Gender Inequalities and Fertility in Morocco: Measuring Women's Empowerment and Impact on the Ideal Number of Children

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Abstract

In Morocco, access to rights for women has strengthened over the decades. Their social status has significantly improved. This study aims to measure women's empowerment, particularly in the domestic sphere and in relation to spouses, and its effect on women's fertility preferences. Women's empowerment is estimated following a similar approach to constructing the SWPER composite index, which is based on several dimensions such as education, decision-making, and attitude towards domestic violence as proposed in the literature. An empirical examination of empowerment's impact on fertility preferences, measured by the ideal number of children, was conducted using a generalized Poisson regression model. The data are from two surveys, the 2003-2004 Population and Family Health Survey and the 2011 National Population and Family Health Survey. The results corroborate women's empowerment in reducing the ideal number of children through independence from traditional social norms, increased bargaining power, and communication within the couple. Women's access to educational resources appears to be a key factor, especially when it comes to fertility planning, as well as the rejection of male violence.

Keywords

Fertility preferences; gender; ideal number of children; Morocco; SWPER index; women's empowerment

Introduction

Since the 1960s, fertility in Morocco has declined steadily, from a peak of 7.2 children per woman to 2.2 according to the latest population census of 2014 (Haut-Commissariat au Plan du Maroc, 2014). Such a decline ranks Morocco among the pioneer countries in demographic transition in Africa and the Arab countries of MENA (the Middle East and North Africa) Region.

As first identified by Davis and Blake (1956), then later confirmed by Bongaarts (1978) and Bongaarts and Potter (1983), the determinants of fertility are situated at two levels. The first relates to contextual factors, and the other, to proximate determinants. The contextual factors (e.g., socio-economic, demographic, environmental, socio-cultural, and health-related factors) indirectly influence fertility through proximate determinants (e.g., age at marriage, contraception, abortion, and postpartum infertility). The focus on the determinants of fertility preferences is, therefore, central for two reasons. The first is that preferences are a fundamental link in the causal chain between fertility and socioeconomic factors (Bongaarts & Casterline, 2013). The second is related to the traditional pattern that has prevailed in Morocco, which, like other Arab-Muslim societies, is generally based on high fertility, and early and universal marriage for both men and women (Tabutin & Schoumaker, 2005). In addition, the social structure incorporates strong natalist values (i.e., pro-birth position) and strong family ties (Faour, 1989).

Among the explanatory theories of fertility, there is the economic approach, initially proposed by Becker (1960) and later developed by Easterlin (1975). Economic theory is based on the microeconomic argument of the demand for children, according to which couples' reproductive strategies are rational and based on their perceptions of the cost-benefits and, therefore, the economic profitability of children (Lesthaeghe & Meekers, 1987). In contrast, the sociological approach argues that economic factors are not justifiable to explain the decline in fertility and focuses on changes in the ideational systems and values within, which the demand for children is embedded and of which preferences are one of the key aspects (Bongaarts, 2001; Kaplan, 1996). Lesthaeghe and Meekers (1987) added an essential nuance by endorsing the hypothesis of incorporating material conditions alongside non-material aspects, namely socialization and individuals' aspirations to explain fertility transitions, by considering that the ideal configuration was the driving force behind the changes in the cost-benefit calculations. As a result, the decline in fertility preferences is regarded as one of the primary triggers leading to fertility transitions.

The literature on the explanatory factors for fertility and related preferences is quite extensive. Few studies, however, have focused on gender inequalities and their impact on fertility changes and observed ideals (Mills, 2010; Upadhyay et al., 2014), even though fertility is a matter of gender relations within couples (Brugeilles & Lestage, 2018). According to Glaude and de Singly (1986), marital relationships, which constitute the inner morphology of the family unit and especially the couple, are based on a domestic organization that shows how the spouses delimit the territory they share and the one each reserve for themselves. This sharing targets several areas ranging from the division of domestic chores, maintenance, and administration, to major decisions such as the desired number of children or the children's education and is subject to bargaining power within a couple. Equality between the sexes and, more particularly between spouses, resulting from women's acquisition of more decision-

making ability or what is known as empowerment, is a key element in demarcating this power (Kabeer, 1994; Rahman, 2013).

Concepts, measures, and associations

Fertility preferences

Fertility preferences "*reflect individual motivations, attitudes and beliefs […] Fertility ideals (or preferences or desires) are part of the reproductive decision-making process*" (Hin et al., 2011, p. 133) and "*represent what someone wishes for or want*" (Miller, 1994, p. 228).

Fertility preferences are conceptualized as the demand for children and refer to expectations, intentions, desires, ideals, and others (Thomson, 2015). Fertility preferences are approached through various concepts such as ideal family size, ideal or desired number of children, desire for an additional child, gender preferences for children, preferred time of birth spacing, choice of contraceptive methods, or the actual-ideal gap, which is measured by the difference between the actual and ideal number of children and indicates a woman's ability to achieve her ideal or desired number of children (Atake & Gnakou Ali, 2019; Feyisetan & Casterline, 2000; Upadhyay & Karesek, 2012).

