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Structural Change in Ethiopia

An Employment Perspective

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Abstract

This paper investigates whether the Ethiopian economy is undergoing a virtuous process of structural change. In particular, it assesses the relative contributions of within-sector and between-sector productivity to output per capita growth. Based on data disaggregated into eight sectors for the period 1996–2011, the analysis suggests that the structure of output has changed considerably—predominantly from agriculture to services—but changes in the composition of employment have lagged behind. Labor productivity growth has been strong across most sectors, albeit mainly driven by within-sector productivity improvements. Nonetheless, the pace of structural change is accelerating and its relative contribution to output growth is increasing.

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Structural Change in Ethiopia: An Employment Perspective

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1. Introduction

While many economists tend to focus on the structure of output, little attention is usually paid to the importance of changing the structure of employment. In the particular context of African economies, relative shifts in production – from agriculture to industry and services – have rarely been followed by commensurate changes in sectoral employment. This undermines the impact and sustainability of the growth process, since research has shown that structural change (in the labor market) is vital for sustaining economic and social development.

In this paper, we conduct an investigation of the structural changes that have taken place in Ethiopia over the past 15 years. For that purpose, we use macroeconomic and household survey data disaggregated into eight sectors to answer the following key questions:

- How has the sectoral composition of output and employment changed over time?
- What are the trends in labor productivity?
- What have been the relative contributions of within-sector productivity and structural change (i.e. labor shifting from low- to high-productivity sectors) to output per capita growth?

Our results suggest that the structure of output has changed considerably. For instance, the share of agriculture in total output declined from 66 percent in 1991 to 45 percent in 2011, while the services have expanded considerably – especially commerce and real estate activities. However, changes in the composition of employment have lagged behind. The share of agricultural employment in total employment remains very high, at about 78 percent. Nonetheless, labor productivity growth has been strong across most sectors (including agriculture), with total output per worker doubling in the past decade. This performance has been mainly driven by within-sector productivity improvements, although the relative contribution of structural change is increasing.

This paper is structured as follows. Section 2 provides a brief overview of the literature on structural change. Section 3 assesses trends in the level, growth and composition of output (value added) and employment, as well as sectoral productivity and employment elasticities by economic sector. In section 4 we use suitable analytical tools to decompose labor productivity growth into within-sector and between-sector changes, while also taking into consideration demographic effects. Section 5 concludes.

2. Literature Review

> 'A powerful historical pathway of structural transformation is experienced by all successful developing countries.' (Timmer and Akkus, 2008)
>
> 'The speed with which this structural transformation takes place is the key factor that differentiates successful countries from unsuccessful ones.' (McMillan and Rodrik, 2011)

It is a historical inevitability. All successful developing countries have undergone a fundamental and potent process of structural transformation. Structural transformation – or 'structural change' – is therefore a critical prerequisite for economic and social development. Through its impact on labor productivity, structural change plays an instrumental role in sustaining economic growth, generating productive employment, and raising living standards. In addition, economic processes that support structural transformation and economic diversification are also more likely to foster inclusive and sustainable growth – especially through the expansion of modern sectors and higher value added exports.

In simple terms, structural change can be defined as the reallocation of labor from low-productivity sectors to more dynamic (higher-productivity) economic activities.[2] For most developing countries, this would usually require shifting labor from subsistence agriculture to commercial agriculture, manufacturing and modern services. This process has strong implications for the economy (e.g. what is produced and how), but also for how society is organized. According to Timmer and Akkus (2008), structural transformation entails four interrelated processes: (i) a declining share of agriculture in total output and employment; (ii) rapid urbanization as people migrate from rural to urban areas; (iii) the rise of a modern industrial and service economy; and (iv) a demographic transition that leads to a spurt in population growth. Hence, structural transformation has implications that go beyond the economic sphere.

Despite its crucial role, the potential contribution of structural change to productivity growth has often been neglected by researchers and policy makers. There is significant (micro-level) research focusing on the reallocation of resources within industries – i.e. within-sector productivity – but inter-sectoral shifts can be an equally important driver of aggregate productivity. In fact, increases in labor productivity can be accounted by several factors, including: increased efficiency in the use of labor, increased use of other inputs (such as physical and natural capital), and labor moving to more productive activities (structural transformation).[3] Moreover, there are several possible growth paths that could support structural change.[4] Timmer (2012) illustrates this with the following hypothetical scenarios:

a. Labor productivity remains constant in industry and services as these sectors absorb labor from agriculture at the same rates as each sector itself expands. This labor-intensive growth (akin to the Lewis Model) leads to the fastest pace of structural transformation, while agricultural productivity increases significantly.

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[2] The term can also refer to the changing composition of output. However, since shifts in production tend to precede shifts in employment, it can be argued that this transformative process is only underway once labor starts to relocate.

[3] Given the interdependence between the different inputs, low labor productivity may not necessarily reflect low labor efficiency, but possibly the lack of complementary inputs (e.g., physical capital).

[4] UNRISD (2010) argues that the classic employment-generating growth path – from agriculture to manufacturing – is not being replicated in most developing economies. The report identifies five broad development paths: (i) transition to manufacturing (e.g. East Asia); industrialisation with dualist labor market regimes (e.g. Latin America); service-led growth (e.g. India); agrarian economies (e.g. many African countries); and mineral-rich countries (e.g. Botswana).

b. Labor productivity in industry and services grows at the same rate as the sectors themselves. Hence, neither sector absorbs new workers, while the entire increase in the labor force remains in agriculture – its share in total employment increases. Agricultural GDP grows faster than the labor force, so labor productivity in the sector does rise slightly. This pattern is somewhat closer to the African experience.

c. Labor productivity in industry and services grows at half the rate of increase in sectoral output. The agricultural labor force rises, but so does labor productivity in the sector. This scenario is half way between the extremes of paths 'a' and 'b'.

Meanwhile, it is important to note that productivity growth in isolation is not a sufficient condition for improving living standards. It is vital to ensure that 'surplus labor' can relocate to more productive jobs elsewhere in the economy. This is because labor productivity growth has a dual character: while it is an important source of economic growth and dynamism, it can also have a labor-saving effect – thus potentially reducing employment demand (Martins and McKinley, 2011). Hence, productivity growth needs to be accompanied by employment growth.

There are a few studies exploring the sources of aggregate productivity by decomposing labor productivity growth. Some of them use the Groningen Growth and Development Center (GGDC) 10-Sector Database, which contains disaggregated (real) value added and employment data for 29 countries – although none of them in Africa. Timmer and de Vries (2009) used part of the dataset to investigate structural transformation in Asia and Latin America, concluding that growth accelerations are mostly explained by within-sector productivity rather than labor reallocation (i.e. structural change). Moreover, they argued that productivity growth in market services is more important than productivity improvements in manufacturing.

McMillan and Rodrik (2011) complemented the full GGDC dataset with national sources for China, Turkey and nine African countries (including Ethiopia). Their main conclusion is that Africa and Latin America have experienced growth-reducing structural change since 1990 – which largely explains the difference between these regions' productivity performance and that of Asia. This means that labor has moved to lower-productivity sectors, therefore dampening economic and productivity growth.[5] Kucera and Roncolato (2012) constructed a sample of 81 countries with data from the UN National Accounts and the ILO, as well as the GGDC. The authors find that within-sector productivity growth is more important than labor reallocation across all regions. Moreover, aggregate labor productivity growth in Asia has been driven by industry (e.g. China) as much as by services (e.g. India).

Despite the broad findings of these studies, there is significant heterogeneity across countries. For instance, McMillan and Rodrik (2011) observe that – despite the negative aggregate results for Africa – Ethiopia, Ghana and Malawi have experienced growth-enhancing structural change. Therefore, it is important to take into consideration specific country contexts, especially since African countries are seldom well-represented in the study samples.

[5] However, a recent revision of the estimates for Sub-Saharan Africa does suggests a more positive picture for the period between 2000 and 2005 – see AfDB et al (2013).

3. Main Trends

This section provides an overview of key trends on output and employment in Ethiopia. In particular, it tracks changes in the level, growth and composition of production (value added) and employment. In addition, it investigates sectoral productivity and provides estimates of employment elasticities by economic sector.

3.1. Gross Value Added

Table 1 presents data on Gross Value Added (GVA). Total GVA increased four-fold in merely two decades, from 128 billion birr in 1991 to 510 billion birr in 2011 (in constant prices).[6] GVA in construction grew eight-fold, while the value added generated by trade, transport & communications, and other services nearly increased by a factor of seven. Agriculture registered the lowest relative expansion – less than tripled its initial value. However, in terms of each sector's contribution to the overall GVA increase (i.e. 383 billion birr), agriculture accounted for nearly 38 percent of this expansion, while other services and trade accounted for 24 and 21 percent, respectively. Hence, despite its relatively lower growth – 5 percent over the entire period – agriculture still provided the greatest contribution to the rise in GVA. This is due to its large weight in the economy, which we will show below.

Table 1: Gross Value Added

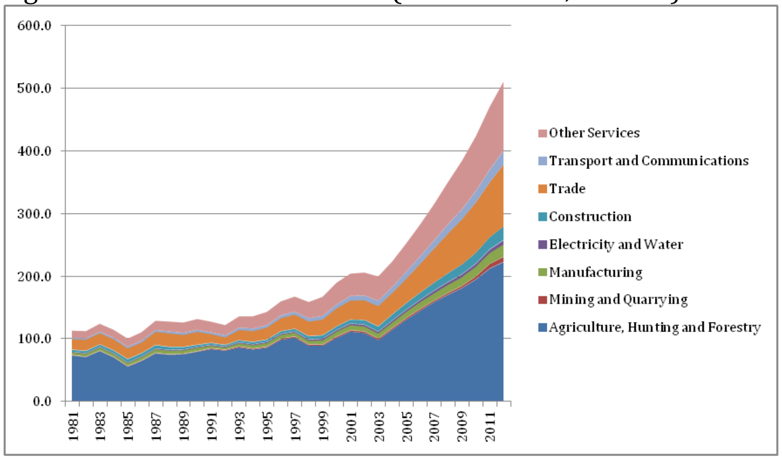
	Constant birr (billion, 2010/11 prices)					Average annual growth (%)				
	1991	1996	2001	2006	2011	1991-96	1996-01	2001-06	2006-11	1991-11
Gross Value Added *	127.7	160.2	204.3	282.4	510.2	4.8	5.2	6.9	10.7	6.9
Agriculture	83.9	98.8	111.9	145.2	223.1	3.5	2.9	5.9	7.9	5.1
Mining & Quarrying	1.4	1.5	2.0	2.6	7.7	4.4	6.5	5.6	24.1	10.2
Manufacturing	4.0	6.4	8.3	11.2	20.5	10.3	5.5	6.3	10.1	8.1
Electricity & Water	1.3	1.5	2.5	3.6	6.5	2.6	11.3	7.6	9.0	7.6
Construction	2.7	3.7	5.9	11.1	21.5	7.3	10.1	13.5	11.5	10.6
Trade	14.6	21.3	30.8	46.2	99.3	9.2	7.7	8.6	13.8	9.8
Transport & Comms	3.2	4.6	7.4	11.9	22.3	8.1	9.9	10.1	10.8	9.7
Other Services	16.7	22.3	35.6	50.7	109.3	6.1	9.9	7.4	14.5	9.5

* Values not adjusted for financial intermediation services indirectly measured (FISIM)
Source: Government of Ethiopia

Economic growth has been accelerating steadily over the past 20 years. In the early 1990s, real GVA grew at an average of about 4.8 percent, compared with 5.2 percent in the late 1990s. This decade witnessed a transition in political power and consequently a first wave of economic reforms. Between 1998 and 2000, the Ethiopia-Eritrea war had a significant impact on the economy. Economic performance continued to improve in the early 2000s, reaching an average growth rate of 6.9 percent – despite facing one of the most severe droughts in two decades. In the second half of the 2000s, economic growth accelerated substantially to over 10 percent per year. The annual data suggest a clear trend break around 2003 – the year of the drought (Figure 1). From that point forward, economic activity has accelerated at an unprecedented pace.

[6] GVA is notoriously difficult to measure. Estimates often depend on critical assumptions and may lack consistency across space and time – e.g. due to changes in methodology and/or failure to update prices. Nonetheless, the (official) data used in this paper are the best estimates available for Ethiopia.

Figure 1: Sectoral Value Added (constant birr, billions)



Source: Government of Ethiopia

In order to better understand the key drivers of economic performance in Ethiopia, it is important to analyze the structure of GVA and its evolution (Table 2). Agriculture continues to be a very large sector in the Ethiopian economy, currently accounting for about 45 percent of GVA. However, agriculture has experienced a steady and significant relative decline through the years – from the 66 percent registered in 1991 (Figure 2 and Figure 3). Trade and other services each represent about 20 percent of GVA, with their relative shares nearly doubling since 1991. The remaining sectors account for less than 5 percent of GVA each.

