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*Descriptive Finding*

**Education stalls and subsequent stalls in African fertility: A descriptive overview**

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## **Education stalls and subsequent stalls in African fertility: A descriptive overview**

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### **Abstract**

#### **BACKGROUND**

Recent stalls in fertility decline have been observed in a few countries in sub-Saharan Africa, and so far no plausible common reason has been identified in the literature. This paper develops the hypothesis that these fertility stalls could be associated with stalls in the progress of education among the women of the relevant cohorts, possibly resulting partly from the Structural Adjustment Programs (SAPs) of the 1980s.

#### **METHODS**

We descriptively link the change in the education composition of successive cohorts of young women in sub-Saharan Africa and the recent fertility stalls. We use reconstructed data on population by age, gender, and level of education from [www.wittgensteincentre.org/dataexplorer](http://www.wittgensteincentre.org/dataexplorer), and fertility rates from the United Nations.

#### **RESULTS**

In most sub-Saharan African countries, we observe that the same countries that had fertility stalls had a stall in the progress of education, particularly for young women who were of primary school age during the 1980s, when most of the countries were under structural adjustment. Conversely, stalls in fertility are less common in countries that did not have an education stall, possibly in relation to SAPs.

#### **CONCLUSION**

The results point to the possibility of a link between the recent fertility stalls and discontinuities in the improvement of the education of the relevant cohorts, which in

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turn could be related to the SAPs in the 1980s. This descriptive finding now needs to be corroborated through more detailed cohort-specific fertility analysis. If the education-fertility link can be further established, it will have important implications for the projections of population growth in affected countries.

## **1. Introduction**

This research note studies the timing and magnitude of possible effects of the Structural Adjustment Programs (SAP), which were enforced in the early 1980s by the International Monetary Fund (IMF) and the World Bank in many developing countries, on the recent stall in fertility declines in several African countries, as mediated by discontinuities in the educational attainment of subsequent cohorts of young women in the affected countries.

While in the 1990s there was a body of literature on the possible implications of the SAP on social and economic development in the affected countries (Rose 1995, Stromquist 1999, Reimers and Tiburcio 1993; Cornia et al. 1993), and over the last decade there has been a body of literature on stalled fertility declines in Africa (summarized in Fuchs and Goujon 2014, p. 166–167), the two have rarely been linked. Tapinos et al. (1997) looked at demographic responses to economic adjustment policy and economic crisis, mostly in Latin America, and, while distinguishing between the short- and long-term effects of the economic crisis, they basically found no evidence of a pervasive effect on fertility. Contrarily, other authors have proposed that economic crisis may foster fertility decline (Foster 1993, Lesthaeghe and Jolly 1994; National Research Council 1993; Eloundou-Enyegue et al. 2000 in the case of Cameroon). Shapiro and Tamashe (2003) hint at the possibility that the effect of the crisis might be short-term, as in the long-term the effect on schooling and family planning would not be sustainable. The two phenomena of SAP and fertility stalls are, indeed, almost twenty years apart, which may have seemed too long for any direct causal effect from, for example, reduced reproductive health spending on fertility. This twenty-year lag is, however, precisely the timing that would be expected for an effect operating through female education: declining primary school enrolment rates for girls during the 1980s would result in lower education, and hence higher fertility, for women in their prime childbearing ages after 2000. The purpose of this descriptive research note is to first provide empirical information about this possible link that could in part explain the stalled fertility decline in some African countries before trying to go deeper into causal analysis. If established, this would have direct implications for assumptions concerning likely future fertility trends in the countries affected.

