

The Global Labor Market and the End of World Population Growth

David Lam
Department of Economics and Population Studies Center
University of Michigan
davidl@umich.edu

Murray Leibbrandt
Southern Africa Labour and Development Research Unit (SALDRU)
University of Cape Town
Murray.Leibbrandt@uct.ac.za

Prepared for:
Population Association of America Annual Meeting
Washington, DC
April 2025

ABSTRACT

The world is projected to add 2 billion people to the total population and 700 million people to the working-age population between 2025 and 2100. Almost all of the additional working-age people will be added in Sub-Saharan Africa, a dramatic change from previous decades, when the growth of the working-age population was concentrated in Asia. This paper analyzes the demography of the African labor force in the coming decades using the latest United Nations population projections. We show that by 2050 Africa will be the only region in the world with a growing working-age population and will be the only region in which the ratio of dependents to working-age population is falling. These dramatic differences are the result of Africa's later and slower fertility decline, with fertility still high in many African countries. Being the only region with a growing working-age population may create opportunities for investment and economic growth in Africa. This growing working-age cohort and especially its females have higher years of schooling than any previous generation. But the quality of their education still lags other regions. On the demand side, Africa needs to produce 2 million jobs per month by 2040 to keep up with the growth of the working-age population. This rate of job creation is similar to that produced in Asia during the period in which its working-age population was growing at similar rates. Still, this remains a daunting challenge for Africa in the coming decades. The dominance of the informal sector in all African labor markets, with the exception of a few upper middle-income contexts, implies that formally measured unemployment rates are not likely to provide telling metrics of African success. Rather, the focus for growth and improved development outcomes has to be on formal sector job creation alongside notably stronger linkages into the informal sector than has been the case to this point.

The Global Labor Market and the End of World Population Growth

David Lam, University of Michigan (davidl@umich.edu)
Murray Leibbrandt, University of Cape Town (Murray.Leibbrandt@uct.ac.za)

1. Introduction

In the last 50 years the global labor market has experienced massive demographic upheaval. As shown in Lam et al. (2019), the world added over 3 billion people to the working-age population between 1970 and 2020, growing from 2.1 billion to 5.1 billion. The average annual growth rate of the world's working-age population from 1970 to 2020 was 1.75%, with a maximum growth rate of 2.3% in the 1980s. Growth at this rate is historically unprecedented. As shown in Lam (2011), historical population growth rates for the world rarely reached 0.5% per year before 1900, reaching 1% around 1950. In the last half century Asia has been by far the largest contributor to the growth of the world's working-age population, accounting for 2 billion of the 3 billion increase (Lam et al. 2019). Adding 3 billion people of working age to the world, with over 70 million per year being added in the 2000s, was an enormous shock to labor markets. Surprisingly, however, most of the countries with the most rapid growth did not experience significant increases in unemployment during this period. Data from the International Labour Organization indicate relatively low levels of unemployment in most Asian countries throughout this period, in spite of the rapid growth of the working-age population (ILO 2023).

There continue to be large demographic challenges to global labor markets, but the nature of those challenges is rapidly changing. As we show below, the era of global population growth is coming to an end. The growth of the working-age population in Asia will soon be negative, an enormous change from the situation of just one or two decades ago. Sub-Saharan Africa, on the other hand, will experience rapid growth of its working-age population, comparable in percentage terms to Asia's growth in previous decades. Over the next 50 years, Sub-Saharan Africa's working-age population is projected to triple. By 2050. it will be the only major region in the world with a growing working-age population.

This paper looks at the demographic trends in labor markets around the world in the rest of the 21st century. While our focus is on the coming decades, we also look back at the last 70 years to put the current demographic trends in perspective. We will also put a major focus on the demography of the labor force in Africa, since that is where almost all of the growth of the working-age population will occur. We will put these trends in the context of

the experience of other countries and regions in order to consider the ways in which Africa's experience is and is not unique. We also present trends for different African countries to clarify the extent to which the overall African trends are shared across the region. We use data from the 2024 revision of the United Nations' World Population Prospects, which provides estimates from 1950 to 2023 and projections from 2024 to 2100. Most of our analysis uses the UN's "Medium Variant" projections, although we discuss the sensitivity of these projections to alternative assumptions about fertility decline.

We begin the paper with an overview of trends in the working-age population from 1950 to 2100 for the world and major regions, and look at the role of fertility in driving these trends.

We then look at the changing age structure of global labor markets, showing the important shift from a "youth bulge" to an "older worker bulge." We look at the rural-urban distribution, pointing out that most of the growing labor force will be in urban areas, although Africa will continue to have a growing rural population. We discuss the demographic dividend, exploring the challenges and opportunities created by Africa's growing working-age population. Harnessing the demographic dividend requires putting the working-age population to productive work. In line with this, we move from demography to the labor market. On the labor supply side, we add to the demography by documenting the rapid increases in education in Africa, and discuss its implications for the ability to absorb millions of young people into the labor force. We then move to the demand side of the labor market, discussing the potential for job creation in Africa as the working-age population declines in other regions.

Section 2 sets the backdrop with an overview of trends in total population and the working-age population from 1950 to 2100 for the world and its major regions. In section 3, the role of changes in fertility in driving these trends is provided. Alternative projections of African fertility decline are discussed. Section 4 looks at the changing age structure of global labor markets, showing the shift from a "youth bulge" to an "older worker bulge" in Africa, Asia, and Latin America, and the associated changes in dependency ratios. Section 5 looks at the rural-urban distribution of population growth, pointing out that most of the growing labor force will be concentrated in urban areas, but that Africa still has a rising rural population. Section 6 discusses the demographic dividend, exploring the challenges and opportunities created by Africa's expanding working-age population. Harnessing the demographic dividend requires putting the working-age population to productive work and, in line with this, section 7 takes us from demography to the labor market. It starts on the supply side by demonstrating

the rapid increases in years of education in Africa, discussing the potentially important implications for the ability to absorb millions of new young people into the labor force. It then moves to the demand side of the labor market, as realizing this potential depends on the current and future demand for labor in Africa. We conclude with a discussion of the implications of these demographic and labor market changes for development policy in Africa and the rest of the world.

2. Growth of the Total Population and the Working-Age Population

The changing roles of Asia and Africa in shaping the world's population can be seen in the top panel of Figure 1, which shows the estimated and projected population for Asia, Africa (including North Africa, Latin America and the Caribbean (henceforth, Latin America), and the Rest of the World – the sum of which is the global population (the vertical line at 2024 separates the UN estimates for 1950-2023 from the UN Medium Variant projections for 2024-2100). As seen in the top panel, world population grew from 2.5 billion in 1950 to 8.2 billion in 2025 and is projected to reach a peak of 10.3 billion in 2084, falling to 10.2 billion by 2100. Asia, which grew from 1.4 billion in 1950 to 4.8 billion in 2025, is projected to peak at 5.3 billion in 2055, with a decline to 4.6 billion in 2100. Africa, which grew from 230 million to 1.6 billion between 1950 and 2025, is projected to add 2.3 billion between 2025 and 2100. Historically, Asia accounted for 60% of global population growth between 1950 and 2025, while only 23% was in Africa. These roles will be dramatically different going forward, with Asia accounting for 6% of global population growth between 2025 and 2083, the projected year of peak world population, while Africa will account for 95% of the 2.1 billion projected increase. In sum, the growth of the world population in the 21st century will be dominated by Africa, Africa being the only major region with substantial population growth after 2050.

The second panel of Figure 1 shows the working-age population for the world and major regions. We follow standard conventions of the International Labour Organization and other international agencies in using age 15-64 as the definition of the working-age population. The working-age population of the world is projected to grow from 5.4 billion in 2025 to 6.2 billion in 2083, falling to 6.1 billion in 2100. The working-age population for Africa is projected to increase from 890 million in 2025 to 1.6 billion in 2050 and 2.5 billion in 2100. One of the key patterns shown in the figure is that Africa will be the only region with a growing working-age population after 2050. In fact, Africa is the only region that is projected to have a larger working-age population in 2100 than in 2025.

While the trends for the working-age population are similar to those for the total population, the second panel of Figure 1 demonstrates that the working-age population reaches a peak sooner and grows more slowly in the 21st century than does total population. For example, the working-age population of Asia reaches a peak in 2041, while the total population reaches a peak in 2055. The working-age population of Latin America peaks in 2042, while the total population peaks in 2055. The difference is due to the fact that the 65+ population will be the last age group to stop growing, an important demographic phenomenon that will be discussed below.

The bottom panel of Figure 1 shows the share of the world's working-age population located in each region. Asia's share, which was over 50% and growing in recent decades, reached a peak at 62% in 2010 and has been falling since. Africa's share of the global working-age population was below 15% until around 2020 and is now rising rapidly, projected to reach 20% around 2035 and 41% in 2100, roughly equaling the share for Asia.

2.1 Growth of the Working-Age Population

Figure 1 shows that the world's working-age population experienced dramatic growth in the last 50 years, and that growth of the working-age population in the rest of the 21st century will be dominated by Africa. Two measures of growth are helpful in thinking about the implications of this growth for global labor markets – the absolute number of people added to the working-age population each year and the rate of growth of the working-age population. The top panel of Figure 2 shows the absolute number of people added to the working-age population each year for the world and major regions. In the 1950s, about 24 million people were being added to the working-age population of the world each year. This number grew dramatically in the 1960s and 1970s, and continued climbing until it reached a peak of 73 million per year in 2005. In other words, the world would have required over 6 million new jobs each month in order to provide a job for each new addition to the working-age population. Most of these additions to the working-age population between 1960 and 2020 were in Asia. Asia peaked at an annual increase of 40 million people to the working-age population in 2005. Absolute increases in the working-age population were relatively low in the rest of the world at the end of the 20th century. In 2000, Asia accounted for 65% of the 68 million people added to the world's working-age population in that year, while Sub-Saharan Africa accounted for only 14%.

Absolute additions to the world's working-age population have dropped rapidly since the peak in 2005, though the numbers are still large. In 2025, the world's working-age

population will increase by 53 million people, with 28 million added in Asia and 21 million added in Sub-Saharan Africa. The annual additions will be dropping rapidly in Asia in the coming years. Sub-Saharan Africa will surpass Asia in 2028, and Asia will have zero increase in its working-age population in 2037.

Since 2010, Sub-Saharan Africa has been the only region with continuing growth in the number of annual additions to the working-age population. Africa is projected to add 21 million people to the working-age population in 2025, rising to a peak of 27 million in 2050. Africa is projected to need 2 million new jobs per month by 2035 in order to provide a job for every new addition to the working-age population.

The bottom panel of Figure 2 shows the annual rate of growth of the working-age population. For the world as a whole, the growth rate rose from 1.5% in the 1960s to a peak of 2.4% in 1970 and has been falling steadily since then. In 2025, the working-age population of the world will grow at about 1% per year. Asia also reached its peak growth rate in 1979, at 2.8% per year, followed by steady declines to a 2025 level of 0.9%. Latin America has followed a path similar to that of Asia, with annual growth rates near 3% in the 1980s, followed by rapid declines to a growth rate in 2025 of around 1%. Sub-Saharan Africa experienced growth rates in the 1980s that were similar to those of Asia and Latin America, with an annual growth rate of 2.8% in 1979. The striking feature about Sub-Saharan Africa in the bottom panel of Figure 2 is that growth rates of around 3% per year have persisted for several decades, a contrast to the very short period of time in which Asia and Latin America experienced growth at that level. The peak annual growth rate of the working-age population in Sub-Saharan Africa was 3.0%, reached in 2020, with the 2025 growth rate projected to be 2.9%. Despite Africa's dominance in the growth of the global working-age population going forward, the growth rates projected for Africa for the coming decades are below those experienced by Asia and Latin America in the 1970s and 1980s. Moreover, it is important to note considerable cross-country variation in these growth rates.

2.2 Country-level variation across Africa

The patterns shown for Sub-Saharan Africa in the previous graphs mask a great deal of heterogeneity across the continent. Figure 3 shows the decadal growth of the working-age population for 2020-30 and 2040-50 for a group of Sub-Saharan African countries, with a group of other countries and regions shown for comparison. As can be seen in Figure 3, Niger's working-age population will increase by 47% between 2020 and 2030. Uganda, Democratic Republic of Congo, Angola, and Tanzania all will increase by around 40%.

Looking at sub-regions, Central Africa, East Africa, and West Africa will experience growth of their working-age populations of 35-40% between 2020 and 2030. At the lower end of these growth rates, South Africa will increase by only 13% and Ghana by 26%. The decadal growth rate of all of Sub-Saharan Africa is 31%. This compares to 7% in Latin America and Asia. India's working-age population will increase by 12% between 2020 and 2030, Indonesia's by 9%, and Brazil's by 4%. China's working-age population is already falling and will decline by 1.8% over the decade.

The lower bar for each country shows the decadal growth rate for 2040-50. It is important to note that every country will have lower growth in the 2040-50 decade than in the 2020-30 decade. The declines vary considerably across countries, however. Niger's working-age population is projected to increase by 34% from 2040 to 2050, while Uganda's decadal growth rate drops to 25% for 2040-50. Ghana's working-age population is projected to increase by 14% for 2040-50, while Kenya's will grow by 17%. By comparison, India's working-age population will only increase by 1.5% from 2040 to 2050, Brazil's will decline by 6%, and China's will decline by 13%. As we will discuss below, projections of the working-age population to 2050 are not very sensitive to assumptions about the rate of fertility decline, so the patterns shown in Figure 3 have a fairly low level of uncertainty.

3. Fertility Rates and the Demographic Transition

To understand the demography of the working-age population in the 21st century, it is important to understand the demographic processes that drove the unprecedented population growth of the last 60 years. The simple mathematics of population growth are that a population grows when the birth rate exceeds the death rate, leaving aside migration in and out of the population. The world population growth rate, which probably never exceeded 0.5% per year before the 20th century, increased to around 1% per year in the mid-20th century, peaked at over 2% in the mid-1960s, and was back down to 1.3% by 2000 (Bongaarts 2009, Lam 2011). The reason for the dramatic increase in population growth is well understood by demographers. A rapid decline in death rates (especially infant and child mortality) from previously high levels caused a period of rapid population growth. A subsequent decline in birth rates then caused the rate of population growth to decline (Bongaarts 2009, Lam 2011, Lee 2003). Demographers use the term "demographic transition" to describe this fundamental process that has driven population growth everywhere in the world.

