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John Bongaarts

Population Council, United States of America

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NOTE

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PREFACE

The Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat organized an Expert Group Meeting on "Fertility, Changing Population Trends and Development: Challenges and Opportunities for the Future" at the United Nations Headquarters in New York on 21 and 22 October 2013. The meeting was convened to inform substantive preparations for the forty-seventh session of the Commission on Population and Development in April 2014. In light of the twentieth anniversary of the 1994 International Conference on Population and Development (ICPD), the Commission's theme for 2014 is an "Assessment of the status of implementation of the Programme of Action of the International Conference on Population and Development".

The meeting brought together experts from different regions of the world to address key questions about the future pace of fertility change, implications for age structure changes and other population trends and effective policy responses. A selection of the papers prepared by experts participating in the meeting is being issued under the Expert Paper Series published on the website of the Population Division (www.unpopulation.org).

This paper examines whether the pattern of fertility decline in sub-Saharan Africa is exceptional in comparison with that experienced in developing countries in other regions, especially Asia and Latin America. Compared to the other regions, populations in sub-Saharan Africa have slightly higher pre-transitional fertility levels, a much later onset of the transition and a slower pace of fertility decline. Further, fertility declines in sub-Saharan Africa begin at lower levels of development (measured by indicators of child survival, women's education and GDP per capita) than in other regions. The paper suggests that policies to encourage a more rapid fertility transition should focus on increasing female education and investing in family planning programmes. The findings also suggest that greater weight needs to be placed on the exceptional pattern of fertility decline in sub-Saharan Africa when making fertility projections for countries in the region.

The Expert Paper series aims at providing access to government officials, the research community, non-governmental organizations, international organizations and the general public to overviews by experts on key demographic issues. The papers included in the series will mainly be those presented at Expert Group Meetings organized by the Population Division on the different areas of its competence, including fertility, mortality, migration, urbanization and population distribution, population estimates and projections, population and development, and population policy.

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A. INTRODUCTION

Over the past half century a revolution in reproductive behaviour has swept through the developing world. Between 1960-1965 and the 2005-2010 the total fertility of the developing world as a whole declined by an estimated 56 per cent--from 6.1 to 2.7 births per woman (United Nations, 2013). Declines have been especially rapid in Asia and Latin America over this period (both 61 per cent), but in sub-Saharan Africa the fertility transition occurred later and is proceeding at a slower pace (19 per cent).

These remarkable trends have been extensively documented and the empirical record is not in dispute. The causes of these trends, however, continue to be the subject of debate. Conventional demographic transition theory argues that social and economic modernization is the main driver of fertility decline (Davis, 1945; Notestein 1945, 1953). In traditional rural, agricultural societies, fertility is considered necessarily high to offset high mortality and ensure population survival. As a society modernizes, economic and social changes such as industrialization, urbanization, new occupational structure, and increased formal education first lead to a decline in mortality, and subsequently also to a decline in fertility. The rising costs of children (e.g., for education) and their declining economic value (e.g., for labour and old-age security) result in a decline in desired family size. This in turn leads to a rise in the demand for and adoption of birth control. This framework has been the basis for various subsequent elaborations by economists, sociologists, and demographers (e.g. Easterlin, 1978; Caldwell, 1982).

While this conventional transition theory is still widely accepted (Bryant, 2007), empirical tests using historical and contemporary data have found it only weakly predictive of observed fertility trends. This is particularly true for the massive study of province-level data from European countries for the period 1870 to 1960 (Coale and Watkins, 1986; Knodel and van de Walle, 1979; Watkins 1986, 1987). Similarly, results from numerous fertility surveys of women 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). Although most traditional societies do have high fertility when compared to modern industrial societies, the transition itself is poorly predicted by customary development indicators (Bongaarts and Watkins, 1996). These unexpected findings led to a revision of thinking about the determinants of fertility and especially to theories about the roles of diffusion of ideas, ideational change and social interaction (Bongaarts and Watkins, 1996; Casterline 2001a, 2001b; Cleland and Wilson, 1987; Cleland, 2001).

