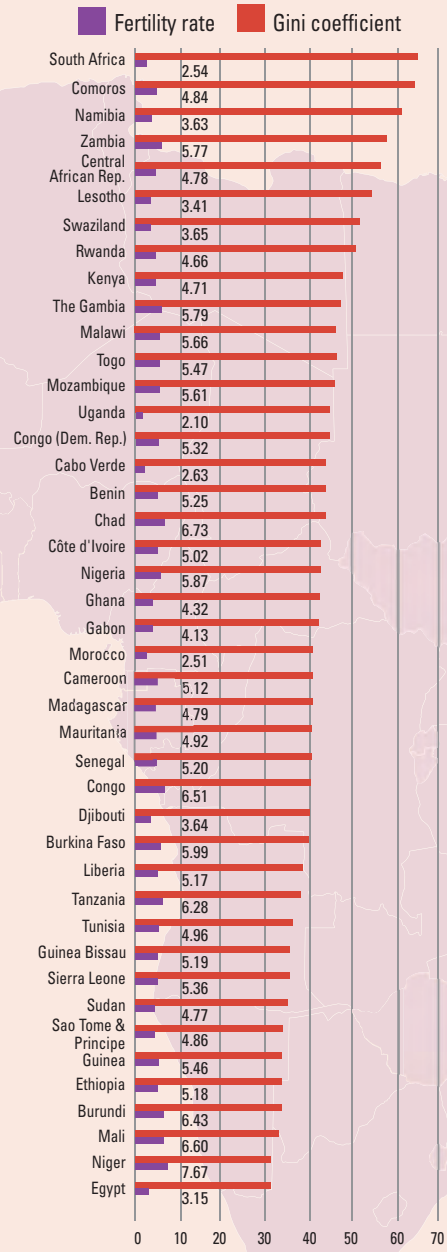
Understanding the link between population and equity

Facts on African population growth and structure

1. Africa's population will quadruple from about 1.19 billion in 2015 to 4.39 billion in 2100, accounting for 39.12 per cent of the global population
2. Africa will account for 82.8 per cent of the world's net population change between 2015 and 2100
3. The youngest population group (0-14 years) is projected to double, the working age (15-64 years) to triple and the elderly (65 years and above) to quadruple by 2050
4. Africa's share of the global working population will rise from 12.6 per cent in 2010 to 41.2 per cent in 2100
5. Africa is the most youthful region, with a median age of 19.4 years, compared with 29.6 globally
6. Between 2010 and 2014, the average fertility rate in Africa stood at 5.4, compared to 1.6 in Europe and Central Asia and 1.7 in Eastern Europe and the Pacific
7. Of the five subregions in the continent, only Southern Africa has started to experience early demographic transition

Most countries with high fertility rate have low Gini Coefficient



How to harness population growth for enhanced equity

1. Invest heavily in child and youth development through appropriate education and health policies and programmes
2. Keep more girls in school and take concrete actions to drastically reduce infant mortality rates
3. Expand the skill content of African educational systems to promote employability of the working population
4. Increase overall productivity to leverage demographic dividends in Africa
5. Implement progressive taxes and transfers through marginal tax rates and well-targeted social protection that favour the bottom 40 per cent
6. Promote labour-intensive manufacturing, labour market flexibility, entrepreneurship growth and infrastructural development to create more jobs
7. Ensure that growth concentrates where the bottom 40 percentiles make their livelihoods to promote inclusive growth

9 Income Inequality and Population Growth in Africa

AYODELE ODUSOLA, FREDERICK MUGISHA, YEMESRACH WORKIE AND WILMOT REEVES

9.1 Introduction

Africa's population is expected to almost quadruple by 2100, from about 1.19 billion in 2015 to 4.39 billion. It will thus account for 39.12 per cent of the world's population by 2100, against 16.14 per cent in 2015. The continent remains the most youthful globally, with a median age of 19.4 years compared to 29.6 globally, 29.2 for Latin America and the Caribbean (LAC) and 30.2 for Asia. Furthermore, more than 60 per cent of the continent's population is below the age of 25 years, compared to around 42 per cent globally. While most other regions are experiencing population ageing, Africa is not. Therefore, the continent plays a significant role in global population dynamics due to its size, its youthful population and structure of the world's population.

In addition, Africa ranks as one of the regions with the highest level of inequality, following Latin America and the Caribbean (LAC). SSA is ranked among the most unequal regions of the world. However, together with LAC, it is also one of the very few regions that is experiencing a decline, on average, in the level of inequality: the Gini coefficient fell from 0.472 in 1990 to 0.445 in 2010 in SSA and from 0.497 to 0.486 in LAC. By contrast, the Gini rose in advanced economies from 0.284 to 0.301 and in Asia and the Pacific from 0.347 to 0.373.

There is an emerging consensus that inequality is becoming a major development challenge. The 2014 World Economic Forum's opinion poll, based on reflections from government, academia, private sector and civil society, rated inequality as the second most serious development challenge globally.[1] More than 70 per cent of respondents from Africa considered the rich-poor gap as a development concern. Combined with growing numbers of jobless youth in Africa, in the context of a rising youth population, this could impede the sustainability of economic growth, weaken social cohesion, threaten peace and security, and create social and political instability in the coming decades. This situation has largely informed the overarching objective of 'leaving no one behind' in the Sustainable Development Goals (SDGs) endorsed by world leaders in September 2015. In addition, 'reducing inequality within and among countries' is one of the 17 goals. 'Achieving and sustaining income growth of the bottom 40 per cent of the population at a rate higher than the national average' is also a target.

[1] About 80 per cent of the nations surveyed considered inequality to be a major problem. Detailed information may be found at Pew Research Center (2013).

The combination of high population growth, in the context of high income inequality and, to some extent, the declining trend in inequality calls for a thorough analysis of the linkage between population and income inequality. The key question is, how does population dynamics affect income inequality in Africa? Answering this question is the main objective of this chapter.