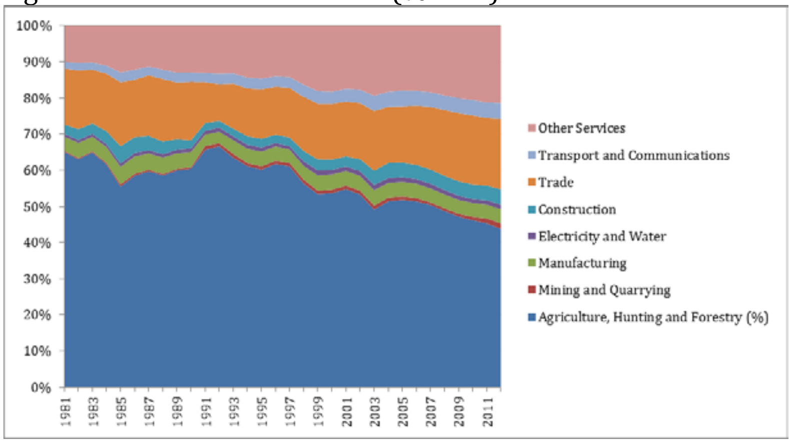
Table 2: Sectoral GVA Shares

	Sectoral GVA Shares (%)				
	1991	1996	2001	2006	2011
Agriculture	65.7	61.7	54.8	51.4	45.2
Mining & Quarrying	1.1	0.9	1.0	0.9	1.4
Manufacturing	3.2	4.0	4.0	4.0	3.8
Electricity & Water	1.0	0.9	1.2	1.3	1.2
Construction	2.1	2.3	2.9	3.9	4.1
Trade	11.4	13.3	15.1	16.4	18.7
Transport & Comms	2.5	2.9	3.6	4.2	4.2
Other Services	13.1	13.9	17.4	18.0	21.3

Source: Government of Ethiopia

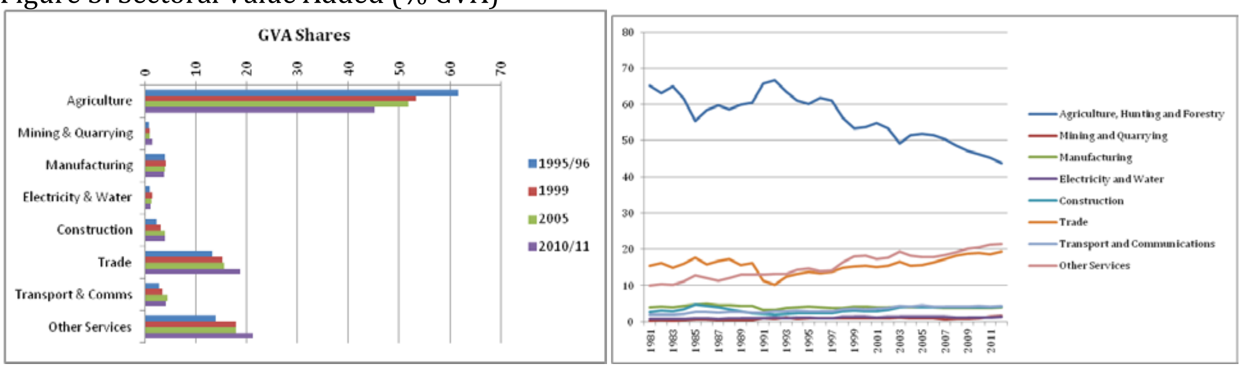
Agricultural output suffered in the late 1990s – especially during the civil war years – but it has picked up momentum since then. Mining & quarrying registered strong growth in the late 2000s, albeit from a low level. Manufacturing growth also declined in the late 1990s, but has now accelerated to over 10 percent. Electricity & water only represents a small share of GVA, although growth has been fairly strong since the mid-1990s. Construction and transport & communications experienced strong growth for most of the period – from similar initial levels. Finally, trade and other services posted respectable growth rates throughout the entire period – especially in the late 2000s.

Figure 2: Sectoral Value Added (% GVA)



Source: Government of Ethiopia

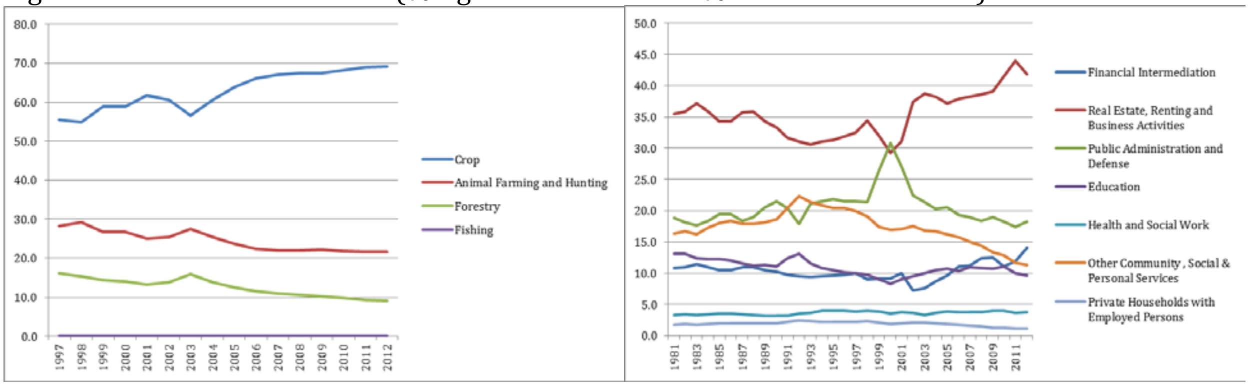
Figure 3: Sectoral Value Added (% GVA)



Source: Government of Ethiopia

In terms of the composition of agricultural GVA, crops have suffered significantly in 2002-2003 – due to the drought – but have since gained substantial weight in agricultural output (Figure 4). Crops increased their share from 57 percent in 2003 to 69 percent 2011, while animal farming & hunting and forestry have declined proportionally. Analyzing the composition of other services can also be particularly useful, given its total weight in total GVA. Its main sub-sector is, by far, 'real estate, renting & business activities' – which accounts for about 9 percent of total GVA and over 40 percent of other services. The sub-sector has experienced strong growth since 2000. Public administration & defense had a surge in 1998-2000 – due to military spending – but its share has been declining in the 2000s. The share of other community, social & personal services has been steadily falling over the past 20 years, while financial intermediation observed strong growth.

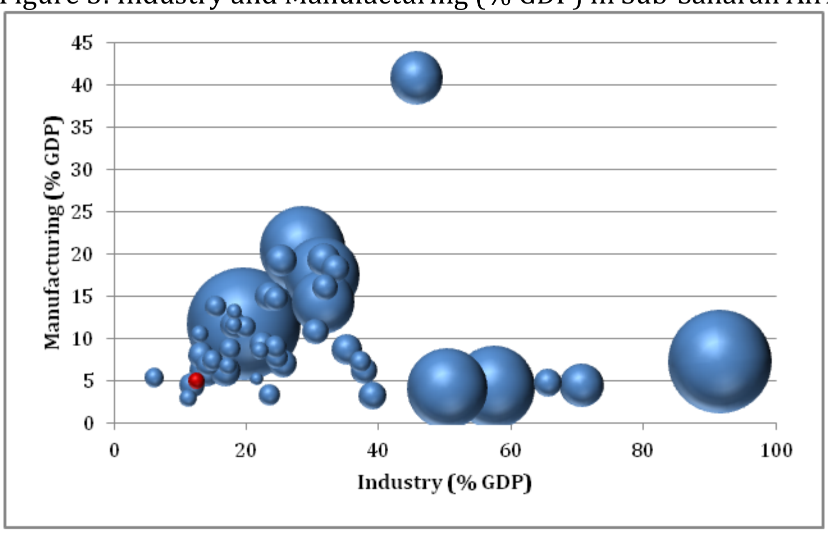
Figure 4: Sectoral Value Added (% Agriculture GVA and % Other Services GVA)



Source: Government of Ethiopia

In comparison to other countries in the region, Ethiopia has one of the lowest shares of industry and manufacturing in GDP in Sub-Saharan Africa (Figure 5). The countries with a high industrial share and a relatively low weight of manufacturing are mostly resource-rich countries – including Equatorial Guinea, Congo, Angola, Gabon and Botswana. Swaziland has a high share of manufacturing (about 40 percent). On the other hand, Ethiopia has one of the highest shares of agriculture in GDP in the continent – at about 45 percent.

Figure 5: Industry and Manufacturing (% GDP) in Sub-Saharan Africa



Notes: The size of the bubbles represents GDP per capita (constant USD). All values are averages for the 2000s.
Source: Calculated from WDI (2013)

In conclusion, the Ethiopian economy has grown significantly since 2003, with agriculture continuing to play a critical role in the economy. Trade and other services (especially real estate) have expanded considerably, and jointly account for 40 percent of total GVA. Manufacturing, a sector typically associated with structural transformation and productivity gains, remains relatively small – especially when compared to other countries in the Sub-Saharan Africa region.

3.2. Employment

In this paper, we predominantly use data from two labor force surveys (LFS) and two household income consumption and expenditure surveys (HICES), namely: HICES 1995/96, LFS 1999, LFS 2005 and HICES 2010/11. The HICES 1999/00 and HICES 2004/05 are not included because the labor force surveys cover similar time periods and provide more comprehensive information on employment issues.[7] Moreover, the HICES 1999/00 does not provide data on the sector of employment, which is a crucial variable for our analysis on structural transformation. In addition, we do not use Census data. The 2007 Census also does not provide data on the sector of employment,[8] while the 1984 Census includes data for Eritrea. The 1994 Census is fairly close to the first HICES and is not included to minimize the use of multiple data sources. The use of the HICES 2010/11 survey is particularly crucial, since it enables us to investigate recent sectoral employment dynamics (and thus structural change).

Before analyzing employment dynamics, it is important to investigate the underlying demographic trends. However, as we will note below, there can be significant discrepancies across data sources. For instance, while Census data is the primary source of population statistics, the methodology we utilize later in the paper requires consistency between data on total population, working age population and sector of employment. We therefore use the data included in survey reports and describe broader trends rather than focus on exact values and magnitudes.

Table 3 suggests that the Ethiopian population increased from about 53 million in 1996 to 63 million in 2005 and 76 million in 2011. The 2007 Census estimated total population at 73.8 million – with those under 10 years of age at 22.8 million (about 31 percent) and those under 15 at 33.2 million (45 percent) – while the 1994 census calculated total population at about 53 million. The World Development Indicators – which interpolates 5-year data from the UN Population Division's World Population Prospects – estimated total population at 77 million in 2007.[9] This seems to highlight some uncertainty around population estimates in Ethiopia.

Nonetheless, there are some important points that can be made. First, Ethiopia's population remains predominantly rural, even if its weight is slowly declining – from 86 percent in 1996 to 83 percent in 2011. Second, Ethiopia's population is very young, with about 65 percent below 25 years of age. Finally, the proportion of the population in the 10-65 age group has recently increased, which led to a falling dependency ratio. This is partly due to the fact that the proportion of 10-14 year-olds is increasing, while the 0-9 age group is declining in relative terms. In conclusion, there are some signs that Ethiopia might be undergoing a period of demographic transition, and thus it is crucial to seize this opportunity.[10] The table also presents data from the WDI, which uses the more traditional age brackets for the working age population – i.e. 15-64. While the broad conclusions above still apply, there is significant variation with regard to the specific values – e.g. dependency ratio – mainly due to the treatment of the 10-14 age group.

[7] Labor force surveys have larger sample sizes and, quite naturally, larger employment modules – which is likely to lead to more consistent estimates. Nevertheless, our results are robust to the use of HICES 2004/05 instead of the LFS 2005.
[8] The questions relating to occupation and industry were dropped from the questionnaire when it was observed that some trainers had difficulty in understanding concepts and definitions relating to the occupational and industrial classifications (CSA, 2012: 49). http://unstats.un.org/unsd/censuskb20/Attachment489.aspx
[9] Although the WDI-UN series are regularly revised to take into consideration recent data (e.g. Census), the modelled estimates for the late 2000s seem far off the Census estimates.
[10] In order to secure a demographic dividend, it is important to provide adequate skills and create productive employment opportunities for this youth bulge. Otherwise, unemployment and underemployment will undermine recent economic and social achievements and potentially fuel social unrest.

Table 3: Demographic Statistics

	1995/96 (HICES)			1999 (LFS)			2005 (LFS)			2010/11 (HICES)		
	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.
Total Population, million	52.7	7.6	45.1	54.5	7.4	47.1	63.2	9.0	54.3	76.1	12.6	63.5
Ages 0-9, %	32.2	25.3	33.4	33.8	23.7	35.4	35.1	23.5	37.0	32.4	22.2	34.4
Ages 10-24, %	33.0	38.4	32.0	31.6	38.8	30.4	30.6	39.0	29.1	32.6	37.8	31.5
Ages 25-64, %	31.4	32.8	31.2	31.2	34.3	30.7	31.1	33.4	30.6	31.3	36.6	30.3
Ages 65 and above, %	3.4	3.5	3.3	3.4	3.3	3.4	3.2	3.2	3.3	3.7	3.4	3.7
Age dependency Ratio (%)	0.55	0.40	0.58	0.59	0.37	0.63	0.62	0.37	0.68	0.56	0.34	0.62
Child (0-9)	0.50	0.36	0.53	0.54	0.32	0.58	0.57	0.32	0.62	0.51	0.30	0.56
Old-age (65+)	0.05	0.05	0.05	0.05	0.04	0.06	0.05	0.04	0.06	0.06	0.05	0.06
World Development Indicators												
Population, million	58.8	8.2	50.5	63.9	9.3	54.6	74.3	11.7	62.6	84.7	14.4	70.3
Ages 0-14, %	46.0	..	..	46.0	..	..	44.5	..	..	40.8	..	..
Ages 15-64, %	51.1	..	..	51.0	..	..	52.4	..	..	55.8	..	..
Ages 65 and above, %	2.9	..	..	2.9	..	..	3.1	..	..	3.4	..	..
Age dependency ratio	0.96	..	..	0.96	..	..	0.91	..	..	0.79	..	..
Young (0-14)	0.90	..	..	0.90	..	..	0.85	..	..	0.73	..	..
Old (65+)	0.06	..	..	0.06	..	..	0.06	..	..	0.06	..	..

