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The Demography of the Labor Force in Sub-Saharan Africa: Challenges and Opportunities

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ABSTRACT

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The world is projected to add 3.1 billion people to the total population and 1.4 billion people to the working-age population between 2020 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 between Africa and other regions are the result of Africa's later and slower fertility decline, with fertility still high in many countries. The continued growth of Africa's working-age population creates both opportunities and challenges. On the one hand, being the only region with a growing working-age population may create opportunities for investment and economic growth. On the other hand, Africa will need to produce 2 million jobs per month by 2040 to keep up with the growth of the working-age population. This will be one of the biggest challenges facing the continent in the coming decades.

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Summary of Key Points

- ***The world will add 3 billion more people by 2100***

According to UN projections, world population will increase from 7.8 billion in 2020 to 9.7 billion in 2050 and 10.9 billion in 2100. The world's working-age population (age 15-64) will increase from 5.1 billion in 2020 to 6.1 billion in 2050 to 6.5 billion in 2100. Growth of both the total population and the working-age population will be close to zero by 2100.

- ***Falling birth rates are causing population growth to decline in all regions***

Falling mortality, especially infant and child mortality, caused rising population growth rates in the mid-20th century, with the world's annual population growth rate peaking at 2.1% in the 1960's. Rapid declines in fertility caused the world's population growth rate to fall to 1.1% by 2020, with a projected decrease to 0.5% by 2050 and close to 0% by 2100. The world's total fertility rate – the average number of children a woman will have over her lifetime – fell from over 5.0 in 1950 to 2.4 in 2020, close to the replacement fertility rate of 2.1. In Asia and Latin America the total fertility rate has fallen from around 6.0 in 1950 to near replacement level. Sub-Saharan Africa has had a later and slower fertility decline, from 6.5 in 1950 to 4.6 in 2020.

- ***Population growth in this century will be dominated by Africa***

Because of Africa's later and slower fertility decline, it will have much faster growth of its total population and its working-age population than other regions in the 21st century. While Asia accounted for 62% of global population growth between 1960 and 2020, Sub-Saharan Africa will account for 87% of global population growth between 2020 and 2100.

- ***All populations are getting older, but Africa remains young***

Due to rapid fertility decline, the age distributions for the world, Asia, and Latin America have shifted from being very young in the 1970s and 1980s to a rapidly aging population. The absolute number of youth aged 15-24 will fall between 2020 and 2050 in Asia and Latin America, with most future population growth concentrated in retirement ages. Sub-Saharan Africa is also getting older, but at a much slower rate. It is the only region that will continue to have rapid growth of its youth population, with the number of 15-24 year-olds increasing 80% between 2020 and 2050.

- ***Africa will be the only region with a growing working-age population by 2050***

The working-age population in Sub-Saharan Africa will more than double between 2020 and 2050. By contrast, the working-age populations of Asia and Latin America will only increase by around 10% in this same period, and will be in decline by 2050. Sub-Saharan Africa will be the

only major region with a growing working-age population by 2050. The annual growth rate of Africa's working-age population will peak at around 3% per year around 2025. Similar growth rates of the working-age population were experienced by Asia and Latin America in the 1980s, but they experienced these growth rates per year for less than a decade, while Africa will experience these high growth rates over several decades.

- ***Dependency ratios are worsening in most regions, but improving in Africa***

Population aging in Asia and Latin America initially caused an increasing concentration in working ages, a key component of the demographic dividend. The share in working ages is now falling in Asia and Latin America, with future population growth concentrated in the population over age 65. The dependency ratio – the ratio of children and elderly dependents to the working-age population – will be increasing in Asia and Latin America throughout this century. Sub-Saharan Africa has a high but falling dependency ratio, and will be the only region with a falling dependency ratio for most of the century.

- ***Africa needs 1.5 million jobs per month, rising to 2 million by 2040***

Sub-Saharan Africa's working-age population of 600 million people is growing at a rate of over 3% per year, adding over 1.5 million people per month. While the percentage growth rate will decline throughout the century, the absolute number added to the working-age population will continue to increase, reaching 2 million per month in 2037 and peaking at 2.3 million per month in 2055. Almost all African countries outside of southern African will have a doubling of their working-age populations between 2020 and 2050.

- ***Africa is the only region with a growing rural population***

Rural populations are declining in Asia and Latin America, with the majority of the population being urban and with all future population growth occurring in urban areas. Sub-Saharan Africa is still 59% rural, though the rural population is projected to fall below 50% by 2036. Sub-Saharan Africa is the only major region with a growing rural population. The rural population is projected to increase by 40% from 2020 to 2050. Urban growth will be much faster, projected to increase by 170% from 2020 to 2050. As in the rest of the world, the big need for jobs will be in urban areas. But, unlike the rest of the world, Africa will still have a large and growing rural population to consider.

- ***Demographic changes create both opportunities and challenges for African economies***

The global labor market is experiencing dramatic demographic changes. While previous growth of the working-age population was dominated by Asia, almost all growth of the working-age population in this century will be in Africa. Africa's falling dependency ratio could create a demographic dividend that spurs economic growth. But this requires meeting the challenge of producing jobs fast enough to keep up with a doubling of Africa's working-age population by 2050 and a quadrupling by 2100.

The Demography of the Labor Force in Sub-Saharan Africa: Challenges and Opportunities

1. Introduction

Over the next 50 years, Sub-Saharan Africa's working-age population is projected to more than triple. By 2050 it will be the only major region in the world with a growing working-age population. These striking demographic trends present both an opportunity and a challenge to African policymakers and stakeholders.¹ On the one hand, being the only region with a growing working-age population may be an advantage in the global economy and a potential boon for investment in the region. On the other hand, continued rapid growth of the working-age population will require high rates of employment growth that must be sustained for much of the century. By 2040 it is projected that Sub-Saharan Africa will need to produce 2 million jobs per month to keep up with the growth of the working-age population. Failure to achieve these high rates of job creation could result in increasing rates of unemployment in the region.

This paper provides a broad overview of the demography of the labor force in Sub-Saharan Africa. 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 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 and sub-regions to clarify the extent to which the overall African trends are shared across the region.

The paper begins, in this section, with an overview of trends in total population and the working-age population from 1950 to 2100 for the world and major regions. Section 2 looks at the role of changes in mortality and fertility in driving these trends. Section 3 looks at the dramatic changes in age structure that have been caused by trends in fertility and mortality, with a focus on the working-age population and dependency ratios. Section 4 looks in detail at the components of growth in the working-age population, demonstrating why Sub-Saharan Africa will be the only region with a growing working-age population by 2050. Section 5 shows the latest regional projections for urbanization. Section 6 discusses the demographic dividend and the challenges and opportunities created by Africa's expanding working-age population. Finally, Section 7 concludes with a discussion of the implications of these demographic changes for employment and development.

¹ Throughout this paper we will often use "Africa" as a shorthand for "Sub-Saharan Africa."

Data for this paper come from the 2019 Revision of the World Population Prospects (WPP), the official United Nations population estimates and projections, prepared by the Population Division of the UN Department of Economic and Social Affairs (United Nations 2019). The 2019 revision provides estimates from 1950 to 2020 and projections from 2021 to 2100. Most of our analysis uses the UN’s “Medium Variant” projections, the most widely used population projections, although we also discuss the sensitivity of these projections to alternative assumptions about fertility decline. A data appendix provides details and caveats about the data and the assumptions used for the projections.

1.1 Growth of the total population and the working-age population

The importance of Africa’s demography in shaping the world’s population in this century can be seen in the top panel of Figure 1, which shows the estimated and projected population for Sub-Saharan Africa, Asia, Latin America and the Caribbean (henceforth, Latin America), and the Rest of the World – the sum of which is the global population. As seen in Figure 1, world population grew from 2.5 billion in 1950 to 7.8 billion in 2020, and is projected to reach 10.9 billion by 2100, at which point world population growth is projected to be close to zero. Asia, which grew from 1.4 billion in 1950 to 4.6 billion in 2020, is projected to peak at 5.3 billion in 2055, and will have only 78 million more people in 2100 than it has in 2020. Sub-Saharan Africa, which grew from 180 million to 1.1 billion between 1950 and 2020, is projected to add 1.8 billion between 2020 and 2100. Asia accounted for 62% of global population growth between 1950 and 2020, while only 17% was in Sub-Saharan Africa. Asia plays a much smaller role going forward, only accounting for a projected 9% of global population growth between 2020 and 2100, while Sub-Saharan Africa will account for 87% of that growth. As is clear in the top panel of Figure 1, growth of world population in the 21st century will be dominated by Africa, with Sub-Saharan Africa being the only major region with substantial population growth after 2050.

Table 1 gives the population size and annual population growth rates for all African countries and a group of comparison countries and regions for 2020, 2030, 2050, and 2100, along with the percentage increase between periods. The overall pattern in Africa is for high but falling population growth rates in the coming decades. The annual population growth rate for Sub-Saharan Africa is 2.6% in 2020, falling to 2.4% in 2030 and 1.8% in 2050. By contrast, the annual growth rate for China is only 0.4% in 2020, falling to zero in 2030 and -0.4% in 2050. Looking at the variation across African countries in Table 1, the lowest population growth rates are in Southern Africa, with an average growth rate of 1.3% in 2020. At the other extreme, a number of African

countries still have population growth rates of over 3% per year in 2020. Fifteen of the African countries in Table 1 are projected to more than double between 2020 and 2050, with Niger projected to increase by 171% in this thirty-year period. The largest absolute population increase in the world will be in Nigeria, which is projected to increase from 206 million in 2020 to 401 million in 2050 and 732 million in 2100.

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. Table 2 shows these figures for each African country and comparison countries. The working-age population of the world is projected to grow from 5.1 billion in 2020 to 6.1 billion in 2050 and 6.5 billion in 2100. The working-age population for Sub-Saharan Africa, which is 600 million in 2020, will more than double to 1.3 billion between 2020 and 2050, and will quadruple to 2.4 billion between 2020 and 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 it has in 2020. As shown in Table 2, some African countries, including Angola, Democratic Republic of Congo, Niger, Tanzania, and Zambia, are projected to have a working-age population in 2100 that is more than five times as large as in 2020. At the other extreme, South Africa is projected to have its working-age population increase by only 30% between 2020 and 2100.

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 2048, while the total population reaches a peak in 2055. The working-age population of Latin America peaks in 2047, while the total population peaks in 2059. 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 2011 and has been falling since. Sub-Saharan Africa's share of the global working-age population was below 10% until around 2010, and is now rising rapidly, projected to reach 20% around 2045 and 38% in 2100, roughly equaling the share for Asia.

2. Birth Rates, Death 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). 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. An understanding of this transition is important in understanding the demography of 21st century Africa. Before the demographic transition, birth rates and death rates were both at high levels (about 4-5% per year), roughly offsetting each other to produce the very low rates of population growth observed for thousands of years before the 20th century. The demographic transition begins when death rates begin to fall, with the gap between birth and death rates causing population growth. Eventually birth rates also fall, with population growth coming to an end when both birth rates and death rates equilibrate at a new lower level. In high-income countries this demographic transition played out slowly over as long as a century, with the gap between the birth rates and death rates rarely exceeding 1% per year. In developing countries the death rate fell much more quickly, causing population growth rates as high as 3% or 4% per year in many countries. With a lag, birth rates also fell more quickly than they had during the North American and European demographic transitions, with the net effect being a short period of very high population growth rates that were historically unprecedented, before population growth stabilized once more (Lee 2003).

Figure 2 shows how the demographic transition has played out in the world and three major developing regions – Sub-Saharan Africa, Asia, and Latin America, since 1950 (when the UN Population Division estimates begin). Each figure shows the crude birth rate (CBR, births per population), the crude death rate (CDR, deaths per population), and the crude rate of natural

increase, equal to CBR-CDR (equal to the annual percentage increase of the population in the absence of international migration).²

The top four panels of Figure 2 show the demographic transition for the world and the three regions. The figure for the world shows that the crude death rate had already fallen to around 2% by 1950 (20 per 1000 population), while the birth rate was still at 3.8% (38 per 1000 population) leading to an annual rate of natural increase of around 1.8% per year. This increased to a peak of about 2.1% per year in the mid-1960s, an historically unprecedented rate of global population growth. Birth rates began falling faster than death rates around 1965, causing the population growth rate to fall substantially since then. The growth rate of world population in 2020 is about 1.05%, projected to fall below 0.5% by 2050 and close to 0% by 2100. Note in Figure 2 that the crude death rate for the world is no longer falling, as rising life expectancy has been offset the by impact of population aging. This is one reason we can be quite certain that population growth rates are unlikely to return to levels of 2% per year, since this would require a return to birth rates last seen over 50 years ago (Lam 2011).

As seen in Figure 2, the patterns for Asia and Latin America look very similar to the patterns for the world as a whole, although both regions experienced higher peak rates of population growth than the world. The African pattern is broadly similar, but with some important differences in timing and magnitudes. The decline in the death rate is similar to that seen in Asia and Latin America, but the birth rate decline starts later, with the result that the population growth rate stays near 3% per year for over 30 years and is still at 2.6%. A growth rate of 2.6% implies a population doubling time of about 27 years.

The bottom four panels of Figure 2 show the demographic transition for the four main sub-regions in Sub-Saharan Africa. Southern Africa, dominated by South Africa, has an early decline in the birth rate, similar to that in Asia and Latin America. The decline in the birth rate is later in the other regions, with annual growth rates of around 3% per year and remaining high for several decades. Eastern, Western, and Central Africa have all recently reached their peak rates of natural increase of about 3%, with declines projected going forward.³ It is important to note that every

² These are called “crude rates” because they simply divide total births and deaths by the total population, not adjusting for age structure. Although they are exactly what matters in driving population growth, they are not good measures of fertility behavior or mortality conditions because of the impact of age structure. For example, many high-income countries have higher crude death rates than some low-income countries, in spite of having higher life expectancy, because of their much older populations.

³ Note that the rate of natural increase does not include migration and thus may be higher or lower than the total population growth rate.

region shown in Figure 2 shows that population growth rates are declining and will continue declining in coming decades. While falling death rates were the major factor driving the population growth of the last 50 years, death rates will play a fairly minor role in the 21st century, having stabilized at low levels all over the world. It is the speed and magnitude of declining birth rates that will determine how fast population growth falls in Africa.