9.2 Overview and demographic trends in Africa

Over the next seven decades, Africa will shape the global demographic landscape significantly. The continent's population will increase by about 3.7 billion between 2015 and 2100, from 1.19 billion in 2015 to 4.39 billion in 2100 (table 9.1). Thus, the continent will account for 82.8 per cent of the world's net population change over the period, i.e., 3.20 billion out of the total 3.86 billion population increase worldwide.

Most other parts of the developing regions, especially LAC and Asia, have experienced demographic transition as a result of a long-term decline in population growth rates over the past seven decades. Africa is yet to experience such a transition, although it has recorded some marginal decline since the beginning of the 21st Century (figure 9.1). Adherence to family planning and longer mean years of schooling have accounted for the demographic transition in most of the affected regions.

TABLE 9.1 Projected total population, 2015-2100

Regions	Population (million)				% change
	Year				
	2015	**2030**	**2050**	**2100**	**2015-2100**
World	7 349	8 501	9 725	11 213	52.58
Africa	1 186	1 679	2 478	4 387	269.89
Asia	4 393	4 923	5 267	4 889	11.29
Europe	738	734	707	646	-12.47
Latin America and the Caribbean	634	721	784	721	13.72
North America	358	396	433	500	39.66
Oceania	39	47	57	71	82.05

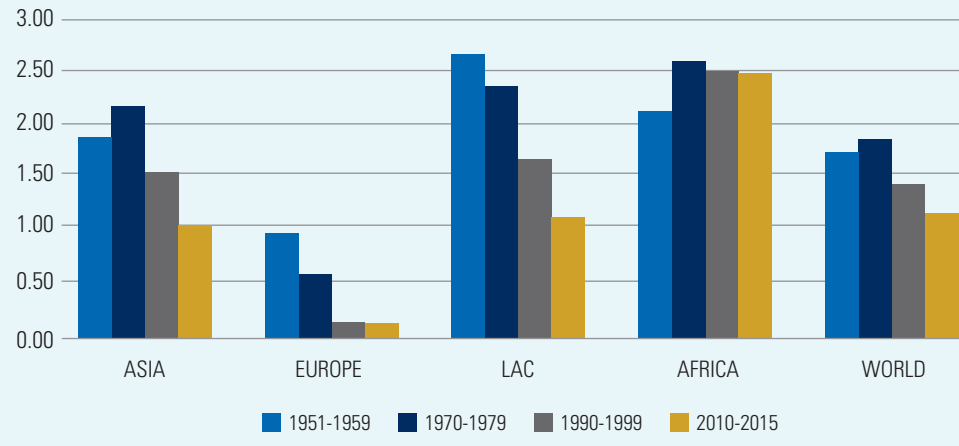
Source: Compiled and computed from United Nations Population Division's database (United Nations, 2014).

Population growth in Africa has been highly volatile and has yet to show a consistent demographic transition. It rose from 1.98 per cent in 1951 to a peak of 2.85 per cent in 1985. In 2000, it fell to 2.44 per cent, but due to increases in Central and West Africa, it rose to 2.6 in 2013, when the rate of decline in other regions outpaced that of North Africa (UNDP, 2016).

Of the five subregions in Africa, only Southern Africa started to experience some demographic transition earlier than others, beginning in 1993 (figure 9.2). Several factors accounted for this, including declining infant mortality and fertility rates, higher mean years of schooling and the prevalence of HIV and AIDS relative to other regions. In 2004, Central Africa began to experience demographic transition, while East Africa and West Africa started in 2010 and 2011, respectively. According to the International Monetary Fund (IMF, 2015), five countries have advanced in the demographic transition

(Mauritius, Seychelles, Cabo Verde, Botswana and South Africa), while 25 countries are currently experiencing it and 15 countries are still at a nascent stage of demographic transition.[2]

FIGURE 9.1. Average growth rate of population by regions



Source: Compiled and computed from United Nations Population Division's database (United Nations, 2014).
Note: LAC = Latin America and the Caribbean

Population structure is also changing, along with population growth. The population of SSA, for instance, is projected to rise from 962.3 million in 2015 to 2.0 billion in 2050 and to 3.7 billion in 2100. Innovations, improved health conditions and enhanced level of literacy will play a major role in the dynamics of population structure in the years ahead. For instance, by 2050, the youngest group (ages 0-14 years) is projected to double to around 685 million; the working-age (15-64 years), to triple to 1.25 billion; and the elderly (65 years and above), to quadruple to 100 million (IMF, 2015). In 2015, 62.8 per cent of the SSA population was below the age of 25 years, compared to about 40 per cent in Asia and LAC. Major investment in child and youth development is key to unleashing the potential of these assets, which could be used to unlock structural economic transformation, total factor productivity and human development in the continent.

The working-age population has an important role to play in addressing inequality in the continent. Between 2010 and 2100, Africa's working-age population[3] will increase by 2.1 billion, compared to a net global increase of 2.0 billion. Africa's share of the working-age population is rising, while most of the rest of the world is facing an ageing population. Its share of the global working-age population will rise from 12.6 per cent in 2010 to 41.2 per cent in 2100 (Drummond, Thakoor and Yu, 2014). This has serious implications for the continent's economy. If well harnessed, this rise could substantially increase its potential productive capacity, thereby offering demographic dividends. The growth potential could unleash the much-awaited African 'miracle' in terms of structural transformation and