Sources: Compiled from survey reports (HICES 1995/96, LFS 1999, LFS 2005, and HICES 2010/11) and WDI (2013).

Table 4 provides information on the labor market status of the population. The surveys suggest that the working age population increased from 36 million in 1996 to 41 million in 2005 and 52 million in 2011 – which corresponds to 68, 65 and 68 percent of total population, respectively. However, the caveats noted above also apply. In terms of its composition, the labor force participation rate – i.e. the share of the economically active population in the working age population – increased significantly up to 2005 and then declined sharply. The employment rate – i.e. the proportion of the employed population in the working age population – followed a similar trend.[11] International data suggests less pronounced patterns for these two variables, possibly due to the different age brackets. A potential explanation of the recent decline of both participation and employment rates relates to the recent increase in the student population.[12] Strong investments in education (including in rural areas) are likely to have contributed to increases in enrolment and attendance rates, therefore increasing the proportion of those that are economically inactive. This is particularly noticeable when the data includes the 10-14 age group. Hence, this should be seen as a positive development.

[11] These trends are also observed when using the HICES 2004/05 instead of the LFS 2005.

[12] The magnitude of these shifts may also be partly due to differences in methodology or definitions. For instance, the HICES data seems to underestimate the level of unemployment (self-declared), which could mean that economic inactivity may not be as high as suggested in 2011. Nonetheless, Molsa (2011) does suggest a large increase in inactivity rates from 2005 (LFS) to 2007 (Census) – from 15.3 to 25.6 per cent (for 15+) – in both rural and urban areas. This is particularly strong for the 15-19 age group. The inactive population is mainly composed of students (more than half) and home makers (about one-quarter).

Table 4: Labor Market Status of the Working Age Population (10+)

	1995/96 (HICES)			1999 (LFS)			2005 (LFS)			2010/11 (HICES)		
	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.	Tot.	Urb.	Rur.
Working Age Population, mln	35.7	5.7	30.0	36.0	5.6	30.4	41.0	6.9	34.2	51.5	9.8	41.6
Economically Active (LF), %	*63.8*	*49.4*	*66.5*	71.1	55.4	74.0	78.4	57.7	82.6	*67.2*	*55.0*	*70.1*
Employed, %	*62.3*	*41.6*	*66.3*	69.7	47.7	73.7	76.6	50.2	82.0	66.5	51.9	69.9
Unemployed, %	*2.3*	*15.9*	*0.4*	2.0	13.8	0.3	5.1	22.6	2.7	*1.0*	*5.7*	*0.2*
Economically Inactive, %	*36.2*	*50.6*	*33.5*	28.9	44.6	26.0	21.0	40.6	17.0	*32.8*	*45.0*	*29.9*
of which: students, %	*8.8*	*28.5*	*5.1*	10.5	26.3	7.6	9.7	26.0	6.4	*17.9*	*28.2*	*15.4*
World Development Indicators												
LF Participation Rate (%, 15+)	81.0	..	..	81.0	..	..	84.6	..	..	84.0	..	..
Ratio of female to male (%)	78.5	..	..	78.7	..	..	86.1	..	..	87.3	..	..
Employment-to-Pop. Ratio (15+)	74.4	..	..	74.4	..	..	80.1	..	..	79.2	..	..
Unemployment Rate (%)	..	..	..	8.2	..	..	5.4	..	..	..	..	..

Sources: Compiled from survey reports (HICES 1995/96, LFS 1999, LFS 2005, and HICES 2010/11) and WDI. Values in italic were directly calculated from survey data and should be treated with great caution.

Unemployment statistics are usually quite controversial, since they are dependent on the specific definition utilized. The official unemployment rate increased from 3.1 percent in 1994 to 8.2 percent in 1999, but has since then declined to 5.4 percent in 2005 and 3.7 percent in 2007 (MoLSA, 2011). Unemployment is typically associated with the (literate) youth in urban areas. Denu et al. (2005) argue that open unemployment is a middle-class phenomenon, with people queuing for government jobs.

Box 1: Population and Labor Force Growth

Population growth has recently decelerated – from an average of about 3 percent per year in the 1990s to nearly 2.5 percent in the 2000s – although it remains relatively high. The average for Sub-Saharan Africa was also 2.5 percent per annum. Nonetheless, the labor force is growing at an even faster pace (at about 3.5 percent), which is considerably high even for regional standards. This is partly a consequence of Ethiopia's demographic profile. Employment growth increased in the early 2000s – to above 4 percent per year – although it has fallen substantially in recent years.

Sources: Census (1994 and 2007) and WDI (2013)

Table 5 provides data on the sectoral distribution of employment. Employment in agriculture has increased significantly, from 18 million in 1996 to nearly 27 million in 2011. This ensured that the share of agricultural employment in total employment remained very high – declining by only 3 percentage points from 81 percent in 1996 to 78 percent 2011 (see also Figure 6). Trade and other services accounted for 3.0 and 2.7 million jobs in 2011, respectively, nearly doubling their 1996 values. Jointly, these two sectors currently account for almost 17 percent of total employment. Manufacturing and construction have also experienced a noticeable expansion, albeit from a lower base. Total employment increased by 11.6 million between 1996 and 2011, with agriculture absorbing 72 percent of this increase, followed by trade (12 percent), other services (10 percent), manufacturing (4 percent) and construction (3 percent).

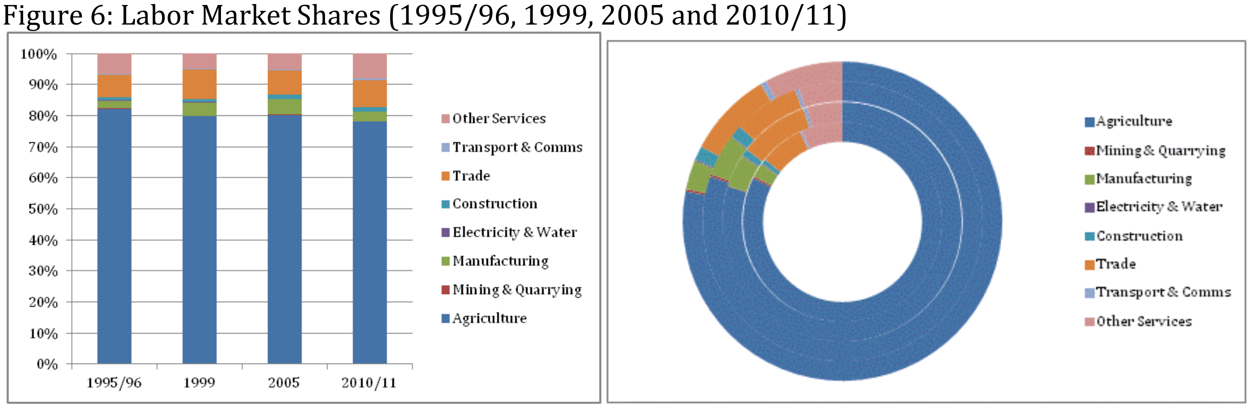
Table 5: Employment by Sector

	Employment (millions)				Annual Average Growth (%)			% Total Employment			
	1996	1999	2005	2011	1996-99	1999-05	2005-11	1996	1999	2005	2011
Agriculture	18.3	19.9	25.2	26.7	2.8	4.0	1.0	81.0	79.9	80.2	78.0
Mining & Quarrying	0.1	0.0	0.1	0.1	-40.1	31.8	-0.9	0.3	0.1	0.3	0.2
Manufacturing	0.5	1.1	1.5	1.0	28.9	5.5	-6.6	2.3	4.5	4.9	3.0
Electricity & Water	0.0	0.0	0.0	0.1	-8.7	2.7	7.4	0.2	0.1	0.1	0.1
Construction	0.2	0.2	0.4	0.5	11.6	11.8	1.0	0.7	0.9	1.4	1.4
Trade	1.6	2.3	2.4	3.0	13.5	0.5	3.7	7.1	9.4	7.7	8.7
Transport & Comms	0.1	0.1	0.1	0.2	15.6	3.0	6.1	0.4	0.5	0.5	0.6
Other Services	1.5	1.2	1.6	2.7	-7.1	5.0	9.4	6.5	4.8	5.0	8.0
Total	22.6	24.9	31.4	34.2	3.3	4.0	1.4	*98.5*	*100.2*	100.0	100.0

Source: Government of Ethiopia

Given the use of different sources of data, we ought to be particularly cautious with the interpretation of growth rates. Nevertheless, it does seem that the pace of employment growth has slowed down considerably in recent years. This is supported by evidence that the employment rate – i.e. the employment-to-population ratio – fell between 2005 and 2011. As mentioned above, this can be partly explained by a large number of youth staying longer in education – see also Broussara and Tekleselassie (2012) who provide evidence on youth employment in Ethiopia. By delaying their entry in the labor market, this increase in the student population (which is counted under the economically inactive) has an impact on several employment indicators.

Figure 6: Labor Market Shares (1995/96, 1999, 2005 and 2010/11)



Note: The inner circle presents data for 1995/96, while the outer circle shows data for 2010/11.
Source: Government of Ethiopia

3.3. Productivity and Elasticities

Table 6 provides information on labor productivity levels, productivity growth, and employment elasticities.[13] The data suggests that most economic sectors have become more productive, thus boosting total and sectoral productivity (Figure 7). Overall, productivity levels suffered in the late 1990s, possibly due to the impacts of civil war, but have rebounded strongly – especially in the late 2000s. Agricultural productivity increased from 5.4 thousand birr per worker in 1996 to 8 thousand birr in 2011. Trade and other services more than doubled their productivity levels, while construction and transport & communications have also experienced noteworthy improvements. The mining & quarrying and electricity & water sectors recorded the strongest productivity performance, although these are the smallest economic sectors of the Ethiopian economy – both in

[13] Labor productivity is often measured as output per worker, while employment elasticities measure the percentage change in employment associated with the percentage change in GDP – e.g. high elasticity values are associated with employment-intensive growth.

GVA and employment terms. The productivity of the manufacturing sector remains very low – in fact, the lowest after agriculture – despite nearly trebling between 2005 and 2011. In terms of average productivity growth, four main sectors stand out in the past 5 years or so: mining & quarrying, manufacturing, construction, and trade.

Table 6: Productivity by Sector

	Labor Productivity ('000 birr) *				Average Productivity Growth (% per year)			Employment Elasticities		
	1996	1999	2005	2011	1996-99	1999-05	2005-11	1996-99	1999-05	2005-11
Agriculture	5.4	4.5	5.2	8.0	-5.9	2.4	7.4	-0.90	0.58	0.10
Mining & Quarrying	20.0	102.6	29.4	87.5	72.6	-18.8	19.9	-7.65	8.47	-0.03
Manufacturing	12.4	6.3	6.6	17.8	-20.2	0.8	17.8	12.92	0.85	-0.43
Electricity & Water	40.8	84.6	100.4	108.9	27.5	2.9	1.4	-0.41	0.44	0.80
Construction	22.3	22.8	22.5	40.4	0.7	-0.2	10.2	0.93	1.02	0.07
Trade	13.3	11.0	16.3	29.5	-6.3	6.8	10.4	2.27	0.05	0.19
Transport & Comms	58.2	48.4	77.1	95.1	-5.9	8.1	3.6	1.90	0.21	0.56
Other Services	15.1	25.5	28.5	36.7	19.1	1.9	4.3	-0.56	0.68	0.59
Total	7.1	6.7	8.0	13.7	-1.7	3.0	9.3	2.24	0.52	0.10

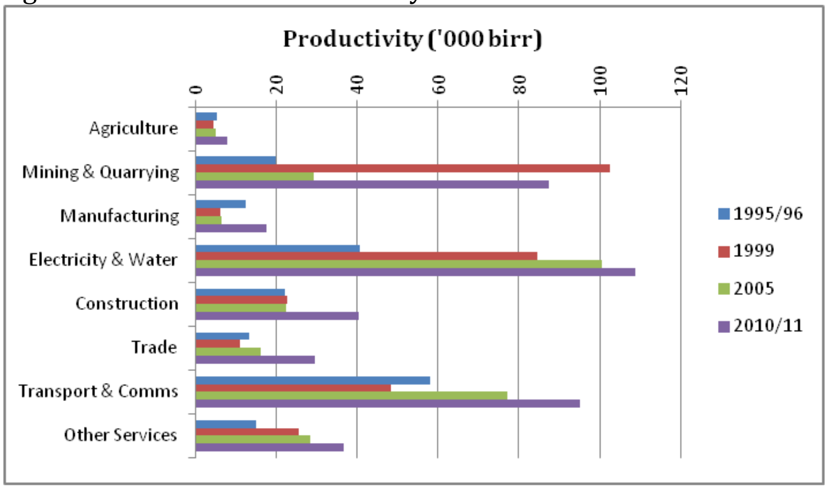
* Constant 2010/2011 prices
Source: Author's calculations

Employment elasticities can provide useful information about the economy's capacity to generate employment and can be a useful complement to productivity data. During periods of positive economic growth, employment elasticities between 0 and 1 indicate that there is both productivity growth and employment growth (see Table 14 in Annex 2). Higher elasticities in this range – i.e. towards 1 – correspond to more employment-intensive growth, while elasticities in the low positive values indicate strong labor productivity growth (Kapsos, 2005).[14] It is therefore important to evaluate economic performance beyond a simple 'productivity' lens.

