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AFRICA'S UNIQUE FERTILITY TRANSITION

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Abstract

Since the 1960s fertility declines have been rapid in Asia and Latin America but in sub-Saharan Africa (“Africa”) the fertility transition occurred later and is proceeding at a slower pace. Although fertility transitions have now started in all African countries, declines have usually been modest. This study finds that the slow pace of the African transition can be attributed to several factors. First, the pace of African development has been slow and other things being equal this alone would lead to slower transitions. Second, the pro-natalist nature of African societies implies a resistance to fertility decline that does not exist or is weaker in non-African countries. Finally, family planning programs remain weak in many African countries. This is clearly a missed opportunity because in the few countries where governments have made family planning programs a priority (e.g. in Rwanda and Ethiopia) rapid uptake of contraception and fertility decline followed.

Over the past half century massive changes in reproductive behavior have occurred throughout the developing world with the total fertility rate declining by 56 per cent--from 6.0 to 2.7 births per woman between 1960 and 2010 (United Nations, 2015). Declines have been especially rapid in Asia and Latin America over this period but in sub-Saharan Africa (“Africa”) the fertility transition occurred later and is proceeding at a slower pace. As a result of this high African fertility and declining mortality, the population of this region is now growing at a faster rate (2.5 percent per year) than other regions of the developing world. The UN projects the sub-Saharan population to grow from 0.8 billion in 2010 to 3.9 billion in 2100 (United Nations 2015). Such an unprecedented expansion of human numbers will create a range of social, economic, and environmental challenges and makes it more difficult for the continent to raise living standards. Not surprisingly, interest in and concerns about the adverse consequences of demographic trends in Africa have reached high levels among policymakers and researchers.

Although fertility transitions have now started in all African countries, declines have often been modest. In addition, in a number of African countries fertility has stalled in mid-transition, a pattern that has rarely been observed in other regions (Bongaarts, 2006, 2008; Ezeh et al. 2009; Machiyama 2010; Shapiro et al 2008; Shapiro et al 2013; Westoff and Cross 2006). This raises the question as to whether, how and why Africa’s fertility transitions are exceptional and what policies and programs can be implemented to accelerate fertility decline.

This paper presents an assessment of trends in regional fertility and development. An examination of fertility transition patterns identifies key differences between regions of the developing world and provides insights into the reasons why Africa’s transitions are slow compared to earlier transitions in Asia and Latin America. Since this paper serves as the introductory chapter to the volume the analysis is carried out at a highly aggregate regional level. Country or sub-national patterns will only rarely be examined because they are described in later chapters.

1) Hypotheses

The simplest explanation for the distinct fertility transitions in Africa is provided by conventional demographic theory which was formulated to explain the fertility decline that occurred in the West from the late nineteenth century through the 1930s (Davis 1945; Notestein 1945, 1953). According to this theory fertility transitions are driven by social and economic development. As societies modernize, economic and social changes such as industrialization, urbanization, new occupational structure, and increased education first lead to lower mortality, and subsequently to a decline in fertility. A reduction in desired family size results from the rising costs of children (e.g., for education) and their declining economic value (e.g., for labor and old-age security) which are considered the central forces believed to drive the transition. The desire for smaller families in turn leads to a rise in the demand for and adoption of birth control.

If this theory applies to contemporary societies, one would expect that the later onset of the transitions in Africa is the result of lower levels of development in the region and that the slow pace of fertility decline is the result of slower improvements in development.

As will be shown below some of the fertility patterns observed in Africa are consistent with conventional transition theory and others are not. There are several possible explanations for these inconsistent findings:

First, the response of fertility to development could be fundamentally different in Africa than elsewhere in the developing world. This view has been expressed persuasively by Caldwell and his collaborators (1987, 1988, 1992) who argue that African societies have unique pro-natalist features. Caldwell (1992) summarized the social and economic reasons for this effect as follows:

”(1) African traditional society and religion stressed the importance of ancestry and descent. ...the younger generations assisted the older generations to such an extent that, for males at least, high fertility ultimately brought substantial economic returns... (2) Polygyny led in West and Middle Africa to separate spousal budgets, with the basic childrearing economic unit being a mother and her dependent children. The father was spared much of the cost of rearing children. (3) There was strength and safety in numbers. Communal land tenure, in conditions of shifting cultivation, meant that large families could demand a greater share of the land... (4) Family planning programs were nonexistent or weak because politicians and bureaucrats believed that there was little demand for fertility control and did not want to be weakened by association with failure and with the promotion of institutions regarded as foreign or as incompatible with African culture (pp.213-214)” Empirical evidence in support of African exceptionalism will be provided in the second part of this paper.