In demographic surveys, questions are sometimes asked using the term 'desire' rather than 'ideal.' Although often used interchangeably (Hin et al., 2011), it is suggested that a distinction should be made between the two terms (Knodel & Prachuabmoh, 1973; Thomson, 2015).

Women's empowerment

Empowerment is a concept that has been highlighted since the 1970s by anglophone research and is found mostly in the field of economic and social development. It is rooted in the philosophical vision of social justice, equality, decision-making power, and the struggle against the domination of a social group over another (Calvès, 2009). Therefore, various definitions are put forward depending on the authors and organizations (Ibrahim & Alkire, 2007). For Rowlands (1996, p. 87),

> "*In the context of the conventional definition, empowerment must be about bringing people who are outside the decision-making process into it. This puts a strong emphasis on access to political structures and formal decision-making and, in the economic sphere, on access to markets and incomes that enable people to participate in economic decision-making.*"

Kabeer (1999, p. 437) referred to empowerment as "*the expansion of people's ability to make strategic life choices in a context where this ability was previously denied to them*," which can be explored through three dimensions; agency, resources, and achievements. For Alsop et al. (2006, p. 17), women's empowerment is "*the process of enhancing an individual's or group's capacity to make purposive choices and to transform those choices into desired actions and outcomes*." Although there are other definitions of this concept, the common point is empowerment's processional nature towards change and access to and control over different resources such as education, income, decision-making, and so on (Malhotra & Schuler, 2005).

Empowerment is also a cross-cutting concept that applies to various social groups, especially women, whose empowerment is recognized as intricately linked to economic and human development (Alsop et al., 2006; Duflo, 2012). Rowlands (1996, p. 89) adopted the definition proposed by Keller and Mbewe (1991), to which women's empowerment is "*a process whereby women become able to organise themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination.*" UNIFEM considered women's economic empowerment as central to achieve gender equality and defines it as "*having access to and control over the means to make a living on a sustainable and long term basis and receiving the material benefits of this access and control*" (Mosedale, 2005, p. 247). Similarly, Duflo (2012, p. 1053) defined women's empowerment as "*improving the ability of women to access the constituents of development – in particular, health, education, earning opportunities, rights, and political participation.*"

Thus, empowerment is characterized by the multiplicity of its dimensions, making it problematic to operationalize despite a relative agreement on its definition (Ibrahim & Alkire, 2007; Malhotra & Schuler, 2005). The dimensions chosen to measure empowerment are economical, sociocultural, family, and political (Duflo, 2012; Malhotra & Schuler, 2005). Other authors have integrated the psychological dimension, particularly in microfinance and social development (Huis et al., 2017; Oakley, 2001). There are also conventional measures such as the level of education and participation in the labor market, and other dimensions as participation in decision-making and violence against women (Ewerling et al., 2017; Ibrahim & Alkire, 2007; Malhotra & Schuler, 2005; Upadhyay et al., 2014).

In the context of developing countries, Safilios-Rothschild (1978) and Mason (1987) argue that changes in the status or role of women can only be understood in relation to that of spouses. Studies that have considered gender aspects, particularly on fertility issues, sought to put women's status and ability at the center of the subject since fertility differs according to whether or not women's status enables them to be empowered to act independently (Leridon, 2015).

Relations between women's empowerment and an ideal number of children

Regarding fertility preferences and their relationship to women's empowerment, the empirical literature is mainly based on demographic and health surveys, which offer the most widely available data in developing countries. Women's participation in household decision-making was the most commonly used empowerment measure (Upadhyay et al., 2014). Education, employment, and exposure of women to the media have also been used as proxies (Kishor & Gupta, 2004). This is in the sense that "*the more cultural or economic assets a spouse has at his/her disposal, the more he/she will be able to make his/her voice heard*" (Glaude & de Singly, 1986, p. 21), referring to the resource theory adopted from economics, which states that a firm's possession of internal resources is a source of sustainable competitive advantage (Barney, 1991). Domestic violence, a significant index of gender inequality, has also been included in several fertility preferences studies (Titilayo & Palamuleni, 2015; Upadhyay & Karasek, 2012). This aspect constituted an essential determinant in fertility analysis in Africa (Odimegwu et al., 2015). The female mobility index has also been tested, however mainly in South Asia (Upadhyay et al., 2014).

Using different indicators, Ewerling et al. (2017) proposed a measure of women's empowerment at the individual level, the Survey-based Women's emPowerment index

(SWPER), operationalized in the African context and based on Demographic and Health Surveys (DHS). Thus, the authors identified three dimensions composing the index: women's attitudes towards domestic violence, decision-making, and social independence.

