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Fertility Transition in Burundi: Contribution of Individual and Contextual factors among Women in Union

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Abstract

Against the backdrop of uneven demographic transitions in sub-Saharan Africa, grasping the dynamics of fertility at a national level poses a significant challenge to the development of effective public policies. This study aims to ascertain the impact of individual and contextual factors on the fertility of union women in Burundi. To accomplish this, the study employs an analytical approach that systematically examines the repercussions of these factors. The analysis is based on data from the 2010 and 2016-2017 Demographic and Health Surveys (DHS). The 2016–17 DHS-III survey covered a sample of 16,620 households and focused on women aged 15–49. The study was conducted in accordance with a two-stage sampling plan to ensure representation at the national level and in urban and rural areas. A

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similar methodology was employed for the 2010 EDSB-II survey, which was conducted on a sample of 9,024 households. The study also incorporated representative samples from urban and rural areas, with biomarker tests administered in 50% of selected households. This approach enabled differentiated analyses to be performed by region and area of residence. While the overall quality of the data was satisfactory, the integration of specific modalities, including age at first marriage and the economic status of women in union, was necessitated by the small size of certain subgroups within the sample. Furthermore, while the decomposition method has been demonstrated to be an effective tool for identifying sources of variation in fertility, it is important to acknowledge its limitations. Notably, the method cannot distinguish precisely between individual and contextual effects, which may consequently introduce bias into the estimates. The findings, derived from the application of rudimentary and sophisticated decomposition techniques, suggest that the observed decline in fertility in Burundi is predominantly due to a performance effect. Furthermore, multivariate analyses demonstrate that economic activity, educational attainment, women's decision-making power and region of residence significantly influenced the reduction in fertility among union women between 2010 and 2016-2017. This study provides a detailed understanding of the mechanisms that led to the decline in fertility in Burundi, clearly distinguishing between the composition and performance effects. The central role of women's empowerment in this process is emphasized. Consequently, enhancing public policies that facilitate women's access to education, formal employment, and participation in household decision-making is recommended to support the ongoing demographic transition.

Keywords: Fertility, women in union, decomposition, empowerment, Burundi

Introduction

The issue of fertility has always been at the heart of societal debates and global political concerns, particularly in sub-Saharan Africa where demographic dynamics are undergoing significant transformations (Leridon, 2015; Millogo, 2020). Rising or falling fertility in this region has direct repercussions on family structures, economic development, and public health and education policies (Sène, 2017). While the decline in fertility represents a challenge in the African context, it also reflects a profound change in social behavior and expectations concerning motherhood, a phenomenon that needs to be understood as a matter of urgency in the context of the Sustainable Development Goals (SDGs), for which the target of reducing gender

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inequalities and access to reproductive health are major issues (Tabutin & Schoumaker, 2020).

In Burundi, a fragile East African country, the decline in fertility is a relatively recent phenomenon, and its roots and consequences are still poorly understood (Singoye et al., 2024). Although the effects of fertility change have been the subject of numerous studies worldwide (Caldwell, 1976; Caldwell, 1977; Thévenon & Gauthier, 2010; Zah, 2010; Trovato, 2016; Singh et al, 2017; Ngamtiate & Nganawara, 2023), little research has focused specifically on this issue in Burundi. Studies devoted to these aspects remain rare, leaving a gap in the in-depth understanding of the demographic dynamics specific to the Burundian context. Some studies come close to addressing the issue but do not directly tackle the effects of fertility on women in union. They address related aspects without exploring in depth the specific effects of fertility variation (Nibaruta et al., 2021; Sindayihebura et al., 2023; Sindayihebura, 2023). The statistics show a downward trend in the average number of children per woman within unions, but the socio-economic and individual factors influencing this dynamic remain largely unexplored. Why has there been such a decline in a country where the economic, political and social challenges remain considerable? What are the implications of this trend for women in union, who are at the heart of this demographic transition? There is still a great deal of research to be done to better understand how these effects influence the decline in fertility in the Burundian context.

Based on an analysis of the factors determining the decline in fertility within women's unions, this article seeks to fill a gap in the existing literature by exploring aspects that have not yet been addressed using a demographic decomposition method, in particular the role of socioeconomic and individual variables in this phenomenon. In addition, this research aims to fit in with the dynamics of Burundi's current sectoral policies, particularly those relating to reproductive health and women's empowerment, while taking account of the country's specific realities. Faced with the challenges of rapid population growth and limited access to health services, the Burundian context demands special attention. While fertility control policies do exist, their implementation remains fragile and uneven, making it necessary to analyze the underlying forces influencing women's fertility decisions. This study is even more relevant today, as Burundi continues its efforts to achieve the SDGs, particularly in terms of reducing inequalities and improving women's living conditions. This article takes a critical look at these issues, highlighting factors that have been neglected until now while contributing to the knowledge needed to adjust public policies and better meet women's expectations in terms of health and reproductive choices. We hypothesize that the slight fall in fertility observed among women in union between 2010 and 2017 can be explained mainly by a performance effect. More specifically, given the

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decisive role of women's level of education and decision-making power regarding household purchases in the transformation of reproductive behaviour in Burundi, we posit that women's economic activity and decision-making power have significantly contributed to this decline in fertility over the period 2010 and 2016-2017. This article aims to use a demographic decomposition approach to analyse the influence of individual and contextual factors on the decline in fertility among women in a union in Burundi between 2010 and 2017, to gain a better understanding of the mechanisms underlying this demographic transition and to inform public policies on reproductive health and women's empowerment.

Background, Data and Methods

Background

Burundi is characterised by rapid population growth that is difficult to control, with an annual growth rate of 2.4%, which could lead to a doubling of the population in 29 years (Kamuragiye & Buzingo,2019). It also has a high population density, accompanied by an extremely young population, with 35% of the total population aged under 15 and 46% aged under 20 ((RGPHAE, 2025). Despite a slight decline, fertility remains high, falling from 6.9 children per woman in 1987 to 5.5 children in 2017 among women in unions aged 15-49 (ISTEEBU & ICF International, 2017).

In Burundi, the birth rate is often seen as an asset for the family, which is seen as a source of wealth (Manirakiza, 2008)). It is also seen as a valuable support for parents in their old age. By encouraging births, it is supposed to ensure future support for older generations (Hakizimana, 2005). In addition, many families prefer a large number of children for their contribution to farm work, and mechanization could reduce fertility in Burundi, especially as household poverty is associated with high fertility (Nibaruta et al., 2021).

Data

To analyse the effects of changes in fertility over time, it is essential to use demographic decomposition methods to understand the factors underlying these changes. For this reason, two data sources will be used as a reference, namely data from the Demographic and Health Surveys II and III (DHS) for 2010 and 2016-2017. The DHS data are accessible to all interested parties, providing up-to-date information on key issues such as fertility and family planning among women in the union. They are nationally and regionally representative, making it possible to monitor trends while taking account of differences between urban and rural areas. The comparability of the data over time and across provinces makes it possible to assess the impact of public policies and analyze trends. Because of their reliability, these data can be used

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for research purposes in demography as well as in other areas of the social sciences.

However, certain limitations were encountered when analyzing the data, in particular the grouping of modalities for certain variables due to the small size of certain categories. For example, for the variable relating to women's economic activity, it was necessary to merge several modalities in order to ensure sufficient statistical representatives, but this resulted in a loss of precision for certain specific categories. Similarly, age at first marriage was grouped into three brackets, which limits the precision of the analysis, particularly for women married at 25 or over. Although these groupings were essential to ensure the robustness of the analysis, they reduced the granularity of the results. Nevertheless, these methodological limitations do not affect the overall validity of the conclusions of this study.

Variables

Since the decomposition method applies to quantifiable phenomena, the substantial variable used in this study is the national average parity, weighted by the fertility rates observed in 2010 and 2016-2017.