Second, while countries' fertility levels are indeed inversely related to socioeconomic indicators (Bryant 2007, Hirschman 2001), this relationship is a loose one. Conventional fertility theory could therefore be incomplete in that it ignores important other processes that affect the transition. This view became widely accepted when detailed analyses of historical and contemporary data found patterns that were inconsistent with conventional theories. The best known of these analyses is a massive study of province-level data from European countries for the period 1870–1960 (Coale and Watkins 1986; Knodel and van de Walle 1979; Watkins 1986, 1987). It yielded two surprising conclusions: 1) socioeconomic conditions were only weakly predictive of fertility declines, and transitions started at widely varying levels of development; 2) once a region in a country had begun a decline, neighboring regions sharing the same language or culture followed after short delays, even when they were less developed. Similarly, results from World Fertility Surveys in 41 developing countries in the 1970s and early 1980s failed to find the expected dominant influence of economic characteristics on fertility (Cleland 1985; Cleland and Wilson 1987). Moreover, levels and trends in fertility in the developing world since the 1950s deviated widely from expectations (Bongaarts and Watkins 1996). For example, Hong

Korea and Singapore started their fertility transitions when they had much higher levels of income, literacy, and urbanization than Bangladesh, where fertility decline began when the country was still largely rural and agricultural. Fertility declined sharply in a few countries with unfavorable development conditions (e.g., in Bangladesh, Indonesia and Sri Lanka). These were traditional, poor, rural, and agricultural societies, yet fertility declined to low levels by the 1990s. These unexpected findings required a revision of thinking about the fertility transition and led to the introduction of theories of the “diffusion” of innovations. Diffusion refers to the process by which new ideas, behaviors, and attitudes spread within a population through a variety of mechanisms (e.g., social networks, opinion leaders, and media). This spread is most rapid within linguistically and culturally homogeneous populations and is often largely independent of social and economic changes. In particular, the diffusion of information about methods of birth control is now considered an important mechanism of fertility change. In addition, new ideas about the costs and benefits of children that may lead to a smaller desired family size are also subject to diffusion processes (e.g., Cleland 2001; Cleland and Wilson 1987; Casterline 2001, 2; Hornik and McAnany 2001; Knodel and van de Walle 1979; Kohler 2001; Montgomery and Casterline 1993, 1996; National Research Council 2001; Retherford and Palmore 1983; Rogers 1973, 1983; Watkins 1987).

Third, as noted by Caldwell, the adoption of voluntary family planning programs could be slower and less pervasive in Africa than in other regions of the developing world. Evidence of high levels of unintended pregnancies persuaded many governments and international organizations to implement these programs from the 1960s onward in Asia and Latin America and these efforts accelerated fertility declines (Bongaarts et al 2012, Cleland et al 2006, Freedman and Berelson 1976). Unfortunately, in a majority of African countries, including Nigeria, DRC, and most of the Sahel, family planning is still given low priority and government leaders are reluctant to talk about contraception and the benefits of smaller families (May 2012).

The empirical analysis in the following sections documents unique features of African transitions and sheds light on the different possible explanations for these findings.

2) Regional fertility and development levels: Is Africa different?

As a first step in the examination of the roles of different determinants of fertility, an overview of long-range trends in regional averages of several key variables will be provided. This allows a basic comparison of average sub-Saharan African patterns with those of other developing regions over time.

Annual trends in five country level indicators will be examined: one outcome variables (fertility as measured by the total fertility rate) and four socioeconomic determinants:

- Total fertility rate (United Nations 2013)
- Log of GDP per capita (at PPP) from the Penn World Table (Feenstra et al. 2013)
- Education level, measured as the percent with at least primary education among women aged 15-35 (Wittgenstein Centre 2014)
- Life expectancy at birth (United Nations 2013)
- Percent urban (United Nations 2014).

The set of countries included in the analysis below was obtained after applying the following exclusion criteria to all developing countries (see Casterline 2001 for a similar approach): a) Countries with a population size of less than 1 million in 1970, b) Countries that started the fertility transition before 1950, as indicated by fertility levels below 5 births per woman after 1950, c) Ex-Soviet states and d) Rich oil exporters. After these exclusions a total of 88 countries were available of which 36 are in sub-Saharan Africa and 52 in other regions. Estimates of the TFR, life expectancy and percent urban are available for all 88 countries from 1960 to 2010, but data on GDP/capita and education are missing for many countries especially before 1970. The analysis will therefore focus on the period from 1970 to 2010.