While the crude birth rate (births as a proportion of the population) determines the rate of population growth, it is not a good measure of fertility behavior since it is heavily influenced by the proportion of the population in childbearing ages. A better measure to describe fertility behavior is the total fertility rate (TFR), which is shown in Figure 3 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.⁴

The top graph in Figure 3 shows the TFR for the world, Sub-Saharan Africa, Asia, and Latin America, demonstrating the dramatic decline in fertility that has occurred since 1950. For the world as a whole the TFR fell from 5.0 births per woman in 1950 to 2.4 in 2020, a 52% decrease and 88% 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. In 2020 Africa's TFR is still around 4.5 births per woman, more than double the TFR in Asia and Latin America. While there is considerable variance within each region, the average trends suggest that 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 TFR 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 3 shows the Total Fertility Rate 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. Southern Africa, 88% of which is 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 2020 than the other African regions. These fertility rates are the key driver of the demographic

⁴ 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.

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

It is beyond the scope of this paper to provide an in-depth review of the 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) analyze the slower pace of fertility decline in Africa, noting 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. A recent analysis by Kebede, Gujon, and Lutz (2019) argues 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.⁵

2.1 How important is uncertainty in fertility projections?

Figure 3 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 other countries (United Nations 2017, 2019). 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 2019 UN population projections include prediction intervals based on the thousands of simulations used to create the projections. Figure 4 shows the projections of the total fertility rate and the size of the

⁵ See also Casterline (2017) and Casterline and Agyei-Mensah (2017) for recent analyses of African fertility.

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 2.6 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 2.8 and 3.4.

The bottom panel of Figure 4 shows the range in the probabilistic projections for the working-age population of Sub-Saharan Africa. A striking feature of this figure is that even though the 95th projection interval for the TFR in 2050 has a range of almost 1 child per woman (plus or minus 15%), there is very little uncertainty in the projection of the working-age population in 2050, with a range of only plus or minus 3%. This is because most working-age people in 2050 have already been born by 2020 and are not affected by fertility rates between 2020 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. Even projections of Africa's working-age population to 2075 have a range of only plus or minus 10% from the upper 95th percentile to the lower 95th percentile in these UN projections. By 2100 the range of uncertainty is much greater, with the upper 95th percentile prediction being 24% higher than the median prediction, an absolute difference of 585 million people in the projected working-age population. Projections in the later decades of the 21st century should be interpreted with this caveat in mind, while projections to 2050 can be interpreted as relatively unaffected by what happens to fertility in the coming decades.⁶

3. Changing Age Structure and Its Implications for Labor Markets

The rapid changes in mortality and fertility that drove the demographic changes of the last 60 years are having a dramatic impact on the age distribution of the population. A changing age distribution can have important economic effects, as the relative size of the working-age population, children, youth, and the elderly take large swings during the demographic transition. Figure 5 shows the age distributions for the world and selected regions in 1990, 2020, and 2050, each 30 years apart. The figure shows the absolute number of people (in millions) in each five-year age group. Figure 6 shows the age distribution in proportional terms, with each bar showing the proportion of the population in a given five-year age group.

⁶ 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.

The age distributions for 1990, the first bar in each age group in Figure 5, show the very young age structure typical of rapidly growing populations all over the world, with much larger numbers of children than middle-aged or elderly. For example, in 1990 there were 2.3 0-4-year-olds in the world for every 40-44-year-old. These patterns are seen in all developing regions, but are exaggerated in Sub-Saharan Africa, where there were 4.4 0-4-year olds for every 40-44-year-old in 1990. Looking at the 2020 age distribution for the world, the number of children has increased only slightly from 1990, while there have been large increases in the numbers in the working ages. The ratio of 0-4-year-olds to 40-44-year-olds for the world fell to 1.4 by 2020, and is projected to fall to 1.1 by 2050. This pattern is seen even more dramatically in Latin America and Asia, an indication of the “demographic dividend” associated with the transition from a young population to a population concentrated in working ages as a result of fertility decline. In Asia, the ratio of 0-4-year-olds to 40-44-year-olds is down to 1.2 in 2020, and is projected to drop below 1.0 (to 0.9) by 2050. In 2050 the Asian and Latin American age distributions are dominated by growing numbers in the oldest ages, with falling absolute numbers of children and youth.

The African pattern in Figure 5 is very different from Latin America and Asia. Absolute numbers of children and youth increase substantially in Africa from 1990 to 2020 and continue to increase to 2050. The total number of 15-19-year-olds in Sub-Saharan Africa, for example, is projected to increase from 51 million in 1990 to 117 million in 2020 and 207 million in 2050, a quadrupling in 60 years. In stark contrast, the number of 15-19-year-olds in Asia will actually be lower in 2050 than it was in 1990. Note that Sub-Saharan Africa is the only region in Figure 5 in which the number of children increased between 1990 and 2020.

Looking at sub-regions within Africa in the bottom four panels of Figure 5, Southern Africa stands out as looking more like Latin America and Asia, with very little growth in the youngest age groups and most growth in the older age groups. Eastern, Central, and Western Africa will all have rapid growth in the number of children and youth in the coming decades, and will be the main source of additional children and youth for the entire world. The number of 0-4-year-olds in Western Africa will increase by 50% between 2020 and 2050, from 65.3 million to 98.7 million. During this same period the number of 0-4-year-olds in Asia is projected to fall by 54.7 million.

Figure 6 shows age distributions in proportions, using a common scale to highlight the large differences across regions. The age distributions for the world, Asia, and Latin America, show the clear shift from a young population in 1990 to an older population in 2050, with 2020 showing a bulge in the working-age population that is a key feature of the demographic dividend. While the

proportion of 0-4-year-olds in the world falls from 12.1% in 1990 to 8.7% in 2020 and 7.1% in 2050, the proportion of 65-69-year-olds doubles from 2.3% to 4.6% between 2020 and 2050. In Asia the proportion of 0-4-year-olds falls from 12.6% to 5.8% between 2020 and 2050, while the proportion of 65-69-year-olds rises from 2.0% to 5.3%.

Importantly, Africa also shows movement in the direction of an older population, though the population will continue to be young in 2050. The proportion of 0-4-year-olds in Africa will fall from 18.0% in 1990 to 11.6% in 2050, close to the proportion of 0-4-year-olds in Asia and Latin America in 1990. A striking feature of Figure 6 is that while Africa will have rising shares in the working ages between 2020 and 2050, Asia and Latin America will have rising shares at the oldest ages. This has obvious importance for the global labor market, as will be discussed further below.

Figure 7 shows one key component of the age distribution – the proportion of the population aged 15-24 – for all Sub-Saharan African countries and a group of comparison countries and regions. The graph is sorted by the youth share in 2020. Table 3 shows both the absolute size and the share of the youth population in each country in 2020, 2030, 2050, and 2100. The range across countries in Figure 7 is substantial, varying from a youth share in 2020 of almost 22% in Ethiopia to under 12% in China. Most African countries are in the range of 18% to 20%. Figure 7 also shows the projected youth share in 2050. Brazil is a useful benchmark in this regard, representing a somewhat typical country that has experienced a rapid decline in fertility. Its youth share will fall from about 16% to 11% over this period, the continuation of a decline from youth shares of around 20% in the 1980s. African countries will also experience declining youth shares of their population between 2020 and 2050, but the declines will be fairly modest and most countries will still have 17-18% of their population in the 15-24 age group in 2050. This will be an important ongoing challenge for absorbing new workers into the labor market.

Figure 8 shows the proportion of the population in working ages (15-64) for all African countries and comparison countries in 2020 and 2050, sorted by the 2020 working-age population. Table 2 shows the total working age and share of working age in 2020, 2030, 2050, and 2100 for all African countries. As seen in Figure 8 and Table 2, China and Brazil have about 70% of their populations in working ages in 2020, an indicator of the extent to which they are still in the positive stage of the demographic dividend resulting from falling fertility and the resulting shift in age structure. This compares to only 48% in Niger, the African country with the smallest working-age share in 2020. Most African countries have about 50-55% of their population in working ages in 2020. An important feature of Figure 8 is that while countries like China and Brazil, along with

Europe and North America, will experience declines in the share of the population in working ages by 2050, most African countries will experience an increase in this share as these countries begin to experience the demographic dividend caused by falling fertility. Most African countries will have working-age shares of around 60-65% in 2050. Whether this is good or bad for economic growth obviously depends on the extent to which this large share of the working-age population can be productively employed. As shown in Table 2, the increase in the working-age share of the population in Africa will already be taking place between 2020 and 2030, a period in which there is very little uncertainty in these demographic projections.

The last three columns of Table 2 show the percentage growth in the working-age population from 2020 to 2030, 2050, and 2100. For Sub-Saharan Africa as a whole, the working-age population is projected to increase by 34% by 2030, by 118% by 2050, and by 307% by 2100. Most countries in Central, Eastern, and Western Africa will have increases in their working-age population of 30-40% in the next 10 years. Whether they can produce a 30-40% increase in jobs to keep up with this growth is clearly a crucial question for African labor markets. Note that China is projected to experience a 2.5% *decline* in its working-age population in the next 10 years, a decline of 26 million people, an indication of the major changes that will be happening in the global labor market.

3.1 Dependency Ratios and the Demographic Dividend

Dependency ratios are a convenient summary measure of one important economic implication of 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 is 0.77 in Africa, more than double the 0.34 child dependency ratio in Asia. To give this an economic interpretation, in order to generate \$100 in expenditures per child, it would take \$77 in taxes per working-age person in Africa, but only \$34 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 is 0.5, compared to 0.13 in Asia and Latin America. This means that generating \$100 per person aged 65+ would cost only \$5 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 8.⁷ 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.

By 2020 the total dependency ratio will be rising in Asia, Latin America, and the world, while it will still be falling in Africa. Africa will experience a rapid decline in its total dependency ratio in coming decades, due to large 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

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.

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.

3.2 How 21st century population growth differs from 20th century population growth

As is clear from the data presented above, population growth in the 21st century differs in important ways from the population growth of the last half of the 20th century. Figure 10 summarizes some of these key differences, comparing the population increase that occurred between 1960 (the year the world reached 3 billion population) and 2020 to the population increase that is projected between 2020 and 2100. As shown in the first vertical bar, the world added 4.9 billion people between 1960 and 2020. This 4.9 billion increase can be broken up into an 856 million increase in the number of children (0-14), a 3.3 billion increase in the number of working-aged (15-64), and a 576 million increase in the number of elderly (65+). The fact that the world added 3.3 billion people to the working-age population in the last 60 years is an important demographic fact that should always be kept in mind in any analysis of trends in global labor markets. The 4.8 billion increase in population between 1960 and 2020 is further broken down by region in the other solid colored vertical bars in Figure 10. The bar for Asia indicates that 2.9 billion of the increase (62%) occurred in Asia, and that 2.2 billion of that was an increase in the working-age population in Asia. Only 874 million were added to the population of Africa between 1960 and 2020, with 482 million of those in working ages.

The second vertical bar in Figure 10 shows the 3.1 billion increase in population that is projected between 2020 and 2100. This increase breaks down into 1.4 billion additional working-age population, 1.7 billion elderly, and a *decline* of 86 million in the number of children 0-14. While the increase in the number of elderly was only 12% of the global population increase between 1960 and 2020, it will be 56% of the increase between 2020 and 2100. Looking at the contributions of different regions, Asia's population will increase by only 78 million between 2020 and 2100, with the elderly being the only age group in Asia that will experience positive growth. Africa, on the other hand, will add 2.7 billion between 2020 and 2100, 1.8 billion of whom are working age. Whereas Asia accounted for 62% of global population growth between 1960 and 2020, compared to 18% for Africa, Asia will account for only 2.5% of global population growth between 2020 and 2100, compared to 87% for Africa.

To summarize some key points from Figure 10, global population growth in the 21st century differs from population growth in the second half of the 20th century in several important ways:

- 20th century population growth was concentrated in Asia, while 21st century population growth will be concentrated in Africa.
- 20th century population growth was dominated by children and youth, while 21st century population growth will be dominated by older workers and the elderly.
- 21st century population growth is considerably slower than the growth from 1960 to 2020. The world added 4.8 billion people in the last 60 years, but will add 3.1 billion in the next 80 years.
- Most additions to the working-age population from 1960-2020 were in Asia, while Africa will account for the vast majority of the working-age population added from 2020-2100.

4. Components of Growth in the Working-Age Population

As shown above, the working-age population will be growing rapidly in African countries in the coming decades, while it will be declining in most other regions. A clearer understanding of why this is happening comes from looking at the components of this growth. The working-age population will grow from one year to the next if the number of new young people aging into the group (turning age 15) plus working-age immigrants is larger than the number of people aging out of the group (turning age 65) plus the number of working-age who die or migrate out of the population. Following this approach, as outlined in Lam and Leibbrandt (2013), Figure 11 provides a decomposition of net entrants to the working-age population, where we decompose the net entrants into those aging in, those aging out, and a residual group that includes deaths and net out-migration. The left panel in each row shows the decomposition in absolute numbers, while the right panel shows the decomposition in growth rates. Table 4 shows detailed compositions for each African country and comparison countries for 2020.

Looking at the top row for the world in Figure 11 and at the bottom row of Table 4, the world labor market will have 48 million net entrants into the working-age population in 2020. This can be decomposed into 125 million 15-year-olds “ageing in” to the working-age population, 57 million 65-year-olds “ageing out” of the working-age population, and 19 million deaths in the working-age population. In percentage terms, the working-age population will have a net increase of 0.9%, decomposed into a 2.5% “entry rate” of new 15-year-olds as a proportion of the working-age population, a 1.1% “exit rate” of 65-year-olds leaving the working-age population, and a 0.4% death rate in the working-age population.

As seen in Figure 11, the absolute number of new net entrants into the world working-age population reached a peak of 74 million per year in 2004, has been falling since, and will continue falling throughout the century until it reaches zero around 2095. The explanation for this decline is

that the number of new 15-year-olds is now growing more slowly than the number of new 65-year-olds. The annual growth rate of the working-age population peaked earlier than the absolute number of new entrants, around 1980.⁸

Not surprisingly, Asia's net entrant line in Figure 11 has a similar shape to that for the world, having driven more than half of global population growth since 1950. However, Asia (and Latin America) are projected to start having negative net entrants to the working-age population by 2050 (the number aging out will exceed the number aging in), whereas global net entrants are not projected to fall below zero until around 2095. The continued positive growth of the world working-age population is driven by the increases in net entrants projected for Sub-Saharan Africa, where the absolute number of net entrants is expected to increase until at least 2050 and remain positive until at least 2100. In 2020 there will be 18.3 million net new entrants into the working-age population in Sub-Saharan Africa, over 1.5 million per month. This is projected to increase to 2 million per month in 2037, reaching a peak of 2.3 million per month in 2055, and not dropping below 2 million per month until 2075. In other words, Africa will need to produce over 2 million jobs per month for more than 40 years, and over 1.5 million jobs per month for almost the entire century, just to keep pace with the growth of the working-age population.