Understanding the demographic transition is important in understanding the demography of global labor markets in the 21st century. The rapid change in the relative importance of Asia versus Africa in global population growth is driven by the differences in timing and pace of mortality and fertility decline. As shown in Lam et al. (2019), mortality rates fell earlier and faster in Asia than in Africa. Asia experienced its most rapid population growth around 1970, while Africa's population growth rate peaked around 1985. More importantly, Sub-Saharan Africa has had a later and slower decline in fertility rates

Figure 4 shows the total fertility rate (TFR) for world regions and Africa sub-regions. The TFR is the number of births a woman would have over her lifetime if she experienced the age-specific fertility rates in a given year. A TFR of 2.1 represents replacement fertility.¹ Figure 4 shows the dramatic decline in fertility that has occurred since 1950. Fertility rates for Asia, Africa, and Latin America were fairly similar in 1950, with all three regions having a TFR of around 5.7 to 6.5 births per woman. For the world as a whole, the TFR fell from 4.9 births per woman in 1950 to 2.4 in 2020, a 51% decrease and 89% of the decrease required to reach replacement fertility. Asia and Latin America had even larger declines, driving the world decline, while Africa has had a considerably later and slower fertility decline.² In 2020, Africa's TFR was still around 4.5 births per woman, more than double the TFR in Asia and Latin America. Africa's fertility's transition is unique in three ways: 1) African fertility was somewhat higher than Latin America and Asia in 1950, before fertility began to fall in any of the regions; 2) Africa's fertility transition began later than in the other regions, by at least 10 to 20 years; 3) Africa's fertility has declined more slowly than in other regions. At the same time, it is important to note that Africa's TFR has been falling since around 1980.

The bottom panel in Figure 4 shows the TFR for African sub-regions. The three largest regions by population – Eastern Africa, Central Africa and Western Africa – all show a similar trend of slowly declining fertility rates that are significantly higher than the rates in other world regions. The TFR for Central Africa was estimated at 5.6 in 2021. Southern Africa, 88% of which was South Africa as of 2020, looks quite different, with a fertility decline more similar to those of Asia and Latin America, and with a much lower TFR in recent years than the other African regions. The TFR for Southern Africa was estimated to be 2.5 in 2021. These fertility rates are the key driver of the demographic change in each African

¹ The replacement level of fertility is slightly above 2 births per woman in order to account for female births that do not survive to reproductive age.

² The sharp drop and subsequent increase for Asia and the World around 1960 is associated with China's Great Famine.

sub-region, and uncertainty about future fertility decline in Africa is the key source of uncertainty in population projections for this century.

There is a large literature analyzing African fertility and the potential explanations for its later and slower fertility decline relative to Asia and Latin America. Bongaarts and Casterline (2013) note that some countries may have had a stall in fertility decline. They point out that ideal family size, as reported in survey data, is higher in African countries, even when controlling for a country's stage in the demographic transition. They find evidence of unmet need for contraception in many countries, as indicated by a high proportion of women who report not wanting additional children but are not using contraception. Singh, Bankole, and Darroch (2017) find that in both 2003 and 2014, roughly half of all African women aged 15-49 who wanted to avoid pregnancy were using no method of conception, modern or otherwise.

Bongaarts (2017) compares the pace of fertility decline in different regions to indicators of socio-economic development. He finds that later and slower economic development helps explain Africa's later and slower fertility decline, but also finds evidence of an "African effect" in which many African countries have higher fertility than would be predicted based on social and economic variables and the estimated impact of those variables on fertility in regions outside Africa. Kebede, Gujon, and Lutz (2019) argue that one factor contributing to slow fertility decline in Africa is the disruptions in educational progress that affected women born in the 1970s and 1980s. These results suggest the pace of African fertility decline may increase as better educated cohorts enter childbearing ages.³

3.1 How would faster fertility decline affect Africa's employment challenge?

The UN's probabilistic population projections, included as part of the World Population Prospects 2024, are useful in answering several questions: How much difference would it make to projections of the working-age population if African fertility fell faster (or slower)? How large are the confidence intervals for predictions of fertility and the growth of the working-age population? How important is uncertainty about African fertility to our analysis of labor force dynamics in coming decades?

Figure 4 shows the total fertility rate for Sub-Saharan Africa falling to roughly the replacement fertility rate of 2.1 by 2100. These UN estimates are based on a projection model that builds on the historical fertility patterns in a wide range of countries (United Nations

³ See also Casterline (2017) and Casterline and Agyei-Mensah (2017) for analyses of trends in African fertility.

2022). These projections play an important role in driving the projections for the growth of Africa's working-age population in 21st century. The speed and magnitude of Africa's fertility decline is the main source of uncertainty in all estimates about global population in the coming decades. The 2022 UN population projections include prediction intervals based on the thousands of simulations used to create the projections. Figure 5 shows the projections of the total fertility rate and the size of the working-age population for Sub-Saharan Africa, including the upper and lower bounds for the 80th percentile and 95th percentile prediction intervals. The top panel shows the projections for the total fertility rate. The interpretation of these prediction percentiles is, for example, that there is a 95% chance that the TFR for Sub-Saharan Africa will be between 2.5 and 3.5 in 2050, based on the UN's probabilistic projections. There is an 80% chance that the TFR in 2050 will be between 2.6 and 3.3.

The bottom panel of Figure 5 shows the range in the probabilistic projections for the working-age population of Sub-Saharan Africa. A striking feature of Figure 5 is that even though the 95th projection interval for the TFR in 2050 has a range of over 1 child per woman (plus or minus 20%), there is much less uncertainty in the projection of the working-age population in 2050, with a range of only plus or minus 12%. This is because most working-age people in 2050 have already been born by 2022 and are not affected by fertility rates between 2022 and 2050. The projections of the working-age population for different regions, then, should be interpreted with a recognition that projections for the next three decades have relatively little uncertainty.

The projected pace of fertility decline has larger effects on the working-age population as we move beyond 2050. Projections for Africa's working-age population in 2075 vary by 43% between the upper 95th percentile and the lower 95th percentile. The median projection for 2075 has a TFR of 2.3 and a working-age population of 1.9 billion in 2075, while the lower 95th percentile, corresponding to a TFR of 1.8, has 550 million fewer people in the working-age population. Faster fertility decline can clearly make a difference for the employment challenge that Africa will face in the second half of the 21st century. We also see in Figure 5, however, that the nature of the employment challenge for the next three decades will only be modestly affected by the pace of fertility decline.⁴

⁴ The projections are also not very sensitive to assumptions about mortality, given that death rates are relatively low in all populations between age 5 and age 65, with plausible ranges of mortality having only modest effects on projections of the working-age population.

3.2 Recent trends in African fertility and their implications for labor force growth

Some recent estimates of fertility in African countries provide evidence about whether African fertility may decline faster or slower than the UN estimates presented above. The best estimates of fertility for most African countries come from the Demographic and Health Surveys and the Malaria Indicator Surveys (MIS) of the DHS Program that also collect data on fertility. Figure 6 shows estimates of the total fertility rate for selected African countries that have DHS survey data from the 1980s or 1990s to recent years. The top panel shows a group of East African and Southern African countries. The bottom panel shows a group of West African countries. The solid lines show DHS/MIS data, while the dashed lines show the estimates in the 2022 UN World Population Prospects, with estimates up to 2021 and Medium Variant projections from 2022 to 2025.

As seen in the top panel of Figure 6, there have been significant declines in the TFR in all of the countries shown according to DHS estimates.⁵ In Uganda, for example, the TFR in DHS surveys fell from 6.7 in 2006 to 5.0 in 2018. In Kenya, the TFR fell from 4.6 in 2008 to 3.3 in 2020. Note that the UN estimates (which are the basis for most of our analysis in this paper) track the DHS estimates quite well. This is not surprising, since the DHS data are a key source of data for the UN estimates, with the UN estimates providing a somewhat smoothed and interpolated version of the DHS estimates.⁶

The bottom panel of Figure 6 shows the data from a number of West African countries. In this case there is some evidence from the most recent surveys that fertility may be falling faster than projected by the UN. The most recent DHS/MIS estimates for Niger, Mali, Nigeria, and Senegal are all below the UN estimates for the same year. For example, the TFR for Nigeria fell by half a birth from 5.3 in 2018 to 4.8 in 2021. Survey-based estimates of the TFR for a single year can be noisy (note, for example, that the TFR for Senegal went from 4.4 in 2018 to 4.7 in 2019 to 3.9 in 2020), so these recent estimates should be interpreted with caution. At the same time, these estimates do serve as a reminder that faster (or slower) decline in fertility in Africa could easily occur, with important implications for the growth of the working-age population in future decades. As previously noted, a faster pace of fertility decline over the next decade would not have much effect on the estimates we

⁵ The most recent estimates for Ghana, Kenya, Malawi, Mali, Niger, Nigeria, Senegal, Tanzania, and Uganda are based on Malaria Indicator Surveys.

⁶ Many African countries do not have comprehensive vital statistics data that can be used to estimate annual fertility rates, so survey estimates such as those from DHS and MIS surveys are the main source of data for those countries. These surveys are collected intermittently, as seen by the data points in Figure 6, so many countries do not have direct data on fertility in some years.

present for the working-age population over the next 20-30 years, but it would have a significant impact on the working-age population in the second half of the century.

Are there ways for Africa to speed up the pace of fertility decline in order to reduce the pressure on employment in the coming decades? There does not seem to be a policy consensus on this, just as there is no strong consensus among researchers about why African fertility decline has been slower than it was Asia and Latin America. While better access to family planning might speed up fertility decline, desired fertility continues to be high in many countries, and there have already been large investments in family planning in most countries. Bongaarts argues that Africa's higher fertility "arises largely from the link between socioeconomic indicators and desired family size rather than between desired family size and fertility," (Bongaarts 2017: 54) a pattern suggesting that increased investments in family planning *per se* may not speed up fertility decline. This has important implications regarding the potential interaction between job creation and fertility decline. Job creation, especially the creation of more productive, better paying employment, may help reduce fertility, in addition to its direct effects on poverty reduction and economic growth. Combined with the substantial educational improvements that are already in place, this suggests the potential for a virtuous cycle in which improvements in employment increase the pace of fertility decline, reducing the pressure on future growth of the working-age population.

It is also important to note that family planning programs are not always a necessary condition for fertility decline. Brazil, for example, had one of the most rapid fertility declines in the world in the 1960s and 1970s, in spite of an almost total absence of family planning programs under the military government, with rising education, especially for women, appearing to have played a major role (Lam and Duryea 1999). Factors such as rising education, improved employment opportunities, and declines in infant mortality, may be just as important as increased access to family planning in driving African fertility decline in this century. For policy makers or international donors making the choice of whether to spend the next development dollar on family planning versus a program to enhance job creation, a strong case can be made that job creation can give immediate improvement to employment and poverty reduction while also helping drive fertility decline.

4. Changing Age Structure, the Working-Age Population and Dependency Ratios

The rapid changes in mortality and fertility that drove the demographic changes of the last 60 years have had a dramatic impact on the age distribution of the population. The

sequence of changes in age structure during the demographic transition is the same in every country, though the pace and magnitude of the changes can vary significantly. Rapid declines in infant and child mortality, the main cause of the rapid population growth of the 1960s and 1970s, first led to very young populations throughout the developing world. As fertility declined, the share of the population in the youngest age groups eventually declined, creating a movement in the age distribution, first toward young adults and then toward older age groups. There is inevitably a period in which the proportion of the population in working ages increases, creating a “demographic dividend” in which there is a high fraction in working wages and low fractions in both the child and elderly dependent age groups (Bloom et al. 2003, Lee and Mason 2006).

4.1 Changes within the working age population

While it is well known that populations around the world are aging, even in Africa, less attention has been given to the aging that takes place within the working-age population. The working-age population gets older just as does the overall population, creating important changes in labor force dynamics (Lam and Leibbrandt 2013; Lam et al. 2019). Figure 7 shows the evolution of the age distribution of the working-age population in Sub-Saharan Africa in the 21st century, with the total working-age population divided into 10-year age groups. The working-age population is currently highly concentrated in the youngest age groups, with the 15-24 age group being the most prominent. This reflects the “youth bulge” that resulted from the rapid population growth of previous decades, which caused the population to become very young (Lee 2003; Lam 2011). As is clear in Figure 7, however, the working-age population is rapidly aging. The size of the 15-24 year age group is leveling off, while the older age groups will become a significantly larger share of the working-age population throughout the century.

Table 1 shows the age breakdown of the working-age population in 2020, 2050, and 2080 for Sub-Saharan Africa, Asia, Latin America, and the rest of the world. As seen in the top panel, the 15-24 age group accounted for 36% of the region’s working-age population in 2020, while the 55-64 age group accounted for only 7%. The growth rates of the age groups across time are larger for older ages. The youngest age group will increase from 218 million to 402 million between 2020 and 2050, an 84% increase, while the oldest age group will almost triple, from 44 million to 124 million. Reflecting the pattern seen in Figure 7, by 2080 the relative shares of the age groups will become more similar, with the youngest age group

accounting for 24% of the working-age population, while the oldest age group will account for 14%.

The second panel of Table 1 shows that Asia is already much further through the transition to an older labor force. The absolute number of 15-24 year-olds and 25-34 year-olds will fall in Asia between 2020 and 2050, while there will be absolute increases in the older age groups. The five age groups will make up almost equal fractions of Asia's working-age population in 2050. All age groups will decline in absolute numbers between 2020 and 2050, with the largest declines in the youngest age groups. It is striking that the number of 15-24 year-olds in Asia is projected to decline by 179 million between 2020 and 2080.

Latin America's situation is similar to that of Asia, with absolute declines in the two youngest age groups between 2020 and 2050, and declines in all age groups between 2050 and 2080. The rest of the world, meaning the world minus Asia, Latin America, and Sub-Saharan Africa, was already at a fairly uniform age distribution within the working-age population in 2020, and will see relatively little change in absolute numbers or relative sizes of the age groups throughout the decade.