In the figures and tables presented below results are presented as unweighed averages of country estimates, separately for sub-Saharan Africa (“Africa”) and other developing regions which includes Asia, Latin America and North Africa.

-Total fertility rate. Figure 1 plots the average TFR for Africa (not including N.Africa), Asia and Latin America from 1960 to 2010. Over this half century the average for Africa has always exceeded that for the other two regions with the difference rising over time reaching two and a half births per women in 2010. Asia and Latin America show a very similar pattern of decline and in the remaining tables and figures these two regions will be combined into one called “other LDCs” or “non-African.” A key indicator used in the analysis below is the year of the onset of the fertility transition which is measured here as the time when the TFR has declined 10 % below it is pre-transitional maximum (Coale and Treadway 1986)ⁱ. By this measure all countries included in the analysis have experienced an onsetⁱⁱ. The average year of onset was 1995 in Africa, while the non-African average onset occurred 20 years earlier in 1975ⁱⁱⁱ. The years surrounding these average transition onsets are indicated by circles in the figures.

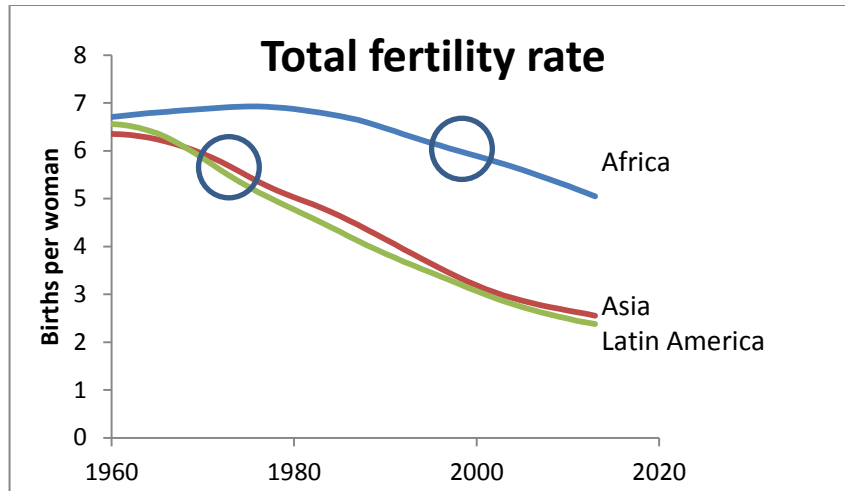


Figure 1

-GDP per capita (PPP). By 1970 many non-African LDCs had already experienced substantial development. Their average GDP per capita at that time is estimated at \$ 2100 per capita, twice the African level. In subsequent decades economies in the non-African LDCs grew rapidly and by 2010 their GDP per capita reached \$6000. In contrast, Africa experienced little change in standards of living over the past half century. In fact, the continent's GDP per capita slumped temporarily in the 1980s and 1990s and it did not rise above the 1970 level until after 2000 (Figure 2). The circles again indicate the average year in which the onset of the fertility transition occurred.

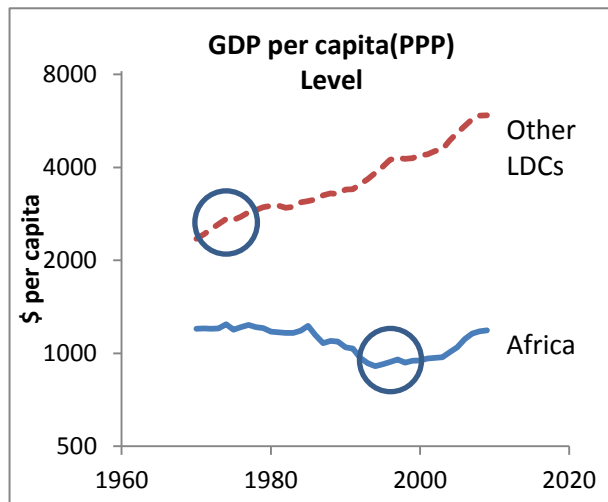


Figure 2

-Education level. This indicator has risen steadily since 1970 in nearly all developing countries mostly due to massive investments in the education sector (Figure 3). However, the African average consistently lags the average in other LDCs. By 2010 the proportion with primary+ education reached 47 % in sub-Saharan Africa and 84% in other LDCs.

