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Getting to Africa's Demographic Dividend

Abstract In this chapter, Cilliers defines the demographic dividend and explains its relationship to economic growth, with a focus on the African continent. It first covers the fundamentals of the relationship between population and economics, then offers an in-depth discussion of two key concepts, the demographic transition and demographic dividend. The chapter demonstrates that sub-Saharan Africa's high fertility rates are a drag on development rather than an advantage, as the region can only expect to enjoy a demographic dividend after mid-century. It then uses scenario analysis to demonstrate that, given the right policy conditions, Africa can accelerate population-driven economic growth by reducing its fertility rate through interventions in education, infrastructure, human capital and, most importantly, women's empowerment.

Keywords Population · Demography · Economic growth · Fertility · Mortality · Dependency ratio · Migration · Demographic transition · Youth · Labour

Learning Objectives

- Understand the demographic transition and why it has not yet occurred in Africa
- Explain the relationship between population and economic growth
- Define the demographic dividend and recognise the multiple means of measuring it
- Interpret demographic data visualisations such as a population pyramid.

The African Union's annual theme for 2017 was *Harnessing the demographic dividend through investments in youth*. In preparation, the AU Commission in Addis Ababa spent considerable resources to review progress with the 2006 African Youth Charter¹ and its 2009–2018 Plan of Action,² that included a roadmap³ aimed at unlocking the potential of the continent's youth.

The basic premise was that Africa's youthful population would ensure fast economic growth and that, as a general notion, rapid population growth was positive for development. If this is indeed the case, the analysis begs the obvious question why Africa, with its youthful populations, does not see commensurate improvements in income?

When, in October 2018, I presented our research on demographics and economic growth to staff from the African Union in Addis Ababa. I argued that the Charter, Plan of Action and roadmap skirted around the need for a more rigorous analysis of the demographic dividend and that it basically missed the point. In fact, Africa's very high fertility rates were actually a serious constraint on development and until such time as the continent significantly lowered fertility rates, it would not be able to economically grow quickly enough to reduce poverty and improve livelihoods. Although trends were going in the right direction, much more urgent action was required to speed up Africa's demographic transition.

It was for some as if I had let the air out of a very large balloon. Actually nothing I presented was particularly new or innovative and has been reflected in mainstream demographic analysis for several decades. As I had expected, the one diplomat after the other, including from a country like Uganda with its young population and elderly president for life, objected strongly to this attempt at stigmatising motherhood and apparently, children, and muttered darkly that I obviously did not understand the benefits of high fertility rates.

In my presentation, I first made the standard distinction between children (aged 0–15) and the elderly (above 64)—the two components of the dependent portion of the population. Forty-three million Africans are born every year, a number that will increase to 53 million annually by 2040.

I then pointed to the well-known youthful structure of the African population with a median age just shy of twenty years, meaning that half the African

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¹The African Union Commission, 2006. *African Youth Charter*. [Online] Available at: https://www.un.org/en/africa/osaa/pdf/au/african_youth_charter_2006.pdf.

²African Union, 2011. *African Youth Decade 2009–2018 Plan of Action*. [Online] Available at: https://www.un.org/en/africa/osaa/pdf/au/african_youth_decade_2009-2018.pdf.

³The African Union Commission, 2017. *AU Roadmap on Harnessing the Demographic Dividend Through Investment in Youth*. Addis Ababa: African Union.

Fig. 4.1 Population pyramid for the Africa, World except Africa, North Africa, sub-Saharan Africa and EU27 in 2018 (Source UN Population Division medium term forecast, 2017 revision in IFs v 7.45)

population is younger than twenty and a half are older. The result is a population pyramid that has a very broad base and quickly narrows with each age group. The contrast is presented in Fig. 4.1 that compares the population pyramid for 2018 for the World without Africa, the EU27 group of countries, North Africa and sub-Saharan Africa. The working-age portion of the population aged 15–64 is shaded.

The large cohort of children below 15 years of age means that African countries generally require huge and ongoing investments in education, health and infrastructure that detract from other required improvements.

A next figure, Fig. 4.2, advances the population pyramid for each of these groups to 2040 to illustrate the ongoing youthful character of the population of sub-Saharan Africa.

A large body of research done over several decades by the World Bank and others have found that it is the increase in the size of the working age population (15–64) *relative* to the dependants that contributes most to economic growth at low- and even middle-income levels of development. In other words, it is the ratio of working age persons to dependents that is important, and whether that ratio is changing.

According to the World Bank, in East Asia one-third of the increase in economic growth during its economic miracle can be attributed to a growing labour force. A substantial portion of the remainder is achieved by

Fig. 4.2 Population pyramid for the Africa, World except Africa, North Africa, sub-Saharan Africa and EU27 in 2040 (Source UN Population Division medium term forecast, 2017 revision in IFs v 7.45)

the determined pursuit of export-oriented policies that provided productive employment for its rapidly expanding population.⁴ Others estimate that the contribution that an increase in the size of the working age population makes to economic growth is even higher.⁵ Literacy and quality basic education is an obvious additional requirement.

At the moment 56% of Africa's population fall within this working age bracket, implying that there are 1.3 persons of working age for every dependent. The ratio in the rest of the world is at 67% of the total population being of working age or two persons of working age to every one dependent. The difference of 0.7 is extraordinarily significant given the large numbers involved.

The underlying logic is quite simple. Economic growth is determined by the contribution from labour, capital and technology. At low levels of development, labour makes the biggest contribution to economic growth and at high levels of development it is technology. So the larger the labour pool in developing regions such as Africa, the quicker it can grow.

