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Fertility in Africa: Dynamics and Challenges of Development

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Abstract

This research is interested in the links between the fertility of women and the economic and social development of their country. It is part of an African context marked by weak indicators of economic and social development but with high indicators of demographic growth. Methodologically, quantitative data relating to demographic, economic, social and health variables are analyzed using a Principal Component Analysis, evolution curves, and projections to the year 2100. The results show that some African countries, despite their high fertility rates, benefit from social progress related to health and life expectancy even if their economy seems to be negatively affected especially by the high dependency indices of young people. Strong inequalities in fertility rates are also noted between different countries and different geographic regions, making the geography of the African population plural. The various demographic projections made show real opportunities for the continent's economic development in the future.

Keywords: Fertility, population growth, economic development, social development, Africa

Introduction

The high fertility and rapid demographic growth of Africa compared to other continents interest several contemporary scientific studies (Leridon, 2015; Dumont, 2010; Hugon, 2007; Tabutin and Schoumaker, 2004). The stakes are high both geopolitically with the risk of the boom in migration to Europe and in terms of socio-economic development of the continent (Sène, 2017; Dumont, 2012; Vimard and Fassassi, 2011; Bayart et al., 2010).

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Today, the debate continues on the impact of Africa's high fertility on its socio-economic development. Most of the work mentioned above generally presents contrasting results. Older works suggest the absence of solid statistical relationships between population growth and economic growth (Blanchet, 1991; Easterlin, 1967) or consider the galloping demography of Africa today as an economic opportunity in the future (Bloom and Williamson, 1998). On the contrary, other research concludes direct and indirect negative impacts of Africa's high fertility on its socio-economic development (Obomeghie et al., 2018; Ndulu, 2006; UN, 1993).

The aim of this study is to contribute to this controversial debate on the links between Africa's high fertility and its prospects for economic and social development. Given the continent's economic backwardness compared to the rest of the world, the working hypothesis can be summed up as follows: the high fertility of the African continent constitutes a brake on its economic and social development. From a methodological point of view, quantitative indicators relating to the population and to the African and global economic and social situation are mobilized and processed. Some indicators are cross-referenced with the help of a PCA (Principal Component Analysis) at the African level. Others are observed over the period 1950-2015 or are projected up to the 2100 horizon to determine trends. The databases analyzed come from the United Nations Population Division (UN, 2017) and the World Bank (WB, 2016).

I. Place of African fertility in the world

I.1. Spectacular demographic growth of the African continent

The projection of the African population, according to the average hypothesis, announces a doubling of its population by 2050. It then goes from 1.2 billion in 2015 to 2.5 billion in 2050. By 2100, projections predict a further doubling of the population, which then drops to 4.5 billion. The continent’s demographic growth is spectacular. The continent goes from 16% in 2015 to 40% of the world population in 2100 (Tab. 1). According to its forecasts more than 1/3 of the world's population will be African. The issue of African demography is therefore global. This is an inescapable geopolitical fact (Lauras-Locoh and Lopez-Escartin, 1992).

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Table 1: World population by continent

	AFRICA	ASIA	EUROPE	AMERICA	OCEANIA
2015 (thousands of inhabitants)	1194370	4419898	740814	988384	31229
Part 2015	16%	60%	10%	13%	0%
2050 (thousands of inhabitants)	2527557	5256927	715721	1214496	57121
Part 2050	26%	54%	7%	12%	1%
2100 (thousands of inhabitants)	4467588	4780485	653261	1211210	71823
Part 2100	40%	43%	6%	11%	1%

Source: United Nations, 2017 revised projections, average hypothesis

I.2. Africa's high fertility characteristic of low-income countries

The evolution of fertility in the five continents between 1950 and 2015 is similar but with different rhythms (Fig. 1). Latin America and the Caribbean and Asia have the largest fertility declines. They vary from around 6 children per woman in 1950 to around 2 children per woman in 2015. For Africa, the number of children per woman varies from 6.62 to 4.72. For Europe, the values vary only from 2.66 to 1.60.

