Socioeconomic Progress and Fertility Transition in the Developing World: Evidence from the Demographic and Health Surveys*

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Introduction

This paper examines fertility decline in the developing world, using data from the Demographic and Health Surveys (DHS). The first substantive part of the paper reviews DHS data on fertility at the national level and also separately for rural and urban places, to assess the current situation of fertility transition as we come to the end of the first decade of the 21st century. We categorize countries as to whether their recent fertility experience reflects decline or stalling of fertility, and in the latter case distinguish between early-transition stalling and mid-transition stalling.

The second substantive section of the paper examines the linkages between fertility decline and stalling, on the one hand, and changes in contraceptive use and socioeconomic development, on the other. To what extent do changes in use of modern contraception and in socioeconomic development account for differences across countries in the pace of fertility transition and the emergence of stalling? Operationally, we use three indicators of socioeconomic development: changes in women's educational attainment, changes in infant and child mortality, and growth in GDP per capita. We also allow for a time trend in the course of fertility transition, and for regional differences, other things equal.

For these multivariate analyses of the magnitude of fertility decline between the two most recent surveys, we use data from the 47 nations that have had multiple Demographic and Health Surveys, since these data provide direct evidence on fertility transition within individual countries. These countries represent about half of the population of the developing world (disproportionately covering the least developed countries), and nearly two-thirds of the population of developing nations other than

China. Our empirical work analyzes data at three different levels: national, urban/rural, and regional (regions within individual countries). This multilevel focus allows us to assess the robustness of our results.

The concluding section of the paper discusses our empirical findings and their implications for the future of fertility transition. The United Nations Population Division has forecasts for fertility up to the middle of this century that typically show continued fertility declines in the developing world. However, our results suggest that for these projections to be realized, especially for sub-Saharan Africa, it will be necessary to continue improvements in women's schooling and in infant and child mortality, and to enhance access to modern contraception.

Fertility Transition in the Developing World

DHS data on fertility transition in the developing world are provided in Table 1. The table gives national, urban, and rural total fertility rates for each DHS survey in countries where there has been more than one DHS survey.[1] This includes data from 25 countries from sub-Saharan Africa, two countries from North Africa, eight countries from Latin America and the Caribbean, and 12 countries from Asia. Consequently, we have a total of 47 countries from throughout the developing world. The rightmost column of the table displays the current fertility trend in each country, identified by the change in the national TFR between the two most recent surveys.

[1] One exception here is the 1999 Nigeria DHS. Concerns about data quality regarding fertility led us to drop that survey. See Ibisomi (2007) for analysis of problems with the Nigeria 1999 DHS data.

Examination of the table reveals that the only countries in which fertility transition is currently stalled are located in sub-Saharan Africa.[2] This state of stalled transition can be found in eight of the 25 sub-Saharan African countries. Fertility transition has begun and the TFR is declining in 15 of the sub-Saharan African countries and in all but one of the countries located in the other three regions. The only country outside of sub-Saharan Africa without declining fertility levels is Armenia. Though its national TFR has remained the same across the two most recent DHS surveys, this TFR is under the replacement level, and the country can therefore be considered post-transitional rather than stalling. The remaining two countries in sub-Saharan Africa, Mali and Niger, both are characterized as pre-transitional.

Of the eight countries experiencing a stall in transition, three are mid-transition and five are early-transition stalls. A country is considered to be stalling if its TFR failed to decline between the two most recent surveys. Early-transition stalling is defined by a stall taking place when a country's TFR has not yet dropped below five. A stall that takes place when the TFR is below five and above the replacement level is considered mid-transition. By this classification, Cameroon, Ghana, and Kenya are experiencing mid-transition stalling, and early-transition stalling can be found in Benin, Guinea, Mozambique, Rwanda, and Tanzania.

Our definition of stalling results in several discrepancies in the countries we considered to be stalled as compared to recent work on the subject. In his paper on fertility transition in developing countries, Bongaarts (2008) defines a stalling country as

[2] At various times in the recent past, half a dozen non-African countries have exhibited stalling. These include four countries in Latin America (Brazil, Colombia, Dominican Republic, and Peru) and two in Asia (Bangladesh and Turkey). In each case, however, a subsequent survey has shown resumption of fertility decline.

one that did not experience significant fertility decline between the two most recent surveys. He notes that "a few transitional countries with very small TFR declines (less than about 0.25 births per woman) are considered to have stalled because these declines are too small to be statistically significant" (109). This differs from our definition in that we only consider a country to be experiencing stalling if its TFR has failed to decline across the two most recent surveys, disregarding significance in cases with only small declines. Bongaarts considers Cote d'Ivoire[3], Ethiopia, Nigeria, Zambia, Zimbabwe, and Guatemala to be stalling, whereas in this paper, we classify all of these countries as declining.

There are two other causes of differences between our results and those of Bongaarts. The first is our addition of certain surveys that were presumably not available when Bongaarts did his work: Benin 2006, Uganda 2006, and Turkey 2003. Because of these additions, we consider Benin to be stalling while Bongaarts does not, and he considers Uganda and Turkey to be stalling while we do not. The second cause for discrepancy is a difference in the definition of a pre-transitional country. Due to lack of historical data, Bongaarts defines a pre-transitional country as one for which the "contraceptive prevalence among married women is 10 percent or less" (2008, 109). We use additional fertility estimates provided by the United Nations Population Division (2007) for historical data and define a pre-transitional country as one for which the TFR has not declined at least 10% from some existent peak. Because of this difference in definitions, we consider Mali and Niger to be pre-transitional countries, whereas Bongaarts characterizes Chad, Guinea, and Mali as pre-transitional. By either definition,

[3] This discrepancy can also be explained by Bongaarts' use of a 2005 Cote d'Ivoire AIS survey, which we did not use.

none of the countries outside of sub-Saharan Africa is considered pre-transitional, though Yemen continues to have an unusually high TFR for Asia as of 1997.