⁴Canning, D., Sangeeta R., and Abdo Y. S., eds. 2015. *Africa's Demographic Transition: Dividend or Disaster?* Africa Development Forum series. Washington, pp. 6–7.

⁵Sharma, R., 2016. *The Rise and Fall of Nations: Ten Rules of Change in the Post-crisis World*. London: Penguin Random House, pp. 6–7, 19.

The size of the labour force does not necessarily correspond exactly with the number of people in the age bracket 15–64 since many would still be getting an education, or would not have a job, but the essential relationship holds even after accounting for these differences.

What History Reveals

Several centuries ago, up until around the middle of the seventeenth century, the countries with the largest populations and the most fertile farming land boasted the largest economies. The size of the labour force and the suitability of the land to agriculture were the main engines of growth, even if they seldom made a difference to average incomes and by modern standards the vast majority of citizens were destitute.

The industrial revolution in the West upended this state of affairs. The technological breakthroughs of the eighteenth and nineteenth centuries transformed the economic structures of the previous centuries by shifting some elements of production from manual labour to machines. Productivity was no longer determined by the fertility of the land or the size of the workforce alone, but also by the unprecedented output of inventions like the steam engine and the cotton gin.

Workers could now produce more output than before, although their actual living conditions only changed very slowly. Productivity soared in Europe and North America, although it generally remained stagnant in the rest of the world. Burdened by colonialism the industrial revolution bypassed much of Africa. This was the start of the 'great divide' that saw Europe, and eventually North America, overtake countries like China, previously one of the largest economies, and come to dominate the world—a global order that has held until very recently.⁶

With industrialisation, population structures changed. People moved to cities to work in factories and birth rates declined, eventually increasing the number of persons or working age compared to dependents. These developments largely also bypassed Africa for a host of reasons mentioned in other chapters, including geography, the continent's high disease burden, the impact of slavery, then colonialism and other factors.

Population growth and age structure remain critical components of economic growth, particularly at lower levels of development. Even in the

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⁶Roser, M., 2019. Economic Growth. [Online] Available at: <https://ourworldindata.org/economic-growth>.

twenty-first century, economies generally do not grow unless their populations also do. Today, countries like Japan, Italy and Germany are experiencing slower economic growth as their populations age. Their population pyramids no longer rest on a wide base, but take the form of an inverted pyramid as the elderly section of the population grows ever larger.⁷ Once populations start to decline in size, economies also struggle to grow in size but can continue to experience steady improvements in income per capita since the golden rule is that economic growth must simply be more rapid than population growth.

All in all population structure is very important for economic growth. The relationship between economic growth and population structure is most often operationalised with reference to the demographic dividend or the dependency relationship, of which the latter is the inverse of the former.

The Impact of the Demographic Dividend

There are a number of ways in which to define the demographic dividend such as median age and rates of fertility. In this book, and in the presentation to the AU and others, I prefer to use the ratio of the working age population (aged 15–64 years) to the dependent population, i.e. children below 15 years of age and those older than 64.⁸

A country's income generally rises when this ratio improves. The quicker the rate of improvement and the higher the rate achieved, the more rapid economic growth will be.⁹ This is particularly true for poor, developing countries.

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⁷Pearson, C. S., 2015. *On the Cusp: From Population Boom to Bust*. Oxford: Oxford University Press.

⁸A second definition is that a favourable 'demographic window' opens when children (i.e. below 15) make up less than 30% of the population and those 64 or older make up less than 15%. Cincotta, R., 2017. *Opening the Demographic Window: Age Structure in Sub-Saharan Africa*. [Online] Available at: <https://www.newsecuritybeat.org/2017/10/opening-demographic-window-age-structure-sub-saharan-africa/>. Alternatively (the third definition) is that the window opens when the median age is above 25.5 years and below 36–41 years. The median age is the age that divides a population into two equal groups, half younger and half older. The maximum median age for the demographic dividend differs because of variations in life expectancy. For example, in 2074, when Africa's demographic dividend ratio peaks at 2:1, the median age is expected to only be 36.5 years. In developed countries with longer life expectancy the top end of the demographic dividend is at 41 years median age. In Africa it is currently 19.8 years. In 1987 it was 17.5 years and by mid-century it should be at roughly 25.5 years. Finally (the fourth definition), a demographic dividend occurs when the total fertility rate is between 2.8 and 2.1 children per woman. In 1987 Africa's total fertility rate was 6.2 children per woman and in 2074 it should be at around 2.1 children. The number 2.1 children per woman is generally considered replacement fertility rate for below that populations start to decline and economic growth generally follows. Exactly when that occurs is affected by changes in life expectancy which, in Africa, is significantly below the global mean.

⁹This is also known as the first dividend since there is also a second and third dividend that is the result of savings and investments, and improvements in productivity.

The ratio of working age persons to dependents in Africa started to slowly improve from the late 1980s from only 1.1 persons of working age for everyone dependent to its current ratio of 1.3. In other words, whereas there were 10 dependents for every 11 people of working age in 1987, today there are 13 persons of working age for every dependent. When the continent gets to a ratio of 1.7 persons of working age to dependants as from the mid-2050s, it will enter a window of particularly rapid income growth through the contribution that is made by labour to growth (as opposed to capital and technology) that will last for about two decades on the Current Path forecast. Eventually Africa experienced a peak ratio of around two persons of working age to every dependent shortly after 2070. Thereafter the relationship starts to decline and, if labour is then still as important as it is today, rates of economic growth will decline.