Most studies on the relationship between women's empowerment and fertility preferences show that there is generally a strong association between the two, depending on the indicator used. Feyisetan and Casterline (2000) have shown that the level of education and economic activity impacted the desired number of children. Steele et al. (1998) found that women who reported that their husbands had full decision-making power regarding all household purchases were more likely to want an additional child. For his part, Woldemicael (2009), using this same decision-making indicator, found a positive relationship with the desire to have a large family. Women who found male violence unjustified were less likely to want a large family. Moreover, violence is strongly associated with the average number of children (Odedina, 2016; Stieglitz et al., 2018), and among its many health consequences are critical aspects of fertility, miscarriages, abortion, and unwanted pregnancies (Campbell, 2002; Odimegwu et al., 2015; Titilayo & Palamuleni, 2015). Other studies suggested that the context in which women live may have more influence than their degree of empowerment (Kritz et al., 2000; Upadhyay et al., 2014).

When considering the degree of mobility, there is no clear association with fertility preferences. The fact that the husband decides on the wife's mobility outside of the home to visit family or friends is unrelated to the desire for an additional child (Steele et al., 1998). It unexpectedly seemed to be a factor in the desire for a smaller family, compared to the situation where women have more mobility freedom (Woldemicael, 2009).

In Morocco, research on the role of women's status, often measured by the level of education and economic activity, has focused on its relationship to fertility levels. Indeed, declining fertility was associated with improvements in women's education and their access to the labor market (Fargues, 1990; Yaakoubd, 1997; Yaakoubd & Vimard, 2012), but also with the increase in male literacy, which played a significant role in fertility transition in Morocco (Sajoux & Chahoua, 2013). However, measuring the relationship with fertility preferences is still rare. Obermeyer (1996) showed that high levels of education among women and men contribute negatively to the desire for an additional child. In contrast, only improvements in women's education were associated with reduced preferences for boys. For their part, D'Addato (2006) highlighted that women and men with low education levels had a higher risk of transitioning to a third birth.

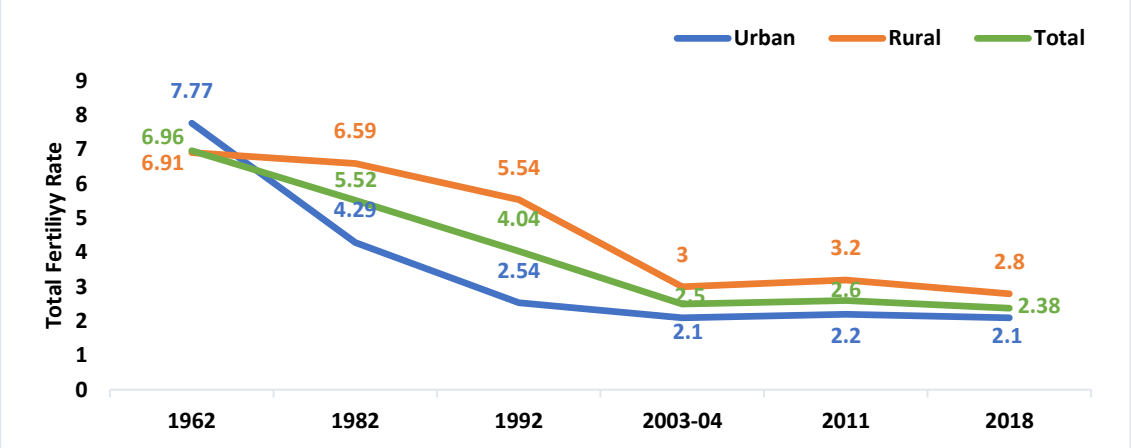
The purpose of this article is twofold. First, measuring women's empowerment in Morocco in 2003-2004 and 2011, and analyzing its impact on fertility preferences. The dimensions retained to measure women's empowerment are different from one survey to another because of the difference in the integrated questions modules relative to this issue. The research hypothesis is that the more women are empowered, the fewer their ideal number of children.