## **2. Surprising discontinuities in the progress of young women's educational attainment in certain African countries**

In a first step, we look at inter-cohort changes in the educational attainment of young women in sub-Saharan Africa using the recent reconstruction by gender and five-year age groups for 171 countries back to 1970 (WIC 2015; Springer et al. 2015). The WIC dataset (2015) was chosen over other datasets (Barro and Lee 2013; Cohen and Leker 2014) as it is more recent and includes a larger number of countries than the two preceding sources. A first comparative inspection of the reconstruction results for different African countries showed discontinuities in the trend of improving education levels for successive cohorts of young women in many African countries. Table 1 shows the education level (defined as having an education vs. having none) of successive cohorts of women born between 1960 and 1985. If we take as the criterion for stalled education an increase of 1% or less between successive cohorts of women, many countries in sub-Saharan Africa exhibit such a pattern – about 66% of the 32 countries in our sample for women born between 1960 and 1985. SAP affected children's education negatively and girls suffered more as a result of the choices of families faced with financial burdens (Stromquist 1999). To our knowledge, the literature does not specify a global criterion for stalls in education. The 1% increase mark was implemented based on our best judgement. Sensitivity analysis has shown that choosing a different mark (e.g., an increase of 0.5% or no increase at all) would yield different results in terms of the scale but not alter the message described below.

Figure 1 shows the time trend in the proportions of women born between 1950–1955 and 1990–1995 who have some schooling, even if it is only incomplete primary, in four of the larger sub-Saharan African countries that are classified as having stalled fertility. We consider as stalled fertility countries ten countries where either of the two ratios of the fertility rates for the period (a) 2000–2005/1995–2000 and (b) 2005–2010/2000–2005 was at or above 0.98; i.e., Congo, Gambia, Kenya, Mali, Mozambique, Niger, Nigeria, Tanzania, Zambia, and Zimbabwe. Fertility rates are taken from the database of the United Nations (UN) 2015 assessment (United Nations 2015). Fertility stalls refer generally to any interruption of the decline in fertility during the transition period. First analysed by Gendell in 1985, they were found in many different settings, and these anomalies to the demographic transition attracted the attention of researchers, particularly, in the last decade, in the case of a subset of African countries. There is no one single definition of the stalls, and the sampling of transition countries depends on the chosen definition: the fertility level (e.g., below 7 children as chosen by Shapiro and Gebresselassie (2008) or between 2.5 and 5 children according to Bongaarts (2006)) or (for instance) when contraceptive prevalence is above 10% among married women (Bongaarts 2008). These authors also differ in their

criterion for a stall; for example Bongaarts (2008) classifies stalls as non-significant declines in fertility ( $p < 0.05$ ), whereas Shapiro and Gebreselassie (2008) only consider the absence of a decline between two measurements, and Garenne's (2008) criterion is that the fertility slope should have changed significantly from negative to nil or positive. Other studies consider yet other criteria, resulting in different sets of stalling countries. However, the concept is basically the same. There is also no clear consensus on the factors behind the lack of a significant decline in fertility that exists in some countries (Moultrie et al. 2008): poor socioeconomic development and family planning (Bongaarts 2008), slow increase in women's education and decline in infant and child mortality (Shapiro et al. 2010), or no common factors (Garenne 2008). Other researchers doubt the existence of all or some stalls and blame the data on which the calculations are based (mostly from demographic and health surveys) as lacking validity (e.g., Schoumaker 2009; Machiyama 2010).

**Table 1: Change in education for women born between 1960–1965 & 1980–1985, and in fertility in period 1995–2010 in sub-Saharan Africa**

Country	Increase in share (in percentage points) of women with any education for 5-year birth cohorts over previous cohort (a)					Stalled education increase between 1975-1980 and 1980-1985	Ratio TFR (b)		Stalled fertility declines between 1995 and 2010
	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985		2000-2005/1995-2000	2005-2010/2000-2005	
Congo	11.2	5.9	2.6	-0.8	0.1	Yes	0.995	0.990	Yes
Gambia	-4.6	8.0	5.8	6.7	11.8	No	0.978	0.989	Yes
Kenya	13.5	6.5	5.0	3.0	-0.3	Yes	0.986	0.960	Yes
Mali	2.0	1.0	0.9	1.5	0.8	Yes	0.986	0.978	Yes
Mozambique	5.2	1.4	3.8	3.3	7.3	No	0.991	0.974	Yes
Niger	1.7	2.9	4.2	-0.4	3.5	Yes	0.997	0.995	Yes
Nigeria	8.9	8.6	9.0	0.1	4.9	Yes	0.981	0.977	Yes
Tanzania	16.5	7.1	0.7	1.2	-0.5	Yes	0.984	0.986	Yes
Zambia	2.9	4.1	1.1	-0.9	2.6	Yes	0.984	0.975	Yes
Zimbabwe	2.2	13.5	1.1	2.3	0.1	Yes	0.957	1.000	Yes
Benin	5.2	1.0	3.9	0.7	10.8	Yes	0.939	0.919	No
Burkina Faso	1.5	1.5	3.9	2.5	5.8	No	0.956	0.945	No
Burundi	1.4	4.2	9.6	25.0	-2.6	Yes	0.962	0.944	No