For the world as a whole, we see once again that Sub-Saharan Africa will account for more than 100% of the 1.2 billion increase in the world's working-age population between 2020 and 2080. The number of young workers aged 15-34 in the world only increases by 51 million between 2020 and 2080, a stability that hides vast differences across regions. Sub-Saharan Africa's addition of 269 million 15-24 year-olds over this period is almost entirely offset by the decline of 217 million 15-24 year-olds in Asia, Latin America, and the rest of the world. For the world as a whole, the growth of the working-age population will be due entirely due to the growth in older age groups. The "youth bulge" of recent decades is turning into an "older worker bulge. It is the rising number of older workers that will need to be accommodated, with no growth in the number of young workers for the world as a whole, or in any of the major regions after 2050.

Another way to see the implications of population aging for global labor markets is to look at the annual additions to the working-age population around the world. Figure 8 shows the annual additions to Sub-Saharan Africa's working-age population, divided into the same 10-year age groups used in Figure 7 and Table 1. Until about 2025, the 15-24 age group has the largest annual increase, with the age group growing by 7.1 million per year in 2025. That addition means that the 2001-2010 birth cohort is 7.1 million larger than the 2000-2009 birth cohort, measured at the time each cohort is 15-24. The 2001-2010 birth cohort is tracked across the graph, a reminder that as we move through the century, we are following the same

cohorts as they move through the age distribution. The 2001-2010 birth cohort shows up as the largest addition to the working-age population in every year, with the absolute size of the addition falling as mortality reduces the size of the cohort as it ages.

The number added at age 15-24 reaches its historic high around 2025. The number of new 15-24 year-olds being added each year is on the decline for the rest of the century, and is projected to go negative by 2090. At the same time, the number of 55-64 year-olds being added each year will be on the increase until around 2065, when the 2001-2010 birth cohort reaches that age.

Table 2 shows the annual additions to each age group in the working-age population in 2020, 2050, and 2080 for Sub-Saharan Africa, Asia, Latin America, and the rest of the world. In Sub-Saharan Africa, 15-24 year-olds are by far the fastest growing group in 2020, with the 6.3 million increase accounting for 35% of the 18.0 million increase in the working-age population. As seen in Figure 8, the annual additions to the 15-24 year-old group fall in absolute numbers in the coming decades, while the annual additions to older age groups increase. The 55-64 age group, which only accounted for 8% of the annual additions to the working-age population in 2020, will account for 27% in 2050 and 31% in 2080. As seen in Figure 2 and Figure 8, 2050 is around the peak year in the number of people added each year, at 26.7 million. These are relatively evenly spread across the age distribution, with the 35-44 age group providing the largest number.

The second panel shows that in Asia the two youngest age groups were already shrinking in 2020. In other words, the number of jobs needed to accommodate new young workers into the labor force in Asia is already declining. The 55-64 age group accounted for over half of the 23 million added to Asia's working age population in 2020. By 2050, Asia's working-age population will shrink by 8.3 million per year, with an 11.3 million reduction in the number of workers under 35. By 2080, Asia's working-age population is projected to shrink by 20 million per year, with a decline of 9 million in the number of workers aged 55-64.

In Latin America, the biggest additions to the working-age population in 2020 were in the older age groups, with a reduction in the number aged 15-24. Latin America's working-age population is projected to shrink by 1 million per year in 2050 and 3 million per year in 2080. The rest of the world was adding 1.5 million per year to the working-age population in 2020, falling to a loss of 1.2 million per year in 2050 and 2.2 million per year in 2080.

The world as a whole added 47 million per year to the working-age population in 2020, with additions from Asia somewhat larger than those in Africa. By 2050 this falls to 16

million per year, at the same time that Africa rises to 26.7 million per year. By 2080, the world's working-age population is projected to decline by 7.5 million per year. We see once again the enormous heterogeneity across regions, however. Sub-Saharan Africa will be adding 17 million per year to its working-age population in 2080. Asia, on the other hand, will be losing 20 million per year, with Latin America and the rest of the world also losing millions each from their working-age populations.

An obvious question is whether the decline in the size of the working-age population in the rest of the world can help offset the millions of new potential workers being added in Africa. As seen in Figure 2, by 2075, there will be no net additions to the working-age population of the world. If all of the jobs freed up by the decline in the working-age population in other regions could be transferred to Africa, Africa's employment challenge would be met. Will capital move from Asia to Africa in response to Asia's declining working-age population? Will Africa be able to generate Asia-style employment growth in the coming decades, and will this become easier as Asia's working-age population declines? These are complex questions that go beyond the scope of this paper, but on which the volume as a whole has much to say. We have hopefully made clear, however, that understanding the demography of the working-age population is critical in thinking about the dynamics of the global labor force in the rest of this century.

4.2 Changing dependency ratios

Dependency ratios are a convenient summary measure to profile important economic implications of these changes in the age structure. Dividing the population into children (aged 0-14), working age (15-64) and elderly (65+), there are three dependency ratios that are commonly used.

$$\text{Child Dependency Ratio} = \frac{\text{Children}}{\text{Working Age}} = \frac{\text{Pop}(0 - 14)}{\text{Pop}(15 - 64)}$$

$$\text{Elderly Dependency Ratio} = \frac{\text{Elderly}}{\text{Working Age}} = \frac{\text{Pop}(65+)}{\text{Pop}(15 - 64)}$$

$$\text{Total Dependency Ratio} = \frac{\text{Children} + \text{Elderly}}{\text{Working Age}} = \frac{\text{Pop}(0 - 14) + \text{Pop}(65+)}{\text{Pop}(15 - 64)}$$

Figure 9 shows these three dependency ratios for the world and for the three major developing regions – Asia, Latin America, and Sub-Saharan Africa – from 1950 to 2100. In all three cases, Africa stands out as having some unique trends relative to the other regions.

As seen in the top panel of Figure 9, the child dependency ratio was increasing in all regions in the 1950s and 1960s, but was declining by 1970 in Asia, Latin America, and the world as a whole, the result of declining fertility. In Africa, the child dependency continued rising until around 1990, and has been falling since then. In 2020, the child dependency ratio was 0.78 in Africa, more than double the 0.36 child dependency ratio in Asia. To give this an economic interpretation, in order to generate \$100 in expenditures per child, it would take \$78 in taxes per working-age person in Africa, but only \$36 per working-age person in Asia. The child dependency ratio will be falling in Africa and in other regions throughout this century, though Africa's ratio will be substantially higher than other regions for several decades.

As shown in the middle panel in Figure 9, the elderly dependency ratio has been rising in all regions since 1950 and is projected to continue rising throughout the century. This elderly dependency ratio has been much lower than the child dependency ratio since 1950, but is rising rapidly in Asia and Latin America and is projected to surpass the child dependency ratio in those regions around 2050. Just as Africa's child dependency ratio is currently much higher than that in other regions, its elderly dependency ratio is much lower. Africa's elderly dependency ratio in 2020 was 0.06, compared to 0.13 in Asia and Latin America. This means that generating \$100 per person aged 65+ would cost only \$6 per working-age person in Africa, compared to \$13 in Asia and Latin America. As is clear in Figure 9, Africa's elderly dependency ratio will remain considerably below that of other regions throughout the century.

With the child and elderly dependency ratios often moving in opposite directions, it is interesting to look at the total dependency ratio, shown in the bottom panel of Figure 9.⁷ This combined dependency ratio was dominated by the much larger child dependency ratio in all regions from 1950 to 2000, and as a result was rising until around 1970 outside of Africa and was rising until around 1990 in Africa. The elderly dependency ratio begins to play a much stronger role after 2000, with a rapidly rising elderly dependency ratio pulling up the overall dependency ratio in spite of the fall in the child dependency ratio.

The total dependency ratio will be rising in the coming decades in Asia, Latin America, and the world, while it will still be falling for most of the century in Africa. Africa will experience a rapid decline in its total dependency ratio in coming decades, due to large

⁷ It should be noted that children and the elderly may be quite different in terms of their economic impact. Similarly, a 1-year-old is different than a 14-year-old and a 65-year-old is different than a 90-year-old. These are very simple summary measures of the dependency burden that are useful as one indicator of the economic impact of changing age structure.

declines in the child dependency ratio and a still low elderly dependency ratio. This is the key feature of the demographic dividend – the concentration of the population in the working ages resulting from falling fertility. By around 2055 the total dependency ratio in Africa will have fallen below the dependency ratios of Asia, Latin America, and the world as a whole, and will continue to be below those other regions for the rest of the century.

5. The Importance of Urbanization

Alongside these changes to the sizes and age structures of working and non-working age populations, there have been substantial movements of these populations from rural to urban areas. It is important to note and take account of where populations live and where they are likely to live and work in the future.

As seen in Figure 10, the world's urban population surpassed its rural population in 2007. The rural population is estimated to have peaked at 3.4 billion in 2020, with future population growth concentrated in urban areas. Asia's rural population peaked around 2005, with the urban population overtaking the rural population around 2020. Latin America has been more urban than rural since 1960, and has had a falling rural population since 1990. Compared to these regions, Africa's trends are unique. It is the only region projected to have a growing rural population going forward, with continued growth of the rural population projected to 2050. The growth of Africa's urban population is projected to be much faster than in other regions, with annual urban population growth rates of almost 4% projected in coming decades, compared to less than 2% in Asia and about 1% in Latin America. Africa's urban population is projected to surpass its rural population around 2035.

Therefore, as its populations increase, Africa is also becoming more urbanized at the same time as the number of Africans in rural areas is increasing too. In 1950, the urban share of Sub-Saharan Africa's population was estimated at 11%; it is projected to be 44% in 2025 and 58% in 2050 (United Nations 2018). Urbanization occurs through two channels: rural-to-urban migration and natural increase within urban centers—the former of which receives more political attention, but both of which likely make significant contributions to urban growth rates (Jedwab, Christiaensen, and Gindelsky 2015).

The United Nations Population Division made projections of future urbanization around the world in its *World Urbanization Prospects, 2018 Revision* (UN 2018). It has not updated those projections since then, but the data are still useful for providing a picture of the rural-urban divide in the population projections presented above. Figure 10 shows urban and rural population growth between 1950 and 2050 (the latest date projected by the UN) for the

world, Sub-Saharan Africa, Asia, and Latin America. As a cautionary note, it is important to keep in mind that comparisons of urban and rural populations between regions are complicated by the fact that the definitions of urban and rural are not consistent across countries. For example, in Nigeria, urban is defined as towns with 20,000 inhabitants or more, while in Ethiopia, urban is defined as localities with 2,000 inhabitants or more. In other countries, definitions and administrative boundaries may change over time (United Nations 2018). Nonetheless, Figure 10 is useful for comparing overall trends between and within regions.⁸

One feature of African urbanization is that it has not been closely tied to economic growth or job creation. Fox (2017) refers to Africa's experience as "urbanization without growth," pointing out that Africa's urban share has increased steadily since 1960 and its urban population has grown faster than other regions, in spite of lower economic growth in many periods. Collier (2017) discusses the challenges African cities face in providing employment, pointing out that they often lack fundamental infrastructure in electrification, roads, and transit, as well as public health and well-defined local governance. Lall, Henderson, and Venables (2017) describes African cities as "crowded, disconnected, and thus costly," where high nominal wages discourage business but high cost-of-living keeps real wages low. They also note that 60% of the urban population live in informal settlements, much higher than the global average, with associated challenges in providing access to basic services (Pariente 2017).

These features reduce the extent to which African cities can capture economies of agglomerations that can help produce jobs. However, Lall, Henderson, and Venables (2017) argue that Africa's cities can still bring economic opportunities through their concentrated geography if property rights, urban planning, and infrastructure are adequately provided. Given that Africa's urban population will be growing much faster than its rural population in coming decades, as shown in Figure 10, it is cities that will need to provide the bulk of the jobs to keep up with Africa's rapidly growing working-age population. But, even up to 2050, more than 40% of African populations will be rural. Thus, these urbanization trends do not make the case for an exclusively urban policy focus.

⁸ The UN only makes projections of urban and rural populations for the total population, without breaking down the projections by age. We thus cannot break down the projected working-age population into urban and rural components.

6. The Demographic Dividend

A discussion of the “demographic dividend” is very useful in linking more closely the implications of this detailed demography to the labor market and to economic development more broadly. The term “demographic dividend” is typically used to refer to the economic benefits that can result as a population shifts from a very young age structure to an age structure more concentrated in working ages as a result of declines in fertility (Bloom, Canning, and Sevilla 1993, Lee and Mason 2006). Bloom and Williamson (1998) argue that this was an important factor in Asia’s “economic miracle,” although similar demographic changes did not produce Asian rates of economic growth in Latin America (Bloom, Canning, and Sevilla 2003). A number of mechanisms may cause the concentration of population in working ages to increase economic growth rates. One is the possible impact of lower child dependency ratios, which may increase savings rates as less income is needed to support children. Declines in fertility may also lead to higher female labor force participation, increased human capital investments for children, and increases in savings for retirement as children are less available for old-age support (Bloom, Kuhn, and Prettnner 2017). These changes may further accelerate economic growth.

In the simplest interpretation of the demographic dividend, dependency ratios such as those in Figure 9 provide the key information. Asia and Latin America began to experience falling total dependency ratios beginning around 1970, with the total dependency ratio continuing to fall until around 2015-2020. This implies that the working-age population was steadily increasing as a percentage of the overall population, the key component of the demographic dividend. Sub-Saharan Africa began this decline in the total dependency ratio about two decades later and continues to have much higher dependency ratios than other regions. The total dependency ratios are now rising in Asia and Latin America, the result of population aging, marking a move out of the period of the demographic dividend. Africa, on the other hand, will continue to experience a declining total dependency ratio, implying an increase in the share of the population in working ages, for most of this century.