Recent work by Shapiro and Gebreselassie (2008) notes that most countries in sub-Saharan Africa are still experiencing fertility decline. This decline ranges in pace from modest to substantial. Every country in the other regions that we study in this paper, with the exception of Armenia, which is post-transitional, is also experiencing decline. As with sub-Saharan Africa, these regions contain both countries experiencing modest fertility decline, such as Guatemala and India, and those for which the decline is more considerable, such as Morocco, Brazil, and Yemen. Figure 1 shows, within each region, countries arrayed according to the magnitude of the pace of decline in the TFR per year between the two most recent surveys, in sub-Saharan Africa, Asia and North Africa, and Latin America and the Caribbean.

The pace of decline is clearly slower in sub-Saharan Africa (an average of only .03 per year across all countries) than in Asia and North Africa (average decline of .09 per year) and in Latin America and the Caribbean (.12 per year). Even without the stalling countries, more than half of the sub-Saharan nations experienced a decline in fertility of less than .05 per year, while only about a quarter of the countries in the other two broad regions had fertility declines per year that were as small.

Table 1 also shows the TFRs for urban and rural places separately by country. Past studies showed more rapid fertility decline early on in urban places than in rural ones (see, for example, Shapiro and Tambashe, 2002). Fertility decline began earlier in urban areas than in rural ones in sub-Saharan Africa, while rural TFRs tended to remain stable or even increase. Even as fertility rates began to decline in rural areas, the decline

was smaller than in urban areas. In countries where fertility transition was relatively advanced, the pace of fertility decline in rural areas began to meet or exceed that of the urban areas. This latter case is what we would expect to see in the regions outside of sub-Saharan Africa, which tend to be ahead of sub-Saharan Africa in terms of fertility transition, and it is indeed what we find by looking at Table 1. India and Kazakhstan are the only two countries outside of sub-Saharan Africa where the level of urban fertility decline is higher than rural fertility decline between the two most recent surveys. In all other countries in these regions the rate of rural fertility decline either at least meets or exceeds the corresponding urban rate. Often, between earlier surveys, urban fertility decline outpaces that of rural areas, and then in later surveys rural decline catches up to urban decline, exceeding it in most cases.

An additional observation concerning sub-Saharan Africa is that countries showing only a small decline in the TFR between the two most recent surveys often have stalled rural fertility in conjunction with still-declining urban fertility. The opposite is the case among the countries of the other regions – that is, among these countries, there are some that are experiencing urban fertility stall or increase while the national TFR continues to decline. In Guatemala, the TFR declined by 0.1 between the two most recent surveys, while the urban TFR increased by 0.3. In Bangladesh, Cambodia, Indonesia, Nepal, and the Philippines, the national TFR declined at varying levels while the urban TFR remained the same. As noted in footnote 2, in several cases increases in fertility at the national level between earlier surveys were followed by subsequent declines; this was true for rural and urban areas as well. These mid- and late-transition fluctuations and stalls of fertility rates followed by declines among the earlier surveys in

the regions outside of sub-Saharan Africa may offer important insight into the persistence of the current stalling in parts of sub-Saharan Africa.

Factors Contributing to Global Fertility Decline and the Stall of Fertility in Sub-Saharan Africa

As we see in Table 1 and Figure 1, fertility stalling at present seems to be localized to sub-Saharan Africa, although it has occurred elsewhere, and there is considerable variation across countries in the pace of fertility decline. Several factors seem to be likely indicators of the magnitude of fertility decline and the likelihood of fertility stall in the developing world. In this section, we narrow the field to a handful of variables that seem to be the strongest candidates for effecting changes in fertility rates and then report the results of our multivariate analyses. Based on previous models and empirical studies of fertility levels and fertility transition, these factors hold the potential to determine differences in fertility behaviors, both in situations of decline and in the fertility stalling that is apparent in sub-Saharan Africa. We first observe the changes in these factors between the two most recent DHS surveys in each country. We then relate the changes in these factors to the corresponding changes in the total fertility rate, in multivariate regressions at the national, urban/rural, and regional levels.

First, we consider the effect that changes in the educational attainment of women of reproductive age have on changes in the TFR. In a considerable number of past works, a general inverse relationship between women's educational attainment and fertility has been established (for example, see Jejeebhoy, 1995; Rutstein, 2002). These and others stress the importance of women's education as a contributing factor to fertility decline, particularly in association with marriage, contraceptive use, and infant and child

mortality (cf., Shapiro and Gebreselassie, 2007). A secular trend toward greater educational attainment of women in the developing world (Schultz, 1993) would imply an increase over time in the percentage of women with secondary or higher education and a reduction in the percentage of women with no schooling.

One would anticipate that countries with relatively large increases in the share of women with some secondary schooling or higher would experience larger decreases in the TFR. Countries with smaller decreases or even increases in the proportion of women with no education would subsequently be linked with smaller declines in fertility or stalling fertility. Conversely, relatively large declines in the percentage of women with no schooling would be expected to result in comparatively large declines in fertility.