In the late 1990s, the overall elasticity value was rather high, although it was accompanied by negative productivity growth – which is undesirable. The elasticity for the early 2000s compares positively with several countries in the region and was achieved together with fairly strong productivity growth. Perhaps unsurprisingly, employment elasticities have dramatically declined in the late 2000s. This is intrinsically related to the strong acceleration of economic growth and the slowdown in employment growth in that period. However, the values still fall within the 'ideal' range, which means that productivity growth was accompanied by employment growth. Nonetheless, it should be noted that employment growth is likely to be correlated with population (and labor force) growth and this information needs to be complemented by data on the quality of employment – e.g. the type of employment (wage vs. self-employment), level of earnings, and job security (see Annex 1).

[14] Khan (2001) argues that employment elasticities should be around 0.7 in developing countries. However, African countries might require even higher employment elasticities – for any given rate of growth – due to strong labor force growth.

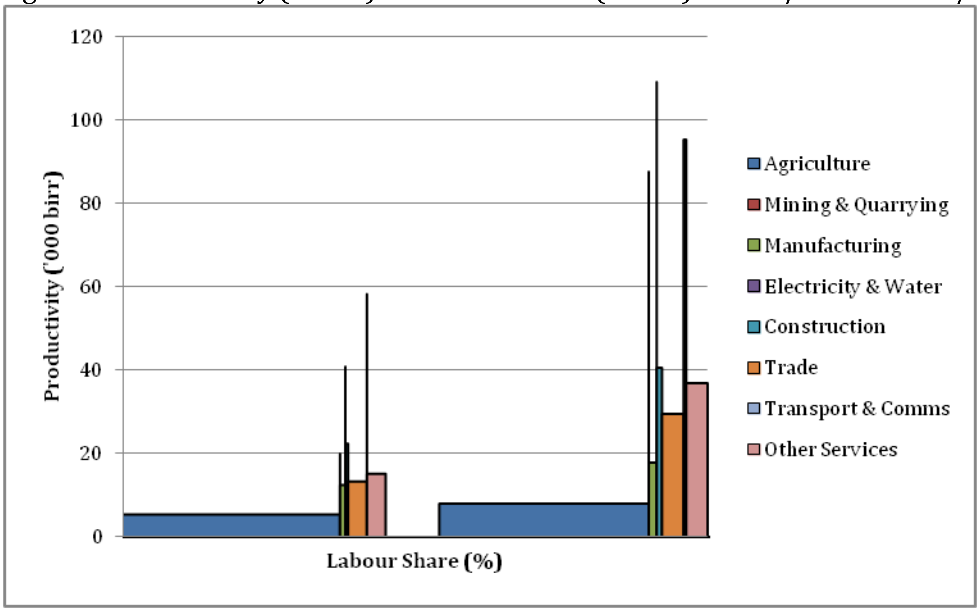
Figure 7: Total Labor Productivity



Source: Author's calculations

It is useful to place productivity trends in perspective, since their ultimate impact on the economy greatly depends on the relative weight of the most dynamics sectors. Figure 8 combines information on labor productivity and sectoral shares of employment for two points in time: 1995/96 and 2010/11. The area represented by each column provides a measure of sectoral GVA – scaled by total employment ($GVA_i/L_i * L_i/L = GVA_i/L$) – thus providing a powerful illustration of the characteristics of the Ethiopian economy. The figure clearly shows the three most important economic sectors (agriculture, trade and other services) and their increasing productivity. The width of the columns remained broadly unchanged, reflecting fairly static shares of employment. It is also evident that the three most productive sectors of the economy account for a very small share of employment, and that productivity gaps are very large. The productivity of mining & quarrying, electricity & water and transport and communications is more than 10 times greater than that of agriculture, although their capacity to generate employment (employment-intensity of the sector) is likely to be fairly limited. Traditionally, (low-skilled) manufacturing has been thought as the sector that can deliver both sufficient employment creation and productivity growth. Despite some recent positive signs, manufacturing remains a small sector with low productivity levels – especially when compared to other countries in the region.

Figure 8: Productivity (Y-axis) and Labor Share (X-axis) – 1995/96 and 2010/11



Source: Author's calculations

Developing countries tend to have large productivity gaps between sectors (Table 7). Overall, agriculture tends to be the sector with the lowest productivity levels, followed by wholesale and retail trade, construction, and 'community, social, personal and government services' (McMillan and Rodrik, 2011). Public utilities and mining are estimated to be about 8 times more productive than agriculture, although they are unlikely to generate sufficient adequate employment numbers – since they are capital-intensive. Nonetheless, inter-sectoral productivity gaps – as measured by the coefficient of variation of the log of sectoral labor productivities – tend to decline over the course of development (i.e. with higher incomes). This suggests that structural change contributes to convergence within and across countries.

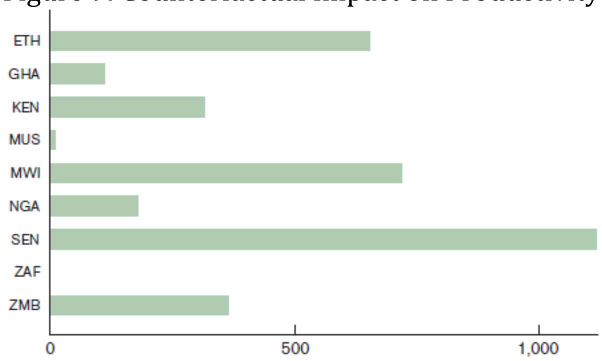
Table 7: Labor Productivity in Sub-Saharan Africa (2005)

Country	Labor Productivity (2000 PPP $)	Coefficient of variation of log sectoral product.	Sector with highest labor productivity		Sector with lowest labor productivity		Annual Productivity Growth (%)**
			Sector *	Product.	Sector *	Product.	
South Africa	35,760	0.074	pu	91,210	con	10,558	0.63
Mauritius	35,381	0.058	pu	137,203	agr	24,795	3.44
Nigeria	4,926	0.224	min	866,646	cspsgs	264	2.28
Senegal	4,402	0.178	firebs	297,533	agr	1,272	0.47
Kenya	3,707	0.158	pu	73,937	wrt	1,601	−1.22
Ghana	3,280	0.132	pu	47,302	wrt	1,507	1.05
Zambia	2,643	0.142	firebs	47,727	agr	575	−0.32
Ethiopia	2,287	0.154	firebs	76,016	agr	1,329	1.87
Malawi	1,354	0.176	min	70,846	agr	521	−0.47
Korea, Rep.	33,552	0.106	pu	345,055	firebs	9,301	3.90
Brazil	12,473	0.111	pu	111,923	wrt	4,098	0.44
China	9,518	0.122	firebs	105,832	agr	2,594	8.78
India	7,700	0.087	pu	47,572	agr	2,510	4.23

* 'agr' Agriculture, hunting, forestry and fishing; 'min' Mining and quarrying; 'man' Manufacturing; 'pu' Public utilities (electricity, gas and water);'con' Construction; 'wrt' Wholesale and retail trade, hotels and restaurants; 'tsc' Transport, storage and communications; 'firebs' Finance, insurance, real estate and business services; 'cspsgs' Community, social, personal and government services. ** Compound annual growth rate of economy-wide productivity (1990-2005).
Source: McMillan and Rodrik (2011)

McMillan and Rodrik (2011) argue that the potential gains in overall productivity from sectoral reallocations can be very large. They estimate that Ethiopia's productivity could increase six-fold – assuming that sectoral productivity levels remain constant and that the inter-sectoral distribution of employment matches that of advanced economies (Figure 9). These potential gains compare positively with other countries in the region, only lagging behind Senegal and Malawi.

Figure 9: Counterfactual Impact on Productivity (% of 2005 levels)



Source: McMillan and Rodrik (2011)

4. Productivity Analysis

This section decomposes labor productivity growth into within-sector and between-sector productivity changes. The methodology utilized also enables an assessment of the contribution of demographic change and employment rates, thus providing a richer perspective on the ongoing changes in the Ethiopian labor market.

4.1. Decomposition at the Aggregate Level

Our starting point for decomposing output per capita is the following equation:

$$\frac{Y}{N} = \frac{A}{N} \cdot \frac{E}{A} \cdot \frac{Y}{E}$$

where Y is total output, N the total population, A the working-age population, and E is total employment. These three components represent the relative size of the working-age population (A/N), the employment rate (E/A) and output per worker (Y/E). In order to calculate the contribution of each of these components to GVA per capita growth, we employ an analytical tool that uses Shapley decompositions.[15] This complements the employment elasticities presented previously.

Table 8 presents estimates for the full period (1996-2011) as well as its three sub-periods. The results for the entire period suggest that the majority of the change in GVA per capita can be explained by changes in output per worker – i.e. labor productivity growth. In fact, out of the 103 percent increase in GVA per capita, over 90 percent of this was due to higher labor productivity. Changes in the employment rate also played an important (though smaller) role, with a contribution of nearly 10 percent. Perhaps surprisingly, the impact of demographic change was negligible (Figure 10).

Table 8: Aggregate Decomposition of GVA per capita

Period	GVA per capita (total change, %)	% Contribution of: Demographic Change	Employment Rate	Output per worker
	Δ(Y/N)	Δ(A/N)	Δ(E/A)	Δ(Y/E)
1996-2011	103.11	-0.38	9.72	90.67
1996-1999	1.06	-231.49	987.55	-656.06
1999-2005	29.85	-7.51	39.61	67.90
2005-2011	54.77	9.71	-33.27	123.56

Note: The values for 1999-2005 differ slightly from Martins (2012), especially for the demographic change component, due to the use of different data sources.

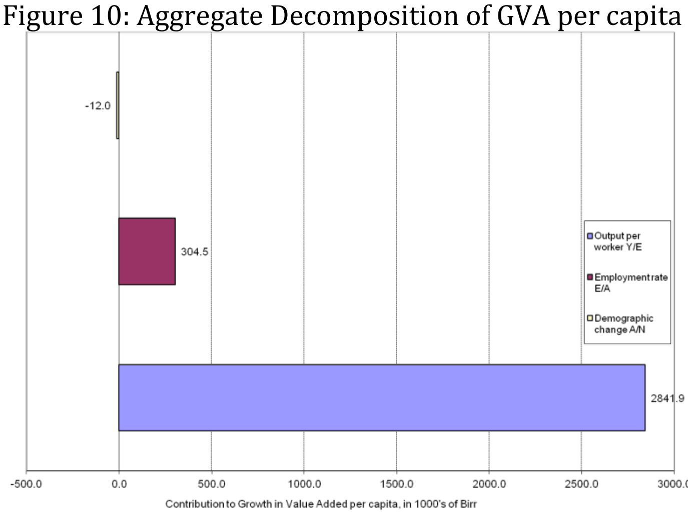
A breakdown of these results into sub-periods provides additional insights. The values for the initial three years (1996-1999) are quite striking. However, this is likely to be due to the 1998-2000 Ethiopia-Eritrea war, when output fell and productivity levels declined. GVA per capita growth averaged only 0.3 percent a year, and therefore the high contribution shares are likely to be a consequence of that. The period from 1999-2005 observed a rebound in GVA per capita growth – nearly 30 percent over 6 years, or 4.4 percent per year – partly due to increased productivity growth and a rise in the employment rate. In the most recent period (i.e. 2005-2011), the economy

[15] See World Bank (2012) for further details on the methodology.

continued to accelerate and became more dynamic, with GVA per capita growth at 7.6 percent a year – i.e. more than 50 percent in just 6 years. Productivity growth was the main contributor to this performance, while demographic change also had a positive impact. However, changes in the employment rate had a negative influence on economic performance. In terms of its interpretation, this means that if the employment rate had remained constant (rather than declined), GVA per capita growth would have been one-third higher. Nonetheless, it has been previously mentioned that this fall in the employment rate might actually constitute a positive development, since the student population is growing – thus delaying their entry in the labor market.

Overall, the Ethiopian economy appears to have gained an important momentum, increasing GVA per capita at a fast pace while labor productivity is also improving strongly. In addition, there are some early signs of a demographic transition, as illustrated by falling dependency ratios, which can deliver a significant demographic dividend. However, some necessary conditions need to be met in order to seize these potential benefits, including a more skilled labor force and the availability of productive employment opportunities for young people.

Figure 10: Aggregate Decomposition of GVA per capita (constant birr)



4.2. Decomposition at the Sectoral Level

Although the previous exercise provided some useful insights, we are particularly interested in the extent to which the Ethiopian economy is undergoing a process of structural transformation. In practice, this requires a disaggregation of the contribution of output per worker (91 percent). In order to do this, we need to use sectoral data for GVA and employment. Overall, the calculations suggest that within-sector productivity has, by far, provided the strongest contribution to GVA per capita growth – accounting for nearly 80 percent of this performance (Table 9).

Inter-sectoral productivity (i.e. structural change) was responsible for about 11 percent of GVA per capita growth. When compared to the Republic of Korea's 'golden' period of the 1970s and 1980s, we note that Ethiopia's pace of structural transformation is significantly slower. The recent contribution of structural transformation is estimated to be 0.5 percentage points of GVA per capita, compared to Korea's 1.8 percentage points (see Table 17 in Annex 2).[16]

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[16] These figures are obtained by multiplying the annual GVA per capita growth rate (4.8 percent for Ethiopia and 6.4 percent for Korea) by the contribution share of structural change (11.2 percent for Ethiopia and 28.3 percent for Korea).