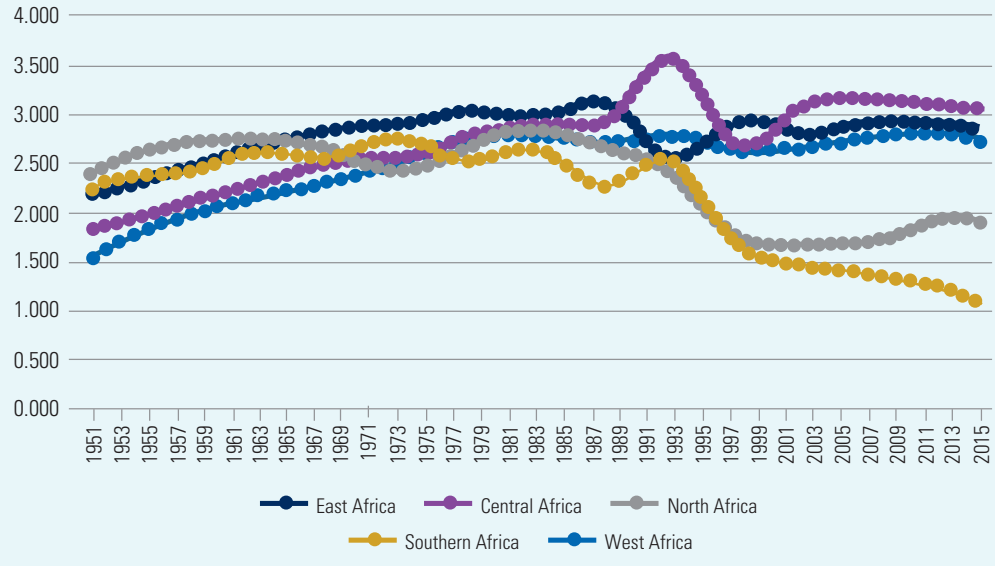
[2] The countries experiencing ongoing transition are Namibia, Swaziland, Equatorial Guinea, Kenya, Zimbabwe, Lesotho, Sao Tome and Principe, Ghana, Rwanda, Eritrea, Guinea-Bissau, Burundi, Togo, Madagascar, Comoros, Gabon, Senegal, Sierra Leone, Benin, Cameroon, Central Africa Republic, Côte d'Ivoire, Ethiopia, Republic of the Congo and Burkina Faso. The countries experiencing nascent transition are Liberia, Guinea, South Sudan, Malawi, Democratic Republic of the Congo, Mozambique, United Republic of Tanzania, The Gambia, Uganda, Chad, Nigeria, Zambia, Mali, Angola and Niger.

[3] The working-age population represents the population aged between 15 and 64 years divided by the total population.

innovation. Otherwise, it could be a serious impediment to growth arising from the risks of social instability, unemployment and poverty.

The fertility rate in Africa is central to these population dynamics, including the working-age population. Scientific innovations have reduced death rates globally,[4] to the extent that the ratio of crude death rate to crude birth rate, which was 51.3 per cent during 1950-1955, fell to 41.8 per cent during 2010-2015. While most parts of the world have experienced a fertility transition, this is not the case in Africa, where the average fertility rate between 2000 and 2014 stood at 5.4, compared to 1.6 in Europe and Central Asia, and 1.7 in East Asia and Pacific. Figure 9.3 shows the trend between 1970 and 2014 across sub-regions.

FIGURE 9.2. Population growth rate in Africa, by region



Source: Compiled and computed from United Nations Population Division's database (United Nations, 2014).

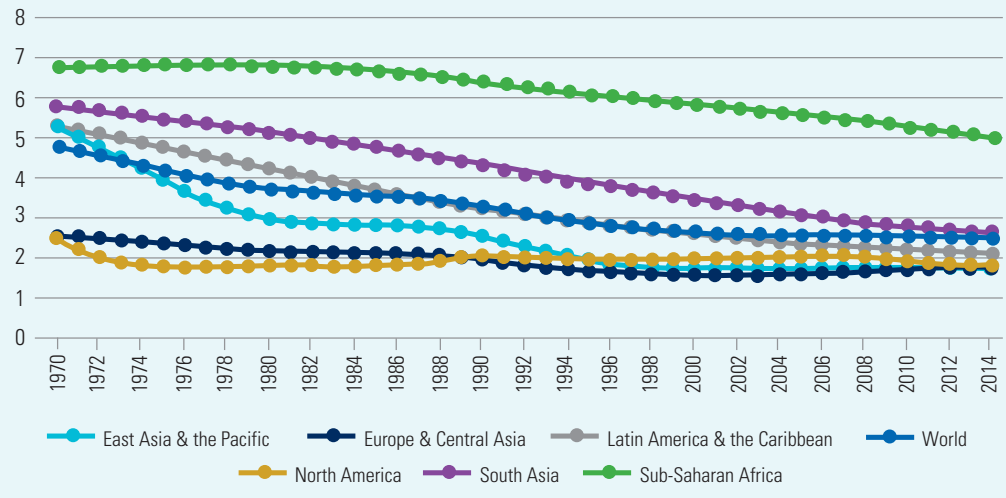
While fertility rates in most of the world's regions, on average, are converging at around 2.0 children per woman, in SSA the rate is still as high as 5.0 children per woman. Europe and Central Asia, East Asia and the Pacific, and North America are at below the population replacement fertility rate.[5] Even if fertility is at the replacement level, at an average of 2.0 children per woman, population will continue to grow, due to the rising number of young people. Therefore, with an average fertility rate of about 5.0 (between 2000 and 2014) for SSA, and countries such as Niger and Somalia with a fertility rate of above 7.0 children per woman,[6] the conditions for rapid population growth already exist within the continent's population structure.

[4] Evidence from the United Nations Population Database – crude death rate (per 1,000 population) – shows that the crude death rate fell from 19.1 in 1950-1955 to 8.1 in 2010-2015.

[5] Population replacement fertility is reached when a population exactly replaces itself from one generation to the next, without migration. This is estimated to be a fertility rate of 2.0.

[6] In Africa, only Mauritius had population replacement fertility rate (1.72) that was lower than 2.0 in 2014, while only Tunisia was very close to the replacement fertility rate (2.08).

FIGURE 9.3. Fertility rates by region, 1970-2014



Source: Compiled and computed from World Development Indicators (accessed December 2016).