Among the 10 countries that are pre-transitional or have experienced early-transition or mid-transition stalls, the average decrease in the percentage of women with no schooling is 2.3 percentage points. In contrast, the average decline among countries with declining TFRs is 5.6 percentage points. By the same token, the average increase in the percentage of women with secondary education or higher is 1.7 in the 10 pre-transition or stalling countries, while the average is 4.7 in all of the declining countries combined. Therefore, countries experiencing declining fertility rates have stronger upward trends in women's educational attainment, while countries with stalling fertility or pre-transitional countries show slower progress in women's education.

Another variable pertinent to fertility behavior is infant and child mortality. Changes in mortality can be a driving factor influencing actual fertility, according to the Easterlin framework for fertility analysis (Easterlin, 1975; Easterlin and Crimmins, 1985). Alterations in mortality are generally reflected in changes in the supply of

children and can motivate fertility control. Of the 47 countries that we examine here, 40 experienced declines in infant and child mortality ($_5q_0$) between the two most recent DHS surveys. However, increases in mortality rates are not uncommon. In sub-Saharan Africa, 11 countries that we examine have had increases in infant and child morality between consecutive DHS surveys (including all surveys). This group consists of all three mid-transition stall countries and two of the five early-transition stall countries. This high incidence of mortality escalations among stalling-fertility countries suggests that decreases in mortality may contribute to fertility decline.

Earlier work with an infant and child mortality rate lagged 5-9 years found that lagged changes in mortality were more closely related to changes in fertility than were contemporaneous mortality changes (Shapiro and Gebreselassie, 2007). However, a 5-9 year lag may still be too short a time period for couples to perceive mortality decline and react by reducing fertility.[4] The same perspective has been presented by Mark Montgomery in his paper, "Perceiving Mortality Decline" (2000). Therefore, for all regressions in this analysis, we use a mortality lag of 0-14 years in order to allow for a longer lag in reaction time. We also explored the use of a 0-9 year lag in infant and child mortality. The results showed, however, that a lag of 0-14 years in $_5q_0$ yielded equations with the greatest explanatory power and with good outcomes for other variables in the equation.

Another variable that we examine in relation to TFR decline is growth in real GDP per capita.[5] Historically, indicators of sustained economic growth such as growth in GDP per capita have accompanied fertility transition. There is some literature, however,

[4] We thank John Cleland for emphasizing this point.
[5] We use GDP data from the Penn World Tables (Heston et al., 2006).

that suggests that economic difficulties may contribute to crisis-led fertility declines, as was seen in some countries in sub-Saharan Africa during the 1980s and 1990s (e.g., Lesthaeghe, 1989; Eloundou-Enyegue et al., 2000; National Research Council, 1993).

Similar to our treatment of mortality, we have explored the use of a lagged variable when estimating the effect of growth in real GDP per capita on fertility changes. In particular, we have chosen a 3-year lag in the percentage growth in GDP per capita over 5 years, thereby measuring economic growth over the five-year period immediately preceding the three years during which fertility is measured. This measure of economic growth is inversely related to the magnitude of fertility decline for the group of 47 countries as a whole. Among countries in which fertility is declining, the average growth in lagged GDP per capita over five years is only 14 percent, whereas the average growth in lagged GDP per capita among pre-transition and stalling-fertility countries is 26 percent.

Next, we explore the use of modern contraception and its potential link with fertility decline. Increased use of modern contraceptive methods among women in union is typically strongly associated with fertility decline. Among the pre-transition and stalling-fertility countries, the average increase in the use of modern contraception is 3.6 percentage points, compared to 6.3 percentage points in the countries where fertility is declining.

In addition, we include a variable identifying a time trend, which allows for any systematic changes over time in the pace of fertility decline that are not addressed by the other explanatory variables. Such changes may be associated with the observation made by Bongaarts and Watkins (1996) and Bongaarts (2002) that as time goes by, fertility

decline occurs at progressively lower levels of socioeconomic development. On the other hand, they may simply reflect unmeasured temporal changes in other variables that also influence the rate of fertility decline. The time trend is the final variable in our baseline estimate of factors influencing fertility decline.

In addition, for a slightly different perspective on changes in the TFR, a sub-Saharan dummy variable was created. Upon review of Table 1, it becomes apparent that not only are TFRs, on average, higher in magnitude in sub-Saharan Africa, but that this area also experiences all of the fertility stalling seen in the developing world at present. A sub-Saharan dummy variable will allow for differences in rates of change in fertility between this region and Northern Africa, Latin America, and Asia, all else equal. We first add this variable to our baseline equation, and then add a variable measuring the level of the total fertility rate as of the first of the two most recent surveys.[6]

Using all of the explanatory variables discussed above, multivariate equations are estimated to account for the most recent changes in fertility at the national, urban/rural, and regional levels. These equations can be found in Table 2. The first part of the table shows coefficients based on national-level data, the second panel uses data from urban and rural areas, while the final panel reports results of analyses of intra-country regional-level data.[7]

The first column of coefficients in Table 2a is the baseline equation for national-level fertility declines. More rapid growth in the percentage of women of reproductive age with no schooling is associated with smaller declines in fertility, and the relationship

[6] If countries in sub-Saharan Africa have slower fertility declines simply because they tend to have higher fertility to begin with, including the initial level of fertility should pick up this effect.
[7] Five countries did not have complete data on GDP per capita and hence were not included in these analyses.

is highly significant. Growth in the percentage of women with at least secondary education was not significantly associated with declines in fertility. Hence, for one of the two education variables the evidence suggests that increased female schooling contributes to fertility decline. In addition to increases in female educational attainment, greater decreases in the lagged infant and child mortality rate are significantly associated with more rapid fertility decline. These results show that socioeconomic development is significantly connected to fertility decline.