Once the demographic dividend has peaked, economic growth is very likely to taper off unless an economy has managed to shift gears so that capital and technology are able to compensate for the decline in the relative size of the labour pool and hence for the declining portion of working age persons to dependents.

China and the Asian Tigers peaked at an extraordinarily high ratio of 2.8 working age persons to every one dependent in 2010 and 2013, respectively, and are now in this exact situation. However, Africa is unlikely to be able to experience the high rates of economic growth achieved by China and the Asian Tigers, since the ratio of working age population to dependants will peak at a relatively low level of two working age persons to every one dependent compared to their ratio of 2.8. And then it seems quite certain that the fourth industrial revolution will change the labour-capital-technology relationship in favour of the latter.

Unsurprisingly, the ratio of working age persons to dependents has played an important role in the improvements in prosperity in Japan, China and the Asian Tigers since the 1960s, as well as in the USA and the Nordic countries, albeit over longer time horizons. In the case of the USA and the Nordic countries, the ratio of working age persons to dependents did not swiftly peak at the levels of China and the Asian Tigers and then decline, but slowly increased and then remained in positive territory for an extended period of time.

The benefit of a constantly growing pool of working age persons played an important role in the steady rates of economic growth and improvements in productivity in the USA and the Nordic countries as these countries eventually graduated to high-income status.

Fast growth in the working age population relative to the number of dependents does not automatically translate into rapid economic growth, since other facilitators like food sufficiency, literacy and basic education, an export orientation and a governing elite committed to growth also need to be present, but it still has some interesting benefits. Smaller families mean fewer additional schools are needed and the ratio of teachers to pupils can be improved more readily. As a result, parents and the state can invest more resources in those fewer children. Eventually governments need to provide fewer additional houses and water and electricity connection, and can invest in higher technology, in research and other measures that are necessary to maintain improvements in productivity, even as the size of the working age population later starts to decline as the size of the elderly population increases to displace child dependents.

In summary, an increasing working age population to dependents boosts economic growth since more working age persons contribute to economic activity although that, in itself, is insufficient.

Comparing Niger, Egypt, Japan and Sweden

In 2018 half of Niger's population was estimated to be younger than 15 years and it only gets to a 16-year median age by 2026. The country has the lowest median age in the world and the life expectancy is 62 years.¹⁰ Niger has fewer than one person of working age to its dependants and this very low relationship means that Niger cannot grow per capita income, except in the unlikely scenario that it is able to grow its economy at sustained rates of around 10% per year or more for successive decades. The disproportionate size of the cohort of children makes it difficult to build enough schools, train enough teachers and roll out an education (or health) system able to cope with the massive influx of pupils and simultaneously improve average levels and quality of education for those children already within the system.

Egypt, on the other hand, with a median age of 25 years and a life expectancy of 72 years, is on the cusp of achieving an age structure favourable for rapid economic growth with a ratio of 1.6 working age persons to every dependant—a ratio that is increasing. Given the right policies and leadership, Egypt should be able to grow improvements in income levels rapidly. The challenge is that Egypt's closed political system mirrors its statist and

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¹⁰Chad has the lowest life expectancy in Africa at 52 years in 2018.

closed economy and means that it could squander this once in a century opportunity.

Sweden, on the other hand, is about to exit the demographic sweet spot (median age of 41 and life expectancy of 83), having been in the demographic sweet spot for most of the twentieth century. It also has a ratio of 1.7 working age persons to dependants but in contrast to Egypt, Sweden's ratio is deteriorating rather than accelerating. With its advanced technology and longevity, Sweden is, however, largely able to compensate for its changing demographics as its people are generally more productive into old age.

Japan has the highest median age in the world at 47 years (with a life expectancy of 84 years). The ratio of working age to dependants is 1.5 and declining with the result that the disproportionate size of the elderly cohort is a large burden on the state. The fact that Japan still manages to grow the size of its economy in spite of its declining population speaks volumes about the high productivity of its economy, particularly its use of technology.

In Sweden and Japan average incomes are still growing, although slowly, but these countries have raised income levels to extraordinary high levels in previous years and the current slow improvements are therefore from a very high base. In these countries, longer life expectancy means that people can extend their working lives beyond 64, thereby expanding the size of the working age population. A higher retirement age can compensate for the high median age to a degree, particularly by adopting practices related to healthy ageing. But because of the prevalence of non-communicable diseases such as cancer in an elderly population, health expenditure is much higher and, in many rich countries, there is considerable resistance to raising the retirement age, perhaps most famous for the repeated efforts to do so in France.

The evolution of the demographic dividend is compared in Fig. 4.2 that presents the percent of the population aged with a forecast to 2050 for Sweden, Egypt, Japan and Niger is presented in Fig. 4.3 with the caveat that the historical data for Egypt and Niger are, for the most part, likely estimations from the UN Population Division.

A demographic dividend provides a structural foundation that can enable rapid economic growth. Since it is the size of a well-educated labour force rather than the amount of capital or technology that makes the largest contribution to economic growth at low levels of development, harnessing the demographic dividend is very important for Africa.

Fig. 4.3 Percent of persons aged 15–64 in Niger, Egypt, Sweden and Japan in 2018 and 2040 (Source Historical data from UNPD, forecast in IFs v 7.45)

Africa's Slow Demographic Transition

Globally, the size of the working age population relative to dependents peaked at around 2010. As a result, the world has entered a structural period of slower growth from which it can only emerge through advances in technology, including capitalising on the digital economy and the fourth industrial revolution, factors that I explore further in Chapter 10.