**Table 1: (Continued)**

Country	Increase in share (in percentage points) of women with any education for 5-year birth cohorts over previous cohort (a)					Stalled education increase between 1975-1980 and 1980-1985	Ratio TFR (b)		Stalled fertility declines between 1995 and 2010
	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985		2000-2005/1995-2000	2005-2010/2000-2005	
Cameroon	8.2	4.1	2.5	2.0	4.5	No	0.951	0.948	No
Central African Rep.	12.4	4.9	4.8	4.0	6.5	No	0.957	0.914	No
Chad	8.0	-0.6	2.4	4.7	6.1	No	0.977	0.947	No
Côte d'Ivoire	5.9	3.9	11.9	-2.7	2.1	Yes	0.939	0.944	No
D.R. Congo	5.0	6.2	2.0	1.8	0.3	Yes	0.979	0.950	No
Equatorial Guinea	1.1	2.4	4.6	0.2	2.4	Yes	0.961	0.951	No
Ethiopia	4.1	6.7	8.0	1.8	8.5	No	0.897	0.858	No
Gabon	3.7	3.5	-0.1	-2.0	4.1	Yes	0.913	0.954	No
Ghana	2.6	0.7	3.2	6.8	11.4	No	0.948	0.940	No
Guinea	1.9	-0.3	3.7	4.8	5.1	No	0.948	0.936	No
Guinea-Bissau	5.5	3.9	7.2	9.5	9.6	No	0.926	0.934	No
Liberia	2.7	3.8	0.4	0.7	0.5	Yes	0.939	0.921	No
Malawi	7.4	4.1	3.4	8.0	9.3	No	0.953	0.951	No
Rwanda	7.3	11.7	6.5	4.0	1.0	Yes	0.915	0.898	No
Senegal	1.4	3.4	4.5	5.7	3.2	No	0.931	0.957	No
Sierra Leone	3.5	1.5	4.6	2.4	6.3	No	0.943	0.911	No
Somalia	0.2	4.7	-0.3	2.4	6.5	No	0.967	0.954	No
Swaziland	6.6	5.1	2.9	1.5	1.1	No	0.893	0.935	No
Uganda	6.1	6.0	6.6	5.1	10.6	No	0.971	0.946	No

Sources: (a) Wittgenstein Centre (WIC) Data Explorer, version 1.2; (b) United Nations 2015; and authors' calculations.