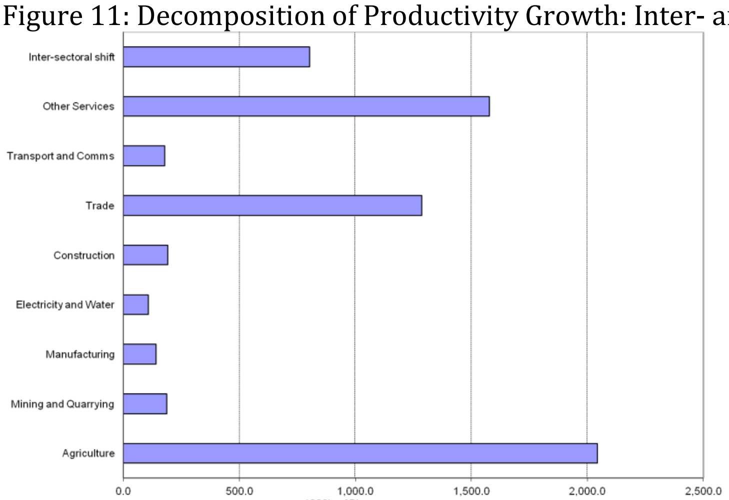
Table 9: Sectoral Decomposition of GVA per capita (1996–2011)

	% Contribution of			Total (%)
	Within-Sector Productivity	Changes in Employment	Inter-sectoral Productivity	
Agriculture	28.45	1.62	2.23	32.30
Mining and Quarrying	2.61	-0.12	-0.61	1.88
Manufacturing	1.96	1.19	0.41	3.57
Electricity and Water	1.48	-0.01	-0.16	1.31
Construction	2.67	1.04	1.86	5.57
Trade	17.90	2.96	2.29	23.15
Transport and Comms	2.49	0.42	2.33	5.23
Other Services	21.95	2.62	2.82	27.39
Subtotals	*79.50*	*9.72*	*11.17*	*100.38*
Demographic component				-0.38
Total				*100.00*
Total % change in value added per capita				103.11

As mentioned above, improvements in the employment rate provided a contribution of about 10 percent, while the demographic component was negligible. Further investigating the sectoral values suggests that the contribution of within-sector productivity was consistently higher than that of inter-sectoral movements. Moreover, agriculture as a whole accounted for almost one-third of the change in GVA per capita, while trade and other services contributed with 23 and 27 percent, respectively.

Figure 11 provides an alternative way of presenting the data. The total change in output per worker (i.e. labor productivity) was estimated at 6.5 thousand birr between 1996 and 2011. Agriculture contributed with over 2 thousand birr, while other services and trade accounted for 1.6 and 1.3 thousand birr, respectively. Interestingly, and despite limited changes in the structure of employment, inter-sectoral shifts (i.e. structural change) provided a contribution of 800 birr. This was the fourth strongest contribution to productivity growth, and was significant larger than the next component – the 192 birr of the construction sector. This suggests that structural change has played a relatively important role in economic performance.

Figure 11: Decomposition of Productivity Growth: Inter- and Within-Sectoral (1996-2011)



Given the uncertainty around population estimates, it is important to ensure that the results do not depend on which estimates are used. As a robustness test, we performed the decomposition above with the following changes: (i) increasing total population in 2011 by 10 million to about 86 million, (ii) keeping constant the working age population ratio (67.6 percent), yielding a working age population of about 58 million, (iii) keeping constant the employment rate (66.5 percent), putting total employment at about 38.7 million, and (iv) keeping constant the sectoral employment shares, therefore changing the amount of labor in each sector proportionally. These changes do not change the results in any considerable way, which is rather reassuring.[17]

Table 10 provides information on the sectoral contribution to structural transformation – the between-sector component. The negative signs in the first column indicate that the employment shares of agriculture, mining and electricity & water were lower in 2011 than in 1996. In the case of agriculture, this actually generated a positive momentum for structural change, since it is the sector with the lowest productivity. In the other two cases, the outcome was a fairly small negative impact. Moreover, construction, trade, transport & communications and other services have provided solid contributions to structural change.

Table 10: Sectoral Contributions to Inter-Sectoral Shifts (1996-2011)

	Direction of Employment Share Shift	Contribution to Inter-sectoral Shifts (%)
Agriculture	–	19.94
Mining and Quarrying	–	-5.45
Manufacturing	+	3.70
Electricity and Water	–	-1.48
Construction	+	16.68
Trade	+	20.48
Transport and Comms	+	20.85
Other Services	+	25.28
Total		*100.00*

Table 11 repeats the same exercise for its sub-periods. We have already described some of these estimates, so we will focus on the decomposition of output per worker. The decline in labor productivity that occurred in the 1996-1999 period was due to both within- and between-sector productivity decreases – especially the former. Productivity levels recovered in the 1999-2005 period, although mostly due to within-sector improvements. Since 2005, productivity growth has accelerated, to which both within- and between-sector productivity contributed. Although productivity improvements within economic sectors have provided the main contribution to total productivity, structural change appears to be gaining an important momentum. In fact, the gap between the contributions of within- and between-sector productivity is narrowing.

Table 11: Sectoral Decomposition of GVA per capita (Several Periods)

	% Contribution of			Demographic Component (%)	Change in GVA per capita (%)
	Within-Sector Productivity	Changes in Employment	Inter-sectoral Productivity		
1996-2011	79.50	9.72	11.17	-0.38	103.11
1996-1999	-491.20	987.55	-164.85	-231.49	1.06
1999-2005	62.51	39.61	5.40	-7.51	29.85
2005-2011	102.86	-33.27	20.71	9.71	54.77

[17] In addition, we re-calculated the decomposition for the period 2005-2011 using the HICES 2004/05 instead of the LFS 2005. The conclusions are robust to this change, even though the structural change component increases from 21 to 27 per cent.

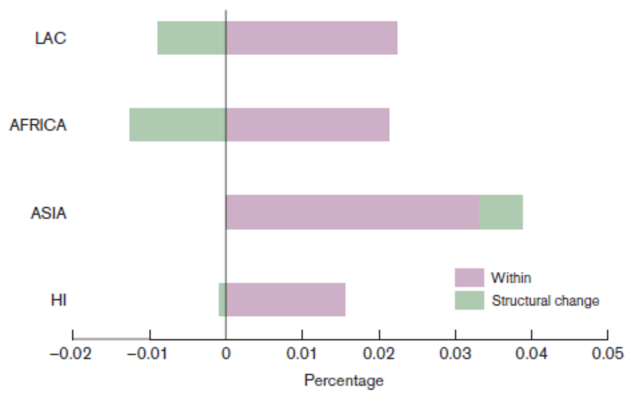
How do these results compare to other countries and regions? McMillan and Rodrik (2011) offer one of the most comprehensive assessments to date – see Table 18 in Annex 2 for related studies. Its coverage, both in terms of countries and sectors, provide a unique glimpse at the evidence on structural change. The authors argue that Africa and Latin America have experienced growth-reducing structural change, which largely explains differentials in productivity performances. This is illustrated by the strong negative structural components in Table 12 – note that the last two columns report the contribution to productivity growth, rather than output per capita. The within components are not that dissimilar across developing regions, which accentuates the importance of this finding. A negative structural change component suggests that labor moved to sectors with even lower productivity levels – possibly from agriculture to informal urban activities. This process undermines sustained economic growth and economic development.

Table 12: Decomposition of Productivity Growth (unweighted averages, 1990-2005)

	Productivity Growth (%)	of which: 'within'	'structural'	% Contribution of 'within'	'structural'
Latin America	1.35	2.24	-0.88	166	-65
Africa	0.86	2.13	-1.27	248	-148
Asia	3.87	3.31	0.57	86	15
High-Income	1.46	1.54	-0.09	106	-6

Source: McMillan and Rodrik (2011) and author's calculations

Figure 12: Decomposition of Productivity Growth (1990-2005)



Source: McMillan and Rodrik (2011)

Timmer and de Vries (2009) and Kucera and Roncolato (2012) also corroborate the view that within-sector productivity has provided a stronger contribution to productivity growth than between-sector productivity. However, this does not necessarily mean that structural transformation is unimportant. On the contrary, the fact that few (developing) economies have been able to shift labor towards more productive sectors is likely to seriously undermine their development prospects. If countries aspire to achieve the levels of development recently registered by East Asian countries, then the trend of growth-reducing structural change will need to be reversed. Naturally, there is a significant degree of heterogeneity across countries. Some countries in Africa have experience growth-enhancing structural change, such as Ethiopia and Ghana (Table 13). In fact, Ethiopia has the second highest contribution of structural change to productivity growth – out of a sample of 38 developed and developing countries. Nevertheless, this is likely to be partly due to the use of the 1994 Census data – which estimated the share of agricultural employment at 90 percent, compared to the 81 percent of the HICES 1995/96 and the 80 percent of the LFS 1999.

Table 13: Country Rankings of Contributions to Productivity Growth (1990-2005)

Ranked by 'within' contribution				Ranked by 'structural change' contribution			
Rank	Country	Region	Within (%)	Rank	Country	Region	Structural Change (%)
1	China	Asia	7.79	1	Thailand	Asia	1.67
2	Zambia	Africa	7.61	2	Ethiopia	Africa	1.48
3	Korea, R.	Asia	5.29	3	Turkey	..	1.42
4	Nigeria	Africa	4.08	4	Hong Kong SAR, China	Asia	1.25
5	Peru	Latin America	3.85	5	Indonesia	Asia	1.06
6	Chile	Latin America	3.82	6	China	Asia	0.99
7	Singapore	Asia	3.79	7	India	Asia	0.99
8	Senegal	Africa	3.61	8	Ghana	Africa	0.59
9	Malaysia	Asia	3.59	9	Taiwan, China	Asia	0.54
10	Taiwan, China	Asia	3.45	10	Malaysia	Asia	0.49

Source: Adapted from McMillan and Rodrik (2011).

5. Conclusions

> *Over four years, I've seen Ethiopia gradually embrace structural transformation and its practical application. Leaders there are acutely aware that, if they are to maintain a robust growth rate, they must move away from agriculture, the dominant sector, toward industrial upgrading and technological innovation, often by imitating economies just a few rungs up the economic ladder. Ethiopia's agriculture sector is important and should not be neglected, but that alone won't get the country onto a path toward middle income and finally to high income status.* (Lin, 2012)

This paper provided insights on recent output, employment and productivity trends in Ethiopia. For that purpose, it used data from two labor force surveys and two household income consumption and expenditure surveys. A number of key stylized facts were uncovered (Box 2). First, output growth has accelerated at an unprecedented pace since 2003. Its average annual growth rate of about 10 percent places Ethiopia as one of the fastest growing economies in the world. This fact is even more remarkable when considering that Ethiopia's growth is not fueled by natural resources, such as oil or gas. Second, agriculture continues to be a very large production sector, although its weight in total output has been steadily declining – from 66 percent in 1991 to 45 percent in 2011. The service sector has expanded considerably (especially commerce and real estate activities), but the share of industry remains one of the lowest in Africa. Third, Ethiopia's population is considerably young (about two-thirds are below the age of 25) and predominantly rural (over 80 percent of the population). Nonetheless, the dependency ratio has been declining, as the youth bulge becomes part of the working age population, while the proportion of people living in urban areas increased by 3 percentage points in the past 15 years.

Box 2: Key Stylized Facts

1. Output growth strongly accelerated since 2003.
2. Agriculture still a very large economic sector, but a range of service activities are growing.
3. Very young and largely rural population, although the dependency ratio is declining and urbanization slowly increasing.
4. Participation and employment rates have recently declined (with employment growth slowing down), mainly due to an increase in student numbers.
5. Share of agricultural employment remains very high, despite a small decline in recent years.
6. Labor productivity has increased considerably (contributing to strong GVA growth), while employment elasticities have fallen.
7. Structural transformation has been relatively slow, but increasingly important.
8. Demographic changes are supporting economic growth (demographic dividend).

Fourth, the pace of employment growth has recently slowed down, which is partly due to a growing student population. In fact, this is behind the recent declines in the participation and employment rates. Fifth, the share of agricultural employment in total employment remains very high (at about four-fifths), even if it has declined by 2 percentage points in the past 6 years. Trade and other services jointly account for nearly 17 percent of total employment. Sixth, labor productivity growth has been strong, with output per worker doubling in the past decade. In fact, GVA growth has been mainly driven by labor productivity growth. Conversely, employment elasticities have fallen but remain positive – suggesting that productivity growth was accompanied by employment growth. Moreover, productivity gaps across economic sectors are very large. Seventh, while within-sector productivity growth accounts for much of the aggregate productivity performance, structural change (i.e. between-sector productivity growth) is playing an increasingly important role. Finally, there is also evidence that the economy is starting to benefit from a demographic dividend.

Therefore it can be concluded that, while economic growth has generated some employment, the growth-employment link has been weakened. This is not necessarily a disappointing development, since employment growth in Ethiopia is intrinsically linked to demographic trends. Not only has population growth slowed down, but the proportion of people outside the labor force has also increased (e.g. students). Nonetheless, unemployment remains an important concern, especially for young people and in urban areas. This may suggest that, despite strong growth, the urban economy might be struggling to create sufficient productive employment opportunities for an increasingly educated urban youth. Moreover, changes in the sectoral composition of employment have significantly lagged behind that of output – despite broadly similar tendencies. In terms of labor productivity growth, while most of it has been accounted by higher within-sector productivity, labor shifts from low- to high-productivity sectors (i.e. structural change) seem to be increasingly important. In fact, it is unlikely that the sectors with the highest productivity levels will be able to absorb a significant amount of labor, due to their intrinsic high capital intensity.

