparison Program (ICP) (World Bank, 2000). The 1990 international poverty line was $1.05 per day at 1985 PPP ($30.42 per month) and the 1999 international poverty line was $1.08 per day at 1993 PPP ($32.74 per month) (Chen and Ravallion, 2001). These poverty lines are referred to as $ 1 a day and are equivalent to the median of the lowest ten poverty lines within the same set of countries. The question is how are these figures computed? The Bank estimates the regression line of the log of country-specific poverty line on per capita consumption and a quadratic per capita consumption term at PPP. This specification can take the following form:

$$\ln z_i = \boldsymbol{f} + \boldsymbol{1}\left(c_i - c^{\min}\right) + \boldsymbol{d}\left(c_i - c^{\min}\right)^2 + \boldsymbol{e}_i$$

Where z_i is the poverty line for country i; ci is consumption per capita (with $c_i \geq c^{\min}$, the minimum consumption per capita among the sample) in a sample of n countries, while ϕ, λ, δ are parameters and ε_i identically and independently distributed error term. In the above specification, the intercept term gives the lower bound to the log poverty line for the poorest country in the sample. Taking the antilog of the estimated value of ϕ and dividing it by the number of days in a month (365/12=30.42 days per month) gives a $ 1 a day poverty line. Thus, a $ 1 a day poverty line can be computed as dividing ϕ by 30.42 at PPP. [16] Similarly, the upper bound poverty line, which is usually referred to as $ 2 a day, can be calculated by doubling the magnitude of the lower poverty line. This poverty line is commonly reflected in lower-middle-income countries (World Bank, 2000:17).

Although such type of poverty measurement is simple (for example one can easily compare poverty levels across countries or regions), it has also problems. First, it fails to define global poverty line that is associated with identification of commodities that must be commanded by households in order to avoid being poor. Second, equivalence purchasing power over commodities is an incomplete concept since it does not show equivalence over commodities. In other words, the type of commodities consumed by the poor are not clearly indicated as the World Bank relies on data about all commodities some which are not consumed by the poor (such as cars, plane tickets, etc.) (for details see Pogge and Reddy, 2002). The central point is that the purchasing power of poor people should be assessed by relating their incomes to the prices of goods and services

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[16] For instance, the estimated value of ϕ at 1993 PPP was 3.46. Taking the inverse of the log of ϕ gives 31.82 per month which is equivalent to $1.05 per day.

they consume in order to meet their basic needs. Finally, the World Bank extrapolates incorrectly from limited data thereby creating an impression of precision that hides the high probable error of its estimates. These problems suggest that global poverty lines estimated and /or generated by the Bank cannot be taken at face value.

Having the limitations of the above measurement of poverty, an attempt is made to examine the reliability of $1 a day poverty line for Ethiopia. The average daily consumption per capita is about Birr 4 for Ethiopia. The estimate for the headcount poverty index turned out to be about 93%, meaning that about 93% of the Ethiopian population is living below the poverty line. This figure is closely related to the report of UNCTAD (2002), which stood as 94% at $1 a day poverty line. The details on poverty measures according to the $1 a day poverty line are in table A4.1.

Table A4.1: Mean Daily Adult Equivalent Consumption Per Capita and Poverty Measures

Mean Daily Adult Equivalent Consumption Per Capita[*]	3.9
Headcount Index	92.6
Poverty Gap Index	62.4
Squared Poverty Gap Index	45.6

- Expressed in Birr at temporally and spatially adjusted 1996 constant prices, and $1=Birr 8.50 (current exchange rate).

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Appendix 2

Table A3.1: Growth Rates of Value Added by Industrial Group in the Manufacturing Sector (At Current Factor Cost in National Accounts Concept)

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	4.5%	-1.0%	-10.8%	3.3%	-3.8%	0.0%	-2.2%	-38.8%	-5.2%	68.4%	89.7%	38.1%	30.3%	1.0%	-20.7%	76.0%	10.9%	19.7%
Tobacco	63.0%	-35.6%	73.8%	-27.8%	4.6%	24.2%	23.5%	-21.7%	5.8%	22.2%	19.2%	-0.6%	34.9%	-15.7%	53.0%	36.0%	13.7%	16.5%
Textiles	-33.7%	17.1%	40.0%	-11.3%	-20.9%	-4.2%	-33.5%	-18.0%	-8.5%	162.7%	50.4%	-16.5%	-5.3%	-10.6%	-11.5%	-3.6%	11.4%	-4.1%
Wearing Apparel	15.0%	-12.9%	-18.8%	-8.5%	39.0%	67.1%	-31.3%	-56.2%	-2.0%	155.3%	14.1%	-30.3%	3.2%	-0.1%	-54.9%	79.7%	21.9%	-7.7%
Leather	-13.2%	-0.2%	62.3%	50.1%	-4.5%	-5.8%	-25.1%	-43.8%	4.2%	288.1%	59.0%	6.4%	8.4%	22.0%	-41.3%	35.4%	-26.9%	2.2%
Wood	-31.8%	33.1%	-25.7%	28.2%	1.3%	8.7%	-18.7%	-35.9%	-3.5%	110.3%	136.9%	12.0%	-0.4%	-20.7%	-32.3%	-18.9%	-10.2%	-6.5%
Paper and Printing	1.8%	5.6%	6.0%	-23.7%	-2.8%	-10.0%	4.8%	8.2%	-3.9%	64.9%	53.7%	-16.7%	40.7%	-11.2%	15.6%	-1.1%	23.1%	9.0%
Chemicals	-6.6%	40.2%	58.2%	-29.0%	-91.6%	7.0%	-36.7%	17.1%	-40.0%	200.3%	49.5%	-7.7%	-12.7%	61.1%	87.1%	-51.4%	58.0%	13.6%
Rubber and Plastic	13.6%	13.9%	-2.6%	2.5%	-55.2%	24.1%	-42.0%	36.6%	-12.1%	119.3%	60.4%	-7.3%	3.7%	43.8%	3.6%	22.1%	7.1%	14.5%
Other Non-Metallic Mineral	30.3%	-8.2%	-29.1%	70.9%	-5.3%	-7.6%	-25.2%	8.2%	-0.4%	120.0%	99.6%	50.2%	35.9%	23.5%	0.1%	-7.6%	17.5%	21.3%
Iron and Steal	-13.0%	-56.2%	153.4%	36.4%	-28.6%	-60.5%	166.1%	-47.0%	-3.8%	245.3%	152.9%	43.8%	-15.2%	13.2%	-27.8%	-18.5%	39.4%	6.4%
Fabricated Metals	20.0%	5.1%	13.9%	-19.3%	-56.4%	40.2%	-52.8%	-119.6%	-15.8%	-1262.3%	98.8%	2.9%	40.4%	-3.6%	-28.7%	17.4%	25.6%	9.7%
Machinery and Equipment	65.7%	-37.6%	37.0%	-10.8%	67.7%	-5.6%	-72.0%	-166.3%	-1.3%	-493.1%	138.2%	-30.6%	77.0%	7.7%	-40.2%	-8.6%	0.2%	3.2%
Vehicles		46.5%	-20.2%	73.3%	-25.8%	-44.2%	-24.7%	-1.9%	-10.5%	242.8%	13.1%	49.2%	12.2%	-23.8%	-48.7%	464.6%	146.1%	23.9%
Furniture	1.8%	13.9%	1.6%	14.3%	19.1%	7.4%	-16.9%	3.5%	6.2%	14.2%	95.8%	17.4%	17.0%	38.0%	28.0%	-12.3%	5.5%	19.8%
Total	-1.7%	8.9%	21.5%	-9.3%	-33.1%	0.6%	-13.3%	-26.8%	-8.2%	111.6%	66.6%	13.2%	18.6%	5.5%	-9.0%	29.5%	17.4%	13.5%

Table A3.2   Employment Share by Industrial Group in the Manufacturing Sector, In Percent