Three major trends are also noted. The first is marked by the highest fertility values over the entire period 1950-2015. It is represented by the African continent. The second trend is Europe, North America and Oceania. The fertility values are the lowest there. Finally, the third trend includes the continents of Asia and Latin America and the Caribbean. Their fertility values are intermediate to the first two trends and are characterized by a rapid decline which allows them to approach the group of the second trend.

The fertility of women according to the income of their country evolves in the same way as that of the continents (Fig. 2). Africa's fertility trends correspond to low-income countries; that of Latin America and the Caribbean and Asia to middle-income countries; and that of Europe, North America and Oceania to high-income countries. Fertility is then dependent on the income level of the countries. It is higher in low-income countries and decreases when the income of countries increases.

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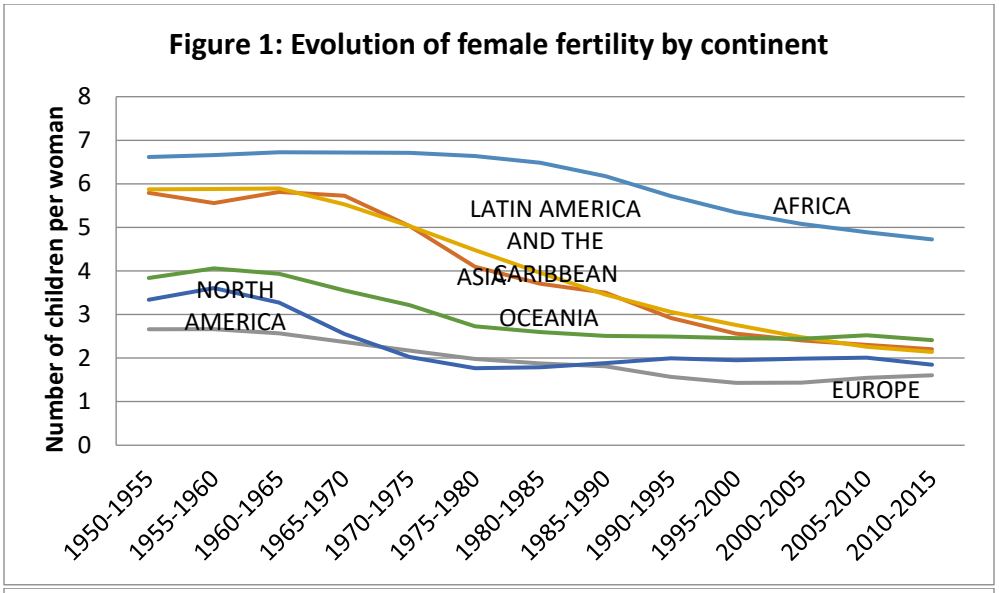