Africa's youthful population stands out against this global backdrop of ageing populations. Only in Africa is the size of the working age population as a portion of the total population still increasing. This development is positive, but it is happening slowly and from a very low ratio of the working age population to dependants.

The result is that Africa is only likely to experience a real demographic dividend from the middle of this century onward. Consequently, for the next three decades Africa's dependent youth population will remain a drag on economic growth, although to a lesser extent with every passing year.

Today, most of Africa still finds itself in the early stages of the demographic transition. In other words, the shift from high death and birth rates to low death and birth rates has started but it is progressing gradually and much slower than it historically did in other regions.

Generally countries (and regions) that have been unable to rapidly progress through the demographic transition and therefore not reach the demographic dividend ratio of 1.7 are characterised by severe poverty and large disease

burdens, as well as high birth and death rates that structurally constrain their ability to reduce poverty and improve livelihoods. The rapid increase in the number of children offsets the increases in income from economic growth and prevents the accumulation of savings resulting in low capitalisation in the economy.

There are many reasons for Africa's comparably slow demographic transition. Historically, low population density—a function of Africa's high disease burden—translated into low levels of urbanisation and lower rates of income growth. Some of these aspects are explored in Chapter 3 on health.

In more recent generations, the continent has also not been able to raise education quality and attainment, roll out the use of modern contraceptives quickly enough or transition to economies where child labour is no longer required.¹¹ Nor has Africa been able to produce sufficient job opportunities to provide meaningful work for its growing population.

Most African countries are experiencing slow income growth because their populations are very young, although the picture is heterogeneous. A few African countries, including Mauritius, Libya, Tunisia, Seychelles, Cape Verde, South Africa and Morocco are much further along in their demographic transition.

Fertility rates across Africa vary significantly. In 2018 they ranged from 7 (in Niger) to 1.4 (in Mauritius). In addition to Mauritius, the countries with the lowest fertility rates are Seychelles, North African countries such as Tunisia, Morocco, Libya and Algeria, and South Africa and Botswana in Southern Africa. The fertility rate for sub-Saharan Africa as a whole is currently estimated at 4.8 children per woman.¹²

In countries such as Tunisia, fertility rates are approaching the level at which population size first stagnates and then starts to decline (understood to be just above two children per woman of childbearing age) unless there is a significant young, net inward migration and/or changes in fertility rates.¹³ Many other countries like Mozambique appear to be stalling in their transition by maintaining very high levels of fertility, while a third group (including Ethiopia) is achieving a rapid reduction from previously very high fertility rates. Ethiopia will therefore achieve the 1.7 ratio of working age persons to

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¹¹According to the World Report on Child Labour, one in four children (aged 5–17) in least-developed countries are involved in child labour. International Labour Organization, 2015. International Labour Organization, 2018. *Women and Men in the Informal Economy: A Statistical Picture*. Geneva: International Labour Office. And also: *World Report on Child Labour 2015: Paving the Way to Decent Work for Young People*. Geneva: International Labour Office.

¹²Africa reaches 2.8 two years earlier, since Northern Africa has a more mature population structure.

¹³2.1 children per woman is generally accepted as the replacement fertility rate. Without inward migration, below that rate populations start to decline.

dependents in 2040, more than a decade before other low-income countries in Africa.¹⁴

Countries with high child mortality rates also tend to have high fertility rates, and a reduction in infant and child mortality supports a virtuous cycle that is key to reducing fertility rates. As children's health and survival improve, family demand for more children slowly declines. Smaller family size improves maternal and child education in a positive reinforcing manner. As female education improves, and as child mortality declines, women have fewer children which in turn allows for healthier and better-educated children. Female education at the secondary level has a particularly strong impact on reducing the average number of births per woman.

The result is that fertility rates are closely associated with education and income levels, as well as with urbanisation. In Ethiopia, for instance, the fertility rate based on 2016 data was 6.4 children for poor women and 2.6 for the wealthy. The corresponding numbers in Tanzania for the same year were 7.5 and 3.1.¹⁵ Geographically speaking, fertility rates in capital cities such as Accra and Addis Ababa are close to replacement levels, while those in rural parts of the Democratic Republic of the Congo are close to seven children per woman.¹⁶

Life expectancy in many African countries is also low. Whereas life expectancy in North Africa was estimated at almost 74 years in 2018, roughly a year longer than the global average, in sub-Saharan Africa it is 64 years—nine years below the global average. In 2018, 28 African countries, ranging from Chad (life expectancy estimated at 52.2 years) to Liberia (life expectancy estimated at 62.9 years), had a life expectancy below 64 years—the final year at which people are typically assumed to still be of working age.

Lower child mortality rates, higher incomes, the education of women, and the availability of contraception all reduce fertility rates.¹⁷ These socio-economic changes are a result of modernisation. Globally better health care, structural changes to the economy, and a rise in women's status and opportunities have all contributed to a reduction in total fertility rates and hence in slowing population growth.

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¹⁴See Eloundou-Enyegue, P., Giroux, S., and Tenikue, M., 2017. African Transitions and Fertility Inequality: A Demographic Kuznets Hypothesis. *Population and Development Review*, 43(S1), pp. 59–83.

¹⁵The averages are for the top and bottom quintile. Institute for Health Metrics and Evaluation, 2019. Global Health Data Exchange. [Online] Available at: <http://ghdx.healthdata.org/series/demographic-and-health-survey-dhs>.