At the individual level, the main explanatory variables are women's level of education and age at first marriage among women in union. The socioeconomic variables taken into account include household standard of living, decision-making regarding household purchases, and the economic activity of women in union. The 'level of education' variable was recorded in three categories: no level, primary, secondary and above. Similarly, age at first marriage was grouped into three brackets: under 18 (early marriage), 18 to 24 (young married women), and 25 and over. This grouping was motivated by the small size of certain sub-groups, which limited the possibility of introducing more modalities. The variable relating to decision-making on household purchases was kept in its original form, with three modalities: woman alone, joint decision, and spouse alone. The household standard of living was maintained as it appears in the source data for this study, divided into five categories: low, medium and high. This variable was constructed from durable goods and household characteristics using a multivariate descriptive statistical method of multiple correspondence analysis to give each household a score. As the 1st dimension (axis) of the MCA (Multiple Correspondence Analysis) represents the greatest source of joint variation between all the qualitative variables taken into account for the construction of this household standard of living variable, this axis (score on the ^{1st}axis) is broken down into the 5 quintiles mentioned above. Finally, the variable on women's economic activity was grouped into three categories due to insufficient numbers in certain modalities: inactive, farmer and manager.

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Analysis Methods

For this study, three methods of fertility analysis are envisaged, namely simple and advanced decomposition, as well as the multivariate decomposition method, which would make it possible to identify the factors associated with changes in fertility among women in union aged 15 to 49.

Simple decomposition

We use simple decomposition to identify the sources of change in the decline of a quantifiable demographic phenomenon according to the factors highlighted in the present study (Eloundou et al., 2017). This method consists of quantifying the contributions of these factors to the quantifiable social change in fertility among women in union. More specifically, it concerns the contribution of the behaviour effect and the composition effect. The behaviour effect reflects the actual change in fertility in the different categories of explanatory variables, while the composition effect indicates changes in the relative size of the groups (Ngamtiate & Nganawara, 2023). The simple decomposition formula is obtained by starting from the expression of the behaviour effect and the national population as a weighted average of the performances in the various sub-populations (Sindayihebura et al., 2023).

$$Y_t = \sum \quad W_{it} * Y_{it} \tag{1}$$

Y_t , being the average parity weighted by the fertility rates observed in year ***t*** at the national level; ***i,*** the various categories of the factors mobilised; ***t*** the time, $\mathbf{W_{it}}$ the proportions at time ***t*** of women in a union of each category ***i***, of the factors highlighted; $\mathbf{Y_{it}}$ the fertility rate at time ***t*** of each modality ***i*** of these factors.

Given the above, the change in fertility among women in union can be broken down as follows:

$$\Delta \mathbf{Y} = \sum \underline{y_i} * \Delta \mathbf{W}_i + \sum \underline{w_i} * \Delta \mathbf{y}_i \tag{2}$$

Composition effect Behavior effect

With $\underline{y_i} = (Y_{it1} + Y_{it2})/2$, $\underline{w_i} = (W_{it1} + W_{it2})/2$ and $\Delta W = (W_{it1} - W_{it2})$

Where ***t*** denotes time and subscripts *1* and *2* denote 2010 and 2016-2017 respectively, ***i*** denotes the categories of the independent variables considered in this study, ΔY denotes the historical change in average parity between 2010 and 2016-2017 among women in a union at national level (Y2010-Y2017), $\underline{y_i}$, represents the average value of the dependent variable in category ***i,*** between 2010 and 2016-2017 (this is a historical average of the parity achieved for the two periods), $\mathbf{W}_i$ indicates the proportion of women in a union in 2010 and 2016-2017,ΔW gives the difference in the proportions of

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women in the same category between 2010 and 2016-2017 and ΔY_{it} indicates the difference in average parity between 2010 and 2016-2017 among women in a union in category ***i***.
Thus, the total change = composition effect + behaviour effect.

Advanced decomposition

Simple decomposition is easy to use but may lack accuracy (Eloundou et al., 2017). The same author shows that the choice of the advanced decomposition method depends on the results obtained by the simple decomposition, depending on whether the composition or performance effect predominates, or both at the same time.

We can therefore estimate the statistical relationship between performance (average parity) and the classification variables using the following regression equation:

$$Y_i = \alpha + \beta X_i + \mu_i$$

In this formula, α also called the intercept, represents the basic fertility (basic performance), **β** the effect of the classification variables **X_1, X_2, ... X_n.** In other words, β is the increase in average parity weighted by fertility rates associated with a unit increase in each of the classification variables. μi represents the error, which can also be interpreted as the relative out performance/under performance of the group, or as the residual effect of factors other than the classification variables taken for this **X_i** study, not considered in the analysis.

The differentiation of this performance (change in the value of **Y*i***) between two periods) is given by **:** $\Delta Y_i = \Delta\alpha + \underline{\beta}\Delta X_i + \underline{x_i}\Delta\beta + \Delta\mu_i$

$\underline{\beta}$, represents the average increase in the effects of educational attainment between the two periods. However, since the definitions of the categories of ***X*** do not change between the two years, the $\underline{\beta}\Delta X_i$ in this equation cancels out and $\underline{x_i}$, equals to **X*i*.**

By incorporating into the basic equation of the previous formula, we obtain the following advanced decomposition:

$$\Delta Y = [\sum \underline{y} * \Delta W_i] + [\sum \underline{w_i} * \Delta\alpha] + [\sum w_i * \underline{\beta}\Delta x_i] + [\sum \underline{w_i} * \underline{x_i}\Delta\beta] + [\sum \underline{w_i} * \Delta\mu_i]$$

(A) (B_1) (B_2) (B_3) — Composition effect

B_4 — Performance effect

ΔY: Change in average parity at the national level between 2010 and 2016-2017.

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Composition effect (A): Impact of changes in demographic structure

$\bar{\mathbf{y}}$**:** Average parity according to each category of women in union, ΔW_i: Change in the proportion of women in union in category ***i*** between 2010 and 2016-2017.

This component captures the impact of changes in the demographic structure of women in the union in Burundi on the total variation in average parity.

Performance effect (B_1): Impact of variations in fertility rates specific to each group

$\bar{\mathbf{w}}_i$**:** average proportion of women in union by category ***i***

$\Delta\boldsymbol{\alpha}$**:** change in average parity specific to a given category.

This component reflects the impact of variations in average parity within each category of classification variables, taking into account their weight in the population.

Effect of Explanatory Factors (B_2): Impact of changes in explanatory factors on fertility

$\mathbf{w}_i$**:** weight or proportion of women in union for each category of the classification variables**,**

$\bar{\boldsymbol{\beta}}$: average value of an explanatory factor (such as education level)**,**

$\Delta \mathbf{x}_i$: Change in the explanatory factor xi within each group.

This parameter **"$\mathbf{w}_i$"** measures the weighting factor and will be used mainly in advanced decomposition using demographic elaboration. In such a decomposition, w represents the average number of children per woman belonging to a given category when the independent value is nominal. This makes it possible to obtain a more accurate estimate, by correctly reflecting the distribution of the average number of children per woman according to different categories.

Effect of changes in coefficients (B_3)

$\bar{\mathbf{w}}_i$ **:** average proportion of women in union within group *i* between the two periods**,**

$\bar{\mathbf{x}}_i$ **:** average value of the explanatory factor **X** in category ***i*,**

$\Delta\boldsymbol{\beta}$: a change in the coefficients associated with the explanatory factors.

This component analyses the impact of variations in the regression coefficients or parameters associated with the explanatory factors on the total variation in the fertility rate.

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Residual effect (B_4): Unexplained or residual component in the variation in fertility

$\Delta\mu_i$**:** unexplained or residual change in the fertility rate among women in union in each category i

This component captures variations that are not explained by the other effects (compositional, performance or explanatory factors) and represents residual or unforeseen effects on fertility.