To some extent, the evidence uncovered in this paper supports the three ongoing shifts (on the labor supply) highlighted by the World Bank (2007): (i) a demographic shift, which has the potential to generate significant benefits – a demographic dividend – although it is not without challenges (e.g. a need to create productive employment opportunities for new entrants in the labor market); (ii) a geographic shift, as illustrated by an increase in rural-urban migration; and (iii) a qualitative shift, as the skill level of the labor force is rising. In addition, there is growing evidence of a structural shift in the composition of the labor force – which, albeit still limited, appears to be picking up pace.

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Annex 1: Employment Characteristics

Here, we compute cross-tabulations from household surveys to provide a number of additional insights on the Ethiopian labor market. Since the focus of this paper is on structural change, we investigate individual (worker) characteristics (e.g. gender, age, and education level) as well as job characteristics (e.g. type of employment, sector of activity, and location) for each sector of employment.

For that purpose, we use data from the International Income and Distribution Database (I2D2), which includes the two Ethiopian labor force surveys (LFS). Nonetheless, it should be noted that due to further data cleaning and the application of international definitions and standards, the data may not match the values previously reported.[18] Moreover, the sectoral (ISIC) aggregation differs slightly – e.g. the 'other services' category used earlier is now disaggregated into financial services, community services and others.

Individual Characteristics

Gender

This first set of figures provides a gender breakdown of sectoral employment. Figure 13 suggests that there are two sectors where women constitute the majority of the workforce – and by a significant margin. These are manufacturing and commerce, where women account for over two-thirds of total workers. Sectors where women are significantly underrepresented include transport & communications, construction, and public utilities. However, there have been some changes during the 1999-2005 period. In relative terms, more women are participating in agriculture, mining, construction, and financial services.

Figure 13: Gender Breakdown by Sector (1999 and 2005)

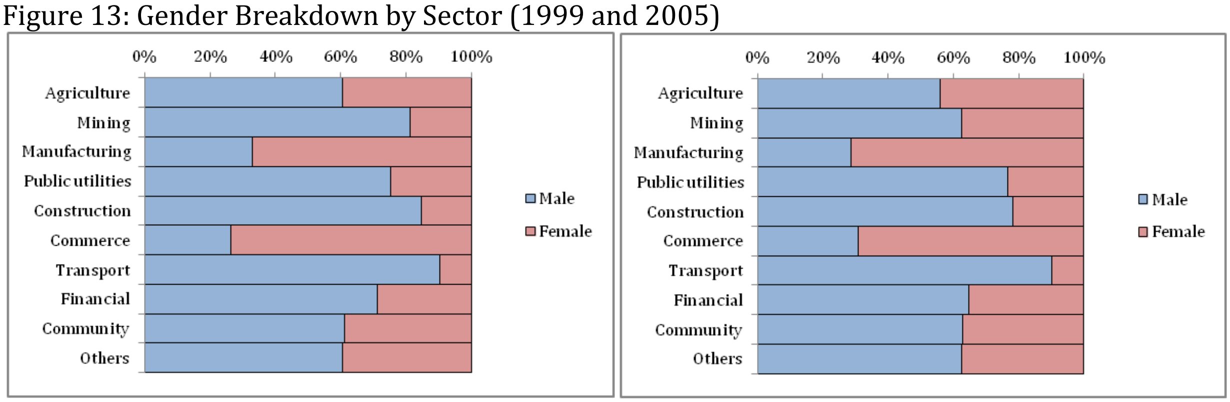
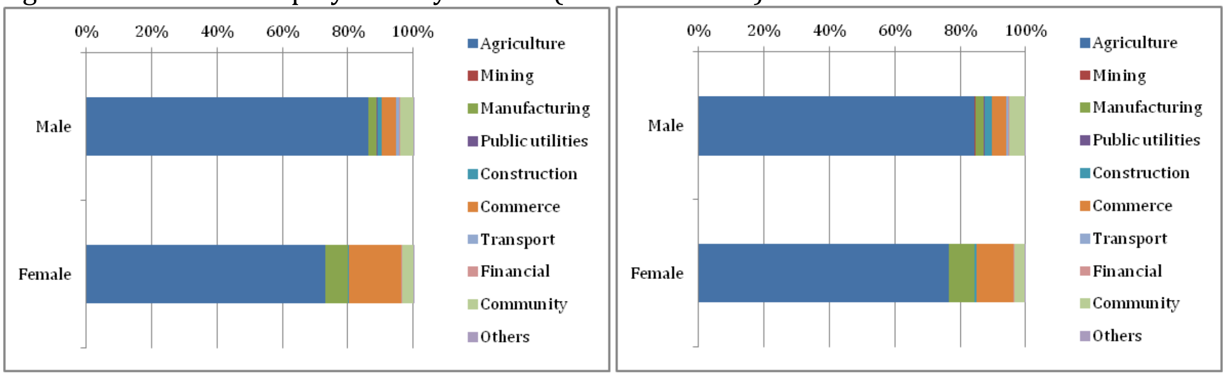


Figure 14 complements the previous analysis by providing a sectoral breakdown of male and female employment. It clearly illustrates that agriculture is the main sector of employment for both males and females. Nonetheless, while the overwhelming majority of men are employed in agriculture (over 80 percent), a fairly significant proportion of women is employed in commerce and manufacturing. There have not been significant shifts in these shares, although the composition of female employment does seem to have moved slightly from commerce to agriculture.

[18] For instance, the I2D2 uses 'current status' (employment in last 7 days) rather than 'usual status' (employment in last 12 months).

Figure 14: Sector of Employment by Gender (1999 and 2005)



Age

This second set of figures disaggregates the information into four age groups. The first point to note from Figure 15 is that by including the 10-14 age group, we are likely to over-represent agriculture in total employment. (In fact, most of these are contributing family workers.) Second, we note that the sectors with the highest share of young people include agriculture, manufacturing, mining and commerce, while the lowest shares can be found in public utilities, financial services, and others. In terms of the largest shifts, these were observed in mining, community services, and other for 15-24 year olds.

Figure 15: Age Breakdown by Sector (1999 and 2005)

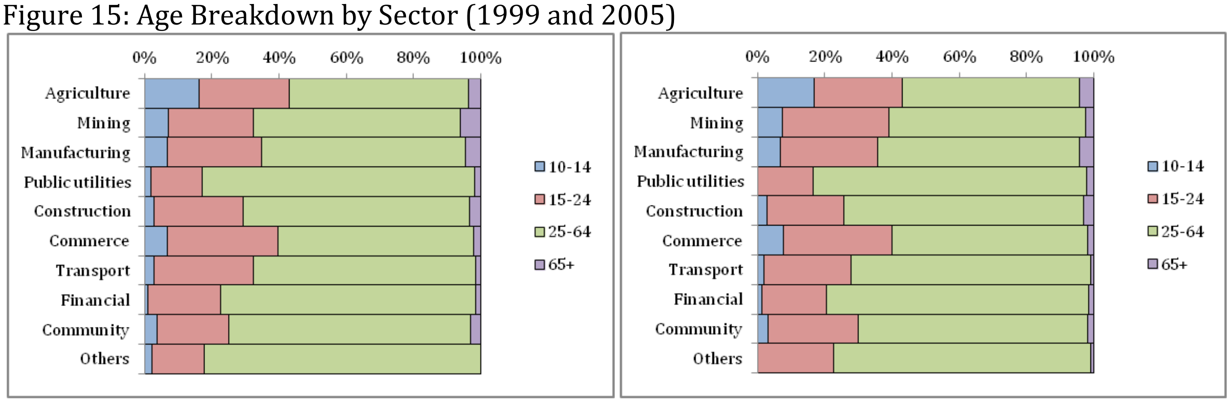
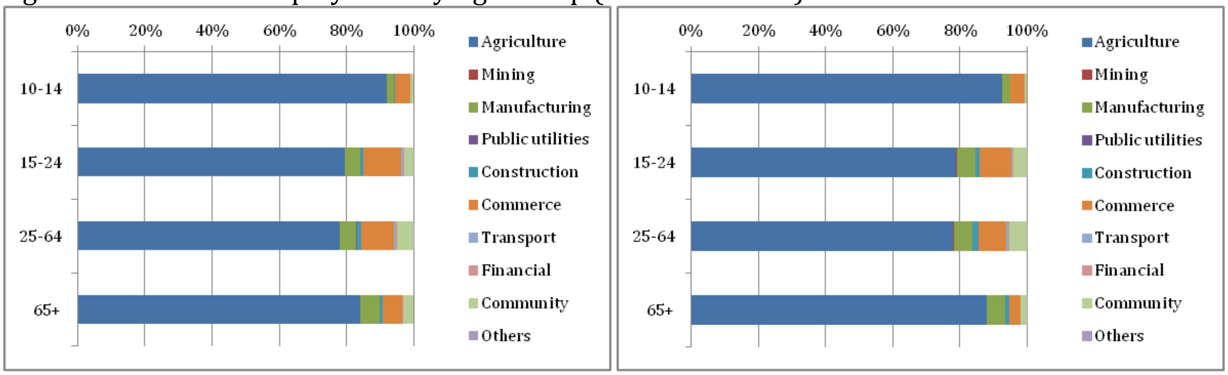


Figure 16 presents the same data by age group. Once again, it shows that virtually all 10-14 year-olds are engaged in agriculture. Perhaps surprisingly, a very large proportion of workers over 65 years of age are also found in agriculture.

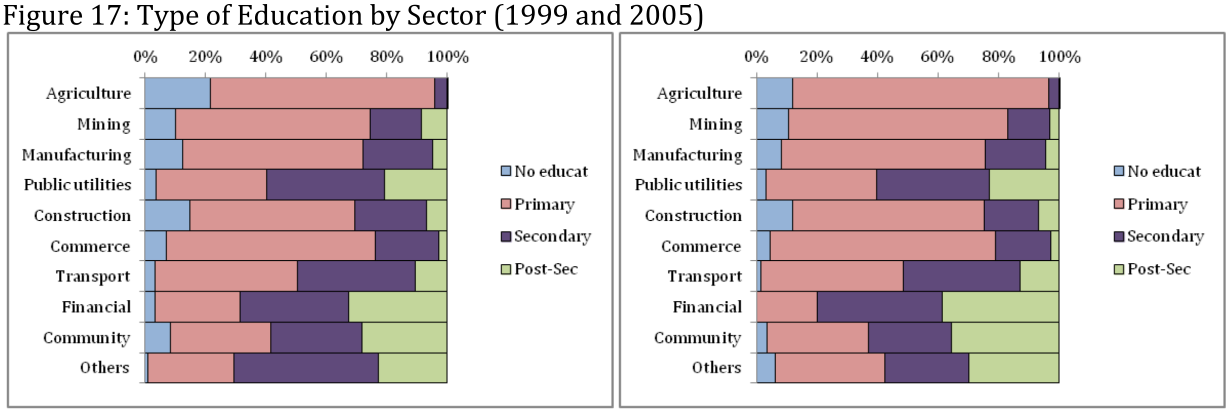
Figure 16: Sector of Employment by Age Group (1999 and 2005)



Education Level

It is also useful to investigate the education level of the workforce by economic sector. Figure 17 illustrates, to a certain extent, the different skill composition of economic sectors. Most workers have primary education as their highest education level. However, the majority of workers in public utilities, financial services, community services and others have at least secondary education – and a relatively high proportion of post-secondary level. Nearly half of workers in transport & communications are educated to either a secondary or post-secondary degree. Although this skill composition of the workforce is not expected to change dramatically in such a short time period, it is noticeable the reduction of workers with no education level (from 17 percent to 10 percent of total) and an increase in those with primary education (from 68 percent to 76 percent) – especially in agriculture.

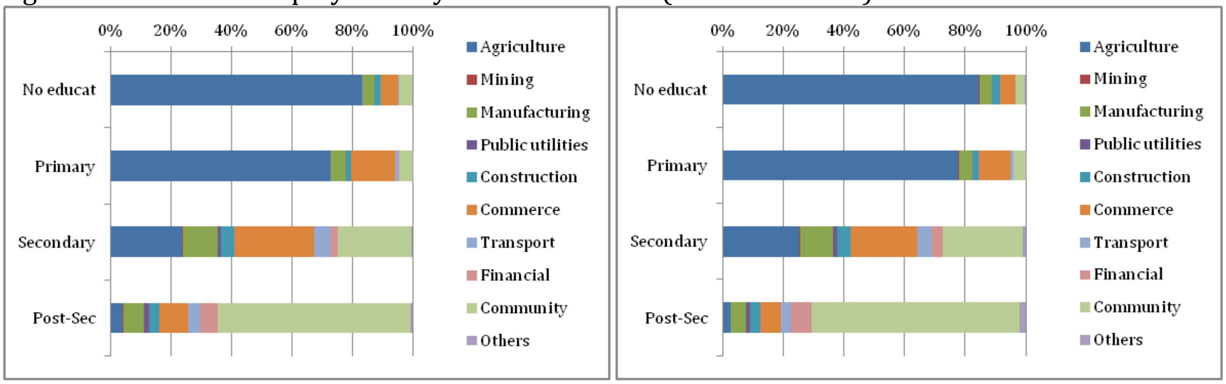
Figure 17: Type of Education by Sector (1999 and 2005)



Note: About one-third of the observations are lost due to no information on education level

Figure 18 presents the data by education level. While the majority of workers with no education level are in agriculture, their weight gradually declines for higher education levels. In particular, there is a considerable fall between the primary and secondary levels. Commerce workers have considerable shares in both primary and secondary education, while community service workers dominate the post-secondary level. Finally, it is evident that agriculture increased its share in workers with primary education, confirming the observations made above.