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Average	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	26.2%	28.7%	29.2%	28.2%	27.6%	28.5%	28.3%	27.9%	27.2%	28.0%	27.4%	27.1%	26.2%	26.0%	25.8%	27.6%	28.7%	29.8%	27.3%
Tobacco	2.1%	1.1%	1.1%	0.9%	0.9%	1.0%	1.1%	1.1%	1.1%	1.1%	1.2%	1.1%	1.1%	1.1%	1.0%	1.0%	0.9%	0.9%	1.0%
Textiles	40.5%	36.8%	35.6%	37.7%	37.8%	34.9%	34.5%	36.1%	36.4%	36.8%	36.1%	34.2%	34.1%	31.2%	29.2%	26.7%	27.2%	24.8%	30.3%
Wearing Apparel	3.5%	3.7%	3.7%	3.7%	3.5%	5.8%	5.6%	5.1%	4.7%	4.3%	4.7%	4.6%	4.4%	4.5%	4.9%	4.5%	4.1%	3.9%	4.4%
Leather	5.7%	6.1%	6.3%	5.9%	6.4%	7.4%	8.0%	7.8%	7.6%	6.8%	7.6%	8.2%	7.8%	8.6%	8.8%	8.2%	7.7%	7.3%	8.0%
Wood	1.9%	1.7%	1.7%	1.6%	1.6%	3.4%	3.0%	2.7%	3.9%	2.3%	3.5%	3.1%	2.8%	2.8%	2.1%	1.4%	1.3%	1.2%	2.2%
Paper and Printing	4.3%	4.8%	4.9%	4.8%	4.9%	5.5%	5.4%	5.5%	5.3%	5.0%	5.4%	5.2%	5.5%	6.1%	5.5%	5.9%	5.9%	6.2%	5.7%
Chemicals	4.3%	4.0%	4.4%	4.2%	3.9%	2.0%	2.1%	2.1%	2.1%	3.3%	2.2%	2.4%	3.0%	3.1%	4.0%	4.4%	4.2%	4.5%	3.5%
Rubber and Plastic	3.4%	3.5%	3.4%	3.5%	3.6%	2.0%	2.1%	2.1%	2.1%	2.9%	2.2%	2.3%	2.2%	2.4%	2.6%	3.3%	3.2%	3.3%	2.7%
Other Non-Metallic Mineral	4.4%	5.0%	5.0%	4.6%	4.6%	4.3%	4.0%	4.0%	3.8%	4.4%	3.9%	5.2%	5.9%	6.7%	7.2%	7.8%	7.3%	7.7%	6.5%
Iron and Steal	0.8%	0.9%	0.9%	0.9%	1.0%	1.3%	1.4%	1.3%	1.4%	1.1%	1.4%	1.3%	1.3%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Fabricated Metals	1.8%	2.1%	2.0%	2.0%	2.0%	1.1%	1.6%	1.7%	1.9%	1.8%	1.9%	2.1%	2.3%	2.2%	2.1%	2.1%	2.2%	2.6%	2.2%
Machinery and Equipment	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.3%	0.3%	0.3%	0.2%	0.3%	0.3%	0.3%	0.5%	0.6%	0.4%	0.5%	0.3%	0.4%
Vehicles	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.8%	0.9%	1.0%	1.2%	1.8%	0.9%
Furniture	1.1%	1.1%	1.2%	1.2%	1.5%	2.0%	2.0%	1.8%	1.8%	1.5%	1.8%	2.5%	2.6%	2.7%	4.1%	4.6%	4.5%	4.4%	3.4%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table A3.3: Real Labour Productivity by Major Economic Sectors, In '000 Birr

Sector/SubSector	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	Average
Agriculture & Allied Activities	0.36	0.28	0.31	0.36	0.35	0.34	0.35	0.36	0.35	0.36	0.34	0.34	0.38	0.39	0.34	0.34	0.34	0.35
Mining & Quarrying	1.65	2.10	2.03	1.75	1.34	1.59	1.47	3.91	2.86	4.10	3.16	3.37	3.72	4.12	4.43	4.74	5.08	3.14
Electricity & Water	6.24	6.42	6.74	6.95	7.22	7.35	7.36	7.42	7.54	7.80	8.02	8.28	7.50	7.76	7.87	7.80	7.93	7.48
Construction	2.30	2.72	2.62	2.71	2.32	1.88	1.48	1.31	1.09	1.36	1.45	1.53	1.60	1.70	1.81	1.80	1.68	1.81
Trade, Hotels & Restaurants	0.55	0.53	0.51	0.61	0.61	0.54	0.56	0.38	0.31	0.42	0.44	0.46	0.49	0.52	0.53	0.56	0.56	0.50
Transport & Communications	4.80	5.10	5.61	5.55	5.78	5.90	5.69	5.15	5.78	6.05	6.25	6.32	6.77	7.07	7.42	7.22	7.96	6.23
Banking, Insurance & Real State	7.83	7.52	7.63	8.41	8.76	8.63	8.56	7.84	7.28	7.77	8.38	8.88	9.43	10.01	10.29	10.49	11.22	8.86
Public Administration & Defence	4.38	4.57	4.64	4.70	5.03	5.56	5.92	4.98	4.16	5.29	5.73	6.13	6.29	6.56	7.99	9.04	10.12	6.10
Education & Health	1.22	1.24	1.23	1.26	1.27	1.31	1.31	1.36	1.39	1.38	1.45	1.49	1.51	1.54	1.61	1.71	1.76	1.43
Domestic & Other Services	0.79	0.82	0.85	0.88	0.91	0.95	1.00	1.05	1.09	1.13	1.17	1.21	1.25	1.28	1.30	1.32	1.34	1.10
Average Labour Productivity	**0.52**	**0.46**	**0.49**	**0.55**	**0.54**	**0.53**	**0.54**	**0.51**	**0.48**	**0.53**	**0.52**	**0.53**	**0.58**	**0.60**	**0.57**	**0.59**	**0.61**	**0.55**

*Computed as a ratio of sectoral value added at constant factor cost to the number of sectoral labour force engaged in the production activity

Table A3.4: Real Labour Productivity by Industrial Group in the Manufacturing Sector, In '000 Birr

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	22.33	17.40	15.72	16.38	16.65	16.58	16.19	12.77	6.54	10.16	17.82	21.14	27.64	27.34	19.63	32.16	32.24	19.58
Tobacco	32.08	96.22	52.20	101.27	61.22	62.03	70.52	69.40	45.01	53.05	61.68	61.68	78.42	66.84	105.74	147.60	168.61	74.82
Textiles	6.39	4.80	5.67	7.03	6.05	5.96	5.91	3.33	2.41	4.15	6.63	5.48	5.51	4.88	4.86	4.99	6.28	5.35
Wearing Apparel	8.18	9.08	7.79	5.92	5.59	5.40	9.61	6.37	2.71	4.50	5.28	3.80	3.69	3.12	1.59	3.40	4.44	5.24
Leather	9.31	7.72	7.23	11.76	15.80	15.08	13.45	9.23	4.73	11.84	17.71	19.42	18.54	20.48	13.38	20.96	16.47	14.17
Wood	17.10	12.06	14.60	10.32	11.49	5.98	6.68	4.84	1.92	4.62	11.26	13.45	12.70	13.03	12.52	11.02	10.35	9.50
Paper and Printing	19.18	18.00	17.76	18.07	12.77	12.95	11.13	11.05	12.57	16.49	20.70	15.57	18.99	17.94	18.21	18.14	19.76	16.53
Chemicals	67.26	66.50	80.89	116.03	82.40	15.39	14.77	9.24	10.17	25.32	31.75	22.36	17.82	17.63	32.02	22.70	32.04	45.16
Rubber and Plastic	22.15	20.68	22.77	22.76	21.25	18.73	21.40	10.12	11.27	22.10	31.00	25.62	23.79	31.15	24.93	30.60	30.40	23.54
Other Non-Metallic Mineral	10.23	10.16	8.57	7.05	11.23	12.27	11.81	7.09	6.86	13.24	18.21	20.94	24.72	27.44	25.04	24.17	25.72	17.49
Iron and Steal	30.65	22.08	9.02	23.15	26.75	16.50	5.66	12.93	5.55	17.25	43.79	52.57	46.64	51.76	36.68	30.19	38.71	28.27
Fabricated Metals	22.03	19.90	19.96	23.73	18.16	15.56	14.32	5.26	-0.80	8.25	13.76	11.04	15.69	16.05	11.15	12.24	12.01	14.21
Machinery and Equipment	22.11	30.29	18.07	23.91	21.05	13.03	11.87	2.57	-1.46	5.06	11.75	7.19	7.85	7.24	5.71	4.66	6.85	8.58
Vehicles		47.08	57.42	50.11	80.74	63.96	35.00	22.18	19.87	62.79	66.41	83.48	52.58	34.49	15.83	68.68	109.17	60.23
Furniture	10.55	10.16	11.06	10.28	9.47	9.60	10.14	8.39	7.96	5.93	8.29	9.33	10.06	8.56	9.92	9.76	10.84	9.49
Total	**15.94**	**14.49**	**14.71**	**17.28**	**15.20**	**11.95**	**11.75**	**8.49**	**5.39**	**9.43**	**14.70**	**15.05**	**17.48**	**17.53**	**15.63**	**20.55**	**23.08**	**14.82**

*Computed as a ratio of real gross value of production to the number of employees engaged in the production activity

Table A3.5: Capital Productivity by Industrial Group in the Manufacturing Sector, In '000 Birr