Multivariate decomposition

The first two methods follow a descriptive approach, where a single variable is used to analyze the phenomenon. In contrast, the Oaxaca-Blinder multivariate decomposition method makes it possible to simultaneously analyze the impact of several socio-economic, cultural, demographic or contextual factors on the fertility of women in union between 2010 and 2017, by decomposing the differences between these periods into observed and unobserved effects. This makes it possible to study the overall impact and interdependence of these factors while taking into account temporal trends and unobserved effects. This method has been used in Canada to analyze the rise in the low-income rate among immigrants, and in Burkina Faso to study the factors associated with changes in adolescent and youth fertility between 2010 and 2021 (Garnett & Feng, 2003; Bassinga et al., 2024). It has the advantage of using the results of regression models to break down the differences between the groups into two components. For this article, these two groups are the period 2010 and 2017 respectively. Thus, the first component is attributed to differences in composition, i.e. differences in the characteristics between the groups and the second is attributed to differences in the effects of the characteristics, i.e. differences in the coefficients of the explanatory variables (Daniel & Hirotoshi, 2011) .

In addition to the individual variables used in the two previous methods, we will also add community variables such as area of residence and region of residence to deepen the analyses. Thus, this model designates **Y** as the vector representing the explained variable (the parity achieved by women in the union in Burundi) the matrix **X** represents the independent variables taken into account in this article and **β** is the vector of regression coefficients associated with these independent variables.

The difference in the means of the variable **Y** (parity achieved) between the two groups (between 2010 and 2017) can be expressed as follows:

$$\bar{Y}_A - \bar{Y}_B = \bar{X}_A\beta_A - \bar{X}_B\beta_B \quad (1)$$

$\bar{Y}_A$and$\bar{Y}_B$, are the means of the **Y** values for the periods 2010 and 2017, respectively and $\bar{X}_A$ et $\bar{X}_B$,are the means of the independent variables in 2010

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and 2017. The effects$\beta_A \; et \; \beta_B$, are the estimated regression coefficients in 2010 and 2017.

To understand where the difference in averages comes from, we decompose this difference into two parts (double decomposition) where effect **E** represents the contribution of differences in the characteristics (the independent variables) between 2010 and 2017 and effect **C** represents the effect of the coefficients or the contribution of differences in the coefficients (the effects of the independent variables) between the two periods.
Equation (1) can be rewritten to include these two components:

$$\bar{Y}_A - \bar{Y}_B = \underbrace{(\bar{X}_A\beta_A - \bar{X}_B\beta_A)}_{E} + \underbrace{(\bar{X}_B\beta_A - \bar{X}_B\beta_B)}_{C} \quad (2)$$

We can then decompose the **E** and **C** effects into the specific contributions of each independent variable : X_k

Effect explained for each variableX_k:$E_k = W\,\Delta x_k \cdot E$ (3) where $W\,\Delta x_k$, denotes the weighting of the contribution of the variable X_k, to the effect explained.

Effect of the coefficients for each variable X_k: $C_k = W\,\Delta\beta_k \cdot C$ (4) with$W\,\Delta\beta_k$ the weighting of the contribution of the variableX_k, in the effect of the coefficients.

The weightings $W\,\Delta x_k$ and$W\,\Delta\beta_k$, are calculated as follows:

Weights for the explained effect $W\,\Delta x_k = \frac{\beta_{Ak}(\bar{X}_{Ak} - \bar{X}_{Bk})}{\Sigma_{\{k=1\}}^{K}\beta_{Ak}(\bar{X}_{Ak} - \bar{X}_{Bk})}$ (5)

where $X_{Ak} \; et \; X_{Bk}$, are the means of the independent variablesX_k , between the period 2010 and 2017.

Weights for the effect of the coefficients$W\,\Delta\beta_k = \frac{\bar{X}_{Ak}(\beta_{Ak} - \beta_{Bk})}{\Sigma_{\{k=1\}}^{K}\bar{X}_{Ak}(\beta_{Ak} - \beta_{Bk})}$ (6)

where$\beta_{Ak} \; et \; \beta_{Bk,}$, are the coefficients of the independent variablesX_k, in the 2010 and 2017 periods.

The gross difference in **Y** is expressed as a weighted sum of the contributions of each variable and each component (explained effect and coefficient effect).

$$\bar{Y}_A - \bar{Y}_B = \Sigma_{\{k=1\}}^{K}E_k + \Sigma_{\{k=1\}}^{K}C_k. \quad (7)$$

Finally, Stata software will be used to estimate fertility rates as a function of the explanatory variables selected. The analysis of the effects at the origin of the decline in fertility in Burundi will then be carried out using

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Excel software. Finally, the multivariate decomposition of the Oaxaca-Blinder type will also be carried out using Stata.

Results

Simple and Advanced Decomposition

Simple decomposition is appreciated for its simplicity, but it can sometimes lack precision, whereas advanced decomposition provides more robust and precise results. For this reason, as a first step, we are going to use the two methods of analysis together to carry out a more detailed analysis of the effect of decomposition and performance. Although advanced decomposition produces more robust results, it is suited to a uni-varied analysis and does not provide a complete view of the dynamics of the phenomenon. For this reason, we will use the Oaxaca-Blinder multivariate decomposition, which takes several factors into account to obtain a more complete view of the factors influencing the fertility of women in union, taking into account the individual effects of each characteristic and the interactions between them, while incorporating unobserved effects.

The educational level of women in the union

The results of the simple decomposition according to the level of education of women in the union between 2010 and 2017 highlight contrasting dynamics in terms of fertility. On the one hand, women with no education and those with higher education both contributed to the significant rise in fertility, with respective contributions of -1044.43% and -161.89% (chart 1). This trend can be explained by the fact that uneducated women, who often face precarious socio-economic conditions, may be encouraged to have more children. The trend reversal observed among women with secondary education and above, despite their smaller numbers, could also be linked to wider societal changes. These women, benefiting from education, may feel greater freedom in their life choices, which encourages them to make decisions that favour higher fertility than expected. In contrast, women with a primary level of education showed a contribution to the decline in fertility of 1350.91%. This could reflect a trend towards smaller families, where primary education, although limited, favours lifestyle choices that restrict the number of children. These results underline the complexity of the interactions between education level, lifestyle choices and fertility dynamics, highlighting the importance of advanced analysis in understanding these trends.

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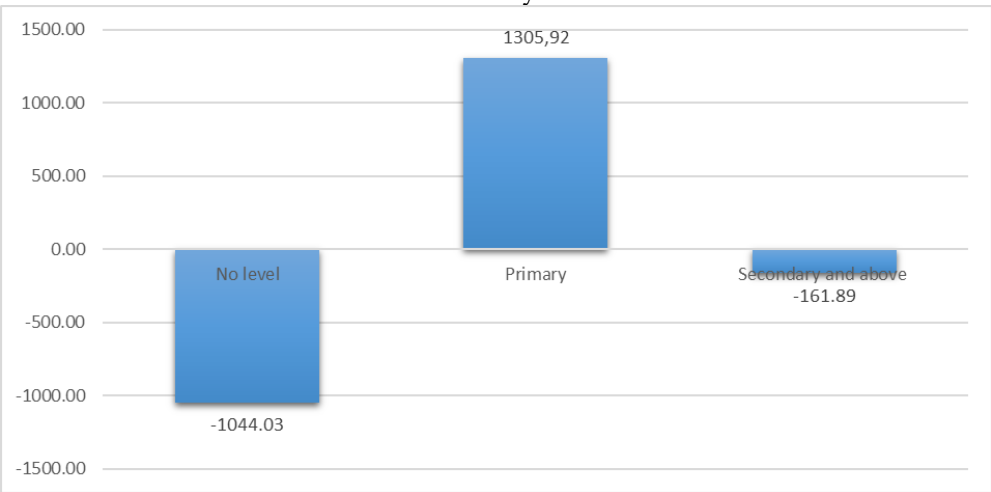
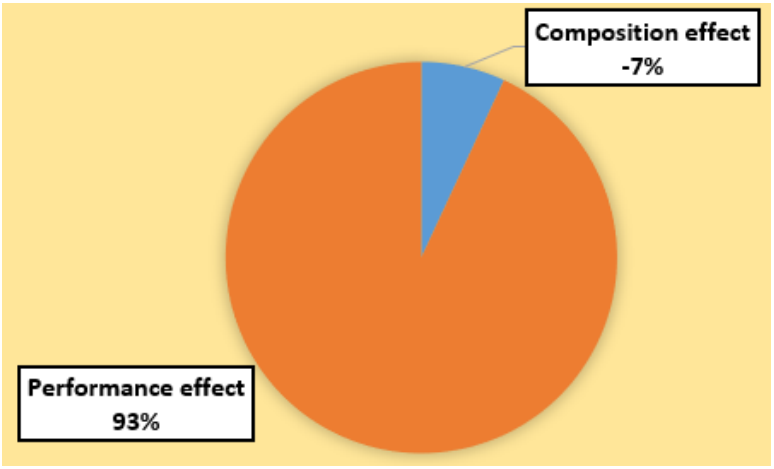
Figure 1: Relative contribution of education categories of women in the union to the fall in fertility



Source: DHS II-2010 and DHS III-2016-2017 Data

Applying the simple decomposition formula presented above reveals that, between 2010 and 2017, the fertility level of women in union, according to their level of education, increased by 8.06% due to the composition effect. In contrast, over the same period, the performance effect led to a 108.06% increase in fertility among women in union (chart 2). These results highlight the predominance of the performance effect in the decline in fertility among women in unions aged 15-49 between 2010 and 2016-2017. Ultimately, variations in fertility within the different categories of women in union, according to their level of education, have contributed to the overall decline in fertility in Burundi.