The assumption that elderly dependents and child dependents are equivalent, and that different ages within each of these groups are equivalent, is obviously a simplification that can miss some of the important links between age structure and economic growth. An alternative approach to characterizing the demographic dividend is with National Transfer Accounts (NTA), an approach developed by Lee and Mason (Lee and Mason 2014, Dramani and Oga 2017). The NTA approach estimates life-cycle profiles of income and consumption, looking at the gap between the two at each age and looking at how intergenerational transfers

of various kinds (family, government, market) smooth these gaps. Applying this approach to Sub-Saharan Africa, Dramani and Oga (2017) find that support ratios are rising in Africa but are still far lower than in Asia or Latin America – a finding consistent with the total dependency ratio.

In addition to what they call the first demographic dividend related to the increase in the proportion of the population concentrated in working ages, Lee and Mason argue that there is a second demographic dividend associated with lower fertility and population aging. The second demographic dividend results from increased investment in physical and human capital as individuals anticipate living longer and require greater savings to finance retirement (Lee and Mason 2006). Unlike the first demographic dividend, which is inevitably transitory as the population moves from a concentration in working ages to a concentration in older ages, Lee and Mason argue that the second demographic transition continues to have a positive impact even as population aging causes a decrease in the share in working ages.

As seen throughout this paper, Sub-Saharan Africa has the potential to benefit substantially from the first demographic dividend in the 21st century, as the share of the population in working ages rises steadily. As emphasized above, Sub-Saharan Africa will be the only region with a rising share of its population in working ages for most of this century. This apparent demographic bonus is also a demographic challenge, however, as taking advantage of the growing working-age population requires rapid growth of new jobs across the continent (Canning et al. 2015, Cleland 2017, Cleland and Machiyama 2017, May and Turbat 2017). Africa has struggled to meet the challenges of its rapidly growing and increasingly well-educated youth population (Filmer and Fox 2014, Fox 2016, Fox, Senbet, and Simbanegavi 2016). As shown in Figure 7, the number of 15-24 year-olds will continue to grow in Sub-Saharan Africa for most of this century, creating a growing need for new entry-level jobs. In addition, the number of workers at older ages will grow at an even faster rate in coming decades, requiring rapid expansion of jobs across the working ages. As seen in Figures 7 and 8, the size of older working-age groups will increase substantially faster than the size of younger working-age groups in Sub-Saharan Africa throughout the century, producing a much older working-age population.

Increasing women's labor force participation, linked to falling fertility, has also been cited as a mechanism through which the demographic dividend leads to increased economic growth (Bloom et al. 2009). Currently, women's labor force participation rates in Sub-Saharan Africa are high relative to other developing regions, with an important factor being high female participation in subsistence agriculture (Klasen 2017). With increasing

urbanization, increasing proportions of women seeking employment outside of subsistence agriculture will add to the need to produce new jobs in urban areas. On the other hand, as we explore later, women are much better educated than they were in the past.

Whether the 21st century is a demographic dividend or a demographic challenge in Sub-Saharan Africa will depend on African countries' ability to produce jobs at a rate similar to the rate at which they were produced in Asia during the period in which its working-age population was growing at similar rates. This is obviously a daunting challenge. A factor potentially working in Africa's favor is that Asia and other regions are entering a period in which their working-age populations will be declining. As Africa begins to reap its demographic dividend, other regions are seeing the demographic dividend fade out with population aging. The demography of the global labor force will change dramatically in coming decades, with Africa having the potential to benefit from those changes.

7. From Demography to the Labor Market

7.1 The quality of Africa's labour supply: Rising education among new labor force cohorts

The trends that we have unpacked above have been directed at providing a detailed picture of the size, age distribution, and location for the supply of labor in Africa and globally. However, the ability of economies to absorb rapidly growing cohorts of labor market entrants will depend not only on the size of these cohorts, but also on their characteristics. Education is one of the most important dimensions affecting the prospects and potential productivity of young workers entering the labor force and this is our focus in this section.

It is important to recognize that the young cohorts entering labor markets in Africa in the coming decades will be the best educated cohorts in recorded history for each of these countries. As pointed out in Lam (2011), education rose rapidly in all developing regions in the last 50 years, in spite of the unprecedented growth of the school-age population. Education rose faster for women than men almost everywhere in the world, with the education gender gap narrowing or even reversing in most countries. While Africa has had more uneven progress in education in the last 50 years, the most recent decades have been a period of significant improvement in Africa too.

Figure 11 shows trends in mean schooling of cohorts in four African countries that have recent census data that can be used to look in detail at the evolution of schooling across birth cohorts – Senegal, Uganda, Guinea, and Zambia. The data are from the Integrated

Public Use Microdata Series, International program (Minnesota Population Center 2020). The horizontal axis shows the year that each birth cohort turned age 20, roughly corresponding to the age of labor force entry. In other words, the graphs can be thought of as showing how the education of new labor force entrants has increased over time. All four countries have had significant increases in education, although Senegal and Guinea both experienced slowdowns and even reversals during the 1980s and 1990s. The gender gap has narrowed but not closed in all four countries, with especially rapid increase in women's schooling since the 1990s.

Recent literature on the situation of youth in Africa suggest that these trends are true more generally across the continent (Fox and Ghandi, 2021; World Bank, 2018). Similar increases in schooling occurred in Asia and Latin America and may help explain why rapid growth of cohorts entering the labor force did not lead to large increases in unemployment. The hope has been that rising levels of education for African cohorts would imply higher productivity to potential employers and increased empowerment in creating good self-employment opportunities.

However, it needs to be recognized that the overall quality of education in Africa is still poor relative to their peers in other regions, even controlling for income level (Fox and Ghandi, 2021; Filmer and Fox, 2014; World Bank, 2018; Arias et al., 2019). This seems to be almost uniformly true across the continent. It is extremely so in the continent's resource-rich countries, which have some of the worst education outcomes even after controlling for income (de la Brière et al., 2017).

This school quality deficit is consequential. Lam and Elsayed (2022) and Fox and Ghandi (2021) review many of the labor market policy evaluations that have been undertaken in Africa. The consolidated evidence shows that the curriculum and teaching methods are not oriented towards developing non-cognitive skills and employability knowledge helpful for navigating the labor market, especially in secondary and post-secondary education systems. As a result, graduating youth often do not know how to interact with potential employers to find a job, or to interact with self-employed mentors to find out how they could perform better.

7.2 The Changing Demand for Labor Confronting Cohorts Entering the Labor Force

In an extensive review, Fox and Ghandi (2021) make a number of key points about the changing employment situation facing youth in Africa. Positively, as levels of economic development and transformation improve in Africa, youth and adult employment outcomes improve. In this regard, after controlling for income level, the outcomes in Africa are similar

to those found in developing countries in other regions. They are not behind the rest of the world, except in the continent's lower-middle-income resource-rich countries where growth does not correlate well with improved employment and development outcomes.

Relatedly, Africa's labor market challenge is not only or even mostly an unemployment challenge. Open unemployment is not widespread in Africa until countries reach upper middle-income status. Although youth unemployment is typically higher than country-wide averages, the difference is very small in the poorest countries. In this regard too, Africa is like the pattern in other parts of the world.

As shown in a recent book by Fields et al. (2023), to be employed in these countries means creating your own job or joining with household members in farming or nonfarming activities. Particularly in Africa and South Asia, and less so in East Asia and Latin America, informal forms of economic activity remain a persistent phenomenon in spite of rapid economic growth in recent decades (Kanbur 2017). Informal employment now constitutes more than 60 per cent of total global employment (ILO 2018) and in Africa 80 per cent of employment is informal (ILO 2018). Micro, small, informal, and household-run enterprises employ a large share of the workforce and provide livelihoods for the poor (La Porta and Shleifer 2014). Women are more likely to engage in precarious forms of informal work, such as contributing family/unpaid workers in the enterprises headed by the males in their households, or in poorly paid casual jobs in the informal sector (Fields et al., 2023). Indeed, Rodrik (2016) argues that with "premature deindustrialization", it seems likely that the trajectory towards informalization in low- and middle-income countries may be intensified in the future.

However, it is important to note that informal economic activity takes many different forms and plays different roles. In low and middle-income countries, it is often a place of residual employment for impoverished, marginalized, and vulnerable workers, particularly at times of economic stress and crisis. It can though also act as a staging ground for household enterprises in their initial stage of growth. While the recognition of the pervasiveness of informality is crucial in twinning employment scenarios to our analysis of labor supply, it does not imply simple policy implications. It is crucial too to recognize and profile heterogeneity in informal work. (Chen 2012; De Vreyer and Roubaud 2013; Kanbur 2017).

Given that most African countries have low rates of unemployment, as conventionally measured, and have not experienced large increases in unemployment as the working-age population has grown, it is possible that these countries can continue to absorb millions of new entrants to the working-age population without an increase in unemployment rates. This

could occur through continued expansion of a relatively low productivity informal sector, including expansion of the numbers employed in agriculture. While this might mean that standard measures of unemployment do not show a dramatic increase in coming decades, in spite of the rapid growth of the labor force, this scenario is unlikely to lead to significant economic growth or declines in poverty. Clearly then, a big challenge is for these countries to expand formal employment at a rate that increases both the absolute size and the relative size of the formal sector. An important question is whether the shrinking of the working-age population in Asia and the rest of the world will help facilitate this kind of formal sector expansion. There will be particularly high growth and development returns to formal sector expansions that greatly improve linkages into and inclusion of informal enterprises. This formal-informal interface will require explicit policy attention.

8. Summary and Conclusions

The global labor market has undergone unprecedented demographic changes in the last 50 years. Three billion people were added to the working-age population of the world between 1970 and 2020, with two billion of those added in Asia. The world added over 60 million people every year to the working-age population from 1980 to 2010, reaching a peak of 72 million per year in 2005. The working-age population of the world grew at over 2% per year in the 1970s and 1980s, and didn't fall below 1.5% per year until 2010. In spite of these demographic pressures on the labor market, most countries did not experience significant increases in unemployment.

While the growth rate of the world's working-age population has declined to around 1% per year, there will be continued demographic pressure on global labor markets in coming decades. The nature of these pressures has changed, however. Growth of the working-age population will be almost entirely concentrated in Sub-Saharan Africa, and the working-age population in all regions will be rapidly aging.

From the perspective of Sub-Saharan Africa, the projected demographic trends presented in this paper offer both challenges and opportunities. Between 2020 and 2050, a period for which projections have relatively little uncertainty, Sub-Saharan Africa's working-age population is projected to more than double, an addition of over 700 million working-age individuals. By 2035, Africa will need over 2 million jobs per month to keep up with the growth of the working-age population, up from 1.5 million per month in 2020.

While this rapid growth of Africa's working-age population creates obvious challenges for employment creation, it also represents a period of economic opportunities and shifting dynamics in the global labor force. Most African countries will have steadily rising proportions of their populations concentrated in working ages for most of this century, creating the potential for a demographic dividend that could spur economic growth. Sub-Saharan Africa will be the only major region in the world with a growing working-age population for the rest of the century. While Sub-Saharan Africa will add 700 million new working-age people between 2020 and 2050, the working-age population of Asia will decline by 240 million.

The main demographic factor driving the continued growth of the working-age population in Sub-Saharan Africa is the continent's later and slower fertility decline compared to regions such as Asia and Latin America. With a total fertility rate of 4.6 births per woman in 2020, Africa has fertility rates that were last seen in Asia and Latin America in the 1970s. The pace of Africa's fertility decline is the main source of uncertainty in projections of population growth in Africa and the world in this century. The UN projects that African fertility will fall steadily in coming decades, continuing the declines of previous decades. While uncertainty in these fertility projections creates uncertainty in projections of the working-age population, they have only a modest impact on projections of the working-age population out to 2050. Since most of the 2050 working-age population has already been born, the projections we have presented in this paper out to 2050 should be viewed as having only a small degree of uncertainty. Beyond 2050, the pace of Africa's fertility decline in the coming decades will be an important determinant of the working-age population.

While Africa's job creation challenge in this century is daunting, it is not unprecedented. Africa's current annual growth rate of the working-age population – around 3% – is similar to the growth rate experienced by Asia and Latin America around 1980. While Africa is projected to add 27 million new working-age people at the peak in 2055, Asia added almost 50 million per year in the early 2000s. The demography of Africa's labor force, then, is not exceptional in terms of the rates of growth or absolute numbers being added to the working-age population. The important difference in Africa's demography compared to Asia and Latin America, however, is that those regions experienced high rates of growth for very short periods of time, while Africa will have rapid growth of its working-age population for several decades. Outside of Africa, these trends have been and will continue to be associated with rapidly rising shares of the population residing and working in urban areas. In Africa, urban population shares are rising too and, by 2050, close to 60% of the population will be

urban. However, this urban share is notably lower than elsewhere and in most African countries the number of people residing in rural areas is estimated to rise going forward.

Ultimately the question is whether African can turn a century in which it is the only region in the world with a growing working-age population into a period of growing employment and rapid economic growth. Moving beyond the demography, it is important to note that the education of new cohorts entering the labor force has been rapidly increasing. That said, there continue to be issues of school quality in many African countries, with concerns that young people entering the labor force are not getting the right cognitive and non-cognitive skills to meet the needs of potential employers or productive self-employment.

Africa's labor market challenge is mostly not an unemployment challenge, at least in the traditional sense, since unemployment rates as conventionally measured are low in most countries. Informal sector employment dominates most African labor markets, in general functioning in a way that adjusts to absorb expansions in labor supply but at a cost to productivity, earnings, and support from the labor market. This generalized characterization of the informal understates important heterogeneities across countries in the specific configurations of the informal sector in the labor market and, particularly important, in the relationships between this sector and the formal sector. For African labor markets to reap their potential demographic dividends, the challenges going forward are to create high-productivity formal sector jobs at a rate that can keep up with the rapid growth of the working-age population and with linkages to informal sectors that are more inclusive than they have been.