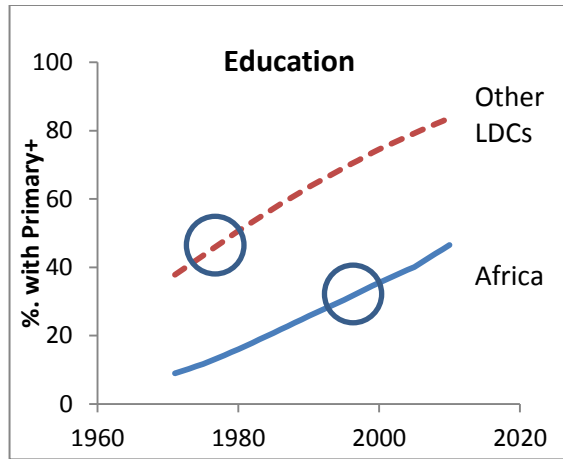


Figure 3

Life expectancy. This indicator had already risen substantially before 1970 as a result of public health interventions in preceding decades. In non-African countries life expectancy continued to rise steadily from 51 in 1960 to 72 in 2010 (Figure 4). Sub-Saharan Africa also experienced further improvements during the 1970s and early 1980s, but progress then stalled due to the massive AIDS epidemic that spread to all corners of the continent. In the most severely affected countries in Southern and Eastern Africa life expectancy actually declined during the 1990s. Africa's average life expectancy did not rise above 50 years until after 2000 when large investments in treatment and prevention programs reduced the AIDS death rate.

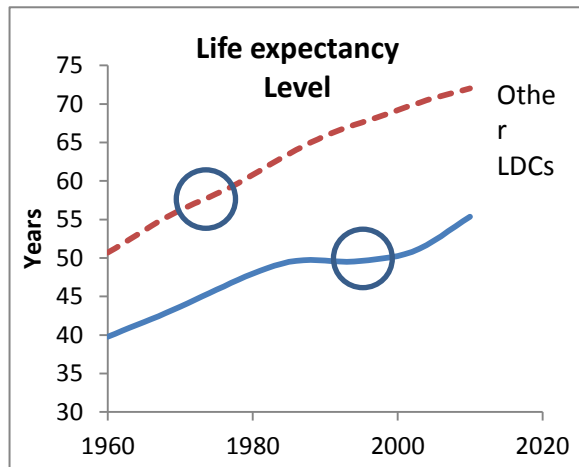


Figure 4

Urbanization. The percent urban has risen since 1970 in all regions of the developing world, but urbanization occurred later in Africa than elsewhere (Figure 5). As a result, the percent urban is higher in the former than in the latter throughout recent decades.

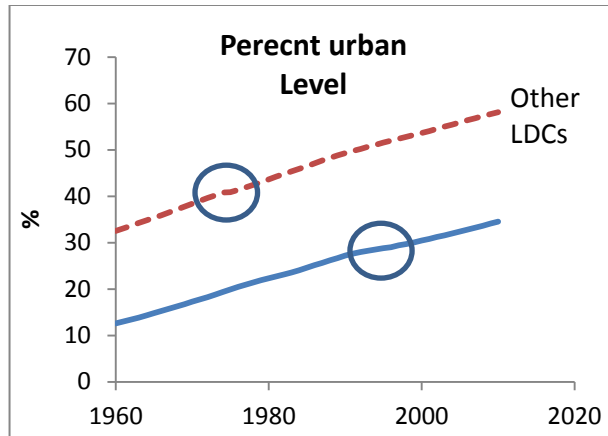


Figure 5

The trends summarized in figures 1-5 are substantially consistent with conventional fertility theory: African fertility has been higher than in other developing countries in the past several decades because its level of development is lower than elsewhere. However, there is also an interesting finding that is not predicted by conventional demographic theory. As indicated by the circles in each of the figures, the levels of the development indicators at the time of transition onset are lower in African than in non-African countries.

Table 1 presents further evidence on this issue. Specifically, it provides estimates of the average level of the four development indicators in the transition onset year. The results confirm that the average values of the socioeconomic indicators at the time of the transition onset are lower in sub-Saharan Africa than in other LDCs.

Table 1: Average TFR and socioeconomic indicators in year of transition onset

	Average at the time of transition onset	
	Sub-Saharan Africa	Other LDCs
TFR decline %	10	10
Year of transition onset	1995	1975
GDP/cap(log)	6.9	7.7
Education (% primary+)	29	42
Life expectancy	52	59
Percent urban	29	40

This unexpected finding is consistent with the analysis of Bongaarts and Watkins (1996) who found that the level of development at the onset of the transition has declined over time among countries. For example, the first transitions in the developing world took place in Hong Kong and Singapore around 1960 when these countries had substantially higher indicators of development than poorer Asian countries had at the time of their transition in the 1970s and 1980s or African countries in the 1990s. Bongaarts and Watkins attribute this effect to the role of diffusion of ideas and social influence at the individual, country and global level.