As seen in the right panel of the bottom row of Figure 11, the annual growth rate of Africa's working-age population will be peaking at around 3% per year around 2025. While this is a high annual growth rate of the working-age population, it is clear from Figure 11 that similar growth rates of the working-age population were experienced by Asia and Latin America in the 1980s. It is also important to note that Asia reached a peak of over 50 million net entrants to the working-age population per year around 2000 (over 4 million per month), a much larger absolute increase than Africa will experience. Africa's rapidly growing working-age population should not be viewed as historically unprecedented. At the same time, Asia and Latin America experienced growth rates of the working-age population of around 3% per year for less than a decade, whereas Africa will have annual growth rates of around 3% over several decades.

Table 4 shows the decomposition of the growth rate of the working-age population in 2020 for all African countries and comparison countries. It is striking that most African countries have annual net growth rates of the working-age population of 3% or higher, with Uganda and Niger

⁸ The annual growth rate of net entrants begins to decline once the absolute number of net entrants begins to grow more slowly than the total size of the working-age population. The peak in the annual growth rate always occurs earlier than the peak in the absolute number of new entrants.

having growth rates of 4% per year. In Uganda, the country with the fastest rate of growth of net entrants into the working-age population, this results from new 15 year-olds adding 4.7% to the working-age population, offset by declines of only 0.4% due to aging out of 65-year-olds and 0.4% exiting due to death or net out-migration. By contrast, Table 4 shows that China already has negative net growth of the working-age population in 2020, the result of the fact that the number of 65 year-olds leaving the group is almost as large as the number of 15 year-olds entering, with additional exits due to death and out-migration leading to a net decline in the working-age population.

Table 5 shows the decomposition of net entrants to the working-age population for 2020, 2030, and 2050 for all African countries and comparison countries. By 2030, Nigeria will be adding 4.2 million net entrants per year, rising to 5.5 million in 2050. Eastern Africa as a whole will be adding 9.5 million net entrants in 2030, rising to 10.7 million in 2050, a 35% increase from 2020 to 2050. The annual growth rate of net entrants declines over time in every country, however, as population aging and slower population growth lead to a decline in the rate at which 15-year-olds enter the working ages and an increase in the rate at which 65-year-olds leave the working ages. Note that Brazil, China, and India are all projected to have net declines in the number of net entrants into the working-age population by 2050. China will have a net decrease of 9 million people per month in the working-age population by 2050, as the number exiting out at age 65 significantly exceeds the number aging in at age 15.

Since our measure of net entrants represents the net increases to a region's working-age population, Figure 11 again illustrates how Sub-Saharan Africa, and not Asia, will be driving growth to the world's workforce for the remainder of the 21st century. As soon as 2026, Sub-Saharan Africa will surpass Asia in the absolute number of annual net entrants (20.5 million), becoming the region with the largest annual increase in the working-age population. By 2050, Africa will account for virtually all of the increase in the working-age population in the world. This growth will cause Africa's working-age population to triple between 2020 and 2068, at the same time that the working-age populations of Asia and Latin America will be declining.

5. Growth of Urban and Rural Populations

As its populations increase, Africa is also becoming more urbanized. In 1950, the urban share of Sub-Saharan Africa's population was estimated at 11%; in 2020 it is estimated at 41%; and in 2050 it is projected to reach 58% (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).

Using data from the United Nations *World Urbanization Prospects, 2018 Revision*, Figure 12 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 12 is useful for comparing overall trends between and within regions. 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.

As seen in Figure 12, the world's urban population surpassed its rural population in 2007. The rural population is projected to peak at 3.4 billion in 2021, with future population growth concentrated in urban areas. Asia's rural population peaked in 2003, with the urban population overtaking the rural population in 2019. Latin America has been more urban than rural since 1960, and has had a falling rural population since 1989. 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 2036.

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 slums, 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 12, it is cities that will need to provide the bulk of the jobs to keep up with Africa's rapidly growing working-age population.

6. The Demographic Dividend

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 et al. 2016). As shown in Figure 11, the number of youth aging into the working-age population will continue to increase in Sub-Saharan Africa for most of this century, creating a growing challenge to create 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 the population ages, so does the working-age population. As seen in the age distributions in Figures 5 and 6, 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 pressure to produce new jobs in urban areas.

Whether the 21st century is a demographic dividend or a demographic disaster 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. Summary and Conclusion

The projected demographic trends presented in this paper offer both challenges and opportunities to Sub-Saharan Africa and the world. 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 2037 Africa will need over 2 million jobs per month to keep up with the growth of the working-age population, up from the current 1.5 million per month. Many African countries will have more than twice the number of net entrants to their working-age population in 2050 as 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. 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 250 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 or 2060. 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.

The demography of the African labor force varies across the continent. Southern Africa, dominated by South Africa, looks more like Asia and Latin American than the rest of Sub-Saharan Africa, with earlier and faster fertility decline and, as a result, more modest growth of its working-age population in the coming decades. While the working-age populations in Eastern, Western, and Central Africa will increase by around 120% between 2020 and 2050, Southern Africa's working-age population will only increase by 34%.

We conclude by noting that while Africa's job creation challenge in this century is daunting, it is not unprecedented. As seen in Figure 11, Africa's current annual growth rate of the working-age population is about 3%. This is similar to the growth rate experienced by Asia and Latin America around 1980. While Africa is projected to add 28 million new working-age people at the peak in 2055 (almost 1 per second), Asia added over 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. 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.

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9. Appendix: Data Description

Data for this paper come from the *2019 Revision of the World Population Prospects (WPP)*, the official United Nations population estimates and projections, prepared by the Population Division of the UN Department of Economic and Social Affairs. In this revision, the year 2020 separates population estimates back to 1950 and projections up to 2100. Detailed documentation about the methodology used for the UN Population Division's estimates and projection can be found in United Nations (2017) and United Nations (2019)

To produce historical population estimates back to 1950, data on population, fertility, mortality and migration were compiled by the UN Population Division from recent censuses, demographic surveys (e.g., Demographic and Health Surveys or Multiple Indicator Cluster Surveys), event registries, and other sources. Between census years population estimates were calculated using fertility, mortality, and migration rates. Also, relevant to Africa, the AIDS epidemic was incorporated into the WPP 2017 and WPP 2019 revisions. Where data are less reliable, the UN population estimates sometimes use indirect estimation techniques. Demographic estimates are particularly difficult in Sub-Saharan Africa, given the fact that censuses have not been regularly performed in many countries and registration of births and deaths is often incomplete.

To produce population projections up to 2100, population in each five-year period was calculated as the prior period's population plus the expected effects of fertility, mortality and international migration in that period. To forecast fertility through 2100, many different fertility trajectories were calculated using a hierarchical model that incorporated the country's past fertility trends, the historical experience of other countries that shared a similar level of fertility, and random distortion terms that ensured the rate of decline and ultimate fertility level varied with each trajectory. A similar process is used to forecast mortality. The most common WPP population projections, known as the "Medium Variant" projections, are derived from the median trajectory of thousands of fertility and mortality trajectories as well as trajectories of international migration rates. These are the projections used in most of this paper. WPP also publishes projections that assume fertility at 0.5 above (high-variant) and below (low-variant) the medium variant, as well as probabilistic projections of population based on the median, 80th and 95th percent prediction intervals of fertility and mortality. These 80th and 95th prediction intervals are shown for the total fertility rate and the working-age population in Figure 4.

10. Figures and Tables

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Table 4: Decomposition of Growth of Working-Age Population (WAP), 2020 (millions)

Table 5: Net Entrants to Working-Age Population (WAP), 2020, 2030, and 2050

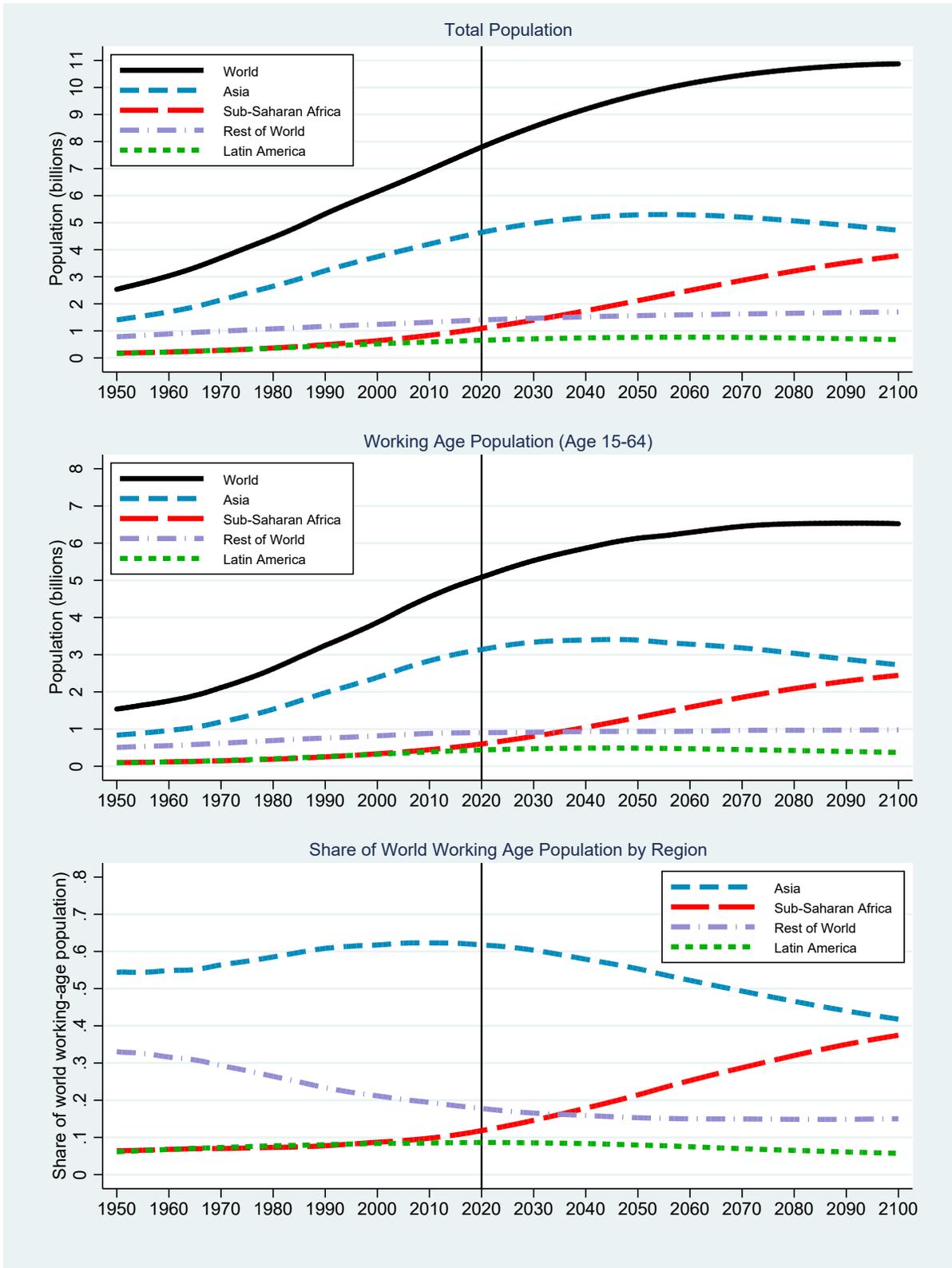


Figure 1: Total Population, Working Age Population, and Shares of World Working Age Population, 1950-2100

(UN World Population Prospects 2019: Estimates 1950-2020, Medium Variant Projections 2021-2100)

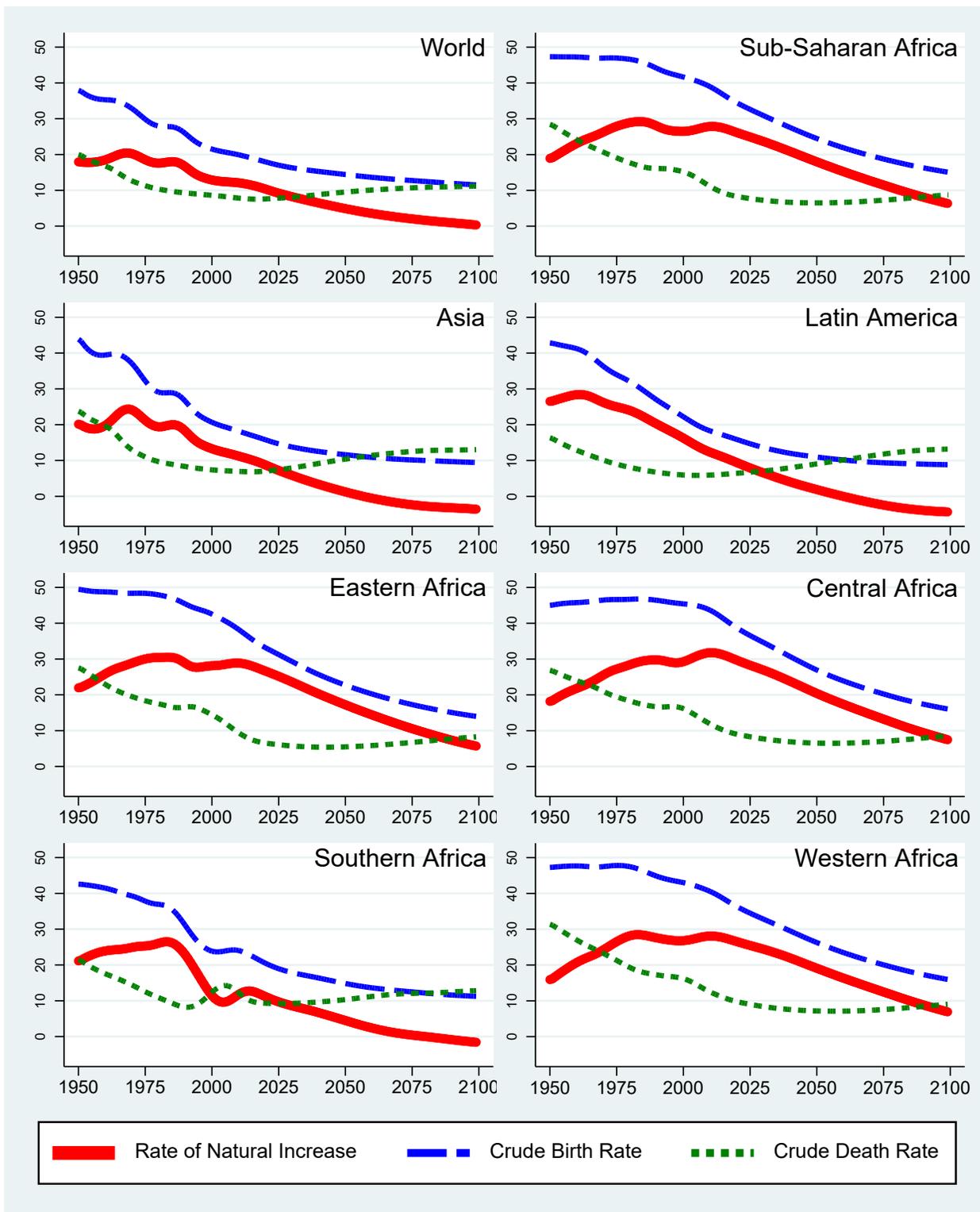


Figure 2: Crude Birth Rate, Crude Death Rate, Rate of Natural Increase, 1950-2100
(Rates are per 1000 population)