References

- Arias Diaz, Omar S.; David Evans, and Indhira Vanessa Santos. 2019. *The Skills Balancing Act in Sub-Saharan Africa: Investing in Skills for Productivity, Inclusivity, and Adaptability*. Africa Development Forum Washington: World Bank Group.
- Bloom, David, and Jeffrey Williamson. 1998. Demographic Transitions and Economic Miracles in Emerging Asia. *World Bank Economic Review* 12: 419-456.
- Bloom, David, David Canning, and Jaypee Sevilla. 2003. The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change. Rand Corporation.
- Bloom, David E., David Canning, Günther Fink, and Jocelyn E. Finlay. 2009. "Fertility, Female Labor Force Participation, and the Demographic Dividend." *Journal of Economic Growth* 14 (2): 79–101.
- Bloom, David E., Michael Kuhn, and Klaus Prettnner. 2017. "Africa's Prospects for Enjoying a Demographic Dividend." *Journal of Demographic Economics* 83 (1): 63–76.
- Bongaarts, John. 2009. "Human population growth and the demographic transition." *Philosophical Transactions of the Royal Society of London. Series B, Biological sciences* 364(1532): 2985-90.
- Bongaarts, John. 2017. Africa's Unique Fertility Transition. *Population and Development Review*. 43(S1): 39-58.
- Bongaarts, John, and John Casterline. 2013. "Fertility Transition: Is Sub-Saharan Africa Different?" *Population and Development Review* 38 (s1): 153–68.
- Canning, David, Sangeeta Raja, and Abdo S. Yazbeck. 2015. *Africa's Demographic Transition: Dividend or Disaster?* World Bank Publications.
- Casterline, John B. 2017. "Prospects for Fertility Decline in Africa." *Population and Development Review*, 43: 3-18.
- Casterline, John B., and Samuel Agyei-Mensah. 2017. "Fertility Desires and the Course of Fertility Decline in Sub-Saharan Africa." *Population and Development Review* 43 (S1): 84–111.
- Chen, Marty. 2012. "Mapping Size and Diversity of Informal Economy." WIEGO Technical Note 2: Mapping Informal Workers. WIEGO, Harvard University.
- Cleland, John. 2017. "Population Growth, Employment, and Livelihoods: The Triple Challenge." *Journal of Demographic Economics* 83 (1): 51–61.
- Cleland, John, and Kazuyo Machiyama. 2017. "The Challenges Posed by Demographic Change in Sub-Saharan Africa: A Concise Overview." *Population and Development Review* 43 (S1): 264–86.
- Collier, Paul. 2017. "Africa's Prospective Urban Transition." *Journal of Demographic Economics* 83 (1): 3–11.
- Demographic and Health Survey Program STATcompiler. Funded by USAID. <http://www.statcompiler.com>. Accessed April 7, 2023
- de la Brière, Bénédicte, Deon Filmer, Dena Ringold, Dominic Rohner, Karelle Samuda, and Anastasiya Denisova. 2017. *From Mines and Wells to Well-Built Minds: Turning Sub-Saharan Africa's Natural Resource Wealth into Human Capital*. Washington: World Bank Publications.
- De Vreyer, Philippe, and Francois Roubaud, eds. 2013. "Urban labor markets in sub-Saharan Africa." Washington: World Bank Publications

- Dramani, Latif, and Idossou Jean-Baptiste Oga. 2017. "Understanding Demographic Dividends in Africa: The NTA Approach." *Journal of Demographic Economics* 83 (1): 85–101.
- Fields, Gary S., T.H. Gindling, Kunal Sen, Michael Danquah, and Simone Schotte. 2023. *The Job Ladder: Transforming Informal Work and Livelihoods in Developing Countries*. Oxford University Press.
- Filmer, Deon, and Louise Fox. 2014. *Youth Employment in Sub-Saharan Africa*. World Bank Publications.
- Fox, Louise. 2016. "What will it take to meet the Youth Employment Challenge in Sub-Saharan Africa?" *GLM|LIC Synthesis Paper No. 2*, IZA, April 2016.
- Fox, Louise, and Dhruv Gandhi. 2021. "Youth employment in sub-Saharan Africa: Progress and prospects," African Growth Initiative Working Paper #28, Washington: Brookings Institute. March 2021
- Fox, Louise, Lemma W. Senbet, and Witness Simbanegavi. 2016. "Youth Employment in Sub-Saharan Africa: Challenges, Constraints and Opportunities." *Journal of African Economies* 25 (suppl_1): i3–15.
- Fox, Sean. 2017. "Mortality, Migration, and Rural Transformation in Sub-Saharan Africa's Urban Transition." *Journal of Demographic Economics* 83 (1): 13–30.
- International Labour Organization. ILO modelled estimates database, ILOSTAT. <https://ilostat.ilo.org/data/>. Accessed April 11, 2023.
- Jedwab, Remi, Luc Christiaensen, and Marina Gindelsky. 2015. "Demography, Urbanization and Development: Rural Push, Urban Pull and... Urban Push?" *World Bank Policy Research Working Paper No. 7333*.
- Kanbur, Ravi. 2017. "Informality: Causes, consequences and policy responses." *Review of Development Economics*. 21(4): 939– 961.
- Kebede, Endale, Anne Goujon, and Wolfgang Lutz. 2019. "Stalls in Africa's Fertility Decline Partly Result from Disruptions in Female Education." *Proceedings of the National Academy of Sciences* 116 (8) 2891-2896.
- Klasen, Stephan. 2017. "What Explains Uneven Female Labor Force Participation Levels and Trends in Developing Countries?" *GLM|LIC Synthesis Paper, No. 7* (October), IZA.
- Lall, Somik Vinay, J. Vernon Henderson, and Anthony J. Venables. 2017. *Africa's Cities: Opening Doors to the World*. World Bank Publications.
- Lam, David. 2011. "How the World Survived the Population Bomb: Lessons from 50 Years of Extraordinary Demographic History." *Demography* 48 (4): 1231–62.
- Lam, David and Duryea, Suzanne. 1999. "Effects of Schooling on Fertility, Labor Supply, and Investments in Children, with Evidence from Brazil." *Journal of Human Resources*, 34 (1): 160-192.
- Lam, David, and Ahmed Elsayed. 2022. *Labour Markets in Low-Income Countries Challenges and Opportunities*. Oxford: Oxford University Press
- Lam, David, and Murray Leibbrandt. 2013. "Global Demographic Trends and their Implications for Employment," Paper prepared for the United Nations Development Program High-Level Panel on the Post-2015 Development Agenda, April 2013
- Lam, David, Murray Leibbrandt, and James Allen. 2019. "The Demography of the Labor Force in Sub-Saharan Africa: Challenges and Opportunities," Growth and Labour Markets in Low Income Countries Programme Synthesis Paper No. 10, November 2019.

- La Porta, Rafael, and Andrei Shleifer. 2014. "Informality and development." *Journal of Economic Perspectives*. 28(3): 109-26.
- Lee, Ronald. 2003. "The Demographic Transition: Three Centuries of Fundamental Change." *Journal of Economic Perspectives*, 17 (4): 167-190.
- Lee, Ronald, and Andrew Mason. 2006. "What Is the Demographic Dividend?" *Finance and Development* 43 (3): 16.
- Lee, Ronald, and Andrew Mason. 2014. "Is Low Fertility Really a Problem? Population Aging, Dependency, and Consumption." *Science* 346 (6206): 229–34.
- May, John F., and Vincent Turbat. 2017. "The Demographic Dividend in Sub-Saharan Africa: Two Issues That Need More Attention." *Journal of Demographic Economics* 83 (1): 77–84.
- Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.3 [dataset]. Minneapolis, MN: IPUMS, 2020. <https://doi.org/10.18128/D020.V7.3>
- Pariente, William. 2017. "Urbanization in Sub-Saharan Africa and the Challenge of Access to Basic Services." *Journal of Demographic Economics* 83 (1): 31–39.
- Rodrik, Dani. 2016. "Premature Deindustrialization." *Journal of Economic Growth* 21(1): 1–33.
- Singh, Susheela, Akinrinola Bankole, and Jacqueline E. Darroch. 2017. "The Impact of Contraceptive Use and Abortion on Fertility in Sub-Saharan Africa: Estimates for 2003–2014." *Population and Development Review* 43 (S1): 141–65.
- United Nations, Department of Economic and Social Affairs, Population Division. 2018. *World Urbanization Prospects: The 2018 Revision*, Online Edition. 2018.
- United Nations, Department of Economic and Social Affairs, Population Division (2022). *World Population Prospects 2022: Methodology of the United Nations population estimates and projections*. UN DESA/POP/2022/TR/NO. 4. https://population.un.org/wpp/Publications/Files/WPP2022_Methodology.pdf
- World Bank. 2018. *World Development Report 2018: Learning to Realize Education's Promise*. Washington: World Bank.

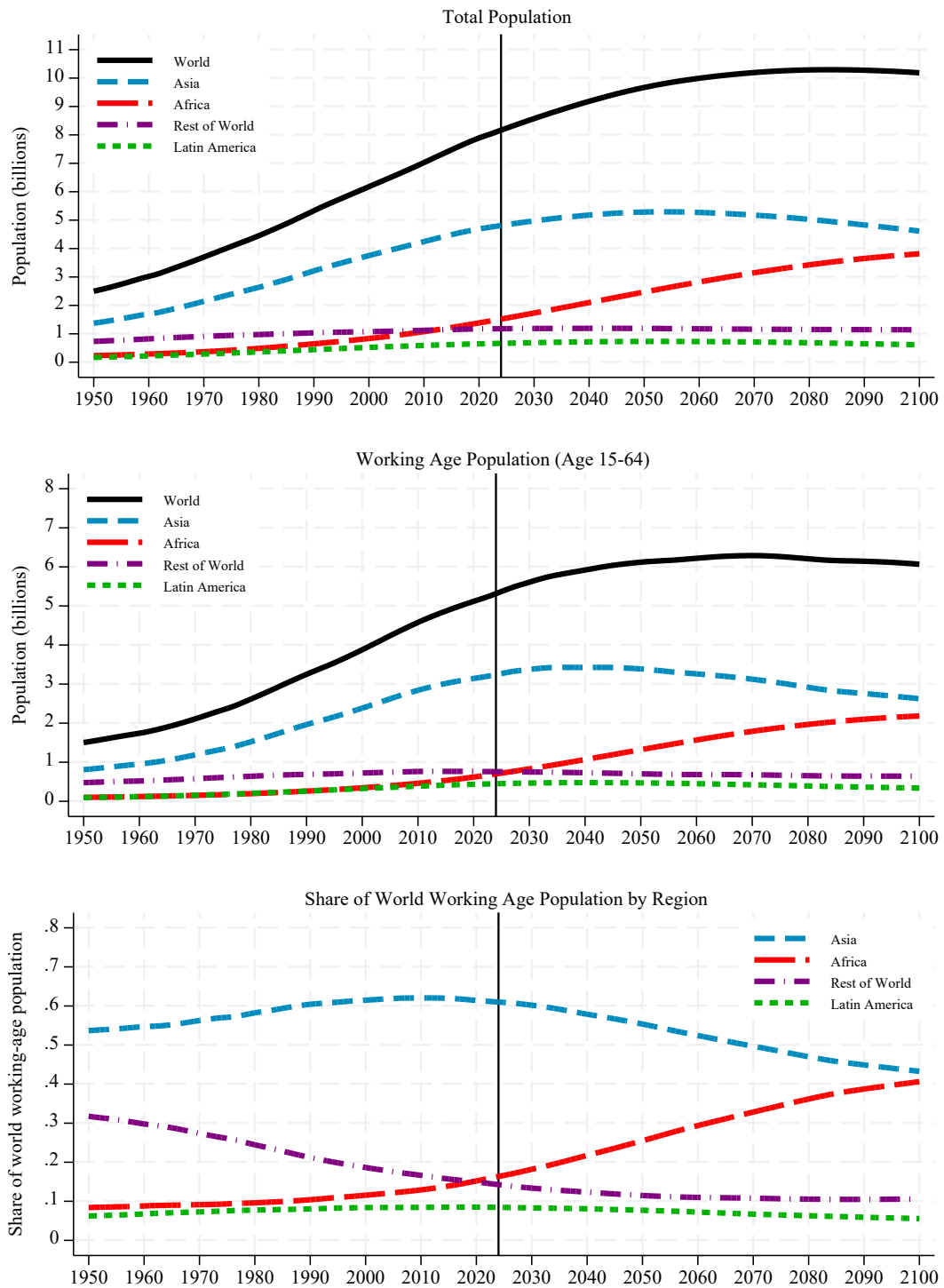


Figure 1: Total Population, Working Age Population, and Shares of World Working Age Population, 1950-2100

Source: UN World Population Prospects 2024: Estimates 1950-2023, Medium Variant Projections 2024-2100