Figure 18: Sector of Employment by Education Level (1999 and 2005)

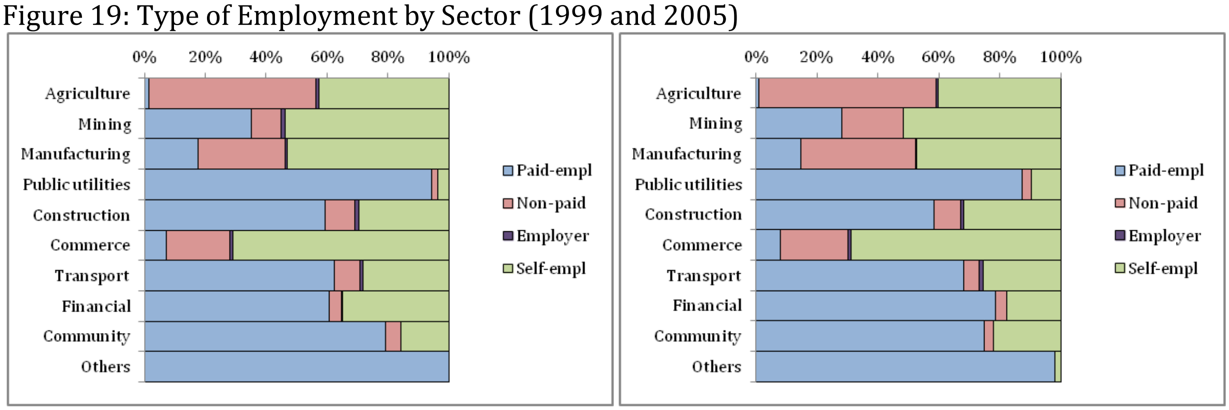


Job Characteristics

Type of Employment

It is useful to investigate the type of employment by economic sector, since this is often used as a proxy for job quality. Figure 19 illustrates the sharp differences in the type of employment that can be found across sectors. For instance, while the vast majority of agricultural employment is associated with self-employment (own-account work) and non-paid employment (e.g. contributing family work), the majority of jobs in public utilities are associated with paid employment (i.e. wage and salaried work). Construction, transport & communications, financial services, and community services are also predominantly associated with wage employment, which is usually seen as providing higher income and job security. However, mining, manufacturing and commerce have low levels of wage employment. The relatively high levels of non-paid work in manufacturing and commerce, in addition to agriculture, may suggest the existence of micro-enterprises in these sectors. It should be noted that there have not been dramatic changes between 1999 and 2005 – especially in aggregate terms.

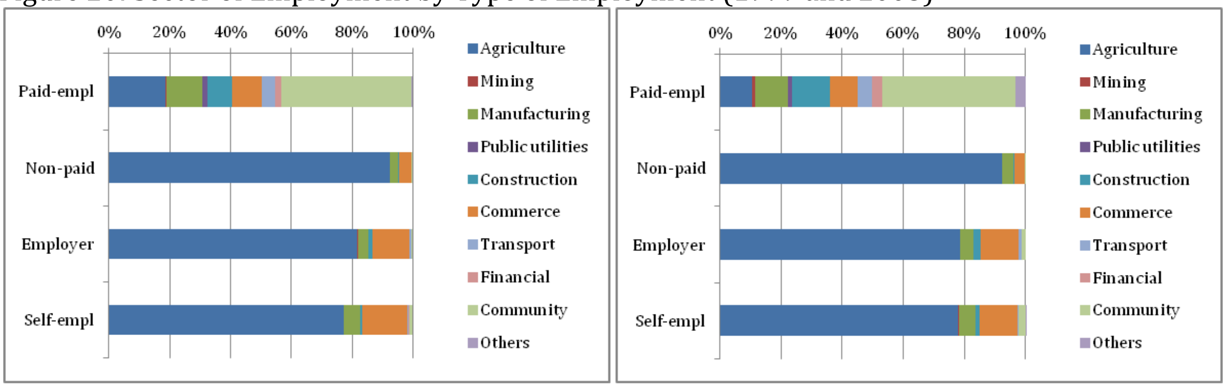
Figure 19: Type of Employment by Sector (1999 and 2005)



Note: 'Others' usually includes extra-territorial organizations and NGOs

We can also investigate this data by type of employment. Figure 20 suggest that a large proportion of wage employment can be found in community services – which includes public administration & defense, education, health & social work, and other community, social & personal service activities. Agriculture also accounts for a sizeable share due to its weight in total employment. Manufacturing, commerce and construction also account for a significant proportion of wage employment. With regard to other types of employment – i.e. self-employment and non-paid employment, but also employers – the agriculture sector dominates, followed by commerce (which includes wholesale and retail trade). In terms of changes through time, the only significant change appears to be the relative decline of agriculture in paid employment – most likely due to an expansion of other sectors.

Figure 20: Sector of Employment by Type of Employment (1999 and 2005)



This is particularly interesting given recent evidence of a 'pecking order' (of types of employment) in terms of household welfare and worker education (Gindling and Newhouse, 2012). From highest to lowest, we have: (i) employers, (ii) wage and salaried employees, (iii) non-agricultural own-account workers, (iv) non-agricultural unpaid family workers, and (v) agricultural workers. As incomes increase, the structure of employment seems to shift rapidly, from agriculture into 'unsuccessful' non-agricultural self-employment and then to non-agricultural wage employment.

Sector of Activity

This set of figures explores the sector of activity. Figure 21 illustrates the relative weight of the public sector, especially in comparison with the private sector. Public sector workers hold the majority jobs in public utilities, while financial services and community services also have a high share of public sector jobs. In relative terms, there is virtually no public sector employment in agriculture and commerce. 'Others' is mainly comprised of NGOs workers. However, there have been some changes through time. Most notoriously, the share of public sector jobs in public utilities has declined considerably, while increasing in financial services and community services. Meanwhile, the share of NGO workers in community services declined substantially.

Figure 21: Sector of Activity by Economic Sector (1999 and 2005)

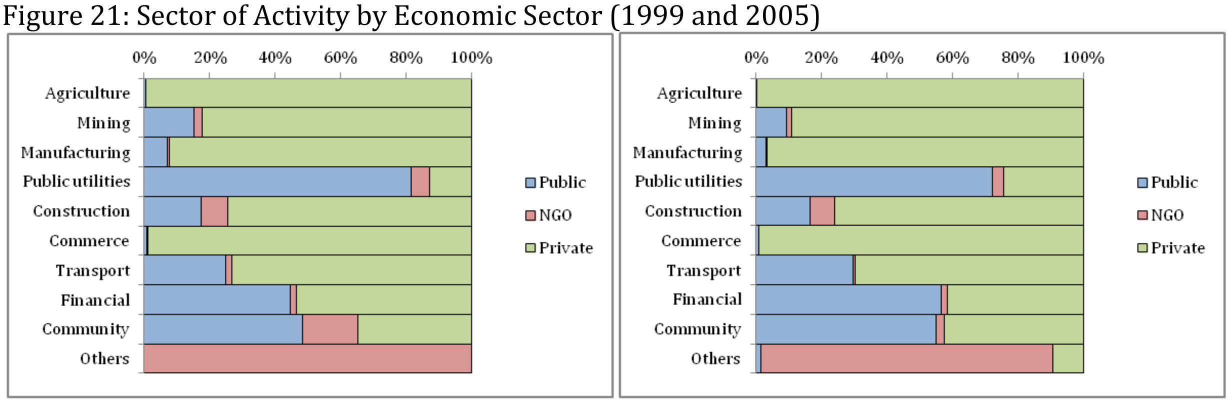
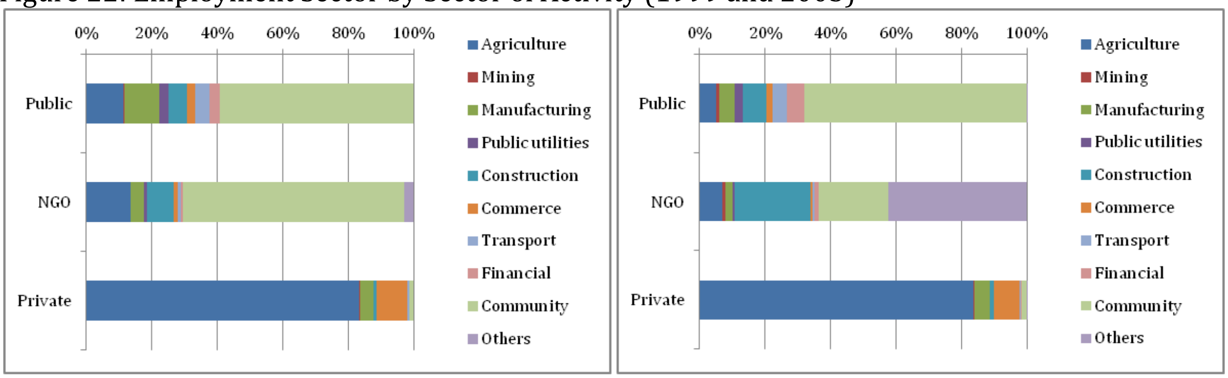


Figure 22 provides an alternative perspective on this issue. The sectoral decomposition of public employment suggests that the majority of workers are found in community services – a share that has increased recently. Agriculture and manufacturing were also relatively important, although their shares appear to have declined. The weight of construction and financial services in total public sector employment has also increased. With regard to the composition of private employment, the vast majority of workers are found in agriculture. Commerce and manufacturing are the second and third most common sector of employment for private sector workers. Finally, there have been strong shifts in the sectoral composition of NGOs, although it should be noted that this category accounts for less than 1 percent of total employment.[19]

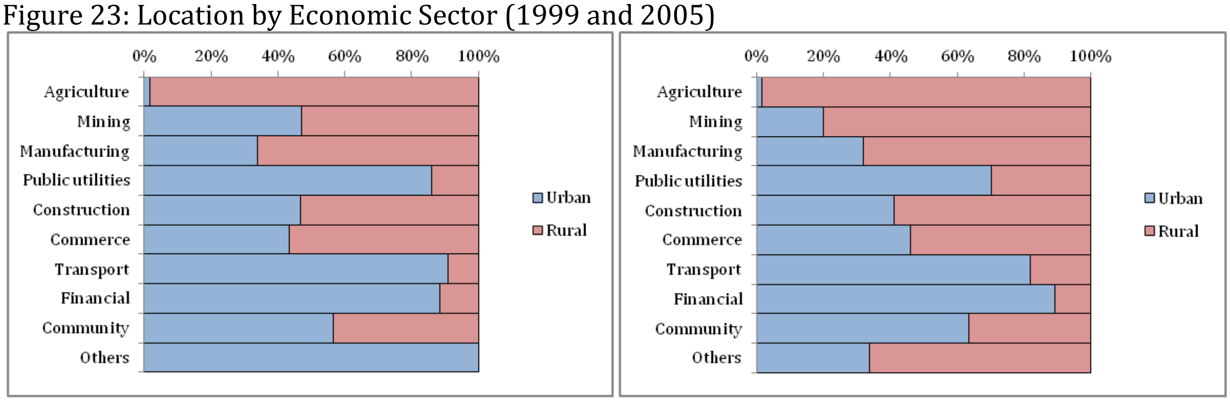
Figure 22: Employment Sector by Sector of Activity (1999 and 2005)



Location

Another important dimension relates to the location of jobs. Figure 23 provides a disaggregation of sectoral employment by area. Virtually all agricultural employment is found in rural areas. Jobs in public utilities, transport & communications and financial services are predominantly found in urban areas. However, there have been some noteworthy changes through time. The urban share of community services has increased, while the rural share of mining, public utilities, transport & communications and others has expanded. Construction and commerce are almost evenly distributed across locations, with a slight predominance of rural areas.

Figure 23: Location by Economic Sector (1999 and 2005)

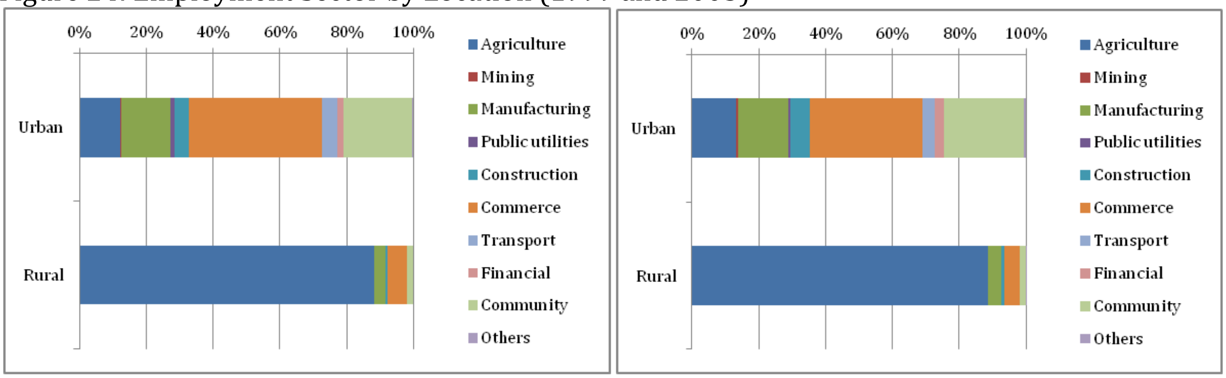


To a certain extent, Figure 24 illustrates the type of jobs available by location. It seems clear that urban areas have a much more diversified portfolio of jobs, while rural areas predominantly entail agricultural jobs. Commerce and manufacturing are the most likely alternatives to agriculture in

[19] This might be due to a coding issue.

rural areas. In urban areas, commerce accounts for the majority of jobs – albeit with a declining share – while community services, manufacturing and agriculture also employ a significant proportion of urban workers.

