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Urbanization, fertility and child education in Sub-Saharan Africa☆

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HIGHLIGHTS

- We analyze the relationship between urbanization, fertility and child education in Sub-Saharan Africa.
- The use of individual-level data allows us to analyze structural rural–urban differences.
- Fertility is lower in urban than in rural areas.
- Investment in child education is higher in urban than in rural areas.
- These patterns are consistent with a transition from a (post-)Malthusian towards a modern growth regime.

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ABSTRACT

Using individual-level survey data, we show that the urbanization process in today's Sub-Saharan Africa is associated with the fertility transition and increased investment in child education. This is consistent with the experience of the Western economies during their transition from a (post-)Malthusian towards a modern growth regime. The use of individual-level data allows us to analyze structural rural–urban differences, holding constant age and regional characteristics which are potentially confounding factors in regional- and country-level regressions.

1. Introduction

Urbanization, i.e., the realization of structural change away from subsistence farming to modern service and industry sectors, was central in the transition of Western economies from a (post-)Malthusian towards a regime of sustained economic growth (e.g., Galor, 2005). Closely interconnected with urbanization were the processes of fertility transition and increased investment in child education, both of which were first observed in cities (Guinnane, 2011). Together, the three characteristics are seen as necessary conditions that enabled the transition to long-run growth (Galor, 2005).[1]

Recent literature on the urbanization process in Sub-Saharan Africa (SSA) – a region in which this process has started relatively recently – highlights the existence of (short-run) negative externalities, such as congestion and crime, associated with urbanization (e.g., Glaeser, 2014; Castells-Quintana, 2017; Jedwab and Vollrath, 2017). However, whether urbanization in today's SSA is, akin to the experience of the Western economies during their transition towards sustained economic growth, associated with a decline in fertility as well as increased investment in human

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[1] Even though urbanization, fertility transition and increased investment in child education are seen as necessary for the transition towards sustained economic growth, the precise mechanisms, such as direction of causality, interlinking the processes are not well understood (Guinnane, 2011).

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capital of children is an important, but largely open, question. This paper constitutes a first step towards addressing this shortcoming. Depending on the answer, the implications with respect to the effects of policies targeted at reducing rural to urban migration on long-run growth, currently implemented in 84% of African countries (p. 90 UN, 2013), can be quite different.

For our empirical analysis, we draw on nationally and subnationally representative individual-level survey data on women aged 15–49 and their children from the Demographic and Health Surveys (DHS) Program. Our cross-sectional dataset encompasses 427,234 observations, covers 72% of countries in SSA, and more than 80% of its total population. Relying on individual-level data allows us to control for country and region fixed effects as well as age of respondents. This implies that we will only compare urban residents with rural dwellers that are of same age and live in the same region. Thereby, we abstract from macro factors, such as the level of development or institutional characteristics, which potentially confound studies conducted at aggregate levels. For example, cross-country analyses of the relationship between urbanization and fertility rates are based on fertility data that are averaged across rural and urban populations. This masks existing structural rural–urban differences.

Our results document that women of reproductive age that reside in urban areas have fewer children (both, alive and ever born) relative to women living in rural areas. Furthermore, investment in human capital of their children, measured by years of schooling, is higher. Together, these findings imply a shift from quantity to quality of children in urban areas, which constitutes an essential step in the transition towards sustained economic growth (Galor and Weil, 2000). Exploiting the representativeness of our data, we show that these results carry over to the subnational as well the country level. Furthermore, we show that mother's eduction and income are two important factors underlying our findings. Overall, our findings document that the urbanization process in today's SSA is not at odds with a transition towards a modern growth regime. It is important to note, however, that our results do not suggest that polices designed to alleviate congestion-related costs – undoubtedly existing today – are not needed in order to promote economic growth in the short run.