In addition to the ongoing debate about determinants of fertility, there is the long standing question whether sub-Saharan Africa is more resistant to fertility change than other regions in the developing world. Caldwell (1992) summarized the issue as follows:

> "The failure of sub-Saharan Africa's fertility to decline until now led to spirited controversy about the reasons for this situation (Boserup, 1985; Frank and McNicoll, 1987; World Bank, 1986, 1989; Caldwell and Caldwell, 1987a, 1987b, 1988, 1990; Cochrane and Farid, 1989; Lesthaeghe, 1989). In the spectrum of views, the World Bank has tended toward the opinion that the region is more underdeveloped even than South Asia and that the time lag in the onset of transition needs little further explanation. The main supports for high African fertility that others identified can be summarized under four headings. (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

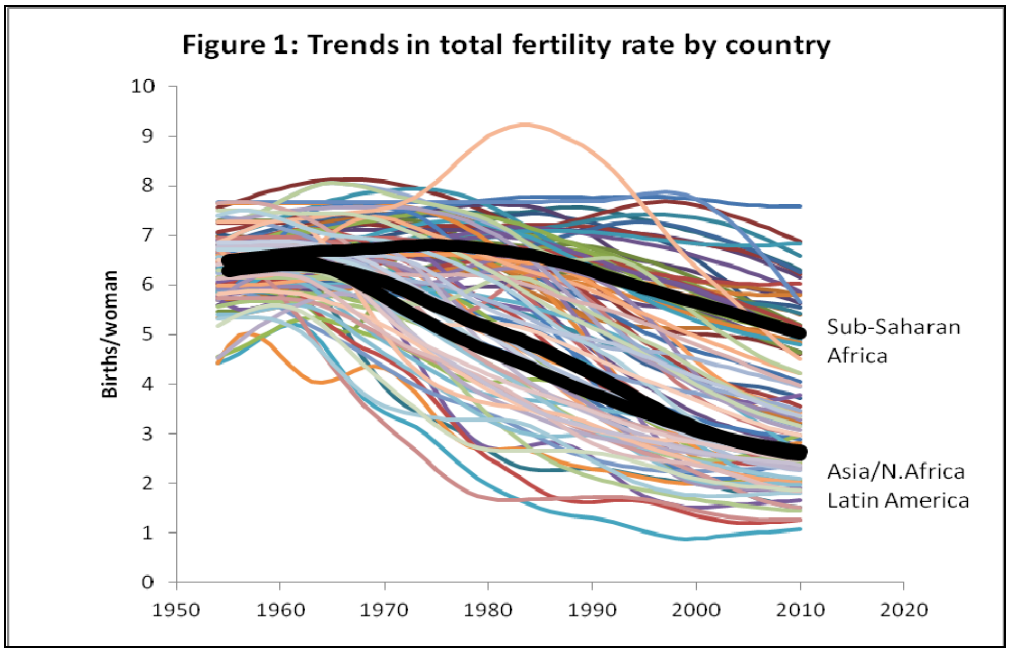
and bureaucrats believed that there was little demand for fertility control and did not want to be weakened by association with failure and with the promotion of institutions regarded as foreign or as incompatible with African culture."(pp.213-214)

In the two decades following the publication of this article in 1992, fertility declines have become widespread in Africa, but fertility remains higher than elsewhere. 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, 2008; Bongaarts and Casterline, 2013). This raises the question as to whether, how and why Africa's fertility transitions are exceptional.

The objective of this paper is to examine the fertility transition patterns in the developing world and identify differences between transitions in sub-Saharan Africa and other regions of the developing world. The concluding section will briefly comment on policy options.

B. PATTERNS OF FERTILITY DECLINE

The analysis below focuses on fertility trends in developing countries (as defined by the United Nations). The main source of data is the United Nations Population Division which provides estimates of demographic indicators for all developing countries for the past half century (United Nations, 2013). For present purposes, a small number of countries have been excluded from the total available: 1) countries that already had entered the fertility transition before 1950,[1] 2) countries with a population of less than one million[2] and 3) the richest oil-producing countries.[3] These exclusions leave a total of 99 developing countries, of which 42 are in sub-Saharan Africa, 38 in Asia/North Africa and 19 in Latin America.



The total fertility (TF) trends from 1955 to 2010 for these 99 countries are plotted in figure 1.[4] Each thin line represents one country and the thick black lines represent the unweighted averages of countries within the three major regions. The general trend is downward despite widely varying trajectories in individual countries. In 1955 the TF averages for the regions are virtually the same at about 6.5 children per woman. In Asia/North Africa and Latin America fertility remained nearly constant during the decade 1955-1965 before the fertility transition started in the late 1960s and early 1970s. Sharp fertility declines in subsequent decades left the TF at 2.6 in both regions in 2010. In contrast, fertility in sub-Saharan

Africa rose slightly during the 1960s and 1970s, before beginning a slow decline. By 2010 the region's total fertility stood at 5, about double the level elsewhere in the developing world.