Fertility and gender: An analysis of the Moroccan context

Evolution of fertility levels and preferences in Morocco

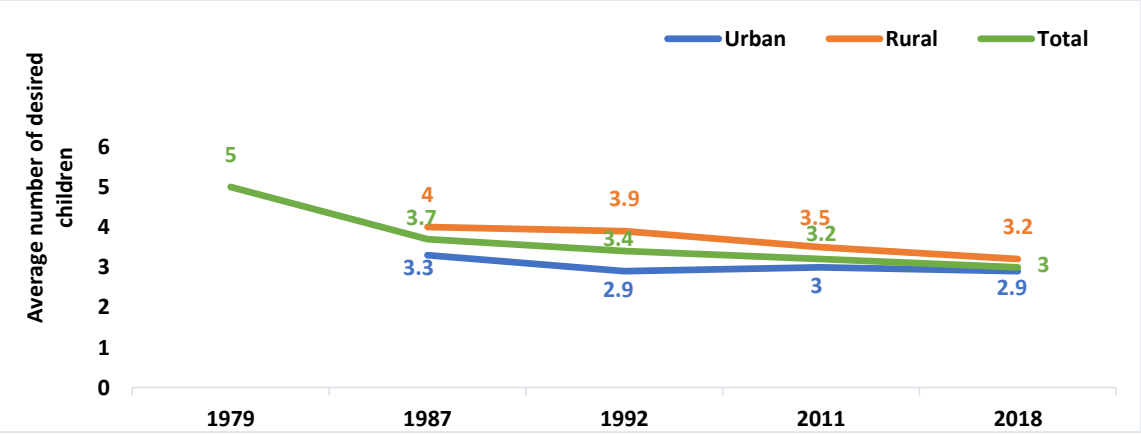
From a peak of 6.96 children per woman in 1962, fertility declined to 5.52 in 1982, and 4.04 children per woman in 1992 (Haut-Commissariat au Plan du Maroc, 2014). The latest national population and family health survey conducted in 2018 by the Ministry of Health (2019) indicated that the total fertility rate was 2.38 (Figure 1). This striking decline in fertility was accompanied by a decrease in the average number of desired children from 5 children per woman in 1979 to 3.7 in 1987 and 3 children in 2018. Differences between urban and rural areas are noteworthy (Figure 2). Rural women reported an ideal of 4 children in 1987 and 3.2 in 2018, while urban women preferred to have 3.3 in 1987 versus 2.9 in 2018. However, overall, there is a trend towards convergence between the two areas, both in terms of the ideal number of children and the fertility level.

Figure 1: Evolution of the Total Fertility Rate, Morocco, 1962-2018



Note: Developed by the authors using data from Haut-Commissariat au Plan and Ministry of Health

Figure 2: Evolution of the Average Desired Number of Children, Morocco, 1979-2018



Note: Developed by the authors using data from Haut-Commissariat au Plan and Ministry of Health

Age at marriage and contraceptive use: Two key proximate determinants

The age at first marriage in Morocco increased dramatically between 1960 and 2018 from 17.5 to 25.5 years of age for women. The average age at first marriage rose from 24 to 31.9 years of age between the two dates for men. This dynamic has affected similarly urban and rural areas.

As this factor cannot continue to increase indefinitely in Moroccan society, which encourages marriage and family building and prohibits extra-marital procreation, the diffusion of contraception has taken the relay in birth control. Studies showed that 72% of women of reproductive age used contraception in 2018, and most users had chosen a modern method (80%) and opted for the pill (60%). Couples who used contraception accounted for only 36% in 1987 and 19.5% in 1980.

Social and political context increasingly favorable

Since 1960, Morocco recognized that population growth was a constraining factor to economic and social progress. After the 1965 Pan-Islamic Conference, there was a consensus among Muslim countries that Islamic precepts were not against contraception and birth control (Hessini, 2007). Therefore, Morocco officially adopted an anti-natalist policy that subsequently led to adopting a national family planning program in 1967 and creating a family planning association recognized as a public utility in 1971 (Bakass, 2003). This program, based for several decades on free access to contraceptives in all public sector health facilities, a system of visits, motivation, monitoring, and home supply, has played an undeniable role in reducing fertility (Bakass, 2003).

Regarding women's status, there has been a revolution in Morocco. The Personal Status Law, established in 1958, organized the family on a highly unequal basis to the detriment of women (Bras, 2007; Rhiwi, 2004). In the mid-1970s, Morocco became involved in programs and actions promoting the emancipation of Moroccan women (Bourqia, 2015; Ennaji, 2018; Naciri, 2014). From the end of the 1990s, several laws were reformed towards gender equality, such as those on trade, family, and disciplinary procedures (Zerari, 2006). Since then, Moroccan women no longer need the husband's consent to participate in economic activities (Mazouz, 2014). In addition, as of 2004, Morocco increased the age of marriage for women from 15 to 18 years of age, abolished marital guardianship, and placed the family unit under the shared responsibility of both spouses, thus repealing laws that violate women's dignity by treating them as perpetual minors (Murgue, 2011; Rhiwi, 2004). The Government ratified the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1993 and lifted all reservations in 2008. The country, since 2002, has been committed to Gender-Responsive Budgeting (GRB) which was enshrined in law in 2015. This means that all statistics are disaggregated by sex and that gender analysis is systematically applied to all policies (UNIFEM, 2006).