Figure 24: Employment Sector by Location (1999 and 2005)



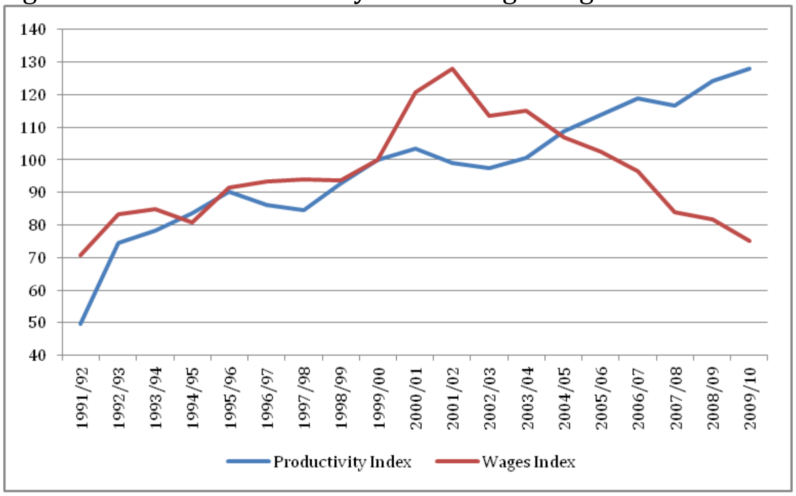
While the I2D2 database does not compile data on migration, there are a number of studies on the topic. The majority of migration flows tend to be internal (i.e. within the country), rural-rural, and temporary (i.e. seasonal). According to Denu et al (2005) the relative low level of migration could be explained by the lack of a well-established system of property rights for land, the large number of different languages spoken, as well as religious and cultural reasons. The results from the 2008 Ethiopia Urban Migration Survey seem to suggest that migrants predominantly move to Addis Ababa for education and jobs, and that this move improves their wellbeing (World Bank, 2010). These welfare gains associated with internal migration appear to be corroborated by de Brauw et al (2012). This might be intrinsically linked to the type of jobs they perform in urban areas, which are likely to be more productive than those in rural areas.

Productivity and Wages in the Manufacturing Sector

Productivity growth is often seen as a crucial prerequisite to sustainably raise living standards, especially because it tends to be associated with an economy's capacity to generate (productive) employment and increase wage levels. In fact, according to economic theory labor productivity (growth) is expected to determine wages (growth). However, this relationship is certainly not automatic. Studying a sample of more than 100 countries, Luebker (2011) finds that differences in the level of labor productivity explain (only) about 65 percent of wage variation across countries.

Given the small proportion of wage employment in Ethiopia, it can be useful to focus on a specific sector in order to evaluate trends in average wages and labor productivity. Moreover, that enables us to use other surveys tools, such as establishment surveys, which are likely to provide more reliable wage data. Figure 25 provides an illustration for large and medium scale manufacturing firms. For most part of the 1990s, wage and productivity levels appear to have increased in parallel. The early 2000s observed a brief spike in average wage levels, before a steep decline ensued. Part of this latter trend can be explained by higher consumer prices, which deteriorate the purchasing power of nominal wages. Inflation was particularly high in 2003, following a serious drought, and in the period from 2005 to 2008, partly due to high international food prices. Meanwhile, labor productivity has been steadily increasing since 2003.

Figure 25: Labor Productivity and Average Wage Indices in Manufacturing (2000=100)



Source: Author's calculations from the Large and Medium Scale Manufacturing and Electricity Industries Surveys

These manufacturing wage trends also seem to be observed in other sectors. Headey et al (2012) find that, although real urban wages were increasing in the early 2000s, the inflation episodes of 2007-2008 and 2010-2011 produced severe declines in purchasing power – between 10 and 26 percent.

Annex 2: Additional Tables and Graphs

Table 14: Interpreting Employment Elasticities

		GDP Growth	
		Positive	Negative
Employment Elasticity (ε)	ε < 0	(–) employment growth (+) productivity growth	(+) employment growth (–) productivity growth
	0 ≤ ε ≤ 1	(+) employment growth (+) productivity growth	(–) employment growth (–) productivity growth
	ε > 1	(+) employment growth (–) productivity growth	(–) employment growth (+) productivity growth

Source: Kapsos (2005)

Table 15: Poverty and Inequality

Survey year	Mean ($)	Poverty line ($)	Headcount (%)	Poverty gap (%)	Poverty gap square	Watts index	Gini index	MLD index
2010	60.68	38.0	30.65	8.19	3.05	0.1091	33.60	0.1910
2005	51.40	38.0	38.96	9.60	3.28	0.1230	29.83	0.1521
1999	42.71	38.0	55.58	16.21	6.48	0.2114	30.00	0.1562
1995	45.35	38.0	60.52	21.23	9.74	0.2921	39.96	0.2777

Source: PovCal

Table 16: Consumption Shares

Year	Income or Consumption share by deciles (%)									
	lowest	2nd	3rd	4th	5th	6th	7th	8th	9th	highest
2010	3.20	4.76	5.74	6.65	7.60	8.65	9.93	11.62	14.34	27.51
2005	4.05	5.21	6.17	7.05	7.92	8.86	9.94	11.39	13.78	25.63
1999	3.87	5.29	6.18	7.01	7.88	8.84	10.00	11.52	13.98	25.43
1995	2.97	4.20	5.03	5.84	6.72	7.73	9.01	10.78	13.88	33.84

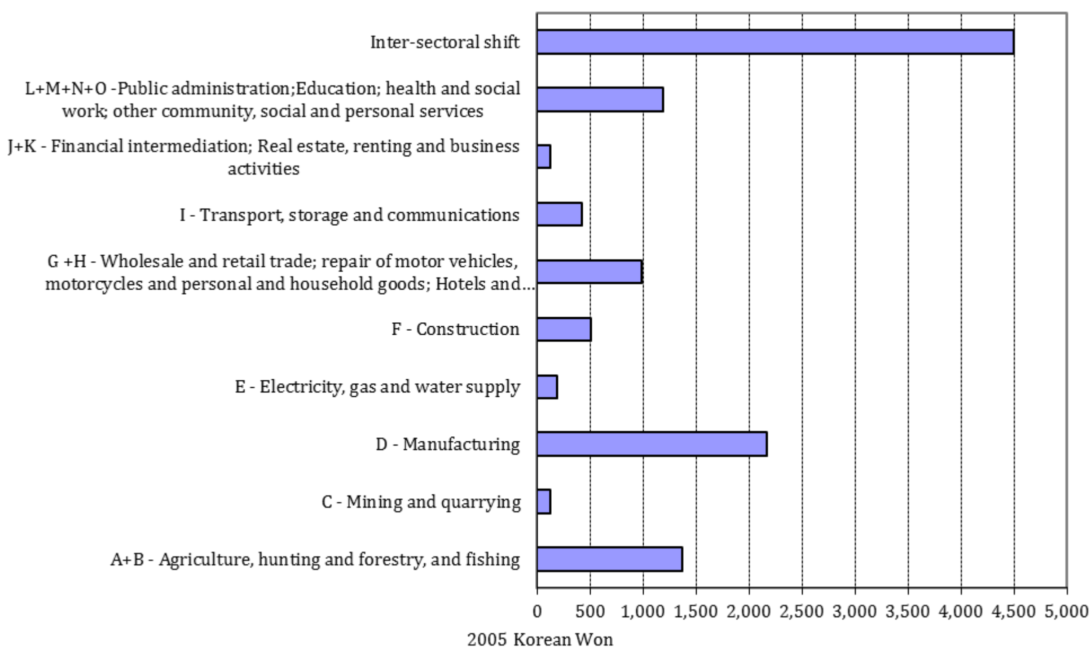
Source: PovCal

Table 17: Contributions to Output Per Capita Growth in the Republic of Korea (1970-1990)

	% Contribution of			Total (%)
	Within-Sector Productivity	Changes in Employment	Inter-sectoral Productivity	
Agriculture, hunting and forestry, and fishing	8.64	-24.48	16.46	0.62
Mining and quarrying	0.80	-0.57	-0.35	-0.12
Manufacturing	13.69	13.20	-3.84	23.05
Electricity, gas and water supply	1.20	0.14	0.22	1.56
Construction	3.22	4.19	3.68	11.09
Wholesale and retail trade; hotels and restaurants	6.24	6.63	-1.94	10.93
Transport, storage and communications	2.65	1.57	-0.36	3.85
Financial interm.; real estate, business activities	0.76	3.69	13.16	17.60
Public admin.; education; health and social work	7.50	2.33	1.29	11.12
Subtotals	*44.70*	*6.71*	*28.31*	*79.72*
Demographic component				20.28
Total				100.00
Total % change in output per capita				247.40

Source: Employment data from OECD's STAN Database for Structural Analysis. GDP data from UNdata's National Accounts Official Country Data database

Figure 26: Decomposition of Growth in Output per Worker for the Rep. of Korea (1970-1990)



Source: Employment data from OECD's STAN Database for Structural Analysis. GDP data from UNdata's National Accounts Official Country Data database

Table 18: Studies on Structural Change

	Pieper (2000)	Ocampo, Rada & Taylor (2009)	Timmer & de Vries (2009)	McMillan & Rodrik (2011)	Kucera & Roncolato (2012)
Years	1975-84, 1985-93	1990-2004	1950-2005	1990-2005	1984-1998, 1999-2008
No. countries	30	57	19	38	81
Sample	9 South & East Asia 2 Turkey & Middle East 11 LAC 9 SSA	8 Semi-industrialized 6 Central & Eastern Europe 2 Former USSR 4 Tigers 1 China 4 South Asia 4 Southeast Asia 3 Small Andean 5 CA & Caribbean 10 MENA 10 Africa	9 LA 9 Developing Asia 1 Japan	9 High income 10 Asian 9 LAC 1 Middle East 9 Africa	25 Developed 18 Central & Southeast Europe, CIS 14 Developing Asia 19 LAC 3 MENA 2 SSA
Sectors	1) Agriculture 2) Industry 3) Industry services 4) Other services	1) Agriculture 2) Industry 3) Services	1) Agriculture 2) Manufacturing 3) Other industries 4) Market services 5) Non-market services	1) Agriculture, hunting, forestry, fishing 2) Mining, quarrying 3) Manufacturing 4) Utilities 5) Construction 6) Wholesale & retail trade, restaurants, hotels 7) Transport, storage, communication 8) Finance, insurance, real estate, business services 9) Other services	1) Agriculture, hunting, forestry, fishing 2) Mining, utilities 3) Manufacturing 4) Construction 5) Wholesale & retail trade, restaurants, hotels 6) Transport, storage, communication 7) Other services
Data	Output: U.N. National Accounts (constant national currency); Employment: ILO	Output: World Bank WDI (constant USD); Employment: ILO GET database	Output: GGDC (constant national currency); Employment: GGDC	Output: GGDC & national sources (PPP USD); Employment: GGDC & national sources	Output: U.N. National Accounts & GGDC (constant national currency); Employment: ILO Laborstat and GGDC

Source: Adapted from Kucera and Roncolato (2012)

Table 19: Productivity, Output and Employment Growth (%)

	Productivity growth			Output growth			Employment growth		
	1984-98	1999-08	Diff.	1984-98	1999-08	Diff.	1984-98	1999-08	Diff.
All countries	1.6	2.5	0.9	3.0	4.2	1.2	1.3	1.6	0.3
Developed countries	1.8	1.1	-0.7	2.9	2.7	-0.2	1.1	1.6	0.5
C&SE Europe, CIS	0.4	5.0	4.6	-0.3	5.8	6.1	-0.7	0.8	1.5
Developing countries	2.0	2.3	0.3	4.3	4.4	0.1	2.3	2.1	-0.2
Asia	3.4	3.8	0.5	5.5	5.7	0.2	2.1	1.8	-0.2
LAC	0.6	1.2	0.5	3.2	3.5	0.3	2.6	2.4	-0.3
MENA	..	2.2	..	..	4.5	..	..	2.2	..
SSA	..	3.0	..	..	4.1	..	..	1.2	..

Source: Kucera and Roncolato (2012)

Table 20: Within-Sector and Reallocation Effects on Labor Productivity Growth (%)

	1984-1998			1999-2008		
	Productivity	Within	Reallocation	Productivity	Within	Reallocation
All countries	1.6	1.4	0.2	2.5	2.3	0.2
Developed countries	1.8	1.7	0.2	1.1	1.2	0.0
C&SE Europe, CIS	0.4	0.6	-0.2	5.0	4.8	0.1
Developing countries	2.0	1.5	0.5	2.3	1.9	0.4
Asia	3.4	2.7	0.7	3.8	2.9	1.0
LAC	0.6	0.5	0.1	1.2	1.1	0.0
MENA	..	..	..	2.2	2.5	-0.2
SSA	..	..	..	3.0	2.4	0.5

Source: Kucera and Roncolato (2012)