Impact of Women's Education on Fertility Rates Botswana

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Introduction

The research question that I have been interested in is the impact of education about sex and fertility for women and how that changes the fertility rate.

Women's education raises the value of time spent working in the market and, as a result, the opportunity cost of spending time to take care of their child seems less. Across time and places, there is a clear negative link between women's education and fertility, although its meaning is ambiguous. Women's level of education may impact fertility through its effects on children's health, the number of children desired, and women's ability to give birth and understanding of various birth control options. Each of these are influenced by local, institutional, and national circumstances. Their relative importance may fluctuate as a society develops economically. We analyse the education–fertility relationship by using data on women from Botswana. A realistic quantification of such a relationship can be problematic for various reasons. First, factors such as motivation and ability are associated with fertility and education but cannot be observed and as a consequence cannot be included in the model.

The central research question of this project revolves around understanding the intricate relationship between women's education and fertility rates. It delves into how education about sex and fertility for women influences their decisions regarding childbirth, ultimately impacting the fertility rate.

Theoretical Framework

Women's education plays a crucial role in shaping their priorities and opportunities. As women become more educated, they often prioritize career and personal development, which can lead to delayed childbearing. This phenomenon is well-documented globally, showing a negative correlation between women's education levels and fertility rates

Memory updated Sure, I can provide a fuller explanation and elaboration on the content of your final project submission. Here's an expanded version of the text with more detailed explanations and insights:

Final Project Submission: Impact of Women's Education on Fertility Rates in Botswana Introduction The central research question of this project revolves around understanding the intricate relationship between women's education and fertility rates. It delves into how education about sex and fertility for women influences their decisions regarding childbirth, ultimately impacting the fertility rate.

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Factors Influencing Fertility

Several factors contribute to the complex dynamics of fertility rates among women. These include:

Children's Health: Educated women are more likely to prioritize their children's health, leading to smaller family sizes as they can allocate more resources per child. Desired Number of Children: Education often correlates with a desire for fewer children, as women focus on quality over quantity. Birth Control Knowledge and Usage: Education empowers women with knowledge about birth control options, leading to informed family planning decisions. Socioeconomic Conditions: Local, institutional, and national circumstances heavily influence fertility rates, with economic development often leading to lower fertility rates.

> Research Question
>
> Does education affect the rate of fertility in Women? What other factors influence rate of fertility in Women?

Research Methodology

To explore these dynamics, data from women in Botswana was analyzed. The dataset includes variables such as children, education level, access to utilities like electricity and television, marital status, and knowledge about and usage of birth control methods. # Hypothesis

> **Note**
>
> Ho : 1 = 2 = … = p-1 = 0
> H1 : j 0, for at least one value of j
> OR
> Ho : Variances equal, model is significant.
> H1 : Variances not equal, model is not significant.

Null Hypothesis (Ho): There is no significant relationship between women's education levels and fertility rates. Alternative Hypothesis (H1): There exists a significant correlation between women's education levels and fertility rates, indicating that higher education levels lead to lower fertility rates.

Some measure of access to birth control could be useful if it varied by region. Often, policy changes in the advertisement or availability of contraceptives can be found. But there is no region information(parameters) in our data set.

Loading in packages:

```
library(readr)
library(tidyverse)
```

```
Warning: package 'dplyr' was built under R version 4.2.3
```

```
Warning: package 'stringr' was built under R version 4.2.3
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.4     v purrr     1.0.2
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.4.4     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.0
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to becor
```

```
library(ggplot2)
library(dplyr)
library(readxl)
library(DataExplorer)
```

```
library(summarytools)
```

```
Warning in fun(libname, pkgname): couldn't connect to display
"/private/tmp/com.apple.launchd.Ml8iUd9Uyo/org.xquartz:0"

system might not have X11 capabilities; in case of errors when using dfSummary(), set st_opti

Attaching package: 'summarytools'

The following object is masked from 'package:tibble':

    view
```

```
library(lmtest)
```

```
Loading required package: zoo

Attaching package: 'zoo'

The following objects are masked from 'package:base':

    as.Date, as.Date.numeric
```

```
library(car)
```

```
Loading required package: carData

Attaching package: 'car'

The following object is masked from 'package:dplyr':

    recode

The following object is masked from 'package:purrr':

    some
```

```
library(reshape)
```

```
Attaching package: 'reshape'

The following object is masked from 'package:lubridate':

    stamp

The following object is masked from 'package:dplyr':

    rename

The following objects are masked from 'package:tidyr':

    expand, smiths
```

Reading in Data:

The data was acquired from Professor Sander's article that he used.

```
Womendata <-  read.csv("_data/data.csv")
```

Variable
children
education
electricity
tv
urban
evermarr
radio
bicycle
knowmeth
usemeth
age
firsthalf

##Methodology: The research methodology employs quantitative analysis using data collected from women in Botswana. The dataset includes variables such as educational attainment,

age, marital status, access to healthcare, use of contraceptives, and fertility rates. Descriptive statistics, correlation analysis, and regression models are utilized to explore the relationships between these variables and derive meaningful insights.