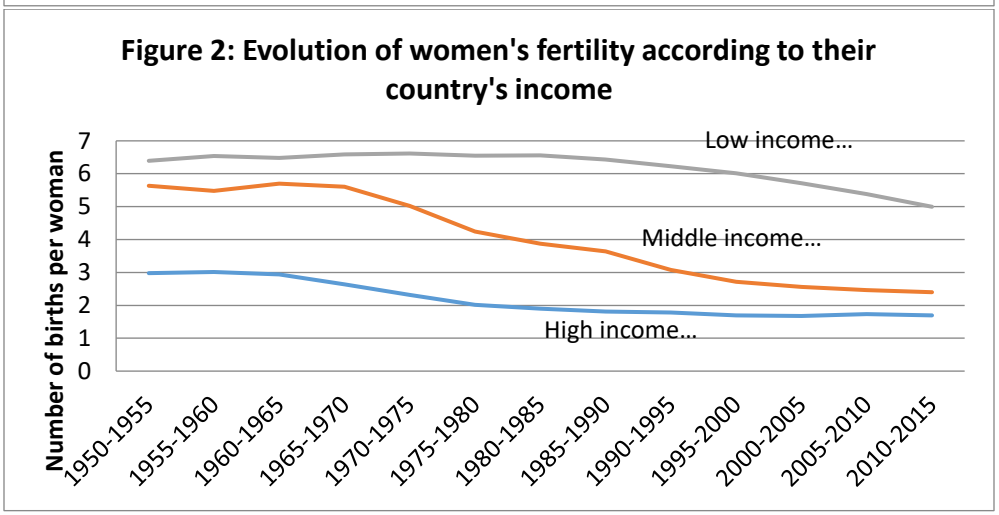

Source: United Nations, 2017 revision

The projection, using the central case scenario, of Africa's fertility in 2070-2075 is 2.49 children per woman. It is equivalent to the world average for 2015-2020 (Fig. 3). This implies a significant catching up of the economic development lag of the African continent on the rest of the world. In the case of the high scenario with a slower transition, fertility falls only by 2.63 children per woman over the period 2095-2100. The African population is then assumed to reach 6.23 billion in 2100. On the contrary, in the low scenario, the transition is faster. Fertility then falls to 1.65 children per woman in 2095-2100 and the population only increases to 3.10 billion by 2100. In this last

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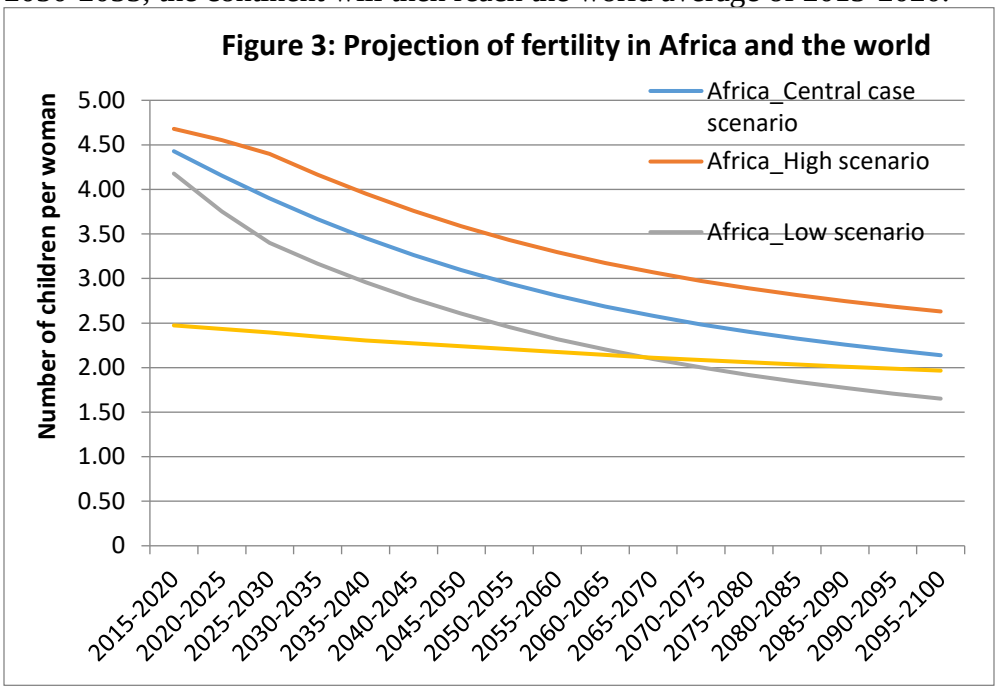
diagram, Africa's economic catch-up to other continents will be faster. From 2050-2055, the continent will then reach the world average of 2015-2020.



