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# Explaining fertility stalls in Sub-Saharan Africa: The role of structural change

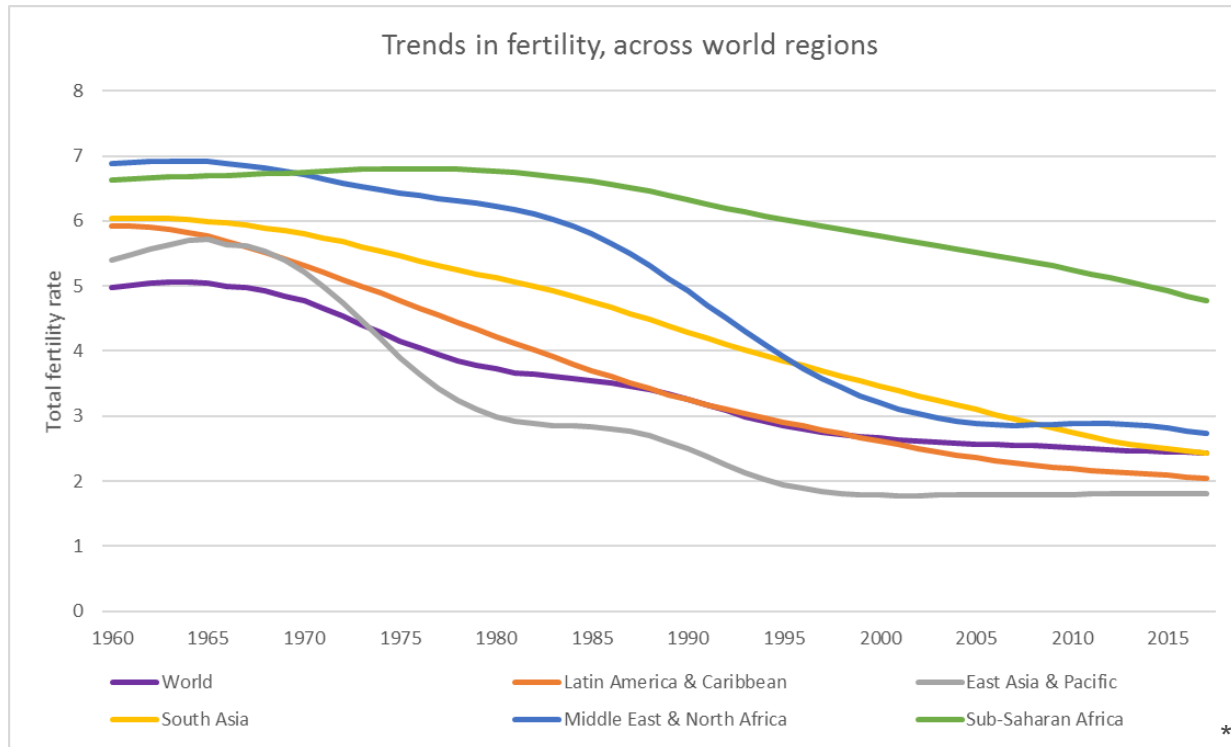
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## Differences in global fertility trends



- Strong and sustained decline in fertility across the world
- Fertility remains high in SSA

\*Source: World Bank Indicators

## Why does fertility remain high in SSA?

### *Significant economic growth and poverty reduction in SSA*

#### Growth dynamics in non-SSA

- **Structural change**, i.e. massive migration of labor from agriculture to industry
- **Formalization** of the economy and increased social protection
- Increasing returns to education and labor market opportunities for women, reduced returns to child labor



**Becker:** reduce the quantity of children, but increase the “quality” of children

#### Growth dynamics in SSA

- Growth based on agriculture, natural resource extraction and informal sector



## Why should we be interested in SSA's fertility dynamics?

- SSA's population projected to double and reach 2.5 billion people until 2050
- BUT: uncertainty about fertility trends → growth might exceed projections

### Scenario 1

#### Absence of structural change



Continuously high population growth, slow economic growth, increased underemployment