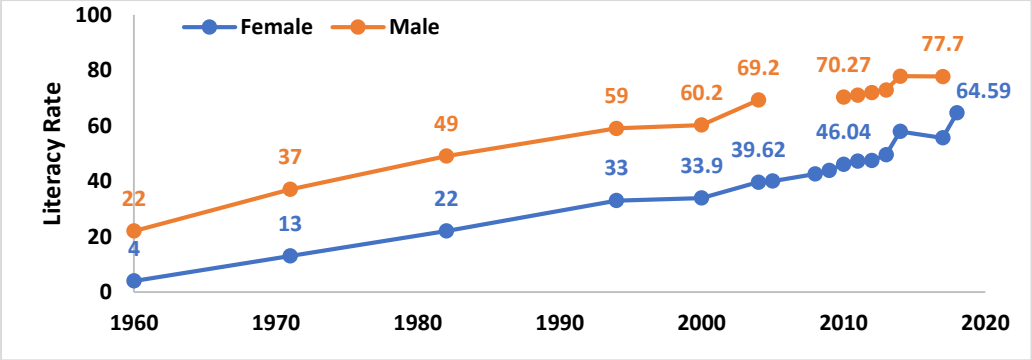
Moreover, in 2015, Morocco committed to the 2030 Agenda for achieving the Sustainable Development Goals (SDGs), which are in line with the Millennium Development Goals (MDGs) to which the country agreed in 2000. Thus, several legislative reforms have been put in place, namely the 2011 Constitution, which enshrined the principle of equality between women and men. In 2014, the penal law that previously allowed the perpetrator of rape to evade prison by marrying the victim was repealed. In 2018, the reformed law on violence against women came into force (Haut-Commissariat au Plan du Maroc, 2020).

This improvement in women's status can be confirmed by the Gender Inequality Index (GII) developed by the United Nations, which has declined from 0.72 in 1995 to 0.5 in 2018. This index allows the identification of the gender gap considering the three critical dimensions of human development: reproductive health, empowerment, and economic status. For example, maternal mortality has dramatically declined from 332 deaths per 100,000 live births in 1992 to 112 deaths in 2009-2010 and 73 deaths in 2015-2016 (Ministry of Health, 2019). Moreover, since 1962, only therapeutic abortion was authorized in cases where pregnancy entails real

risks to the mother's health or life (Belhouss et al., 2011). Since 2015, the law permits abortion in cases of rape, incest, or fetal malformation in addition to therapeutic abortion (Gruénais, 2017).

In terms of women's education, Morocco has made significant progress at all levels of schooling. Whereas in the early 1970s, the ratios of girls to boys in primary, secondary, and higher education were 0.5, 0.4, and 0.2, respectively; however, they are now tending toward parity. In addition, the female literacy rate has risen steadily from 4% in 1960, to 18% in 1982 and 68% in 2018. In comparison, this rate increased from 22% in 1960 to 49% in 1982 and 78% in 2017 for men (Figure 3).

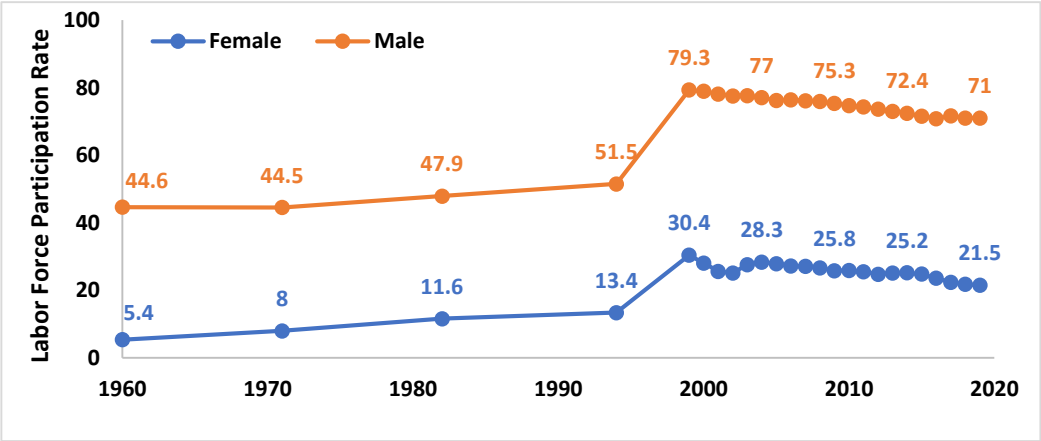
Figure 3: Evolution of the Literacy Rate of Women and Men Aged From 15 and Over, Morocco, 1960-2020



Note: *Developed by the authors using data from Haut-Commissariat au Plan and Economic and Social Commission for Western Asia data*

Inequality persists in the economic participation of Moroccan women. After a long upward trend that peaked at 31% at the end of the 1990s, the activity rate stagnated—followed by a drop to 22% (Figure 4), a level well below the world average, in contrast to the high-income countries and sub-Saharan Africa, which stand at 47%, 53%, and 61% respectively. On the contrary, the male participation rate is remarkably higher, currently standing at 71%, showing a gender gap in Morocco of around 50 points (Figure 4).