¹⁶Canning, D., Sangeeta, R., and Abdo, Y. S, eds. 2015. Africa's Demographic Transition: Dividend or Disaster? Africa Development Forum series. Washington, p. 18.

¹⁷Roser, M., 2017. Fertility Rate. [Online] Available at: <https://ourworldindata.org/fertility-rate>.

The Peak and Length of the Demographic Dividend

An important explanation for the dynamism and growth of the US economy over an extended period of time is that it entered its demographic dividend shortly before 1930 and will only exit it around 2036, after having been in this favourable position for more than a century. Like Sweden, the demographic dividend explains much of the high levels of income that the USA has been able to attain during this lengthy period.

China, on the other hand, will spend around 50 years in this fortunate window, less than half that of the USA. This explains why China is unlikely to ever approximate income levels of the USA, reflected in the oft-repeated mantra that China will grow old before it gets rich.

Development takes time. Eventually India will spend around 60 years in the demographic high growth range, having only recently attained a ratio of 1.7 working age persons to dependents. However, while China experienced a peak ratio of 2.8 working age persons to dependents, India's likely peak ratio will be at around 2.2 and achieve that shortly before 2040. By this metric, India could experience a modest degree of income catch up with China, but only in the second half of the twenty-first century.

Nigeria only progresses to the 1.7 ratio at roughly 2060 in the Current Path forecast. Less than thirty years later it then peaks at two and will exit the 1.7 ratio early in the next century. Given this long-term horizon, it is virtually impossible to speculate responsibly on Nigeria's long-term future growth prospects, also because the region is expected to suffer significant impacts from climate change at a time of huge technological advances. But what is sure is that current demographic forecasts condemn Nigeria to moderate income growth and even then, only over extended time horizons.

In this context it is important to remind oneself that the impact of technology on productivity is increasing every year. While labour is an important component in productivity at lower levels of development, capital and technology are becoming ever more important, which would reduce Nigeria's growth advantage—indeed that of much of sub-Saharan Africa.

The point is that the level at which countries achieve their peak demographic dividend—and how long they stay there—significantly impacts on economic growth. The longer a country is within this demographic window, the better—although it is again important to emphasise that the contribution that labour makes to growth is declining over time due to the impact of labour-saving technology.

Fig. 4.4 Demographic dividend of Nigeria, China and India: 1960–2100 (Source Historical data from UNPD, forecast in IFs v 7.45)

A peak of 2.8 working age persons to dependants (China in 2010) delivers much more rapid economic growth than a peak of 2.2 (India in 2035) or a peak of 2.0 (Nigeria in 2084). This is because the size of the potential labour force relative to dependants is larger.¹⁸ That peak of 2.8 contributed significantly to China's almost 11% rate economic growth in 2010. According to the IFs Current Path forecast, India is projected to grow at 6.2% in the decade from 2030 to 2040 and Nigeria at less than half that in the 2090s, which is partly explained by its low peak of 2.0 (Fig. 4.4).¹⁹

Looking to the end of this century, the ratio of working age persons to dependents is set to contract in all regions except in sub-Saharan Africa, where it will only peak at a ratio slightly below 2.1 at around 2075. At that point, Africa will have a population of 3.3 billion people (of which 3 billion will be living in sub-Saharan Africa).

A different way to express this metric is that 67% of the population of sub-Saharan Africa will be of working age while the global average at that point is expected to be 62%. In this context, a 5 percentage point difference would indicate that sub-Saharan Africa will grow at a greater rate than global

¹⁸The dependency ratio is the inverse of the demographic dividend. If the labour force increases in size relative to dependents, it causes the dependency ratio to decrease (or the demographic dividend to increase), in which case economic growth is very likely to follow. So, a dependency ratio of one to one means that every worker has to support one dependent. In a country like South Korea, which had a dependency ratio of 0.39 in 2018, each person of working age only has to support one-third of a dependent.

¹⁹Growth rates for the USA would be around 1.5% in 2050 and around 1% for the EU27. Europe, globally the oldest region, is well on its way to emulating Japan—having too large an elderly population compared to its working age population.

averages, but not by much. Also, because Africa will achieve a relatively low worker to dependant ratio, it will very likely grow at quite modest rates along the Current Path forecast. None of this is good news for a continent that aspires to catch up with global income averages.

Whereas Europe and Japan are experiencing slow economic growth partly because of their large elderly population, sub-Saharan Africa is now the only region in the world where a high child dependency burden is a main cause of slow growth in low income levels.

Only Tunisia, Morocco, Libya and Algeria, the small island states Mauritius and Seychelles, Botswana, South Africa and Djibouti currently have a ratio of 1.7 and higher.

Africa also has a larger youth bulge (people between 15 and 29) as a portion of the total adult population (i.e. those aged above 15) than any other global region. It is typical of many poor countries to have a large share of young people relative to the total adult population and this is also associated with increased risk of conflict and high rates of criminal violence. This is compounded when young people lack opportunities in terms of education, training and employment and feel they have no voice and are excluded from the economy and politics. Whereas the youth bulge in the rest of the world peaked in around 1980 at around 42% of the adult population, Africa only gets to the 42% rate at around 2040.

The Potential Benefits of Reducing Fertility Rates

Generally, a decline in fertility follows a decline in child mortality with a time lag of several years, as parents come to no longer expect to lose as many children.²⁰ The provision of basic infrastructure for water and sanitation, as well as advances in primary healthcare, reduce infant mortality and eventually lead to lower fertility rates.