Pace of change in regional fertility and development

The preceding section examined levels of fertility and socioeconomic indicators over time without commenting on the rate of change in these variables. Since Africa's fertility seems to be declining at a relatively slow pace it is of interest to examine this issue further.

The pace of change in each of the various indicators is calculated as the absolute annual change, i.e. the difference in estimates between one year and the previous year. For the socioeconomic indicators this usually yields a positive pace because these indicators tend to rise over time. However, the TFR tends to decline over time and the annual change is therefore usually negative. To simplify comparisons among indicators, the pace for the TFR is measured as the absolute annual decline, which is usually positive.

The resulting pace estimates are plotted in Figures 6, 7, 8, 9, and 10 which correspond to the absolute levels given in Figures 1, 2, 3, 4, and 5. Each of these figures also includes two circles, the first points to the period in the mid-1970s around the average time of transition onset in non-African countries and the second points to the mid-1990s around the transition onset in sub-Saharan Africa.

Total fertility rate. As expected from the early onset of the transition in non-African countries, the pace of change in the TFR rose sharply in the 1960s and reached a peak of 0.11 births per woman per year in the mid-1970s (Figure 6). The pace remained near 0.1 into the 1990s, before declining sharply in the 2000s. In the future this pace should approach zero as these countries reach the end of their transitions near or below 2 births per women.

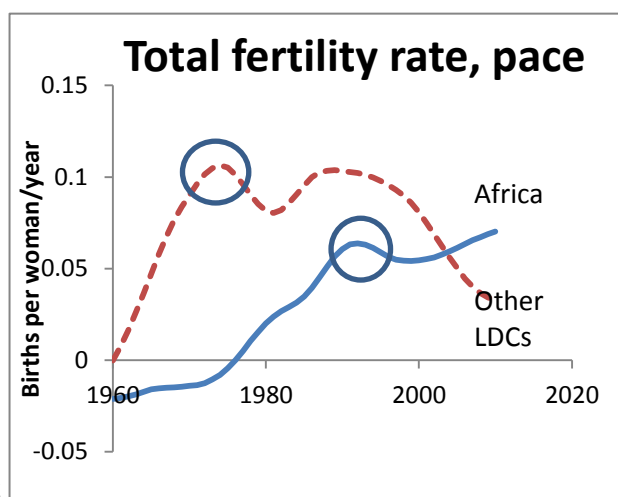


Figure 6

The African pattern is quite different. In the 1960s and part of the seventies the pace was negative reflecting a rising TFR. During the 1980s the pace rose sharply as countries began entering transitions. A peak was reached in the mid-1990s (second circle), but it occurred at a lower level than in non-African countries. During the 1990s and 2000s the average African pace remained around 0.06 which is about 40% lower than the transition pace in non-African countries.

GDP per capita. In the non-African countries the average growth rate of GPP per capita was near 3% per year in the early seventies, followed by period of slower growth in the 1980s and peaks in the early 1990s and 2000s (Figure 7). The African pattern is broadly similar in shape, but is lower with a growth rate of near zero from 1980 to the mid-1990s. After 2000 both regions experienced quite rapid growth.

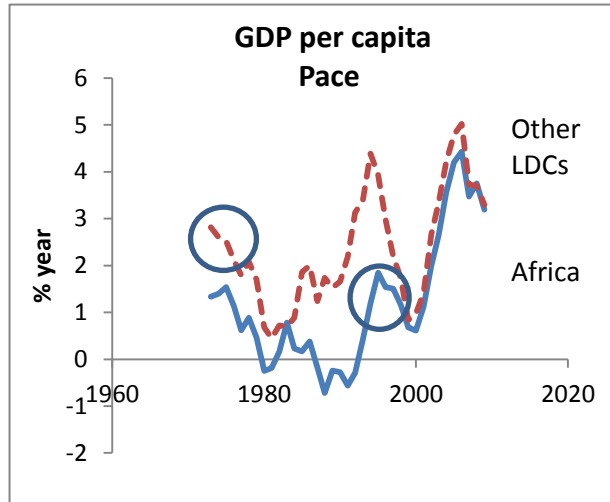


Figure 7

Education. The pace of improvement in the education level peaked in the 1970s in the other LDCs and in the 1990s in Africa (Figure 8). The pace at transition onset is lower in Africa than elsewhere.