Figure 2: Contribution to the total change in fertility by level of education of women in union



Source: Data from EDS, II-2010 and EDS, III-2016-2017 (ISTEEBU and ICF International)

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Analysis of the advanced decomposition reveals complex dynamics influenced by the level of education of women in union, as shown by the results in Table 1. Women with no education show an effect of -0.023 on fertility, suggesting that lack of formal education is associated with higher fertility rates, probably due to limited access to information on family planning. In contrast, those with primary education had a positive effect of 0.015, indicating that the acquisition of a basic education contributes to a significant reduction in fertility rates, thanks to greater awareness of contraceptive methods and reproductive health.

The advanced decomposition highlights the performance (α) and composition (β) effects on fertility. For women in unions with no education, the performance effect is -0.163, while the composition effect is zero (0.000), highlighting that women with no education suffer negative fertility consequences without benefiting from any advantage linked to their demographic composition. For those with primary education, the performance effect is -0.190 and the composition effect is 0.107, indicating that primary education not only reduces fertility but also improves understanding of reproductive health issues. As for secondary education, although the effect is marginal (0.005), it shows a slight tendency to reduce fertility, with a differentiation effect of 0.063, suggesting that these women are better informed and able to make informed decisions.

The results of the simple decomposition show that the increase in fertility is partly due to changes in the size of women in the union, according to their level of education, with a contribution of -0.125. On the other hand, the results of the advanced decomposition indicate that this increase is more related to the differentiation effect, with a value of 0.125. On the other hand, the simple decomposition reveals that the total drop in fertility among women in union is mainly attributable to the performance effect, with a total decrease of 309%. However, the advanced decomposition shows that this performance effect still predominates, but this time it contributes to the rise in fertility with a value of -519%. These results illustrate the complexity of the factors influencing fertility, both in its rise and its fall.

Table 1: Results of the decomposition of the performance effect according to the woman's level of education

Simple decomposition			Advanced decomposition			
The educational level of the woman in the union	**Effect of composition**	**Performance effect**	**Composition effect**	**Basic effect**	**Differentiation effect**	**Residual effect**
	wj	Yj	wj	**α**	**β**	**E**
No level	0,062	0,187	0,062	-0,067	0	-0,109
Primary	-0,045	-0,143	-0,045	-0,064	0,041	0,209
Secondary and above	-0,141	0,073	-0,141	-0,066	0,084	-0,107
Contribution to the different categories	-0,125	0,117	-0,125	-0,198	0,125	-0,006
Overall contribution	-327%	309%	-327%	-519%	329%	-17%

Source: Data from EDS, II-2010 and EDS, III-2016-2017

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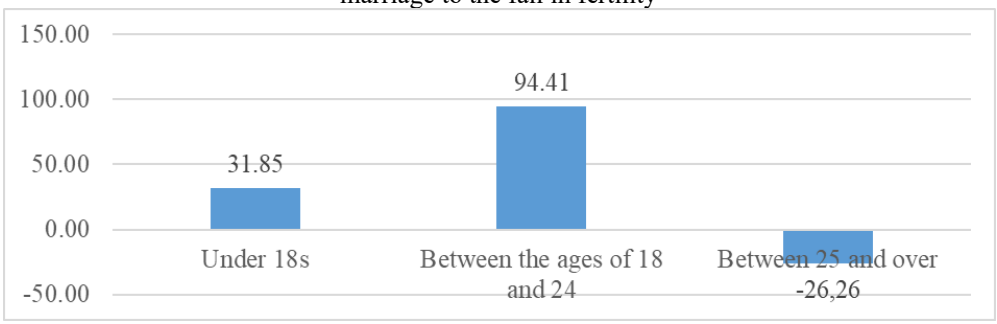
Average age at first marriage

The findings of the elementary decomposition by age at the primary marriage of women in the union demonstrate that those women in the union who are married at the age of 25 and above contributed to the increase in fertility to -26.25 between 2010 and 2017 (chart 3). Conversely, women in the union who were married at under 18 and between 18 and 24 contributed to the fall in fertility by 31.85% and 94.41%, respectively. The findings indicate that women in union who married between the ages of 18 and 24 contributed to the observed decline in fertility among women in union in Burundi.

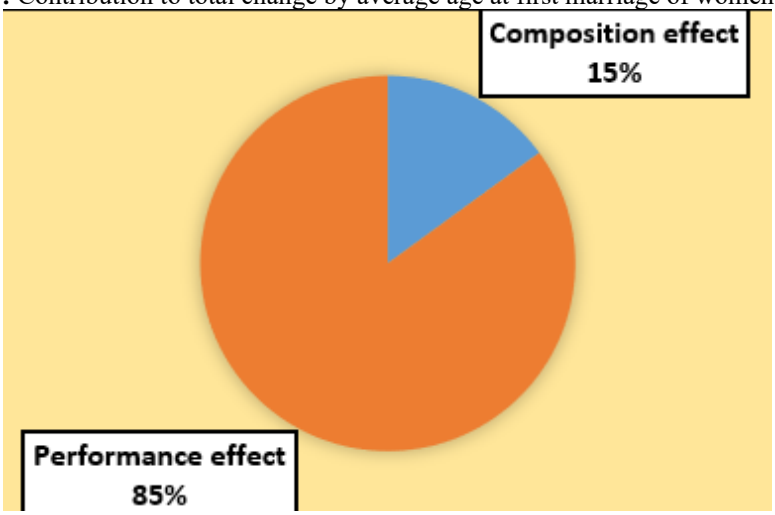
Graph 3: Total relative contribution of the categories of women in union at their first marriage to the fall in fertility



Source: Data from EDS, II-2010 and EDS, III-2016-2017

The results of the simple decomposition show that the level of fertility among women in union by age at first from 2010 to 2017 fell as a result of a performance effect of 85.02% and a composition effect of 14.98% (Figure 4). Throughout the period, the performance effect contributed more to the decline in fertility among women in the union in Burundi.

Figure 4: Contribution to total change by average age at first marriage of women in union



Source: Data from EDS, II-2010 and EDS, III-2016-2017

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Analysis of women's age at first marriage, using advanced decomposition, provides important insights into its implications for fertility (table 2). The data indicate that early marriage, defined as marriage before the age of 18, has a positive effect on fertility (0.049), although this effect is relatively small (0.006) in terms of performance. This suggests that women married early are more likely to have children quickly, but the overall impact on fertility remains limited, perhaps due to contextual or socio-economic factors that also influence reproductive decisions.

For the 18-24 age group, the effect is also positive (0.041), with a significant performance of 0.124. This result indicates that women who marry in this age group have higher fertility rates, which can be interpreted as a period when family planning is less widespread, resulting in a higher number of births. However, the composition effect is negative (-0.950), suggesting that the demographic composition of this group may include limiting factors, such as limited access to education or reproductive health services, which could negatively influence long-term fertility.