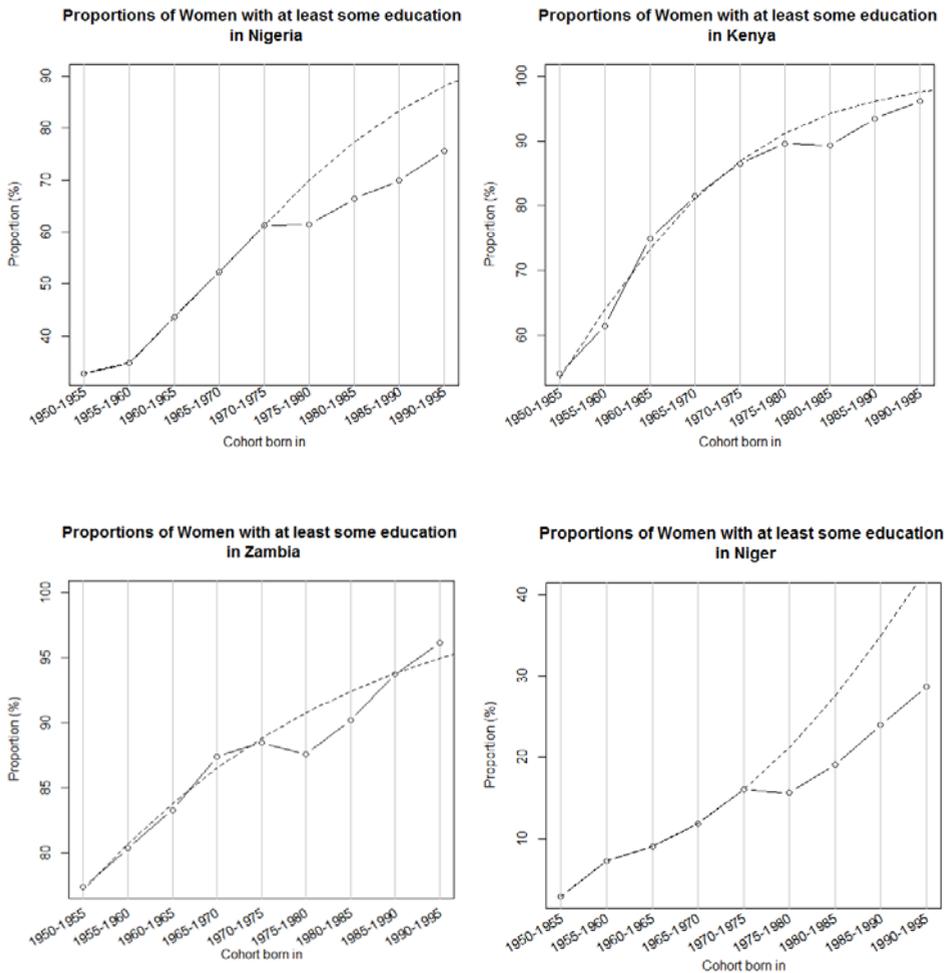
Note: The criterion for a stall in education for women is when the increase in level of education (compared to no education) is 1 percentage point or less between the two 5-year birth cohorts born between 1975 and 1985. The criterion for a stall in fertility decline is computed as a decline in total fertility rates below or equal to 2% during one or both of the periods 1995-2000 to 2000-2005 and 2000-2005 to 2005-2010. Not all sub-Saharan African countries are included in the table; the following countries have been removed: insular countries, e.g., Cape Verde; countries that have already or almost achieved full intake into primary education, e.g., South Africa; and countries that were not in the WIC Data explorer for lack of comprehensive data on education, i.e., Angola, Botswana, Djibouti, Eritrea, Mauritania, and Togo.

As shown in Table 1, there is a higher share of countries with fertility stalls among countries with education stalls. It is striking that 8 out of 10 countries that are classified as having stalled fertility around and after 2000 were showing stalls in the improvement of female education for women born between 1975 and 1985, who then suffered most in terms of school intake from the intensive SAPs of the 1980s. By contrast, only 8 out of the 22 countries that have not recently experienced a fertility stall had an education stall earlier (36%) during the intensive adjustment period of the 1980s.

The link between the education stalls and the implementation of SAPs is less clear. First, there is no consistent reliable information about the degree to which SAPs affected the education sector, and, secondly, adjustment policies were often implemented in countries already affected by crises and the education stall may have been triggered by the crisis itself (Klasen 2003; Heidhues et al. 2004).

Figure 1a shows the trends for Nigeria, which, with over 170 million inhabitants, is currently the most populous African country. While only around 30% of Nigerian women born in 1950–1955 had ever received any formal schooling, this proportion doubled to around 60% for those born in 1970–1975, but then saw an abrupt interruption of this increasing trend among cohorts born in 1975–1980 who were of primary schooling age around during 1980–1990, and the proportion remained virtually unchanged. Later, the increasing trend started again, although at a somewhat slower speed. Figure 1b shows a similar pattern for Kenya but at an already higher level of primary enrolment. Between cohorts born in 1950–1955 and 1970–1975 the proportion of women who had ever received any schooling had increased from 54% to 87%. This improvement slowed for the subsequent cohort born in 1975–1980 and then even declined for the cohort born in 1980–1985. Only for the cohorts born in 1985–1990, who would reach school age during 1990–2000, did the improvement picked up speed again. This pattern is almost identical to that in Zambia (Figure 1c), where the discontinuity happened five years earlier. The pattern for Niger (Figure 1d) again closely resembles that described above for Nigeria, and similarly for the other six countries in our sample.