Figure 4: Evolution of the Labor Force Participation Rate of Women and Men Aged From 15 and Over, Morocco, 1960-2020



***Note**: Developed by the authors using data from National Employment Survey data, HCP*

Data and methods

Data sources

This paper used the 2003-2004 Population and Family Health Survey (PFHS) based on a three-stage stratified national sample of about 16,000 households with a sampling rate of 0.24%, and the 2011 National Population and Family Health Survey (NPFHS) based on a two-stage stratified national sample of 12,000 households with a sampling rate equal to 0.2%, both conducted in Morocco. These are representative sample surveys at the national, regional, and residence levels (urban or rural) (Ministry of Health, 2005, 2012).

The sample was 11,513 households and 16,798 women aged 15-49 in the first survey with response rates of 99% and 96%, respectively, and 15,343 households and 11,069 women aged 15-49 in the second survey with response rates of 98.5% and 94.6% respectively. Given that women's empowerment is related to gender relations within couples, the analysis focused on married women of reproductive age. After data processing and quality control, there were 8,222 in 2003-2004 and 9,586 in 2011, with 93% and 95% response rates, respectively.

Variable of interest

The dependent variable is measured by the ideal number of children, a discrete numerical indicator based on the following question asked in the 2003-04 survey: "*If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be*?" asked women with children, and "*If you could choose exactly the number of children to have in your whole life, how many would that be?"* asked women without children at the time of the survey. In 2011, the question was asked to all women as follows: "*If you could choose exactly the number of children to have in your whole life, how many would that be?"* Non-numerical responses such as 'as God decides' are possible but will not be included in our analysis. They represent 2.5% and 3.5% in 2003-2004 and 2011, respectively.

In this article, we use terms such as ideal family size, or desired or preferred number of children interchangeably with ideal number of children.

Independent variables

Our key explanatory variable is women's empowerment. To measure this variable, we adopt a similar approach to that used in the construction of the SWPER index, operationalized in the African context by Ewerling et al. (2017) and which has the particularity of being measured at the individual level. Our measure is based on only married women aged between 15 and 49 years, since there are no statistics on non-legally married women even if they are in a free union. The integration of adolescent girls in our analysis can be justified because they represent a non-negligible proportion (4.3% and 3.5% in 2003-2004 and 2011, respectively).

The construction of the SWPER index is based on a set of variables divided into three key dimensions (Table 1). The first includes variables that reflect the woman's attitude towards spousal violence in five situations (she goes out without permission, neglects her children, argues with her husband, refuses to have sex with him, or burns the food). A second dimension concerns women's participation in decision-making about their health care, major

household purchases, and visits to family or relatives. Social independence is the last dimension measured by age at first marriage, age at first birth, the age difference between spouses, women's education and education difference between spouses, women's economic activity, and frequency of reading a newspaper or magazine.

Table 1: Selected Indicators for Measuring Women's Empowerment, 2003-2004

Indicator	Notation	Code or unit
Beating not justified if the wife goes out without telling husband	Beat1	Justified= 0 ; Not justified=1
Beating justified if the wife neglects the children	Beat2	Justified= 0 ; Not justified=1
Beating justified if the wife argues with husband	Beat3	Justified= 0 ; Not justified=1
Beating justified if the wife refuses to have sex with husband	Beat4	Justified= 0 ; Not justified=1
Beating justified if the wife burns the food	Beat5	Justified= 0 ; Not justified=1
Frequency of reading newspaper or magazine	Read	Not at all=0; Infrequent reading=1; Frequent reading=2
Respondent worked in past 12 months	Work	No=0 ; Yes=1
Woman's education in completed years of schooling	Education	Continuous variable
Education difference: woman's minus husband's completed years of schooling	Education difference	Continuous variable
Age difference: woman's age minus husband's age	Age difference	Continuous variable
Age of woman at first marriage	Age at 1st marriage	Continuous variable
Age of woman at first birth	Age at 1st birth	Continuous variable
Who usually decides on the respondent's health care?	Decision 1	Husband/other alone=-1; Joint=0; Respondent alone=1
Who usually decides on large household purchases?	Decision 2	Husband/other alone=-1; Joint=0; Respondent alone=1
Who usually decides on visits to family or relatives?	Decision 3	Husband/other alone=-1; Joint=0; Respondent alone=1

While the 2003-2004 PFHS allowed this index to be measured based on detailed modules proposed in 2017, the 2011 NPFHS, while participation in decision-making was only targeted through a single question, does not contain information on violence. Thus, we retain the couple's discussion of the fertility project (i.e., the desired number of children and family planning) and the woman's participation in family planning decision-making as proxies. A question about the obstacles to women's access to health care because the husband refuses, allows us to measure the mobility degree. This variable enhances the measure of women's empowerment through their participation in decision-making on their health and their freedom of movement. Table 2 summarizes these variables.