Our paper relates to various branches of literature. Closely related is the literature on economic growth, particularly on unified growth theory (Galor and Weil, 2000; Galor, 2005) as well as the literature on fertility decisions, initiated by the seminal work of Becker (1960). Equally relevant are studies that analyze determinants and consequences of urbanization in developing countries, and in SSA in particular (e.g., Henderson, 2005; Jedwab et al., 2017; Henderson et al., forthcoming). Within this field, a number of studies find that the costs associated with urbanization, such as congestion-related externalities or increased crime rates, can outweigh potential benefits (e.g., Glaeser, 2014; Castells-Quintana, 2017; Jedwab and Vollrath, 2017). These results are not incompatible with ours. While the aforementioned papers focus on current effects of urbanization, our paper addresses its compatibility with a transition to long-run growth. Finally, our paper relates to the demographic literature on urbanization in SSA that correlates the level of urbanization with fertility rates in cross- or single-country regressions (e.g., Shapiro and Tambashe, 2002; White et al., 2008). Our study adds to the existing literature by providing empirical evidence for the compatibility of SSA's urbanization process with a transition towards a modern growth regime. The use of individual-level data avoids issues related to aggregate analyses.

The remainder of the paper is organized as follows: Section 2 outlines our empirical strategy, Section 3 describes the data, while Section 4 presents the results and Section 5 concludes.

2. Empirical strategy

We assess the strength of the relationship between population growth, child education and urbanization at the individual level using the following cross-sectional OLS regression setup:

$$y_{i,r,c} = \psi \ \text{urban}_{i,r,c} + \boldsymbol{\gamma}' \mathbf{C}_{i,r,c} + \tau_r + \varepsilon_{i,r,c}. \quad (1)$$

The dependent variable $y_{i,r,c}$ is the outcome variable for individual i, living in region r and country c. Whether a person resides in an urban area is captured by the indicator $\text{urban}_{i,r,c}$. The vector $\mathbf{C}_{i,r,c}$ includes individual-level controls such as age fixed effects and sex of the children. Regional differences, and with that country-specific differences, are accounted for by region fixed effects (τ_r). The idiosyncratic error term is symbolized by $\varepsilon_{i,r,c}$ and the standard errors are clustered at the DHS cluster level.[2] All regressions are weighted using sample weights provided by the DHS. For the empirical analysis at the subnational and country level, we employ regression setups analogous to Eq. (1).

3. Data and descriptive analysis

Data

We employ individual-level survey data on women aged 15–49 from the Demographic and Health Surveys (DHS) Program. The surveys are representative at both country level and subnational reporting areas. The latter typically correspond to first-level administrative country subdivisions or groups thereof.

For each respondent, we extract the number of children ever born, the number of children that died as well as the number of children alive.[3] The surveys further report the respondents' age, years of schooling, wealth (captured by an index ranging from 1 to 5) as well as location of residence, categorized as either rural or urban. We link the surveyed women to their children, for whom information on sex, age and educational attainment is provided.[4]

The DHS surveys are conducted at irregular intervals and the number of waves available per country vary. When multiple survey waves exist, we use the most recent, subnationally representative, survey.[5] Overall, the individual-level dataset of women aged 15–49 encompasses 427,234 observations gathered from 31 SSA countries that encompass 304 regions. These women are mothers to a total of 403,711 children aged 6–17.[6] Representative subnational and country-level datasets are constructed by computing weighted averages of the variables.

Fig. 1 depicts the geographical scope of our dataset along with the subnational reporting areas. Shaded gray are the countries included. They are home to 83% of SSA's total population.

Summary statistics

Table 1 reports summary statistics for our key variables stratified according to type of residence. Thirty-eight percent of respondents live in urban areas. The comparison of unconditional means foreshadows formal results presented in the next section: Women

[2] The level of significance remains unchanged if we cluster the standard errors at the regional level (Tables A.3–A.4).

[3] "Number of children alive" captures the difference between the number of children ever born and the number of children that died, i.e., the "net" number of children.

[4] Information on child education, sex and age is reported in the DHS household surveys.

[5] Table A.1 reports details on countries and survey waves included in our analysis.

[6] Primary school starting age in SSA is typically age six (World Development Indicators). When investigating investment in child education, we therefore restrict our attention to children aged 6 and older. The pattern of results remains unchanged if we include children of all ages.