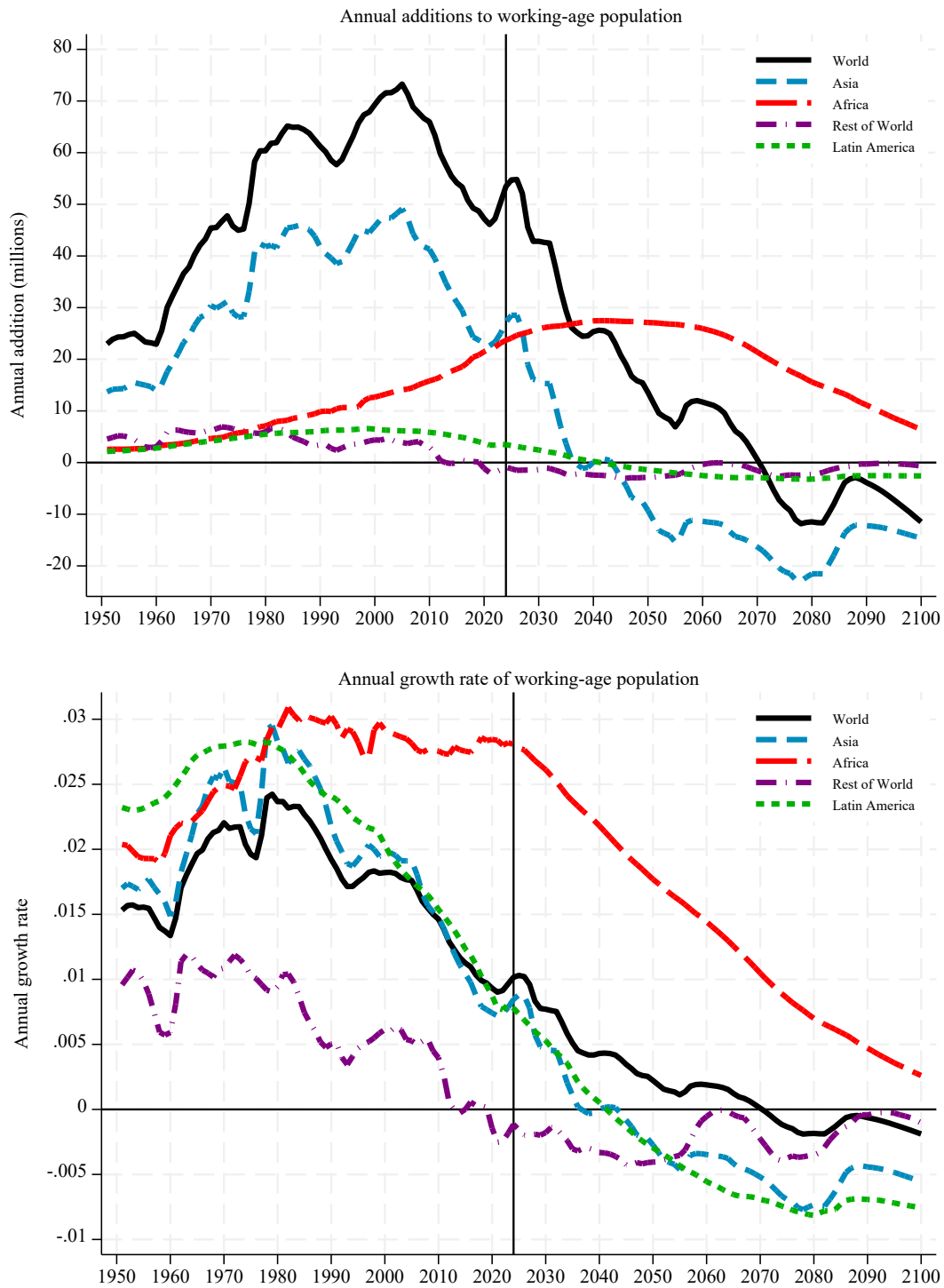


Figure 2: Annual additions and annual growth rate of working-age population, 1950-2100

Source: UN World Population Prospects 2024: Estimates 1950-2023, Medium Variant Projections 2024-2100

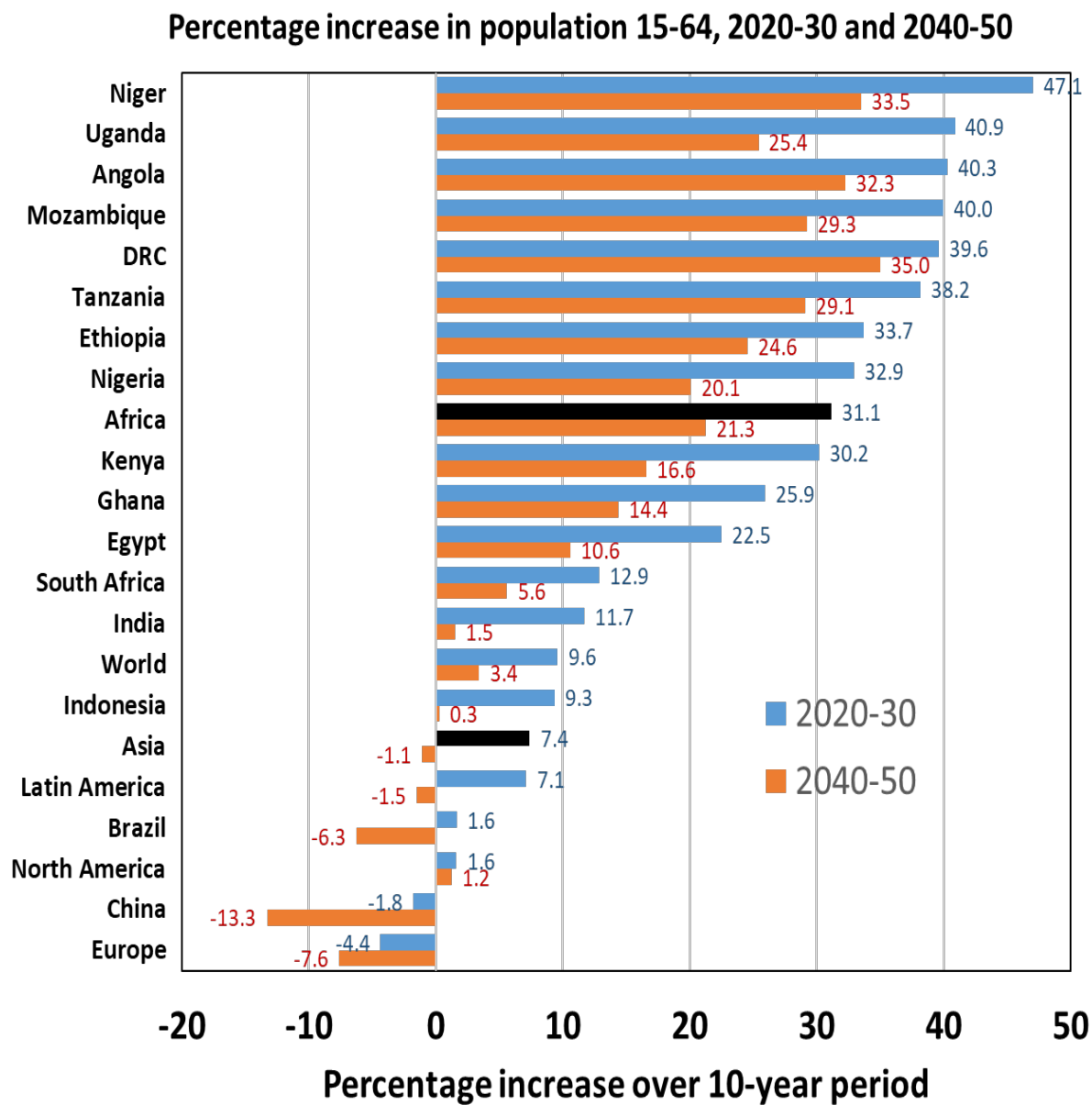


Figure 3: Growth of population aged 15-64, 2020-30 and 2040-50, Selected African countries with comparison countries and regions

Source: UN World Population Prospects 2024, Medium Variant Projections 2024-2100.

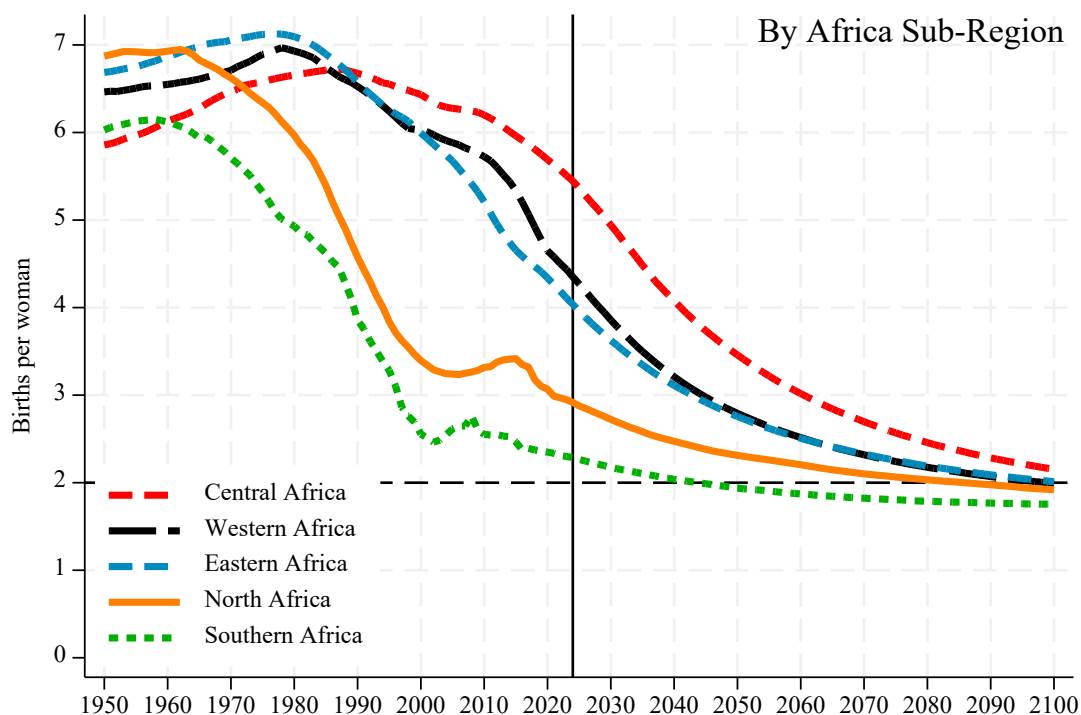
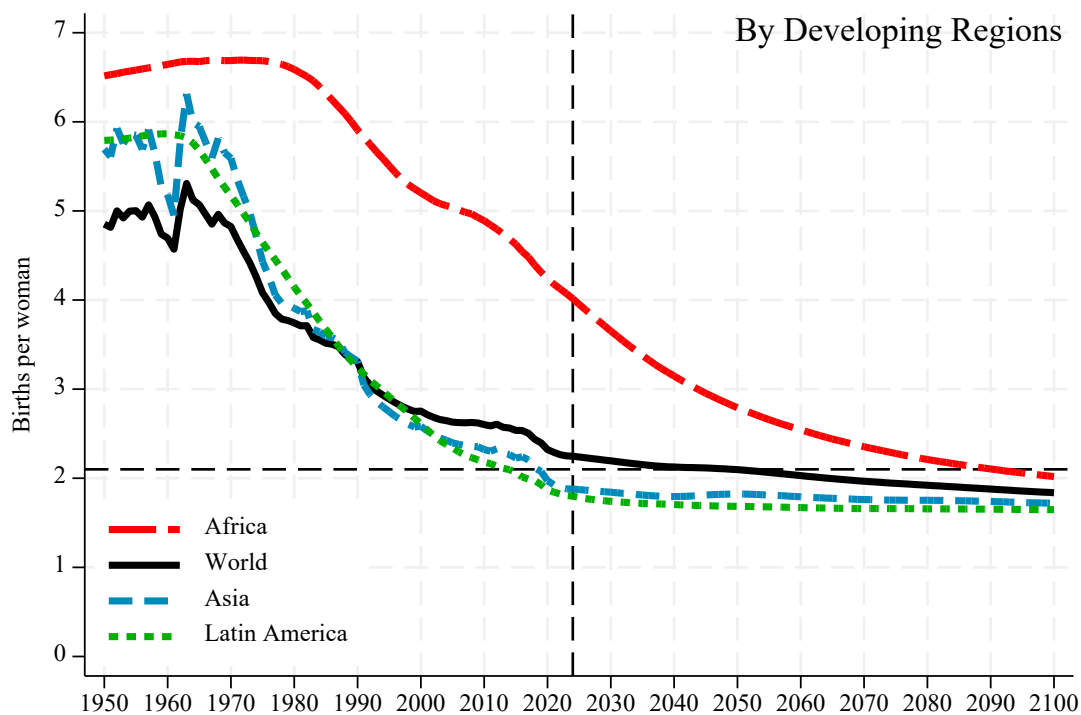


Figure 4: Total Fertility Rates by Region and Africa Sub-Region, 1950-2100

Source: UN World Population Prospects 2024: Estimates 1950-2023, Medium Variant Projections 2024-2100

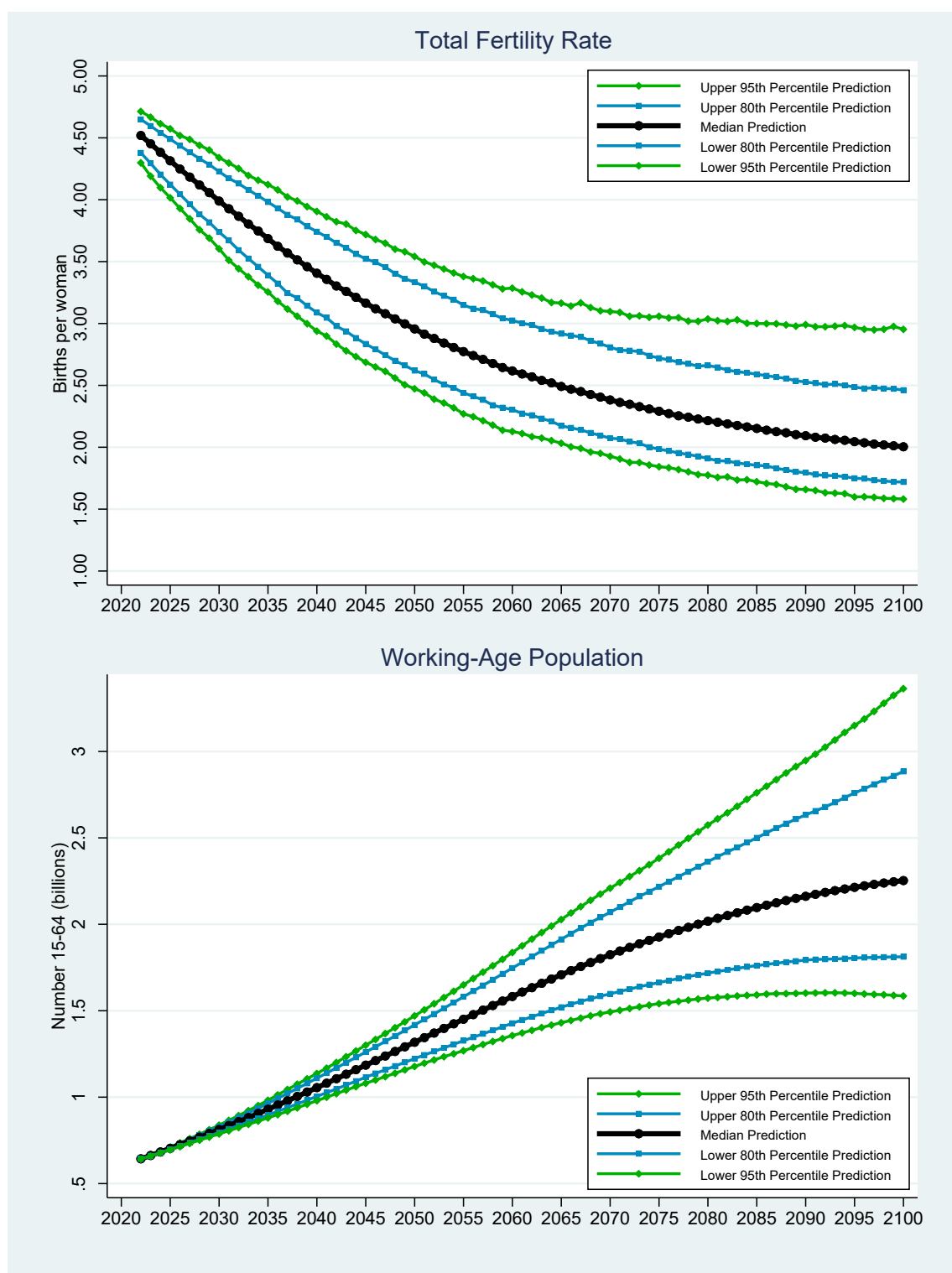


Figure 5: Projected Total Fertility Rate and Working-Age Population with Prediction Percentiles, Sub-Saharan Africa, 2022-2100

Source: UN World Population Prospects 2022: Median, 80th, and 95th Percentile Projections.