Furthermore, the coefficient for the time trend is negative and weakly significant, indicating that there is a tendency for fertility declines to decrease as time passes, other things being equal. Neither the growth in the percentage of women using modern contraception nor lagged percentage growth in GDP per capita over five years is statistically significant.[8] Overall, these variables account for more than half of the variation in the declines in fertility.

The second equation for national-level fertility, in the second column of coefficients in Table 2a, includes a sub-Saharan Africa dummy variable, which is statistically significant. Other things equal, fertility declines between surveys are smaller in sub-Saharan Africa by a little more than a quarter of a child. Decreases in the percentage of women with no schooling and in the infant and child mortality rate are still significantly associated with greater declines in fertility. While the time trend variable is no longer significant, the percentage growth in GDP per capita has a significantly negative coefficient. This suggests that increases in GDP per capita, an indicator of economic growth, are related to stalling fertility. This result is consistent with results

[8] All of these implications match those found by Shapiro and Gebreselassie (2008) in their study of fertility in sub-Saharan Africa except for the coefficient for percentage growth in GDP per capita. In that study, growth in GDP per capita had a statistically significant negative coefficient.

from the previous study of fertility transition in sub-Saharan Africa by Shapiro and Gebreselassie (2008). Adding the dummy variable for Africa boosts the explanatory power of the equation: the variables account for more than 60 percent of the variance of fertility decline.

The third national-level equation adds a variable measuring the level of the total fertility rate at the outset of the interval during which fertility decline is measured. This variable was included in order to see if the difference in the pace of fertility decline between sub-Saharan Africa and other parts of the developing world, other things equal, reflects the higher fertility and earlier stage of fertility transition in Africa. This variable has a weakly significant positive coefficient, suggesting that controlling for our other explanatory variables countries with higher fertility tend to have slightly more rapid fertility decline. At the same time, inclusion of this variable results in a substantial increase in the magnitude (in absolute value) and significance of the coefficient of the sub-Saharan dummy variable. That is, controlling for the initial fertility level as well as the measures of socioeconomic change and other explanatory variables, we find substantially smaller fertility declines in sub-Saharan Africa, other things equal.

We estimated equations based on separate observations of urban and rural data. This doubled the number of observations. The first column of coefficients in Table 2b contains the baseline equation for urban/rural-level declines in fertility. The coefficient for the percentage of women with no schooling is almost identical to its corresponding coefficient at the national level, while the coefficients for the infant and child mortality rate and time trend variables are quite similar to their national-level counterparts. Unlike the national-level baseline, the coefficient for growth in the percentage of women using

modern contraception in this equation is significantly positive. Greater increases in the percentage of women using modern contraception are here associated with larger fertility declines. Increases in the percentage of women with at least secondary education and growth in GDP per capita are not significantly associated with fertility decline.

The next column displays the equation for urban/rural-level fertility decline with the addition of the sub-Saharan Africa dummy variable, which has a negative, weakly significant coefficient. The coefficients parallel those of the baseline (preceding) equation except for a couple of differences. The time trend variable is no longer significant but the percentage growth in GDP per capita is now significantly negatively related to fertility decline. Both of the equations for urban/rural-level fertility account for a little less than 50 percent of the variance of fertility decline.

The final column of coefficients shows the consequences of additionally controlling for the initial level of the total fertility rate. As in the national-level results, this variable has a positive impact on the size of the decline in fertility, and its inclusion yields a considerable increase in the absolute value and significance of the coefficient of the sub-Saharan Africa dummy variable. Again, then, other things equal, fertility decline appears to be distinctly slower in Africa.

Finally, equations were estimated using data from all available regions within the countries of Africa, Asia, Latin America, and the Caribbean. The baseline regional equation is in the first column of Table 2c, the equation with the sub-Saharan Africa dummy variable is in the second column, and the equation including the initial total fertility rate is in the third column. Increases in the percentage of women using modern contraception and decreases in the infant and child mortality rate significantly contribute

to more rapid fertility decline, while time passing is associated with significantly smaller fertility reductions, ceteris paribus. Growth in GDP per capita is not significant in the baseline or last equation but is weakly significant in the second equation. And other things equal, fertility decline is higher in countries with greater initial fertility but significantly slower in sub-Saharan Africa. While these results match the previous equations, the coefficients for female educational attainment are inconsistent with the earlier equations. There is no longer a significant relationship between decreases in the percentage of women with no schooling and declines in fertility. Decreases in the percentage of women with at least secondary education are now significantly associated with fertility decline in the first two equations. This is an anomalous result. These regional equations do not perform as well as the preceding equations in the table, accounting at most for a bit more than a quarter of the variance of fertility decline.

Summary and Conclusions

Using Demographic and Health Survey data from 47 developing countries representing a substantial share of the developing world, this paper has documented ongoing fertility transition in the vast majority of these countries. However, eight nations in sub-Saharan Africa are presently experiencing stalls in their fertility transitions. More broadly, there is considerable variation across countries in the pace of fertility decline.