Source: United Nations, 2017 revised projections

I.3. Extreme youth of the African population

The demographic inertia of the African population is considerable because of its extreme youth. Thus, Africa's youth dependency index, calculated on the basis of the ratio of young people under the age of 15 to the adult population aged 15 to 65, is the only one to experience almost zero variation on a global scale in the period from 1950 to 2015. It is 74.0% in 2015 while that of the world population is only 39.9%. In the central case scenario, it is not until 2075 to see the dependency index of young Africans reach 40.5%, which is approximately the same value as that of the world (39.9%) and of Latin America and the Caribbean (38.30%) in 2015 (Tab. 2).

According to the central case scenario, by 2075, Africa should then enter the window of "economic opportunity" (Bloom and Williamson, 1998). Today, large emerging countries like India and Brazil are in this phase. With relatively low proportions of the young and old population, the dependency index is then at its optimal level and has not yet started to rise with the aging of the population.

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Table 2: Evolution of the dependency index for young people under 15

	1950	2015	2050	2075	2100
WORLD	56.5	39.9	33.9	31.4	29.5
AFRICA	74.6	74.0	51.9	40.5	33.8
ASIA	61.1	36.2	28.0	26.4	26.1
EUROPE	40.1	23.7	26.2	26.4	26.8
LATIN AMERICA AND THE CARIBBEAN	71.6	38.3	26.8	25.6	25.8
NORTH AMERICA	41.8	28.5	28.0	28.5	28.4
OCEANIA	47.5	36.5	32.4	29.8	28.2

Source: United Nations, 2017 revised projections, central case scenario

II. Characteristics of African fertility

II.1. Categorization of countries according to demographic, economic, social and health indicators

The PCA determined the correlations between the different variables. They are eight in number in the 54 independent African states. The choice of variables is linked to their relevance for carrying out a study of territorial disparities in terms of demography and socio-economic development in African countries and to their availability (Tab. 3). The PCA reduced the mass of original data from the eight variables into two groups represented by component 1 (population growth and economic growth) and component 2 (health and life expectancy).

Table 3: Indicators used in the PCA

INDICATORS	DESCRIPTION
Improved sanitation facilities, rural (% of rural population with access)	Access to improved sanitation facilities, rural, refers to the percentage of the rural population using improved sanitation facilities. Improved sanitation facilities are likely to ensure hygienic separation of human excreta from human contact. They include flush/pour flush (to piped sewer system, septic tank, pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet.
GDP per capita (current US$)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.
Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
Mortality rate, under-5 (per 1,000 live births)	Under-five mortality rate is the probability per 1,000 that a newborn baby will die before reaching age five, if subject to age-specific mortality rates of the specified year.

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Total fertility (Live births per woman)	The average number of the live births a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality. It is expressed as live births per woman.
Rate of natural increase (per 1,000 population)	Crude birth rate minus the crude death rate. Represents the portion of population growth (or decline) determined exclusively by births and deaths. It is expressed per 1,000 population annually.
Total dependency ratio	Ratio of population aged 0-14 and 65+ per 100 population 15-64
Access to electricity (% of the population)	Access to electricity is the percentage of the population with access to electricity. Data on electrification are obtained from industry, national surveys and international sources.

Source: United Nations Population Division (2017) and the World Bank (2016)

A strong correlation between the indicators of demographic growth (natural growth rate, total fertility rate (average number of living children per woman), total dependency index) is noted. Likewise, an inverse correlation is found between this group of variables and that relating to economic variables, namely GDP per capita and the rate of access to electricity. African countries with higher fertility rates have the highest natural growth rates and total dependency rates. On the other hand, they have the lowest indices of GDP per capita and rate of access to electricity. It is interesting to note that there is no clear correlation between the indicators of population growth and the social indicators relating to health (under-5 mortality rate, percentage of the rural population with access to improved sanitation facilities) and life expectancy.