Although each country has a unique fertility trajectory, fertility transitions share similarities. Countries typically have high and relatively stable fertility during the pre-transitional period which comprises most of human history. Once the transition starts, the pace of fertility decline in the first one or two decades following the onset is usually faster than in later decades. The transition ends around or below the replacement level. In any given country, today's level of fertility is therefore a function of 1) the pre-transitional level of fertility, 2) the timing of the onset of the fertility transition, and 3) the pace of fertility during the transition. Each of these factors will now be examined in more detail.

1. *Pre-transitional fertility*

All 99 countries were pre-transitional in 1955, and the 1955 TF level can therefore be considered a measure of pre-transitional fertility. The first row in table 1 presents regional estimates of the 1955 TF. Differences between the three regions are very minor: 6.3 in Asia/North Africa to 6.5 in sub-Saharan Africa and Latin America.

An alternative measure of pre-transitional fertility is the maximum TF observed in any year between 1955 and 2010. These estimates are provided in the second row of table 1. This measure is slightly higher than the 1955 TF. Possible reasons for the difference are that the TF has risen in some countries after 1955 (e.g., due to declines in breastfeeding, post partum abstinence or sterility due to STIs) or that the 1955 TF in some countries was slightly and temporarily depressed due to economic recession, war or other major disturbing events. The findings in table 1 indicate only minor differences in pre-transitional fertility among regions. Sub-Saharan Africa has the highest maximum TF but the differences from the other region are modest.

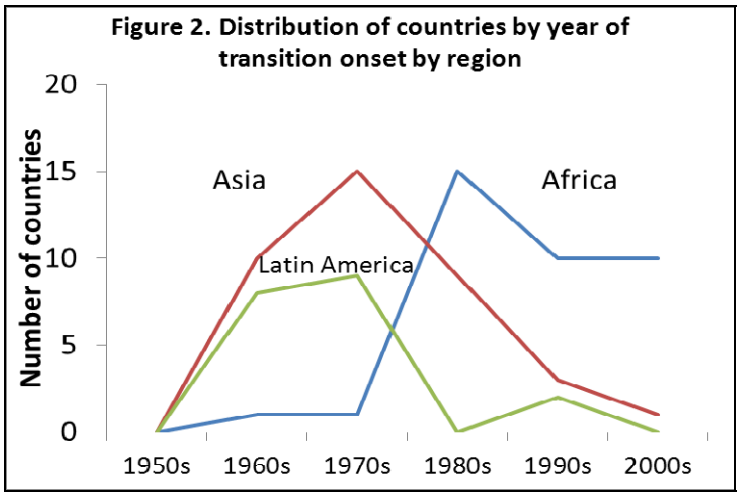
TABLE 1: ALTERNATIVE ESTIMATES OF PRE-TRANSITIONAL FERTILITY BY REGION

	Sub-Saharan Africa	*Asia/ North Africa*	*Latin America*
TF in 1955	6.5	6.3	6.5
Maximum TF 1955-2010	7.1	6.7	6.6
Number of countries	42	38	19

2. *Onset of the transition*

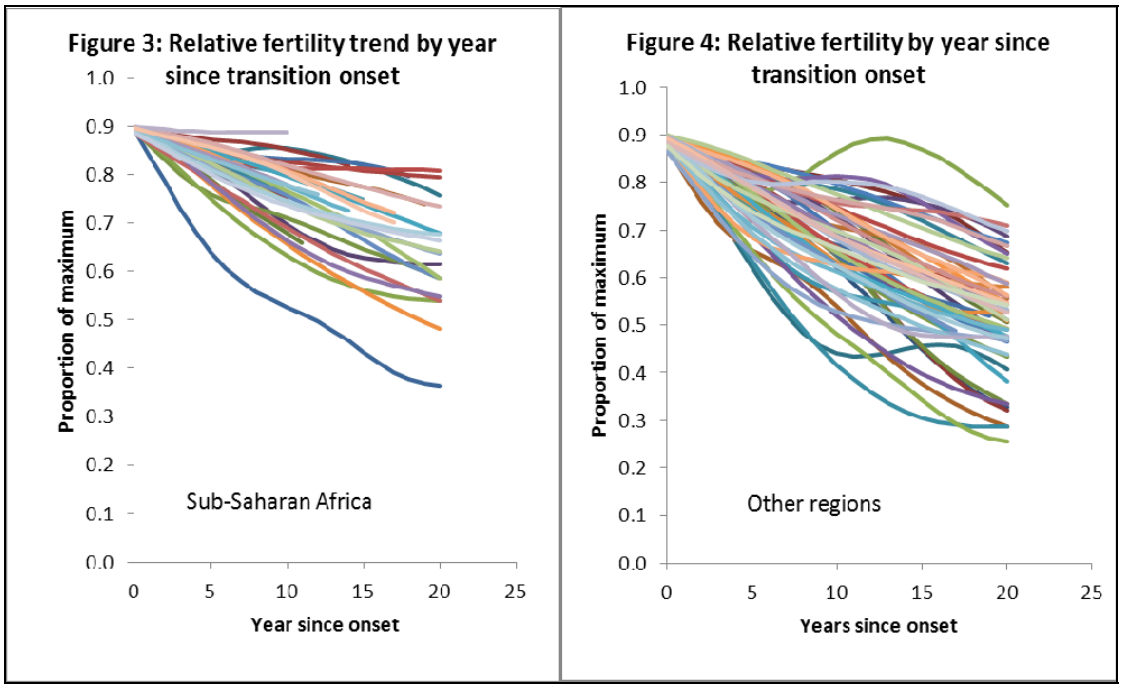
The relatively stable pre-transitional period ends with the onset of the transition as indicated by a substantial decline in fertility.[5] The timing of this onset is conventionally defined as the first year in which the population reaches a 10 per cent decline in fertility from a preceding maximum (Coale and Treadway, 1986) and this practice is adopted here as well. Among the 99 countries the onset years range from 1960 in Singapore to 2010 in Chad. Three countries were still pre-transitional by 2010 (Gambia, Mali and Niger).