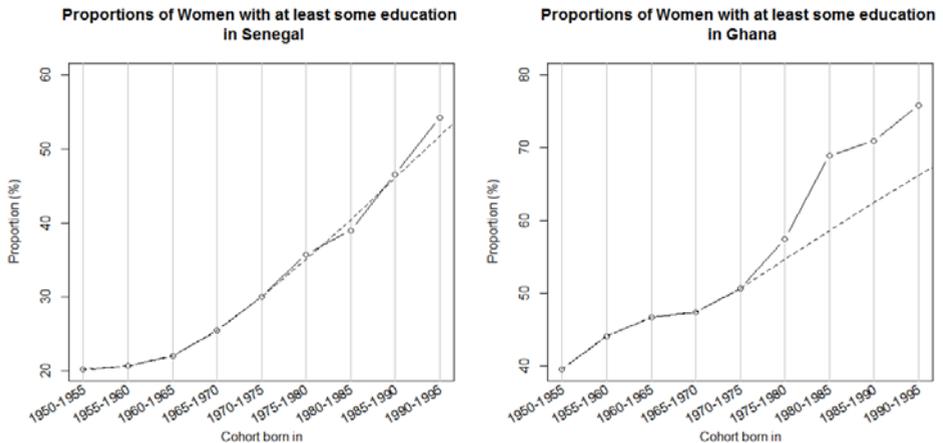
**Figure 1: Trends in the proportion of women cohorts born between 1950 and 1995 who have received at least some schooling for (a) Nigeria, (b) Kenya, (c) Zambia, and (d) Niger**

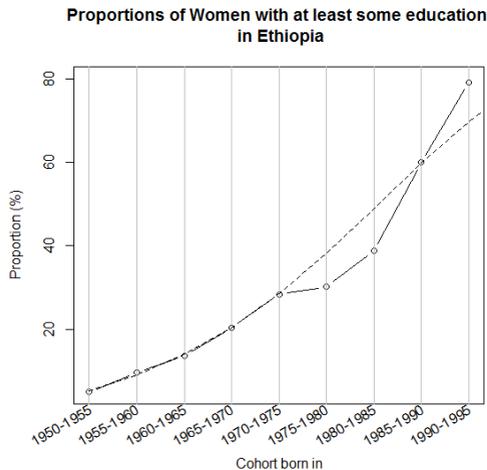


Notes: The dotted lines show the extrapolation of the trend from cohorts born between 1950 and 1975 based on cubic spline.

But there are also other large African countries that do not show such discontinuities, or even experienced accelerated educational improvement for these cohorts. Figure 2a shows the trends for successive cohorts in Senegal, where the improvement in the proportion of women who had ever attended school shows almost a straight line for women born after 1965 with only a very minor dent for those born between 1980 and 1985. In Ghana, after a period of little improvement for women born between 1965 and 1970, the rate of improvement even accelerated up until the year 1985, after which it slowed again. A particularly interesting case is Ethiopia, where a slowing of the improving trend between 1975 and 1980 was followed by an acceleration that was even faster than the original increase, and the proportion of women born 1990-1995 who had some schooling was brought to a level which, at close to 80%, is even higher than the trend line based on the cohorts born between 1950 and 1975.

**Figure 2: Trends in the proportion of women cohorts born between 1950 and 1995 with at least some primary schooling experience: (a) Senegal, (b) Ghana, and (c) Ethiopia**



**Figure 2: (Continued)**

Notes: The dotted lines show the extrapolation of the trend from cohorts born between 1950 and 1975 based on cubic spline.