The fertility rate is still high in countries experiencing a high infant mortality rate and deep-rooted cultural practices (such as early child marriage, son preference and limited knowledge among women of, for example, family planning) (United Nations, 2014). There is a strong correlation between fertility rate and early child marriage. For instance, of the six countries with more than 50 per cent early child marriage, five had a fertility rate of more than 5.0 children per woman (figure 9.4). In some instances, high fertility could be associated with conflict and post-conflict situations.[7]

As a structural issue, at times underpinned by social norms and cultural factors such as early child marriage and low mean years of schooling, high fertility rates are not likely to disappear in the near future. This thus calls for an examination of the implications of population size and structure on the inequality level in the continent, which has been deemed to be one of the highest globally.

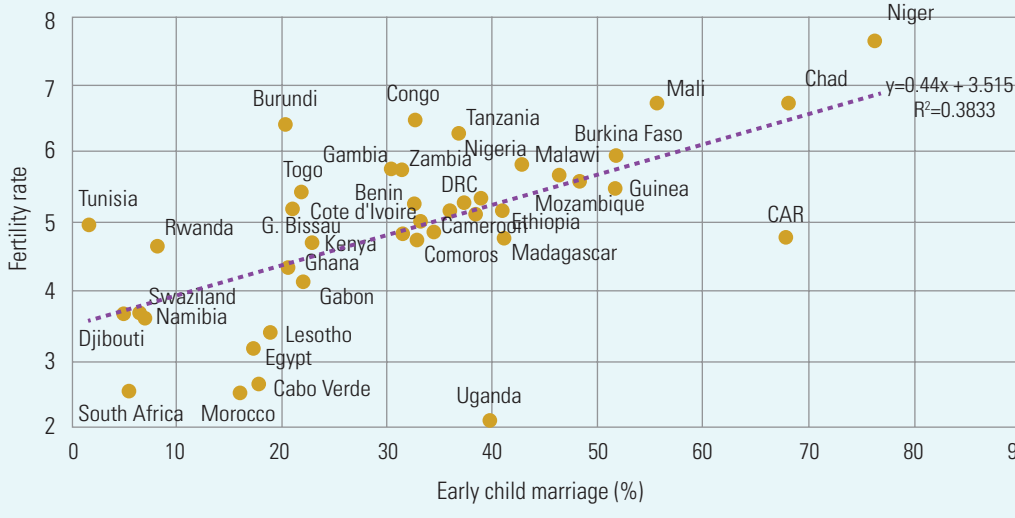
9.3 Linkage between population variables and inequality: An overview from the literature

The literature is replete with descriptions of various channels through which population growth affects economic growth, per capita income and inequality. One is fertility rate. De la Croix and Doepke (2002) discuss the role of the fertility differential between rich and poor families in explaining the relationship between inequality and economic growth. Poor families tend to have many children and are also more inclined to invest very little in their children's education. Inequality lowers household investment in education, thereby affecting economic growth. The fertility rate through human capital accumulation is one of the transmission mechanisms linking inequality with growth. The 'hump-

[7] The most fertile countries as measured by the number of children per women during 2010-2015 are Niger (7.63), Somalia (6.63), Mali (6.35), Chad (6.31), Angola (6.2) and Burundi (6.08). Most of the countries have experienced some form of conflict or are emerging from one.

shape' inequality-population growth nexus lends credence to the relationship between inequality, population and economic growth. Declining fertility enhances female labour force participation, thereby increasing women's incomes and reducing gender inequality (Bloom et al., 2009). When institutional impediments constraining women's participation in the labour market are addressed, fertility is further reduced and household incomes are increased.

FIGURE 9.4. Correlation between fertility rate and early child marriage



Note: CAR = Central African Republic; G. Bissau = Guinea-Bissau; DRC = Democratic Republic of the Congo.
Source: Authors' computation from World Development Indicators (accessed December 2016).

Another channel is the rise in the share of working-age population, which is an indicator of demographic transition. If the increased work force is gainfully employed, increase in per capita income is an important direct channel. This not only increases household incomes, but also raises national outputs (IMF, 2015).

Population growth affects inequality through the dependency ratio. A rapid increase in population is linked with a higher youth dependency ratio. As a result, countries with very high population growth often lag, economically, behind those with lower population growth (Rougoor and Charles, 2014). Similarly, countries with very low population growth rates are often associated with a higher old age-dependency ratio. Using a life cycle theory, Deaton and Paxson (1997) argue that decreases in population growth rates redistribute population towards older, more unequal cohorts and can increase national inequality.

A rise in labour productivity is an additional channel. An advance in the demographic transition increases household investment in the education and health of family members, with a concomitant effect on labour productivity (Soares, 2005). Hassan, Sanchez and Yu (2011) also argue that the increase in the savings rate associated with demographic transition could boost investments and economic growth and, all things being equal, could facilitate rapid reduction in poverty and inequality. The public savings associated with lower public expenditure on education and health of

the population below 14 years could be used to enhance the quality of education and health systems or bridge infrastructure gaps impeding growth and poverty reduction.

A similar channel has been proposed by the National Academies Press (NAP, 1986) through the class of people contributing additional population and labour market adjustments. Whether change in fertility leads to future inequality depends on the group of people that is adding to the net fertility. If a substantial change in population is seen among the poor, this could lead to inequality. The converse holds for the rich. A rapid rise in population of the poor will lead to an increase in unskilled labour supply relative to demand, thereby depressing relative wages for the unskilled labour, i.e., creating a wide gap between earnings of skilled and unskilled workers. In contrast, slower population growth will decrease income inequality by increasing the rate of return to labour relative to other factors of production, such as capital.

Distribution of income across factors of production constitutes another channel. For example, Boulier (1975) argues that a more rapid rate of population growth could lead to increased inequality by altering the distribution of income among labour earnings, profits, rent and interest. Since the income from profit and rent is less equally distributed among individuals than labour income, a more rapid rate of population growth will lead to less equal distribution of income over time. Income tends to be skewed in favour of profit, rent and interest.

Population size also directly influences inequality measures such as the Gini coefficient. As one country's population grows faster than other countries', the relative weight of that country increases. Inequality will increase in countries with a rapidly growing population, even if GDP per capita remains the same in other countries (Rougoor and Charles, 2014).