Figure 2 plots the distribution of countries by year of onset for each of the three regions. The average onset year is 1976 for Asia/North Africa and 1972 for Latin America. In contrast, the average year of onset in sub-Saharan Africa is 1993. This is a slight underestimate because three African countries have not yet reached their onset year. Despite the slight downward bias in the estimate for sub-Saharan Africa, it is clear that the transition onset in this continent has occurred about two decades later than in the rest of the developing world.



3. *Pace of fertility decline*

Figures 3 and 4 plot the fertility trends for the 20 years after the year of onset. The vertical axis measures the relative fertility level as a percentage of the recent maximum TF level. The plotted lines start at 90 per cent, the level which is defined as the onset of the transition. Since Asia/North Africa and Latin America show very little differences in their fertility transitions, these two regions are combined in these and subsequent figures and tables.



Once the onset year has passed, fertility declines fairly rapidly in most countries. The exceptions are rare cases in which fertility bounces back temporarily; this is typically due to the impact of disruptions caused by war or famine (e.g., in Cambodia and North Korea). Table 2 presents the average fertility decline (measured as per cent change from the recent maximum) at 10 and 20 years following the onset year. In the first and second decade, sub-Saharan African fertility declined by 26 per cent and 37 per cent, respectively. In contrast, the fertility declines in other regions were more rapid: 32 per cent by year 10 and

49 per cent by year 20. The difference in the pace of decline between sub Saharan Africa and the other regions is statistically significant ($p<0.01$) (this result comes from two OLS regressions in which the declines in years 10 and 20 are the dependent variables and a dummy variable for sub-Saharan Africa is the independent variable, data not shown). Note that the pace of decline is more rapid in the first than in the second decade after onset.

TABLE 2: AVERAGE PER CENT DECLINE IN FERTILITY FROM MAXIMUM BY YEAR SINCE TRANSITION ONSET

	Year since onset of transition		
	0	10	20
Sub-Saharan Africa	10	26	37
Other regions	10	31	48

Note: Includes only countries observed for 20 years after onset

C. SOCIOECONOMIC DETERMINANTS OF FERTILITY DECLINE

The preceding analyses established that fertility transition patterns in sub-Saharan Africa differ significantly from those in other regions in the developing world. Compared to the other regions, populations in sub-Saharan Africa have slightly higher pre-transitional levels, a much later onset of the transition and a slower pace of decline. The question addressed next is why these regional differences exist.

As noted, conventional transition theory predicts that fertility levels are inversely related to socioeconomic development indicators. To asses this effect, three time series of indicators will be used:

- Probability of a newborn surviving to age 5 (United Nations, 2013)
- Years of schooling among women aged 25 to 35 (Gakidou et al., 2010)
- GDP per capita, PPP 2005 $US (Heston et al., 2012)

Simple bivariate regressions confirm that each of these three indicators has a strong and highly significant inverse effect on fertility in any given year.

A multivariate regression is estimated to assess whether sub-Saharan African countries respond differently to development than other regions. In this regression the TF in 2010 is the dependent variable and the three development indicators are the explanatory variables. In addition, a dummy variable for countries in sub-Saharan Africa is included to determine whether the fertility of countries in this region differs significantly from those of populations in other regions after controlling for development indicators.