### 3. A legacy of the SAP of the 1980s?

For many countries, particularly in Latin America and sub-Saharan Africa, the 1980s saw a contradictory international discourse on education and economic reform. On the one hand, UNESCO highlighted the overriding importance of education for national development and organized a series of regional conferences that finally culminated in the World Conference on Education for All in Jomtien (Thailand) in 1990. On the other hand, the World Bank and the IMF emphasized the need to restructure economies, reduce the role and the size of government spending, and enforce fiscal discipline. In particular, the Mexican government's 1982 announcement that it could no longer service its debt obligations was widely seen as a wake up call, reminding the global community that a restructuring and stabilization of public finances was a prerequisite for subsequent sustainable economic growth. And since many countries in Africa and Latin America were dependent on the World Bank and IMF for credit, these institutions were able to impose the structural adjustment policies on these countries that they considered necessary and appropriate.

It is hard to find comparable data on changes in government education expenditure for the countries discussed in this paper. We focus on changes between 1980 and 1990

as a percentage of GDP. For the countries with strong discontinuities, listed in Figure 1, the following information on education spending was found: In Nigeria the total educational spending by the Federal Government dropped from 16.2% of the budget in 1979 to only 10% of the budget in 1986-1989 (Fadayomi 1993). Kenya was an intensive adjustment country and the funding for education as a percentage of GDP declined strongly, from 5.9% in 1981 to 4.6% in 1984, after which it recovered again (UNESCO 2015). For Niger we could not find information about changes in the education budget before 1990, but it is clear that it was among the adjustment lending countries. Zambia, which also was an intensive adjustment lending country, decreased education spending massively, from 6.3% of GDP in 1976 and 5.4% in 1983 down to a low of 2.7% in 1987 and even below 2.0% in the early 1990s (UNESCO 2015).

While Ethiopia was not among the structural adjustment countries (in the 1980s), both Ghana and Senegal were. But Ghana, despite being in this category, after an initial decline from 2.7% in 1980 to 1.8% in 1981, managed to increase its education spending as a proportion of GDP to above 3.0% in the mid- and late 1980s (UNESCO 2015), while Senegal saw a slight decline in 1990 (Reimers 1997). On average, for all the bigger African countries for which we could find data on their exposure to SAPs and the resulting changes in education spending, the pattern is clear: Those countries that were heavily exposed to SAP saw significant declines in their education spending as a proportion of GDP, which under conditions of rapid population growth resulted in declines in school enrolment rates, and most likely also in the quality of education. Countries that were not affected by SAP policies or that managed to maintain or even increase their education spending despite SAP (such as Ghana) had no discontinuities in the improving education of subsequent cohorts during the 1980s.

## **4. Conclusions**

Given the strong differentials of fertility by level of female education in all African countries and the huge body of literature that explains the causal mechanisms behind the pervasive negative association between the two (Bongaarts 2010; Cochrane 1979; Castro Martin 1995; Fuchs and Goujon 2014; Lutz and Skirbekk 2014), it seems plausible to *prima facie* assume the possibility of a direct causal relationship between the stalled trend in female education and the subsequent stall in fertility decline in the countries affected by the former.

A more detailed cohort- and education-specific analysis is needed to more systematically establish the relationship between the identified education discontinuity and the fertility stall, using data from the rounds of Demographic and Health Surveys in sub-Saharan African countries. The analysis should allow the comparison of the fertility

and education of cohorts of women born around the time of SAP, differentiating between more- and less-intensive SAP. This would be a logical next step after this first descriptive paper. Our analysis only shows that the stalls in education for women born between 1975 and 1985 that are observed in 8 out of 10 African countries that experienced SAP might have resulted in the observed fertility stalls in 1995–2010. Conversely, other countries in sub-Saharan Africa that did not show such education discontinuities also experienced smooth and continuous fertility declines, in clear contrast to those experiencing fertility stalls. Hence, this could potentially point to the long-sought-after common cause of stalled fertility in the countries affected.

If, after more detailed analysis, this explanation of the stalled fertility does indeed hold, then this will also have far reaching consequences for the future prospects of fertility and population growth in the countries affected. Given that the described education discontinuity in many countries was a temporary phenomenon that only affected some cohorts, and that the subsequent cohorts of young women again benefitted from continued educational improvement, this could be expected to result in near-term aggregate level fertility declines in the countries affected.

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