(UN World Population Prospects 2019: Estimates 1950-2020, Medium Variant Projections 2021-2100)

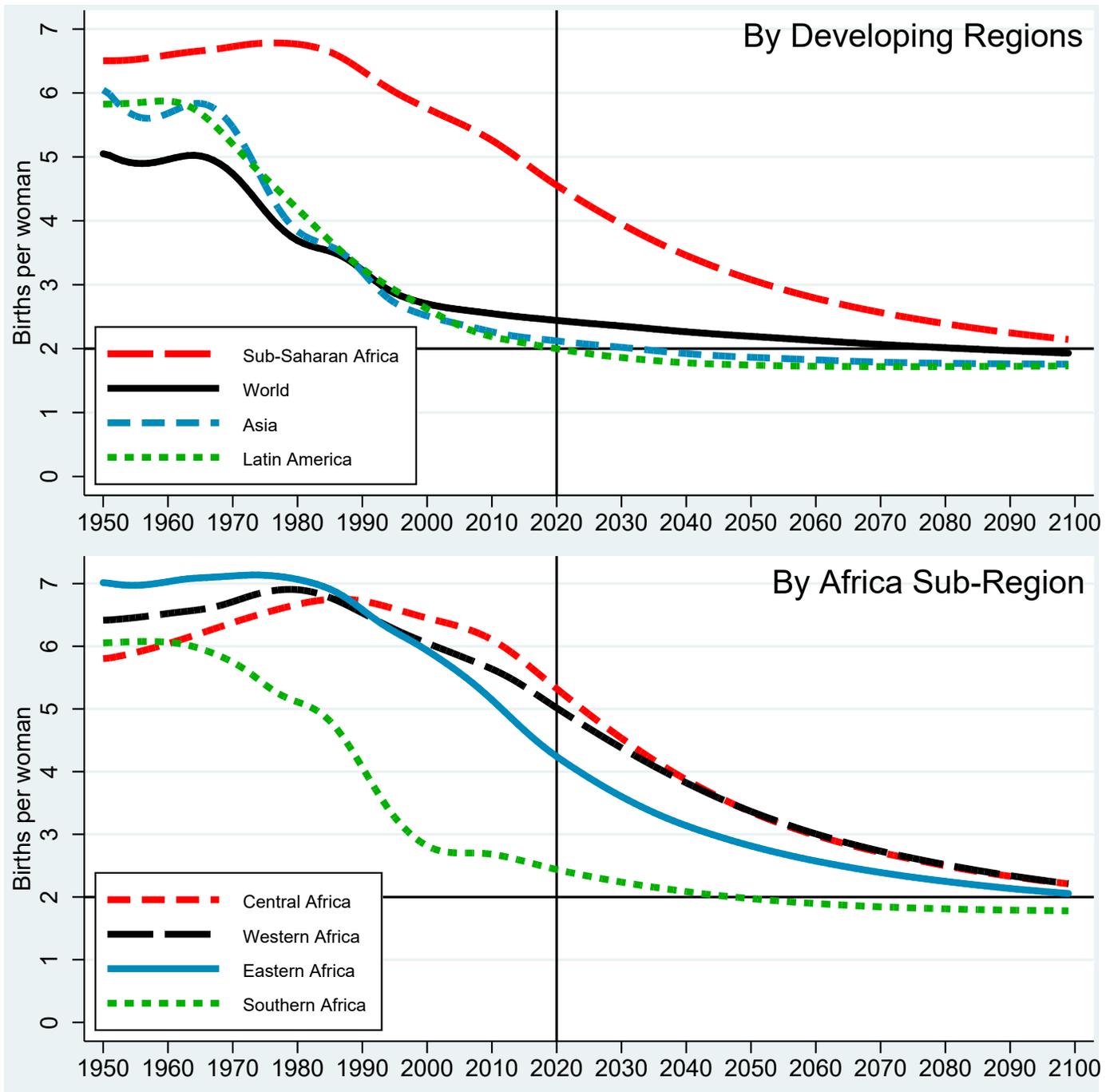


Figure 3: Total Fertility Rates by Region, 1950-2100

(UN World Population Prospects 2019: Estimates 1950-2020, Medium Variant Projections 2021-2100)

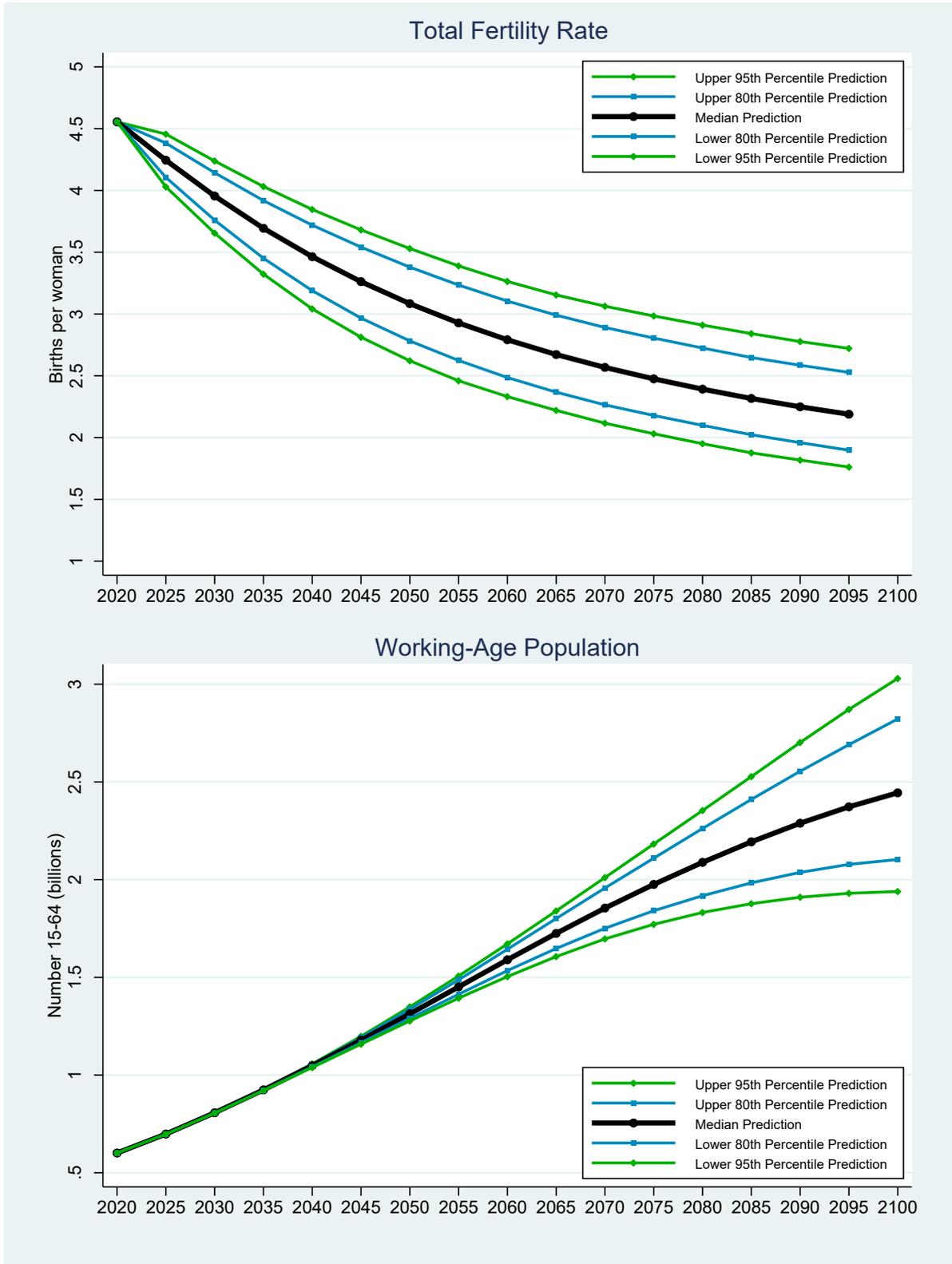


Figure 4: Projected Total Fertility Rate and Working-Age Population with Prediction Percentiles, Sub-Saharan Africa, 2020-2100

(UN World Population Prospects 2019: Median, 80th, and 95th Percentile Projections)

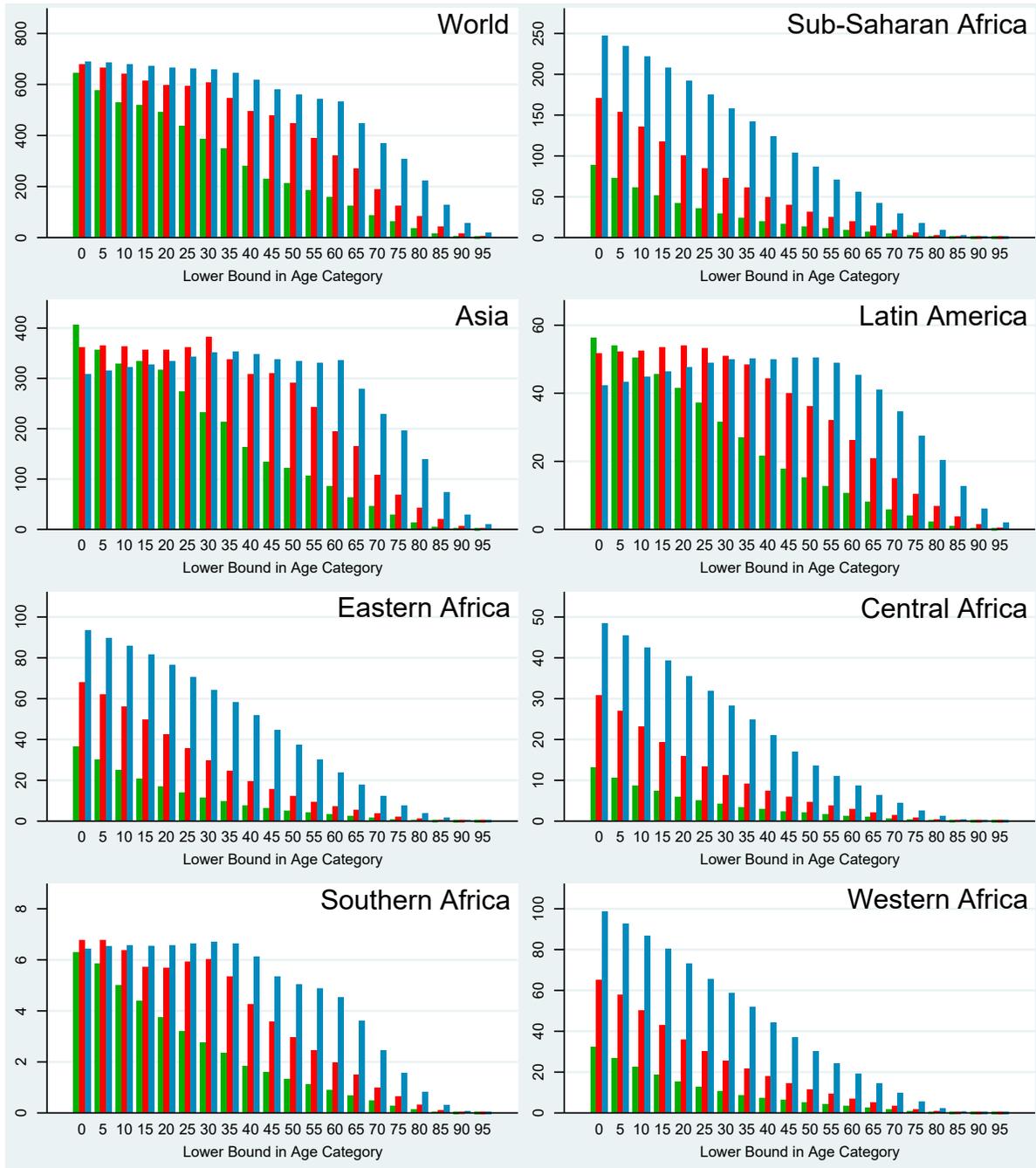


Figure 5: Size of five-year age groups for world and regions, millions, 1990, 2020, 2050

(UN World Population Prospects 2019: Estimates and Medium Variant Projections)

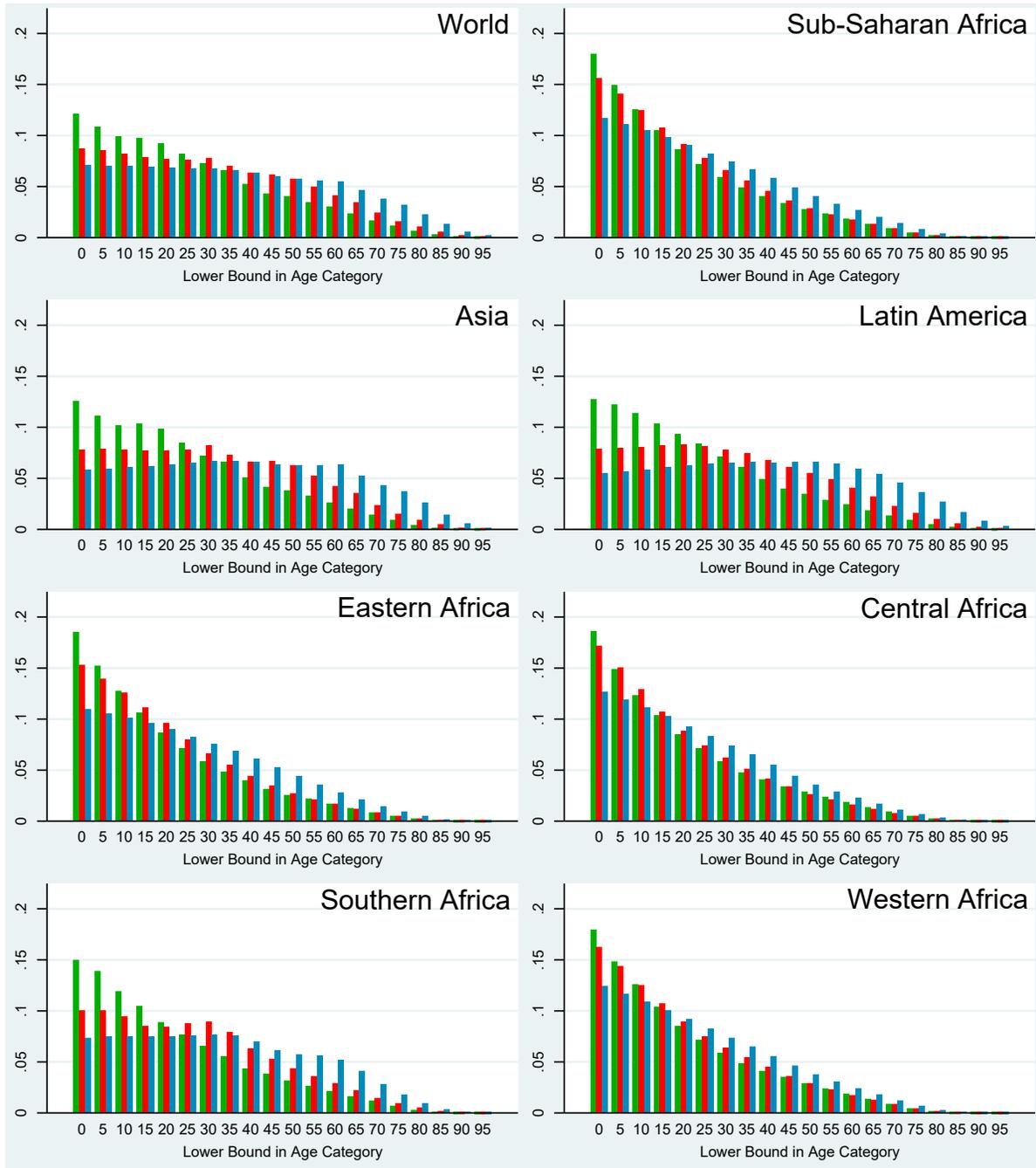


Figure 6: Age Distribution for World and Regions, proportions in 5-year age groups, 1990, 2020, 2050