In an unconventional way, Campante and Do (2006) argue that populous countries tend to be less unequal. Using the distribution channel, they establish a negative relationship between population size and density, on the one hand, and inequality, on the other. This is based on different 'derived' distribution channels, as in the case of benefits and opportunities that citizens may receive under a new elected government or that are the basis of calls for revolution or insurgency against a ruling elite. When the proportion of people that can demand a change in government is large (e.g. youth) relative to the total population, distribution will be large. The authors found a negative relationship between population factors (size and density) and inequality.

9.4 Methodology, data and data sources

In analysing the linkage between demography and inequality, Galor and Weil (2000) and Rougoor and Charles (2015) identified age structure and fertility rate as important variables that work through economic growth and the share of the working-age population. In contrast, Firebaugh and Goesling (2004) proposed income growth and population growth, and their variation at regional or global levels, as important factors in equalising inequality. Education is used as a proxy for human capital, which plays an important role in transmitting the impact of inequality on economic growth (De la Croix and Doepke, 2002). Schultz (1998) also underscores the role of wage differential by skills, measured by education, for instance, in explaining the increase in inequality globally. Others, such as Soares (2005), examine the role of labour productivity as an important factor in explaining the dynamics of inequality.

Using a panel data of 43 African countries, an ordinary least squares technique has been employed to estimate the various parameters. Gini and/or the income share of the bottom 40 per cent is used as a dependent variable, while population growth rate, fertility rate, early child marriage, population dependency ratio, GDP per worker, economic growth rate, share of the working population, share of people with secondary education, poverty rate and distribution factor (income share of the lowest percentile relative to the highest percentile) serve as independent variables.

$$Gini = \beta_0 + \beta_1 p + \beta_2 f + \beta_3 e + \beta_4 d + \beta_5 gpw + \beta_6 g + \beta_7 wp + \beta_8 s + \beta_9 pr + \beta_{10} de + \mu \quad (1)$$

$$P = \alpha_0 + \alpha_1 e + \alpha_2 gpw + \alpha_3 g + \alpha_4 wp + \alpha_5 s + \alpha_6 pr + \Omega \quad (2)$$

Equation 1 is run at both bivariate and multivariate levels, while equation 2 is only run at the multivariate level. Where Gini = Gini coefficient; p = population growth rate; f = fertility rate; e = early child marriage; d = population dependency ratio; gpw = GDP per worker; g = economic growth rate; wp = the share of the working population; s = the share of people with secondary education; pr = poverty rate; and de = distribution effect. β_i and α_i are parameter estimates, and μ and Ω are error terms. Other variables of interest are income growth that is faster/slower than the regional average and population growth that is faster/slower than the regional average.

The population figures are sourced from the United Nations Population Division database. Early child marriage data have been collected from the United Nations Children's Fund (UNICEF) database. All other variables come from the World Development Indicators from the World Bank database.

9.5 Empirical evidence

The empirical findings from this chapter show two distinct results about inequality and population: strong negative impact when there are no control variables and weak or no impact when control variables are introduced.

Table 9.2 provides the correlation index between inequality and population growth, fertility rates, early child marriage, dependency rates and working-age population. From both measures of inequality (Gini and the share of income held by the bottom 40 per cent), countries with higher fertility rates tend to have lower levels of inequality.[8] As evident in table 9.2, high fertility rates are associated with a higher share of income going to the bottom 40 per cent of the population. This is also evident in figure 9.5. All countries, where data are available, with a fertility rate of 6.0 children per woman (Niger, Mali, Burundi, United Republic of Tanzania, Republic of the Congo, Chad and Nigeria) are associated with a low Gini – less than 0.44. However, most countries classified as advanced in demographic transition in SSA (see IMF, 2015) exhibit a high level of inequality. Botswana, South Africa, Namibia and Seychelles, for instance, have Ginis of more than 0.6, while only Cabo Verde and Mauritius recorded Ginis that are equivalent to high-fertility countries.

A similar relationship is observed for other population variables such as population growth rate, early child marriage and dependency rates. For instance, countries with high population growth rates are associated with a higher income share of the bottom 40 per cent. This finding tends to support Compante and Do (2006), who used the distribution channel. Ordinarily, in the absence of

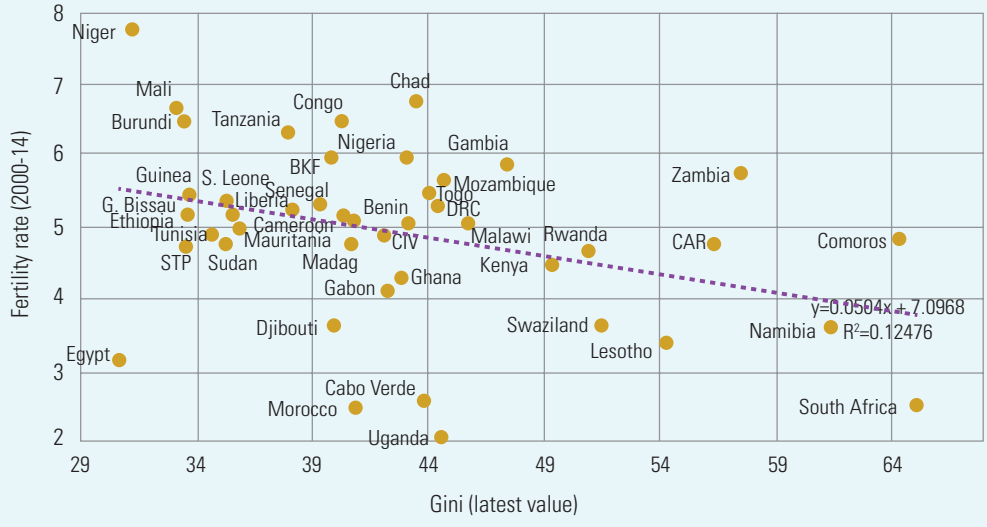
[8] In reality, population growth is associated with increased inequality because such growth occurs mainly among poor nations, which translates into intergenerational poverty. However, population growth in Africa is associated with declining inequality, perhaps because income growth is occurring in sectors where the poor earn their livelihoods or because of the prevalence of social capital, including working in family businesses and providing community insurance when the unexpected occurs. All these have an impact on labour market adjustment, as mentioned by Boulier (1975) and NAP (1986).

distribution and threat of insurgency channels theorised by Campante and Do (2006), population variables are expected to be disequalising. One plausible factor is the methodological measurement of Gini, which has been essentially derived from consumption, rather than income, surveys. Households with larger families are expected to spend a substantial proportion of their incomes on consumption, using either child or adult equivalent measurements. In terms of aggregate consumption, this tends to give an impression of a high level of consumption.[9] This may not be the case if per capita consumption is considered.