Table 3 presents the results. The effects of the socioeconomic indicators are all in the expected direction, i.e., higher survival, more schooling and higher incomes are associated with lower fertility and these effects are statistically significant. A key finding from this regression is that a sub-Saharan Africa effect exists and equals a statistically significant 0.53 births per woman.

TABLE 3. RESULTS FROM OLS REGRESSION ANALYSIS OF THE EFFECTS OF SOCIOECONOMIC VARIABLES ON THE TOTAL FERTILITY IN 2010

Variable	*Effect*	*(SE)*	*p-value*
Child survival (%)	-0.149	(0.033)	0.000
Schooling (years)	-0.0857	(0.0295)	0.005
GDP per capita (PPP US$)	-0.287	(0.0969)	0.004
Sub-Saharan Africa	0.529	(0.229)	0.024
Intercept	20.2	(2.88)	0.000
No. of obs.	94		
R^2	0.84		

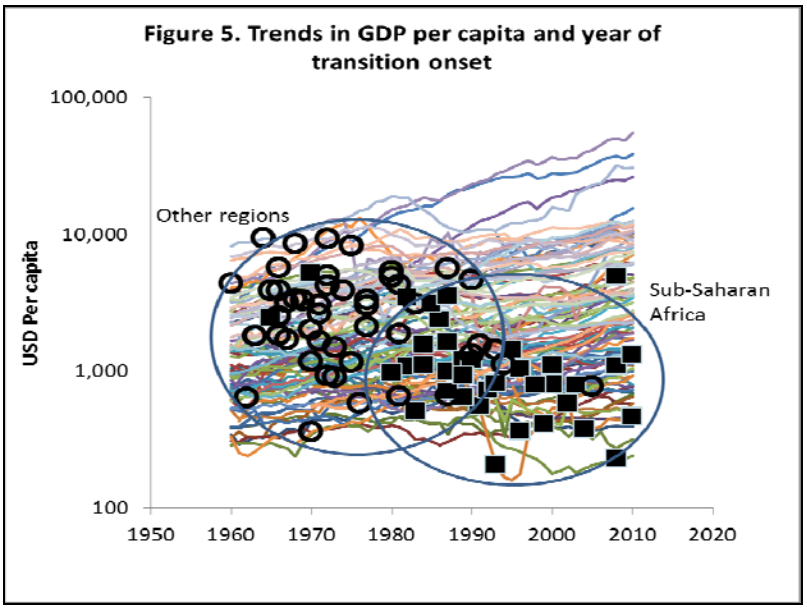
1. *Pre-transitional fertility*

To determine the effects of socioeconomic variables on pre-transitional fertility in the year of its maximum, a regression is estimated in which the maximum post-1955 fertility is the dependent variable and years of schooling, GDP per capita, child survival and a dummy variable for sub-Saharan Africa are the explanatory variables.[6] The results indicate that the dummy for sub-Saharan Africa is the only statistically significant variable. Pre-transitional fertility is an estimated 0.32 births per woman higher in sub-Saharan Africa than in other regions.

2. *Onset of the transition*

As noted, the onset of the fertility transition occurred later in sub-Saharan Africa than in other regions. According to conventional demographic theory, the trajectory of fertility in a country is determined by the trajectory of socioeconomic development; early development results in an early fertility transition and late development in a late transition. If this association holds exactly then levels of socioeconomic development should be more or less the same in all countries at the time of transition onset, regardless of when the onset occurs.

Figure 5 examines this proposition. The figure's multiple thin lines plot trends for the GDP per capita for all countries. As expected, GDP per capita rises in most years in most countries. Before 1960 all these countries were pre-transitional, but over time, as development proceeds, country after country enters the transition. The transition onset years are indicated with markers (black squares for sub-Saharan Africa and the open circles for other regions. Two key findings emerge from this figure: 1) the GDP per capita in the onset year varies very widely among countries; 2) The later the onset occurs, the lower the GDP per capita in the onset year.



Similar results hold for the effects of child survival and years of schooling on the onset. The decline over time in the level of these development indicators at the time of onset is of particular interest and is further explored with bivariate regressions in which the year of onset is the dependent variable and one of the development indicators in the year of transition onset is the independent variable. The results are summarized in table 4. The coefficients for the development measures are all significantly negative which means that the later onsets are associated with lower levels of per cent survival to age five, years of schooling and the GDP per capita in the year of the onset of the transition. These regressions were repeated with a dummy variable for sub-Saharan Africa. The dummies were statistically significant and the effects of development indicators were all smaller (years of schooling and GDP per capita remained statistically significant).