The need to have many children is not only based on the expectation that some children could die before reaching adulthood, but also because in economies dominated by employment in the agricultural sector (a characteristic of many poor and developing countries), families need children as labour. Child labour was widespread in most agrarian societies, even during industrialisation.

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²⁰Roser, M., 2017. Fertility Rate. [Online] Available at: <https://ourworldindata.org/fertility-rate>.

Although many factors impact fertility rates, levels of female education is perhaps the most important driver. In addition, women's increased participation in the labour force, which is closely linked to improved female education and steady improvements in gender parity, also reduces total fertility rates.²¹

For example, women who are better educated have more employment opportunities and are likely to want fewer children. Educated women (and men) are also more likely to be better informed about modern contraceptives and the benefits that lower fertility offers in terms of better education for a smaller number of children. Alternatively, where women have a lower social status, lower levels of decision-making opportunities and fewer opportunities outside the household, fertility rates tend to be higher.

While the Middle East and North Africa is generally not considered a progressive region in terms of gender parity (with the limited exception of Tunisia), in 2015 girls in the region were about 5 percentage points more likely to enrol in primary school than girls in sub-Saharan Africa. From an economic productivity perspective, the investment in female education in North Africa is, however, largely wasted, with the female share of the total labour force being roughly half that of sub-Saharan Africa (24% versus 43%). Whereas the labour force participation rate for females is only 23% in North Africa, it is 64% in sub-Saharan Africa.²²

The use of modern contraceptives is a more immediate driver of total fertility rates than education, although poor access to education among women constrains uptake. Research suggests that the average gap between actual and desired fertility could be as high as two children per woman in sub-Saharan Africa,²³ pointing to a large pent-up demand for the provision of modern contraceptives.

Data from the UN Population Division forecasts that the unmet demand for modern contraceptives in low-income Africa will be 28% in 2018 and 25% in lower-middle-income African countries, with large country to country variations. Estimates for the unmet need for family planning in Africa for women of reproductive age (15–49 years) who are married or in union for 2017 range from 12% in Zimbabwe to 41% in the Democratic Republic of the Congo.²⁴

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²¹Ibid.

²²International Labour Organization, 2018. *World Employment and Social Outlook: Trends 2018*. Geneva: International Labour Office, pp. 11–12.

²³Canning, D., Sangeeta, R., and Abdo, Y. S, eds. 2015. *Africa's Demographic Transition: Dividend or Disaster?* Africa Development Forum series. Washington, p. 19.

²⁴United Nations Department of Economic and Social Affairs, 2018. *Estimates and Projections of Family Planning Indicators 2018*. [Online] Available at: https://www.un.org/en/development/desa/population/theme/family-planning/cp_model.asp.

The potential for a rapid uptake of contraceptives with a large impact on fertility and the potential to improve Africa's demographic dividend is therefore large.²⁵

The Components of the Demographic Dividend Scenario

In this section, I explore a scenario called the Demographic Dividend that could set the continent on a demographic trajectory quite different to the Current Path. In designing and exploring this scenario, I do not ask how these policies are motivated or assess the inevitable socio-political challenges that would accompany them. Rather, I only look at the potential impact of successful implementation.

Owing to the slow-moving nature of demographic dynamics, I also take a longer view than in most of the other chapters in the book. As with other chapters the interventions in the IFs system are detailed at www.jakkeicillie.rs.org and benchmarked against the historical and expected progress in South America and South Asia as two comparable regions.

The first, and most impactful, intervention is the ambitious roll-out of modern contraceptives in sub-Saharan Africa (since total fertility rates in North Africa are already very low) which should be possible given the unmet demand mentioned previously. Whereas, in 2020, only 31% of fertile women in sub-Saharan Africa use modern contraceptives, the intervention pushes that rate up to 68% by 2040—21 percentage points above the Current Path forecast for that year.

A second intervention is a modest reduction in child and adult female mortality rates from communicable diseases. This intervention imitates a health system better equipped for family planning. A high under-five mortality rate is an important driver of high levels of desired fertility since high child mortality rates translate into families having more children. Maternal mortality is already forecast to decrease on the Current Path from 402 deaths per 100,000 live births in 2020 to 190 in 2040. The intervention

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²⁵For example, three low-income countries (Rwanda, Ethiopia and Malawi) achieved a 13–19% increase in contraceptive use over 15 years (2000–2015) and 22–27% over 30 years (1985–2015). Three lower-middle-income countries (eSwatini, Lesotho and Zambia) achieved an 11–12% increase in contraceptive use over 15 years (2000–2015) and 22–23% over 30 years (1985–2015).

Fig. 4.5 Peak World population in 2018 and 2100 under different scenarios (Source IFs v 7.45 initialising from UN Population Division World Population Prospects, 2017 revision)

reduces the 2040 number to 90, which is still significantly above the 2040 number of 29 in South America and 39 in South Asia.²⁶

A final intervention is a 20% improvement on a general index that measures female empowerment.²⁷ Although generally considered the fundamental or deep driver of changes in the number of children that women decide to have, women’s empowerment is also the intervention with the least direct impact on demographics. This is because changes in social norms normally take longer to impact on fertility than other measures.

Scenario Impact on Global Population

Given the momentum behind Africa’s youthful population, the impact of the Demographic Dividend scenario on the size of the world’s population would be substantial. These forecasts are presented in Fig. 4.5 that presents

²⁶Eastern and Southern Africa have seen the most improvement since 2000 United Nations Children’s Fund, September 2019. Maternal Mortality Declined by 38 Percent Between 2000 and 2017. [Online] Available at: <https://data.unicef.org/topic/maternal-health/maternal-mortality/>.