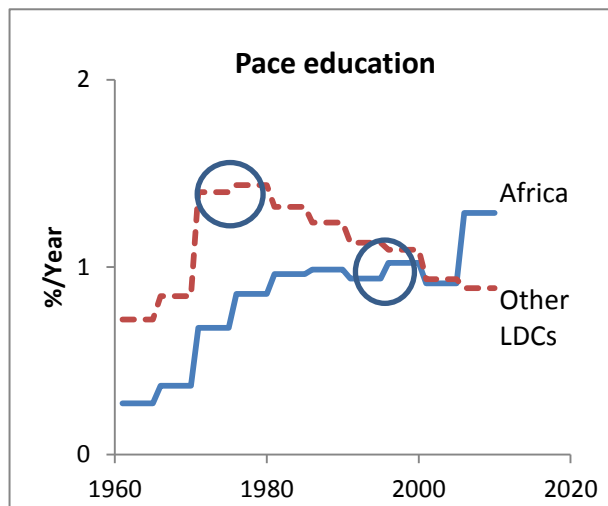


Figure 8

Life expectancy. Both regions experienced a fairly rapid pace of increase in the seventies and early 1980s (although from different absolute levels). But trends then diverged strongly as the AIDS epidemic took hold and African life expectancy dropped for a short period (Figure 9). The recent sharp upswing in life expectancy in Africa is due to the rapid and widespread uptake of

ART treatment, but this rebound has been insufficient to narrow the life expectancy gap between African and non-African countries before 2010.

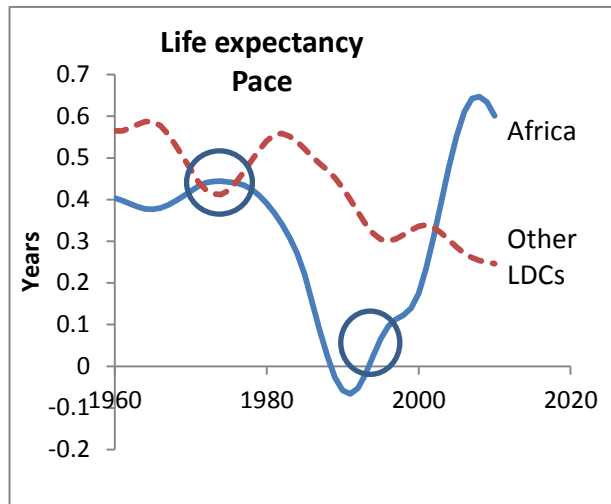


Figure 9

Percent urban. Urbanization has proceeded at a rapid pace throughout the developing world since 1970. The pace declined slightly over time with Africa's pace generally lower than in other LDCs.

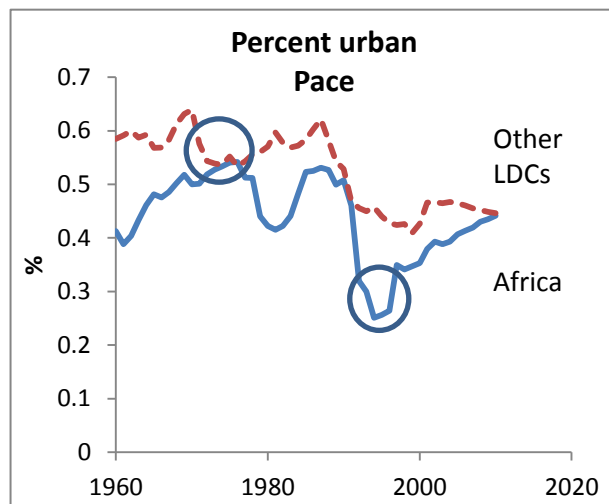


Figure 10

Table 2 presents the average values of the pace of change in the TFR and in the socio-economic in the transition year. These findings lead to two conclusions:

- a) The pace of fertility decline was slower at the time of transition onset in Africa than in the other LDCs

b) The pace of change in the development indicators at the time of the onset was slower in Africa than in the rest of the LDCs.

These results are broadly consistent with classical transition theory which assumes a relationship between development and fertility and hence a correlation between the rate of change in fertility and its determinants. Apparently, the explanation for the relatively slow pace of fertility decline in sub-Saharan Africa during the 1990s lies generally in the continent's slower pace of development during this period.

Table 2: Average pace of TFR and development indicators in the year of transition onset

	Average pace at the time of transition onset	
	Sub-Saharan Africa	Other LDCs
TFR	0.09	0.15
Year	1995	1975
GDP/cap(log)	0.0	0.04
Education (% with prim+)	1.1	2.0
Life expectancy	0.18	0.54
Percent urban	0.31	0.56

3) The “Africa” effect

The preceding analysis of past regional trends found relationships between socioeconomic development and the onset and pace of the transition to be different in Africa than in other LDCs. We now examine the impact of these past differences on fertility in 2010. A key objective is to determine whether there is an “Africa effect”, i.e. whether countries in Africa have a systematically higher fertility than countries in other regions after controlling for socioeconomic development.