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	0.96	0.81	0.81	0.77	0.80	0.85	0.90	0.87	0.53	0.77	0.86	1.37	1.22	1.10	0.62	0.66	0.52	0.77
Tobacco	4.23	5.64	3.98	7.50	4.04	7.30	10.46	17.14	12.46	11.77	12.46	14.44	14.71	13.28	27.87	4.97	6.42	8.20
Textiles	1.21	0.88	1.37	0.60	0.56	0.49	0.38	0.18	0.14	0.33	0.35	0.30	0.32	0.29	0.30	0.14	0.15	0.31
Wearing Apparel	3.16	3.21	3.29	2.29	2.69	2.17	3.95	2.21	0.73	1.32	1.30	1.13	0.65	0.27	0.11	0.20	0.24	0.69
Leather	1.32	0.92	0.95	1.49	2.11	2.35	1.57	0.98	0.57	2.26	2.02	1.73	1.13	1.26	0.44	0.52	0.23	0.81
Wood	3.39	2.59	3.93	2.53	2.42	3.39	1.86	1.05	1.35	3.70	4.37	8.17	3.18	2.56	2.76	2.35	2.28	2.88
Paper and Printing	2.57	2.76	2.37	3.13	2.34	2.36	2.17	1.16	1.64	2.92	2.70	1.58	1.50	1.10	1.03	0.83	1.00	1.43
Chemicals	2.33	1.80	2.27	3.33	2.43	1.16	1.24	0.81	1.06	3.48	3.69	1.68	0.32	0.29	0.41	0.17	0.26	0.75
Rubber and Plastic	1.45	1.92	2.39	2.35	2.38	1.49	2.08	0.15	0.20	0.20	0.25	0.22	0.21	0.25	0.27	0.34	0.35	0.34
Other Non-Metallic Mineral	0.93	0.11	0.11	0.09	0.17	0.18	0.17	0.14	0.15	0.14	0.27	0.43	0.52	0.39	0.41	0.41	0.44	0.32
Iron and Steal	2.44	0.81	0.93	2.25	3.17	1.07	0.46	1.27	0.76	3.09	7.05	8.15	6.79	3.06	1.25	0.88	0.83	1.83
Fabricated Metals	1.94	1.64	1.51	1.90	0.94	0.64	0.07	0.04	-0.01	0.10	0.19	0.21	0.26	0.29	0.21	0.23	0.18	0.22
Machinery and Equipment	0.99	1.61	0.85	1.63	1.59	0.18	0.17	0.05	-0.04	0.18	0.22	0.16	0.25	0.24	0.43	0.38	0.18	0.23
Vehicles		0.66	0.83	0.57	1.00	0.75	0.46	0.39	0.41	1.05	1.15	1.64	1.24	0.53	0.22	1.15	1.89	1.01
Furniture	3.38	2.94	2.45	2.58	4.12	4.74	3.25	2.69	2.36	1.73	1.06	0.83	0.53	0.37	0.42	0.39	0.45	0.59
Total	**1.39**	**0.89**	**1.02**	**1.06**	**0.98**	**0.79**	**0.63**	**0.46**	**0.34**	**0.54**	**0.66**	**0.76**	**0.73**	**0.62**	**0.49**	**0.47**	**0.45**	**0.61**

*Computed as a ratio of value added at current factor cost in the national accounts concept to the value of total fixed assets

Table A3.6: Employment Intensity of Output by Industrial Group in the Manufacturing Sector[*]

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	0.11	0.12	0.12	0.14	0.14	0.12	0.12	0.13	0.20	0.12	0.07	0.05	0.04	0.04	0.05	0.03	0.03	0.06
Tobacco	0.08	0.02	0.04	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02
Textiles	0.29	0.39	0.33	0.26	0.31	0.30	0.31	0.50	0.60	0.23	0.15	0.19	0.18	0.19	0.20	0.21	0.18	0.25
Wearing Apparel	0.23	0.21	0.24	0.31	0.33	0.33	0.19	0.26	0.54	0.21	0.19	0.27	0.27	0.30	0.62	0.32	0.25	0.27
Leather	0.20	0.24	0.26	0.16	0.12	0.12	0.14	0.18	0.31	0.08	0.06	0.05	0.05	0.05	0.07	0.05	0.07	0.08
Wood	0.15	0.19	0.15	0.19	0.16	0.28	0.22	0.25	0.55	0.23	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.13
Paper and Printing	0.09	0.10	0.10	0.10	0.13	0.13	0.14	0.14	0.12	0.08	0.05	0.07	0.05	0.05	0.05	0.05	0.04	0.07
Chemicals	0.03	0.03	0.02	0.01	0.02	0.09	0.09	0.15	0.13	0.04	0.03	0.05	0.06	0.05	0.03	0.05	0.04	0.03
Rubber and Plastic	0.11	0.10	0.09	0.10	0.10	0.10	0.09	0.15	0.11	0.05	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.06
Other Non-Metallic Mineral	0.24	0.20	0.23	0.31	0.19	0.16	0.16	0.22	0.19	0.09	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.06
Iron and Steal	0.08	0.09	0.22	0.09	0.08	0.12	0.33	0.12	0.23	0.07	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.04
Fabricated Metals	0.11	0.10	0.10	0.09	0.12	0.13	0.13	0.29	-1.60	0.14	0.08	0.09	0.06	0.06	0.09	0.08	0.08	0.10
Machinery and Equipment	0.11	0.07	0.11	0.09	0.10	0.15	0.16	0.60	-0.87	0.23	0.10	0.14	0.13	0.14	0.17	0.21	0.14	0.16
Vehicles		0.04	0.03	0.04	0.03	0.03	0.05	0.07	0.06	0.02	0.02	0.01	0.02	0.03	0.06	0.01	0.01	0.02
Furniture	0.18	0.18	0.17	0.18	0.20	0.19	0.18	0.20	0.18	0.16	0.12	0.11	0.10	0.11	0.10	0.11	0.10	0.13
Total	0.13	0.13	0.13	0.11	0.13	0.16	0.16	0.18	0.25	0.12	0.07	0.07	0.06	0.06	0.06	0.05	0.04	0.09

[*] Computed as a ratio of the workforce to the value added at current factor cost in the national accounts concept.

Table A3.7: Capital Intensity of Employment by Industrial Group in the Manufacturing Sector

Industrial Group	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Average
Food and Beverages	22.64	22.07	19.86	20.37	19.54	18.41	16.85	14.01	12.16	12.81	20.05	15.61	22.67	24.96	32.13	50.08	64.56	24.73
Tobacco	7.47	15.35	12.26	15.01	18.01	10.07	8.36	5.10	4.34	4.81	5.31	4.04	5.33	5.08	3.88	30.18	26.05	10.25
Textiles	7.00	6.05	4.36	13.93	12.52	13.12	16.00	16.80	14.67	15.51	21.19	18.19	17.47	17.41	16.26	31.90	34.47	15.63
Wearing Apparel	3.44	3.14	2.49	3.07	2.39	2.69	2.48	2.67	3.25	4.22	4.58	3.32	5.66	11.89	14.03	15.31	15.15	5.96
Leather	9.39	9.27	8.02	9.34	8.61	6.95	8.73	8.72	7.22	6.49	9.87	11.07	16.39	16.97	30.36	36.57	59.26	16.24
Wood	4.97	4.19	3.47	4.53	5.64	2.09	4.46	5.83	1.70	1.34	2.76	1.56	3.99	5.16	4.64	4.77	4.50	3.55
Paper and Printing	10.13	7.48	8.34	7.17	6.85	6.33	6.00	9.51	6.27	5.25	8.31	9.63	12.70	16.52	18.49	22.65	20.86	11.22
Chemicals	39.28	44.16	41.58	48.45	48.08	18.14	16.01	13.06	9.58	7.73	9.17	12.93	54.92	75.77	88.17	107.46	97.60	51.55
Rubber and Plastic	15.26	10.79	9.54	9.68	8.94	12.53	10.29	66.86	57.43	107.93	125.06	116.70	112.68	122.69	91.02	90.06	86.74	58.08
Other Non-Metallic Mineral	11.03	89.59	76.98	74.87	65.46	67.62	67.55	52.29	44.99	96.24	67.57	48.38	47.16	70.16	61.14	58.27	58.24	61.76
Iron and Steal	12.57	27.32	9.71	10.29	8.44	15.46	12.19	10.18	7.32	5.59	6.21	6.45	6.87	16.94	29.41	34.18	46.52	15.75
Fabricated Metals	11.38	12.15	13.20	12.52	19.29	24.13	192.27	140.87	100.80	85.82	71.69	53.03	60.06	54.61	53.55	53.56	68.19	57.65
Machinery and Equipment	22.37	18.82	21.22	14.70	13.24	72.77	68.98	48.00	36.32	27.77	54.23	44.35	31.16	30.48	13.25	12.13	38.95	34.77
Vehicles		71.22	69.30	88.02	81.04	85.38	75.45	57.43	48.30	60.07	57.85	51.03	42.43	64.52	71.63	59.61	57.71	63.78
Furniture	4.16	3.83	4.76	4.73	2.64	2.20	3.17	2.90	2.96	4.25	8.80	11.11	18.85	24.14	23.44	22.73	20.05	13.82
Total	**13.17**	**17.28**	**15.32**	**18.90**	**17.52**	**15.73**	**18.92**	**18.33**	**15.29**	**18.65**	**23.12**	**19.72**	**24.01**	**29.03**	**32.44**	**43.22**	**50.47**	**23.28**

