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Ethiopia's Spatial and Structural Transformation

Public Policy and Drivers of Change

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ABSTRACT

This paper evaluates Ethiopia's urbanization trend during the last four decades, while also considering Ethiopia's structural transformation and recent public investments to promote greater industrialization within the country. Ethiopia's urban population grew 4.2 percent per year between 1994 and 2015, far outpacing the overall population growth rate of 2.5 percent. Compared to the urban growth rate of Africa (3.5 percent per year), Ethiopia experienced a 20 percent faster urban population growth rate (UNDESA 2015). Urbanization in Ethiopia is expected to reach 38 percent by 2050. However, this level is relatively low compared to the majority of sub-Saharan Africa (SSA) countries.

Improved road infrastructure, rural to urban migration and secondary city development is increasing urbanization within the country. In addition, recent public investments to promote industrialization and increase manufacturing labor opportunities via newly constructed and planned industrial parks are projected to increase urbanization and bolster structural transformation across the country. We evaluate these investments and demographic trends within the context of other countries in sub-Saharan Africa, as well as with the experience of India and China.

Ethiopia's investment in higher-value manufacturing and service activities via economic zones may provide similar infrastructure to that of China and India's 'township and village enterprises' (TVE). However, a focus on increasing human capacity and labor mobility will be necessary to ensure that rural farmers are able to take advantage of labor opportunities outside of the agriculture sector. We calculate the projected economic impact of Ethiopia's planned industrial zones and sugar factories and find that while public and private investment in industrial and agro-industrial parks may provide a catalyst for future growth, they are likely to provide only a small share of total output and employment. Investments in sugar factories are anticipated to total USD 5.2 billion, with estimated production of USD 3.6 billion and value-added of USD 3.3 billion. However, an increase in sugar output of this magnitude would imply massive sugar exports that may not be financially profitable.

1. INTRODUCTION

Ethiopia is urbanizing rapidly, but from a low base. According to the Central Statistical Agency, Ethiopia's urban population in 2015 represented 19.4 percent of the total population of 90.1 million people (CSA 2013b). The urban population at the time of the 1994 census was far lower, 13.7 percent of the 53.8 million total (CSA 1996). Thus, the urban population growth rate (4.2 percent) between 1994 and 2015 far exceeded the overall population growth rate (2.5 percent) and was 20 percent faster than the urban population growth rate of 3.5 percent per year in the rest of Africa over the last two decades (UNDESA 2015). In spite of this high growth rate, however, Ethiopia remains among the least urbanized countries in sub-Saharan Africa, which had an overall urbanization rate of 38 percent, and its urban population share is 12 percentage points behind 41 countries that are anticipated to have at least 50 percent urbanization by 2050 (UNDESA 2015).[1]

Urbanization has major implications for overall growth. Long term economic development is generally associated with a movement of workers from low productivity agricultural labor to high productivity manufacturing labor with this labor generally moving from rural to urban areas. This structural transformation not only boosts incomes of individuals earning a higher wage, but it also provides capital to invest in inputs and mechanization for greater agricultural productivity growth in rural areas. Moreover, urbanization, if supported by appropriate infrastructure, has the potential to boost total factor productivity

[1] Urban growth is defined as the growth of total urban population. The term "urbanization" refers to the proportion of the population living in urban areas (Lemelin et al. 2014).

and economic output through positive agglomeration effects. For these reasons, urbanization has been implicitly or explicitly a central aspect of Ethiopia's development strategy for the last two decades, including the Agricultural Development Led Industrialization strategy of the early 2000's and the more recent Growth and Transformation Plans I and II.

This paper examines the urbanization process in Ethiopia and places it in the context of structural transformation and recent public investments to promote industrialization. The paper is organized as follows. Section two, after a brief overview of the data and methodology used in the paper, describes the historical growth of total and urban populations in Ethiopia, and projects future urban population growth. This analysis takes into account natural population growth in urban centers, as well as drivers of urbanization including increases and improvements in transportation infrastructure and migration patterns. Section three builds on this analysis, presenting data on both population growth and the structural transformation of Ethiopia's economy, in comparison with other countries in sub-Saharan Africa, as well as with the experience of India and China. Section four focuses on key aspects of Ethiopia's development strategy related to structural transformation and urbanization. It and provides estimates of the direct and multiplier effects of industrial parks and agro-industrial centers, which represent the major public investments designed to implement Ethiopia's development strategy. Section five summarizes and highlights areas for future research and analysis.

2. URBANIZATION IN ETHIOPIA

Over the last three decades, the size and number of cities dramatically increased across Ethiopia. In 1994, Ethiopia had a population of over 53.6 million people, but housed only 13 cities with populations greater than 50,000 people. By 2007, the total population increased by 20 million, but the number of cities doubled to 26. By 2015, the total population increased another 16 million from 2007, and the number of cities almost doubled again with 45 cities of at least 50,000 people. Urbanization rates differ across regions, with Oromia and Southern Nations, Nationalities, and Peoples' (SNNP) regions experiencing the largest growth in city numbers from 8 to 15 and 5 to 11 cities, respectively, between 2007 and 2015 (Table 2.1).

Table 2.1. Number of cities of at least 50,000 people

	Cities over 50,000 people			
Region	**1984**	**1994**	**2007**	**2015**
Addis Ababa	1	1	1	1
Afar	0	0	0	0
Amhara	3	3	7	8
Benishangul-Gumuz	0	0	0	0
Dire Dawa	1	1	1	1
Gambella	0	0	0	1
Harari	1	1	1	1
Oromia	3	4	8	15
SNNP	0	1	5	11
Somali	0	1	1	2
Tigray	1	1	2	5
Ethiopia	10	13	26	45
Percent of total population living in a city of at least 50,000 people	5.1	6.0	7.3	9.5

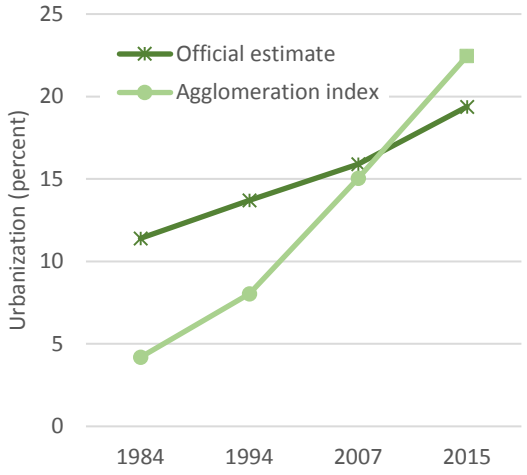
Source: Census data, population projections (CSA 2013b) and other sources.
SNNP = Southern Nations, Nationalities, and Peoples' region

Correlated with this increase in the number of cities over time is an overall increase in urbanization throughout Ethiopia. We evaluate urban population and urban growth rates using two methodologies. First, we review the official rural and urban population figures based on official census data collected in

1984, 1994, and 2007 (CSA 1991; 1996; 2010; 2013b). In addition, we simulate urbanization trends into the future using CSA's published population projection figures and the urban growth rate of 5.4 percent per year estimated in the World Bank's Ethiopian urbanization review (2015).[2] Second, we evaluate urbanization over time using the agglomeration index methodology developed by Uchida and Nelson (2009). The agglomeration index allows for a more consistent calculation of urbanization over time because it does not rely on definitions of urban and rural administrative units that change over time due to re-districting and redefinition of urban or rural locations.[3] A comparison of results generated from the two methodologies reveals important differences in overall urban growth rates, and in particular, urban growth trends in and around the capital city of Addis Ababa.

Comparing Ethiopia's urban share of population as measured by the agglomeration index with official urbanization rates based on administrative boundaries suggests that urban growth may be occurring faster than officially projected. Until 2007, official CSA estimates of the share of Ethiopia's population living in urban areas was greater than the agglomeration index estimation. In 1984 and 1994, few urban centers and limited road networks resulted in lengthy travel times to urban areas, hence a lower agglomerated area estimate. However, by 2015 the compounded effect of city and population growth, along with ongoing investments in road infrastructure, has improved accessibility and led to a higher urbanization rate as measured by the agglomeration index than the CSA official estimate of the share of the population residing in urban areas (Figure 2.1). As urban centers proliferate and transportation infrastructure facilitates the movement of goods and people, it is expected that agglomerations extending past official urban boundaries will continue to grow.

Figure 2.1. Comparison of the agglomeration index for Ethiopia and official estimates of the share of the total population residing in urban areas, 1984 to 2015



Source: CSA & Agglomeration index estimations

Focusing specifically on the official population figures published from the census, we evaluate urbanization over time by city size, separating cities into three categories: 1) cities with between 50,000 and 100,000 people; 2) cities with between 100,000 and 500,000 people; and 3) the city of Addis Ababa. In order to understand growth rates by city size, we identify cities that were projected to have at least 50,000 people by 2015 based on the 5.4 percent growth rate published by the World Bank's Ethiopian urbanization review using the most recently published census data from 2007. We then create a database of those specific cities dating back to 1984 (the first census year of the analysis) in order to evaluate urban growth

[2] The average urban growth rate estimated by the World Bank's Ethiopian urbanization review incorporates natural population growth, rural-urban migration, migration to mega project sites, and urban area expansion.
[3] A detailed explanation of administrative definitions and urbanization calculations in Ethiopia can be found in Schmidt and Kedir (2009).

over time, holding the number of cities constant throughout the period from 1984 to 2015. Similarly, we use the same consistent set of cities to project urban growth to 2035.

Census data, reported by administrative unit, suggest that the population of Addis Ababa, Ethiopia's capital and largest city, grew at 2.02 percent per year from 1994 to 2007 and at 2.25 percent per year between 2007 and 2015. The population of cities between 100,000 and 500,000 persons grew at twice the rate of Addis Ababa (Table 2.2, see also Annex Tables A2.1 and A2.2). Similarly, the growth rates of cities between 50,000 to 100,000 people grew at more than twice the rate of Addis Ababa between 1994 and 2015. Projecting urbanization rates into the future using the official census data suggests that the population growth rate of medium and large cities will continue to outpace the growth rate of Addis Ababa. These projections suggest that the total urban population living in cities greater than 50,000 people will increase by over 10 million by 2025 compared to 2007 levels, and increase by an additional 11 million persons by 2035 (Table 2.2 and Annex Figure A2.1).

Table 2.2. Urban center census populations, population projections, and growth rates in Ethiopia, 1984 to 2035

City size	Census May 1984	Census Oct. 1994	Census May 2007	Population Projection[a] July 2015	Population Projection[a] 2025	Population Projection[a] 2035
Population size, thousands						
50,000 to 100,000 [a]	337	650	1,139	1,782	3,284	5,593
100,000 to 500,000 [a]	847	1,340	2,276	3,488	9,225	20,242
Addis Ababa	1,413	2,113	2,740	3,273	4,561	5,810
Subtotal	2,597	4,102	6,154	8,543	17,070	31,646
Total urban (CSA)	4,869	7,385	11,863	17,459	31,072	52,574
Total Population	42,617	53,764	73,751	90,076	111,644	132,701
Annual population growth rate since previous measurement, %						
50,000 to 100,000 [a]		6.77	4.41	5.76	6.31 [c]	5.47 [c]
100,000 to 500,000 [a]		4.69	4.16	5.48	10.21 [c]	8.18 [c]
Addis Ababa		4.11	2.02	2.25	3.37 [c]	2.45 [c]
Subtotal		5.33	3.13	4.37	6.94 [c]	6.20 [c]
Total urban (CSA)		4.25	3.71	4.95	5.40 [b]	5.40 [b]
Total Population		2.35	2.46	2.53	2.17 [d]	1.74 [d]

Source: Central Statistical Agency of Ethiopia (1984, 1994, 2007, 2015), EGIS (2016), and authors' calculations.
Note: [a] City size categories are defined in terms of 2015 population using CSA urban population projections regardless of population size in years prior to or following 2015. This permits examination of changes in population for a consistent set of geographic localities over time.
[b] 5.4 percent is the overall urban growth rate used for projections from 2012 forward by the World Bank's Ethiopia Urbanization Review: Urban Institutions for a Middle-Income Ethiopia. This projection rate is also used by the Ethiopian Development Research Institute (EDRI).
[c] Growth rates derived from the EGIS national urban system study report (2016) projections.
[d] These total population growth rate projections are the log estimate annual growth rate of the respective period years of the full 2008-2037 series of World Bank projected populations, medium variant.

However, these data can be misleading given the urban area expansion that has occurred in and around Addis Ababa. It is important to note that Addis Ababa official population statistics are confined to the Addis Ababa census administrative boundary designation and do not take into account the urban expansion occurring along major transportation corridors leading from and adjacent to the Addis Ababa administrative boundaries. A paper by Zeleke et al. (2018) shows that the expansion of Addis Ababa in terms of land use is exponential. In absolute terms, this expansion in Addis Ababa is larger than the combined land use of Adama, Mekele, Hawassa, and Bahir Dar with respective 2015 populations of 324,000, 324,000, 300,000, and 243,000. From 1986 to 2010, the average rate of growth in area for Addis Ababa was calculated at 9.1 km^2/year, while the combined average rate of growth in area for Adama, Mekele, Hawassa, and Bahir Dar was 3.2 km^2/year (Zeleke et al. 2018).

In order to take into account urban agglomerations and city growth in a more systematic manner, as well as take into account urban agglomeration that is overlapping administrative boundary definitions, we calculate an agglomeration index based on market access and population density thresholds.[4] The agglomeration index is constructed using several spatial datasets that provide population data at a 1 km^2 grid cell unit, namely LandScan and GRUMP, to evaluate urban populations. LandScan and GRUMP datasets are processed to be comparable to population statistics published by the CSA census documents, whereby total population reported in the census is maintained. Urban areas are defined as locations that have a population density of at least 150 people per square kilometer and are located within one hour travel time to a city of at least 50,000 people. This analysis builds upon earlier work by Schmidt and Kedir (2010), that modeled travel times to major cities (see Annex 1 for further detail on the estimation of travel time and the agglomeration index).[5] We compare previous estimates reported by Schmidt and Kedir (2010) to updated 2015 agglomeration values.

Table 2.3. Agglomeration Index for Ethiopia, 1984 to 2015, percent of people residing in urban areas, by region

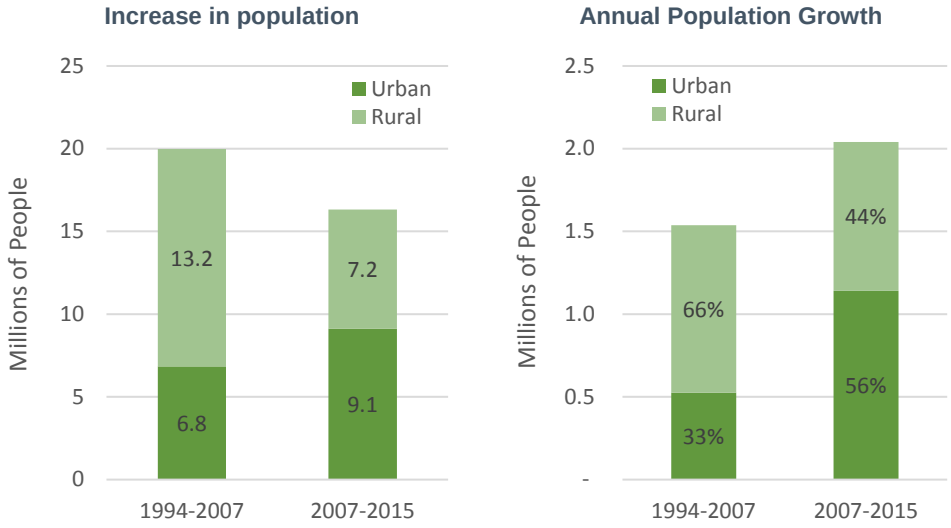
	Urban share of total population, %			
Regions	**1984 [a]**	**1994**	**2007**	**2015**
Addis Ababa	57.5	91.1	91.9	99.9
Afar	-	-	-	0.6
Amhara	3.2	4.9	7.9	14.0
Benishangul-Gumuz	-	-	-	-
Dire Dawa	16.9	55.8	59.5	67.9
Gambella	-	-	-	11.9
Harari	44.7	75.8	81.0	94.3
Oromia	2.0	5.2	10.3	15.9
SNNP	-	2.6	23.7	39.5
Somali	0.3	2.4	2.7	2.4
Tigray	2.7	4.3	8.1	19.1
Ethiopia	4.2	8.0	15.1	22.5

Note: See Annex 1 for details on urban population calculations using the agglomeration index. SNNP = Southern Nations, Nationalities, and Peoples' region.
[a] Population figures for 1984 were approximated due to changes in administrative boundaries after 1984. In order to maintain consistency across all years, we geographically allocated population to the current regional boundaries.

Comparing urbanization over the last four decades using the agglomeration index methodology highlights the immense investments in road infrastructure as well as the increasing growth of secondary cities across Ethiopia. While in 1984, only 4.2 percent of the total population was considered urban according to the agglomeration index, 22.5 percent of the population was urban in 2015 (Table 2.3). More recently between 2007 and 2015, the urban share of population increased almost 7.5 percent from 2007 to 2015, increasing from 15.1 to 22.5 percent between 2007 and 2015. Of the population increase in Ethiopia of 36 million between 1994 and 2015, the urban share of annually added population increased from 33 percent between 1994 and 2007 to 56 percent between 2007 and 2015. (Figure 2.2).