We carry out multivariate analyses to assess the degree to which differences in the pace of socioeconomic progress contribute to differences in the speed of fertility transition. We find that increased women's schooling, reduced infant and child mortality, and increased use of modern contraception are all associated with more rapid declines in

fertility and hence a lower likelihood of stalling. At the same time, there is some evidence that fertility declines are smaller when GDP growth is more rapid, that these declines diminish in magnitude over time and in going from higher-fertility to lower-fertility regimes, and that countries in sub-Saharan Africa have smaller declines, other things equal.

Sub-Saharan Africa was the last major part of the world to initiate fertility transition. The evidence presented here shows a weaker pace of decline in fertility compared to other regions, even after controlling for a number of socioeconomic and other factors that influence the magnitude of fertility decline.

What is the future of fertility transition in the developing world? On the one hand, the predominance of countries with declining fertility and the fact that half a dozen non-African countries have experienced fertility stalls and then subsequently resumed fertility decline suggests that fertility transition will be ongoing. At the same time, our multivariate results suggest that sustaining fertility decline will require continued improvements in women's schooling and in infant and child mortality, as well as increased contraceptive prevalence. And the region with the highest fertility, sub-Saharan Africa, remains as most vulnerable to stalling of fertility transition.

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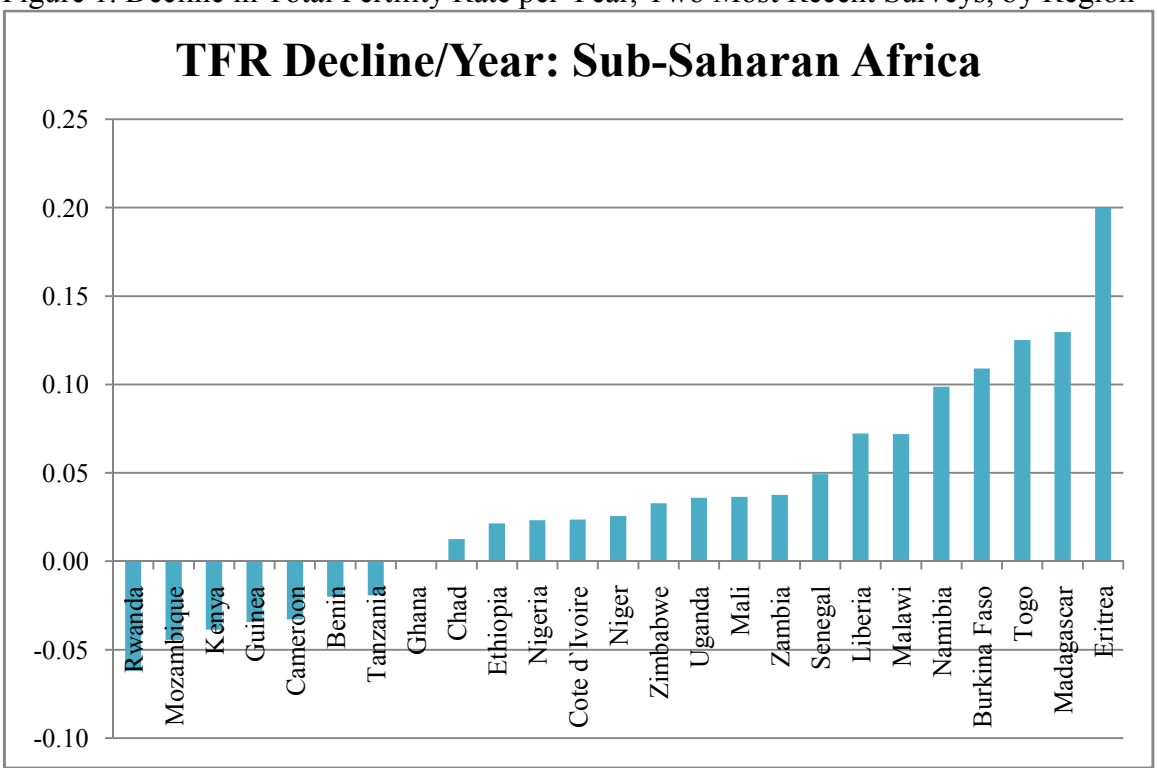
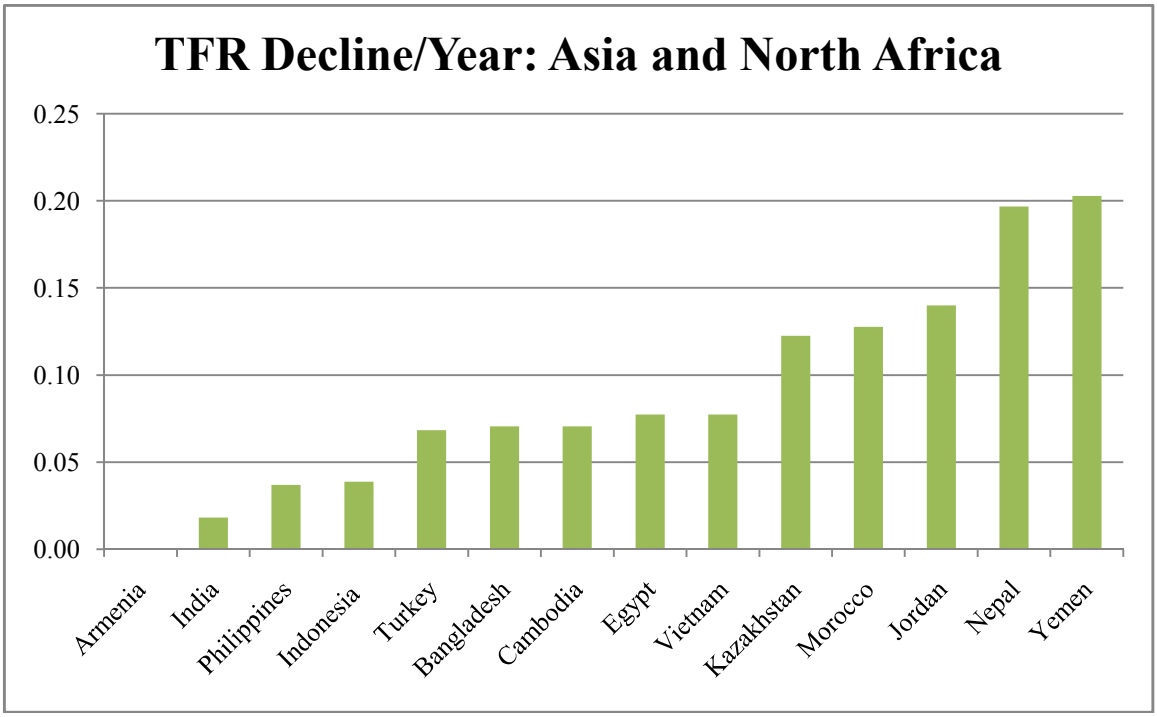
Figure 1. Decline in Total Fertility Rate per Year, Two Most Recent Surveys, by Region