**Demographic burden** on public resources

### Scenario 2

#### Structural change



Slower population growth, sustained economic growth



**Demographic dividend**

## Research question and contribution to the literature

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***To what extent can we explain SSA's lagging fertility transition by sluggish structural change?***

*To our knowledge, our study is the first to empirically analyze the link between fertility and structural change in a rigorous way at the sub-national level across a large number of low- and middle-income countries.*

## Construction of a novel dataset

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- Demographic and Health Surveys (DHS) + Living Standard Measurement Surveys (LSMS) + annual harmonized global nighttime light dataset (Li et al. 2020)
- All data aggregated and merged at the regional level (admin 1)
- Panel of 543 regions covering 60 low- and middle-income countries from SSA, MENA, LA and Asia; 1986 to 2018 (N= 2370)

## Measurement of fertility

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Year-specific regional means of the **total fertility rate (TFR)**:  
“the total number of children born [...] to a woman in her lifetime if she were subject to the [...] age-specific fertility in the population”  
(WHO, 2018)

## Measures of structural change and industrialization

Outcome	Definition
<b>Women's education</b> (share with different education levels)	<ul style="list-style-type: none"> <li>• No education</li> <li>• Primary school education</li> <li>• Secondary school or higher education</li> </ul>
<b>Women's occupation</b> (share in different occupations)	<ul style="list-style-type: none"> <li>• Agriculture (employed, self-employed)</li> <li>• Nonagricultural formal jobs (skilled industry workers, professionals, clerical staff)</li> <li>• Nonagricultural informal jobs (unskilled industry workers, sales, services, domestic workers)</li> <li>• Not working</li> </ul>
<b>Regional economic development</b>	<ul style="list-style-type: none"> <li>• Ln mean nighttime luminosity</li> </ul>
<b>Insurance coverage</b>	<ul style="list-style-type: none"> <li>• Share of households with health insurance</li> </ul>
<b>Relative female wages</b>	<ul style="list-style-type: none"> <li>• Ln mean male wage &amp; Ln mean female wage               <ul style="list-style-type: none"> <li>➢ 15-60 years old, dependent employment, urban, &gt;20 hours/week, non-agricultural jobs</li> </ul> </li> </ul>



## Model alternatives

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$$TFR_{rct} = X'_{rct}\beta_1 + \beta_2 T_t + \varepsilon_{rct} \quad (1a)$$

$$TFR_{rct} = X'_{rct}\beta_1 + \beta_2(\gamma_c \times T_t) + \varepsilon_{rct} \quad (1b)$$

$$TFR_{rct} = \rho WTFR_{rct} + X'_{rct}\beta_1 + \beta_2(\gamma_c \times T_t) + \varepsilon_{rct} \quad (1c)$$

$$TFR_{rct} = \rho WTFR_{rct} + X'_{rct}\beta_1 + \beta_2(\gamma_c \times T_t) + v_{rc} + \varepsilon_{rct} \quad (1d)$$

- $TFR_{rct}$ : Regional total fertility rate (TFR)
- $WTFR_{rct}$ : Spatial lag of regional TFR
- $X'$ : Vector containing indicators of structural economic change
- $T$ : Time-fixed effects
- $\gamma$ : Country-fixed effects
- $\gamma \times T$ : Country-specific time trends
- $v$ : Region-fixed effects

## Main results

### Main regressions – biggest sample

Indicators of structural change	Sample 1a	Sample 1a	Sample 1a	Sample 1a
	Spec. 1a	Spec. 1b	Spec. 1c	Spec. 1d
	(1)	(2)	(3)	(4)
Share of women with primary school education	-1.364** (0.5249)	-1.686** (0.7847)	-1.686** (0.7395)	-0.972 (0.7279)
Share of women with post-primary education	-3.043*** (0.4181)	-3.202*** (0.4190)	-3.200*** (0.3926)	-3.457*** (0.7499)
Share of women working in nonagricultural formal jobs	-3.131*** (0.9996)	-2.083** (0.9105)	-2.062** (0.8547)	-1.088** (0.5125)
Share of women working in nonagricultural informal jobs	1.445** (0.5724)	-0.225 (0.4188)	-0.230 (0.3928)	0.435** (0.1988)
Share of women that do not work	-0.133 (0.4185)	-0.389 (0.2503)	-0.388* (0.2338)	-0.0553 (0.1227)
Economic development (mean nighttime luminosity)	-0.243*** (0.0326)	-0.155*** (0.0230)	-0.155*** (0.0214)	-0.0436** (0.0197)
General time-effects	yes	no	no	no
Country-specific time-effects	no	yes	yes	yes
Spatial lag	no	no	yes	yes
Region-fixed effects	no	no	no	yes
R-Squared	0.591	0.856	0.857	0.664
Observations	1,982	1,982	1,982	1,982
Region groups	528	528	528	528