[4] Census definitions of urban and rural vary over time due to changes in administrative boundary definitions, thus prohibiting a comparative analysis of city growth and expansion across different census years.
[5] The methodology to summarize travel time and calculate agglomeration is slightly modified compared to Schmidt and Kedir (2010). See Annex 1 for an in depth description of the methodology and modifications.

Figure 2.2. Population added since 1994 and annual population growth, in millions

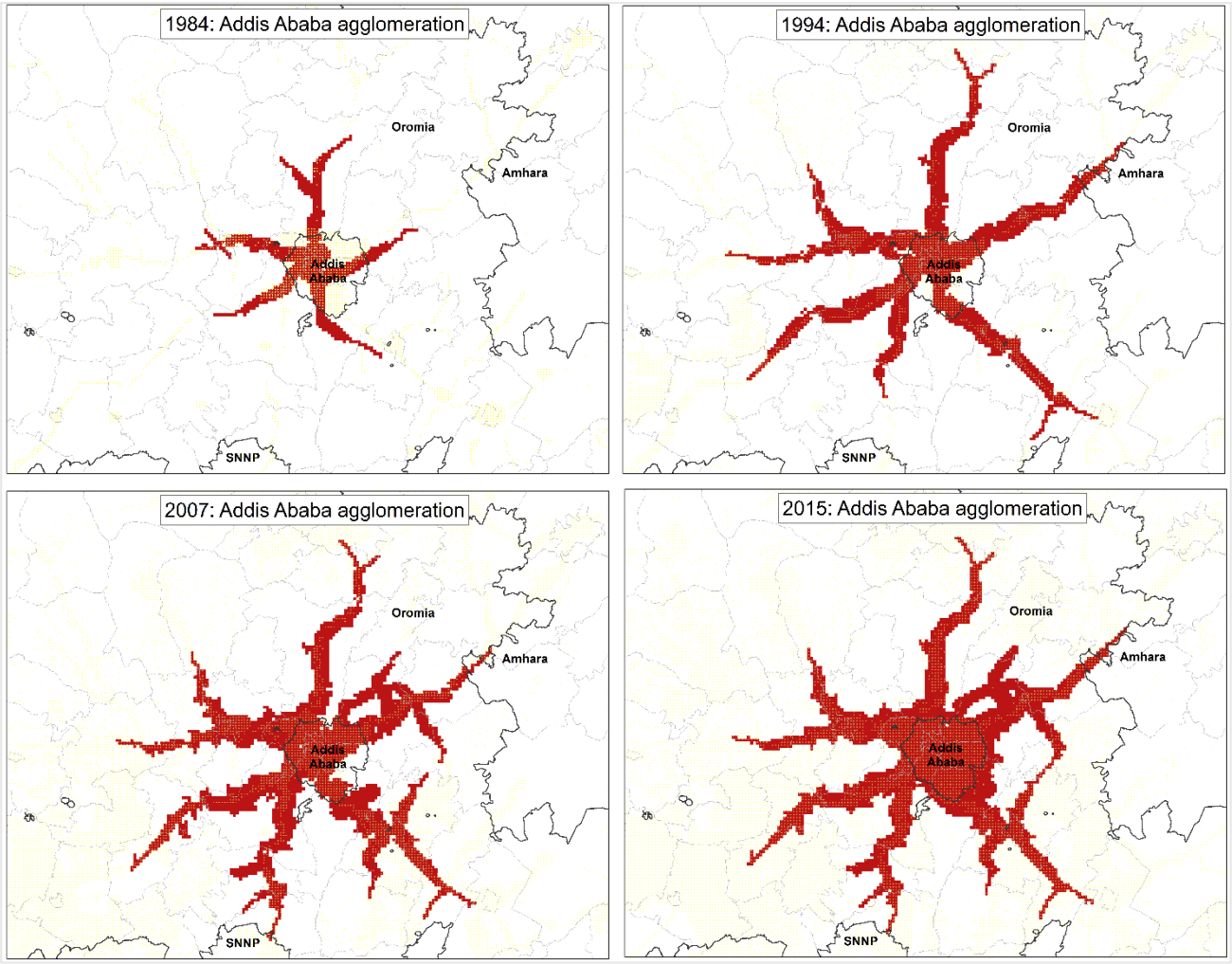


Source: Central Statistical Agency of Ethiopia (1984, 1994, 2007, 2015), EGIS (2016), and authors' calculations.

Urbanized networks are forming between important secondary cities throughout the country. For example, between 1994 and 2015 the emergence of upgraded or newly-constructed roads along the main corridors connecting Addis Ababa to Dukem, Bishoftu, Mojo, Adama, and Assela to the southeast of Oromia region all significantly improved the travel time between cities and accelerated the rate of urbanization. Particularly striking is the growth in urban corridors in and around Addis Ababa over time (Figure 2.3). While in 1984, urban population as classified by the agglomeration index was limited to the western part of the city with limited agglomeration around the five major transportation corridors, the greater urban area and corridors of Addis Ababa fully comprise the Addis Ababa administrative unit and reach to other neighboring smaller cities in Oromia and Amhara regions (Figure 2.3).

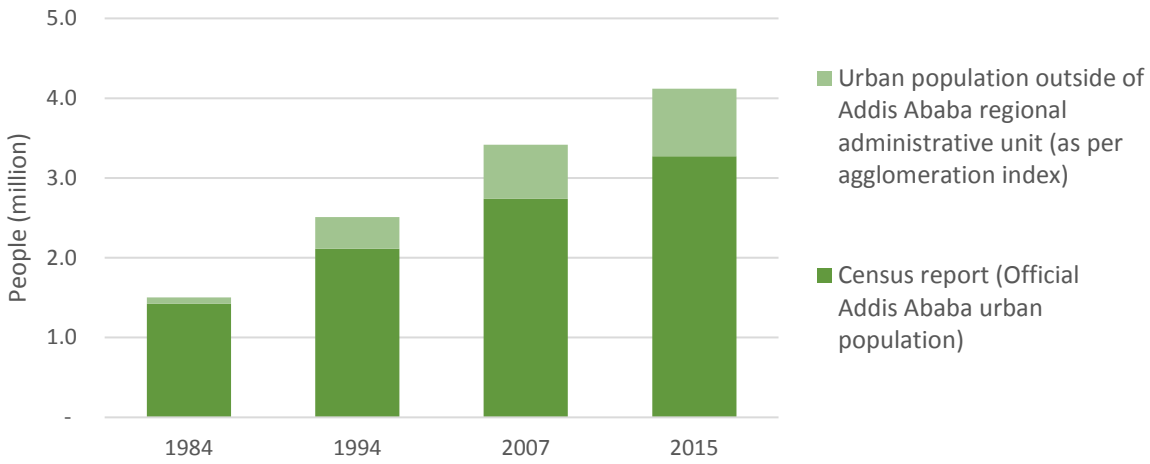
Comparing the official statistics of urbanization of Addis Ababa based on administrative boundaries with the agglomeration index measure of urbanization, we find that the capital city has grown substantially larger than official statistics indicate. In 1984, based on the agglomeration index, the Addis Ababa administrative area was a mix of rural and urban populations with more than 50 percent of the area defined as rural. Limited road networks within the city and low population densities resulted in a lower agglomeration value of urbanization totaling 1.3 million people compared with the 1984 census population for Addis Ababa reported at 1.42 million people. In addition, limited road networks restricted agglomeration outside of the city borders, limiting urbanization to 82,000 urban people that lived outside of the Addis Ababa administrative region based on the agglomeration index calculation (Figure 2.3 and 2.4). By 2015, the entire Addis Ababa administrative region was urban and extended along wide agglomerated urban corridors outside of the administrative region, accounting for an extra 846,000 people. According to the agglomeration index analysis, approximately 20 percent of Addis Ababa's urban population lives outside of the Addis Ababa administrative region boundary along major transportation corridors and in urban feeder towns.

Figure 2.3. Agglomeration Index for 1984, 1994, 2007 and 2015: Addis Ababa



Source: Authors' calculations

Figure 2.4. Urban population within the Addis Ababa regional administrative unit and additional urban population based on agglomeration index calculations, 1984 to 2015



Source: Authors' calculations

Investments and improvements in major transportation arteries as well as the development of regional secondary cities within Ethiopia have improved the accessibility of remote rural areas to urban centers. Between 2007 and 2015, an additional 15 percent of the population were within 3 hours travel

time of a city of at least 50,000 people – the share of the population with this level of access to urban centers rising from 44.4 percent in 2007 to 58.6 percent in 2015. (Table 2.4, and Annex Tables A1.2-A1.4). Even the most remote populations that were more than 10 hours away from a city decreased from 11 percent of the population in 2007 to 5.4 percent in 2015.

Table 2.4. Travel time to nearest city of at least 50,000 people in 2015, percentage share of total population, by region

Region	< 1 hour	1 - 3 hours	3 - 5 hours	5 - 10 hours	> 10 hours
Tigray	24.7	34.9	20.0	18.1	2.4
Afar	1.2	18.3	26.3	41.7	12.6
Amhara	16.2	39.3	24.9	17.6	2.1
Oromia	18.3	39.7	24.5	15.4	2.2
Somali	4.6	11.0	12.8	29.7	42.0
Benishangul-Gumuz	0.1	1.3	18.3	49.0	31.4
SNNP	40.4	36.2	11.2	9.6	2.5
Gambella	15.7	18.0	16.3	27.6	22.4
Harar	94.3	5.7	-	-	-
Addis Ababa	99.9	0.1	-	-	-
Dire Dawa	69.0	16.8	8.8	5.5	-
Ethiopia	24.5	34.1	19.8	16.2	5.4

Source: Authors' calculations using the agglomeration index. SNNP = Southern Nations, Nationalities, and Peoples' region

Table 2.5. Ethiopia: Urban and rural populations, labor force size, and growth rates, 1994 to 2035

	Population					Labor Force				
	Addis Ababa	Other urban[a]	Total urban[b]	Rural	Total	Addis Ababa	Other urban[a]	Total urban[b]	Rural	Total
Population and labor force size, thousands										
1994	2,113	1,990	4,102	49,375	53,477					
2007	2,740	3,415	6,154	67,597	73,751	1,420	1,770	3,190	35,039	38,229
2011[c]	2,994	4,242	7,237	74,269	81,506	1,724	2,442	4,166	42,753	46,919
2015	3,273	5,270	8,543	81,533	90,076	2,064	3,323	5,387	51,416	56,804
2025	4,561	12,148	16,709	94,935	111,644	3,169	8,441	11,611	65,969	77,580
2035	5,810	24,677	30,487	102,214	132,701	4,187	17,781	21,967	73,649	95,616
Annual growth rate, %										
2011-15	2.25	5.57	4.24	2.36	2.53	4.61	8.01	6.64	4.72	4.90
2015-25	3.37[d]	6.31[d]	6.94[d]	1.53	2.17	4.38	9.77	7.98	2.52	3.17
2025-35	2.45[d]	5.47[d]	6.20[d]	0.74	1.74	2.82	7.74	6.59	1.11	2.11

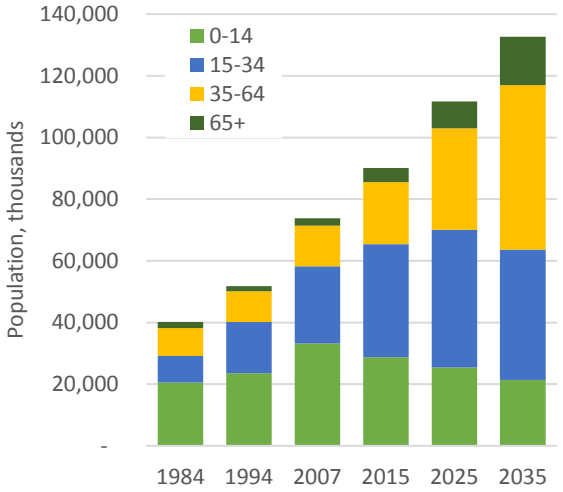
Source: Central Statistical Agency of Ethiopia (1994, 2007, 2015), EGIS (2016), and authors' calculations.
Note: [a] City size categories are defined in terms of 2015 population using CSA urban population projections regardless of population size in years prior to or following 2015. This permits examination of changes in population for a consistent set of geographic localities over time
[b] Urban is defined as settlements with a population of 50,000 and greater. All other areas are rural for the purposes of this table.
[c] 2011 figures are imputed using a steady growth rate between 2007 and 2015.
[d] Growth rates derived from the EGIS national urban system study report projections (2016).

Nonetheless, while urban centers continue to grow, total population and labor force growth in Ethiopia are slowing. Annual population growth is expected to decelerate from the average between 2011 and 2015 of 2.5 percent per year to 1.7 percent per year between 2025 to 2035 (Table 2.5).[6] Likewise, annual labor force growth, which was 4.9 percent between 2011 to 2015, is expected to drop to 2.1

[6] The changes in population growth rates in Ethiopia by decade are given in Annex Table A2.4. Population growth averaged 2.5 percent from 2010 to 2020, and is expected to decline to 1.8 percent between 2020 and 2030, and decline further to 1.4 percent by 2040.

percent in the 2025-35 period.[7] Given the recent surge in population and subsequent deceleration, Ethiopia is currently experiencing a "youth bulge" in the labor force as people born between 1998 and 2002 – those aged 15 to 19 years old in 2015 – enter the labor market. Until this cohort retires, Ethiopia is likely to have an opportunity for a "demographic dividend" as the ratio of workers to dependents rises (Figure 2.5).

Figure 2.5. Ethiopia's census population and population projections by age bracket, 1984 to 2035



Source: Authors' calculations using historical CSA data and projections (CSA 2013b) and EGIS growth rates (2016).

Ethiopia's labor force, which is the sum of females and males between the ages of 15 and 64 years, is increasing faster than the overall population. It will continue to do so over the next two decades, rising from a 51.8 percent participation rate in 2007 to an expected 72.1 percent in 2035 (Table 2.6).[8] While the population of females of any age is slightly lower than the population of males, their participation in the labor force is slightly greater than that of males. Moreover, population growth of females is taking place at a slightly higher rate of 0.1 percentage points above the annual male population growth, while the male annual labor force growth is about equal to or slightly higher than growth of the female labor force.

Table 2.6. Female and male labor force participation and annual growth, 2007 to 2035

	Population			Labor Force			
	Female	Male	Total	Female	Male	Total	Participation rate, %
Population and labor force size, thousands							
2007	36,534	37,217	73,751	19,312	18,917	38,229	51.8
2015	44,825	45,250	90,075	28,486	28,318	56,804	63.1
2025	55,705	55,939	111,644	38,856	38,724	77,580	69.5
2035	66,311	66,389	132,700	47,833	47,783	95,616	72.1
Annual growth rate, %							
2007-15	2.6	2.5	2.5	5.0	5.2	5.1	--
2015-25	2.2	2.1	2.2	3.2	3.2	3.2	--
2025-35	1.8	1.7	1.7	2.1	2.1	2.1	--

Source: Authors' estimates based on CSA data and projections (CSA 2013b).

[7] The size of Ethiopia's labor force by decade is given in Annex Table A2.3. Annual labor force growth was an average 3.7 percent from 2010 to 2020, down from 5.8 percent during the period from 1990 to 2000.
[8] The changes in Ethiopia's labor force participation rate by decade are given in Annex Table A2.3. Labor force participation averaged 79.0 percent from 2010 to 2020 according to the Ethiopia labor force survey.

3. MIGRATION AND STRUCTURAL TRANSFORMATION

3.1. Migration in Ethiopia

According to the last three censuses in Ethiopia, those of 1984, 1994, and 2007, the share of migrants moving to another district is increasing. From 1984 to 1994, migrant population grew from 4.5 million people, or 11 percent of the population in 1984, to 6.9 million, 13 percent of the population in 1994. Total migrants increased to 12.2 million (17 percent) in 2008 (CSA 1991; 1996; 2010). Almost half of the migrants in 2008 migrated from a rural area to another rural area, while 27 percent of migrants moved from a rural to an urban area (Dorosh et al. 2011). More recent data collected by the National Labor Force Survey in 2013 (NLFS) suggests that rural-rural and rural-urban migration shares were almost equivalent at 35 and 33 percent, respectively, of total migrants.

Given that the most recent census data are from 2007[9], we use the National Labor Force survey of Ethiopia to evaluate migration rates within the country.[10] Although measures of the contribution of rural-urban migration toward total urban growth are reported in various datasets, including the 2007 census and the National Labor Force Survey, unlike in the generation of the agglomeration index, the sampling design used to generate these calculations are constrained to administrative boundaries. Therefore, the rural-urban migration rate of 32.5 percent as reported by the NLFS in Table 3.1 masks a substantial share of rural to peri-urban and rural to urban migration due to the NLFS reliance on administrative units for the delineation of rural and urban areas. As per the agglomeration index results, areas defined as urban expand beyond administrative boundary delineations along major transport corridors leading to urban centers, effectively redefining areas that were previously rural to peri-urban or urban given their importance to economic agglomeration and access to urban activity. Thus, rural-urban migration as reported by the NLFS can be considered as a lower bound because it is defined using administrative boundaries and does not capture the agglomerated urban areas as presented in this paper.