In Africa, the fertility indices are therefore inversely proportional to the economic indicators. But, they are not directly dependent on social indicators like health or life expectancy. For example, Uganda with a fertility of 5.91 children per woman has the same life expectancy of 75 years as Algeria which has a fertility of 2.96 children per woman. Algeria's GDP per capita (US $ 5,447) is however higher than Uganda's which is only US $ 598. Cameroon has a fertility of 4.95 children per woman and has infant mortality rates (under 5) of 87.9 ‰ and access to improved sanitation facilities in rural areas of around 47.9 ‰. Lesotho, which has lower fertility rates (3.26 children per woman), however, has higher infant mortality rates (90.2 ‰) and significantly higher rates of access to improved sanitation facilities in rural areas. low (26.2 ‰). Yet Lesotho has a GDP per capita of around US $ 1375 which is higher than Cameroon's (US $ 1259). Despite the high fertility rates, the health situation and life expectancy in the African continent have generally improved.

The score diagram shows the correlation of countries with respect to the two components (Fig. 4). Most African countries have a similar situation in terms of demographic, economic, health and life expectancy growth. Four

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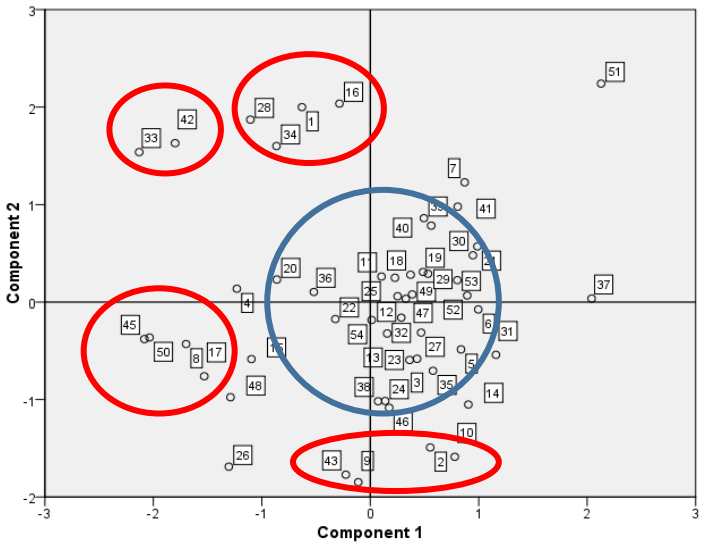
groups of countries stand out, however. The group formed by the countries of North Africa (Algeria, Egypt, Libya and Morocco) indicates relatively low population growth but significantly higher life expectancy and access to improved health infrastructure across the continent. The group of island countries (Mauritius and Seychelles) has lower population growth indicators than the previous one. It is also characterized by good health and life expectancy indicators, but above all by good economic indicators (GDP per capita and population's access rate to electricity). The third group, made up of Cape Verde, Equatorial Guinea, South Africa and Tunisia, is distinguished by the lowest population growth rates and the best economic indicators on the continent. Finally, the last group of countries (Chad, DRC and Sierra Leone) is marked by the lowest health and life expectancy indicators.

Figure 4: Score diagram showing correlations between countries and components



1	Algeria	28	Libya
2	Angola	29	Madagascar
3	Benin	30	Malawi
4	Botswana	31	Mali
5	Burkina Faso	32	Mauritania
6	Burundi	33	Mauritius
7	Cameroon	34	Morocco
8	Cape Verde	35	Mozambique
9	Central African Republic	36	Namibia
10	Chad	37	Niger
11	Comoros	38	Nigeria
12	Congo	39	Rwanda
13	Cote d'Ivoire	40	Sao Tome and Principe
14	RDC	41	Senegal
15	Djibouti	42	Seychelles
16	Egypt	43	Sierra Leone
17	Equa. Guinea	44	Somalia
18	Eritrea	45	South Africa
19	Ethiopia	46	South Sudan
20	Gabon	47	Sudan
21	Gambia	48	Swaziland
22	Ghana	49	Togo
23	Guinea	50	Tunisia
24	Guinea-Bissau	51	Uganda
25	Kenya	52	Tanzania
26	Lesotho	53	Zambia
27	Liberia	54	Zimbabwe