In contrast, for women married at 25 and over, the effect is negative (-0.064), indicating a tendency towards lower fertility rates in this group. The performance effect is very small (0.018), suggesting that women married later potentially benefit from better opportunities in terms of education and career, allowing them to delay childbearing. The differentiation effect is particularly pronounced (-0.336), showing that the characteristics of this demographic group (such as a higher level of education or more favourable socio-economic status) contribute to a reduction in births. The residual effect (0.347) is significant, indicating that other factors, not captured by the base effects, also play an important role in the fertility of women married later. This could include cultural elements or reproductive health policies that favour late motherhood and birth spacing.

The findings of the elementary decomposition process indicate that the decline in fertility is predominantly attributable to the performance effect, which is associated with the alteration in fertility across diverse age categories at the initial marital union of women in union between 2010 and 2016-2017. This decomposition reveals that 85% of the total decline in fertility can be explained by this performance effect. Conversely, when considering advanced decomposition, while the residual effect predominates, the performance effect remains significant. The study found that this contributed to an increase in fertility across different categories, with respective contributions of -1.285% for the rise within categories and -737% for the total rise in fertility. This underscores the significance of the performance effect in analyzing fertility trends, whilst acknowledging the pivotal role played by other factors, such as the residual effect. The results of this study underscore the pivotal role of age at marriage as a crucial factor in determining fertility. The implementation of

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policies aimed at postponing the age of marriage, whilst concomitantly enhancing access to educational opportunities and reproductive health services, has the potential to contribute to a reduction in fertility rates and the enhancement of the quality of life for women.

Table 2: Results of the decomposition of the performance effect of age at first marriage

Age at first marriage	Simple decomposition		Advanced decomposition			
	Composition effect	**Performance effect**	**Composition effect**	**Basic effect**	**Differentiation effect**	**Residual effect**
	wj	Yj	wj	**α**	**β**	**E**
Under 18s	0,049	0,006	0,049	0,016	0,000	-0,009
Between the ages of 18 and 24	0,041	0,124	0,041	0,038	-0,950	1,036
Between 25 and over	-0,064	0,018	-0,064	0,007	-0,336	0,347
Contribution to the different categories	0,026	0,148	0,026	0,060	-1,285	1,374
Global Contribution	15%	85%	15%	34%	-737%	788%

Source: DHS II-2010 and DHS III-2016-2017 data

A simple breakdown of fertility trends by socioeconomic variables

Decision-making on the purchase of household goods

Graph 5 of the simple decomposition according to decision-making regarding household goods influenced the variation in fertility between 2010 and 2017. Thus, when the woman makes the purchase decision alone or when the decision is joint, this contributes to the fall in fertility by 119.36% and 697.69% respectively. On the other hand, when the husband makes the purchase decision alone, this results in an increase in fertility of minus 717.05% (chart 5)

Graph 5: Total relative contribution of household goods decision-making categories to the decline in fertility

Source: DHS II-2010 and DHS III-2016-2017 Data

The results of the simple decomposition indicate that the level of fertility among women in union, depending on who makes the decisions regarding the purchase of household goods, fell between 2010 and 2017. This decline is attributed to a performance effect and a composition effect, valued

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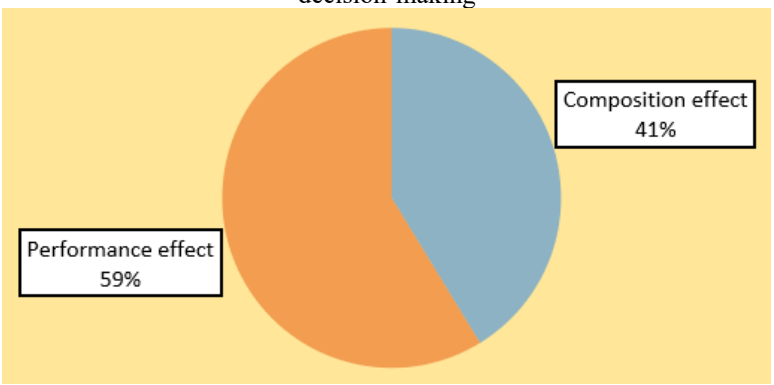
at 58.73% and 41.28% respectively. Over this period as a whole, the performance effect had a greater influence on the increase in fertility among women in union in Burundi (see Figure 6).

Graph 6: Contribution to the total change in fertility according to household goods decision-making



Source: DHS II-2010 and DHS III-2016-2017 Data

The findings of the advanced decomposition analysis demonstrate that the decision-making process concerning the acquisition of household goods exerts a substantial influence on fertility among women within the union in Burundi, as illustrated in Table 3. The findings indicate that when decisions are made exclusively by the woman, the composition effect is positive (0.063), while the performance effect is marginally negative (-0.023). This finding suggests that, while women's autonomy is generally beneficial, contextual factors may impede the positive effect on fertility. Conversely, when decisions are made collectively, the composition effect is found to be highly significant (0.217), thereby suggesting that a collaborative approach fosters a more conducive family environment for fertility. This balanced approach to decision-making has the potential to enhance mutual support, thereby optimizing resource management and living conditions, which are pivotal for the well-being of children.

On the other hand, decisions made solely by the spouse show a negative composition effect (-0.267), indicating that this dynamic may be detrimental to women's interests and, consequently, to fertility. Although the performance effect is slightly positive (0.027), it is insufficient to compensate for the harmful consequences of male decision-making dominance. The residual effect (0.182) highlights the importance of other factors influencing this dynamic, suggesting that more attention should be paid to promoting shared decision-making.

In the different categories of women in union, the results of the simple decomposition highlight the predominance of the performance effect in the decline in fertility between 2010 and 2016-2017, with a contribution of 0.020.

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Furthermore, in general, this performance effect exerts a significant influence of 59% on the decline in fertility during this period. However, the results of the advanced decomposition reveal that the performance effect, with a value of -0.280, predominates in the rise in fertility between 2010 and 2016-2017. Overall, this effect contributed more to the rise in fertility, reaching a value of -839%. It should also be noted that factors not taken into account in this study exert a significant influence, with a variation of 1171% in the fall in fertility between 2010 and 2016-2017. These results highlight the need for initiatives to strengthen women's participation in the management of family resources, which could foster environments that are more conducive to motherhood and family planning.

Table 3: Results of the decomposition of the performance effect according to decision-making on the purchase of household goods

Decision-making on the purchase of household goods	Simple decomposition		Advanced decomposition			
	Composition effect	**Performance effect**	**Composition effect**	**Basic effect**	**Differentiation effect**	**Residual effect**
	wj	Yj	wj	**α**	**β**	**E**
Women only	0,063	-0,023	0,063	-0,023	0,000	0,002
Joint decision	0,217	0,016	0,217	-0,160	0,040	0,208
Spouse only	-0,267	0,027	-0,267	-0,097	0,049	0,182
Contribution to the various categories	0,014	0,020	0,014	-0,280	0,089	0,391
Overall contribution	41%	59%	41%	-839%	265%	1171%

Source: DHS II-2010 and DHS III-2016-2017 Data

Household standard of living

The results of the simple decomposition of the influence of household standard of living on the decline in fertility among women in union in Burundi reveal some interesting dynamics (Figure 7). In terms of the contribution made by groups, we can see that women in unions living in households with a high standard of living are those who have contributed most to the rise in fertility (-665.60) between the two periods. The following investigation focuses on the period between the two specified timeframes. However, women in unions living in very poor households contributed more to the decline in fertility among women in unions in Burundi.