Conversely, households with large family size are likely to spend less on the education and health of their members, thereby promoting intergenerational poverty. The correlation between poverty rate and population variables is positive (table 9.2). The correlation ranges between 0.449 for dependency rate and 0.528 for population growth rate. Countries with a larger share of working population, more population with secondary education and higher GDP per capita tend to have lower poverty rates. With the inverse relationship between poverty rate and share of working population, the demographic transition tends to be associated with low poverty rates.

When Firebaugh and Goesling's (2004) equalising and disequalising factors were used, they revealed additional insight. They propose using income growth that is faster than the regional average combined with population growth that is faster than the regional average. At the bivariate level, the impact of population growth that is faster or slower than the regional average on inequality is negative and significantly established at 10 per cent. However, at the multi-variate level, when control variables are introduced, the population variables have no effect on inequality (table 9.4).

FIGURE 9.5. Correlation between fertility rate and Gini



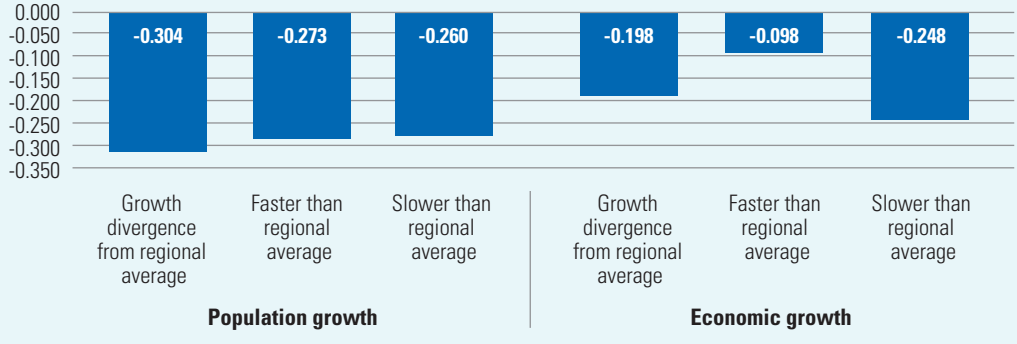
Note: STP = Sao Tomé and Principe; DRC = Democratic Republic of the Congo; BKF = Burkina Faso; CAR = Central African Republic; Madag = Madagascar; G. Bissau = Guinea-Bissau; S. Leone = Sierra Leone; Congo = Republic of the Congo; CIV = Côte d'Ivoire.

Source: Authors' computation from World Development Indicators (accessed December 2016).

[9] Ernst Engel (1821–1896) observed that as income of households rises, the proportion of income spent on food falls, even if actual expenditure on food rises. By implication, the income elasticity of demand for food is between 0 and 1. In this regard, as the 'Engel coefficient' increases, the household or the country is by nature poorer, i.e., experiencing a lower standard of living.

By contrast, the rate of decline in Gini could be faster in countries whose economies are growing more slowly than the regional average (figure 9.6). The relationship is established as significant for bivariate regression (see table 9.4) using changes in Gini since 2000. This implies that when countries experience rapid economic growth, upper quintiles tend to benefit more than lower quintiles. At the multivariate level, the relationship becomes positive and statistically established for countries with greater than regional average economic growth rate. Growth that is 1 per cent faster than the regional average leads to about a 9 per cent increase in inequality. As shown in figure 9.7, eight of the 11 countries that experienced a faster growth rate of at least 1.5 percentage points above the regional average (between 2000 and 2015) recorded an increase in inequality.

FIGURE 9.6. Correlation of population growth and economic growth with Gini, using deviation from regional averages

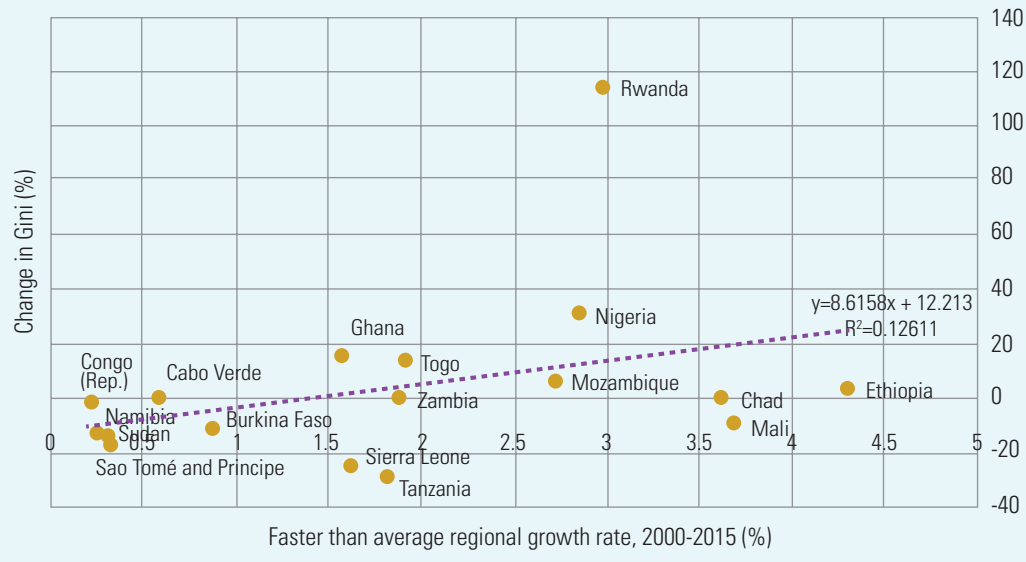


Source: Author's computation.