Figure 11

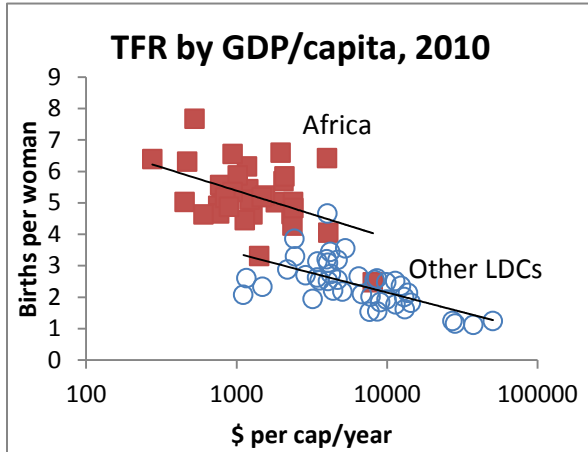


Figure 12

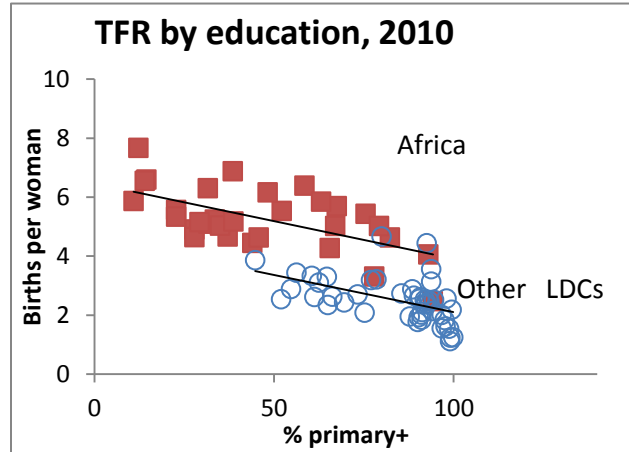


Figure 13

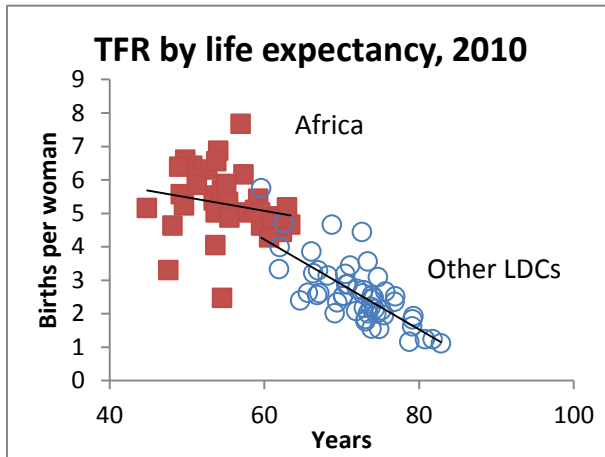
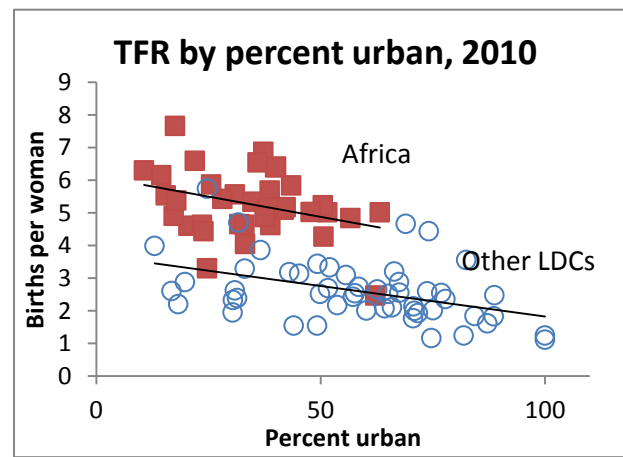


Figure 14



Figures 11 through 14 plot country estimates of TFR by GDP/capita (fig 11), by education (fig 12), by life expectancy (Fig 13) and by percent urban (figure 14) for all available countries in 2010. Each African country is represented with a small solid square marker and each non-African country with an open circle. Regression lines are fitted separately to African and non-African data points in each figure. Several conclusions can be drawn:

-The correlations between fertility and the development indicators are in the expected negative direction. That is fertility tends to be lower the higher the GDP per capita, education level, life expectancy and percent urban.