(UN World Population Prospects 2019: Estimates and Medium Variant Projections)

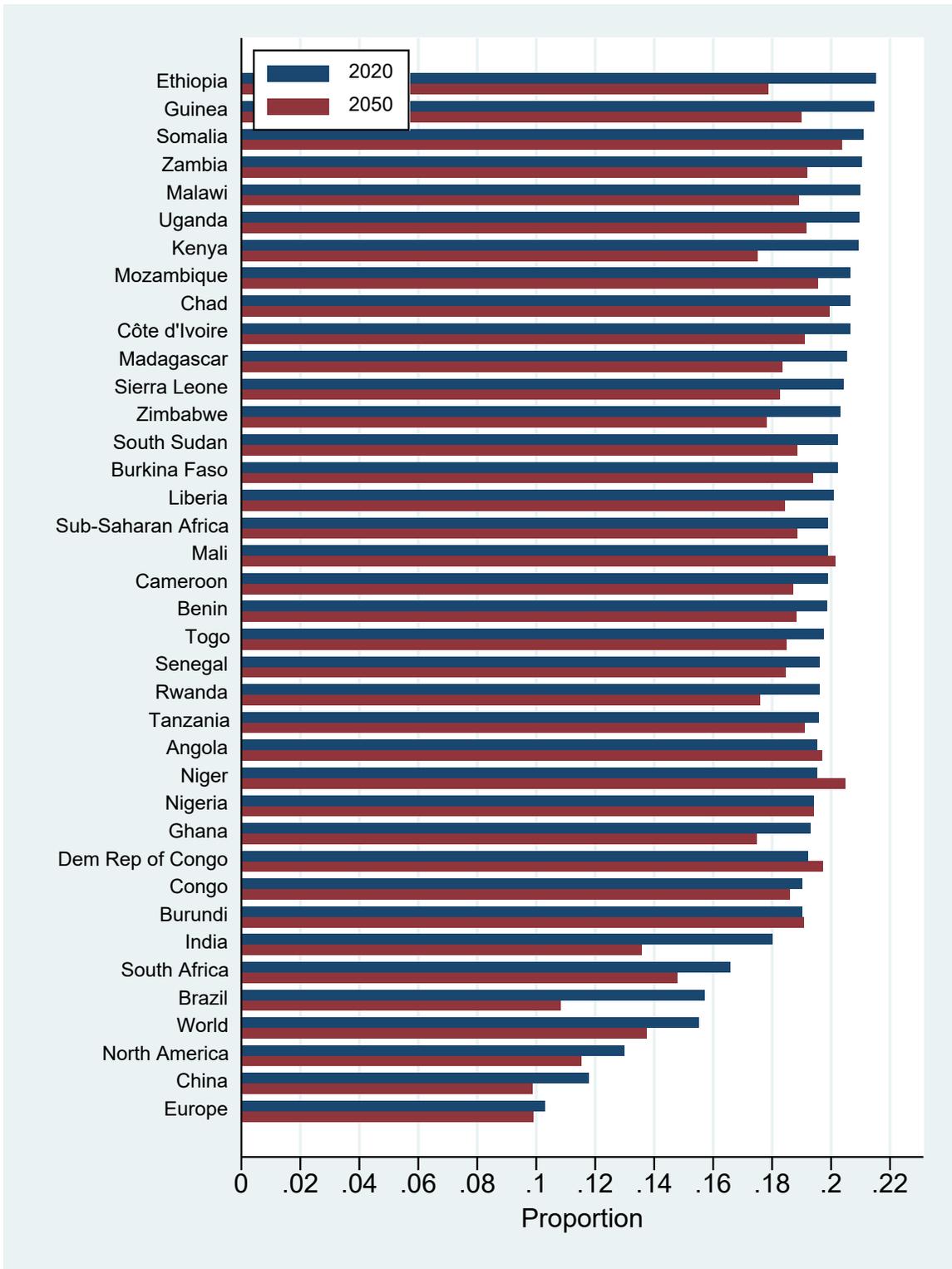


Figure 7: Youth (15-24) as proportion of total population, 2020 and 2050, Sub-Saharan countries with at least 5 million population and comparison regions

(UN World Population Prospects 2019: Estimates and Medium Variant Projections)

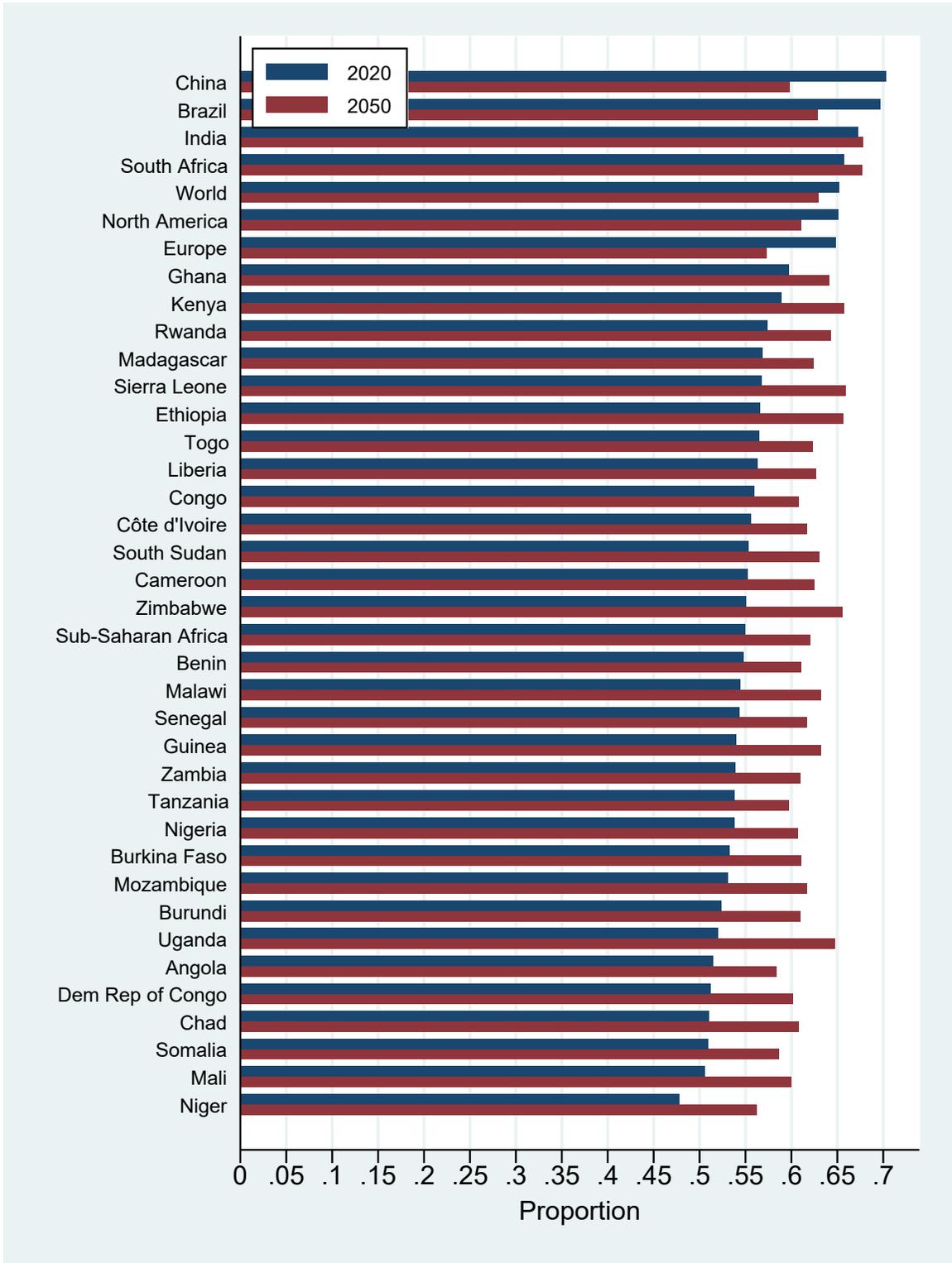


Figure 8: Working age (15-64) population as share of total population, 2020 and 2050, Sub-Saharan countries with at least 5 million population and comparison regions

(UN World Population Prospects 2019: Estimates and Medium Variant Projections)

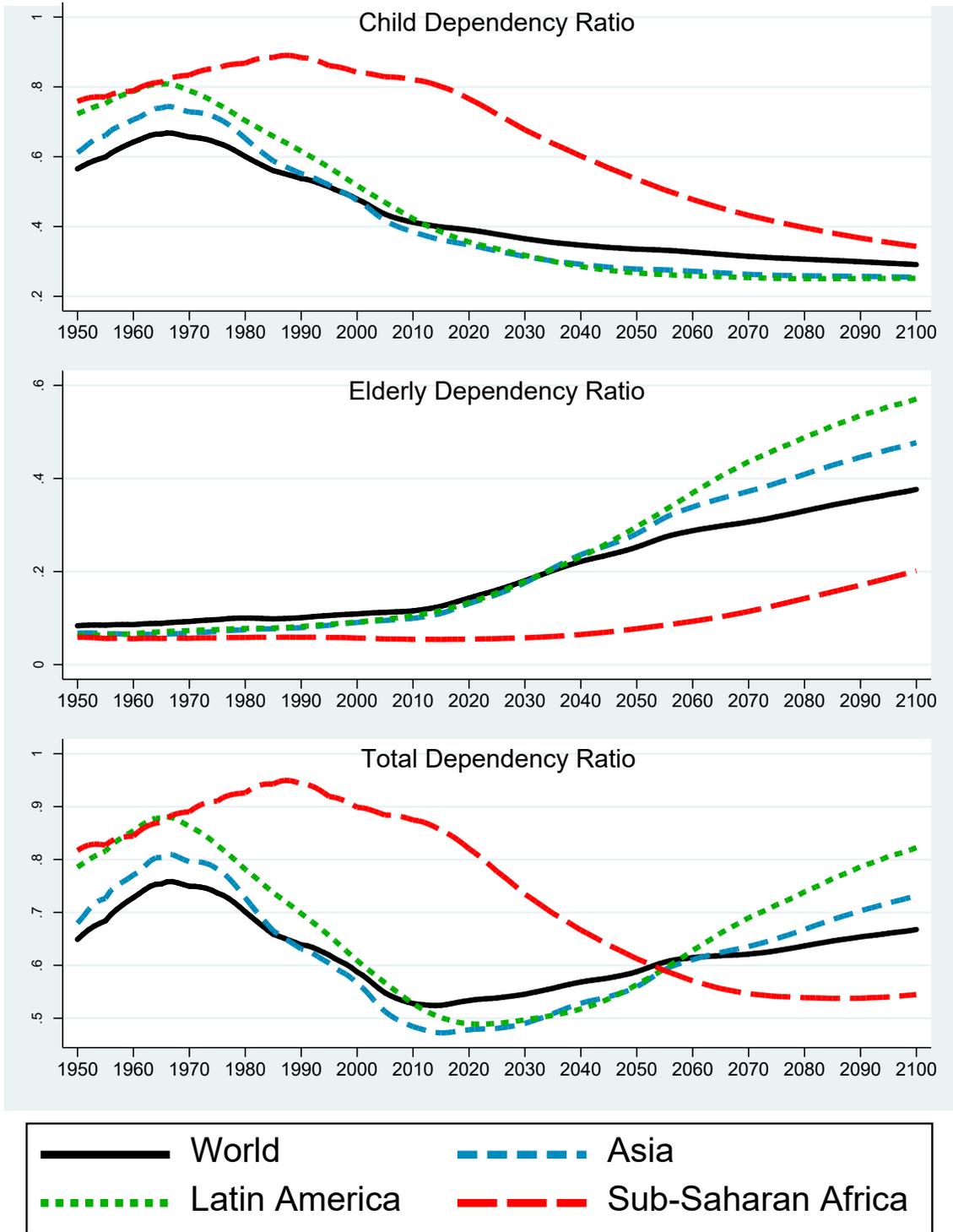


Figure 9: Dependency Ratios by Region, 1950-2100
 Child Dependency Ratio = $\text{Pop } 0-14 / \text{Pop } 15-64$
 Elderly Dependency Ratio = $\text{Pop } 65+ / \text{Pop } 15-64$
 Total Dependency Ratio = $(\text{Pop } 0-14 + \text{Pop } 15-64) / \text{Pop } 15-64$

(UN World Population Prospects 2019: Estimates 1950-2020, Medium Variant Projections 2021-2100)