Table 2: Selected Indicators for Measuring Women's Empowerment, 2011

Indicator	Notation	Code or unit
Age of woman at first marriage	Age at 1st marriage	Continuous variable
Age of woman at first birth	Age at 1st birth	Continuous variable
Age difference: woman's age minus husband's age	Age difference	Continuous variable
Frequency of discussion with the spouse on family planning in the past year	Discussion on FP	Never=0; Once or twice=1; More than twice=2
Discussion with the spouse on the ideal number of children	Discussion on the ideal number of children	No =0 ; Yes=1
Family planning decision-making	Decision on FP	Husband/other alone =-1; Joint=0; Respondent alone =1
Difficulties in receiving care: getting permission to go	Mobility freedom	A major problem=0; Is not a major problem=1
Women's education	Education	No education=0; Literacy/Primary=1; Secondary/Higher=2
The difference in education: woman's minus husband's level of education	Education difference	Lower=0; Equal=1; Higher=2
The woman worked in the past or is currently working	Work	No=0 ; Yes=1

In addition, the analysis integrates other control variables, namely the place of residence (urban or rural), the number of children ever born, and the wealth index, which reflects the household's socioeconomic class. This index is proposed in the database in the form of five wealth quintiles: Quintile 1 (poorest class), Quintile 2 (poorer class), Quintile 3 (middle class), Quintile 4 (richer), and Quintile 5 (richest).

It should be noted that the missing values of selected variables do not exceed 1.7% after eliminating outliers. Exceptionally, age at first birth represents 10.2% of missing data, particularly for nulliparous women in the 2003-2004 PFHS. We then used a single hot deck imputation, which randomly selects the value to be imputed for a missing case among a group of individuals similar in terms of variable or group of variables. In this case, women were grouped into age groups at first marriage, which was chosen as having the highest correlation with age at first birth (89%). Also, since the 2011 NPFHS does not contain the age at first birth, we estimate the interval between the mean age at first marriage and the mean age at first birth based on the 2003-2004 PFHS. Assuming that it has not changed between the two dates, the age at first birth in 2011 for each woman was measured by adding the previously calculated interval to her age at first marriage.

Women's socio-demographic and economic characteristics

Table 3 shows that most women were married before the age of 20 and had their first birth before 25. Women with two or fewer children represented 47% in 2003-2004 and 49% in 2011. Furthermore, a majority of women were urban (50.5% in 2003-2004 and 57.2% in 2011), illiterate (64.9% and 51.3% respectively), and inactive (83.7% and 74.7% respectively). In 2003-2004, approximately 22.2% of women were poorest, 18.7% were richest, and 16.8% belonged to the middle class, while in 2011, 15.8% lived in extreme poverty, 19.4% were from the richest class, and 23% constituted the middle class.

Table 3: Women's Sociodemographic and Economic Characteristics, 2003-2004 and 2011 PFHS

		PFHS 2003-2004 (N=8,222)		NPFHS 2011 (N=9,586)	
Characteristics		**N**	**%**	**N**	**%**
Current woman's age	15-19	352	4.28	335	3.49
	20-24	1,080	13.14	1,151	12.01
	25-39	1,387	16.87	1,591	16.60
	30-34	1,444	17.56	1,796	18.74
	35-39	1,424	17.32	1,731	18.06
	40-44	1,360	16.54	1,612	16.82
	45-49	1,175	14.29	1,370	14.29
Age at first marriage	< 15	788	9.58	374	3.90
	15-19	3,946	47.99	4,308	44.94
	20-24	2,321	28.23	3,057	31.89
	25-39	814	9.90	1,254	13.08
	30-34	269	3.27	430	4.49
	35-39	70	0.85	136	1.42
	40-44	13	0.16	25	0.26
	45-49	1	0.01	2	0.02
Age at first birth	< 15	207	2.52	42	0.44
	15-19	3,006	36.56	2,630	27.44
	20-24	3,128	38.04	4,123	43.01
	25-39	1,245	15.14	1,839	19.18
	30-34	474	5.77	680	7.09
	35-39	143	1.74	202	2.11
	40-44	19	0.23	64	0.67
	45-49	---	---	6	0.06
Parity	0-2	3,854	46.87	4,708	49.11
	3-5	3,210	39.04	4,026	42.00
	⩾6	1,158	14.08	852	8.89
Place of residence	Rural	4,070	49.50	4,094	42.71
	Urban	4,152	50.50	5,492	57.29
Educational status	No education	5,338	64.92	4,916	51.28
	Literacy/Primary	1,365	16.60	2,281	23.80
	Secondary/Higher	1,519	18.47	2,389	24.92
Work status	Working	1,343	16.33	2,419	25.33
	Not working	6,879	83.67	7,167	74.77
Wealth status	Poorest	1,828	22.23	1,520	15.86
	Poorer	1,820	22.14	1,898	19.80
	Middle	1,652	20.09	2,207	23.02
	Richer	1,384	16.83	2,101	21.92
	Richest	1,538	18.71	1,860	19.40

The ideal number of children

Table 4 shows that Moroccan women report an average ideal fertility level of around three children. The distribution of women according to their declared ideal number of children shows that this preference is mainly concentrated around 2, 3, and 4 children, with respective percentages of 35.5%, 18.8%, and 31.5% in 2003-04, while 11.8% of women declared five or

more children. This structure had not significantly changed in 2011 since 37.4% reported two children, 31.5% had an ideal of 4 children, while those who wanted three or more children represented 20.8%. Women who idealize a large family size (5 and more) are around 9%. Women who desired nulliparity are negligible, representing 0.12% in 2003-2004 and 0.05% in 2011.