TABLE 4. RESULTS FROM BIVARIATE OLS REGRESSIONS OF THE EFFECTS OF SOCIOECONOMIC VARIABLES ON THE YEAR OF TRANSITION ONSET

Variable	*Effect*	*(SE)*	*p-value*
Child survival (%)	-0.77	(0.26)	0.003
Schooling (years)	-1.80	(0.87)	0.043
GDP per capita (log)	-18.12	(3.12)	0.000

These findings imply that the development indicators at the time of the (relatively late) transition onsets in sub-Saharan countries are lower than at the onsets in the other regions. Table 5 presents the average values of development indicators at the time of transition onset. Differences between regions are in the expected direction and are statistically significant except for per cent survival to age five.

TABLE 5: AVERAGES FOR YEAR OF TRANSITION ONSET AND SOCIOECONOMIC INDICATORS AT ONSET (N=85)

	Average in year of transition onset			
	Onset year	*Per cent survival to age 5*	*Years of schooling women aged 25 to 35*	*GDP per capita US$*
Sub-Saharan Africa	1992	84.5	3.0	1359
Other regions	1975	87.7	3.4	3119

3. *Pace of fertility decline*

A full analysis of the pace of fertility decline throughout the transition would require the observation of all countries for several decades. Unfortunately this is not possible because many countries, especially in sub-Saharan Africa, had a fairly recent transition onset, and their decline trajectory has therefore only been observed for a relatively short time. To maximise the number of countries that can be included, the following assessment of the levels and differences in the pace is restricted to the first decade after the transition onset.

Table 6 presents the average changes in the TF and in the three socioeconomic indicators during the first decade of the transition. The declines in the TF and the increases in the socioeconomic indicators are substantial but the changes are smaller in sub-Saharan Africa than elsewhere. That is, both development progress and the fertility transition are slower in Africa than in the other regions. The difference between sub-Saharan Africa and the other regions is statistically significant for the changes in TF and GDP per capita ($p<0.05$), weakly significant for change in years of schooling ($p=0.056$) and not significant for the change in childsurvival.[7]

TABLE 6: CHANGE IN TF AND SOCIOECONOMIC INDICATORS DURING FIRST DECADE OF TRANSITION

	Change during first decade of transition			
	TF	*Child survival*	*Years schooling*	*GDP per capita US$*
Sub-Saharan Africa	-0.96	2.9	1.2	149
Other regions	-1.47	3.8	1.6	513

Are these results consistent with conventional transition theory? If that theory holds one would expect a decline in the TF to be more or less proportional to the rise in development indicators. A region or country with little improvement in development would have little fertility decline and vice versa. As shown in table 6, improvements in development indicators in sub-Saharan Africa during the first decade of transition are smaller than in the other regions and so is the decline in the TF.

Simple bivariate regressions using country data show that the TF decline is inversely correlated with increases in survival, years of schooling and GDP per capita (data not shown). However, these effects are only statistically significant for years of schooling. Similar results hold with the addition of a dummy variable for sub-Saharan Africa (which is statistically significant) to these bivariate regressions (data not shown). Apparently trends in development are only weak predictors of the pace of decline during the first decade of the transition.

One interesting result that is not predicted by conventional theory is the positive effect of the level of development (not the trend) at the onset on the pace of fertility decline during the first decade of the transition. That is, the longer a country delays the transition (relative to its development), the higher the level of development at onset and the faster the initial transition. The effects are statistically significant for the three development indicators (see table 7).

TABLE 7. RESULTS FROM BIVARIATE OLS REGRESSIONS OF THE EFFECTS OF LEVEL OF SOCIOECONOMIC VARIABLES AT ONSET ON THE CHANGE IN THE TF IN THE FIRST DECADE OF THE TRANSITION.

Variable	*Effect*	*(SE)*	*p-value*
Child survival (%)	-0.086	(0.014)	0.000
Schooling (years)	-0.072	(0.032)	0.029
GDP per capita (log)	-0.605	(0.180)	0.003

The addition of a dummy variable for sub-Saharan Africa reduces the effects of socio-economic variables, and they remain only significant for child survival (and weakly significant for schooling with p=0.078). These results are not straightforward to interpret because of co-linearity between the dummy for sub-Saharan Africa and the development indicators.