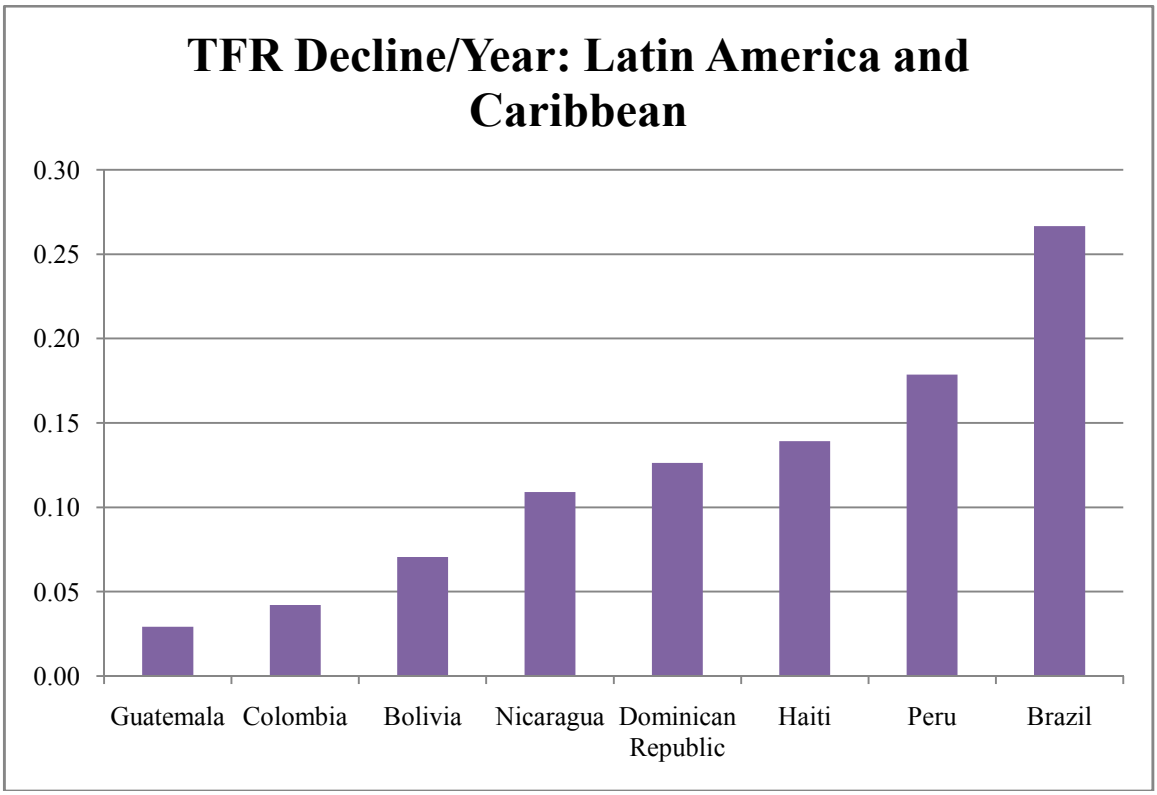

TFR Decline/Year: Latin America and Caribbean
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Guatemala
Colombia
Bolivia
Nicaragua
Dominican Republic
Haiti
Peru
Brazil

Table 1. Total Fertility Rates, National, Urban, and Rural, and Trend: Countries with Multiple Surveys