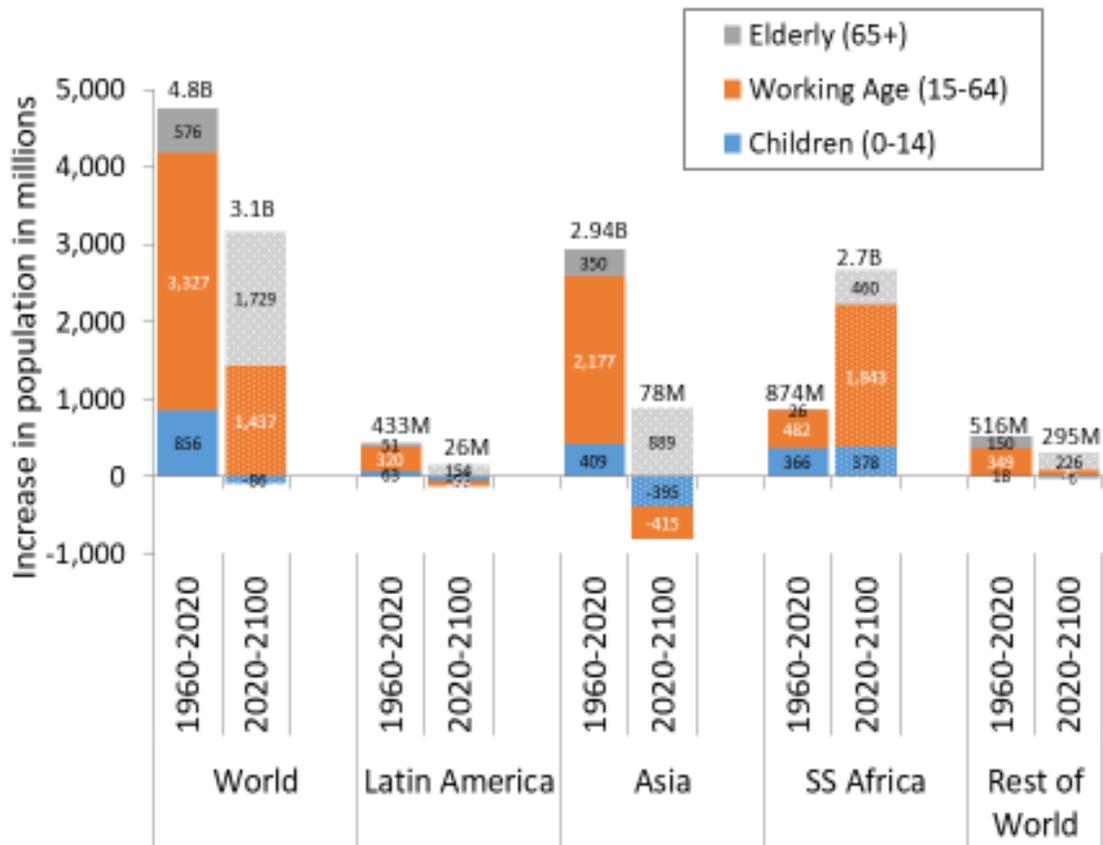


Figure 10: Increase in population from 1960-2020 and 2020-2100 by age group and region
 (For example, between 1960 and 2020 the number of 0-14 year-olds in the world increased by 856 million, 409 million of which were added in Asia)

(UN World Population Prospects 2019: Estimates and Medium Variant Projections)

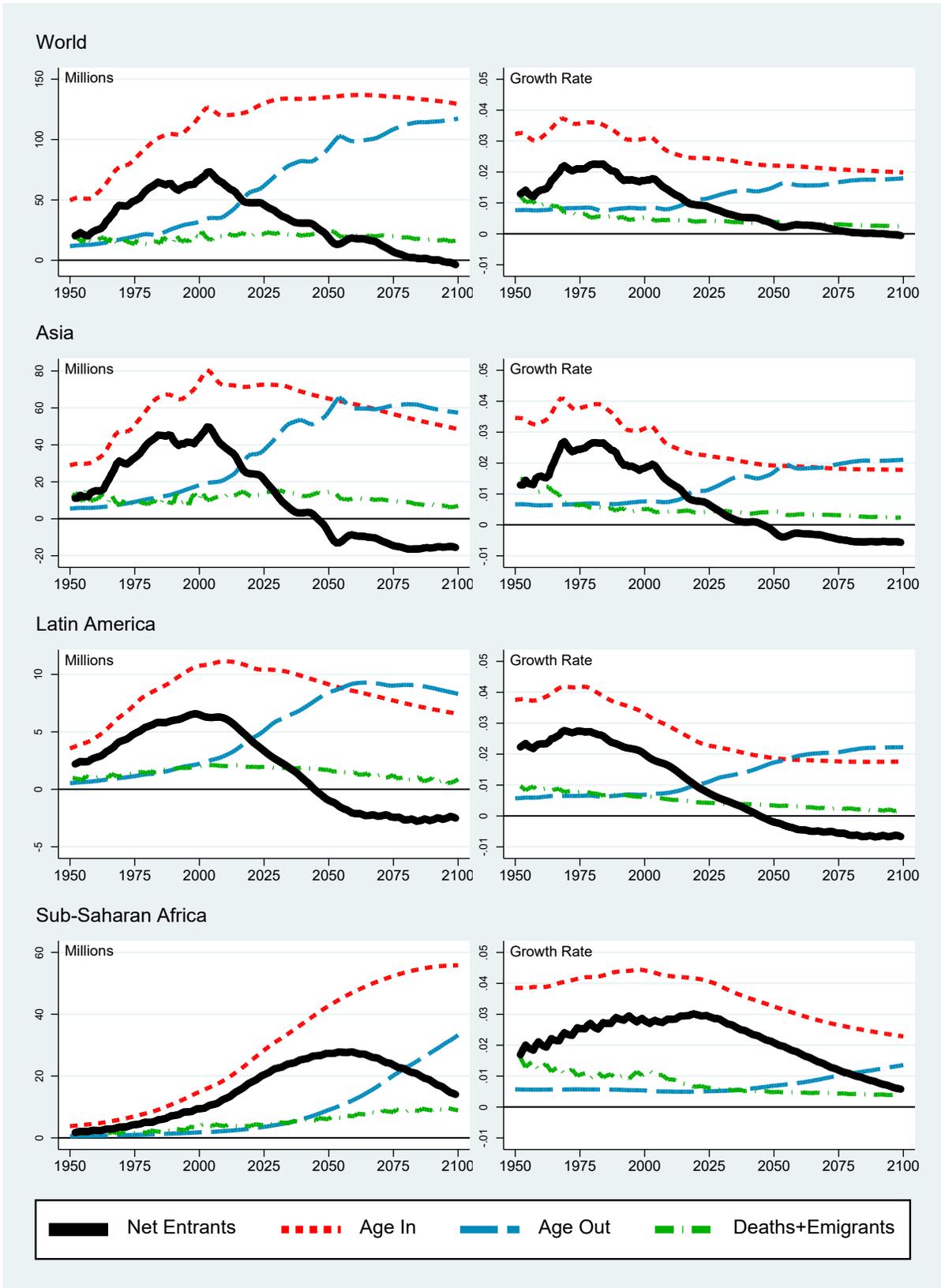


Figure 11: Components of Growth of Working Age Population, by Region, 1950-2100

(UN World Population Prospects 2019: Estimates 1950-2020, Medium Variant Projections 2021-2100)

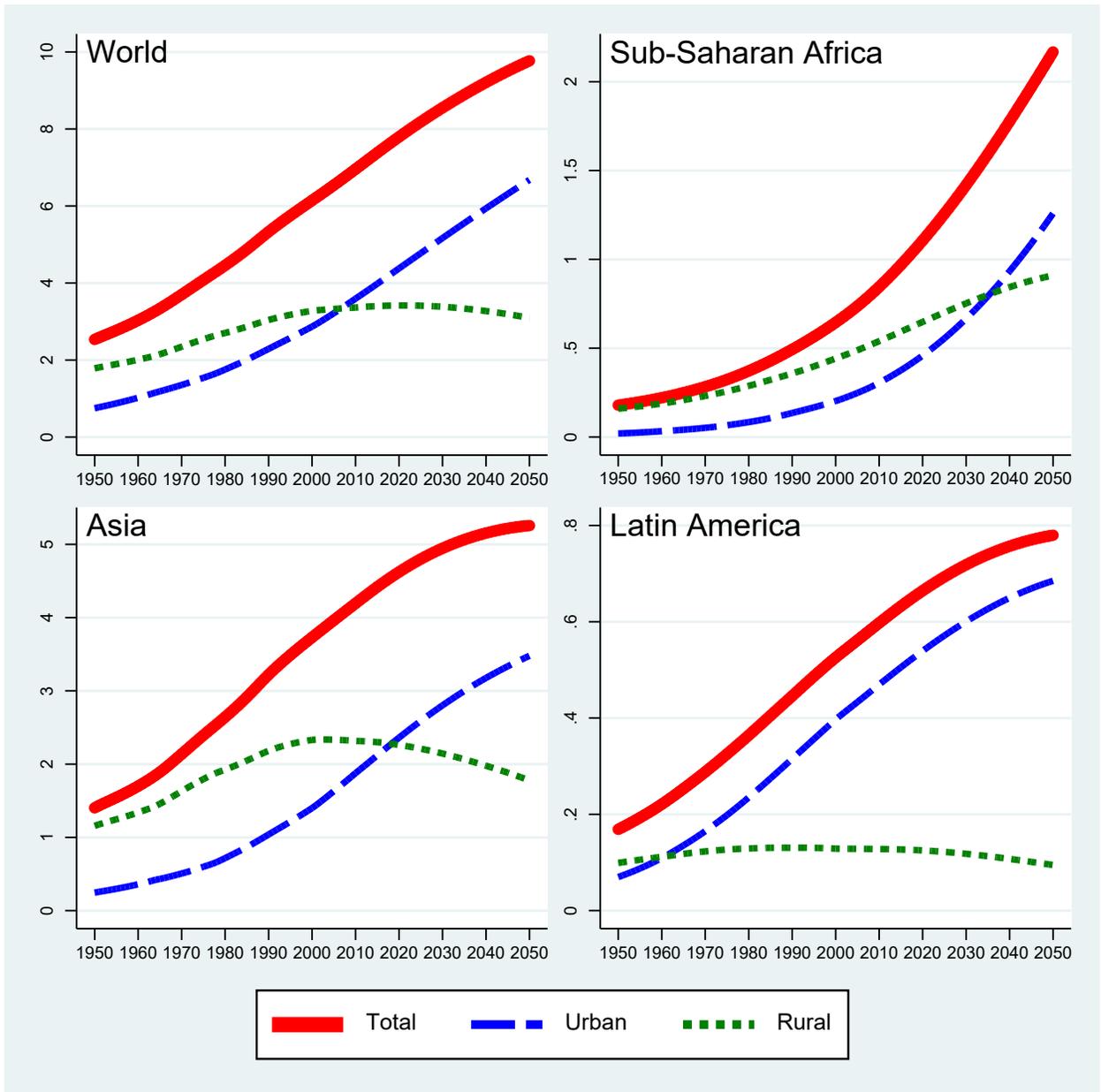


Figure 12: Urban and Rural Population by Region, Billions, 1950-2050

(Data from UN World Urbanization Prospects, 2018 Revision)

Table 1: Total Population Summary Statistics, Sub-Saharan Africa and Comparison Regions

Region	Total Population (millions)				Annual population growth rate (%)				Increase from 2020 (%)		
	2020	2030	2050	2100	2020	2030	2050	2100	2030	2050	2100
Sub-Saharan Africa	1094.4	1399.9	2117.7	3775.3	2.6	2.4	1.8	0.6	27.9	93.5	245.0
Central Africa	179.6	238.2	382.6	746.1	3.0	2.7	2.1	0.7	32.6	113.1	315.4
Angola	32.9	44.8	77.4	188.3	3.2	3.0	2.4	1.2	36.4	135.6	472.9
Cameroon	26.5	33.8	50.6	90.2	2.6	2.3	1.8	0.7	27.2	90.5	239.9
Central African Rep	4.8	5.9	8.4	11.6	1.8	2.1	1.4	0.1	23.0	73.9	140.8
Chad	16.4	21.7	34.0	61.8	3.0	2.6	1.9	0.6	32.1	107.2	276.5
Congo	5.5	7.0	10.7	21.0	2.5	2.3	1.9	0.9	27.2	93.9	279.9
Dem Rep of Congo	89.6	120.0	194.5	362.0	3.1	2.8	2.0	0.6	34.0	117.2	304.2
Equatorial Guinea	1.4	1.9	2.8	4.5	3.4	2.5	1.7	0.4	33.5	101.1	221.5
Gabon	2.2	2.7	3.8	5.9	2.4	1.9	1.4	0.4	23.3	71.1	163.2
Eastern Africa	445.4	569.7	851.2	1451.8	2.6	2.3	1.7	0.6	27.9	91.1	226.0
Burundi	11.9	15.8	25.3	50.9	3.1	2.7	2.1	0.8	32.6	113.0	328.1
Djibouti	1.0	1.1	1.3	1.3	1.5	1.0	0.5	-0.2	13.0	31.1	34.8
Eritrea	3.5	4.2	6.0	9.1	1.4	1.9	1.4	0.3	19.6	69.3	155.5
Ethiopia	115.0	144.9	205.4	294.4	2.5	2.1	1.4	0.2	26.1	78.7	156.1
Kenya	53.8	66.4	91.6	125.4	2.3	2.0	1.3	0.1	23.6	70.3	133.3
Madagascar	27.7	35.6	54.0	100.0	2.6	2.4	1.8	0.7	28.6	95.2	261.0
Malawi	19.1	24.8	38.1	66.6	2.7	2.5	1.8	0.5	29.9	99.4	247.9
Mozambique	31.3	41.2	65.3	123.6	2.9	2.6	2.0	0.7	31.8	109.0	295.6
Rwanda	13.0	16.2	23.0	33.4	2.5	2.1	1.5	0.2	25.3	77.9	158.0
Somalia	15.9	21.2	34.9	75.7	2.9	2.8	2.3	0.9	33.3	119.7	376.4
South Sudan	11.2	13.8	20.0	31.7	1.2	2.1	1.6	0.4	23.6	78.3	183.5
Tanzania	59.7	79.2	129.4	285.7	2.9	2.7	2.2	1.1	32.5	116.6	378.2
Uganda	45.7	59.4	89.4	136.8	3.3	2.5	1.7	0.2	29.9	95.6	199.0
Zambia	18.4	24.3	39.1	81.5	2.9	2.7	2.1	0.9	32.3	112.8	343.6
Zimbabwe	14.9	17.6	23.9	31.0	1.5	1.8	1.2	0.0	18.4	61.1	108.3
Southern Africa	67.5	75.4	87.4	93.6	1.3	1.0	0.5	-0.1	11.6	29.4	38.6
Botswana	2.4	2.8	3.5	4.2	2.1	1.5	0.9	0.0	18.0	49.3	77.1
Eswatini	1.2	1.3	1.7	2.1	1.0	1.3	1.1	0.1	11.9	46.9	84.9
Lesotho	2.1	2.3	2.7	2.7	0.8	0.8	0.5	-0.4	8.5	24.4	25.8
Namibia	2.5	3.0	4.0	5.4	1.8	1.6	1.2	0.2	18.5	56.7	111.5
South Africa	59.3	66.0	75.5	79.2	1.3	0.9	0.5	-0.1	11.2	27.3	33.5
Western Africa	401.9	516.6	796.5	1483.8	2.6	2.4	1.9	0.7	28.6	98.2	269.2
Benin	12.1	15.7	24.3	47.2	2.7	2.5	1.9	0.8	29.3	100.3	289.4
Burkina Faso	20.9	27.4	43.4	83.2	2.8	2.6	2.0	0.7	31.1	107.8	298.0
Côte d'Ivoire	26.4	33.7	51.3	96.6	2.5	2.4	1.9	0.8	27.8	94.3	266.3
Gambia	2.4	3.2	4.9	8.2	2.9	2.6	1.8	0.4	31.2	102.0	238.3
Ghana	31.1	37.8	52.0	79.0	2.1	1.8	1.4	0.4	21.8	67.4	154.3
Guinea	13.1	17.0	26.0	45.3	2.8	2.5	1.8	0.5	29.6	97.8	244.6
Liberia	5.1	6.4	9.3	15.5	2.4	2.2	1.6	0.5	26.0	84.7	207.0
Mali	20.3	27.0	43.6	80.4	3.0	2.8	2.0	0.5	33.1	115.2	296.9
Mauritania	4.6	6.0	9.0	17.1	2.7	2.3	1.8	0.8	28.3	94.1	267.0
Niger	24.2	34.8	65.6	164.9	3.8	3.5	2.8	1.1	44.0	171.0	581.4
Nigeria	206.1	263.0	401.3	732.9	2.5	2.4	1.9	0.6	27.6	94.7	255.6
Senegal	16.7	21.6	33.2	63.5	2.7	2.4	1.9	0.8	28.7	98.2	279.3
Sierra Leone	8.0	9.6	12.9	16.7	2.1	1.8	1.2	0.0	21.0	62.3	109.0
Togo	8.3	10.4	15.4	26.9	2.4	2.2	1.7	0.6	25.9	86.2	225.5
For Comparison											
Brazil	212.6	223.9	229.0	180.7	0.7	0.4	-0.1	-0.6	5.3	7.7	-15.0
China	1439.3	1464.3	1402.4	1065.0	0.4	0.0	-0.4	-0.5	1.7	-2.6	-26.0
India	1380.0	1503.6	1639.2	1450.4	1.0	0.7	0.2	-0.5	9.0	18.8	5.1
Asia	4641.1	4974.1	5290.3	4719.4	0.9	0.6	0.1	-0.4	7.2	14.0	1.7
Latin America	654.0	706.3	762.4	680.0	0.9	0.6	0.2	-0.5	8.0	16.6	4.0
Europe	747.6	741.3	710.5	629.6	0.1	-0.1	-0.3	-0.1	-0.8	-5.0	-15.8
North America	368.9	390.6	425.2	490.9	0.6	0.5	0.3	0.3	5.9	15.3	33.1
World	7794.8	8548.5	9735.0	10874.9	1.0	0.8	0.5	0.0	9.7	24.9	39.5