Table A3.8: Growth Rates of Capital Productivity by Industrial Group in the Manufacturing Sector, In Percent

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	-15.7%	0.3%	-5.0%	4.0%	6.9%	5.7%	-3.2%	-39.1%	-3.0%	45.0%	12.0%	59.0%	-11.1%	-10.1%	-43.7%	7.2%	-21.6%	-7.9%
Tobacco	33.5%	-29.5%	88.6%	-46.1%	80.6%	43.3%	63.9%	-27.3%	15.9%	-5.5%	5.8%	16.0%	1.8%	-9.7%	109.8%	-82.2%	29.3%	-8.3%
Textiles	-27.5%	55.7%	-56.3%	-7.3%	-11.4%	-23.7%	-50.9%	-21.8%	-26.7%	129.5%	6.3%	-15.7%	6.5%	-7.2%	1.5%	-52.4%	6.9%	-12.0%
Wearing Apparel	1.6%	2.5%	-30.4%	17.7%	-19.4%	81.9%	-44.0%	-67.0%	-11.1%	80.9%	-1.8%	-13.1%	-42.0%	-58.0%	-58.8%	78.0%	21.2%	-34.4%
Leather	-29.9%	2.8%	57.3%	41.3%	11.3%	-33.3%	-37.3%	-41.7%	-2.8%	293.2%	-10.6%	-14.4%	-34.4%	11.5%	-65.2%	18.2%	-55.4%	-31.9%
Wood	-23.5%	51.8%	-35.6%	-4.3%	40.1%	-45.3%	-43.6%	29.4%	-12.7%	172.8%	18.3%	86.8%	-61.0%	-19.7%	8.0%	-14.9%	-2.8%	-11.9%
Paper and Printing	7.4%	-14.0%	31.8%	-25.1%	0.6%	-7.7%	-46.5%	41.2%	-8.1%	78.0%	-7.6%	-41.5%	-5.1%	-26.5%	-6.3%	-19.3%	20.2%	-17.8%
Chemicals	-22.7%	25.6%	47.0%	-27.1%	-52.2%	7.0%	-34.7%	31.0%	-13.0%	228.0%	6.1%	-54.5%	-80.7%	-11.3%	41.8%	-58.6%	54.1%	-45.1%
Rubber and Plastic	32.0%	24.6%	-1.5%	1.0%	-37.1%	39.2%	-92.7%	29.7%	-27.3%	4.4%	21.0%	-11.4%	-3.8%	20.3%	7.9%	24.1%	3.1%	7.4%
Other Non-Metallic Mineral	-87.8%	-1.9%	-15.4%	82.2%	5.7%	-3.6%	-22.5%	12.6%	-8.5%	-9.8%	95.8%	60.6%	21.1%	-25.4%	4.7%	1.3%	6.5%	11.7%
Iron and Steal	-66.8%	14.8%	142.4%	40.9%	-66.3%	-56.5%	173.6%	-40.3%	-9.1%	306.8%	128.5%	15.6%	-16.7%	-55.0%	-59.2%	-29.2%	-5.8%	-31.0%
Fabricated Metals	-15.4%	-7.6%	25.3%	-50.3%	-31.5%	-88.5%	-49.9%	-121.1%	-55.2%	-1318.3%	99.7%	8.5%	25.4%	12.5%	-29.2%	9.7%	-22.9%	6.2%
Machinery and Equipment	62.9%	-47.1%	91.0%	-2.3%	-88.7%	-3.9%	-68.9%	-175.0%	-43.2%	-554.3%	18.9%	-25.2%	55.4%	-5.7%	81.3%	-10.8%	-54.2%	6.5%
Vehicles		25.3%	-31.3%	75.0%	-24.8%	-38.1%	-16.7%	6.6%	-9.6%	154.0%	9.8%	42.5%	-24.3%	-56.9%	-58.7%	421.5%	64.2%	-3.2%
Furniture	-12.9%	-16.8%	5.3%	60.0%	14.9%	-31.4%	-17.2%	-12.4%	-0.9%	-26.8%	-38.7%	-22.0%	-35.4%	-30.5%	13.5%	-7.8%	15.8%	-20.1%
Total	**-35.6%**	**13.9%**	**4.1%**	**-7.8%**	**-19.4%**	**-19.6%**	**-27.4%**	**-26.3%**	**-14.8%**	**58.7%**	**23.0%**	**14.7%**	**-4.0%**	**-15.3%**	**-20.4%**	**-4.0%**	**-4.8%**	**-5.3%**

Table A3.9: Growth Rates of Employment Intensity of Output by Industrial Group in the Manufacturing Sector, In Percent

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	2.7%	5.9%	13.4%	-1.9%	-9.5%	-1.6%	2.8%	56.4%	3.8%	-40.5%	-43.6%	-28.7%	-23.3%	0.2%	36.2%	-40.7%	-5.0%	-16.7%
Tobacco	-69.2%	69.8%	-52.1%	51.4%	-9.6%	-20.1%	-17.4%	33.7%	-11.2%	-13.2%	-15.4%	0.0%	-26.2%	15.1%	-38.4%	-28.5%	-14.0%	-18.9%
Textiles	34.7%	-14.7%	-20.8%	17.4%	-1.7%	2.2%	60.6%	21.0%	6.1%	-62.5%	-31.9%	21.9%	-3.1%	7.2%	4.2%	6.0%	-16.9%	0.4%
Wearing Apparel	-8.9%	17.4%	29.1%	7.0%	0.3%	-43.1%	36.7%	106.2%	6.3%	-61.3%	-7.3%	40.2%	0.2%	12.3%	103.1%	-49.0%	-20.0%	7.6%
Leather	22.0%	7.6%	-39.7%	-24.9%	1.5%	13.5%	32.0%	71.0%	-1.2%	-74.3%	-27.3%	-8.1%	2.1%	-14.1%	58.6%	-30.4%	32.9%	-1.0%
Wood	30.8%	-23.9%	31.3%	-17.8%	75.9%	-18.6%	12.2%	119.0%	12.3%	-57.6%	-59.6%	-16.3%	-0.7%	-4.4%	1.4%	13.4%	4.6%	-8.7%
Paper and Printing	6.5%	-0.3%	-2.5%	36.7%	-1.8%	8.6%	-2.3%	-11.2%	5.1%	-38.9%	-32.4%	30.2%	-20.8%	3.6%	-6.0%	0.3%	-13.3%	-5.2%
Chemicals	-2.9%	-19.2%	-35.5%	35.3%	406.4%	0.7%	55.3%	-14.0%	27.1%	-65.7%	-21.5%	37.6%	20.7%	-19.0%	-40.2%	96.3%	-31.4%	-0.8%
Rubber and Plastic	-9.6%	-13.2%	10.5%	4.8%	3.5%	-16.8%	75.0%	-25.8%	2.3%	-53.7%	-29.5%	6.8%	6.7%	-24.3%	23.3%	-19.3%	-3.3%	-5.7%
Other Non-Metallic Mineral	-15.0%	13.3%	34.3%	-38.6%	-16.5%	-1.2%	37.9%	-14.7%	-3.8%	-52.9%	-28.1%	-23.3%	-16.1%	-10.7%	8.1%	2.7%	-9.8%	-10.9%
Iron and Steal	17.2%	134.1%	-57.0%	-15.3%	48.0%	177.1%	-63.8%	92.3%	9.9%	-70.7%	-61.1%	-26.5%	11.7%	-10.7%	39.2%	20.4%	-25.1%	-6.3%
Fabricated Metals	-6.5%	-4.7%	-7.1%	27.9%	6.5%	3.3%	125.2%	-646.2%	10.5%	-108.8%	-40.7%	9.9%	-30.2%	-3.1%	42.0%	-9.7%	-2.1%	-5.4%
Machinery and Equipment	-38.4%	60.2%	-16.5%	11.1%	47.4%	4.4%	282.9%	-245.5%	20.2%	-126.2%	-57.4%	44.1%	-9.3%	7.5%	25.2%	21.3%	-34.7%	1.0%
Vehicles		-21.6%	26.6%	-39.3%	15.2%	73.8%	30.6%	-7.8%	8.1%	-71.2%	-6.5%	-29.8%	57.4%	51.1%	115.0%	-77.2%	-39.6%	-1.3%
Furniture	5.1%	-7.4%	5.6%	9.6%	-4.5%	-4.1%	9.4%	-7.5%	0.9%	-13.6%	-22.2%	-10.4%	-9.6%	11.4%	-10.5%	10.9%	-6.0%	-4.4%
Total	**-0.1%**	**-5.4%**	**-14.0%**	**14.5%**	**26.0%**	**-1.6%**	**17.6%**	**34.4%**	**6.8%**	**-53.0%**	**-35.2%**	**-9.9%**	**-15.2%**	**-3.2%**	**10.9%**	**-22.5%**	**-13.7%**	**-11.7%**