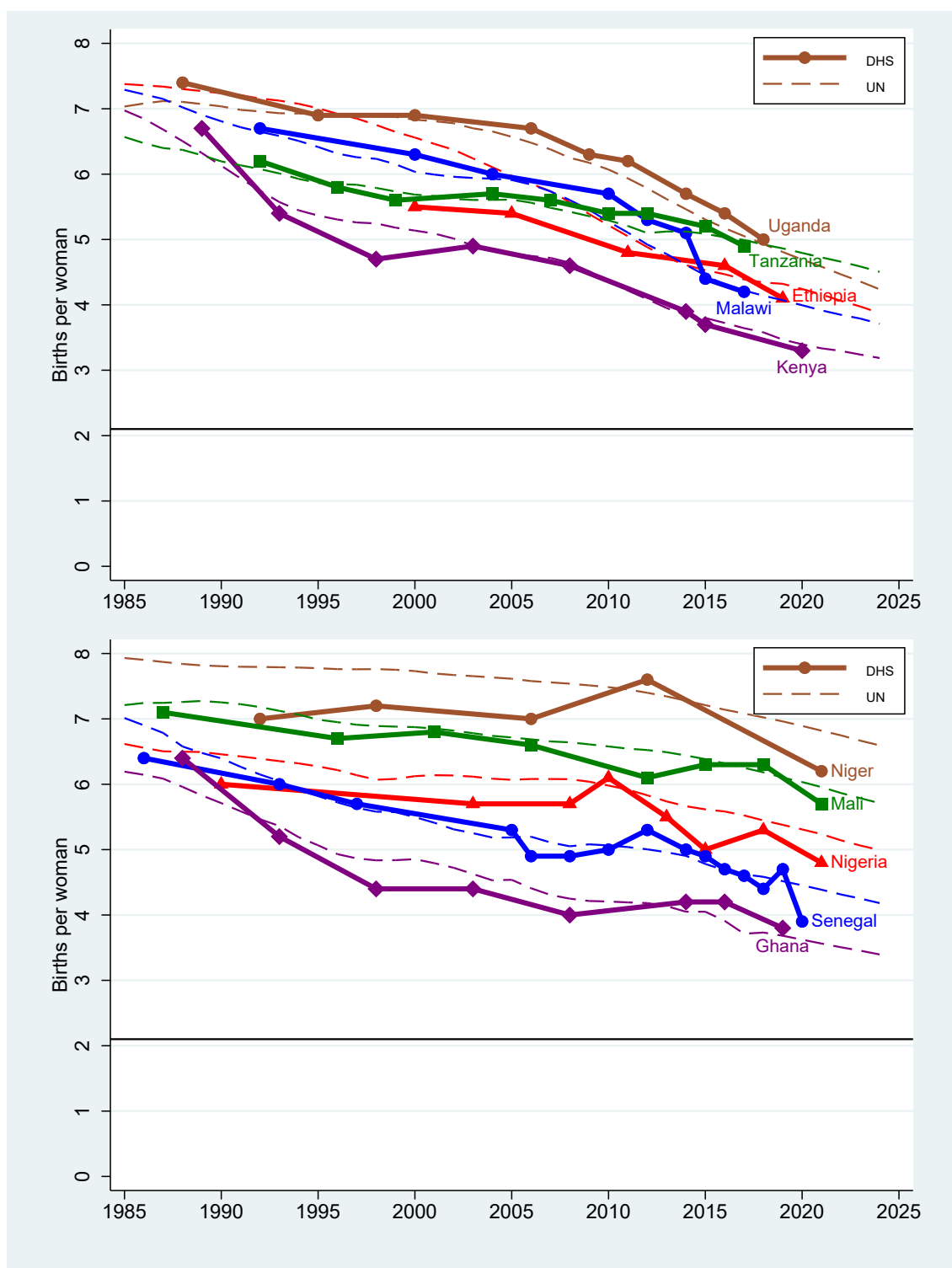


Figure 6: Total Fertility Rate for selected African countries, Estimates from Demographic and Health Surveys and Estimates and Projections from United Nations Population Division, 1985-2025

Sources: UN World Population Prospects 2022: Estimates 1950-2021, Medium Variant Projections 2022-2025; DHS STATCompiler (DHS 2023)

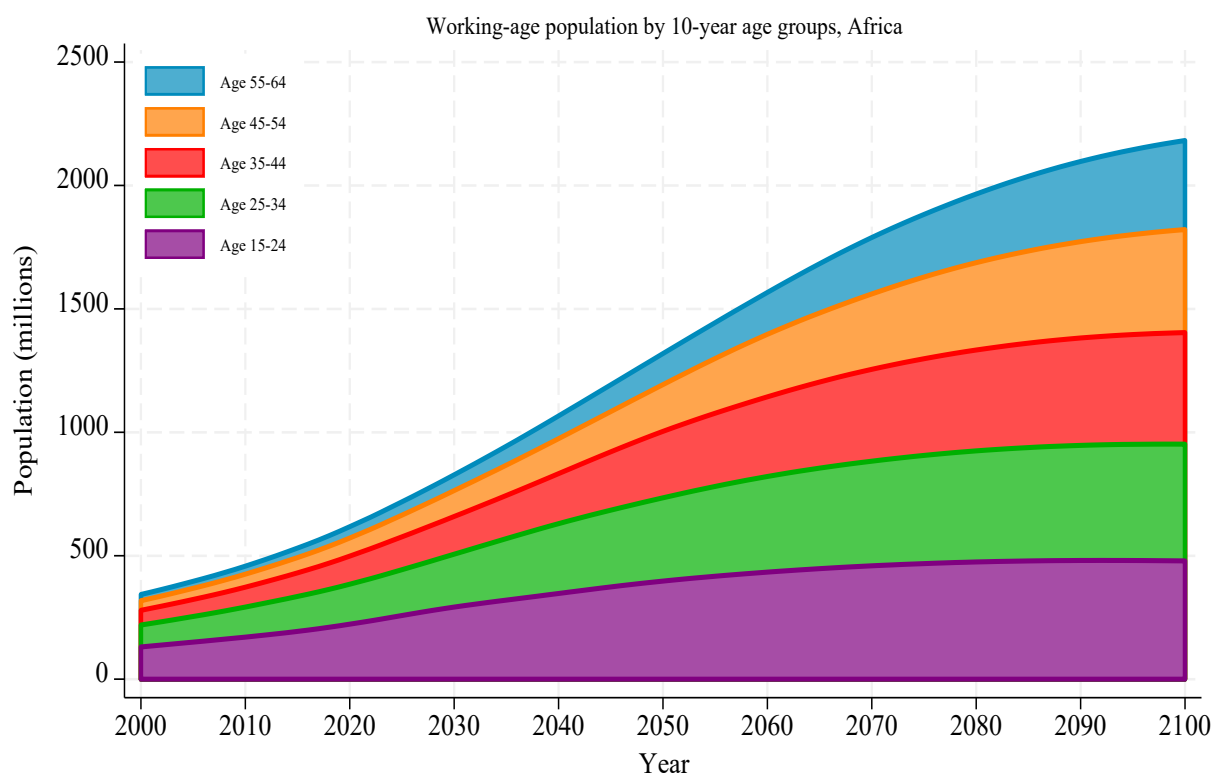


Figure 7: Working-age population by 10-year age groups, Sub-Saharan Africa, 2000-2100

Source: UN World Population Prospects 2024: Estimates 2000-2023, Medium Variant Projections 2024-2100

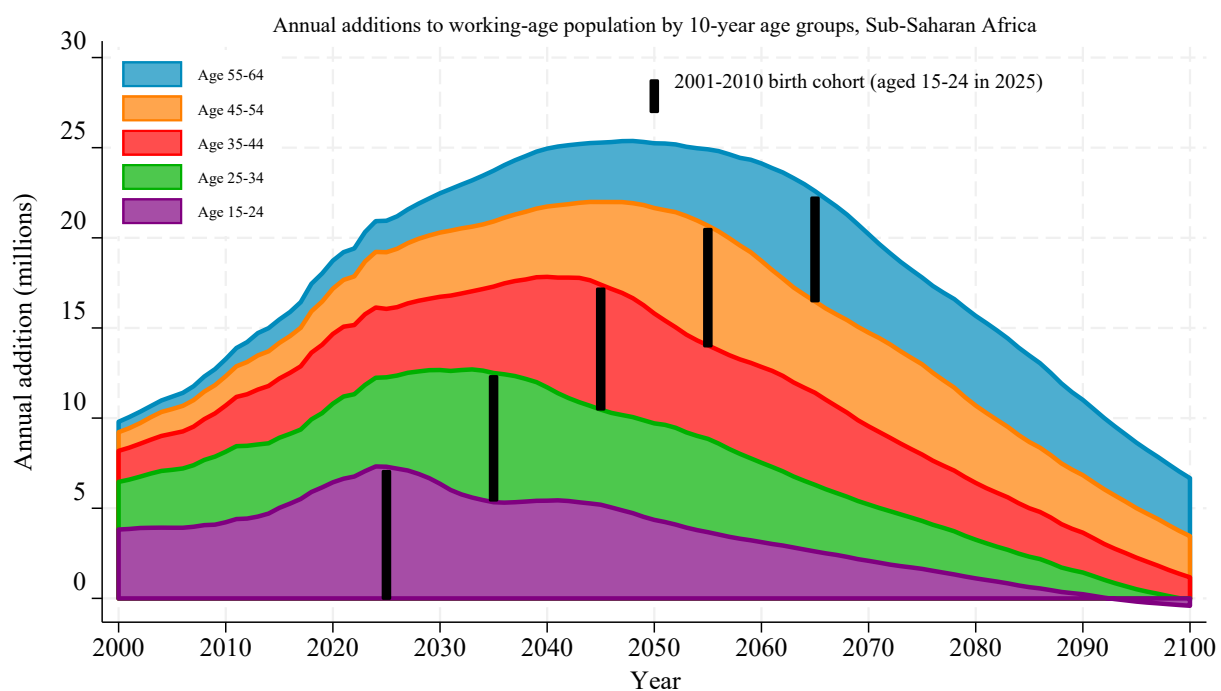


Figure 8: Annual additions to working-age population by 10-year age groups, Sub-Saharan Africa, 2000-2100

Source: UN World Population Prospects 2024: Estimates 2000-2023, Medium Variant Projections 2024-2100

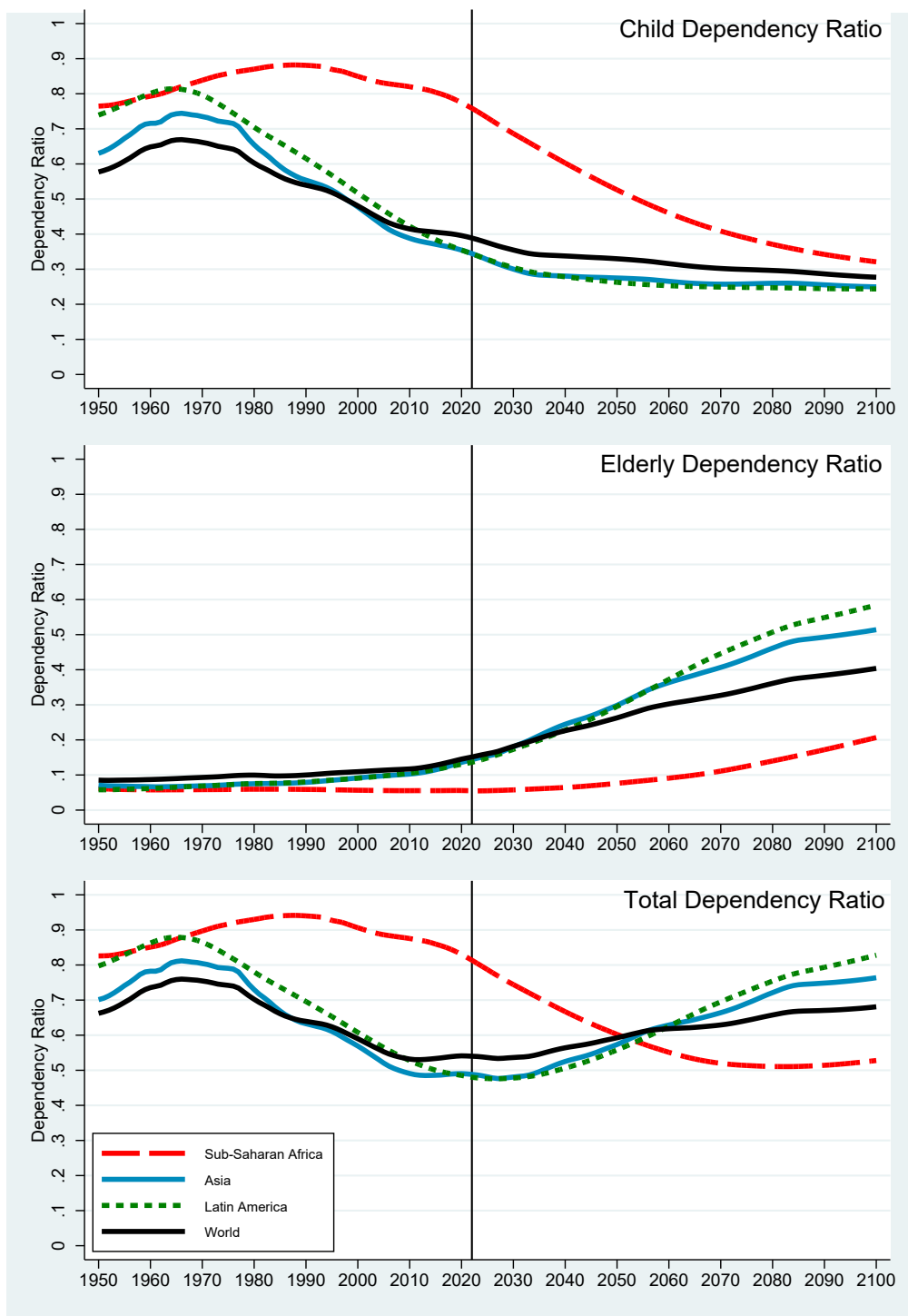


Figure 9: Dependency Ratios by Region, 1950-2100
 Child Dependency Ratio = $\text{Pop 0-14} / \text{Pop 15-64}$
 Elderly Dependency Ratio = $\text{Pop 65+} / \text{Pop 15-64}$
 Total Dependency Ratio = $(\text{Pop 0-14} + \text{Pop 15-64}) / \text{Pop 15-64}$