Table 3.1. Forms of migration by region, percent of region migrants

Current Region	Rural-Rural	Rural-Urban	Urban-Urban	Urban-Rural	Total, thousands
Amhara	40.0	32.9	18.0	9.2	2,628.0
Oromia	39.8	27.4	17.4	15.4	4,368.4
SNNP	39.2	27.5	18.1	15.3	2,067.4
Tigray	31.1	35.5	24.4	9.1	768.4
Benishangul-Gumuz	55.4	22.5	15.1	6.9	227.0
Gambela	40.6	25.6	22.9	11.0	86.9
Afar	25.5	37.3	25.6	11.6	190.2
Somali	20.5	23.8	35.7	20.0	101.9
Addis Ababa	0.0	58.7	41.3	0.0	1,217.1
Dire Dawa	3.9	37.7	52.8	5.6	112.8
Harar	6.5	38.5	52.5	2.4	50.2
Ethiopia	34.5	32.5	21.3	11.6	11,818.3

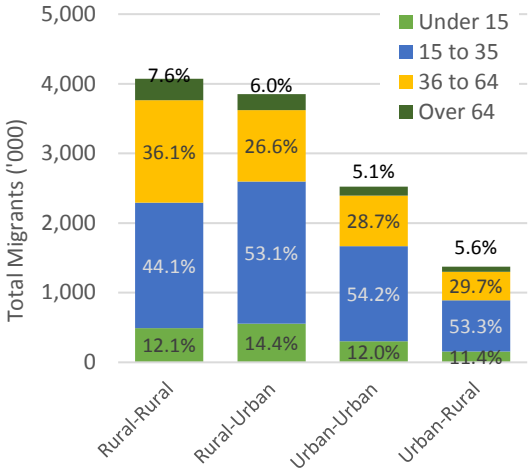
Source: Authors' calculations using NLFS 2013. SNNP = Southern Nations, Nationalities, and Peoples' region.

The NLFS data provide a national picture of migration and suggest that migration destinations vary by regions. Greater rural-rural migration occurs in Amhara, Oromia, and SNNP regions; less than a third of migrants moved from rural to urban areas in these regions (Table 3.1).[11] Youth between the ages of 15 and

[9] CSA is planning to implement a 2018-year census.
[10] The NLFS is a nationally representative dataset that provides information on labor trends in the country, and is collected every five years.
[11] Data from the Ethiopia Socioeconomic Survey (ESS) for 2012/13 suggest that the rural-urban migration rate in Ethiopia was approximately 2 percent of rural households per year.

35 make up a large share of the migrant population. Overall, 53 percent of migrants from rural to urban areas and 44 percent of rural-rural migrants were between the ages of 15 and 35 years (Figure 3.1).

Figure 3.1. Forms of migration by age group and by migration type, total and percent of migrants



Source: Authors' calculations using NLFS 2013

According to the NLFS data, 32 percent of migrants at least 15 years old move in search of work or due to job transfers. Men are the primary migrants moving for economic reasons with 45 percent of males moving for work, while a majority of female migration is attributed to marriage, followed by migration in search of work at 32 and 22 percent, respectively. When disaggregating migrants by origin and destination, of all migrants that move from rural to urban areas, less than half – 58 percent of men and 34 percent of women – are motivated to migrate in search of work.

Although a large share of the migrant population leaves rural areas to specifically seek work in urban areas, more than half of rural-urban migrants leave their home *woreda* (district) due to other reasons, including education, to reunite with family members, displacement, and shortage of agricultural land in origin location. More detailed studies of migrants in Ethiopia suggest that migrants are predominantly 'pushed' from their homes rather than attracted by an urban 'pull' of higher returns on human capital investments. For example, the Ethiopian Urban Migration Study (Moller 2012) reports that more than 42 percent of migrants stated that they would not have migrated if had been able to make a living in their original home. In comparison to non-migrants, migrants that moved to Addis Ababa came from families with much lower educational levels than non-migrants. Female migrants had three times the illiteracy rate of non-migrant females.

Other analyses also suggest that migrants in Ethiopia are 'pushed' from rural areas as an insurance mechanism via income diversification, rather than 'pulled' to urban areas in search of higher returns to human capital. Asfaw et al. (2010) report that young men are the most common migrants in Amhara region, with respondents citing a lack of sufficient means of subsistence, shortage of land, and shortage of employment opportunities in the rural areas as their primary reasons for migrating. Dorosh et al. (2011) reported that households with more agricultural land were less likely to send out migrants, while poorer households and households afflicted by a community-wide drought were more likely to have migrant household members. Similarly, Kosec et al. (2017) found that larger land inheritances lead male youth in Ethiopia to migrate less to urban centers and increase the likelihood of them being employed in the agricultural sector. These findings are echoed by Gray and Mueller (2012), who reported men's labor migration in Ethiopia increases with drought.

In theory, migration can potentially improve the sending household's well-being via remittances. However, studies of Ethiopian migrants suggest remittances are uncommon among both rural and urban migrants. Results from the Ethiopia Urban Migration Survey suggest that only 13 percent of respondents send remittances home (Martins 2014). A majority of migrants report that it is too costly to remit. Analysis by de Brauw et al. (2013), using a panel survey of 1,800 households, reported that only 33 percent of rural-urban migrants in Ethiopia send remittances. Given the relatively low remittance rate of internal migrants in Ethiopia and the reported 'push' factors for migration, a main determinant for migrants may be to facilitate the household's ability to smooth consumption when facing dire circumstances.

Migrating can be costly, risky, and difficult for any individual regardless of ex-ante human or capital endowments. Recent analysis of migration in Ethiopia suggests that individuals in search of basic education, social services, and more secure livelihoods due to shortage of land and lack of employment opportunities in the origin household make up the greatest share of the migrant population. To the extent that these workers have skills, find employment, and increase market demand, they contribute to agglomeration economies that raise overall productivity (Lucas Jr. 1988; Morretti 2004; Ciccone and Peri 2006). Nonetheless, given that rural-rural migration is more prevalent that rural-urban migration in Ethiopia and that rural-urban migration is characterized predominantly by 'push' factors, an increased focus on the rural and small town non-farm economy may be an equally viable avenue to absorb excess rural labor, diversify rural income sources, and reduce seasonal consumption shortfalls as a medium term rural development strategy. Bachewe et al. explore the role of off-farm income in rural areas of Ethiopia using nationally representative household data and show that off-farm and wage income are relatively more important for poor, female, and youth-headed rural households (2016).

3.2. Benefits of secondary city development and the rural non-farm economy

Much of the future growth in Ethiopia's urban population will likely be in secondary cities that will have the potential to serve as regional markets for agricultural products and to provide seasonal and full-time employment for nearby rural areas. However, currently, labor statistics in Ethiopia suggest a low rural non-farm participation rate. Recent work by Schmidt and Bekele (2016) evaluated labor activities in Ethiopia to understand labor diversification in rural areas. They used the Ethiopia Socioeconomic Survey (ESS) to compose work portfolios for each individual based on hours reported working in each sector. The analysis suggested that approximately 76 percent of the total working age (15 to 64 years old) population reported working on their own farm, for a wage, or in a non-farm enterprise (Table 3.2). Of those, over three-quarters of the working population reported working solely on their own-farm. About 13 percent of the population reported working in a mix of own-farm and off-farm activities, while 12 percent reported working exclusively off-farm in wage labor or in non-farm enterprises.

In order to understand work portfolios by location, we disaggregate the labor data in the ESS (2012/13) into workers that live in rural areas, small towns (defined, as per the survey's classification, as those living in centers with less than 10,000 people) or urban centers of greater than 10,000 people. Given the growth in secondary cities and urban agglomerations along major transportation corridors, it is surprising that only 11 percent of the rural working age population reports working in a non-farm activity in addition to working on their own farm. Even in small towns, only 12 percent of the population works in a mixture of off and on-farm labor, whereas one-third of the population of small towns reports working solely in off-farm work.

Table 3.2. Distribution of labor type in Ethiopia by spatial domain, 2013

	People aged 15 to 64 years, thousands (percentage share)			
	Rural	Small town[c]	Urban[c]	Total
Own farm only	27,304.3	55.4	216.4	27,576.1
	(67.8)	(13.8)	(3.1)	(57.8)
Own farm and off-farm	4,404.5	47.8	166.1	4,618.3
	(10.9)	(11.9)	(2.4)	(9.7)
Off-farm[a]	922.7	130.6	3,189.7	4,243.0
	(2.3)	(32.6)	(45.5)	(8.9)
Not working	6,620.3	121.9	2,077.5	8,819.8
	(16.4)	(30.4)	(29.6)	(18.5)
Student[b]	1,010.5	45.3	1,357.6	2,413.4
	(2.5)	(11.3)	(19.4)	(5.1)
Working population	32,631.4	233.8	3,572.2	36,437.5
	(81.0)	(58.3)	(51.0)	(76.4)
Total population (aged 15-64 years)	40,262.2	401.1	7,007.4	47,670.7

Source: Adapted from Schmidt and Bekele (2016)
[a] Off-farm work comprises individuals that work in off-farm enterprise and/or wage work.
[b] Students are defined as those that do not report time working in own farm, wage, or off-farm enterprise activities and report activity as student
[c] Small towns were defined as those under 10,000 inhabitants, while urban areas were defined as having a population of 10,000 inhabitants or more at the time of the survey year (2013/14).

Evaluating specific activities of work within the non-farm employment sector suggests that non-agricultural employment in Ethiopia is moving toward a service sector focused economy. Although the government of Ethiopia has made significant investments in education during the last decade, a large share of non-agricultural work is comprised of low-skill jobs. For example, according to the National Labor Force Survey (2013), 30 percent of non-agricultural work is comprised of sales workers, of which street and local market vendors comprise 44 percent (Schmidt and Beleke 2016). The second largest employment type is construction and mining activities that account for only 10 percent of total non-agricultural employment in Ethiopia. The specific service activities that individuals are engaged in across Ethiopian small towns and cities reflect a low level of development with limited labor demand.

3.3. Contextualizing Ethiopia's story: The Chinese and Indian experiences

To understand the urbanization and labor patterns experienced by Ethiopia, we compare them with the patterns of countries that have recently experienced or are quickly approaching an economic transformation. China and India represent insightful examples of the process of structural change and labor mobility. In both countries, initial investment policy focused on industrialization at the expense of rural areas. These strategies were paired with restrictions on labor mobility, particularly in China. Eventually, both countries realized a need for agricultural policy reform – China in the late 1970s and India in the early 1990s – as well as a need to relax rural-urban migration restrictions. While China has experienced a more classic economic transformation through rapid industrial and agricultural growth leading to significant rural-urban migration, India's transformation has been constrained by insufficient labor demand from the industrial sector and is more strongly characterized by rural-rural migration (Fan, Chan-Kang, and Mukherjee 2005; Binswanger-Mkhize 2012; Cai 2013). We briefly discuss each country's migration patterns and outcomes within the context of its development policies.

China

Prior to 1978, China's economic policy focused on the development of heavy industry with a rationing system to enable urban residents to access food and necessities sold at government prices, which were significantly lower than international prices. Surpluses in the agricultural sector further enhanced urban-

based subsidies. In addition to state intervention aimed at bolstering urban industrial investments, a strict control of rural-urban migration through the *hukou* system of household registration assigned a residency location and defined employment for each individual, effectively restricting any rural-urban movement within the country. These policies deliberately aimed to accumulate capital investment in the urban sector and in doing so increased the income of urban workers dramatically compared with that of rural laborers. By 1978, rural per capita income was 34 percent that of urban income; and more than 75 percent of rural inhabitants were below the poverty line (Fan, Chan-Kang, and Mukherjee 2005). By the late 1970s, poverty incidence in the rural areas, coupled with a lack of sufficient economic incentives for increased agricultural productivity, demanded economic policy reform.

Increases in agricultural productivity via deregulation of agricultural procurement prices and a relaxation of *hukou* allowed rural residents to take advantage of higher returns to labor in the rural non-farm and urban sectors (Cook 1999; Fan 2008; Fang, Yang, and Meiyan 2009). These reforms created a dramatic shift in the rural labor force. Rapid growth in 'township and village enterprises' (TVE), the primary conduit of rural non-farm labor, grew dramatically. Employment in rural TVEs increased by 63 percent between 1990 and 2007 (Fang and Wang 2010). Following the increase in TVEs, migration from rural to urban areas became the main driver for reductions in excess labor in agriculture. Permanent migration from rural to urban areas almost doubled from 80 million people in 2001 to 152 million in 2011 (Fang and Wang 2010; Cai 2013).

China's urban sector continues to attract rural workers, and increases in migrant wages suggest that urban labor demand continues to outpace supply. China's investment in labor-intensive manufacturing and service-sector growth, paired with early reforms in the agricultural sector and relaxed labor mobility restrictions, led to significant increases in agricultural productivity and high returns to labor in the non-agricultural sectors. Since 2004, wages for migrant workers, particularly unskilled workers, have been continuously rising in urban as well as coastal areas due to migrant labor shortages.

India

The Green Revolution in India during the 1970s and 1980s led to significant increases in agricultural output per capita and declining poverty; however, employment in agriculture was not adequately responsive to agricultural growth. Rather, growth in non-farm activities and rural non-farm employment was a major driving factor for rural poverty reduction, similar to China's TVE experience. This growth compensated for slower growth in farm incomes (Binswanger et al. 2014).

As in China, India pursued a heavy industrialization policy, maintaining artificially low farm prices in order to provide inexpensive food and inputs for industrial development. However, India did not address the growing need for macroeconomic reforms until 1991. These reforms led to increases in economic growth via increases in food demand, greater diversification of foods, and improved terms of trade for agriculture (Fan, Chan-Kang, and Mukherjee 2005).[12] Unlike in China, however, in India urban-rural differentials in consumption, income, and poverty did not rise and urban employment growth was inadequate to provide the labor demand needed to accommodate migration from rural areas. (Binswanger 2013). Thus, the rural non-farm sector contributes the largest source of employment growth in India, and rural-rural migration in the dominant migration pattern within the country.

Employment growth within the rural non-farm sector has taken place in the informal sector and especially in self-employment activities. However, the share of specific non-farm activities has changed over time. According to Binswanger and Dsouza (2015), almost 40 percent of rural non-farm work was in manufacturing in 1983, while in 2010 it accounted for approximately 30 percent. Jobs in social services

[12] However, public investment in agriculture declined in the 1990s, and the terms of trade for agriculture during the latter part of the 1990s turned against agriculture, which marked a slowdown in agricultural growth (Binswanger and Dsouza 2015).

declined from 26 percent to 18 percent from 1983 to 2010. The share of non-farm work dedicated to construction has experienced the largest increase, from 10 percent to approximately 19 percent of rural non-farm jobs in 2010, reflected in the dynamic construction in rural towns and villages across India (Binswanger and Dsouza 2015).

Much like sub-Saharan Africa (SSA) in general and Ethiopia in particular, India's economic growth is a constrained transformation in which the majority of agricultural workers are moving to informal jobs in the rural non-farm sector, and insufficient urban labor demand limits rural-urban migration for higher wage or higher productivity opportunities. However, the growing rural non-farm sector has compensated for recent declines in agricultural growth, underlining earlier work that established important linkages between the farm and non-farm sectors in India.[13] According to Binswanger and Dsouza (2015), India's reliance on the rural non-farm economy is the driving force for poverty reduction in the country. It suggests an alternative model for economic growth and structural transformation to one that relies on migration from rural to large urban agglomerations.