Improved secondary education, GDP per worker and share of working population tend to be disequalising when both Gini and income share of the bottom 40 per cent are used. As these variables (share of population with secondary education, GDP per worker and share of working population) improve, the income share of the bottom 40 per cent tends to fall. As households' education and income levels improve, they often spend less of their income on basic consumption (according to Engel's Law). This is typical of consumption-based inequality measurement. Alternatively, an increase in education, income and job opportunities expands the middle class, thereby moving the majority of the people originally in the bottom 40 per cent to the third quintile or even higher.

Socioeconomic factors tend to drive population growth in Africa. A rise in the share of population with a secondary education and in the working population tends to reduce population growth. However, only the working population is statistically significant. A 10 per cent rise in the share of the working population tends to reduce population growth by about 0.44 per cent (see the last column of table 9.3). Early child marriage still drives population growth in Africa: a 10 per cent rise in early child marriage increases the population growth rate by 0.13 per cent. Economic factors still play an important role in determining population growth dynamics in Africa – an indication that the continent is yet to experience a genuine demographic transition. A 1.0 per cent rise in economic growth tends to raise population growth by about 0.07 per cent, while a rise in poverty level also drives population growth (where the number of children in the family is seen as insurance for parents during old age). This tends to confirm findings from Odusola et al. (1997) and Oyediran and Odusola (2004).

FIGURE 9.7. Correlation between change in Gini and faster than average regional growth rate, 2000-2015



Source: Authors' computation from data from the World Development Indicator Database.
Note: S. Leone = Sierra Leone; BKF = Burkina Faso; Congo = Republic of the Congo.

9.6 Policy implications and conclusions

The need to examine the linkage between Africa's population growth and income inequality is more important than ever, given the objective of 'leaving no one behind' by 2030. This chapter examines the relationship between population dynamics and income inequality in Africa.

Some parts of Africa have started to experience a demographic transition, especially in Southern Africa, and countries such as Mauritius, Seychelles, Cabo Verde, Botswana and South Africa have advanced in the demographic transition. The rising role of Africa in shaping the global population dynamics, both in size and structure, calls for substantial investment in early child and youth development in order to achieve demographic dividends. The rising share of the working population in Africa, which is shrinking in most other regions, could become an asset if African stakeholders (governments, private sector and civil society organisations) invest in child and youth development through appropriate education and health policies and programmes. This should be complemented by investment in vocational skills development and science, technology and innovation. Early child marriage plays an important role in promoting fertility rate and population growth. In this regard, efforts to keep more girls in school (especially secondary and tertiary education) and reduce the infant mortality rate are important for promoting demographic transition.

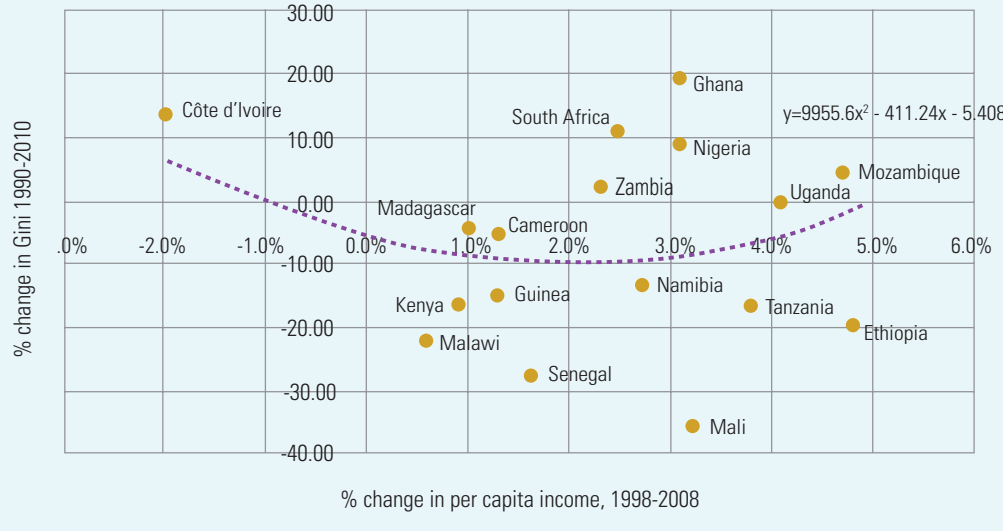
While the relationship between poverty and population variables is clear, the relationship between population and inequality still remains ambiguous in Africa. Although at the bivariate level, a negative and significant relationship was established with income inequality across the population variables, this is not the case at the multivariate level. All countries with fertility rates of at least 6.0 children per woman (Niger, Mali, Burundi, United Republic of Tanzania, Republic of the Congo, Chad and

Nigeria) are associated with low Ginis, below 0.44, while most countries that have advanced in the demographic transition – such as Botswana, South Africa, Namibia and Seychelles – are associated with Ginis above 0.6.

A cursory analysis of a variant of Kuznets' framework[10] tends to suggest the link is through change in per capita income. Countries that succeeded in increasing per capita income by 2 per cent or less on an annual basis were able to reduce inequality. The converse holds for those that increased per capita income by more than 2 per cent (see figure 9.8). When annualised growth in per capita income is greater than the population replacement fertility rate (2.0 children per woman), income distribution tends to be more skewed in favour of the rich. The labour market adjustment as proposed by NAP (1986) and Boulier (1975) becomes less optimal when per capita income grows faster than the population replacement fertility rate. This tends to suggest that development progress has been pro-poor in some African countries, creating opportunities for additional population growth that is concentrated among the poor. This must continue through investments in enhancing quality health and education systems, expanding the skill content of the education system to promote the employability of the working population and bridging the infrastructure deficit that impedes private sector development.