²⁷IFs still uses the Gender Empowerment Measure (GEM) for its history and forecasts. GEM has now been discontinued and replaced by the Gender Inequality Index (GII).

the forecast of peak world population in the Current Path and Demographic Dividend scenario. In the Demographic Dividend scenario peak world population should occur just before 2080 at roughly 10 billion people with enormous positive implications for global sustainability. In the Current Path forecast peak global population would occur a decade or so later, at 10.5 billion people. Whereas Africa would constitute 29% of the global population at the time of the Demographic Dividend peak in 2077, it would constitute 35% of the global population in 2089 along the Current Path.

By the end of the century, Africa's population would grow to 3.1 billion people in the Demographic Dividend scenario (constituting 32% of global population) and be close to its peak population (as opposed to peak World population discussed in the previous paragraph), while on the Current Path it is expected to be more than 3.8 billion people (constituting 36% of global population) and still be several decades away from a Current Path population peak for the continent.

These forecasts over extended time horizons are, I need to emphasise, very uncertain. Forecasting to 2040 is already stretching our understanding of how human and natural systems interact. Things will certainly be very different by 2100. For example, while the UNPD medium variant population forecast to 2100 is for a global population at 10.88 billion people (compared to the IFs Current Path forecast of 10.5 billion). Its low variant projection is only 7.32 billion and its high variant for a much larger number of 15.60 billion people.²⁸ Many things could impact this forecast of which the impact of climate change, discussed in Chapter 15, could be the most important.

Impact of the Demographic Dividend on Africa

The impact of the Demographic Dividend on sub-Saharan Africa compared to the Current Path forecast is presented in Fig. 4.6. I include only the Current Path ratio of working age persons to dependents for North Africa since this region is much further along in the demographic transition and benefits little from the Demographic Dividend scenario. Figure 4.6 also includes a line graph on the ratio of working age persons to dependents for the World except Africa, that peaked in 2012. I include this to show that, outside of Africa, the size of the working age population relative to dependents is now declining, although it differs from region to region, implying

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²⁸United Nations, Department of Economic and Social Affairs, World Population Prospects 2019, <https://population.un.org/wpp/Download/Standard/Population/>. Accessed on 31 December 2019.

Fig. 4.6 Ratio of working age to dependants: Africa vs World except Africa: 1980 to 2100 (Source Historical data from United Nations Population Division World Population Prospects, the 2017 revision. Forecast in IFs v 7.45)

that these regions have to first compensate for that decline with more capital and technology to maintain current levels of productivity.

The Demographic Dividend scenario advances the onset of sub-Saharan Africa's peak demographic dividend by 8 years (from 2074 to 2066), and increases the peak ratio of persons of working age to dependents from 2.0 to 2.2, resulting in a larger portion of persons of working age to dependants than would otherwise be the case. In the Demographic Dividend scenario sub-Saharan Africa gets to the 1.7 ratio in 2042 and exits in 2093, more than half a century later, about the same period as it spends in this favourable window in the Current Path. But because the peak ratio is higher, economic growth and incomes grow more rapidly in the Demographic Dividend scenario. For that reason the total size of the economy of sub-Saharan Africa is smaller, as one would expect with a smaller population, but only by about US\$61 billion in 2040. Much more important is what happens to GDP per person for sub-Saharan Africa which is more than US\$220 higher by 2040 at US\$6055 than on the Current Path—and this would be for a population of 1.785 billion people! All these indicators gain momentum over time and their true impact only becomes evident a decade or so later.

With more persons of working age and fewer children to educate, less basic infrastructure to build and slowing population growth, the improvements cascade across various indices of human well-being. For example, the number of people living below the US\$1.90 extreme poverty line in sub-Saharan Africa would be 9 million people fewer in 2030 and 50 million people fewer in 2040.

Table 4.1 presents the impact of the Demographic Dividend scenario on the five countries in Africa that, by 2040, would have the largest population.

Inevitably the impact of the Demographic Dividend scenario accelerates over time. Whereas, by 2040, the population of sub-Saharan Africa would be about 80 million fewer, by 2063 (the end year of the African Union's Agenda 2063 vision) sub-Saharan Africa would have a population that is about 340 million people less, a slightly smaller total economy, but because of more rapid growth, average GDP per capita (in purchasing power parity or PPP) that is US\$830 more.

The difference between the Current Path and the Demographic Dividend scenarios on population structure and education by 2063 is presented in Fig. 4.7, using a common scale for each pyramid. In the Demographic Dividend scenario, Africa has a much more mature population structure with a distinctive bulge along the midriff, compared to the more youthful structure of its population that is evident in the Current Path forecast.

Table 4.1 Impact of demographic dividend: selected countries and indicators of impact

	Population: Demographic Dividend compared to Current Path	Economy: Demographic Dividend compared to Current Path	Reduction in people without access to safe water	GDP per capita	Reduction in people in extreme poverty (US\$1.90)
Nigeria	353 instead of 361 million	US\$15.5 billion smaller	1.9 million	US\$185 increase to US\$8330	6.5 million
Ethiopia	166 instead of 178 million	US\$0.2 billion smaller	541,000	US\$205 increase to US\$4840	2 million
DRC	155 instead of 161 million	US\$0.7 billion smaller	1.2 million	US\$50 increase to US\$1520	6.8 million
Tanzania	95 instead of 101 million	US\$4 billion smaller	1.7 million	US\$320 increase to US\$5810	3.8 million
Uganda	83 instead of 89 million	US\$3.5 billion smaller	61,5000	US\$234 increase to US\$4070	4.2 million

Source IFs v7.45

The red grouping at the heart of each population pyramid indicates no education or incomplete primary education. The blue ribs on the outer edge of the pyramid indicate completed tertiary education. In the Demographic Dividend scenario the median years of adult education in Africa would have increased by two months (to 8.8 years), with a concomitant impact on labour productivity.