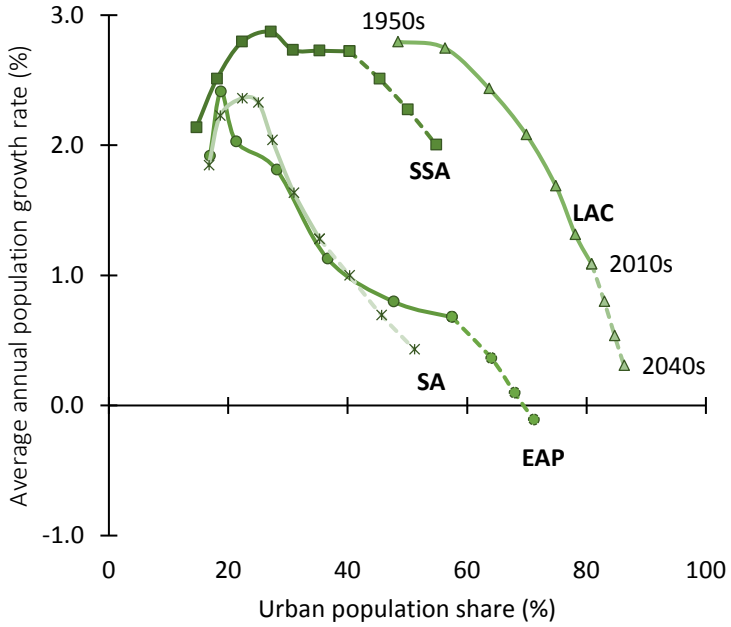
Comparing Ethiopia with the structural transformations of India and China

Understanding the growth pathways that China and India experienced during their economic structural transformations is insightful when assessing migration trends and determinants in Africa. Migration and employment in Africa appear consistent with recent patterns observed in India. In China, the rural population began experiencing negative growth starting in the 1990s, about a decade after the one-child policy was introduced. As a result, urbanization progressed much faster in China than in India (see Annex Table A2.3). In 1990, the urban share of the population in China was 35.9 percent, and the agriculture share of GDP was 26.6 percent. In India, even by 2020, rural population growth is still expected to be positive, if just barely. In 1990, the urban share of the population in India was 27.7 percent, and the agriculture share of GDP was 30.1 percent. In sub-Saharan Africa, while urbanization is still taking place at a rapid pace, rural population growth is projected to still be quite positive in 2020 at 1.7 percent. Ethiopia has lower urbanization compared to other countries in SSA, with a rural population growth of 1.6 percent, close to the average level for sub-Saharan Africa.

Over the past several decades China experienced a massive exodus of people from rural areas driven by the overall slowing of population growth due to restrictive population control policies early on, a resultant drop in the youth population, and significant urban economic growth. Trends in sub-Saharan Africa, including Ethiopia, in contrast are more similar to India's experience. The rural population is continuing to increase and any absolute population declines are projected to take place decades from now (Figure 3.2). Whereas India's labor force is expanding at close to the total population's growth rate of about 1.2 percent, Ethiopia's labor force population exceeds its total population growth rate – the population in the labor force is growing annually at about 3.5 percent compared to 2.5 percent for the population. While Ethiopia's youth bulge is just entering its labor force now, China's young working population is decreasing in size (Thurlow et al. 2018).

[13] For extended discussion on these linkages, see Mellor (1976) and Hazell and Haggblade (1990).

Figure 3.2. Population growth and share of population that is urban by global region, 1950 to 2050

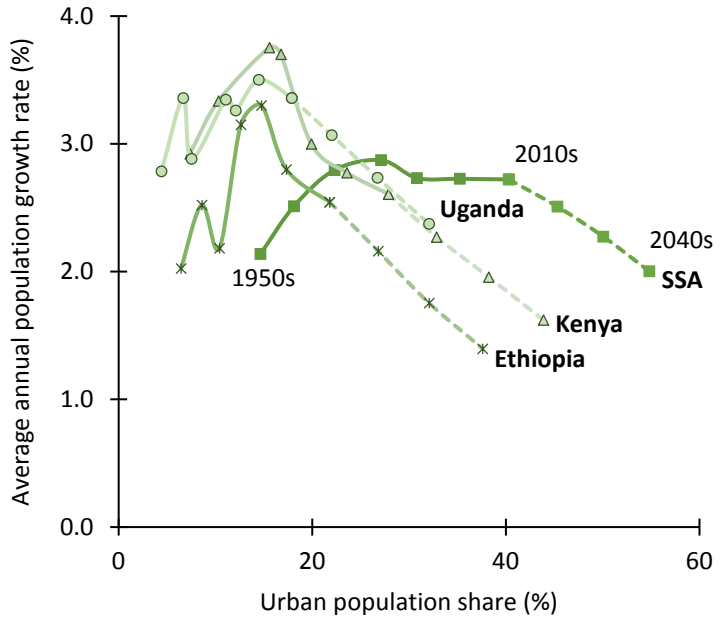


Source: Thurlow et al. 2018
Notes: Figure includes historical data (solid lines) and projections (dashed lines). Future populations are based on the median variant fertility and life expectancy projections. EAP is East Asia and the Pacific; LAC is Latin America and the Caribbean; SA is South Asia; and SSA is Sub-Saharan Africa.

Figure 3.2 shows total population growth and urban population shares from 1950 to 2050 for the regions of Latin America and the Caribbean (LAC), sub-Saharan Africa (SSA), South Asia (SA), and East Asia and the Pacific (EAP). Every region has passed its peak population growth rate and population growth continues to slow in each region going forward to 2050 (Thurlow et al. 2018). SSA in the 2040s will have a population growth rate similar to South Asia in the 1990s and to East Asia and the Pacific in the 1970s, indicating an comparable trend, although about six decades later and at a larger scale. Figure 3.2 also shows that South Asia in 2010 is only as urbanized as East Asia and the Pacific was in 1990, and that the gap between these two regions is expected to stay roughly the same over the next several decades. (Also see Annex Table A2.3.)

Compared to the majority of other countries in SSA where population growth peaked at an average rate of 2.9 percent in 1980, Ethiopia's peak population growth took place around 1990 and at a higher growth rate of 3.3 percent (Figure 3.3; also Annex Table A2.4). Uganda and Kenya, two of Ethiopia's East African neighbors, similarly peaked at population growth rates higher than the average SSA rate. However both of these countries reached their peaks closer to when the rest of SSA did – Kenya's peak took place closer to 1970, and Uganda's took place around 1980.

Figure 3.3. Population growth and share of population that is urban in sub-Saharan Africa, 1950 to 2050



Source: Authors' calculations using population estimates for developing countries from UNDESA (2015; 2017).
Notes: Figure includes historical data (dark lines) and projections (faint lines). Future populations are based on the median variant fertility and life expectancy projections.

Today, Ethiopia is only as urbanized as SSA was in in 1980s – Ethiopia's urban share in 2020 is 26.8 percent according to these data, while the SSA urban share reached 27.1 percent by 1980, up from a 22.3 share in 1970 (Annex table A2.4). However, Ethiopia's urbanization growth rate is similar to Kenya and Uganda – Ethiopia's urban population share lags consistently between 0.9 to 6.3 percentage points behind Kenya and leads consistently between 1.5 and 5.5 percentage points ahead of Uganda in urban population share in every decade from 1950 to 2040. By 2040, projections suggest that Ethiopia will be about 40 percent urban compared to SSA's average of 55 percent urban, Kenya at 45 percent, and Uganda at only 35 percent.

4. INDUSTRIAL AND AGRO-INDUSTRIAL PARKS

4.1. Government policy related to industrial development: The Growth and Transformation Plan II

As part of its summary of the performance and lessons learned from the first Growth and Transformation Plan (GTP I), which was implemented from 2010/11 through 2014/15, the GTP II reaffirmed its commitments, as well as recognized its shortcomings, in the area of promoting industrial development and encouraging foreign and local investment. Many of the GTP I targets related to the development of the industrial sector were not met, both in the promotion of small and medium enterprises, as well as in the development of industrial parks, of which there were nine targeted to be completed by the end of GTP I implementation. The importance of continued investments in the industrial sector was recognized in the context of the high performance of the sector compared to other sectors during the GTP I implementation period. Moreover, the need to continue expanding import substitution in the manufacturing sub-sector, in particular, was recognized.

To harness the potential of Ethiopia's rapid ongoing urbanization toward sustainable growth and continued economic structural transformation, the GTP II highlights the role of increased industrial and economic density within urban centers as a conduit to structural transformation in several positive ways: by

strengthening trade, building access to regional and international markets, linking emerging sectors, forming clusters that lend themselves to the advantages of agglomeration, and capitalizing on economies of scale (National Planning Commission 2016).

More concretely, the expansion of the country's industrial parks comes with three primary expectations. The parks are expected to (1) create a conducive environment for increasing investments in the manufacturing sector, (2) promote higher export processing, and (3) enhance linkages between domestic and foreign firms to facilitate transfer of technology, skills and other externalities. Furthermore, to achieve these expectations for competitive industrial development, the GTP II outlines several provisions the government commits to offer the parks in order to allow for adequate delivery:

- All required infrastructure;
- Streamlined public procedures;
- Fiscal and trade policy incentives to attract export-oriented foreign direct investment, as well as domestic industrial investment;
- Sector and sub-sector policies to ensure sustainable and competitive industrial development;
- Follow up and support to ensure the effectiveness of existing policies; and
- To the extent possible, creation of the required capacity needed in the park development and management by using international best practices to inform them.

As part of its support to the industrial parks, and the manufacturing industry as a whole, the GTP II envisions that the industrial parks are to be developed based on feasibility studies and investment demand in coming years. The Plan aims to strengthen the institutional arrangement and ownership of the parks, as well as the capacity in these institutions to develop, administer and regulate the parks, to enable them to perform their role more effectively. The on-going land administration reforms would also be accelerated during GTP II, prioritizing land supplied to industrial parks with the goal or encouraging investments in industrialization and export development. Finally, there is mention throughout the GTP II strategy, that any emphasis on developing, expanding, and supporting the parks is certainly not to be perceived as a detriment for medium, small, or micro enterprises, but rather that these changes should also strengthen and increase the market share of these businesses.

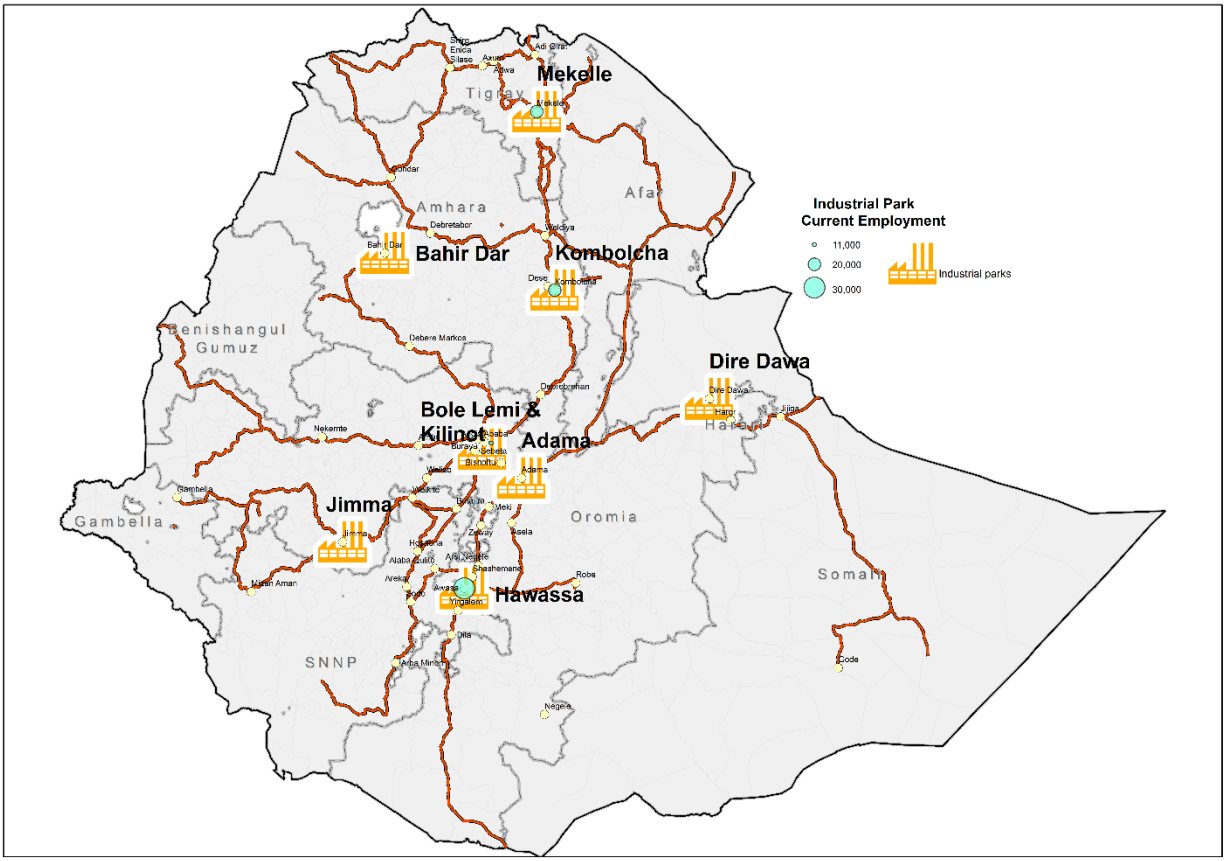
4.2. The current status of Ethiopia's industrial parks

Five Industrial parks are currently operational in the country (Figure 4.1):

- Addis Industry Village Park, which has existed since the 1980s, although it was renovated in 2015;
- Bole Lemi I, which was completed during or shortly after the conclusion of the GTP-I;
- Hawassa, inaugurated in July of 2016; and
- Kombolcha, inaugurated in July 2017;
- and Mekelle, also inaugurated in July 2017.

The lead sub-sector in all of these parks is apparel and textiles. Secondary sub-sectors include food processing. Addis Industry Village has a land area of 8.7 ha. The other four parks currently have a combined area of 427 hectares with approximately 41,000 people currently employed. The four together are expected to attain an area of 2,147 hectares with 189,000 people employed over the next 10 years (Table 4.1). The current developed area of these four parks is about 20 percent of future targets, while employment currently sits at about 22 percent of targeted future employment.

Figure 4.1. Industrial Parks' Geographic Locations in Ethiopia



Source: Information compiled in Annex Table A3.2.

Table 4.1. Ethiopia's current and planned industrial parks as of 2018

	Industrial parks	Expected (current) area and employment	Private and public investments	Sectors
Operational	1. Addis Industry Village 2. Bole Lemi I (GTP-I) 3. Hawassa (GTP-II) 4. Kombolcha (GTP-II) 5. Mekelle (GTP-II)	2,147 (427) hectares; 184,000 (41,000) employed	Combined foreign and domestic investments.	Apparel, Textiles, Food Processing, Leather
In Progress	6. Jimma (GTP-II) 7. Bole Lemi II 8. Kilinto 9. Dire Dawa (GTP-II) 10. Adama (GTP-II) 11. Bahir Dar (GTP-II) 12. Arerti Phase I	Pilot Phase (combined) 1,018 ha; Expected (combined): 9,979 ha 168,400 employees	Bole Lemi II and Kilinto are being constructed with the support of the World Bank. Adama is being constructed as a joint venture between the Ethiopia and the Hunan Province of China, with the help of a quarter billion dollar Chinese loan.	Wide Spectrum of Sectors
In Planning	13. Debre Birhan 14. Aysha 15. Awsh Arba 16. Andido 17. Bishoftu 18. Asayta 19. Airlines Logistics	Approximately 1,500 hectares expected	TBD	TBD

Source: Information compiled in Annex Table A3.2.

Seven industrial parks are currently under construction, but not yet operational – Jimma, Bole Lemi II, Kilinto, Dire Dawa, Adama, Bahir Dar, and Arerti. These are anticipated to have a pilot phase total combined area of 1,018 hectares, with an eventual combined area of 9,979 hectares. A wide spectrum of

sectors will be operating in these industrial parks, including pharmaceuticals, agro-processing, electric and electronics products, wood and furniture, textiles, apparel, vehicles assembly, food processing, chemicals, paper and allied products and heavy industries, machinery and parts.

Jimma, Dire Dawa, Adama, and Bahir Dar industrial parks are included in the GTP-II, as are the industrial parks in Hawassa, Kombolcha, and Mekelle that are already in operation. The construction of Kilinto and Bole Lemi II parks has been commissioned by the Ethiopian Industrial Parks Development Corporation (IPDC) with the support of a loan by the World Bank. Adama Industrial Park is being constructed as a joint venture between the governments of Ethiopia and the Hunan Province of China, with the help of a USD 250 million Chinese loan. Every park is being constructed by a Chinese firm. The seven parks currently being constructed are expected to be operational by June 2018.

Up to seven more parks are in planning for development over the next five years with construction on some now under way. These include industrial parks in Debre Birhan, Aysha, Awsh Arba, Andido, Bishoftu, and Asayta, and the Airlines Logistics park. The sectors to be active in these new parks are yet to be entirely determined, but the combined area is expected to be approximately 1,500 hectares. Some estimates have projected that two million jobs will ultimately come from the 17 to 19 industrial parks that are in current plans. These jobs would constituted between 3 and 5 percent of Ethiopia's total labor force.