Source : Author

II.2. Contrasting fertility indices across the African continent

The spatial distribution of fertility over the period 2010-2015 reveals an unequal situation between the different African countries (Fig. 5). The values go from 5.5 to 7.4 children per woman in some countries such as Niger (7.4), DRC (6.6) and Somalia (6.4) against 1.5 to 3.3 children per woman in other countries such as Mauritius (1.5), Tunisia (2.2) and South Africa (2.5). Within regional geographic areas, rates also vary. Some regions have more countries with relatively low fertility, that is, less than 3.3 children per woman. This is the case, for example, in Southern and North Africa. Others, like West and Central Africa, have more countries with higher fertility rates, above 5.5. As such, Dumont (2010) evokes the very diverse nature of the geography of the African population.

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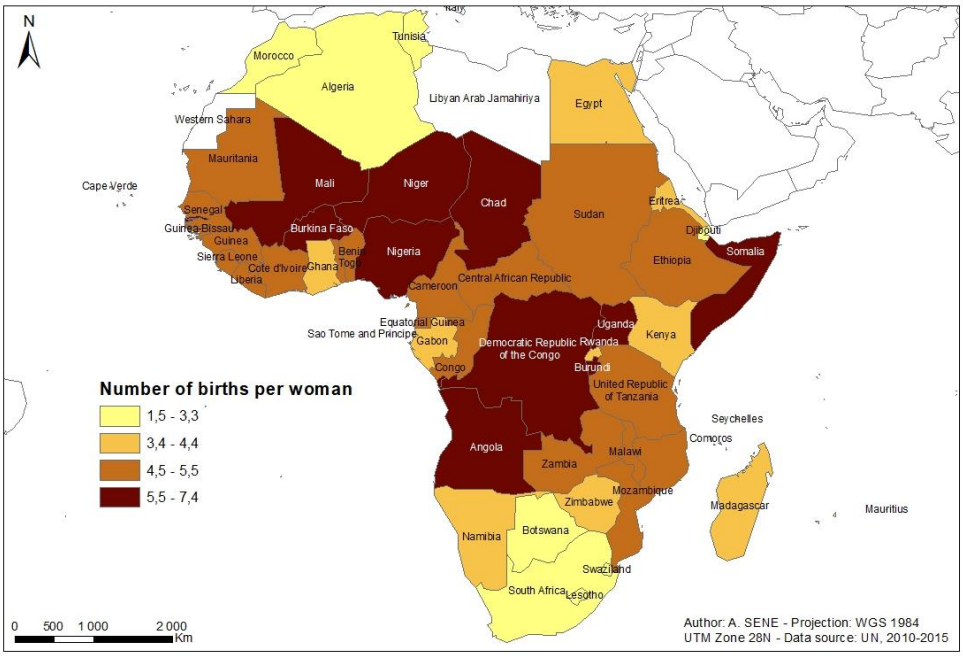
Figure 5: Mapping of female fertility in Africa



Source : Author

II.3. Different trends in the evolution of fertility in Africa's regions

Two trends emerge from the evolution of fertility in the different regions of the continent. The first trend is that of the regions of Central, West and East Africa, whose fertility is developing in the same way. The number of children per woman in these regions is almost stable around 6 to 7 between 1950 and 2000. From this date until 2015, a slight decrease in fertility is observed and is between 5 and 6 children per woman. The other trend is in the regions of southern and northern Africa. These 2 regions have a similar development and are marked by a rapid decline in their fertility. The number of children per woman varies from 6 to 7 in the 1950s to less than 3.5 from the early 2000s (Fig. 6). However, Southern Africa began its rapid fertility decline earlier (from 1960-1965) compared to North Africa (from 1980-1985).

This fracture in the evolution of fertility in the various African regions is reflected in their differentiation on the economic level since the start of independence around 1960. Given the important demographic similarities noted at the regional level, the continent's development policies should then focus more on integration and regional economic planning. Improving regional integrations through political cooperation and infrastructure projects is also considered relevant for improving the geography of development by the work of Vimard and Fassassi (2011) and the World Bank (2008).