Table A3.10: Growth Rates of Capital Intensity of Employment by Industrial Group in the Manufacturing Sector, In Percent

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	-2.5%	-10.0%	2.6%	-4.1%	-5.8%	-8.5%	-16.9%	-13.2%	-7.1%	5.4%	56.5%	-22.2%	45.3%	10.1%	28.7%	55.9%	28.9%	21.6%
Tobacco	105.5%	-20.1%	22.4%	20.0%	-44.1%	-17.0%	-38.9%	-15.0%	-11.1%	10.9%	10.4%	-23.9%	31.9%	-4.6%	-23.6%	677.3%	-13.7%	24.2%
Textiles	-13.5%	-28.0%	219.5%	-10.1%	4.8%	21.9%	5.0%	-12.7%	14.3%	5.7%	36.6%	-14.2%	-4.0%	-0.3%	-6.6%	96.2%	8.1%	8.7%
Wearing Apparel	-8.8%	-20.6%	23.1%	-22.3%	12.9%	-8.1%	8.0%	21.6%	-1.4%	29.7%	8.6%	-27.6%	70.7%	110.0%	18.0%	9.2%	-1.0%	23.9%
Leather	-1.3%	-13.5%	16.4%	-7.8%	-19.2%	25.5%	-0.1%	-17.2%	-2.3%	-10.1%	52.1%	12.2%	48.1%	3.5%	78.9%	20.5%	62.1%	29.9%
Wood	-15.6%	-17.3%	30.7%	24.4%	-63.0%	113.7%	30.7%	-70.8%	-6.0%	-21.4%	106.8%	-43.6%	156.0%	29.2%	-10.0%	2.7%	-5.6%	17.6%
Paper and Printing	-26.2%	11.5%	-14.0%	-4.4%	-7.6%	-5.1%	58.5%	-34.1%	-3.3%	-16.3%	58.3%	15.9%	31.8%	30.1%	11.9%	22.5%	-7.9%	20.1%
Chemicals	12.4%	-5.8%	16.5%	-0.8%	-62.3%	-11.8%	-18.4%	-26.7%	-20.3%	-19.3%	18.6%	41.0%	324.8%	38.0%	16.4%	21.9%	-9.2%	43.0%
Rubber and Plastic	-29.3%	-11.6%	1.5%	-7.6%	40.2%	-17.9%	549.8%	-14.1%	18.6%	87.9%	15.9%	-6.7%	-3.4%	8.9%	-25.8%	-1.1%	-3.7%	-4.6%
Other Non-Metallic Mineral	712.0%	-14.1%	-2.7%	-12.6%	3.3%	-0.1%	-22.6%	-14.0%	6.1%	113.9%	-29.8%	-28.4%	-2.5%	48.8%	-12.9%	-4.7%	0.0%	-3.8%
Iron and Steal	117.3%	-64.5%	6.0%	-18.0%	83.2%	-21.1%	-16.5%	-28.1%	-7.1%	-23.6%	11.1%	3.9%	6.5%	146.7%	73.6%	16.2%	36.1%	34.3%
Fabricated Metals	6.8%	8.6%	-5.1%	54.0%	25.1%	696.9%	-26.7%	-28.4%	36.8%	-14.9%	-16.5%	-26.0%	13.3%	-9.1%	-1.9%	0.0%	27.3%	-3.7%
Machinery and Equipment	-15.9%	12.8%	-30.7%	-9.9%	449.4%	-5.2%	-30.4%	-24.3%	14.5%	-23.5%	95.3%	-18.2%	-29.7%	-2.2%	-56.5%	-8.4%	221.0%	-10.4%
Vehicles		-2.7%	27.0%	-7.9%	5.4%	-11.6%	-23.9%	-15.9%	-4.8%	24.4%	-3.7%	-11.8%	-16.9%	52.1%	11.0%	-16.8%	-3.2%	1.6%
Furniture	-7.8%	24.1%	-0.6%	-44.2%	-16.8%	44.5%	-8.7%	2.1%	-6.3%	43.6%	107.2%	26.2%	69.7%	28.1%	-2.9%	-3.0%	-11.8%	21.5%
Total	**31.2%**	**-11.3%**	**23.3%**	**-7.3%**	**-10.2%**	**20.2%**	**-3.1%**	**-16.6%**	**1.7%**	**22.0%**	**23.9%**	**-14.7%**	**21.8%**	**20.9%**	**11.8%**	**33.2%**	**16.8%**	**14.0%**

Table A3.11: Arc Elasticity of Employment by Major Economic Sectors**

Sector/SubSector	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Agriculture & Allied Activities	-0.11	0.14	0.12	-0.81	2.18	0.42	0.43	-0.82	0.62	0.37	-0.62	0.66	0.15	0.65	-0.20	0.59	1.02	1.21
Mining & Quarrying	0.07	-1.74	-0.19	-0.10	0.11	-0.41	0.01	-0.09	0.29	0.05	-0.11	0.25	0.17	0.17	0.22	0.24	0.24	0.30
Electricity & Water	0.44	0.31	0.41	0.36	0.55	0.93	0.74	0.58	0.49	0.38	0.44	0.41	-0.31	0.38	0.61	1.67	0.57	1.09
Construction	0.11	-1.60	0.38	-0.18	-0.13	-0.11	-0.24	-0.16	-0.25	0.08	0.24	0.30	0.30	0.26	0.26	1.49	-0.50	0.38
Trade, Hotels & Restaurants	-0.88	-2.00	0.10	1.18	-0.22	0.29	-0.07	-0.15	-0.72	0.06	0.34	0.26	0.26	0.27	0.50	0.35	0.57	0.33
Transport & Communications	0.26	0.18	1.94	0.35	0.51	-1.61	-0.30	0.15	0.61	0.32	0.39	0.66	0.24	0.33	0.31	-4.46	0.18	0.38
Banking, Insurance & Real State	-1.25	0.60	0.18	0.35	3.24	1.53	-0.35	-0.44	0.95	0.25	0.22	0.27	0.26	0.26	0.44	0.54	0.24	0.31
Public Administration & Defence	0.34	0.59	0.61	0.24	0.17	0.25	-0.16	-0.15	0.66	0.07	0.21	0.24	0.47	0.34	0.09	0.14	0.15	0.20
Education & Health	0.61	1.18	0.51	0.75	0.39	0.92	0.40	0.50	0.59	1.16	0.30	0.48	0.55	0.53	0.33	0.27	0.40	0.41
Domestic & Other Services	0.34	0.38	0.40	0.37	0.33	0.31	0.30	0.37	0.36	0.37	0.38	0.42	0.41	0.45	0.62	0.56	0.59	0.49
Total	**-0.23**	**0.23**	**0.16**	**-276.89**[1]	**6.38**	**0.55**	**-0.52**	**-0.61**	**0.98**	**0.19**	**1.32**	**0.42**	**0.22**	**0.44**	**-1.56**	**0.37**	**0.42**	**0.49**

** Since there are no time-series employment data, all values are computed based on projections using the 1984 and 1994 census data.

[1]This large figure is due to real GDP for the years 1986/87 and 1987/88 which are almost identical, implying a growth rate of nearly zero per cent. In calculating the arc elasticity of employment, we divide the growth rate of employment by the growth rate of real GDP which is a very small number (almost zero). As a result the arc elasticity figure will be very high in absolute terms.