Table 4.2. Industrial parks in Ethiopia – expected employment

				Population, thousands				Ratios, %	
Region	City	Park(s)	Surrounding or nearby zone (potential labor pool)	City	Total Zone	Urban	Expected employ-ment, thousands	Expected employ-ment / Region labor force[a]	Expected employ-ment / Urban labor force[a]
Oromia	Addis Ababa	Addis Industrial Village	E. Shewa	3,273	1,737	501			
Oromia	Addis Ababa	Bole Lemi I	E. Shewa	3,273	1,737	501	60.0	5.5	19.0
Oromia	Addis Ababa	Bole Lemi II	E. Shewa	3,273	1,737	501	15.0	1.4	4.7
Oromia	Addis Ababa	Kilinto	E. Shewa	3,273	1,737	501	15.0	1.4	4.7
Addis Ababa, excluding Addis Industrial Village				*3,273*	*1,737*	*501*	*90.0*	*8.2*	*28.5*
Oromia	Jimma	Jimma	Jimma Zone	178	3,060	203	25.0[b]	1.3	19.6
Oromia	Adama	Adama	E. Shewa	39	1,737	501	25.0[b]	2.3	7.9
Dire Dawa	Dire Dawa	Dire Dawa	Dire Dawa	440	440	277	68.0	24.5	38.9
SNNP	Awassa	Hawassa	Sidama	300	3,514	310	84.0	3.8	42.9
Tigray	Mekele	Mekelle	E. and S. Tigray	324	2,034	407	20.0	1.6	7.8
Amhara	Kombolcha	Kombolcha	S. Wolo	92	2,981	472	20.0	1.1	6.7
Amhara	Bahir Dar	Bahir Dar	W. Gojjam & S. Gondar	282	4,869	596	20.0	0.7	5.3
Amhara	Arerti	Arerti (Phase I)	North Shewa	-	2,172	335	0.4	0.0	0.2
Total of eleven new parks (excluding Addis Industrial Village)							352.4		

Source: Authors' own calculations using expected employment levels from news articles and other sources listed in References and CSA Census Population projections of Ethiopia for all regions at woreda level, 2014-2017. City population is defined as the "urban" population of the woreda with the city/town's name, with the exception of Jimma and Awassa cities, for which CSA's regional report did not have these figures, and the city populations listed at https://www.citypopulation.de/Ethiopia.html were used instead.
SNNP = Southern Nations, Nationalities, and Peoples' region.
Notes:
[a] By region labor force, we mean the labor force from the surrounding/nearby zones listed in column five. Labor force is estimated at 63 percent of total population (World Bank).
[b] We estimate expected employment at Jimma and Adama parks to be 25,000 on the basis of the statement made by the Director of the ILO country office for Ethiopia, that the number of new jobs in textiles will sum to around 350,000 in total.

Table 4.2 lists the 12 parks that are either operational or are currently under construction and the 2015 CSA projected population of both the city and zone(s) in which they are located, as well as the total

expected employment each park is anticipated to generate. Expected employment per urban labor force is highest for Hawassa industrial park in SNNP region at 42.9 percent of Sidama zone's urban labor force and 3.8 percent of the zone's total labor force (rural and urban combined). Bole Lemi I, Bole Lemi II and Kilinto, the three industrial parks in Addis Ababa, are expected to employ 90,000 workers, which amounts to a combined 28.5 percent of East Shewa zone's urban labor force, and 8.2 percent of its total labor force. The total labor force is estimated at 63 percent of total population.

Eleven of these parks, excluding Addis Industrial Village, are expected to employ a combined minimum total of 352,000 persons. Total investment on the 11 parks is estimated at USD 1.8 billion, with the value of public investment being USD 1.1 billion. This yields about one job per USD 5,000 of total investment, or about one job per USD 3,000 in public investment. Annual wages across the 11 parks is estimated at USD 280 million (Table 4.3). (Also see Annex Table A3.1 for details on the average wages of the administrative zones in which these parks are located which were used in the estimation of annual earnings to be paid across the industrial parks).

Table 4.3. Industrial parks in Ethiopia – expected public and total investments, employment, and wages

Industrial park	Expected employment ('000)	Public investment (USD million)	Total investment (USD million)[a]	Jobs per USD 1,000 of public investment	Jobs per USD 1,000 of total investment	Total annual wages (USD million)[b]
Bole Lemi I (Addis Ababa)	60.0	51[c]	103	1.17	0.50	48.2
Bole Lemi II (Addis Ababa)	15.0	149	149	0.10	1.00	12.0
Kilinto (Addis Ababa)	15.0	234	234	0.49	1.00	12.0
Addis Ababa: 3 Parks	*90.0*	*435*	*485.9*	*0.21*	*0.89*	*72.3*
Jimma	25.0	64	64	0.39	1.00	20.1
Adama	25.0	250	500	0.49	0.50	20.1
Dire Dawa	68.0	95	190	0.72	0.41	54.6
Hawassa	84.0	125	250	0.67	0.50	67.5
Mekelle	20.0	63	125	0.32	0.50	16.1
Kombolcha	20.0	63	125	0.32	0.50	16.1
Bahir Dar	20.0	30	60	0.67	0.50	16.1
Arerti (Phase I)[d]	0.4	1.3	2.6	0.31	0.50	0.3
Total of eleven new parks	352.4	1,124	1,801	0.31	0.12	283.0

Source: Authors' own calculations using expected employment levels from news articles included in the references section, and CSA Census Population projections of Ethiopia for all Regions at woreda level from 2014 – 2017, as well as CSA market surveys.
Notes: [a] Total investments for constructing Adama, Dire Dawa, Hawassa, Mekelle, Kombolcha, and Bahir Dar are split evenly between public and private components, when the actual share could not be confirmed.
[b] Earnings at minimum wage are calculated on the basis of the 2016 average unskilled daily labor wage over the represented administrative zones from CSA market data (71.5 birr/day, see Annex Table A3.1), multiplied by 22 working days in a month, annualized and divided by an exchange rate of 23.5 Birr/ USD.
[c] Public expenditures for Bole Lemi I were USD 51 million (1.3 billion birr), we assume that private investment matched this amount.
[d] Employment and the level of public Investment for Arerti park is based on the average share across the other ten parks for which we have both public investment and expected employment estimates. Then, the public investment figures for Arerti park (phase I) is imputed using the assigned average share of jobs per public investment. The total investment figure for Arerti (phase I) assumes private investment will match the imputed estimate of USD 1.3 million public investment. Several news sources have stated that tens of millions of dollars have already been invested in the construction of Arerti industrial park so far, however.

There are 17 agro-industrial parks planned for construction across the country. Only one is currently operational in its pilot phase, Yirgalem in eastern SNNP. Along with Yirgalem, three others – Baeker in Western Tigray, Burie in Southwest Amhara, and Bulbula in Central Eastern Oromia – are part of the first four-year investment development horizon. Beginning with a combined 997 hectares in the pilot phase, these four parks are expected to cover 4,000 hectares and employ over 2.3 million individuals in 120 firms (see Annex Table A3.2). By 2025, 13 additional agro-industrial parks are expected to be constructed over a combined area of 100,000 hectares.

Industrial parks also have been developed by foreign companies, primarily Chinese. These include Huajian Industrial Park on the outskirts of Addis Ababa, specializing in shoes; Modjo Industrial Park, specializing in "George Shoes"; and the Eastern Industrial Zone, located 37 km south of Addis Ababa, which hosts miscellaneous manufacturing industries and was operational in 2015. It currently spans 40 hectares, but will expand to an expected 207 hectares. Also, a fertilizer plant has been constructed at the Dire Dawa industrial park that was co-financed by the Moroccan and Ethiopian governments, with 60 percent of financing from private investment.

In summary, Ethiopia is developing and supporting industrial zones to foster higher-value manufacturing and service activities, according to the GTP II. These zones may provide infrastructure akin to China and India's TVEs. However, a focus on increasing human capacity and labor mobility will be necessary to ensure that rural farmers are able to take advantage of the new labor opportunities outside of the agriculture sector that the industrial parks offer. The following section models a variety of scenarios to understand how Ethiopia's focus on industrialization may impact GDP and employment in the future.

4.3. Estimates of multiplier effects on GDP and employment

Table 4.4 presents data on investment and production for Ethiopia's industrial, agro-industrial parks, and sugar factories, along with calculations of the multiplier effects of these investments. Value-added is estimated using value-added as a share of production coefficients consistent with Ethiopia's national accounts -- 0.3 for Bole Lemi I and Hawassa, and 0.25 for the remaining industrial parks. For the agro-industrial parks, we assumed a coefficient of value-added of 0.4 for Baeker and Bulbula, where a combination of agricultural products are processed (livestock, sesame, coffee, cereals, sorghum, sugar, fruits and vegetables and pulses) and a coefficient of value-added of 0.22 for Burie and Yirgalem. A 0.925 coefficient of value-added is used for the sugar factories.

Two estimates of the multiplier effects are presented. The first estimate, Total value-added I, is based on a multiplier of 1.75, an average of national economy-wide multiplier estimates using endogenous prices from computable general equilibrium models, (Haggblade et al. 2007, table 7.3). The second estimate, Total value-added II, uses a multiplier of 2.10, based on national semi-input-output fixed price models. These larger multipliers may be appropriate for local economy effects where there is substantial underemployment.

For the industrial parks, the value-added per investment ranged from 1.75 to 2.10 in the case of the endogenous price multipliers, excluding Bole Lemi I, whose production appears to be an outlier. Using the larger fixed-price model multiplier, the value-added per investment ranged from 2.10 to 2.52, again excluding Bole Lemi I. The value-added per investment for the agro-industrial parks ranged from 0.21 to 0.77 using the lower endogenous price multiplier, and from 0.25 to 0.93 using the larger fixed-price multiplier. For the sugar factories, the value-added per investment ranged from 0.56 to 4.72 in the case of the endogenous price multipliers and from 0.68 to 5.66 using the larger fixed-price model multiplier.

Given that the total investment in the industrial parks is USD 1.74 billion, estimated production and value-added are USD 6.57 and 1.69 billion, respectively. Including estimated multiplier effects, total value-added is USD 3.0 to 3.6 billion. For agro-industrial parks, the total investment is USD 2.3 billion with total production of USD 2.1 billion and value-added of USD 0.70 billion. Including multiplier effects, the total value-added ranges from USD 1.2 to 1.5 billion, approximately two percent of GDP in 2016 (USD 72.4 billion).

Table 4.4. Estimates of multiplier effects of investments in industrial parks and sugar factories in Ethiopia

	Invest-ment, USD million	Produc-tion, USD million	Value-added[a] USD million	Total Value-added I [b] USD million	Total Value-added I / Invest-ment	Total Value-added II [c] USD million	Total Value-added II / Invest-ment
Industrial Parks							
Bole Lemi I	102	20	6	11	0.10	13	0.12
Hawassa	250	1,000	300	525	2.10	630	2.52
Kombolcha	125	500[d]	125	219	1.75	263	2.10
Mekelle	125	500[d]	125	219	1.75	263	2.10
Jimma	64	256[d]	64	112	1.75	134	2.10
Bole Lemi II	149	596[d]	149	261	1.75	313	2.10
Kilinto	234	937[d]	234	410	1.75	492	2.10
Dire Dawa	190	760[d]	190	333	1.75	399	2.10
Adama	500	2,000[d]	500	875	1.75	1,050	2.10
Total	1,739	6,569	1,693	2,963	1.70	3,556	2.04
Agro-Industrial Parks							
Baeker (W Tigray)	634[e]	700	280	490	0.77	588	0.93
Burie (SW Amhara)	620[e]	558	123	216	0.35	259	0.42
Bulbula (E Oromia)	635[e]	591	236	414	0.65	496	0.78
Yirgalem (E SNNP)	480[e]	260	57	101	0.21	121	0.25
Total	2,370	2109	697	1220	0.51	1,464	0.62
Sugar Factories							
Wonji Shoa Modern Factory	528	206	191	334	0.63	400	0.76
Finchaa sugar crushing mill	132	206	191	334	2.53	400	3.03
Metehara (expanded)		85	78	137		165	
Tendaho (2nd phase not started)	769	472	437	765	0.99	918	1.19
Arjo Dediessa	152	444[f]	411	719	4.72	863	5.66
Kesem	297	202[f]	187	327	1.10	393	1.32
Wolkayit	200	376[f]	348	609	3.05	731	3.65
Kuraz Sugar Development Project	1,475	1,041[f]	963	1,685	1.14	2,022	1.37
Tana Belles Sugar Project	1,620	564[f]	522	914	0.56	1,096	0.68
Total	5,173	3,597	3,327	5,823	1.13	6,988	1.35

Notes: [a] We assume a coefficient of value-added of 0.3 for Bole Lemi I and Hawassa, and a coefficient of value-added of 0.25 for the remaining industrial parks listed. For the agro-industrial parks, we assumed a coefficient of value-added of 0.40 for Baeker and Bulbula, and a coefficient of value-added of 0.22 for Burie and Yirgalem. For the sugar factories, we assume a coefficient of value-added of 0.925, which accounts for 0.075 fertilizer share of sugar cane value, the value found in the Pakistan study of Anderson et al. (2010) in 2004/2005 (assuming USD 1 cane = USD 1.6 processed sugar).
[b] The Total value-added I is based on the multiplier 1.75, which is the national endogenous price estimation method given by Haggblade et al. (2007) in table 7.3 of their paper.
[c] The Total value-added II is based on the multiplier 2.10, which is based on national semi-input-output fixed price models.
[d] For all parks but Bole Lemi I, the production figure is scaled to the total investment made in the park, using the share of expected production to investment for Hawassa industrial park. The data for expected production for Kilinto industrial park in Annex Table A3.2 seems too low and estimates could not be found from other sources.
[e] For the agro-industrial parks, we assume private investment is allocated according to shares of public investments.
[f] For all the sugar factories, but Wonji Shoa, Finchaa, Metehara, and Tendaho, the expected production is calculated using an average of the expected production in dollars per kg of sugar output per year of Wonji Shoa, Finchaa, Metehara and Tendaho, multiplied by the tons of sugar per year capacity of each respective factory.

Public and private investment in industrial and agro-industrial parks may provide a catalyst for future growth by facilitating the transfer of technology and contributing a significant share of export earnings. However, this analysis shows that even if the plans for these industrial parks are successful, they are likely to provide only a small share of total output and employment.

Investments in the sugar factories are anticipated to total USD 5.2 billion, with estimated production of USD 3.6 billion and value-added of USD 3.3 billion, which is 9.4 times 2014/15 sugar production and value-added). If these targets were achieved, the sugar investments would have a larger effect on GDP than the industrial and agro-industrial parks combined. Including estimated multiplier effects, the total value-added of the planned sugar factories in Ethiopia comes to between USD 5.8 billion and 7.0 billion. However, an increase in sugar output of this magnitude would imply massive sugar exports that would not necessarily be profitable financially.

5. Conclusions

As in most developing countries, Ethiopia's urbanization is driven by various demographic, economic, and political factors. These factors include higher net birth rates, rural-urban migration, and expanding urban centers all contribute to overall urban population growth (Farrell 2017). This rapid urbanization has major implications for structural transformation, the shift in employment and value-added from agriculture increasingly to the industry and services sectors of the economy.

Ethiopia is urbanizing rapidly. However, the country remains behind many sub-Saharan African countries. Urbanization is expected to reach 38 percent by 2040. However, this level is still low relative to most developed countries, as well as many developing countries. Like other SSA countries, most of Ethiopia's population is still living in rural areas, despite substantial structural change in production and employment.

According to official CSA projections, the population of Addis Ababa will increase from 3.27 million in 2015 to 7.17 million in 2035. Yet much of the expected 56 percent increase in urban population nationally over the next 20 years will likely be in secondary cities. Between 1984 and 2015, the number of secondary cities expanded rapidly, so that by 2015, 35 cities had populations over 50,000, and nine cities had populations over 100,000. These secondary cities have the potential to play a key role in Ethiopia's future development, as they serve as major regional markets for local agricultural products, help spread the benefits of growth across more of Ethiopia, and contribute to rapid poverty reduction, in part by providing seasonal and full-time employment opportunities for new migrants and for residents in surrounding areas.

Government policy will play a key role in these developments in terms of overall investment in infrastructure, as well as macro-economic and trade policy that will have major implications for private sector incentives. Public and private investment in industrial and agro-industrial parks may provide a catalyst for future growth as well by facilitating the transfer of technology and contributing a significant share of export earnings, even though they are likely to provide only a small share of total output and employment in the Ethiopian economy.

ANNEXES

Annex 1: Estimations of travel time and the agglomeration index

Travel time estimation

In order to calculate travel time to the nearest city of 50,000 people, the model built here combines transport infrastructure (road network) and landscape features (land use, rivers, lakes, and slope). The traverse modality from point of origin to the nearest city assumes that all movement along the road is by vehicle, whereas off-road people walk through different land cover types before reaching the nearest road.

This analysis uses the 2007 road network as the base data (Annex Table A1.1), with updated road surface types for the 2015 year from Open Street Maps and Google Earth. The fact that access to nearest city is mainly determined by road infrastructure, a specific speed limit was assigned to the three road types in our GIS data (asphalt/concrete, gravel, and earth) ranging from 90 to 10 km/hr. For off-road travel, however, an average walking speed of 5 km/hr is used through various land cover types.