Descriptive Statistics

```
summary(Womendata)
```

```
      X           mnthborn         yearborn          age       
 Min.   :   1   Min.   : 1.000   Min.   :38.00   Min.   :15.00  
 1st Qu.:1091   1st Qu.: 3.000   1st Qu.:55.00   1st Qu.:20.00  
 Median :2181   Median : 6.000   Median :62.00   Median :26.00  
 Mean   :2181   Mean   : 6.331   Mean   :60.43   Mean   :27.41  
 3rd Qu.:3271   3rd Qu.: 9.000   3rd Qu.:68.00   3rd Qu.:33.00  
 Max.   :4361   Max.   :12.000   Max.   :73.00   Max.   :49.00  

   electric          radio              tv             bicycle       
 Min.   :0.0000   Min.   :0.0000   Min.   :0.00000   Min.   :0.0000  
 1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.00000   1st Qu.:0.0000  
 Median :0.0000   Median :1.0000   Median :0.00000   Median :0.0000  
 Mean   :0.1402   Mean   :0.7018   Mean   :0.09291   Mean   :0.2758  
 3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:0.00000   3rd Qu.:1.0000  
 Max.   :1.0000   Max.   :1.0000   Max.   :1.00000   Max.   :1.0000  
 NA's   :3        NA's   :2        NA's   :2         NA's   :3       
     educ             ceb            agefbrth        children     
 Min.   : 0.000   Min.   : 0.000   Min.   :10.00   Min.   : 0.000  
 1st Qu.: 3.000   1st Qu.: 1.000   1st Qu.:17.00   1st Qu.: 0.000  
 Median : 7.000   Median : 2.000   Median :19.00   Median : 2.000  
 Mean   : 5.856   Mean   : 2.442   Mean   :19.01   Mean   : 2.268  
 3rd Qu.: 8.000   3rd Qu.: 4.000   3rd Qu.:20.00   3rd Qu.: 4.000  
 Max.   :20.000   Max.   :13.000   Max.   :38.00   Max.   :13.000  
                                   NA's   :1088                    
   knowmeth         usemeth          monthfm          yearfm       
 Min.   :0.0000   Min.   :0.0000   Min.   : 1.00   Min.   :50.00  
 1st Qu.:1.0000   1st Qu.:0.0000   1st Qu.: 3.00   1st Qu.:72.00  
 Median :1.0000   Median :1.0000   Median : 6.00   Median :78.00  
 Mean   :0.9633   Mean   :0.5776   Mean   : 6.27   Mean   :76.91  
 3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.: 9.00   3rd Qu.:83.00  
 Max.   :1.0000   Max.   :1.0000   Max.   :12.00   Max.   :88.00  
 NA's   :7        NA's   :71       NA's   :2282    NA's   :2282   
    agefm          idlnchld         heduc            agesq       
```

```
 Min.   :10.00   Min.   : 0.000   Min.   : 0.000   Min.   : 225.0
 1st Qu.:17.00   1st Qu.: 3.000   1st Qu.: 0.000   1st Qu.: 400.0
 Median :20.00   Median : 4.000   Median : 6.000   Median : 676.0
 Mean   :20.69   Mean   : 4.616   Mean   : 5.145   Mean   : 826.5
 3rd Qu.:23.00   3rd Qu.: 6.000   3rd Qu.: 8.000   3rd Qu.:1089.0
 Max.   :46.00   Max.   :20.000   Max.   :20.000   Max.   :2401.0
 NA's   :2282    NA's   :120      NA's   :2405
     urban           urb_educ         spirit          protest
 Min.   :0.0000   Min.   : 0.000   Min.   :0.0000   Min.   :0.0000
 1st Qu.:0.0000   1st Qu.: 0.000   1st Qu.:0.0000   1st Qu.:0.0000
 Median :1.0000   Median : 0.000   Median :0.0000   Median :0.0000
 Mean   :0.5166   Mean   : 3.469   Mean   :0.4222   Mean   :0.2277
 3rd Qu.:1.0000   3rd Qu.: 7.000   3rd Qu.:1.0000   3rd Qu.:0.0000
 Max.   :1.0000   Max.   :20.000   Max.   :1.0000   Max.   :1.0000

    catholic         frsthalf          educ0          evermarr
 Min.   :0.0000   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
 1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000
 Median :0.0000   Median :1.0000   Median :0.0000   Median :0.0000
 Mean   :0.1025   Mean   :0.5405   Mean   :0.2078   Mean   :0.4767
 3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:0.0000   3rd Qu.:1.0000
 Max.   :1.0000   Max.   :1.0000   Max.   :1.0000   Max.   :1.0000
```

```
str(Womendata)
```

```
'data.frame':   4361 obs. of  28 variables:
 $ X       : int  1 2 3 4 5 6 7 8 9 10 ...
 $ mnthborn: int  5 1 7 11 5 8 7 9 12 9 ...
 $ yearborn: int  64 56 58 45 45 52 51 70 53 39 ...
 $ age     : int  24 32 30 42 43 36 37 18 34 49 ...
 $ electric: int  1 1 1 1 1 1 1 1 0 1 ...
 $ radio   : int  1 1 0 0 1 0 1 1 1 1 ...
 $ tv      : int  1 1 0 1 1 0 1 1 0 0 ...
 $ bicycle : int  1 1 0 0 1 0 1 1 0 0 ...
 $ educ    : int  12 13 5 4 11 7 16 10 5 4 ...
 $ ceb     : int  0 3 1 3 2 1 4 0 1 0 ...
 $ agefbrth: int  NA 25 27 17 24 26 20 NA 19 NA ...
 $ children: int  0 3 1 2 2 1 4 0 1 0 ...
 $ knowmeth: int  1 1 1 1 1 1 1 1 1 1 ...
 $ usemeth : int  0 1 0 0 1 1 1 1 1 0 ...
 $ monthfm : int  NA 11 6 1 3 11 5 NA 7 11 ...
```