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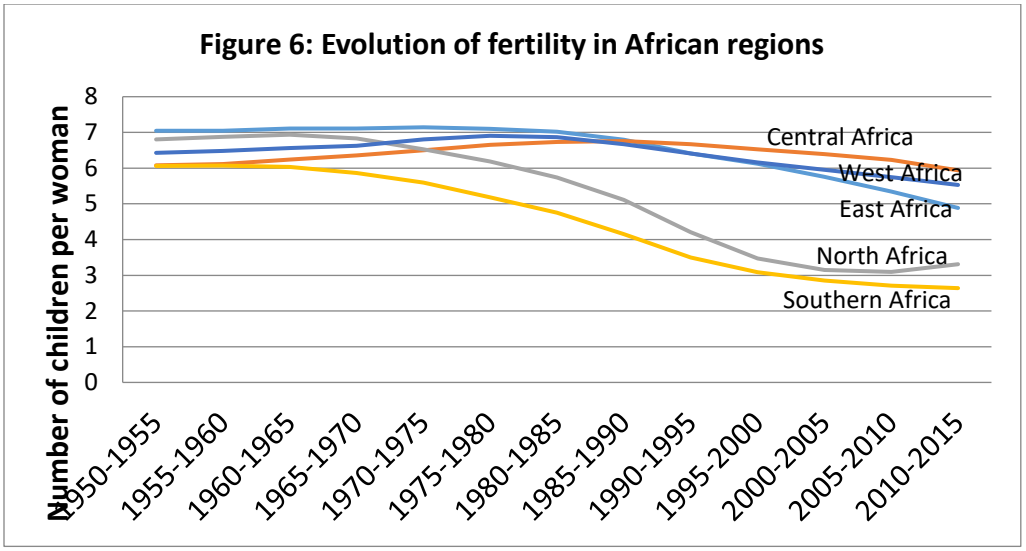

Source: United Nations, 2017 revision

Conclusion

The trends in fertility by continent and by country income are similar and show that fertility in Africa is specific to low-income countries. The more a continent has income per country, the lower these fertility rates. The PCA further confirms these results by highlighting the inverse correlation, in Africa, between population growth indicators including fertility and economic indicators such as GDP per capita and access to electricity. In contrast, social development indicators such as life expectancy, infant mortality and access to improved sanitation facilities do not directly correlate with indicators of population growth. In other words, if the high fertility rates in Africa are a constraint for its economic development, they are not a direct constraint on its social and health development. The whole of the African continent now enjoys social benefits relating to health and life expectancy despite its high fertility rates.

Today, the extreme youth of the African population constitutes a constraint to its economic development because of its very high youth dependency index (74% against 39.9% for the world average in 2015). However, according to projections for 2075, the youth dependency index will drop, according to the central case scenario, to 40.5%. The continent's population structure will be the same as the emerging countries of today. Real opportunities for economic development will then present themselves to Africa for decades before the increase in the percentage of the elderly begins to become a constraint on its population.

Demography in Africa is plural. Even though fertility on a continental scale is high compared to other continents, it is still important to contextualize.

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In 2015, southern Africa's average fertility rate, estimated at 2.64 children per woman, is close to that of the world (2.47). At the same time, Central Africa with 5.94 children per woman has double the fertility of southern Africa. The variations in fertility are even greater at the country level. Mauritius, for example, has 1.5 children per woman, while Niger recorded 7.4 in 2015, or 5 times more. The main current consequence of this demographic inequality is reflected in economic inequality at the continental level. South Africa is thus considered to be one of the emerging countries, while many West and Central African countries are now classified as heavily indebted poor countries. The future of the socio-economic development of the African continent will therefore depend on the ability of its countries to redefine their development policies taking into account their national and regional demographic context. Far from being negative, it presents several opportunities that can serve as a springboard for improving the continent's social and economic conditions and its geopolitical position in the world.

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