Annex Table A1.1. Estimating travel time to nearest city with population of at least 50,000 persons in Ethiopia – data sources summary

Layers	Description
Road network in 2015	The 2007 road network surface updated using Open Street Map and verified on Google Earth.
Cities	Cities/towns of at least 50,000 as reported by CSA population projection report (CSA 2013b)
Landscape features	Slope factor : raster value generated for each cell based on slope rise or run according to van Wagtendonk and Benedict (1980) formula $v = v0e^{-ks}$ where: v = off-road foot based velocity over sloping terrain v0 = the base speed of travel over flat terrain, 5 km/hr in this case s = slope in gradient (meters per meter) k = a factor which defines the effect of slope on travel speed (k is 3.0 in this case) Rivers and lakes: A 1 km/hr traverse speed assigned for both features Land cover: An average of 5 km/hr is used for entire land cover area other than waterbodies.
Population density	GRUMP 2000: The Global Rural-Urban Mapping Project, Version 1 (GRUMPv1) gridded population estimated based on country's census unit and derived density at resolution of 30 arc-second (1km) grid for the year 2000. GRUMP 2015: Gridded Population of the World, Version 4 (GPWv4) density grid estimated for 2015 using national census and adjusted to UN population projection for 2015. LandScan 2012: LandScan spatially models population density by allocating population with respect to land use/land cover, transportation infrastructure, landscape (elevation and slope), etc.[a] For the research years 1984,1994, and 2007, GRUMP and LandScan 2000 was projected to each year using a 3 percent average annual growth rate. For 2015, LandScan 2012 projected to 2015 using woreda level annual population growth rate calculated from 2007 census and 2015 projected population.

Notes: [a] The LandScan 2012™ High Resolution global Population Data Set is copyrighted by UT-Battelle, LLC, operator of Oak Ridge National Laboratory under Contract No. DE-AC05-00OR22725 with the United States Department of Energy.

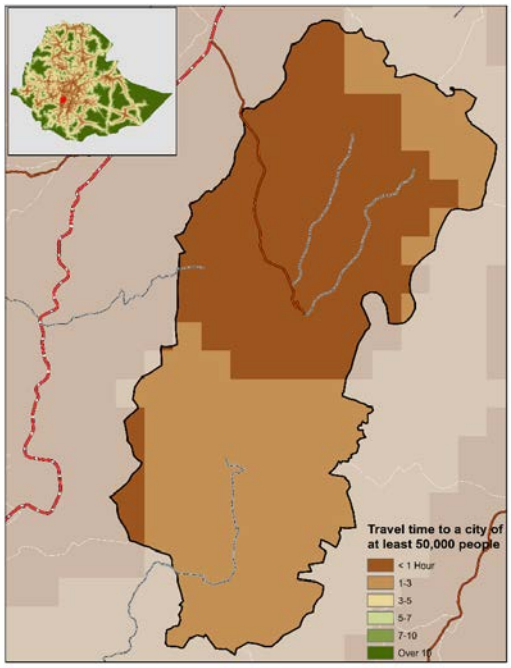
Prior to combining the GIS layers into a friction (or impedance) grid, each layer was assigned the designated speed limit and vector layers, including roads, rivers and lakes, were converted into a 1km grid-cell raster layers. Slope is also taken into account in order to model uphill and downhill movement. All input layers are combined into a friction grid using a Python (arcpy) script that runs a "Mosaic to New Raster" function in ArcGIS 10.5.

The travel time raster grid is then generated by calculating the travel time from any point within Ethiopia to the nearest city of at least 50,000 people. The Python (arcpy) script used the COSTDISTANCE function, where the friction grid and cities of at least 50,000 people locations are inputs to calculate travel

time in minutes from each grid cell to the nearest city. Given the broad assumptions and the quality of data used, the travel time model provides an estimated measure of varying market access across the country.

The travel time computation was summarized differently for the research here from how it was done in Schmidt and Kedir (2010). Schmidt and Kedir (2010) used woreda population and average woreda-level travel time in order to calculate population by travel time. In contrast, the analysis presented in this paper classifies each grid cell's travel time values (without averaging cells at woreda level) and accordingly summarizes population values. Graphical examples in figure A1.1 and A1.2 show this difference.

Annex Figure A1.1. Travel time to nearest city calculation methods, example 1



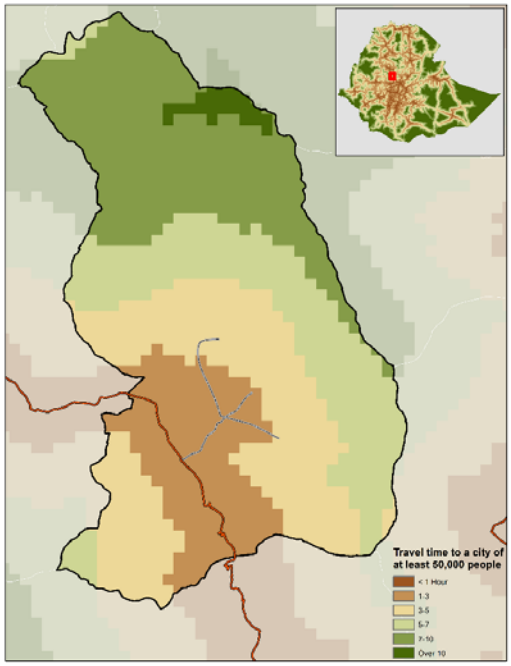
Previous method: Average travel time grid cell values in the woreda used to set the entire woreda population into one travel time category. This either underestimates (see example 1) or overestimates (example 2) population within a travel time band.

New method: Each travel time grid cell value is used to summarize the corresponding population grid values.

Example 1: The woreda average travel time to the nearest city is 59 minutes and therefore the whole woreda population fall under 1 hour travel time category. The summary from grid population however shows 49 percent of the population is under 1 hour and the rest between 1-3 hours.

	Percent population calculated	
Anigacha woreda	**Woreda population**	**Grid population**
under 1 hour	100	49.5
1 - 3 hours	-	50.5

Annex Figure A1.2. Travel time to nearest city calculation methods, example 2



The average woreda travel time to nearest city is 5.5 hours. Using the average woreda travel time for the entire woreda population results in 100 percent of the population being within the 5 to 7 hours travel time category.

However, if a gridded population surface is used, only 20 percent of the woreda population is within the 5 to 7 hours category, 53 percent are closer than 5 hours, and 27 percent face a travel time of more than 7 hours to the nearest city.

	Percent population calculated	
Abuna Gindebere woreda	**Woreda population**	**Grid population**
under 1 hour	-	-
1 - 3 hours	-	25
3 - 5 hours	-	28
5 - 7 hours	100	20
7 - 10 hours	-	26
over 10 hours	-	1

Annex Table A1.2. Travel time to nearest city of at least 50,000 people in Ethiopia in 1984, share of population, percent

Region	< 1 hour	1 to 3 hours	3 to 5 hours	5 to 10 hours	> 10 hours
Tigray	2.7	4.1	9.5	45.0	38.6
Afar	-	0.3	4.0	22.2	73.6
Amhara	3.7	8.8	13.9	37.1	36.5
Oromia	2.3	10.0	13.6	40.1	34.0
Somali	0.3	1.5	5.3	11.4	81.5
Benishangul-Gumuz	-	-	-	4.8	95.2
SNNP	-	0.4	4.2	50.4	45.0
Gambella	-	-	-	35.0	65.0
Harari	45.3	44.9	8.6	1.3	-
Addis Ababa	57.5	41.3	1.2	-	-
Dire Dawa	17.1	52.7	14.6	11.3	4.3
Ethiopia	4.4	8.2	10.2	37.4	39.7

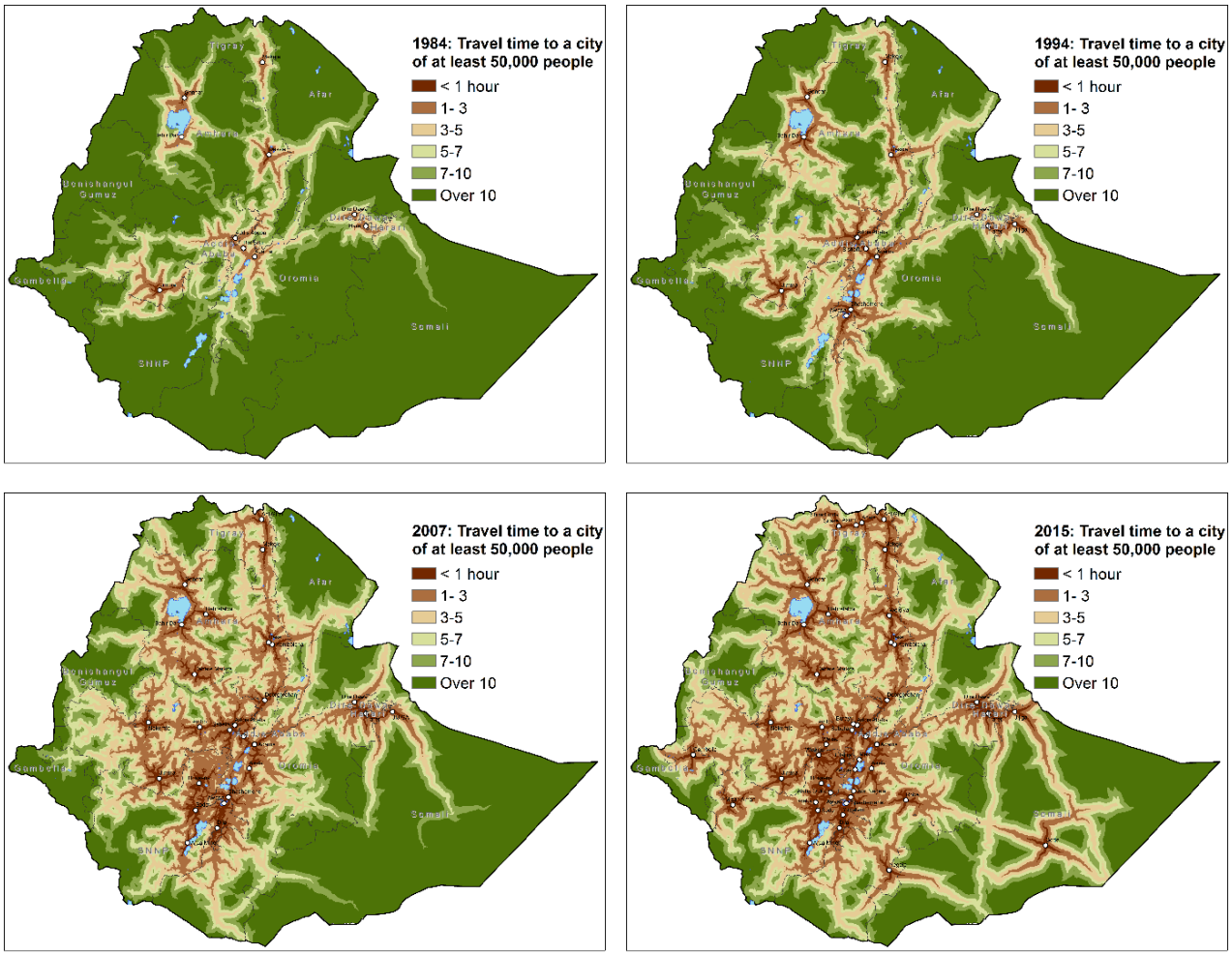
Annex Table A1.3. Travel time to nearest city of at least 50,000 people in Ethiopia in 1994, share of population, percent

Region	< 1 hour	1 to 3 hours	3 to 5 hours	5 to 10 hours	> 10 hours
Tigray	5.3	10.9	17.6	37.6	28.6
Afar	-	1.8	4.3	31.0	63.0
Amhara	5.8	13.8	17.2	36.2	26.9
Oromia	6.2	16.0	15.7	33.9	28.2
Somali	2.9	4.7	5.1	13.7	73.6
Benishangul-Gumuz	-	-	1.6	16.0	82.4
SNNP	2.6	18.1	24.1	34.4	20.8
Gambella	-	-	-	16.4	83.6
Harari	84.0	14.1	2.0	-	-
Addis Ababa	91.1	8.9	-	-	-
Dire Dawa	57.1	11.7	12.5	15.7	3.1
Ethiopia	8.7	14.0	16.1	31.9	29.3

Annex Table A1.4. Travel time to nearest city of at least 50,000 people in Ethiopia in 2007, share of population, percent

Region	< 1 hour	1 to 3 hours	3 to 5 hours	5 to 10 hours	> 10 hours
Tigray	10.0	15.9	28.0	33.8	12.3
Afar	-	3.5	14.3	38.2	44.1
Amhara	9.3	31.4	26.8	27.0	5.6
Oromia	11.8	28.6	24.5	28.3	6.8
Somali	3.3	5.5	5.9	19.1	66.3
Benishangul-Gumuz	-	1.9	8.1	28.1	62.0
SNNP	24.1	42.9	14.5	14.3	4.2
Gambella	-	-	-	14.4	85.6
Harari	85.3	11.5	3.2	-	-
Addis Ababa	91.9	8.1	-	-	-
Dire Dawa	62.3	20.3	11.1	6.3	-
Ethiopia	16.2	28.3	20.8	23.9	10.8

Annex Figure A1.3. Ethiopia – maps of travel time to nearest city of at least 50,000 people in 1984, 1994, 2007, and 2015



Source: Agglomeration index estimations

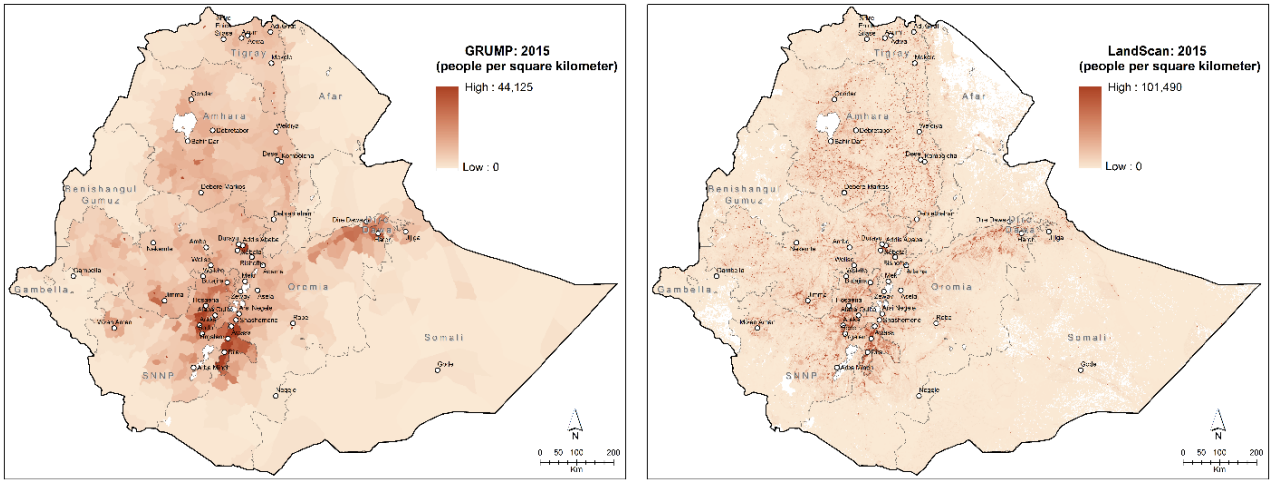
Agglomeration index

Agglomerated areas are places characterized by relatively large population concentrations with economic interactions (Lemelin et al. 2014). For countries like Ethiopia where urbanization is relatively low, we classify agglomerated areas as those with a population density above 150 persons per square kilometers and within one hour travel time from an urban center of at least 50,000 people (Schmidt and Kedir 2010). Accordingly, all areas which fall above the minimum population density (150 people per km^2) and under the maximum travel time to an urban center (one hour) are considered an agglomerated area, even if the area transcends the defined urban administrative boundary. The shape of city growth follows the pattern of infrastructure, which may also be hindered by natural physical barriers. The agglomeration index measurement requires travel time and demographic datasets of population density.

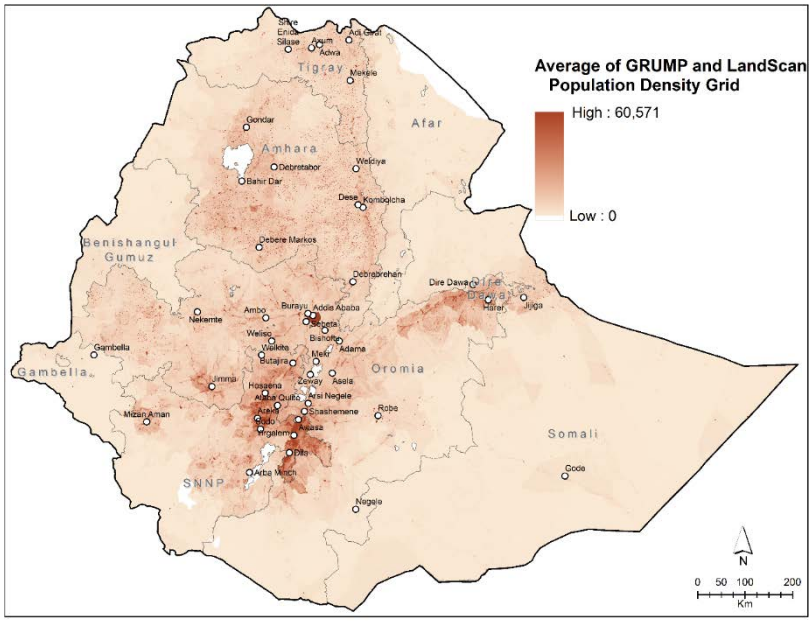
The agglomeration index generated for this analysis was built by Schmidt and Kedir (2009) for three consecutive census years (1984, 1994, 2007) using projected average gridded population density of one kilometer resolution from the Global Rural and Urban Mapping Project (GRUMP) as well as from LandScan (Annex Figure A1.4). Given that the underlying population distribution models for GRUMP and LandScan

differ and each has pros and cons in how the population is spatially allocated,[14] we average the two datasets for this analysis to better capture the true pattern of population distribution in Ethiopia (Annex Figure A1.5).