Table A3.12: Arc Employment Elasticity of Value Added by Industrial Group in the Manufacturing Sector for each Year

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	Trend	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	Trend
Food and Beverages	1.62	-5.01	-0.11	0.42	3.43	241.84	-0.24	0.11	0.26	0.00	0.08	-0.04	0.00	1.16	-0.39	0.06	0.49	0.15
Tobacco	-0.79	-0.26	-0.23	-0.34	-1.21	-0.03	0.09	-0.22	-0.91	0.27	0.05	0.98	-0.01	0.19	-0.11	-0.08	-0.16	-0.14
Textiles	0.32	-0.01	0.27	-0.37	1.06	0.50	-0.20	0.04	0.28	-0.01	0.05	-0.11	1.55	0.39	0.68	-0.61	-0.66	0.90
Wearing Apparel	0.32	-0.17	-0.25	0.25	1.01	-0.07	0.20	0.17	-2.13	-0.01	0.41	0.08	1.06	-108.88	0.15	-0.10	-0.11	0.01
Leather	-0.44	-43.11	-0.03	0.25	0.69	-1.21	0.04	0.09	0.71	0.00	0.26	-0.34	1.27	0.22	0.17	-0.16	0.10	0.57
Wood	0.34	0.04	0.10	0.19	60.21	-1.32	0.47	-1.12	-2.56	-0.10	-0.03	-0.52	2.81	1.17	0.97	0.43	0.59	2.32
Paper and Printing	4.70	0.94	0.56	-0.18	1.63	0.23	0.49	-0.48	-0.32	0.01	0.07	-0.50	0.28	0.72	0.56	0.74	0.29	0.42
Chemicals	1.41	0.33	0.04	0.13	0.63	1.10	0.05	0.04	0.32	0.02	0.35	-3.50	-0.43	0.50	0.14	0.09	0.15	0.94
Rubber and Plastic	0.20	-0.08	-2.91	3.01	0.97	0.14	-0.04	0.04	0.81	0.01	0.22	0.14	2.87	0.20	7.67	-0.06	0.50	0.60
Other Non-Metallic Mineral	0.36	-0.50	0.16	0.07	3.94	1.15	-0.13	-0.93	10.32	0.03	0.44	0.30	0.39	0.44	76.55	0.67	0.34	0.49
Iron and Steal	-0.15	-0.04	0.06	0.43	-0.20	-0.15	-0.02	-0.04	-1.60	0.00	-0.01	0.13	0.35	0.08	-0.02	0.10	0.11	0.01
Fabricated Metals	0.61	0.02	0.42	-0.17	0.95	1.12	-0.12	-0.06	0.25	0.00	0.18	4.49	-0.05	1.85	-0.05	0.35	0.89	0.44
Machinery and Equipment	0.03	0.00	0.39	0.08	2.17	0.26	-0.10	0.02	-13.52	-0.01	0.01	0.00	0.79	2.05	0.63	-1.28	-185.16	1.31
Vehicles		0.32	-0.05	0.07	0.56	0.07	0.07	5.01	0.23	-0.01	0.44	0.09	6.29	-0.64	-0.21	0.06	0.33	0.95
Furniture	3.88	0.39	4.44	1.76	0.72	0.41	0.54	-1.24	1.14	-0.09	0.55	0.30	0.34	1.41	0.52	0.23	-0.14	0.78
Total	**1.09**	**0.35**	**0.21**	**-0.42**	**0.47**	**-1.56**	**-0.14**	**0.06**	**0.17**	**-0.01**	**0.12**	**0.15**	**0.03**	**0.39**	**-0.10**	**0.01**	**0.08**	**0.13**

Table A3.13: Productivity Effect by Industrial Group in the Manufacturing Sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Food and Beverages	1.35	1.85	0.77	0.54	0.03	0.59	1.02	0.96	0.99	0.86	1.11	1.00	-12.10	1.26	0.90	0.04
Tobacco	3.96	1.12	1.53	1.17	-0.31	1.06	-3.54	1.10	0.72	0.94	0.02	1.02	0.85	1.19	1.11	1.21
Textiles	0.76	1.01	0.64	1.34	0.06	0.30	1.10	0.98	1.04	0.94	1.09	-0.07	0.76	0.06	0.56	1.57
Wearing Apparel	0.67	1.16	1.18	0.74	-0.10	1.13	0.89	0.93	1.03	0.72	0.94	-4.49	2.97	0.92	1.19	1.11
Leather	1.40	-11.07	1.06	0.67	0.61	2.36	0.98	0.96	1.00	0.68	1.33	-0.80	0.67	0.89	1.19	0.91
Wood	0.79	0.93	0.94	0.65	6.62	-9.86	0.81	1.36	1.23	1.08	1.63	0.85	-0.12	0.12	0.63	0.52
Paper and Printing	-3.58	-0.34	0.34	1.12	-0.47	0.88	-0.43	1.49	0.97	0.84	1.34	0.61	0.42	0.15	0.33	0.55
Chemicals	0.11	0.57	0.94	0.91	0.88	-1.21	0.97	0.92	0.95	0.54	2.80	1.27	-0.04	0.79	0.90	0.78
Rubber and Plastic	1.62	1.14	-0.01	-26.99	0.20	0.79	1.01	0.88	0.97	0.69	0.95	-2.57	0.73	-9.03	1.08	-0.24
Other Non-Metallic Mineral	-0.07	1.28	0.82	0.88	-0.68	0.31	1.05	0.30	0.93	0.39	0.46	0.52	0.49	6.99	0.42	0.50
Iron and Steal	1.05	1.02	0.87	0.46	1.10	1.05	1.07	1.02	0.98	1.03	0.75	0.71	0.90	1.01	0.92	0.83
Fabricated Metals	-7.45	0.76	0.73	1.12	0.24	-0.24	1.04	0.99	0.98	0.69	2.15	1.07	-0.52	1.03	0.60	-0.09
Machinery and Equipment	0.93	1.00	0.63	0.94	-0.72	0.87	1.02	1.01	0.98	0.98	1.00	0.12	-1.16	0.52	1.95	-12.30
Vehicles	0.00	0.55	1.08	0.88	0.64	0.96	0.97	0.55	1.02	0.49	0.81	-3.32	1.41	1.10	0.73	0.43
Furniture	-1.26	0.60	27.85	-0.51	0.09	0.64	0.70	0.56	0.96	0.35	0.68	0.55	-0.48	0.48	0.37	1.09
Total	0.84	0.32	0.76	1.39	0.63	0.63	1.05	0.97	1.01	0.82	0.53	0.96	0.13	1.08	0.98	0.89

Table A3.13: Employment Effect by Industrial Group in the Manufacturing Sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Food and Beverages	-0.45	-0.94	0.22	0.46	0.97	0.42	-0.03	0.08	0.00	0.08	-0.09	0.00	13.24	-0.36	0.06	0.96
Tobacco	-0.99	-0.23	-0.27	-0.28	1.30	-0.05	4.62	-0.15	0.24	0.05	0.98	-0.02	0.17	-0.12	-0.08	-0.19
Textiles	0.33	-0.01	0.29	-0.40	0.95	0.71	-0.17	0.03	-0.02	0.04	-0.11	1.07	0.27	0.95	0.43	-0.46
Wearing Apparel	0.29	-0.18	-0.24	0.28	1.14	-0.07	0.16	0.16	-0.02	0.24	0.08	5.64	-2.33	0.16	-0.09	-0.09
Leather	-0.48	12.88	-0.04	0.25	0.41	-1.52	0.03	0.08	0.00	0.21	-0.30	1.88	0.30	0.17	-0.12	0.12
Wood	0.29	0.06	0.08	0.31	-10.79	9.73	0.26	-0.91	-0.09	-0.03	-0.52	0.16	1.09	0.92	0.42	0.52
Paper and Printing	4.88	1.36	0.65	-0.16	1.45	0.14	1.44	-0.43	0.02	0.13	-0.45	0.32	0.61	0.84	0.68	0.42
Chemicals	0.90	0.35	0.04	0.12	0.63	2.30	0.04	0.07	0.02	0.37	-2.55	-0.34	1.05	0.11	0.14	0.16
Rubber and Plastic	-0.66	-0.13	1.01	29.99	0.91	0.18	-0.03	0.11	0.02	0.22	0.06	3.84	0.21	12.53	-0.07	1.25
Other Non-Metallic Mineral	1.07	-0.33	0.22	0.07	1.54	0.72	-0.08	0.73	0.04	0.45	0.47	0.41	0.46	-6.57	0.60	0.47
Iron and Steal	-0.08	-0.04	0.05	0.46	-0.16	-0.15	-0.03	-0.04	0.00	-0.01	0.21	0.33	0.09	-0.02	0.10	0.13
Fabricated Metals	9.35	0.24	0.23	-0.15	0.89	1.35	-0.10	-0.06	0.00	0.18	-1.43	-0.05	1.49	-0.04	0.37	1.11
Machinery and Equipment	0.05	0.00	0.28	0.07	2.77	0.14	-0.09	0.02	-0.01	0.01	0.00	0.80	2.34	0.61	-1.17	9.05
Vehicles	0.00	0.37	-0.09	0.08	0.45	0.06	0.04	0.50	-0.01	0.49	0.15	6.86	-0.62	-0.21	0.06	0.36
Furniture	2.35	0.37	-28.88	1.64	0.90	0.34	0.37	0.47	0.05	0.46	0.28	0.41	1.74	0.45	0.64	-0.08
Total	0.17	0.67	0.20	-0.45	0.47	0.38	-0.07	0.04	-0.01	0.12	0.46	0.03	0.87	-0.09	0.01	0.10