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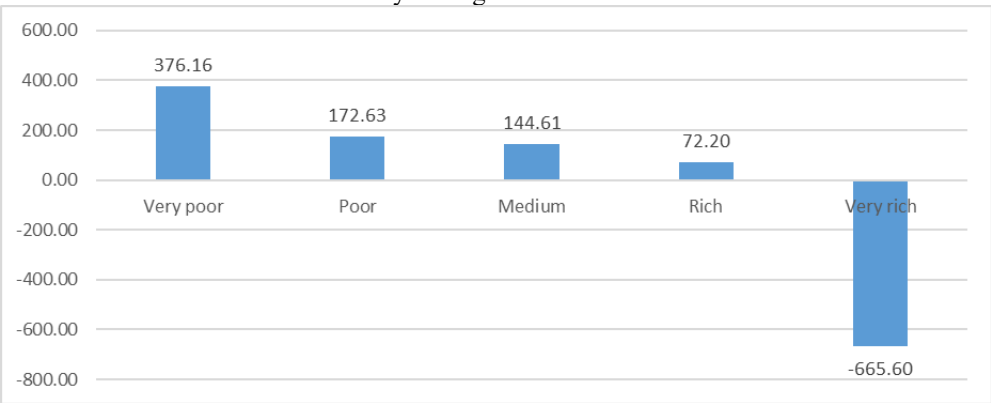
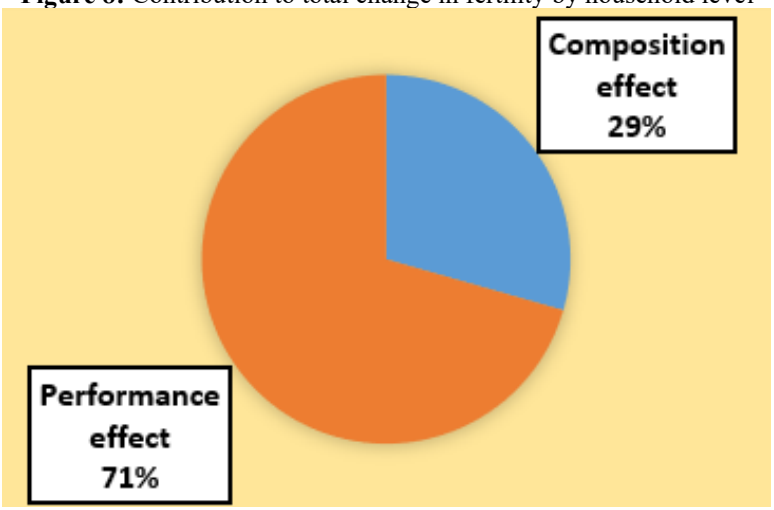
Figure 7: Total relative contribution of household standard of living categories to the fall in fertility among women in union



Source: DHS II-2010 and DHS III-2016-2017 Data

Application of the simple decomposition formula above shows that the level of fertility among women in union according to the household standard of living from 2010 to 2017 fell by about 71 % as a result of a performance effect, compared with about 29 % as a result of the composition effect (see Figure 8). This means that the change in the fertility behaviour of women in union according to their household standard of living made a significant contribution to the about 71 % fall in fertility. The effect of the change in the structure of the population according to the level of education of women in the union also contributed to about 29 %.

Figure 8: Contribution to total change in fertility by household level



Source: DHS II-2010 and DHS III-2016-2017 data

Analysis of the results of the advanced decomposition according to the standard of living highlights some interesting trends regarding the influence

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of this factor on fertility. For households classified as 'very poor', the composition effect is positive (0.028), suggesting that precarious living conditions can lead to high fertility rates. This could be attributed to limited access to education and family planning resources. However, the performance effect is slightly negative (-0.010), indicating that although these households have higher fertility rates, this does not necessarily translate into satisfactory family well-being (table 4).

In the 'poor' group, the composition effect remains positive (0.048), while the performance effect becomes more pronounced and negative (-0.034). This indicates that the challenges faced by these households are significant, leading to high fertility rates without sufficient resources for optimal child development. In contrast, for the 'average' and 'rich' groups, the composition effects are negative (-0.009 and -0.086 respectively), suggesting a trend towards lower fertility rates, possibly due to better access to education and healthcare, which allows women to make more informed choices about their reproduction.

For 'very rich' households, although the composition effect is positive (0.003), the performance effect remains weak (0.007). This indicates that apparent wealth does not guarantee optimal reproductive decisions, as factors such as career priorities may also play a role. The residual effects, particularly for the 'poor' (-0.040) and 'rich' (0.003) groups, underline that unmeasured factors continue to influence fertility dynamics. In sum, these results highlight the crucial role of standard of living as a determinant of fertility, while calling for policies to improve access to educational and health resources, particularly for the most disadvantaged households.

The results of the simple decomposition show that the performance effect predominates, with a fall of 0.007 in the different categories of women in union between 2010 and 2016-2017. In contrast, the results of the advanced decomposition highlight the differentiation effect (0.042%) in the decline in fertility between 2010 and 2016-2017. Moreover, overall, the results of the simple and advanced decomposition show that the performance and differentiation effects predominate in the decline in fertility by 71% and 412% respectively. Although both effects contribute to the fall in fertility, the differentiation effect seems to have a much stronger impact, suggesting that changes in the demographic and socio-economic characteristics of women in union are key factors in this development.

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Table 4: Results of the decomposition of the performance effect by household standard of living

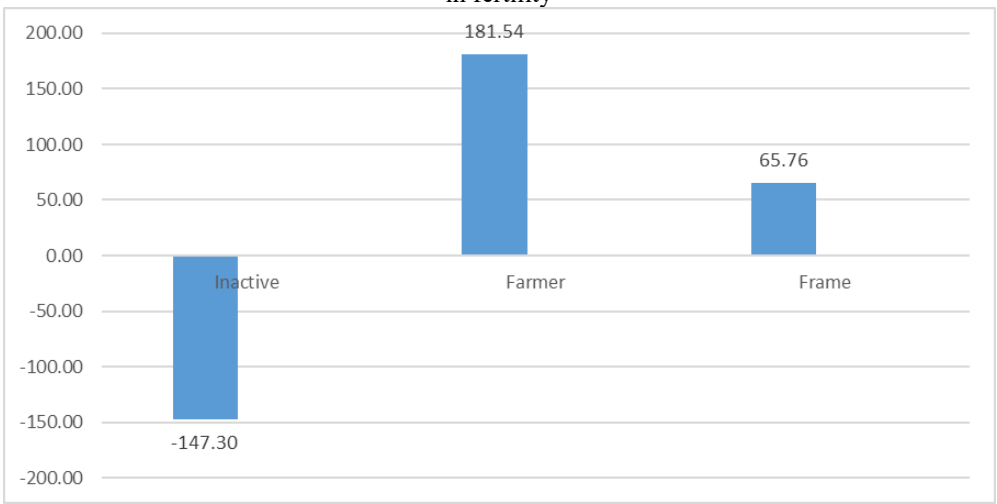
ousehold standard of living	Simple decomposition		Advanced decomposition			
	Composition effect	**Performance effect**	**Composition effect**	**Basic effect**	**Differentiation effect**	**Residual effect**
	Wj	Yj	wj	**α**	**β**	**E**
Very poor	0,022	0,016	0,022	-0,002	0,000	0,018
Poor	0,028	-0,010	0,028	-0,002	0,004	-0,012
Medium	0,048	-0,034	0,048	-0,002	0,008	-0,040
Rich	-0,009	0,016	-0,009	-0,002	0,012	0,007
Very rich	-0,086	0,018	-0,086	-0,002	0,018	0,003
Contribution to the various categories	0,003	0,007	0,003	-0,010	0,042	-0,025
Overall contribution	29%	71%	29%	-99%	412%	-242%

Source: DHS II-2010 and DHS III-2016-2017 data

Economic activity of women in unions

In this analysis, the results of the simple decomposition show that women farmers (181.54%) and managers (about 65 %) play a decisive role in the fall in the fertility rate, while the economically inactive (-147.30%) represent a major factor in the increase in fertility among women in the union in Burundi (Figure 9). These results indicate that changes in the occupational structure and evolving socio-economic roles of women strongly influence overall fertility among women in union in Burundi.