Annex Figure A1.4. GRUMP and LandScan population density grids for Ethiopia, 2015



Annex Figure A1.5. Average of GRUMP and LandScan population density grids for Ethiopia, 2015



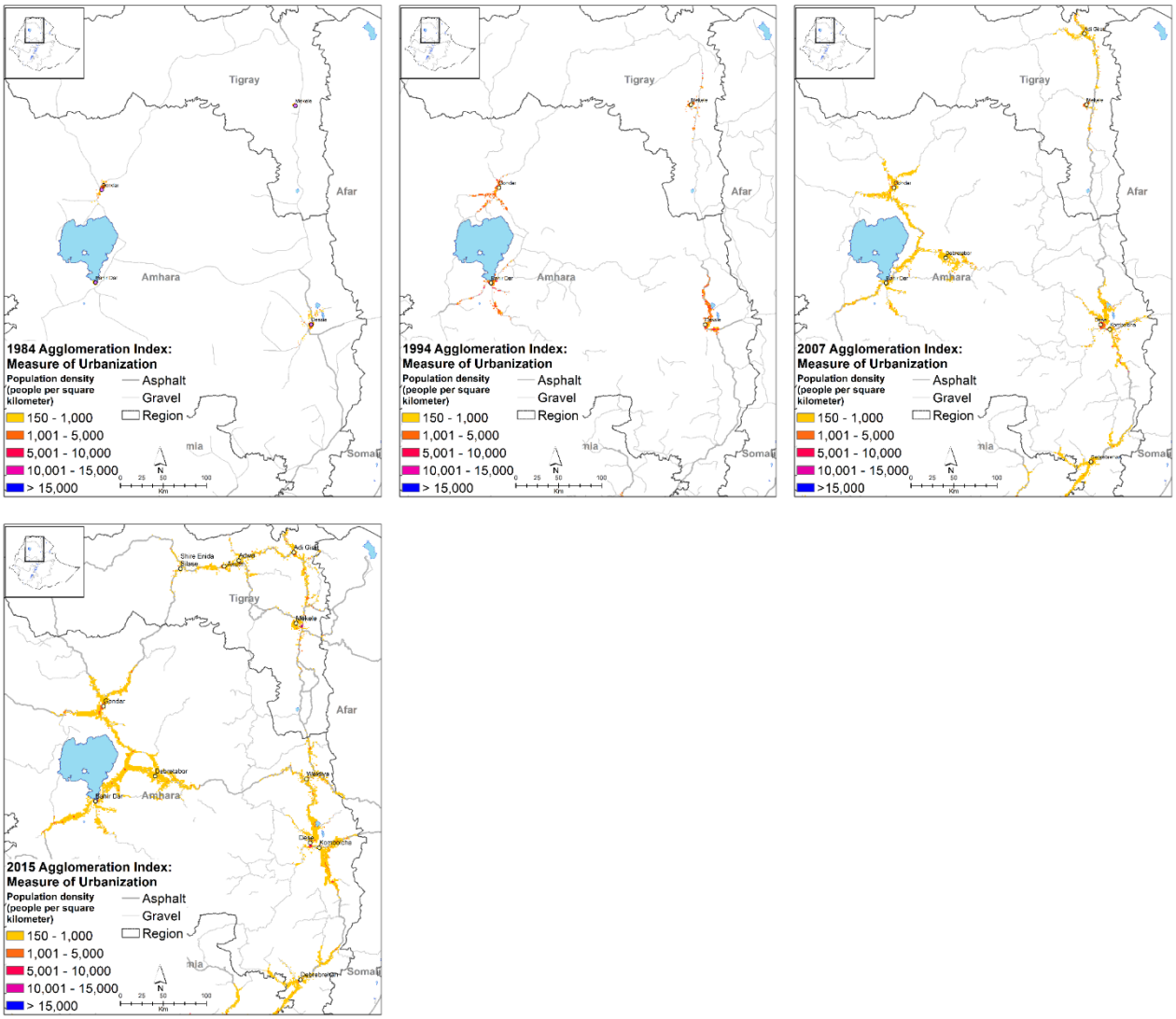
For the three index (census) years, 1984, 1994, and 2007, Schmidt and Kedir (2009) adjust the GRUMP and LandScan grids from 2000 with a three percent per year growth rate. For the 2015 projection year, unlike the previous analysis, we use LandScan 2012 gridded data and project the population to 2015 by a growth rate calculated from the 2007 census (CSA 2007) and the 2015 projected population figure

[14] GRUMP data spatially allocates population based on the census population at the lowest available administrative unit, whereas LandScan data uses roads, land cover, slopes and other terrain features to model population density across geographic space.

(CSA 2013b). The woreda level growth rate was then applied to each grid that was located within each woreda boundary (Annex Figures A1.4 and A1.5).

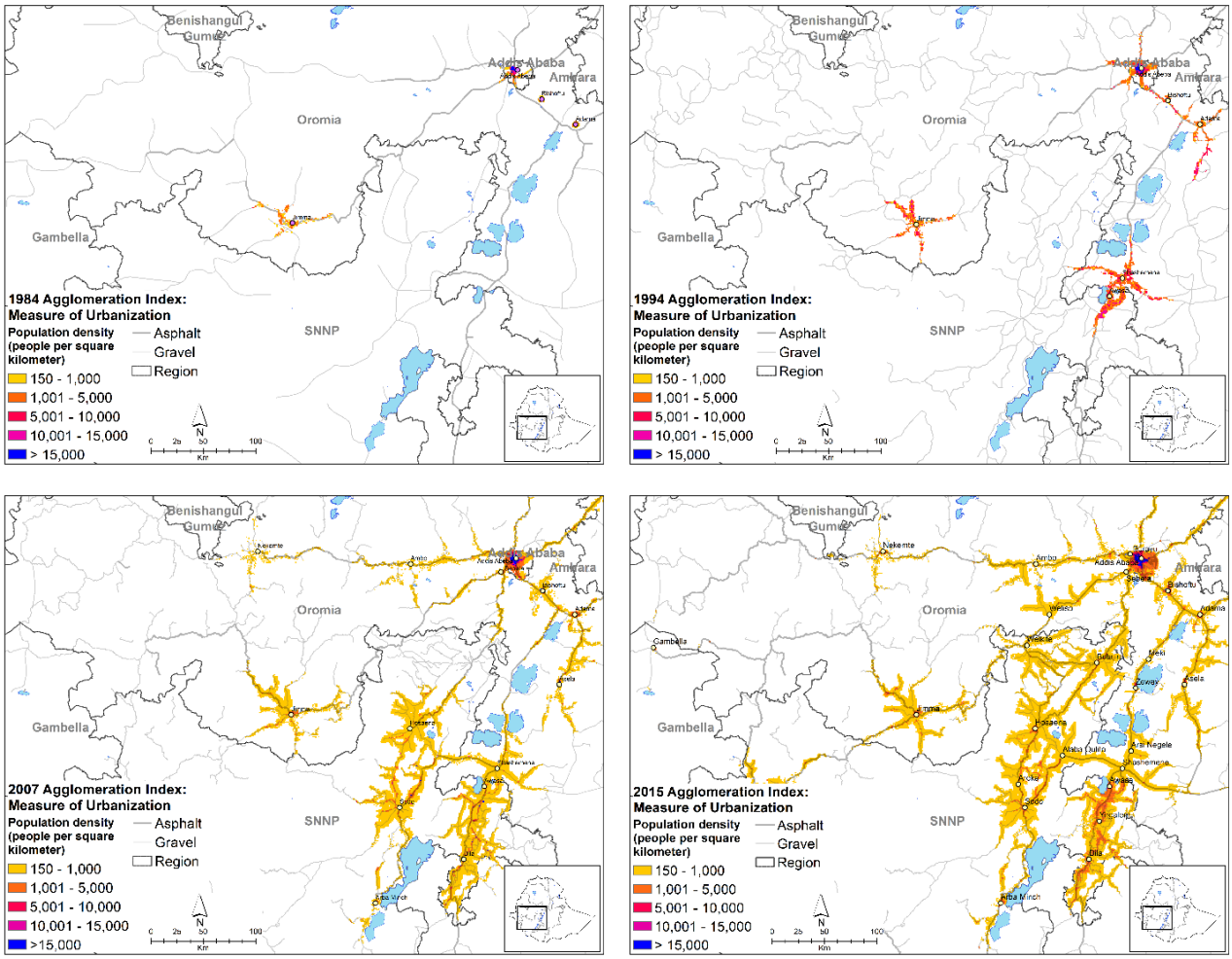
Areas that met the criteria set to define agglomerated area with a population density of at least 150 persons per square kilometers and less than 1 hour to the nearest city with 50,000 or more people were identified using the Python (arcpy) script using the CON function of ArcGIS 10.5.

Annex Figure A1.6. Agglomeration index for 1984, 1994, 2007, and 2015 for north and northwest Ethiopia



Source: Agglomeration index estimations

Annex Figure A1.7. Agglomeration index for 1984, 1994, 2007, and 2015 for west and southwest Ethiopia



Source: Agglomeration index estimations

Annex 2: Population projections for Ethiopia

Annex Table A2.1. Population figures and projections for selected urban centers in Ethiopia, 1984 to 2035

Urban center	Census May 1984	Census Oct 1994	Census May 2007	Projection July 2015	Projection 2025	Projection 2035
Addis Ababa	1,412,600	2,112,700	2,739,600	3,273,000	4,561,149	5,810,263
Adama (Nazret)	76,300	127,800	220,200	324,000	856,789	1,880,020
Gondar	80,900	112,200	207,000	323,900	856,525	1,879,440
Mek'ele	61,600	96,900	215,900	323,700	855,996	1,878,280
Hawassa	36,200	69,200	157,100	300,100	793,588	1,741,340
Dire Dawa	98,100	164,900	233,200	277,000	732,502	1,607,301
Bahir Dar	54,800	96,100	155,400	243,300	643,385	1,411,756
Dessie	68,800	97,300	120,100	187,900	496,885	1,090,296
Jimma	61,000	88,900	121,000	177,900	470,441	1,032,270
Jijiga	23,200	56,800	125,900	159,300	421,255	924,343
Shashemene	31,500	52,100	100,500	147,800	390,844	857,614
Bishoftu (Debre Zeit)	51,100	73,400	99,900	147,100	388,993	853,552
Sodo	24,600	36,300	76,100	145,100	383,704	841,947
Arba Minch	23,000	40,000	74,900	142,900	377,886	829,182
Hosaena	15,200	31,700	70,000	133,800	353,822	776,379
Harar	62,200	76,400	99,400	129,000	341,129	748,527
Dila	23,900	33,700	59,200	112,900	298,554	655,106
Nekemte	28,800	47,300	75,200	110,600	292,578	641,992
Debre Birhan	25,800	38,700	65,200	102,100	269,994	592,438
Total population for centers with population 50,000 to 100,000, thousands [a]	337	650	1,139	1,782	3,284	5,593
Total population for centers with population 100,000 to 500,000, thousands [a]	847	1,340	2,276	3,488	9,225	20,242
Addis Ababa, thousands	1,413	2,113	2,740	3,273	4,561	5,810
Total urban, thousands	4,869	7,385	11,863	17,459	31,072	52,574
Population growth from last census, %						
For centers with population 50,000 to 100,000, thousands [a]	--	6.77	4.41	5.76	6.31	5.47
For centers with population 100,000 to 500,000, thousands [a]	--	4.69	4.16	5.48	10.21	8.18
Addis Ababa	--	4.11	2.02	2.25	3.37	2.45
Total urban	--	4.25	3.71	4.95	5.40	5.40

Source: Central Statistical Agency of Ethiopia (1984, 1994, 2007, 2015), EGIS (2016), World Bank (2015) and authors' calculations using growth rates from EGIS national urban system study report projections (2016), and a growth rate of 5.4% for the total urban population projection from the World Bank's Ethiopia Urbanization Review: Urban Institutions for a Middle-Income Ethiopia for years 2012 and forward (2015).

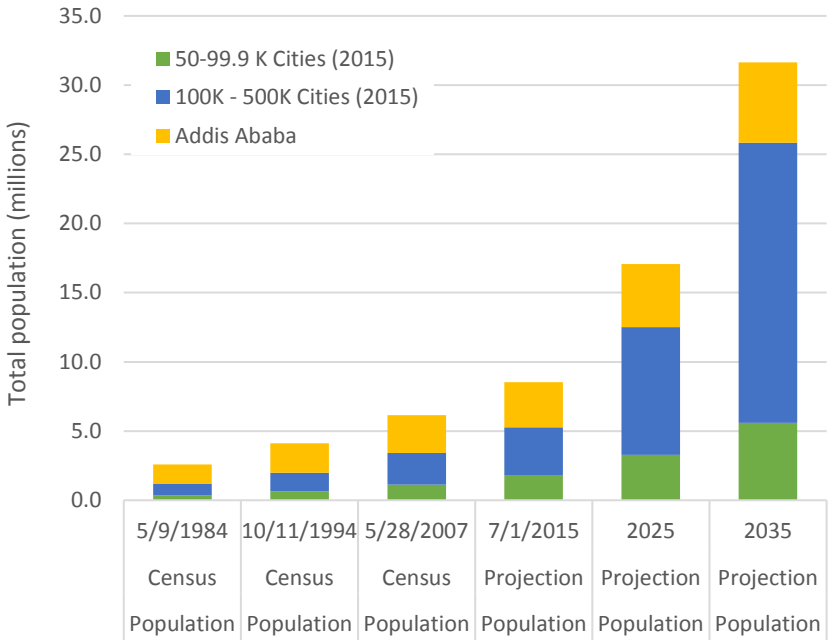
Note: [a] City size categories are defined in terms of 2015 population using CSA urban population projections regardless of population size in years prior to or following 2015.

Annex Table A2.2. Urban population projections for Ethiopia, 2025 and 2035

	City size categories, by population in 2015				
	20,000 to 50,000 [a]	**50,000 to 100,000**	**100,000 to 500,000**	**Addis Ababa**	**> 50,000**
Cities, number	95	26	18	1	45
1994 – total urban population	1,168	650	1,340	2,113	4,102
2007 – total urban population	1,901	1,139	2,276	2,740	6,154
2015 – total urban population	**2,982**	**1,782**	**3,488**	**3,273**	**8,543**
Annual change, 1994 to 2007, %	3.82	4.41	4.16	2.02	3.17
Annual change, 2007 to 2015, %	5.79	5.76	5.48	2.25	4.18
Projected 2025 total urban population	5,531	3,284	9,225	4,561	16,709
Projected 2035 total urban population	9,792	5,593	20,242	5,810	30,487
Annual change 2015 to 2025, % [b]	6.37	6.31	10.21	3.37	6.94
Annual change 2025 to 2035, %[b]	5.88	5.47	8.18	2.45	6.20

Source: Central Statistical Agency of Ethiopia (1994, 2007, 2015), EGIS (2016), and authors' calculations.
Notes: [a] City size categories are defined in terms of 2015 population (using CSA urban population projections) regardless of population sizes in years prior to or following 2015.
[b] Growth rates derived from the EGIS national urban system study report projections (2016).

Annex Figure A2.1. Breakdown of urban population in Ethiopia by city size categories for urban centers with population of more than 50,000, 1984 to 2035



Source: Central Statistical Agency of Ethiopia (1984, 1994, 2007, 2015), EGIS (2016), and authors' calculations.
Notes: City size categories are defined in terms of 2015 population (using CSA urban population projections) regardless of population sizes in years prior to or following 2015.