Table A3.14: Multiple Effect by Industrial Group in the Manufacturing Sector

Industrial Group	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Food and Beverages	0.10	0.09	0.01	0.01	0.00	-0.01	0.01	-0.04	0.00	0.06	-0.02	0.00	-0.15	0.10	0.04	0.00
Tobacco	-1.97	0.11	-0.26	0.11	0.02	-0.01	-0.07	0.05	0.04	0.01	0.00	-0.01	-0.03	-0.07	-0.03	-0.03
Textiles	-0.08	0.00	0.07	0.06	-0.01	-0.01	0.07	-0.01	-0.02	0.02	0.02	0.01	-0.03	0.00	0.01	-0.12
Wearing Apparel	0.03	0.03	0.06	-0.02	-0.04	-0.06	-0.05	-0.09	-0.01	0.04	-0.02	-0.15	0.36	-0.08	-0.10	-0.03
Leather	0.08	-0.82	-0.02	0.09	-0.02	0.16	-0.01	-0.04	0.00	0.11	-0.03	-0.09	0.03	-0.06	-0.07	-0.03
Wood	-0.09	0.01	-0.02	0.04	5.17	1.14	-0.07	0.55	-0.13	-0.05	-0.10	-0.01	0.03	-0.04	-0.05	-0.03
Paper and Printing	-0.30	-0.02	0.01	0.05	0.02	-0.02	-0.01	-0.06	0.01	0.03	0.11	0.07	-0.03	0.01	0.00	0.04
Chemicals	-0.01	0.08	0.02	-0.04	-0.51	-0.09	-0.02	0.01	0.03	0.09	0.76	0.07	-0.01	0.09	-0.04	0.07
Rubber and Plastic	0.04	-0.01	0.00	-2.00	-0.11	0.03	0.02	0.01	0.02	0.09	-0.01	-0.27	0.06	-2.50	-0.02	-0.01
Other Non-Metallic Mineral	-0.01	0.05	-0.04	0.04	0.14	-0.03	0.03	-0.02	0.03	0.17	0.07	0.07	0.05	0.57	-0.02	0.03
Iron and Steal	0.02	0.03	0.08	0.07	0.06	0.10	-0.04	0.02	0.01	-0.02	0.04	-0.04	0.01	0.00	-0.02	0.04
Fabricated Met als	-0.91	0.00	0.04	0.04	-0.13	-0.11	0.07	0.07	0.02	0.12	0.28	-0.02	0.03	0.01	0.04	-0.02
Machinery and Equipment	0.02	0.00	0.09	-0.01	-1.06	-0.01	0.07	-0.04	0.03	0.01	0.00	0.07	-0.18	-0.13	0.21	4.25
Vehicles	1.00	0.08	0.01	0.05	-0.09	-0.03	-0.02	-0.05	-0.01	0.03	0.04	-2.54	0.21	0.11	0.21	0.21
Furniture	-0.09	0.03	2.03	-0.13	0.01	0.02	-0.06	-0.02	-0.01	0.18	0.04	0.03	-0.26	0.07	-0.01	-0.01
Total	-0.02	0.01	0.04	0.05	-0.10	-0.01	0.02	-0.02	-0.01	0.07	0.01	0.01	0.00	0.01	0.00	0.01

Table A3.15: Determinants of Labour Productivity and Employment in the Ethiopian Manufacturing Industries

Economic Activity	Estimated Equation	R^2	D.W.
Manufacturing Sector, Aggregate	$\ln(V/L) = -4.74 + 0.93\ln(V) + 0.65\ln(K/L)$ $\quad\quad\quad\quad (-7..55)\quad\quad (123.79)\quad\quad\quad (9.15)$	0.99	1.45
	$\ln(L) = 4.74 + 0.07\ln(V) - 0.65\ln(K/L)$ $\quad\quad\quad (7.55)\quad\quad (9.89)\quad\quad\quad (-9.15)$	0.92	1.45
Food and Beverages Products	$\ln(V/L) = -10.05 + 1.02\ln(V) - 0.18\ln(K/L) + 0.$ $\quad\quad\quad\quad (-17.50)\quad\quad (18.08)\quad\quad\quad (-2.75)$	0.99	0.99
	$\ln(L) = 10.05 - 0.02\ln(V) + 0.18\ln(K/L) - 0.02$ $\quad\quad\quad (17.50)\quad\quad (-0.39)\quad\quad\quad (2.75)\quad\quad\quad\quad (-3.15)$	0.47	0.99
Tobacco Products	$\ln(V/L) = -8.17 + 1.11\ln(V) + 0.05\ln(K/L)$ $\quad\quad\quad\quad (-8.21)\quad\quad (11.24)\quad\quad\quad (0.58)$	0.93	0.10
	$\ln(L) = 8.17 - 0.11\ln(V) - 0.05\ln(K/L)$ $\quad\quad\quad (8.21)\quad\quad (-1.14)\quad\quad\quad (-0.57)$	1.00	1.00
Textiles Products	$\ln(V/L) = -9.74 + 0.92\ln(V) + 0.13\ln(K/L)$ $\quad\quad\quad\quad (-13.42)\quad\quad (14.49)\quad\quad\quad (4.76)$	0.95	1.59
	$\ln(L) = 9.38 + 0.09\ln(V) + 0.10\ln(K/L) - 0.04\,t$ $\quad\quad\quad (18.02)\quad\quad (2.00)\quad\quad\quad (1.58)\quad\quad\quad\quad (-3.87)$	0.78	1.94
Wearing Apparel	$\ln(V/L) = -7.58 + 0.95\ln(V) + 0.14\ln(K/L) - 0.$ $\quad\quad\quad\quad (-10.15)\quad\quad (12.07)\quad\quad\quad (1.98)\quad\quad\quad\quad (-2$	0.91	1.54
	$\ln(L) = 7.58 + 0.05\ln(V) - 0.14\ln(K/L) + 0.04\,t$ $\quad\quad\quad (10.15)\quad\quad (0.69)\quad\quad\quad (-1.98)\quad\quad\quad\quad (2.79)$	0.35	1.54.
Leather and Leather Products	$\ln(V/L) = -7.92 + 0.93\ln(V) + 0.06\ln(K/L) - 0.$ $\quad\quad\quad\quad (-23.30)\quad\quad (27.58)\quad\quad\quad (1.57)\quad\quad\quad\quad (-2$	0.99	1.82
	$\ln(L) = 7.92 + 0.07\ln(V) - 0.06\ln(K/L) + 0.02\,t$ $\quad\quad\quad (23.30)\quad\quad (2.08)\quad\quad\quad (-1.57)\quad\quad\quad\quad (2.90)$	0.84	1.82
Wood and Wood Products	$\ln(V/L) = -6.08 + 0.81\ln(V) + 0.52\ln(K/L) - 0.$ $\quad\quad\quad\quad (-4.36)\quad\quad (5.22)\quad\quad\quad (3.31)\quad\quad\quad\quad (-0.$	0.79	0.87
	$\ln(L) = 6.07 + 0.19\ln(V) - 0.52\ln(K/L) + 0.01\,t$ $\quad\quad\quad (4.36)\quad\quad (1.25)\quad\quad\quad (-3.31)\quad\quad\quad\quad (0.80)$	0.37	0.87
Paper and Printing	$\ln(V/L) = -7.78 + 0.95\ln(V) - 0.10\ln(K/L)$ $\quad\quad\quad\quad (-11.12)\quad\quad (13.38)\quad\quad\quad (-2.09)$	0.98	0.94
	$\ln(L) = 7.78 + 0.05\ln(V) + 0.10\ln(K/L)$ $\quad\quad\quad (11.12)\quad\quad (0.64)\quad\quad\quad (2.09)$	0.70	0.94
Chemicals and Chemical Products	$\ln(V/L) = -4.98 + 0.78\ln(V) - 0.22\ln(K/L) + 0.$ $\quad\quad\quad\quad (-17.24)\quad\quad (26.44)\quad\quad\quad (-6.15)\quad\quad\quad\quad (2.$	0.99	2.37
	$\ln(L) = 4.61 + 0.26\ln(V) + 0.16\ln(K/L)$ $\quad\quad\quad (18.22)\quad\quad (10.04)\quad\quad\quad (6.34)$	0.95	1.78
Rubber and Plastic Products	$\ln(V/L) = -3.53 + 0.55\ln(V) + 0.10\ln(K/L) + 0.$ $\quad\quad\quad\quad (-4.38)\quad\quad (6.76)\quad\quad\quad (1.74)\quad\quad\quad\quad (1.$	0.92	1.72
	$\ln(L) = 3.53 + 0.45\ln(V) - 0.10\ln(K/L) - 0.02\,t$ $\quad\quad\quad (4.38)\quad\quad (5.61)\quad\quad\quad (-1.74)\quad\quad\quad\quad (-1.03)$	0.70	1.72