-The correlations are far from perfect and there is considerable variation around the regression lines

-The cluster of African countries lies largely above the cluster of non-African countries at a given level of development. (The exception is Figure 13 where life expectancy is distorted by the AIDS epidemic). This finding indicates the existence of an “Africa effect.” To confirm this conclusion; a multiple regression is estimated with the TFR as the dependent variable and the four socioeconomic indicators as well as a dummy variable for Africa as the explanatory variables. The results are summarized in the first column of Table 3. The main finding is that the Africa effect is statistically significant at 1.1 births per woman.

Table 3: Results of three OLS regression with TFR, contraceptive prevalence and desired family size as dependent variables.

	TFR	Contraceptive prevalence	Desired Family size
Africa effect	1.1**	-11*	1.2*
GDP/cap	-0.33*	0.83	0.3
Education	-0.019***	0.51***	-2.7***
Life expectancy	-0.03	0.65	-0.04
Percent urban	0.00	-0.15	0.01
R ²	0.84	0.86	0.72
N	71	71	39
Year	2010	2010	Latest DHS

***p<0.01, **p<0.01, *p<0.05

What is the cause of this substantial Africa effect? To investigate this issue two additional multiple regressions were estimated. In the first of these, contraceptive prevalence in 2010 as estimated by the United Nations (2013) is the dependent variable and the explanatory variables are the same as in the TFR regression. The results are presented in the second column of Table 3. The Africa effect is substantial and statistically significant at -11 percent.

In the final regression desired family size is the dependent variable and the same explanatory variables are again used. Estimates of desired family size are taken from the latest available DHS surveys in 42 countries, because there is no other source of desired family size estimates for countries in 2010. The results in the last column of Table 3 again show a substantial and

significant Africa effect on desired family size. This finding is consistent with results from Bongaarts (2011) and Bongaarts and Casterline (2013).

A key finding here is that the Africa effect is approximately the same size for the TFR (1.1) and for the desired family size (1.2). This implies that the Africa effect arises in the link between socioeconomic indicators and desired family size rather than between desired family size and fertility.

Conclusion

This study uncovered both expected and unexpected patterns in the fertility transitions of African populations. The results can be summarized concisely: The African transition is later, earlier, slower and higher than the earlier transitions in other regions of the developing world.

Later. The onset of the transition in Africa occurred on average in the mid-1990s, about two decades later than in non-African countries. This delay is more or less in accord with conventional theory which predicts that transitions take place later in time in countries where socioeconomic development is delayed.

Earlier. The level of development at time of onset of the African fertility transition was lower than at the onsets in other LDCs. In other words, the African transitions occurred earlier than they would have occurred if Africa had followed the non-African relationship between fertility and development. This finding is expected from diffusion theory.

Slower. The pace of fertility decline at the time of the African transition onset was slower than the comparable pace at the onset of non-African transitions. At the same time the pace of improvement in development indicators at time of the African onset was also slower. This finding is therefore largely in accord with conventional demographic theory.

Higher. At a given level of development Africa's fertility is higher, contraceptive use is lower and desired family size is higher than in non-African countries. While the higher preferences can explain the lower prevalence of contraception and the higher fertility, the reasons for the relatively high preferences lie in traditional pro-natalist social, economic and cultural practices as discussed by Caldwell (1992).

The slow pace of the African transition and the occasional stalling of fertility declines can therefore be attributed to several factors. First, the pace of African development has been slow and other things being equal this alone would lead to slower transitions. Second, the pro-natalist nature of African societies implies a resistance to fertility decline that does not exist or is weaker in non-African countries. Finally, although the role of family planning programs in Africa has not been examined in this chapter, the fact that these programs remain weak in many African countries undoubtedly contributes to slow transitions in much of the continent (see further discussion in other contributions to this volume). The AIDS epidemic may have been partly responsible for diverting resources and policy attention from other health issues, including family planning (Schiffman 2008). But this is clearly a missed opportunity because in the few countries where governments have made family planning programs a priority (e.g. in Rwanda

and Ethiopia) rapid uptake of contraception and fertility decline followed (Olson and Piller 2013, Westoff 2013).

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Endnotes

ⁱ A discussion of alternative ways to measure the transition onset is provided in the next chapter in this volume by Gerland et al.

ⁱⁱ The last transitions onsets occurred in Mali and Niger in 2011. These are included in analyses of the determinants of the onset by extrapolating trends up to 2010 for socioeconomic indicators that are not available after 2010

ⁱⁱⁱ The average year of onset is 1977 for Asia and 1972 for Latin America

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