Source: Estimated from United Nations World Population Prospects 2019: Estimates and Medium Variant Projections

Table 2: Working-Age Population (WAP) (Age 15-64) Summary Statistics, Sub-Saharan Africa and Comparison Regions

Region	Working-Age Population (millions)				WAP % of total population				Increase from 2020 (%)		
	2020	2030	2050	2100	2020	2030	2050	2100	2030	2050	2100
Sub-Saharan Africa	601.1	807.0	1313.4	2444.3	54.9	57.6	62.0	64.7	34.2	118.5	306.6
Central Africa	93.8	131.2	231.0	486.6	52.2	55.1	60.4	65.2	39.9	146.4	419.1
Angola	16.9	24.2	45.2	120.4	51.4	54.1	58.4	63.9	43.5	167.5	612.3
Cameroon	14.7	19.7	31.6	58.8	55.2	58.4	62.5	65.2	34.6	115.6	301.3
Central African Rep.	2.6	3.4	5.4	7.8	53.7	57.7	64.5	66.9	32.2	109.2	200.2
Chad	8.4	11.8	20.7	40.8	51.0	54.2	60.8	66.0	40.4	146.9	387.2
Congo	3.1	4.1	6.5	13.5	56.0	58.7	60.8	64.3	33.5	110.7	336.6
Dem Rep of Congo	45.8	64.9	117.0	238.1	51.2	54.0	60.2	65.8	41.5	155.3	419.4
Equatorial Guinea	0.9	1.2	1.9	3.0	60.8	62.6	66.9	67.2	37.4	121.1	255.0
Gabon	1.3	1.7	2.4	3.8	59.2	61.2	63.6	64.2	27.5	83.9	185.4
Eastern Africa	246.2	333.4	538.4	923.5	55.3	58.5	63.3	63.6	35.5	118.7	275.2
Burundi	6.2	8.7	15.4	32.8	52.4	55.4	61.0	64.4	40.4	147.9	426.6
Djibouti	0.7	0.8	0.9	0.8	66.4	68.1	67.7	60.4	15.9	33.8	22.6
Eritrea	1.9	2.5	3.8	5.7	54.4	60.0	64.1	63.4	32.0	99.6	198.1
Ethiopia	65.0	86.8	134.8	183.3	56.5	59.9	65.6	62.3	33.5	107.4	182.0
Kenya	31.7	41.8	60.2	79.2	58.9	62.9	65.7	63.1	32.0	90.0	150.0
Madagascar	15.7	20.9	33.7	63.3	56.8	58.6	62.4	63.3	32.7	114.3	302.3
Malawi	10.4	14.5	24.1	42.4	54.4	58.4	63.2	63.8	39.5	131.8	308.1
Mozambique	16.6	23.0	40.3	80.4	53.1	55.9	61.7	65.0	38.8	142.8	384.6
Rwanda	7.4	9.7	14.8	20.7	57.4	59.7	64.3	62.0	30.4	99.2	178.8
Somalia	8.1	11.2	20.5	49.5	50.9	52.7	58.6	65.3	37.9	152.9	510.8
South Sudan	6.2	8.0	12.6	21.1	55.3	58.1	63.0	66.4	29.8	103.1	240.1
Tanzania	32.1	44.5	77.3	181.0	53.8	56.3	59.7	63.4	38.6	140.5	463.2
Uganda	23.8	33.9	57.9	88.2	52.0	57.1	64.7	64.5	42.6	143.3	271.0
Zambia	9.9	13.9	23.8	52.0	53.9	57.2	60.9	63.8	40.4	140.7	425.4
Zimbabwe	8.2	10.8	15.7	20.2	55.1	61.4	65.5	65.1	31.9	91.8	146.2
Southern Africa	44.0	50.6	59.0	59.7	65.1	67.1	67.5	63.8	15.0	34.2	35.7
Botswana	1.5	1.8	2.3	2.6	62.1	65.4	66.6	62.2	24.3	60.1	77.5
Eswatini	0.7	0.8	1.2	1.4	58.5	64.0	67.6	65.7	22.4	69.7	107.5
Lesotho	1.3	1.5	1.8	1.8	62.8	63.9	66.4	65.3	10.5	31.5	30.9
Namibia	1.5	1.9	2.6	3.5	59.6	62.3	65.8	64.2	23.9	73.0	128.0
South Africa	39.0	44.6	51.1	50.5	65.7	67.6	67.7	63.7	14.4	31.2	29.5
Western Africa	217.3	291.8	484.9	974.5	54.1	56.5	60.9	65.7	34.3	123.2	348.5
Benin	6.6	8.9	14.8	30.5	54.8	57.1	61.0	64.5	34.7	123.1	358.7
Burkina Faso	11.1	15.4	26.5	54.0	53.2	56.2	61.0	64.9	38.4	138.2	385.0
Côte d'Ivoire	14.7	19.3	31.6	63.4	55.6	57.4	61.6	65.6	31.8	115.4	332.0
Gambia	1.3	1.8	3.1	5.4	53.5	56.1	62.8	65.7	37.6	136.9	315.5
Ghana	18.6	23.3	33.3	51.2	59.7	61.6	64.1	64.7	25.5	79.7	175.6
Guinea	7.1	9.7	16.4	29.6	54.0	57.2	63.2	65.4	37.3	131.5	317.2
Liberia	2.8	3.8	5.9	10.1	56.3	59.0	62.7	65.0	32.1	105.6	254.2
Mali	10.2	14.6	26.1	53.3	50.5	54.0	59.9	66.4	42.2	155.4	421.5
Mauritania	2.7	3.5	5.6	11.0	57.1	59.2	62.0	64.3	32.9	110.7	313.1
Niger	11.6	17.4	36.8	107.6	47.7	49.9	56.2	65.2	50.5	218.8	831.3
Nigeria	110.9	147.7	243.4	485.6	53.8	56.2	60.7	66.3	33.3	119.6	338.1
Senegal	9.1	12.5	20.5	40.1	54.3	57.8	61.6	63.2	37.1	125.0	341.3
Sierra Leone	4.5	5.8	8.5	11.1	56.7	60.5	65.9	66.6	29.0	88.4	145.3
Togo	4.7	6.2	9.6	17.6	56.5	59.4	62.3	65.5	32.4	105.5	277.5
For Comparison											
Brazil	148.2	152.6	143.8	95.7	69.7	68.2	62.8	53.0	3.0	-2.9	-35.4
China	1012.1	986.5	838.4	579.0	70.3	67.4	59.8	54.4	-2.5	-17.2	-42.8
India	928.3	1029.1	1111.2	852.3	67.3	68.4	67.8	58.8	10.9	19.7	-8.2
Asia	3139.8	3337.9	3392.4	2724.9	67.7	67.1	64.1	57.7	6.3	8.0	-13.2
Latin America	439.1	471.8	487.6	373.1	67.1	66.8	64.0	54.9	7.5	11.1	-15.0
Europe	484.7	460.2	406.9	347.6	64.8	62.1	57.3	55.2	-5.0	-16.0	-28.3
North America	240.2	243.2	259.5	277.9	65.1	62.3	61.0	56.6	1.2	8.0	15.7
World	5083.5	5531.5	6130.5	6520.8	65.2	64.7	63.0	60.0	8.8	20.6	28.3

Source: Estimated from United Nations World Population Prospects 2019: Estimates and Medium Variant Projections

Table 3: Youth Population (Age 15-24) Summary Statistics, Sub-Saharan Africa and Comparison Regions

Region	Youth Population (millions)				Youth % of total population				Increase from 2020 (%)		
	2020	2030	2050	2100	2020	2030	2050	2100	2030	2050	2100
Sub-Saharan Africa	217.7	282.9	398.9	553.9	19.9	20.2	18.8	14.7	30.0	83.3	154.5
Central Africa	35.1	49.0	74.7	113.5	19.5	20.6	19.5	15.2	39.7	112.9	223.5
Angola	6.4	9.3	15.2	30.8	19.5	20.7	19.7	16.4	45.0	137.6	380.1
Cameroon	5.3	6.9	9.5	13.6	19.9	20.4	18.7	15.1	30.8	79.3	157.7
Central African Rep.	1.1	1.3	1.7	1.6	22.4	22.1	19.9	14.0	21.6	54.9	51.0
Chad	3.4	4.5	6.8	9.5	20.6	20.9	19.9	15.3	33.9	100.2	180.0
Congo	1.0	1.4	2.0	3.2	19.0	20.5	18.6	15.5	36.9	89.6	209.6
Dem Rep of Congo	17.2	24.6	38.3	53.2	19.2	20.5	19.7	14.7	43.1	122.9	209.3
Equatorial Guinea	0.3	0.4	0.5	0.6	18.5	19.4	18.1	14.2	40.0	97.2	146.5
Gabon	0.4	0.5	0.6	0.8	16.7	18.4	16.9	13.8	35.3	73.1	117.0
Eastern Africa	92.1	116.1	157.8	202.1	20.7	20.4	18.5	13.9	26.1	71.3	119.4
Burundi	2.3	3.3	4.8	7.7	19.0	20.6	19.1	15.1	43.8	113.8	240.6
Djibouti	0.2	0.2	0.2	0.1	18.3	16.7	13.9	11.2	2.8	-0.5	-17.6
Eritrea	0.7	0.9	1.1	1.2	18.6	21.9	17.9	13.2	41.1	63.0	81.5
Ethiopia	24.7	28.7	36.7	36.1	21.5	19.8	17.9	12.2	16.0	48.4	45.8
Kenya	11.2	13.6	16.0	15.6	20.9	20.4	17.5	12.4	20.7	42.4	38.6
Madagascar	5.7	6.9	9.9	14.2	20.5	19.4	18.4	14.2	21.3	74.4	149.8
Malawi	4.0	5.2	7.2	9.1	21.0	21.1	18.9	13.6	30.5	79.5	125.7
Mozambique	6.5	8.5	12.8	18.0	20.6	20.7	19.6	14.6	31.8	97.9	179.6
Rwanda	2.5	3.2	4.1	4.0	19.6	19.6	17.6	12.1	25.4	59.7	58.8
Somalia	3.4	4.3	7.1	12.4	21.1	20.5	20.4	16.3	29.3	112.0	268.9
South Sudan	2.3	2.8	3.8	4.7	20.2	20.2	18.9	14.8	23.7	66.3	107.3
Tanzania	11.7	16.0	24.7	44.2	19.6	20.2	19.1	15.5	36.7	111.2	277.5
Uganda	9.6	12.9	17.1	17.7	21.0	21.7	19.1	13.0	34.4	78.6	84.9
Zambia	3.9	5.1	7.5	12.6	21.0	20.9	19.2	15.4	31.2	94.0	225.1
Zimbabwe	3.0	4.0	4.3	4.0	20.3	22.8	17.8	12.9	33.0	41.5	32.7
Southern Africa	11.4	13.2	13.1	11.4	16.9	17.5	15.0	12.1	15.2	14.9	-0.6
Botswana	0.4	0.5	0.5	0.5	18.3	18.6	15.4	11.7	20.0	25.6	13.9
Eswatini	0.2	0.3	0.3	0.3	20.9	21.0	16.9	12.8	12.4	19.0	13.8
Lesotho	0.4	0.4	0.4	0.3	19.6	17.9	16.7	12.4	-1.0	5.7	-20.4
Namibia	0.5	0.6	0.7	0.7	19.3	19.5	17.1	13.1	20.3	39.4	43.8
South Africa	9.8	11.4	11.2	9.5	16.6	17.2	14.8	12.1	15.5	13.5	-2.9
Western Africa	79.0	104.6	153.3	226.9	19.7	20.3	19.2	15.3	32.4	93.9	187.1
Benin	2.4	3.1	4.6	7.3	19.9	19.8	18.8	15.4	29.2	89.7	201.6
Burkina Faso	4.2	5.7	8.4	12.4	20.2	20.7	19.4	14.9	34.0	99.0	192.8
Côte d'Ivoire	5.4	6.7	9.8	15.3	20.6	19.8	19.1	15.8	22.7	79.9	180.6
Gambia	0.5	0.6	1.0	1.2	20.1	20.4	19.5	14.2	33.1	96.3	138.4
Ghana	6.0	7.2	9.1	11.0	19.3	19.1	17.5	14.0	20.6	51.5	84.1
Guinea	2.8	3.5	4.9	6.6	21.4	20.4	19.0	14.6	23.5	75.2	135.2
Liberia	1.0	1.3	1.7	2.2	20.1	20.0	18.4	14.3	25.5	69.5	118.9
Mali	4.0	5.7	8.8	12.1	19.9	21.2	20.1	15.1	42.1	117.9	201.4
Mauritania	0.9	1.1	1.6	2.6	19.1	19.2	18.1	15.2	29.6	84.2	192.9
Niger	4.7	7.1	13.4	26.4	19.5	20.5	20.5	16.0	51.0	184.5	458.3
Nigeria	40.0	53.4	77.9	113.4	19.4	20.3	19.4	15.5	33.6	94.8	183.6
Senegal	3.3	4.4	6.1	9.3	19.6	20.6	18.5	14.7	35.3	86.5	183.6
Sierra Leone	1.6	2.0	2.4	2.2	20.4	20.6	18.3	13.4	22.0	45.1	37.1
Togo	1.6	2.1	2.8	4.0	19.7	20.1	18.5	14.9	28.3	74.3	146.3
For Comparison											
Brazil	33.4	29.4	24.8	16.8	15.7	13.1	10.8	9.3	-12.0	-25.7	-49.6
China	169.5	169.8	138.5	105.1	11.8	11.6	9.9	9.9	0.2	-18.3	-38.0
India	248.6	241.4	222.5	150.6	18.0	16.1	13.6	10.4	-2.9	-10.5	-39.4
Asia	712.9	719.8	661.6	496.1	15.4	14.5	12.5	10.5	1.0	-7.2	-30.4
Latin America	107.6	103.5	93.9	67.0	16.5	14.7	12.3	9.9	-3.8	-12.8	-37.7
Europe	76.9	82.2	70.3	64.3	10.3	11.1	9.9	10.2	6.9	-8.6	-16.4
North America	47.9	47.6	49.0	52.3	13.0	12.2	11.5	10.7	-0.5	2.4	9.2
World	1209.6	1293.9	1338.5	1305.8	15.5	15.1	13.7	12.0	7.0	10.7	8.0