Country (Year of Survey)	TFR			Trend
	National	Urban	Rural	
Sub-Saharan Africa				
Benin 1996	6	4.9	6.7	
Benin 2001	5.6	4.4	6.4	
Benin 2006	5.7	4.9	6.3	early-transition stall
Burkina Faso 1992/93	6.5	4.6	7	
Burkina Faso 1998/99	6.4	3.9	6.9	
Burkina Faso 2003	5.9	3.4	6.5	decline
Cameroon 1991	5.8	5.2	6.3	
Cameroon 1998	4.8	3.8	5.4	
Cameroon 2004	5	4	6.1	mid-transition stall
Chad 1996/97	6.4	5.9	6.5	
Chad 2004	6.3	5.7	6.5	Decline
Cote d'Ivoire 1994	5.3	4.4	6	
Cote d'Ivoire 1998/99	5.2	4	6	Decline
Eritrea 1995	6.1	4.2	7	
Eritrea 2002	4.8	3.5	5.7	Decline
Ethiopia 2000	5.5	3	6	
Ethiopia 2005	5.4	2.4	6	Decline
Ghana 1988	6.4	5.3	7	
Ghana 1993	5.2	3.7	6	
Ghana 1998	4.4	3	5.3	
Ghana 2003	4.4	3.1	5.6	mid-transition stall
Guinea 1992	5.67	5.18	5.89	
Guinea 1999	5.5	4.4	6.1	
Guinea 2005	5.7	4.4	6.3	early-transition stall
Kenya 1989	6.7	4.5	7.1	
Kenya 1993	5.4	3.4	5.8	
Kenya 1998	4.7	3.1	5.2	
Kenya 2003	4.9	3.3	5.4	mid-transition stall
Liberia 1986	6.7	6	7.1	
Liberia 2007	5.2	3.8	6.2	Decline
Madagascar 1992	6.1	3.8	6.7	
Madagascar 1997	6	4.2	6.7	
Madagascar 2003/2004	5.2	3.7	5.7	Decline

Malawi 1992	6.7	5.5	6.9	
Malawi 2000	6.3	4.5	6.7	
Malawi 2004	6	4.2	6.4	Decline
Mali 1987	7.1	6.3	7.4	
Mali 1995/96	6.7	5.4	7.3	
Mali 2001	6.8	5.5	7.3	
Mali 2006	6.6	5.4	7.2	pre-transition
Mozambique 1997	5.2	4.6	5.3	
Mozambique 2003	5.5	4.4	6.1	early-transition stall
Namibia 1992	5.4	4	6.3	
Namibia 2000	4.2	3.1	5.1	
Namibia 2006/2007	3.6	2.8	4.3	Decline
Niger 1992	7	6.4	7.1	
Niger 1998	7.2	5.6	7.6	
Niger 2006	7	6.1	7.3	pre-transition
Nigeria 1990	6	5	6.3	
Nigeria 2003	5.7	4.9	6.1	Decline
Rwanda 1992	6.2	4.5	6.3	
Rwanda 2000	5.8	5.2	5.9	
Rwanda 2005	6.1	4.9	6.3	early-transition stall
Senegal 1986	6.4	5.4	7.1	
Senegal 1992/93	6	5.1	6.7	
Senegal 1997	5.7	4.3	6.7	
Senegal 2005	5.3	4.1	6.4	Decline
Tanzania 1992	6.2	5.1	6.6	
Tanzania 1996	5.8	4.1	6.3	
Tanzania 1999	5.6	3.2	6.5	
Tanzania 2004	5.7	3.6	6.5	early-transition stall
Togo 1988	6.4	4.9	7.3	
Togo 1998	5.2	3.2	6.3	Decline
Uganda 1988	7.4	5.7	7.6	
Uganda 1995	6.9	5	7.2	
Uganda 2000/01	6.9	4	7.4	
Uganda 2006	6.7	4.4	7.1	Decline
Zambia 1992	6.5	5.8	7.1	
Zambia 1996	6.1	5.1	6.9	
Zambia 2001/02	5.9	4.3	6.9	Decline
Zimbabwe 1988	5.4	3.8	6.2	
Zimbabwe 1994	4.3	3.1	4.9	
Zimbabwe 1999	4	3	4.6	
Zimbabwe 2005/06	3.8	2.6	4.6	Decline

North Africa				
Egypt 1988	4.5	3.6	5.6	
Egypt 1992	3.9	2.9	4.9	
Egypt 1995	3.6	3	4.2	
Egypt 2000	3.5	3.1	3.9	
Egypt 2005	3.1	2.7	3.4	Decline
Morocco 1987	4.6	3.2	6	
Morocco 1992	4	2.5	5.5	
Morocco 2003-2004	2.5	2.1	3	Decline
Latin America & Caribbean				
Bolivia 1989	5	4	6.6	
Bolivia 1994	4.8	3.8	6.3	
Bolivia 1998	4.2	3.3	6.4	
Bolivia 2003	3.8	3.1	5.5	Decline
Brazil 1986	3.4	2.8	5.1	
Brazil 1991	3.7	2.8	5.2	
Brazil 1996	2.5	2.3	3.5	Decline
Colombia 1986	3.2	2.6	4.7	
Colombia 1990	2.8	2.5	3.6	
Colombia 1995	3	2.5	4.3	
Colombia 2000	2.6	2.3	3.8	
Colombia 2005	2.4	2.1	3.4	Decline
Dominican Republic 1986	3.7	3.1	4.8	
Dominican Republic 1991	3.3	2.8	4.4	
Dominican Republic 1996	3.2	2.8	4	
Dominican Republic 1999	2.7	2.5	3	
Dominican Republic 2002	3	2.8	3.3	
Dominican Republic 2007	2.4	2.3	2.8	Decline
Guatemala 1987	5.5	4	6.4	
Guatemala 1995	5.1	3.8	6.1	
Guatemala 1998/99	5	4.1	5.8	Decline
Haiti 1994/95	4.8	3.3	5.9	
Haiti 2000	4.7	3.4	5.8	
Haiti 2005	3.9	2.7	5	Decline
Nicaragua 1997/98	3.6	2.9	5	
Nicaragua 2001	3.2	2.6	4.4	Decline
Peru 1986	4.1	3.1	6.3	
Peru 1992	3.5	2.8	6.2	
Peru 1996	3.5	2.8	5.6	