Economic Activity	Estimated Equation	R^2	D.W.
Non-Metallic Products	$\ln(V/L) = -4.61 + 0.61\ln(V) + 0.02\ln(K/L) + 0.0$ 　　　　　(−4.38)　　(8.45)　　　　(0.33)　　　　　　(1.9	0.97	0.87
	$\ln(L) = 4.61 + 0.39\ln(V) - 0.02\ln(K/L) - 0.03t$ 　　　(6.53)　　(5.47)　　　　(−0.33)　　　　　(−1.93)	0.80	0.87
Iron and Steel Manufacturing	$\ln(V/L) = -7.30 + 1.06\ln(V) + 0.10\ln(K/L) - 0.$ 　　　　　(−32.08)　(39.79)　　　(3.55)　　　　　　(−7	0.99	1.51
	$\ln(L) = 7.30 - 0.06\ln(V) - 0.10\ln(K/L) + 0.05t$ 　　　(32.08)　　(−2.16)　　　(−3.55)　　　　　(7.30)	0.83	1.51
Fabricated Metal Products	$\ln(V/L) = -3.69 + 0.62\ln(V) - 0.03\ln(K/L) + 0.0$ 　　　　　(−3.41)　　(5.81)　　　(−0.49)　　　　　　(0.3	0.85	1.91
	$\ln(L) = 3.69 + 0.38\ln(V) + 0.03\ln(K/L) - 0.01t$ 　　　(3.41)　　(3.59)　　　(0.49)　　　　　　(−0.36)	0.62	1.91
Machinery and Equipment	$\ln(V/L) = -3.33 + 0.91\ln(V) - 0.25\ln(K/L) - 0.0$ 　　　　　(−2.97)　　(5.51)　　　(−2.21)　　　　　　(−4.0	0.70	1.32
	$\ln(L) = 0.70 + 0.47\ln(V) + 0.433\ln(K/L)$ 　　　(0.52)　　(2.32)　　　(2.71)	0.58	1.13
Motor Vehicles Manufacturing	$\ln(V/L) = -1.13 + 0.70\ln(V) - 0.58\ln(K/L)$ 　　　　　(−0.97)　　(7.10)　　　(−1.50)	0.81	0.89
	$\ln(L) = 1.13 + 0.30\ln(V) + 0.58\ln(K/L)$ 　　　(0.97)　　(3.03)　　　(1.50)	0.64	0.89
Furniture Manufacturing	$\ln(V/L) = 0.51 + 0.13\ln(V) + 0.20\ln(K/L) - 0.01$ 　　　　　(0.66)　　(1.40)　　　(4.66)　　　　　　(−1.46	0.95	1.64
	$\ln(L) = -1.29 + 0.97\ln(V) - 0.20\ln(K/L)$ 　　　(−2.24)　　(14.29)　　　(−4.67)	0.99	1.63

Source: Own calculations

Note: Figures in parentheses are t-statistics.

Table A3.16: Correlation Matrix Between Sectoral Output Growth Rates, 1984/85-1999/00

Sector/Sub-Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	All
Agriculture	1.00																
Industry	0.13	1.00															
Mining & Quarrying	0.02	-0.32	1.00														
Large & Medium Scale Manufacturing	0.19	0.94	-0.46	1.00													
Small Scale Industry & Handicrafts	0.55	0.72	-0.40	0.72	1.00												
Electricity & Water	-0.22	0.21	-0.10	0.23	0.04	1.00											
Construction	-0.15	0.78	0.05	0.56	0.33	0.06	1.00										
Distributive Services	0.22	0.87	-0.60	0.88	0.74	0.05	0.57	1.00									
Trade, Hotels & Restaurants	0.27	0.89	-0.44	0.89	0.74	0.06	0.60	0.97	1.00								
Transport & Communications	-0.16	0.28	-0.56	0.29	0.22	0.06	0.17	0.38	0.15	1.00							
Other Services	-0.03	0.72	-0.36	0.76	0.42	0.07	0.48	0.74	0.78	0.12	1.00						
Banking, Insurance & Real State	0.37	0.67	-0.46	0.68	0.54	0.02	0.45	0.81	0.81	0.17	0.75	1.00					
Public Administration & Defence	-0.14	0.70	-0.25	0.74	0.36	0.10	0.47	0.66	0.71	0.10	0.97	0.58	1.00				
Education	-0.09	-0.58	0.34	-0.58	-0.56	-0.23	-0.42	-0.59	-0.56	-0.36	-0.19	-0.23	-0.23	1.00			
Health	-0.17	0.61	-0.42	0.61	0.36	0.11	0.52	0.52	0.49	0.26	0.40	0.34	0.38	-0.57	1.00		
Domestic & Other Services	0.04	-0.37	0.34	-0.33	-0.26	0.09	-0.30	-0.42	-0.33	-0.34	-0.55	-0.51	-0.46	-0.30	-0.15	1.00	
GDP at Constant Factor Cost	0.85	0.59	-0.25	0.64	0.80	-0.13	0.22	0.68	0.72	0.03	0.46	0.73	0.34	-0.30	0.15	-0.27	1.00

Table A3.17: Correlation Matrix Between Sectoral Real Labour Productivity Growth, 1984/85-1999/00

	1	2	3	4	5	6	7	8	9	10	11	12
Agriculture & Allied Activities	1											
Mining & Quarrying	0.02	1										
Manufacturing	0.27	-0.50	1									
Electricity & Water	-0.22	-0.10	0.20	1								
Construction	-0.15	0.05	0.53	0.06	1							
Trade, Hotels & Restaurants	0.27	-0.44	0.89	0.06	0.60	1						
Transport & Communications	-0.16	-0.56	0.31	0.06	0.17	0.15	1					
Banking, Insurance & Real State	0.37	-0.46	0.69	0.02	0.45	0.81	0.17	1				
Public Administration & Defence	-0.14	-0.25	0.69	0.10	0.47	0.71	0.10	0.58	1			
Education & Health	-0.26	0.06	-0.23	-0.18	-0.04	-0.27	-0.24	0.01	0.05	1		
Domestic & Other Services	0.04	0.34	-0.35	0.09	-0.30	-0.33	-0.34	-0.51	-0.46	-0.46	1	
Average Labour Productivity	0.85	-0.25	0.70	-0.13	0.22	0.72	0.03	0.73	0.34	-0.25	-0.27	1

Table A3.18: Correlation Matrix Between Sectoral Employment Growth, 1984/85-1999/00

	1	2	3	4	5	6	7	8	9	10	11	12
Agriculture & Allied Activities	1											
Mining & Quarrying	0.85	1										
Manufacturing	0.78	0.94	1									
Electricity & Water	0.80	0.93	0.84	1								
Construction	0.82	0.91	0.92	0.92	1							
Trade, Hotels & Restaurants	0.92	0.85	0.82	0.75	0.84	1						
Transport & Communications	0.93	0.94	0.89	0.90	0.93	0.91	1					
Banking, Insurance & Real State	0.66	0.84	0.81	0.82	0.80	0.67	0.78	1				
Public Administration & Defence	0.80	0.91	0.88	0.78	0.78	0.74	0.85	0.66	1			
Education & Health	0.88	0.78	0.79	0.68	0.76	0.89	0.87	0.64	0.78	1		
Domestic & Other Services	0.85	0.87	0.86	0.82	0.83	0.78	0.87	0.69	0.87	0.87	1	
Average Labour Productivity	0.80	0.58	0.51	0.65	0.59	0.68	0.69	0.42	0.54	0.74	0.78	1

Table A3.19: Correlation Coefficient Between Labour Productivity and Employment
For Major Economic Sectors

Sector/Sub-Sector	1984/85-1991/92	1992/93-1999/00	1984/85-1999/00
Agriculture & Allied Activities	-0.37	-0.58	-0.44
Mining & Quarrying	0.78	-0.56	0.41
Manufacturing	-0.72	-0.67	-0.65
Electricity & Water	-0.40	0.16	0.03
Construction	0.40	-0.37	0.03
Trade, Hotels & Restaurants	-0.45	-0.54	-0.45
Transport & Communications	-0.53	0.58	-0.13
Banking, Insurance & Real State	-0.41	0.32	-0.20
Public Administration & Defence	-0.26	-0.16	-0.22
Education & Health	0.70	0.26	0.36
Domestic & Other Services	0.52	-0.27	0.08

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