Source: Estimated from United Nations World Population Prospects 2019: Estimates and Medium Variant Projections

Table 4: Decomposition of Growth of Working-Age Population (WAP), 2020 (millions)

Region	Net entrants		Ageing in		Ageing out		Deaths+Emigrants	
	#	% of WAP	#	% of WAP	#	% of WAP	#	% of WAP
Sub-Saharan Africa	18.17	3.0%	24.96	4.2%	3.01	0.5%	3.78	0.7%
Central Africa	3.17	3.3%	4.15	4.4%	0.44	0.5%	0.54	0.6%
Angola	0.61	3.6%	0.77	4.6%	0.07	0.4%	0.09	0.6%
Cameroon	0.45	3.0%	0.61	4.2%	0.07	0.5%	0.09	0.7%
Central African Rep.	0.06	2.5%	0.13	4.9%	0.01	0.5%	0.05	1.9%
Chad	0.30	3.5%	0.40	4.7%	0.04	0.5%	0.06	0.8%
Congo	0.09	2.9%	0.12	4.0%	0.01	0.5%	0.02	0.6%
Dem Rep of Congo	1.60	3.4%	2.05	4.5%	0.23	0.5%	0.22	0.5%
Equatorial Guinea	0.03	3.5%	0.03	2.9%	0.00	0.4%	-0.01	-1.0%
Gabon	0.03	2.2%	0.04	3.1%	0.01	0.5%	0.00	0.4%
Eastern Africa	7.88	3.2%	10.45	4.2%	1.16	0.5%	1.41	0.6%
Burundi	0.20	3.2%	0.26	4.2%	0.03	0.5%	0.04	0.6%
Djibouti	0.01	1.8%	0.02	2.7%	0.00	0.6%	0.00	0.4%
Eritrea	0.04	2.1%	0.09	4.4%	0.01	0.6%	0.03	1.7%
Ethiopia	2.08	3.2%	2.66	4.1%	0.33	0.5%	0.26	0.4%
Kenya	0.98	3.1%	1.27	4.0%	0.14	0.4%	0.15	0.5%
Madagascar	0.48	3.0%	0.63	4.0%	0.08	0.5%	0.07	0.5%
Malawi	0.36	3.5%	0.47	4.5%	0.04	0.4%	0.06	0.6%
Mozambique	0.57	3.4%	0.75	4.5%	0.08	0.5%	0.10	0.7%
Rwanda	0.21	2.8%	0.29	3.9%	0.04	0.5%	0.03	0.5%
Somalia	0.26	3.2%	0.39	4.8%	0.04	0.5%	0.08	1.1%
South Sudan	0.10	1.7%	0.25	4.1%	0.03	0.5%	0.12	1.9%
Tanzania	1.08	3.3%	1.39	4.3%	0.14	0.4%	0.16	0.5%
Uganda	0.97	4.0%	1.13	4.7%	0.09	0.4%	0.07	0.4%
Zambia	0.36	3.6%	0.45	4.6%	0.04	0.4%	0.06	0.6%
Zimbabwe	0.15	2.0%	0.35	4.3%	0.04	0.5%	0.16	1.7%
Southern Africa	0.63	1.4%	1.19	2.7%	0.32	0.7%	0.24	0.6%
Botswana	0.03	2.4%	0.05	3.2%	0.01	0.7%	0.00	0.2%
Eswatini	0.01	1.7%	0.03	4.1%	0.00	0.5%	0.01	1.9%
Lesotho	0.02	1.0%	0.04	3.2%	0.01	0.7%	0.02	1.5%
Namibia	0.03	2.0%	0.05	3.4%	0.01	0.5%	0.01	0.9%
South Africa	0.54	1.4%	1.02	2.6%	0.29	0.8%	0.19	0.5%
Western Africa	6.50	3.0%	9.18	4.2%	1.08	0.5%	1.59	0.8%
Benin	0.21	3.1%	0.27	4.1%	0.03	0.5%	0.03	0.5%
Burkina Faso	0.37	3.3%	0.49	4.4%	0.05	0.4%	0.08	0.7%
Côte d'Ivoire	0.42	2.8%	0.60	4.1%	0.08	0.5%	0.11	0.8%
Gambia	0.04	3.2%	0.05	4.2%	0.01	0.4%	0.01	0.6%
Ghana	0.45	2.4%	0.65	3.5%	0.09	0.5%	0.11	0.6%
Guinea	0.25	3.4%	0.32	4.5%	0.04	0.5%	0.03	0.5%
Liberia	0.08	3.0%	0.12	4.1%	0.02	0.5%	0.02	0.6%
Mali	0.36	3.5%	0.49	4.8%	0.05	0.5%	0.08	0.9%
Mauritania	0.08	3.0%	0.10	3.7%	0.01	0.5%	0.01	0.3%
Niger	0.47	4.0%	0.57	5.0%	0.06	0.5%	0.05	0.5%
Nigeria	3.20	2.8%	4.69	4.2%	0.56	0.5%	0.94	0.9%
Senegal	0.28	3.1%	0.38	4.2%	0.05	0.5%	0.05	0.5%
Sierra Leone	0.12	2.7%	0.19	4.1%	0.02	0.5%	0.04	1.0%
Togo	0.14	2.9%	0.19	4.1%	0.02	0.5%	0.03	0.6%
For Comparison								
Brazil	0.97	0.6%	3.13	2.1%	1.57	1.1%	0.60	0.4%
China	-1.89	-0.2%	16.48	1.6%	15.75	1.6%	2.62	0.3%
India	12.71	1.3%	25.39	2.7%	8.21	0.9%	4.47	0.5%
Asia	24.77	0.8%	71.70	2.3%	34.91	1.1%	12.02	0.4%
Latin America	4.25	1.0%	10.61	2.4%	4.41	1.0%	1.95	0.4%
Europe	-2.18	-0.5%	7.73	1.6%	8.90	1.8%	1.01	0.2%
North America	0.53	0.2%	4.62	1.9%	4.14	1.7%	-0.05	0.0%
World	48.29	0.9%	124.56	2.5%	56.93	1.1%	19.34	0.4%

Source: Estimated from United Nations World Population Prospects 2019: Estimates and Medium Variant Projections

Table 5: Net Entrants to Working-Age Population (WAP), 2020, 2030, and 2050

Region	Net entrants (millions)			Net entrants (% of WAP)			Percentage Change	
	2020	2030	2050	2020	2030	2050	2020-2030	2020-2050
Sub-Saharan Africa	18.2	22.8	27.6	3.0%	2.8%	2.1%	25.3	51.8
Central Africa	3.2	4.3	5.7	3.3%	3.2%	2.5%	34.2	80.3
Angola	0.6	0.8	1.3	3.6%	3.4%	2.8%	38.0	107.8
Cameroon	0.4	0.6	0.6	3.0%	2.8%	2.0%	23.7	40.0
Central African Rep.	0.1	0.1	0.1	2.5%	2.6%	2.0%	40.0	68.5
Chad	0.3	0.4	0.5	3.5%	3.2%	2.4%	29.5	68.1
Congo	0.1	0.1	0.1	2.9%	2.7%	2.1%	23.9	57.2
Dem Rep of Congo	1.6	2.2	3.0	3.4%	3.3%	2.5%	37.3	88.0
Equatorial Guinea	0.0	0.0	0.0	3.5%	2.8%	1.8%	7.5	10.2
Gabon	0.0	0.0	0.0	2.2%	2.5%	1.3%	41.2	3.3
Eastern Africa	7.9	9.5	10.7	3.2%	2.8%	2.0%	20.0	35.4
Burundi	0.2	0.3	0.4	3.2%	3.4%	2.3%	49.3	77.4
Djibouti	0.0	0.0	0.0	1.8%	1.4%	0.2%	-7.9	-86.1
Eritrea	0.0	0.1	0.1	2.1%	2.5%	1.7%	51.1	51.0
Ethiopia	2.1	2.3	2.3	3.2%	2.7%	1.7%	12.9	8.3
Kenya	1.0	1.0	0.9	3.1%	2.4%	1.4%	0.7	-12.3
Madagascar	0.5	0.6	0.7	3.0%	2.6%	2.0%	16.6	45.4
Malawi	0.4	0.4	0.5	3.5%	2.9%	2.1%	18.1	42.1
Mozambique	0.6	0.7	1.0	3.4%	3.1%	2.4%	26.4	69.7
Rwanda	0.2	0.2	0.2	2.8%	2.5%	1.5%	16.1	6.3
Somalia	0.3	0.3	0.6	3.2%	3.1%	2.7%	32.4	115.8
South Sudan	0.1	0.2	0.2	1.7%	2.5%	1.9%	99.6	135.9
Tanzania	1.1	1.4	1.9	3.3%	3.0%	2.5%	25.5	76.2
Uganda	1.0	1.1	1.2	4.0%	3.3%	2.1%	17.3	24.4
Zambia	0.4	0.4	0.6	3.6%	3.1%	2.4%	20.8	57.8
Zimbabwe	0.2	0.3	0.2	2.0%	2.8%	1.5%	101.2	59.0
Southern Africa	0.6	0.7	0.2	1.4%	1.3%	0.3%	5.9	-65.9
Botswana	0.0	0.0	0.0	2.4%	2.0%	0.8%	7.4	-46.5
Eswatini	0.0	0.0	0.0	1.7%	2.0%	1.1%	44.7	16.8
Lesotho	0.0	0.0	0.0	1.0%	1.1%	0.5%	17.2	-34.7
Namibia	0.0	0.0	0.0	2.0%	2.2%	1.2%	36.8	10.8
South Africa	0.5	0.6	0.1	1.4%	1.2%	0.2%	2.9	-74.1
Western Africa	6.5	8.4	11.0	3.0%	2.8%	2.2%	29.2	68.9
Benin	0.2	0.3	0.3	3.1%	2.8%	2.2%	23.9	60.6
Burkina Faso	0.4	0.5	0.6	3.3%	3.1%	2.4%	27.9	69.4
Côte d'Ivoire	0.4	0.5	0.7	2.8%	2.7%	2.1%	27.2	62.1
Gambia	0.0	0.1	0.1	3.2%	3.1%	2.2%	33.2	65.2
Ghana	0.4	0.5	0.5	2.4%	2.1%	1.5%	11.6	11.7
Guinea	0.2	0.3	0.4	3.4%	3.0%	2.1%	18.7	44.7
Liberia	0.1	0.1	0.1	3.0%	2.5%	1.9%	13.6	31.9
Mali	0.4	0.5	0.7	3.5%	3.3%	2.6%	34.4	87.6
Mauritania	0.1	0.1	0.1	3.0%	2.7%	1.9%	22.2	38.7
Niger	0.5	0.7	1.2	4.0%	4.0%	3.4%	49.2	166.8
Nigeria	3.2	4.2	5.5	2.8%	2.8%	2.2%	31.2	71.8
Senegal	0.3	0.4	0.4	3.1%	3.0%	2.1%	32.7	52.2
Sierra Leone	0.1	0.1	0.1	2.7%	2.3%	1.5%	11.4	1.9
Togo	0.1	0.2	0.2	2.9%	2.6%	1.9%	15.7	34.6
For Comparison								
Brazil	1.0	0.2	-1.1	0.6%	0.1%	-0.7%	-82.0	-213.5
China	-1.9	-6.0	-9.1	-0.2%	-0.6%	-1.1%	220.0	381.8
India	12.7	7.9	-0.1	1.3%	0.8%	0.0%	-37.5	-100.7
Asia	24.8	13.0	-7.6	0.8%	0.4%	-0.2%	-47.4	-130.5
Latin America	4.3	2.6	-1.0	1.0%	0.5%	-0.2%	-40.0	-124.0
Europe	-2.2	-2.3	-3.1	-0.5%	-0.5%	-0.8%	6.5	44.2
North America	0.5	0.4	0.5	0.2%	0.1%	0.2%	-33.0	-1.4
World	48.3	40.1	18.8	0.9%	0.7%	0.3%	-17.0	-61.1

Source: Estimated from United Nations World Population Prospects 2019: Estimates and Medium Variant Projections