Figure 9: Total relative contribution of categories of women's economic activity to the fall in fertility



Source: DHS II-2010 and DHS III-2016-2017 Data

Interpretation of the results in the graph below reveals a significant dynamic in fertility among women in union between 2010 and 2017. The

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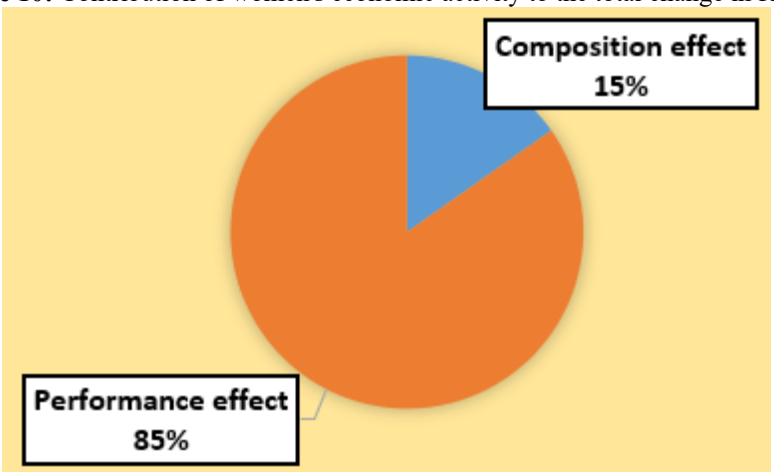
increase in fertility observed can be largely explained by a performance effect of 84.74%, which indicates that changes in women's reproductive behaviour or choices, irrespective of their socioeconomic profile, have played a major role (graph 10). In contrast, the composition effect, which accounts for about 15 %, indicates that changes in the structure of the population, such as the average age at childbirth or the proportion of women in the union in particular socioeconomic groups, have had a less significant impact on fertility. This implies that although demographic composition can influence fertility rates, most of the change is attributable to changes in behaviour or social norms.

Figure 10: Contribution of women's economic activity to the total change in fertility



Source: DHS II-2010 and DHS III-2016-2017 Data

Analysis of the economic activities of women in the union concerning fertility reveals significant results using the advanced decomposition method. For inactive women, the composition effect is negative (-0.200), indicating that the absence of economic activity is associated with higher fertility rates, which can be interpreted as a tendency to have children without the resources necessary for their well-being. The performance effect is also slightly negative (-0.027), suggesting that although inactivity may result in greater commitment to family responsibilities, this does not offset the negative impact on fertility. The residual effect (0.002) shows that other factors play a marginal role in this dynamic.

In contrast, women engaged in agricultural activities show a positive composition effect (0.154) and a substantial performance effect (0.125). This indicates that involvement in agriculture promotes more favourable conditions for fertility, perhaps by improving access to resources and enhancing women's economic status. For women managers, the composition effect is positive (0.069) and the performance effect is modest (0.032), suggesting that although their professional involvement may have benefits in terms of resources and family planning, there are still challenges to overcome to optimise these

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effects. The residual effect (0.044) also indicates that unmeasured factors contribute to this dynamic. In sum, these results underline the importance of women's economic engagement in fertility management, while highlighting the need for policies that support access to education and resources to improve living conditions and reproductive choices.

The results of the simple decomposition show that the performance effect predominates in the decline in fertility among women in union between 2010 and 2016-2017, contributing 0.130. On the other hand, the advanced decomposition shows that this performance effect contributes even more to an increase in fertility, with an impact of -0.280. Thus, overall, the simple decomposition reveals that the fall in fertility among women aged 15 to 49 in the union is mainly attributable to the performance effect, which has a positive impact of 85%. However, according to the results of the advanced decomposition, this performance effect is negative, with a contribution of -182%. Furthermore, it is important to note that residual effects also predominate in the advanced decomposition, with significant contributions of 0.342 and 222% according to the different categories. These results therefore underline the complexity of the dynamics influencing fertility, highlighting the importance of performance and residual effects in the variations observed.

Table 5: Results of the decomposition of the performance effect according to the woman's economic activity

Women's activity	Simple decomposition		Advanced decomposition			
	Composition effect	**Performance effect**	**Composition effect**	**Basic effect**	**Differentiation effect**	**Residual effect**
	wj	Yj	wj	**α**	**β**	**E**
Inactive	-0,200	-0,027	-0,200	-0,029	0,000	0,002
Farmer	0,154	0,125	0,154	-0,228	0,057	0,296
Frame	0,069	0,032	0,069	-0,023	0,012	0,044
Contribution to the various categories	0,023	0,130	0,023	-0,280	0,069	0,342
Overall contribution	15%	85%	15%	-182%	45%	222%

Source: DHS II-2010 and DHS III-2016-2017 data

Multivariate decomposition

The results of the Oaxaca-Blinder multivariate decomposition on the parity of women in union in Burundi, comparing the 2010 and 2016-2017 periods, reveal a gradual reduction in the parity achieved by women in union, with a statistically significant difference of -0.12 ($p = 0.036$). This reduction indicates a change in reproductive behaviour over time, probably influenced by social, economic and political factors. Improvements in women's education, women's participation and women's decision-making power over the purchase of household goods have certainly played a key role in this

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dynamic. Region of residence also has an impact on parity, with a tendency towards lower parity in some regions.

The effect of endowments (E), which measures the impact of the characteristics taken into account in this article, reveals a modest and statistically insignificant contribution ($p = 0.272$). This indicates that changes in women's socio-demographic characteristics between 2010 and 2017 did not have a major effect on parity. However, women's education has a positive but small impact on parity, suggesting that better access to education contributes, albeit modestly, to a reduction in the number of children.

In contrast, the coefficient effect, which examines the impact of these characteristics on parity, shows a significant and negative effect of -0.12 ($p = 0.030$). This indicates that changes in factors such as women's professional activity (-0.038) and their role in household decision-making (-0.019) had a substantial effect on the reduction in parity in 2016-2017 compared with 2010. Greater economic and decision-making autonomy seems to have enabled women to make fewer reproductive choices, reflecting the transformation of women's social roles in recent years.

Some variables, such as age at marriage, standard of living and place of residence, showed no significant variation in their coefficients between 2010 and 2017. For example, age at marriage influences parity, but changes in marriage behaviour between these two periods were not sufficient to induce significant changes in fertility. It seems that persistent cultural and social norms continue to play a major role in decision-making about marriage and fertility, particularly in certain regions of Burundi.

The interactions between these highlighted characteristics and the periods studied reveal that factors such as professional activity and household decision-making had a greater effect in 2016-2017. This indicates that women's economic and decision-making autonomy has continued to grow, contributing to a reduction in parity over time. Furthermore, although region of residence has a significant impact on parity in endowments ($p = 0.003$), this effect remains marginal in the coefficient and interaction analysis, indicating that regional differences play a role in women's reproductive choices, but are not the main drivers of the observed reduction in parity.

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Table 6: Effects of Socio-economic and Contextual Factors on the Parity of Women in Union in Burundi: Comparison between 2010 and 2016-2017

parity	Coefficient	Std, err,	z	P>|z|	[95% conf, interval]	
Overall						
2010 period	3.947646	.0473436	83.38	0.000	3.854854	4.040437
Period 2016-2017	4.068664	.0331173	122.86	0.000	4.003755	4.133572
Difference	-.1210179	.057777	-2.09	0.036	-.2342587	-.0077771
Endowments	.0212629	.0193563	1.10	0.272	-.0166748	.0592005
Coefficients	-.1218992	.0562782	-2.17	0.030	-.2322023	-.011596
Interaction	-.0203816	.0149908	-1.36	0.174	-.049763	.0089998
Endowments (C)						
Age at first marriage	.00956	.0068092	1.40	0.160	-.0037858	.0229058
Women's level of education	.0572791	.015717	3.64	0.000	.0264743	.0880838
Women's economic activity	-.0379185	.0078185	-4.85	0.000	-.0532424	-.0225945
Decision on the purchase of household goods	-.0194589	.0053658	-3.63	0.000	-.0299757	-.0089421
Household standard of living	-.001803	.0016115	-1.12	0.263	-.0049615	.0013554
Place of residence	.0001028	.0011716	0.09	0.930	-.0021935	.0023991
Region of residence	.0135014	.0045537	2.96	0.003	.0045763	.0224265
Coefficients (E)						
Age at first marriage	-.2713225	.1730186	-1.57	0.117	-.6104328	.0677878
Women's level of education	.1481097	.1544125	0.96	0.337	-.1545332	.4507526
Women's economic activity	-.2091815	.2672247	-0.78	0.434	-.7329323	.3145694
Decision on the purchase of household goods	-.4309172	.2062663	-2.09	0.037	-.8351917	-.0266427
Household standard of living	-.0685737	.118269	-0.58	0.562	-.3003766	.1632292
Place of residence	.1082788	.2892601	0.37	0.708	-.4586607	.6752183
Region of residence	-.2431755	.1317343	-1.85	0.065	-.50137	.015019
Cons	.8448828	.5707844	1.48	0.139	-.2738341	1.9636
Interaction						
Age at first marriage	.0028005	.0026628	1.05	0.293	-.0024185	.0080195
Women's level of education	-.004949	.0053298	-0.93	0.353	-.0153951	.0054972
Women's economic activity	.0082092	.0105331	0.78	0.436	-.0124353	.0288536
Decision on the purchase of household goods	-.01613	.0081375	-1.98	0.047	-.0320792	-.0001808
Household standard of living	-.0013016	.0023523	-0.55	0.580	-.0059121	.0033088
Place of residence	-.0007853	.002162	-0.36	0.716	-.0050227	.0034521
Region of residence	-.0082254	.0050359	-1.63	0.102	-.0180955	.0016447