The share of the working population is used as a proxy for access to decent work. That access promotes both demographic transition and poverty reduction. Lessons learned from Latin America and the Caribbean and Asia have shown that job creation could be facilitated through labour market flexibility and the promotion of labour-intensive manufacturing. Investing in the skill content of educational systems, creating jobs for millions of Africans entering the labour market annually and increasing

FIGURE 9.8. Change in Gini and per capita income



Source: Authors' computation from data from the World Development Indicator Database.

[10] This variant uses changes in Gini and per capita income as opposed to levels of the two variables.

overall productivity are key to leveraging demographic dividends in Africa. A macroeconomic policy environment that allows the private sector to thrive – protecting investors' rights, reducing the cost of doing business and strengthening the rule of law and regulatory frameworks – is also vital.

Policies that are able to transfer incomes from the highest to the lowest percentile are important to address inequality. Appropriate fiscal incentives (taxes and transfers) that redistribute wealth to the bottom 10 per cent will help accelerate reduction in inequality. Based on experiences from most African countries, such fiscal instruments must be designed to promote achievement of their distributional objectives at a minimum cost to economic efficiency. Fiscal policies that enhance human capital of low-income households will reduce income inequality and promote economic growth. The level and composition of tax revenues still require further research to determine the optimum level that can be leveraged. Fiscal space (tax-GDP ratio) in Africa is still relatively low. In addition, tax composition tends to favour indirect taxes such as the VAT, which tend to be less progressive than direct taxes, such as the income tax. Spending on social protection in Africa is improving but still remains relatively low. African governments must pay special attention to the redistributive role of taxes, transfers and public expenditures.

Evidence from the findings shows that eight of the 11 countries that grew at least 1.5 per cent faster than the regional average (between 2000 and 2015) recorded increases in inequality. This calls for an inclusive growth process. Growth must concentrate on sectors where most of the poor households and the bottom 40 per cent make their livelihoods, including agriculture, micro and small-scale enterprises. Growth driven by enclave sectors, including the extractives, will continue to worsen inequality.

TABLE 9.2 Correlation Index between Gini and other variables of interest

	Income share of bottom 40%	Fertility rate	Poverty rate	ECM	Gini intensity	PGR	Depend. rate	Working pop.	GDP-PW	% secondary	Growth
Income share of bottom 40%	1.000										
Fertility rate	0.343	1.000									
Poverty rate	-0.061	0.459	1.000								
ECM	0.263	0.460	0.385	1.000							
Distribution effect	0.901	0.278	-0.026	0.268	1.000						
PGR	0.331	0.699	0.528	0.653	0.373	1.000					
Dependency rate	0.256	0.943	0.449	0.573	0.159	0.603	1.000				
Working pop.	-0.238	-0.934	-0.459	-0.535	-0.133	-0.567	-0.995	1.000			
GDP-PW	-0.223	-0.608	-0.523	-0.363	-0.118	-0.340	-0.610	0.618			
% Secondary	-0.260	-0.550	-0.545	-0.678	-0.220	-0.628	-0.473	0.452	0.510	1.000	
Growth	0.194	0.324	0.066	0.169	0.164	0.332	0.373	-0.348	-0.225	-0.181	1.000

Note: ECM = Early child marriage (18 years and below); Distribution effect = Share of the lowest 10% to the highest 10%; PGR = Population growth rate (2000-14); Depend. rate = Dependency rate (2000-2015); Working pop. = Share of working population (2000-2015); GDP-PW= GDP per worker (2005-2015) and % Secondary = Share of secondary school pop. (2008-2014).
Source: Author's computation.

TABLE 9.3 Regression results with Gini and population growth as dependent variables

	Gini as a dependent variable (M1 – M11)											Population growth as a dependent variable
	M1	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**
Intercept	52.01*	55.31*	47.33*	58.24*	41.45*	47.25*	14.34	37.97*	59.44*	36.22**	22.06***	4.08**
Population growth rate	-3.55*										2.02	
Fertility rate		-2.47**										
Early child marriage			-0.13***									0.013**
Dependency rate				-0.18***								
GDP per worker					0.0002							0.001
Growth rate						-0.88					0.056	0.069***
Share of working population							0.53***				0.493***	-0.044***
% of secondary education								0.10**			0.062	-0.008
Distribution effect									-2.12*		-2.098*	
Annual rate of change of urban population										1.46**		
Poverty rate											0.059***	0.009**
R^2 Adjusted	0.07		0.10	0.05	0.05	0.04	0.02	0.04	0.05	0.75	0.07	0.79 0.56
F-statistics	4.16*	5.84**	3.12***	3.42**	2.55	1.68	2.96***	3.02***	28.54*	12.14**	26.80*	9.76*

Source: Author's computation.

TABLE 9.4 Income and population growth that is faster or slower than the regional average

	Bivariate models								Multivariate models	
	M1	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**
Intercept	45.11*	41.83*	43.63	41.66	41.96	44.78	42.34	44.96	-7.37	-8.24***
Population growing faster than regional average	-6.82***								11.23	16.7
Population growing slower than regional average	-4.49***							5.49		
Economic growth faster than regional average	-0.68						9.03**	9.27*		
Economic growth slower than regional average	-2.01***					0.1				
% with secondary education higher than regional average	0.14				-0.04	-0.31				
% with secondary education lower than regional average	0.19			-0.28						
% of working population higher than regional average			0.53		1.28					
% of working population lower than regional average				1.22	5.07***	5.91**				
R^2 Adjusted	0.052	0.045	0.015	0.039	0.032	0.027	0.013	0.049	0.259	0.161
F-statistics	3.29***	2.97***	0.39	2.69***	2.36	2.16	1.55	3.15***	1.49	3.02**

Source: Author's computation.

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