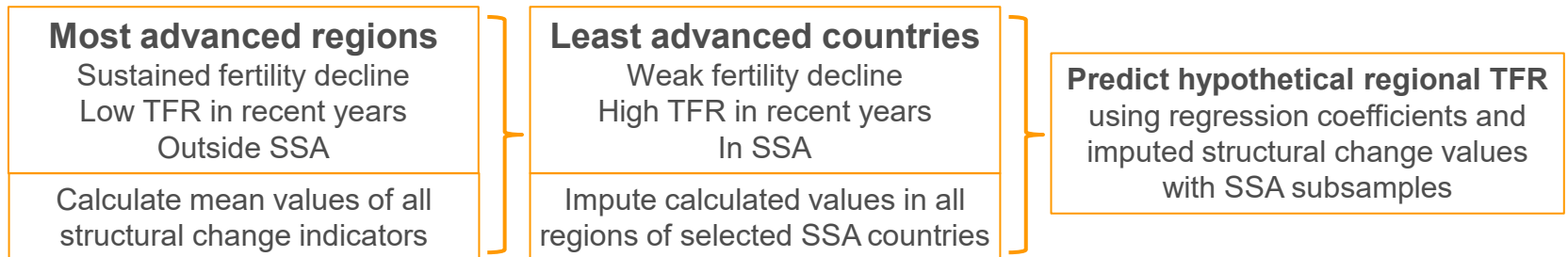
Notes: Each column refers to one regression. 13 regions have information on female occupation, female employment and/or economic development for only one survey year and thus do not contribute to the fixed-effects regressions in Column (4).

Source: Own calculations using data from DHS and LSMS (and similar) surveys.

## The unlocked potential of structural economic change

### Simulations

How high would fertility be in SSA had the region experienced similar structural economic change as the „most advanced“ regions in our sample?



→ Structural change could decrease TFR in SSA's highest fertility regions from around 6 children to 3 – 4.3 children (by 27 to 50%)

## The unlocked potential of structural economic change

### Shorrocks decomposition

Calculates relative contribution of explanatory variables to  $R^2$

	Sample 1a	Sample 1b (SSA)	Sample 2a	Sample 2b (SSA)
Female education	21.95 %	25.22 %	26.54 %	27.18 %
Female employment	12.40 %	13.89 %	13.77 %	16.49 %
Economic development	12.89 %	12.29 %	8.22 %	6.11 %
Country-specific time trends	52.76 %	48.61 %	51.46 %	50.22 %
Total R-squared	0.86	0.76	0.86	0.76
Female education			23.86 %	25.05 %
Female employment			12.92 %	15.45 %
Economic development			8.02 %	5.57 %
Insurance coverage			7.17 %	4.56 %
Country-specific time trends			48.03 %	49.36 %
Total R-squared			0.86	0.77

Source: Own calculations using data from DHS and LSMS (and analog) surveys.

- Structural change contributes to half of the explained variation in the regional TFR

## Our paper shows that...

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- Structural economic change is an important driver of the fertility transition
- Especially important role of female (post-primary) education, female employment in nonagricultural formal jobs and a general increase in economic development
- Suggestive evidence for role of health insurance and relative female wages
- Boost industrialization (classic manufacturing / industries without smokestacks)
- Invest in education and labor market reforms that increase female labor market participation
- Expand access to formal insurance