Source: Data from 2010 and 2016-2017

Discussion

This study aims to measure the impact of individual and contextual variables on changes in the fertility of women in unions between 2010 and 2016-2017. Although the simple and advanced decompositions show that these individual variables of women in the union in Burundi played an important role in the decline in fertility (composition and performance effects), the results of the multivariate decomposition indicate that only the woman's level of education, the woman's economic activity and the woman's decision-making power regarding the purchase of household goods played a driving role in the decline in fertility observed among women in the union between 2010 and 2017. Furthermore, by including contextual variables in this multivariate model, the results indicate that only the region of residence played

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a role in this decline in fertility between these two periods. To this end, in this section, we will take the factors that played a key role in the fertility decline between 2010 and 2016-2017 and compare them with similar work carried out in other countries.

Influence of the level of education of women in union on fertility decline

The study highlights the decisive role played by education in reducing the fertility of women in union in Burundi, confirming the conclusions of numerous studies similar to the present one. These results are in line with those of Peri-Rotem (2020) in Great Britain and France, which also observed a decline in fertility and an increase in infertility among better-educated women. In addition, studies conducted in Cameroon by Ngamtiate & Nganawara (2023) indicate that women's education enables them to better understand the importance of contraception and to emancipate themselves from the socio-cultural norms that inhibit its use, thus reinforcing the idea that education is a powerful lever for reducing fertility in Burundi.

These results also converge with those of Baudin et al. (2021) in India, who showed that increasing women's level of education leads to a significant drop in fertility, often due to different personal priorities, such as career development and better mastery of family planning tools. In West Africa, Bassinga et al (2023) also highlighted the considerable impact of education on variations in fertility, emphasising that education plays a fundamental role in managing women's reproductive choices. In short, these results confirm that education is a key factor in empowering women and reducing fertility rates, suggesting the need to increase access to education to promote more informed reproductive choices in Burundi and other similar contexts.

Influence of decision-making on the purchase of household goods on the decline in fertility among women in union in Burundi

This study shows that decision-making on the purchase of household goods has a significant influence on fertility decline among women in the union in Burundi between 2010 and 2017. These results are in line with previous work, particularly that carried out in Burkina Faso by Gnoumou &Thiombiano (2015), which suggests that women's participation in decision-making, particularly in economic matters, enables them to make more informed choices about their lives, including reproduction.

These findings go beyond simple economic dynamics, highlighting the importance of decision-making autonomy within the household in influencing reproductive choices. Indeed, the DHS-II and III data show that the proportion of women making purchasing decisions alone has fallen slightly, while joint decision-making has increased slightly and that of spouses making decisions alone has also remained almost stable. This trend seems to corroborate the

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results obtained by Ngamtiate & Nganawara (2023) in Cameroon, which show that women who are gainfully employed, and by extension have a degree of financial autonomy, have a direct impact on the decline in fertility, as they play an active role in household decision-making. Women's economic empowerment could therefore be an important lever for improving their decision-making power, not only over household assets, but also over reproductive issues. In this sense, these results highlight the importance of encouraging women's active participation in household economic management, which may indirectly influence their desire and ability to control their fertility.

Influence of the economic activity of women in union on fertility decline

This study also shows that the economic activity of women in the union has a direct influence on their fertility in Burundi. These results are in line with those found in other geographical contexts. In Cameroon, de Ngamtiate & Nganawara (2023) found that women engaged in economic activity were more likely to participate in household decision-making and control financial resources, thereby increasing their autonomy and ability to influence fertility management. In Iran, Lebugle Mojdehi (2016) found that the more economically active a woman is, the more her status contributes to lower fertility, suggesting that this increased autonomy allows for more considered reproductive choices that are less subject to social pressures. Doepke et al (2023) also argue that women's economic engagement promotes their autonomy, enabling them to make more informed reproductive decisions, thereby reducing the pressure to conform to traditional social norms.

Influence of the region of residence of the woman in union on the decline in fertility

The results of this article also highlight the impact of region of residence on the decline in fertility among women in union between 2010 and 2016-2017. Several researchers have shown that regional variations play a driving role in couples' reproductive behaviour. A study of contextual and individual factors in fertility in Burundi found that the region of residence has a significant influence on fertility (Singoye et al., 2024). Similarly, a study of the factors that explain fertility in the northern regions of Cameroon showed that, despite the high social value placed on children, fertility varies according to the region in which women live (Georges et al., 2021). In addition, couples' fertility behaviour, modulated by their region of residence, affects their fertility (Andro, 2001). This regional variation influences fertility expectations and practices. Social and economic transformations, influenced by the region of residence, modify women's reproductive aspirations and behaviours (Samuel & Attané, 2005).

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Certain regions are often favourable and others are less favourable to fertility decline. The results of this article and those of Nouhou (2016) explicitly reveal that developing countries are often characterised by the persistence of social inequalities, and these inequalities are often spatial, particularly where fertility is concerned. Some regions embody modern values and are more inclined to reduce fertility, while others do not (Schoumaker, 1999; Tabutin & Schoumaker, 2020). These studies illustrate that the region of residence, in conjunction with cultural, social and economic factors, has a decisive influence on the fertility of women in union in Africa. Understanding these fertility dynamics in the Burundian context is essential if we are to develop public health and development policies tailored to the specific characteristics of the region. Finally, this section has enabled us to verify our hypotheses, which state that the small decline in fertility observed between 2010 and 2016-2017 is largely attributable to the performance effect (with the simple and advanced decomposition) and that economic activity and women's decision-making power over the purchase of household goods contributed more to the decline in fertility between 2010 and 2016-2017 (with the multivariate decomposition).

Conclusion

The results of the simple and advanced decompositions suggest that the slight decline in fertility observed during this period is primarily due to the performance effect. Therefore, it is not changes in women's characteristics that have influenced fertility, but rather changes in the way these characteristics affect the decision to procreate.

Multivariate analysis sheds further light on this issue, showing that certain variables influence the fertility dynamics of married women in Burundi more than others. Notably, women's economic activity, level of education, decision-making power within the household, and region of residence emerge as key determinants. These factors reflect a gradual change in women's social roles and autonomy, encouraging more controlled reproductive behaviour. This confirms that women's empowerment, in its various forms, is making a significant contribution to the fertility transition in Burundi. Thus, the results of this article confirm our hypotheses regarding the role of contextual and individual factors in the slight decline in fertility observed between 2010 and 2016–17 among women in unions.

Finally, a number of avenues could be explored to accelerate the decline in fertility rates in Burundi. Strengthening policies to improve girls' access to education, particularly in rural areas, while encouraging women's economic integration through vocational training and entrepreneurship, would be appropriate. Promoting equality in household decision-making and improving access to sexual and reproductive health services are also essential

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factors. These integrated measures would not only enable sustainable reductions in fertility, but also improve the overall well-being of women and their families.

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