Peru 2000	2.8	2.2	4.3	Decline
Asia				
Armenia 2000	1.7	1.5	2.1	
Armenia 2005	1.7	1.6	1.8	post-transition
Bangladesh 1993/94	3.4	2.7	3.5	
Bangladesh 1996/97	3.3	2.1	3.4	
Bangladesh 1999/2000	3.3	2.5	3.5	
Bangladesh 2004	3	2.5	3.2	Decline
Cambodia 2000	3.8	2.8	4	
Cambodia 2005	3.4	2.8	3.5	Decline
India 1992/93	3.4	2.7	3.7	
India 1998/99	2.8	2.3	3.1	
India 2005/06	2.68	2.06	2.98	Decline
Indonesia 1987	3.1	2.6	3.4	
Indonesia 1991	3	2.6	3.2	
Indonesia 1994	2.9	2.3	3.1	
Indonesia 1997	2.8	2.4	3	
Indonesia 2002/2003	2.6	2.4	2.7	Decline
Jordan 1990	5.6	5.1	6.8	
Jordan 1997	4.4	4.2	5	
Jordan 2002	3.7	3.5	4.2	Decline
Kazakhstan 1995	2.5	2	3.1	
Kazakhstan 1999	2	1.5	2.7	Decline
Nepal 1996	4.6	2.9	4.8	
Nepal 2001	4.1	2.1	4.4	
Nepal 2006	3.1	2.1	3.3	Decline
Philippines 1993	4.1	3.5	4.8	
Philippines 1998	3.7	3	4.7	
Philippines 2003	3.5	3	4.3	Decline
Turkey 1993	2.5	2.3	2.9	
Turkey 1998	2.6	2.4	3.1	
Turkey 2003	2.23	2.06	2.65	Decline
Vietnam 1997	2.3	1.6	2.5	
Vietnam 2002	1.9	1.5	2	Decline
Yemen 1991/92	7.7	5.6	8.2	
Yemen 1997	6.5	5	7	Decline

Table 2a. Regression Analysis of the Decline in the Total Fertility Rate Between the Two Most Recent Surveys National Data

Variable	**1**	**2**	**3**
Increase in percentage of women with no schooling	-.040**	-.041**	-.035**
Increase in percentage of women with at least secondary education	-.0067	-.0099	-.0051
Growth in the percentage of women using modern contraception	.014	.009	.012
Increase in the infant and child mortality rate[a]	-.0065*	-.0070**	-.0056*
Percentage growth in GDP per capita over 5 years (3-year lag)	-.0046	-.0067*	-.0056+
Time Trend	-.042+	-.026	-.017
Sub-Saharan Africa dummy variable	--	-.28*	-.467**
Original level of the total fertility rate	--	--	.094+
Intercept	.40+	.49*	.079
R-squared	.534	.609	.642
Adjusted R-squared	.454	.528	.555
F-ratio	6.69**	7.52**	7.40**
N	42	42	42

a We use the infant and child mortality rate for the period 0-14 years prior to the survey.

** Significant at the .01 level.

* Significant at the .05 level.

+ Significant at the .10 level.

Table 2b. Regression Analysis of the Decline in the Total Fertility Rate Between the Two Most Recent Surveys Urban/Rural Data

Variable	**4**	**5**	**6**
Increase in percentage of women with no schooling	-.039**	-.038**	.033**
Increase in percentage of women with at least secondary education	-.0090	-.0110	-.0064
Growth in the percentage of women using modern contraception	.035**	.033**	.031**
Increase in the infant and child mortality rate[a]	-.0053+	-.0052+	-.0043
Percentage growth in GDP per capita over 5 years (3-year lag)	-.0042	-.0057*	-.0047+
Time Trend	-.039*	-.027	-.020
Sub-Saharan Africa dummy variable	--	-.19+	-.33**
Original level of the total fertility rate	--	--	.078*
Intercept	.32+	.39*	.057
R-squared	0.464	0.489	.523
Adjusted R-squared	0.422	0.442	.472
F-ratio	11.12**	10.40**	10.27**
N	84	84	84

a We use the infant and child mortality rate for the period 0-14 years prior to the survey.

** Significant at the .01 level.

* Significant at the .05 level.

+ Significant at the .10 level.

Table 2c. Regression Analysis of the Decline in the Total Fertility Rate Between the Two Most Recent Surveys Regional Data

Variable	**7**	**8**	**9**
Increase in percentage of women with no schooling	-.010	-.008	-.007
Increase in percentage of women with at least secondary education	-.011*	-.013**	-.004
Growth in the percentage of women using modern contraception	.024**	.024**	.017**
Increase in the infant and child mortality rate[a]	-.0060**	-.0064**	-.0045**
Percentage growth in GDP per capita over 5 years (3-year lag)	-.0016	-.0039+	-.0022
Time Trend	-.078**	-.062**	-.044**
Sub-Saharan Africa dummy variable	--	-.24**	-.599**
Original level of the total fertility rate	--	--	.192**
Intercept	.72**	.76**	.076
R-squared	0.154	0.173	.262
Adjusted R-squared	0.137	0.155	.242
F-ratio	9.34**	9.23**	13.59**
N	316	316	316

a We use the infant and child mortality rate for the period 0-14 years prior to the survey.

** Significant at the .01 level.

* Significant at the .05 level.

+ Significant at the .10 level.