In the Demographic Dividend scenario, Africa also reduces the gap in average education levels for adults between itself and the rest of the world.

While Zimbabwe, Malawi, Zambia São Tomé & Príncipe, Kenya and Rwanda would experience the largest increase in percentage point terms of their working age persons by 2040, Morocco, Seychelles, Libya and Mauritius would actually have a marginally smaller working age population than in the Current Path forecast.

The effects of the interventions in the Demographic Dividend scenario are also significant in various other indices of well-being. The infant mortality rate in Africa would fall to approximately 18 deaths per live births by 2040,

Fig. 4.7 Population education distribution for sub-Saharan Africa in 2063 in Current Path vs Demographic Dividend scenario (Source IFs 7.36 initialising from United Nations Population Division medium term forecast and Barro-Lee educational attainment dataset)

compared to 25 deaths on the Current Path. Meanwhile, the average fertility rate would drop to 2.6 children per woman by 2040 and to two children before 2060. On the Current Path, this average is expected to drop to 3.3 children by 2040, and 2.3 children by 2060.

Conclusion: Reducing Fertility Rates and Working Towards Africa's Demographic Dividend

This chapter has explained how very high fertility rates in much of Africa currently are a drag on development. Although Africa's demographic profile started to change for the better from the late 1980s, the ratio of working age

persons to dependants has only slowly improved. Under current expectations sub-Saharan Africa will only achieve a demographic dividend in the second half of the twenty-first century at which point the value of the contribution of a larger labour force to economic growth is likely to have reduced.

The empowerment of women lies at the root of fertility rates. As the World Bank noted in an extensive study on African demographics, '[T]he number of children that a couple have depends directly on a woman's position in the household and her bargaining power relative to that of her husband'.²⁹

There is a large body of literature supporting the idea that greater inclusion of women can improve overall development outcomes and potentially economic growth.³⁰ A study from the McKinsey Global Institute concludes, maybe somewhat hyperbolically, that advancing women's equality to a 'best in region' benchmark, could add US\$12 trillion to the global economy by 2025, while a 'full potential' scenario could add US\$28 trillion.³¹

A demographic dividend can be enhanced and intensified through the accelerated roll-out of modern contraceptives and the improved health of women and children by investing in basic infrastructure such as the provision of clean water and improved sanitation that was discussed in Chapter 3. In addition, access to quality education and adequate nutrition are other key enablers that improve human capital. These are all discussed in separate chapters.

Finally, in order to fully realise the potential of the demographic dividend people need job opportunities which is probably Africa's biggest challenge. This matter will be examined further in Chapter 9.

All these interventions to unlock Africa's human capital will require governments, especially those in low- and lower-middle-income countries, to make family planning a high priority on their developmental agenda. This applies most pertinently to Niger, Somalia, the Democratic Republic of the Congo, Mali, Chad, Angola, Burundi, Nigeria, Uganda, The Gambia, Burkina Faso and Mozambique. In all these countries the total fertility rate currently exceeds five children per woman. In an additional 23 countries, the average fertility rate exceeds four children per woman. That rural fertility

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²⁹Canning, D., Sangeeta, R., and Abdo, Y. S., eds. 2015. *Africa's Demographic Transition: Dividend or Disaster?* Africa Development Forum series. Washington, p. 17.

³⁰Barro, R. J., 1996. *Determinants of Economic Growth: A Cross-Country Empirical Study*. NBER Working Paper No. 5698, August. And also: Rothman, D. S., Irfan, M. T., Margolese-Malin, E., Hughes, B. B., and Moyer, J. D., 2014. *Building Global Infrastructure: Forecasting the Next 50 Years. Patterns of Potential Human Progress*. Boulder: Paradigm Publishers, Volume 4.

³¹Woetzel, J., Madgavkar A., Ellingrud, K., Labaye, E., Devillard, S., Kutcher, E., Manyika, J., Dobbs, R., and Krishnan, M. 2015. McKinsey Global Institute. [Online] Available at: <https://www.mckinsey.com/featured-insights/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>.

rates are significantly higher than those in urban areas and differ according to income complicates these dynamics.

From a societal point of view, this means that Africans need to engage candidly and robustly in public discussions and scholarly analysis on the economic and developmental implications of the continent's large youthful population. Changes in fertility reflect shifts in social and cultural norms that may take time, but while the fertility transition is slow to get started it can rapidly pick up momentum.

Political leadership in discussing gender inequality, fertility and family size is vital, as are public media campaigns that demonstrate the health and economic benefits of smaller families.

Subsequent chapters will touch on the additional benefits of advancing Africa's demographic dividend, including the prospect for less political turbulence with a declining youth bulge, the lower chance of experiencing a violent political transition (Chapter 12), and the increased chance of being a liberal democracy as median age increases (Chapter 13).

Although the impact of the Demographic Dividend scenario is significant, it is insufficient to reverse the Current Path forecast of growing divergence in average incomes between Africa and the rest of the world. To improve its human capital endowment, the continent requires a consort of structural transitions, including an agricultural revolution, that is the subject of the next chapter.

Further Reading

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