D. DISCUSSION

The preceding analysis examined the empirical record of trends in fertility and indicators of social and economic development for 99 developing countries between 1955 and 2010. While social and economic development clearly play an important role, a number of findings deviate from what would be expected if fertility and development were closely linked as assumed in conventional demographic transition theory:

1) Fertility before the onset of the transition is relatively stable and sometimes even increases. These trends occur even though development indicators are often rising substantially.
2) The onset of the transition occurs at widely varying levels of development.
3) The threshold of development at the onset of the transition has declined over time
4) The pace of fertility decline is more rapid in the first decade of the transition than in later years and the pace is faster the higher the level of development at the time of onset.

The first finding is well established and is the consequence of an absence of deliberate use of birth control before the transition onset when demand for births exceeds the supply (Easterlin, 1978). The remaining findings are consistent with those of Bongaarts and Watkins (1996), who undertook a similar but more in depth analysis of fertility patterns in developing countries up to 1990. They also provide a detailed discussion and potential explanations. Their main conclusion builds on earlier research on the diffusion of ideas:

> "Our theoretical framework follows Notestein and those of his successors who consider socioeconomic conditions to be the principal underlying force that brings about the initial fertility transitions. We agree that development is potent: it changes the costs and benefits of children and hence the demand for them. In addition, it multiplies the channels of social interaction, such that all countries and, we believe, most individuals participate in exchanges through local, national, and international channels about the advantages and disadvantages of fewer children or techniques of modern contraception. We conclude, however, that development alone is insufficient to account for observed variations in the timing of the onset of transitions or in variations· in their pace and that social interaction should be taken into account. Before the transition onset, social interaction can inhibit fertility change. But once innovative fertility behavior has been adopted by a group of individuals within a community, by a community within a country, or by a few countries within a region, social interaction can become a powerful force that accelerates the pace of transition" (Bongaarts and Watkins, 1996, pp. 668-669)

The comparison of countries in sub-Saharan African with those in other regions found several significant differences. First, pre-transitional fertility was modestly higher in sub-Saharan Africa. This effect is the result of differences in the proximate determinants of natural fertility (e.g., marriage patterns) which will not be examined here. The second and most important difference is that sub-Saharan Africa entered the transition later in time. This is to be expected from its lower levels of development. Interestingly, once level of development is taken into account, countries in sub-Saharan Africa enter the transition earlier than would be expected. That is, the level of development at the onset is lower in sub-Saharan Africa than elsewhere. Third, once the transition is underway the pace of decline is slower than

in other regions. This slower pace is consistent with conventional thinking because the pace of development was also slower in sub-Saharan Africa than elsewhere. In other words, the level of development in sub-Saharan Africa is lower at the time of the onset and this apparently has a separate inhibiting effect on the pace of early decline.

In sum, the evidence examined here shows that the pattern of fertility decline in sub-Saharan Africa is indeed exceptional. The identification of the precise reasons for this exceptionalism is beyond the scope of this paper. However, the four factors mentioned by Caldwell 1992 (see excerpt in the introduction) seem plausible candidates. In addition, the relatively slow level of development in the region implies that the cost of raising children has remained low compared to other developing regions and the benefits of having offspring remain substantial in the subsistence economies which characterizes the majority of sub-Saharan African countries. The drivers of diffusion processes such as the public media and urbanization have also less influential than in other regions.

The differences in fertility transitions between sub-Saharan Africa and other regions have implications for the construction of population projections. These projections require assumptions about future trajectories of fertility. To make such assumptions it is standard practice to examine historical fertility trajectories in other developing countries that have already moved through much or all of the transition. Unfortunately, contemporary late or post-transitional countries are largely confined to Asia and Latin America because the fertility transitions in sub-Saharan Africa started much later and are still incomplete. Fertility projections based on the experiences of countries in Asia and Latin America would be acceptable only if transitions in sub-Saharan Africa will follow trajectories similar to those of other regions. However, the evidence examined here suggests that this may not be the case. This implies that population projections for sub-Saharan Africa might be improved by giving more weight to the African experience in making fertility projections for this continent.

E. POLICY IMPLICATIONS

These findings suggest that the future pace of fertility decline in sub-Saharan Africa will likely be slower than the pace in other regions at comparable times from the transition onset, unless special interventions are undertaken.

The conventional approach to accelerating the fertility transition is to invest in development, which, over time, will bring about a decline in the desired family size and in fertility. In particular, investments in schooling of girls (an MDG goal) are considered a top priority because education has many benefits for the future lives of girls as well as for their communities (Levine et.al., 2008; World Bank, 2008; UNICEF, 2004). In addition, there is a strong inverse correlation between level of education and the fertility of women (Caldwell, 1980; Jejeebhoy, 1995; Sen, 1999). It is important to note that a large increase in GDP per capita is not a prerequisite for fertility decline. This is evident in the very low fertility has been achieved in some very poor societies such as Sri Lanka and the state of Kerala in India. Although poor, these populations have high levels of literacy and female empowerment as well as low infant mortality and ready access to methods of family planning. The only drawback of investments in education is that they take time to have an effect on fertility because of the delay between the age at schooling and the childbearing years.