Annex Table A2.3. Population growth, labor force participation, and agricultural share of GDP for China, India, sub-Saharan Africa, and Ethiopia, 1980 to 2020

Year	Population, millions	Population growth, %	Urban share, %	Urban growth, %	Rural population, millions	Rural pop. growth, %	Urban population, millions	Labor force	Working age population	Labor force participation rate	Agriculture share of GDP, %
China											
1980	993.9	1.7	26.4	6.1	801.5	0.8	192.4	429,030	*633,517*	*78.6*	29.6
1990	1172.4	0.9	35.9	4.8	862.4	-0.5	310.0	647,244	817,508	79.2	26.6
2000	1283.2	0.6	49.2	4.5	822.8	-1.6	460.4	693,547	902,785	77.3	14.7
2010	1359.8	0.5	61.0	3.0	690.4	-2.0	669.4	736,663	1,038,171	71.1	9.8
2020	1424.5	0.1	68.7	1.4	555.2	-1.9	869.3	*831,517*	*1,160,066*	*71.7*	8.6
India											
1980	696.8	2.2	25.5	3.8	535.8	2.1	160.9	*239,070*	*391,508*	*60.0*	36.7
1990	870.1	1.9	27.7	3.1	647.8	1.8	222.3	*295,834*	*508,090*	*58.3*	30.1
2000	1053.1	1.6	30.9	3.1	761.7	1.2	291.3	336,217	587,794	57.2	23.9
2010	1231.0	1.2	34.8	2.6	850.2	0.6	380.7	378,926	707,840	54.2	18.9
2020	1383.2	0.9	39.5	2.4	902.1	0.1	481.1	*459,473*	*1,030,998*	*42.5*	17.4
Sub-Saharan Africa											
1980	385.8	2.9	27.1	6.1	299.8	2.5	86.0	*138,337*	-	*69.8*	*24.1*
1990	512.1	2.7	30.8	4.9	373.3	2.4	138.8	184,492	-	69.8	23.5
2000	670.6	2.7	35.2	5.0	463.9	2.2	206.6	246,046	-	69.8	19.6
2010	877.5	2.7	40.3	5.0	568.2	2.1	309.3	326,257	-	69.9	17.8
2020	1147.8	2.5	45.3	4.4	685.3	1.7	462.5	403,242	-	70.4	17.9
Ethiopia											
1980	35.3	3.1	12.6	6.5	31.6	3.3	3.7	-	-	-	*58.6*
1990	48.1	3.3	14.7	6.2	42.0	3.5	6.1	-	-	-	52.0
2000	66.5	2.8	17.3	5.5	56.7	2.8	9.8	*28,165*	*37,041*	*76.0*	47.8
2010	87.7	2.5	21.8	6.2	72.5	2.2	15.2	*39,756*	*49,623*	*80.1*	44.7
2020	112.8	2.2	26.8	5.2	88.2	1.6	24.6	*57,393*	*72,625*	*79.0*	37.2
World											
1980	4458.4	1.8	42.9	3.1	2705.2	1.2	1,753.2	*2,003,731*	-	*67.7*	*12.2*
1990	5330.9	1.4	46.6	2.5	3041.6	0.8	2,289.4	2,365,685	-	66.5	*9.2*
2000	6145.0	1.3	51.6	2.5	3280.8	0.3	2,864.2	2,793,023	-	65.3	5.2
2010	6958.2	1.1	56.2	2.2	3365.2	0.1	3,593.0	3,206,311	-	63.2	3.9
2020	7795.5	0.9	60.0	1.7	3413.2	0.0	4,382.3	3,490,989	-	62.8	3.8

Source: UNDESA (population indicators), ILO (labor force indicators), and World Bank (agriculture share of GDP indicators)
Notes: Numbers in italics are interpolated using a standard growth rate over the closest time period for which information exists. Estimates for agriculture share of GDP for 2020 are the 2016 rate (not a projected 2020 rate), excepting the world 2020 agriculture share of GDP, which is the 2015 world rate. Labor force estimates for 2020 are the 2017 value, unless in italics, signifying they were interpolated to represent a 2020 projection, using a standard growth rate over the closest time period for which information exists. Urban share is defined according to the national statistical offices in each respective country.

Annex Table A2.4. Rural and urban population growth in selected African countries

Year	Population, millions	Population growth, %	Urban population, millions	Urban growth, %	Rural population, millions	Rural growth, %	Urban share, %
Ethiopia							
1950	18.1	2.0	0.83	7.1	17.29	2.0	6.4
1960	22.2	2.5	1.42	7.1	20.73	2.5	8.6
1970	28.4	2.2	2.44	5.0	25.97	2.2	10.4
1980	35.3	3.1	3.67	6.5	31.59	3.3	12.6
1990	48.1	3.3	6.07	6.2	42.02	3.5	14.7
2000	66.5	2.8	9.81	5.5	56.73	2.8	17.3
2010	87.7	2.5	15.19	6.2	72.51	2.2	21.8
2020	112.8	2.2	24.57	5.2	88.19	1.6	26.8
2030	139.6	1.8	37.43	4.2	102.19	1.0	32.1
2040	166.1	1.4	53.26	3.5	112.88	0.6	37.6
2050	190.9		71.76		119.11		
Kenya							
1950	6.1	2.9	0.34	7.6	5.74	3.1	7.4
1960	8.1	3.3	0.60	9.4	7.51	3.4	10.3
1970	11.3	3.8	1.16	11.9	10.09	3.6	15.6
1980	16.3	3.7	2.54	5.5	13.73	4.2	16.7
1990	23.4	3.0	3.92	6.0	19.48	2.9	19.9
2000	31.5	2.8	6.26	5.6	25.19	2.5	23.6
2010	41.4	2.6	9.75	5.3	31.60	2.2	27.9
2020	53.5	2.3	14.90	4.8	38.59	1.7	32.8
2030	67.0	2.0	21.98	4.1	44.98	1.2	38.2
2040	81.3	1.6	31.07	3.5	50.22	0.7	43.9
2050	95.5		41.89		53.58		
Uganda							
1950	5.2	2.8	0.15	10.6	5.01	2.9	4.4
1960	6.8	3.4	0.30	11.0	6.49	3.6	6.7
1970	9.4	2.9	0.63	5.0	8.82	3.2	7.5
1980	12.5	3.3	0.95	10.4	11.60	3.4	11.1
1990	17.4	3.3	1.93	5.0	15.51	3.6	12.1
2000	24.0	3.5	2.90	6.9	21.13	3.7	14.5
2010	33.9	3.4	4.91	7.2	29.00	3.4	17.9
2020	47.2	3.1	8.44	6.6	38.75	2.9	22.0
2030	63.8	2.7	14.05	5.9	49.79	2.3	26.8
2040	83.6	2.4	22.37	5.1	61.24	1.7	32.1
2050	105.7		33.89		71.81		
Sub-Saharan Africa							
1950	185.0	2.1	19.53	7.1	165.46	1.8	14.6
1960	228.5	2.5	33.46	5.8	195.08	2.3	18.1
1970	292.9	2.8	53.03	6.2	239.84	2.5	22.3
1980	385.8	2.9	86.03	6.1	299.79	2.5	27.1
1990	512.1	2.7	138.82	4.9	373.29	2.4	30.8
2000	670.6	2.7	206.64	5.0	463.93	2.2	35.2
2010	877.5	2.7	309.32	5.0	568.21	2.1	40.3
2020	1,147.8	2.5	462.54	4.4	685.30	1.7	45.3
2030	1,470.6	2.3	666.44	3.8	804.20	1.4	50.1
2040	1,841.4	2.0	921.87	3.4	919.52	1.0	54.8
2050	2,245.1		1,230.81		1,014.31		

Source: Authors' calculations using population estimates for developing countries from UNDESA (2015; 2017).

Annex 3: Industrial parks in Ethiopia

Annex Table A3.1. Average 2014, 2015, and 2016 wages across industrial park locales, in Ethiopian Birr)

Industrial Park	Region	City	Market locale	2014			2015			2016		
				Un-skilled daily	Maid month	Guard month	Un-skilled daily	Maid month	Guard month	Un-skilled daily	Maid month	Guard month
Adama	Oromia	Adama (Nazret)	East Shewa	54.3	470	576	57.2	513	678	68.8	519	757
Bole Lemi I & II, Addis Industrial Village	Oromia	Addis Ababa	Bole	47.7	468	449	68.1	524	507	75.8	668	584
Kilinto	Oromia	Addis Ababa	Akaki	49.4	440	420	56.0	534	545	-	69	-
Jimma	Oromia	Jimma	Jimma	41.6	223	296	56.0	273	324	60.9	310	350
Dire Dawa	Dire Dawa	Dire Dawa	Dire Dawa	67.4	478	-	87.1	546	-	91.5	641	-
Hawassa	SNNP	Awassa	Sidama	33.2	350	-	33.0	386	-	36.7	396	550
Mekelle	Tigray	Mekelle	E. and S. Tigray	63.3	326	-	65.4	405	-	79.3	470	-
Kombolcha	Amhara	Kombolcha	S. Wolo	44.1	296	335	55.6	353	422	74.0	406	404
Bahir Dar	Amhara	Bahir Dar	W. Gojjam & S. Gondar	41.3	218	-	50.9	289	-	64.1	326	-
Arerti	Amhara	Arerti (town)	North Shewa	66.9	282	-	71.1	300	-	69.0	364	-
			Average	50.5	342	375	60.3	401	449	68.9	405	472
			Median	47.7	326	378	56.0	386	464	71.5	396	477

Source: CSA Market Survey data

Annex Table A3.2. Industrial parks and sugar factories in Ethiopia, currently operational and planned

GTP I	GTP II		Name of Park	Operational	Area (ha)	Expected Area (ha)	Current Employment	Expected Employment	Sectors	# Firms	Expected Prod (mn US$/yr)	Expected Exports (mn US$/yr)	Public Invt (mn US$ total)	Private Invt (mn US$ total)
			Industrial Parks, developed by IPDC, 10 year investment horizon, 2015-2025. GTP-II runs from 2015/16 - 2019/20											
		1	**Addis Industry Village** in Addis Ababa	(1980s) 2015	8.7	8.7			Apparel	10 bldgs		Geared toward domestic exporters		
X		2	**Bole Lemi I** Industrial Park South eastern part of Addis Ababa, 863 km from Djibouti port	2015	156	156	11,000	60,000	Apparel/ Textiles and Leather/ Leather products (shoes)	12	20	20	51	51
X	X	3	**Hawassa** Industrial Park 275 kms South of Addis Ababa	2015/6	130	300	30,000	84,000	Textile, Garments/ Apparel	20	1000	1000	125	125
X	X	4	**Kombolcha** Industrial Park 480 km from Djibouti port, 6km from Kombolcha dry port	2016/7	75	700		20,000	Textile, Apparel and Food Processing				63	63
	X	5	**Mekelle** Industrial Park 750 km from Djibouti port	2016/7	75	1,000		20,000	Textile, Apparel and Food Processing				63	63
	X	6	**Jimma** Industrial Park SW of Addis Ababa by 346 km, 1098 km from Djibouti	2018	50	500		25,000	Textile, Apparel, Food processing				64	0
		7	**Bole Lemi II** Industrial Park 15km from Addis Ababa	2018	186	186		15,000	Textile & Apparel				149	0
		8	**Kilinto** Industrial Park 6km south of Addis Ababa, 863 km from Djibouti port	2018	337	337		15,000	Pharmaceuticals, Agro processing, electric products, ...		20	Export and local consump-tion	234	0
X	X	9	**Dire Dawa** Industrial Park ~262-380 km from Djibouti and 445 km east of Addis Ababa	2018	150	4,156		68,000	Heavy industries, Textile/Apparel, Vehicles assembly, ...				95	95
X	X	10	**Adama** Industrial Park SE of Addis Ababa by 74 km, 678 km from Djibouti port	2018	120	2,000		25,000	Heavy Machinery & Parts, Textile, Apparel, vehicles …				250	250

Notes: Public expenditures for Bole Lemi I were approximately 51 mn dollars (1.3 billion birr), we assume that the private investment matched this amount. Total investments for constructing Hawassa, Kombolcha, Mekelle, Dire Dawa, Adama and Bahir Dar are split evenly between public and private components, when the actual share could not be confirmed. We estimate expected employment at Jimma and Adama parks to be 25,000 on the basis of the statement made by the Director of the ILO country office for Ethiopia, that the number of new jobs in textiles will sum to around 350,000 in total.

GTP I	GTP II		Name of Park	Operational	Area (ha)	Expected Area (ha)	Current Employment	Expected Employment	Sectors	# Firms	Expected Prod (mn US$/yr)	Expected Exports (mn US$/yr)	Public Invt (mn US$ total)	Private Invt (mn US$ total)
			Industrial Parks, developed by IPDC, 10 year investment horizon, 2015-2025. GTP-II runs from 2015/16 - 2019/20											
	X	11	**Bahir Dar** Industrial Park NW of Addis by 578 km, 985 km from Djibouti port	2018	75	1,000		20,000	Food processing, Textile, Apparel				30	30
	X	12	**Arerti** Industrial Park, Phase 1 50 km from Mojo dry port, Mogo Station of Addis Ababa to Djibouti Railway. 105 km from Addis Ababa	2018	100	100		400	Construction Materials and Household appliance manufacturing, …					
	X	13	**Debre Birhan** Industrial Park	2018										
	X	14	**Aysha Dewelle** Industrial Park	2018										
		15	**Awsh Arba** Industrial Park	*2018/9*		225			"TBD"					
		16	**Andido** Industrial Park	*2018/9*		425			"TBD"					
		17	**Bishoftu** Industrial Park	*2018/9*		180			"TBD"					
		18	**Asayta** Semera Industrial Park	*2018/9*		274			"TBD"					
		19	**Airlines Logistics** Park	*2018/9*		200			"TBD"					
			Totals		**10,000**	**100,000**		**352,400**				**1,000**	**5,000**	**10,000**
			Agro-Industrial Parks (IAIPs), developed by the Ministries of Industry and Agriculture, 4 year investment/development horizon											
		1	Baeker (Western Tigray)	2017/8	259	1,000		779,307	Livestock, sesame, ...		700		232.8	
		2	Burie (Southwest Amhara)	2017/8	260	1,000		629,368	Sesame, cereals, ...		558		227.6	
		3	Bulbula (Central Eastern Oromia)	2017/8	263	1,000		552,637	Livestock, coffee, cereals, …		591		233.1	
		4	Yirgalem (Eastern SNNP)	2017/8	215	1,000	134,000	398,889	Coffee		260		176.2	
			Totals		**997**	4,000	600,000	**2,360,201**		**120**	**2109**		**869.7**	**1,500**
Note: Numbers in Italics are extrapolations from the information found, and should not be taken as definitive.														

GTP I	GTP II		Name of Park	Operational	Area (ha)	Expected Area (ha)	Current Employment	Expected Employment	Sectors		# Firms	Expected Prod (mn US$/yr)	Public Invt (mn US$ total)	Private Invt (mn US$ total)	Total investment
			Industrial Parks, developed by Foreign Companies or governments												
	X	1	Eastern Industrial Zone 37km south of Addis Ababa (Chinese)	2014/5	40	207			Misc manu-facturing						
		2	Modjo Industrial Park (Taiwan)						George Shoe					5,750	
		3	Huajian Industrial Park, outskirts of Addis (Chinese)						Shoes						
		4	Dire Dawa's Fertilizer Plant (Morocco)	2022				1,200					*1,720*	*2,580*	4300
			Sugar Factories						TSY	TCD	Ethanol				
		1	Wonji Shoa Modern Factory	2013	12800	16000	2750	15,917	221	13	12.8	206.1	*528*		528
		2	Finchaa (sugar crushing mill)	2011	19000	21000	2200	15,917	270	12	20.0	206.1	132		132
		3	Metehara (expanded)	2004	10950	10235	4140		137	0	12.5	84.7			
	X	4	Tendaho (2 phases, second not yet begun)	2015 (2006)	20866	50000		50,000	619	13	63.0	472.4	*401.6*	367	769
X		5	Arjo Dedessa/Arjo Dediessa	2015	24000	50000	167	18,000	571	12	0.0	444.2	152		152
X		6	Kesem/Kessem	2015	8413	20000		9,000	260	10	30.0	202.1	*147*	150	297
	X	7	Wolkayit			50000			484	24	41.7	376.3	*100*	100	*200*
			Kuraz Sugar Dev't Project	2017	12903	100000			1,339		131.0	1041.0	*900.4*	*575*	1475
X		8	Omo Kuraz I	2017					250	12	28.0	194.4	225		*225*
	X	9	Omo Kuraz II	2017	1300				278	12	28.0	216.1	*230*	*100*	*330*
	X	10	Omo Kuraz III	by 2020					278	12	26.2	216.1	*220*		*220*
		11	Omo Kuraz V	by 2020					556	24	52.3	432.3	*225.4*	*475*	700
			Tana Belles Sugar Project	by 2020	13049	75000			726	24	20.8	564.4	1620		1620
	X	12	Beles I (in Amhara)	by 2020		25000	7500		242	12	20.8	188.1			
	X	13	Beles II (in Beni Gumuz)	by 2020		25000	7500		242	12	20.8	188.1			
	X	14	Beles III	later		25000			242		20.8	188.1			
			Totals			**392,235**	350000	**600,000**	**4,627**			3,597	*3,849*	***1,324***	***5,173***

Notes: TSY: Expected Tones Sugar/year, TCD: Expected Tones Crushed Cane/day; Ethanol is measured in '000 cubed meters/year;
Numbers in italics are extrapolations from the information found, and should not be taken as definitive.

Source: Authors' compilation from news articles included in the references section.

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About ESSP

The Ethiopia Strategy Support Program is an initiative to strengthen evidence-based policymaking in Ethiopia in the areas of rural and agricultural development. Facilitated by the International Food Policy Research Institute (IFPRI), ESSP works closely with the government of Ethiopia, the Ethiopian Development Research Institute (EDRI), and other development partners to provide information relevant for the design and implementation of Ethiopia's agricultural and rural development strategies. For more information, see http://www.ifpri.org/book-757/ourwork/program/ethiopia-strategy-support-program; http://essp.ifpri.info/; or http://www.edri-eth.org/.

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