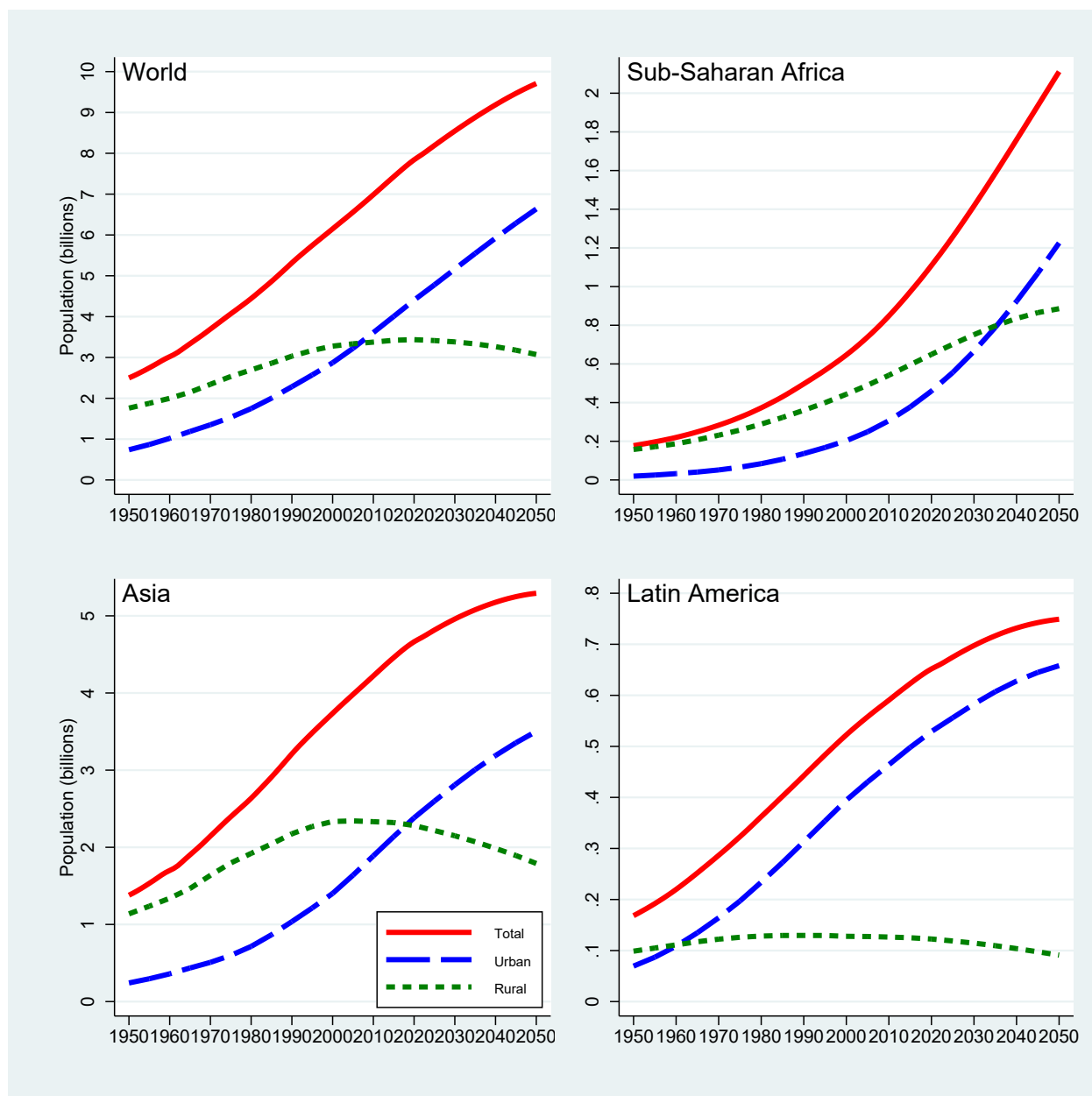


Figure 10: Urban and Rural Population by Region, Billions, 1950-2050

Source: Proportion urban taken from UN World Urbanization Prospects, 2018 Revision; Population totals taken from UN World Population Prospects 2022: Estimates 1950-2021, Medium Variant Projections 2022-2050

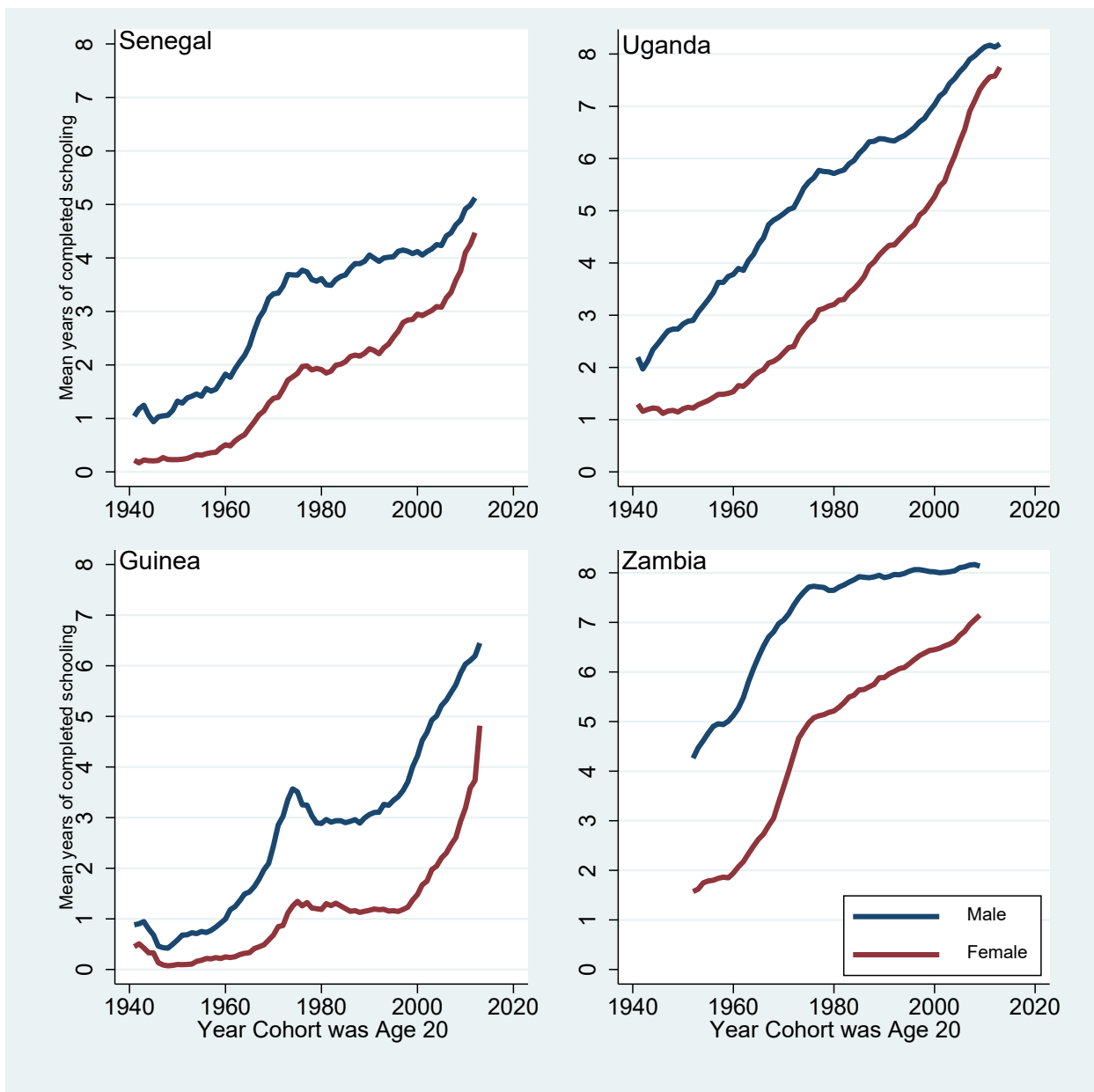


Figure 11: Mean years of completed schooling for cohorts at age 20, Senegal, Uganda, Guinea, and Zambia (Five-year moving averages)

Source: IPUMS-International Census Data (Minnesota Population Center 2020)

**Table 1. Number of working-age people by age group and region,
2020, 2050, and 2080**

	2020			2050			2080	
Age Group	Millions	Share of total		Millions	Share of total		Millions	Share of total
<i>Sub-Saharan Africa</i>								
Age 15-24	218	36%		402	31%		487	24%
Age 25-34	159	26%		337	26%		463	23%
Age 35-44	112	18%		266	20%		423	21%
Age 45-54	72	12%		188	14%		363	18%
Age 55-64	44	7%		124	9%		282	14%
Total	606			1,318			2,018	
<i>Asia</i>								
Age 15-24	717	23%		631	19%		538	18%
Age 25-34	741	24%		670	20%		576	20%
Age 35-44	644	21%		720	21%		604	21%
Age 45-54	593	19%		675	20%		602	20%
Age 55-64	435	14%		667	20%		620	21%
Total	3,129			3,364			2,941	
<i>Latin America</i>								
Age 15-24	108	25%		90	19%		73	18%
Age 25-34	104	24%		94	20%		77	19%
Age 35-44	93	21%		100	21%		82	20%
Age 45-54	76	17%		101	21%		86	21%
Age 55-64	58	13%		95	20%		89	22%
Total	439			481			407	
<i>Rest of World</i>								
Age 15-24	175	19%		176	19%		171	19%
Age 25-34	196	21%		188	20%		184	20%
Age 35-44	193	21%		199	21%		191	21%
Age 45-54	180	20%		182	20%		185	20%
Age 55-64	171	19%		188	20%		186	20%
Total	914			934			917	
<i>World</i>								
Age 15-24	1,218	24%		1,300	21%		1,269	20%
Age 25-34	1,200	24%		1,290	21%		1,300	21%
Age 35-44	1,041	20%		1,286	21%		1,300	21%
Age 45-54	921	18%		1,146	19%		1,237	20%
Age 55-64	708	14%		1,075	18%		1,177	19%
Total	5,088			6,096			6,283	

Table 2. Annual additions to the number of working-age people by age group and region, 2020, 2050, and 2080						
	2020		2050		2080	
Age Group	Number of millions added	Share of total added	Number of millions added	Share of total added	Number of millions added	Share of total added
Sub-Saharan Africa						
Age 15-24	6.3	35%	5.2	19%	1.1	6%
Age 25-34	4.1	23%	5.9	22%	2.2	12%
Age 35-44	3.9	22%	6.3	24%	3.6	21%
Age 45-54	2.3	13%	5.8	22%	5.1	29%
Age 55-64	1.5	8%	3.5	13%	5.4	31%
Total	18.0		26.7		17.3	
Asia						
Age 15-24	-0.7	-3%	-1.4	17%	-3.1	16%
Age 25-34	-0.1	0%	-9.9	119%	-5.1	26%
Age 35-44	8.0	35%	2.2	-26%	-1.5	7%
Age 45-54	3.7	16%	0.0	0%	-1.1	6%
Age 55-64	12.1	53%	0.8	-9%	-8.9	45%
Total	23.0		-8.3		-19.7	
Latin America						
Age 15-24	-0.4	-9%	-0.4	33%	-0.5	18%
Age 25-34	0.5	13%	-1.0	83%	-0.6	20%
Age 35-44	1.4	33%	-0.2	19%	-0.6	21%
Age 45-54	1.1	27%	-0.2	18%	-0.3	12%
Age 55-64	1.5	37%	0.7	-53%	-0.9	29%
Total	4.1		-1.2		-3.0	
Rest of World						
Age 15-24	0.2	14%	0.2	-18%	-0.3	14%
Age 25-34	-1.5	-100%	-2.0	188%	-0.8	37%
Age 35-44	1.9	124%	1.8	-174%	0.4	-17%
Age 45-54	-0.2	-11%	0.1	-9%	0.2	-11%
Age 55-64	1.1	73%	-1.2	113%	-1.7	77%
Total	1.5		-1.0		-2.2	
World						
Age 15-24	5	12%	3.5	22%	-2.9	38%
Age 25-34	3	6%	-7.0	-44%	-4.4	58%
Age 35-44	15	32%	10.1	63%	1.9	-26%
Age 45-54	7	15%	5.7	36%	3.9	-51%
Age 55-64	16	35%	3.8	23%	-6.1	81%
Total	47		16.0		-7.5	