Fortunately, there is an additional policy option to accelerate fertility decline: invest in family planning programmes. These programmes provide information about and access to contraception in order to permit women and men to take control of their reproductive lives and avoid unplanned pregnancies. In the developing world, 134 million married or in-union women who do not want to get pregnant are not using contraception (Alkema et al., 2013). The key cause of an unmet need for contraception is that contraception is often costly to individuals in terms of the commodities (pills, condoms, IUDs, etc.),

transportation, and reimbursement of providers of contraceptives and health care services; this is the case even when subsidies are provided by the Government. In addition, there are significant non-economic costs such as health concerns, social disapproval, and spousal resistance, as well as unnecessary medical barriers (e.g., requiring a doctor instead of a nurse or other trained health care worker to provide certain contraceptives (Casterline and Sinding, 2000). This unmet need is responsible for most of the 80 million unplanned pregnancies that occur each year. About half of these pregnancies end in abortion and the other half end in births; both contribute unnecessarily to health risks for mothers and children, to the cost of raising families, and to the adverse impact of rapid population growth (Singh, 2013).

Past successes of family planning programmes have been well documented (Bongaarts et al., 2013). For example, over the past few decades Bangladesh has implemented a highly effective voluntary family planning programme. A unique feature of the programme is its staff of female outreach workers who advise women and distribute supplies at their doorstep, thus overcoming social barriers such as those posed by purdah (Simmons et al., 1988). In addition, the Government implemented a nationwide information and education campaign. This programme, together with improvements in education and child survival, have led to the near completion of the fertility transition in this very poor country with the total fertility reaching 2.3 births per women in 2011 (NIPORT et al., 2013).

The potential role of such programmes in sub-Saharan Africa is demonstrated by the recent experience of Rwanda and Ethiopia. In the mid-2000s the Rwandan Government made a strong commitment to family planning and, with support from international donors, sharply increased access to contraceptive methods throughout the country (Solo, 2008; USAID, 2009, Murunga et.al., 2013; Westoff, 2013). Government officials spoke out about the need to reduce fertility. In response, reproductive behaviour changed quickly: between 2005 and 2010 total fertility dropped from 6.1 to 4.6, and the use of modern methods of contraception among married women rose from 10 per cent to 45 per cent (National Institute of Statistics of Rwanda, 2011). Ethiopia has a broadly similar experience: after making contraceptive services available through much of the country, contraceptive use rose from 8 per cent to 29 per cent among married women between 2000 and 2011 (UNFPA, 2012). These family planning programmes were accompanied by information and education campaigns through radio, TV and other media which contributed to a higher demand for contraception and a lower desired family size by diffusing new ideas about the benefits of smaller families and the role of women (Bongaarts, 2011). Clearly, the obstacles to adoption of contraception that existed in Rwanda and Ethiopia were reduced quite quickly by family planning programmes. There is little doubt that such programmes can also be effective in other countries in sub-Saharan Africa, but their implementation requires political commitment, which is often lacking.

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NOTES

[1] Any country in which the TF never reached five births per woman in any year between 1950 and 2010 was considered to have experienced the transition onset before 1950.

[2] Developing countries with less than a million population were excluded because estimates of demographic trends are usually less reliable than in larger countries. This exclusion also makes the unweighted averages of fertility trends more representative.

[3] Gabon, Kuwait, Libya, Oman, Saudi Arabia, and the United Arab Republics were excluded because their high GDP/cap levels from oil resources are atypical for the other developing countries.

[4] The United Nations estimates from 1950 to 1955 are excluded because the yearly data for a number of countries fluctuate considerably. This may be the due to residual effects of World War II or to the interpolation procedure used to estimate single year data from five year averages.

[5] In a few countries fertility fluctuates before the onset of the transition. This fluctuation implies that there is more than one local maximum before the year of onset. The 10 per cent decline to establish the transition onset is measured from the most recent maximum, provided this maximum is less than 10 per cent below any earlier maximum.

[6] A similar regression with the TF in 1955 as the dependent variable could not be calculated because estimates of socioeconomic variables in 1955 were lacking for many countries.

[7] These results are based on four bi-variate OLS regressions in which the TF and the three socio-economic variables are the dependent variables and a dummy variable for Africa is the only independent variable.