Table 4: Fertility Preferences of Moroccan Women Between 2003-2004 and 2011

The ideal number of children	PFHS 2003-2004 %	NPFHS 2011 %
0	0.12	0.05
1	2.18	1.36
2	35.51	37.38
3	18.80	20.79
4	31.51	31.46
5 or more	11.85	8.96
The average number per woman	**3.3**	**3.2**

Statistical methods used

To measure women's empowerment, we constructed a composite indicator. To take into account both quantitative and qualitative dimensions of this concept, we used Factor Analysis of Mixed Data (FAMD), which functions as a Principal Component Analysis (PCA) for quantitative variables and as a Multiple Correspondence Analysis (MCA) for qualitative variables based on the complete disjunctive coding of the qualitative variables (Pagès, 2004). The implementation of this method allows the measurement of each woman's composite empowerment indicator and its equivalent for each of the identified dimensions. For the number of dimensions to be retained, we used the criterion of Guttman (1954) and Kaiser (1960), which is based on the principle that a factorial axis is interesting if its eigenvalue is greater than 1.

The explanatory variables do not present the problem of multi-collinearity since the test shows that all VIFs (Variance Inflation Factor) are not exceeding 3, and their mean ranged from 1.26 to 1.9 depending on the model and period studied (Chatterjee et al., 2000).

As the dependent variable is of discrete numerical type, we used the generalized Poisson regression model, which allowed us to take account of a potential over-dispersion or under-dispersion of data (Wang & Famoye, 1997). For the two surveys, two regression models were estimated integrating empowerment and control variables. In the first, women's empowerment was introduced in its aggregate form (aggregate model, noted Model 1). The second incorporated the identified dimensions (disaggregated model, noted Model 2). This latter model was used to assess the impact of each empowerment dimension on women's fertility preferences.

For the four models, the goodness-of-fit test based on Pearson residuals does not reject the null hypothesis that the Poisson generalized model fits the data correctly (p-value=1 > 0.05).

Results

Women's empowerment: key levels and dimensions

The results of the FADM lead us to select the first six factorial axes for 2003-2004 and 2011, which explained about 70% and 60% of the total inertia, respectively (Tables 5 and 6). These tables indicate the loadings of the items which substantially contribute to each factor retained (correlation values exceeding 0.3). Both in 2003-2004 and 2011 surveys, the Cronbach's α statistics for measuring the reliability of the scale is equal or more than 0.7 (0.86 and 0.7 respectively).

Table 5 shows that:

1. The first factorial axis is correlated particularly with the items related to the respondent's opinion about whether wife-beating was justified in various situations: it concerns 'attitudes towards conjugal violence' dimension

2. The second axis opposes women who decide alone or jointly with another person (spouse or other), to women who have stated that the decision is ultimately up to the spouse or a third person: we labeled it 'participation in decision making.'

3. The third axis contrasts women who decide together with their husbands or others with women who choose alone: this dimension reflects 'joint or isolated decision-making.'

4. The fourth axis is made up of the age at first marriage, the age at first birth, and the age difference: this dimensional factor refers to 'women's social independence' or their ability to break away from social norms.

5. The fifth axis is built mainly by women's education, reading newspapers, and the difference in education between spouses: this dimension indicates the 'educational and cultural resources.'

6. The sixth and last factorial axis opposes working women who frequently read a newspaper or magazine to women who are not working outside the home and rarely read newspapers: we named it 'economic and cultural resources.'

Table 5: Indicators' Loadings for the Formation of Factorial Axes Selected in the FAMD, 2003-2004

Indicators	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Age at 1st marriage	0.10241	0.04597	-0.00444	0.92560	0.11851	-0.01108
Age at 1st birth	0.08428	0.04889	-0.01431	0.92412	0.10931	-0.00698
Education	0.34173	0.11291	-0.00407	0.27214	0.75682	0.11754
Education difference	-0.15411	-0.00815	-0.01979	-0.05684	0.67472	-0.11027
Age difference	-0.06342	0.03581	0.04492	0.44151	-0.19759	0.11011

Indicators	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Beat1= not justified	0.93984	0.14311	-0.03565	0.09800	0.16566	0.04712
Beat1= justified	-0.70340	-0.10711	0.02668	-0.07335	-0.12398	-0.03527
Beat2= not justified	0.93141	0.12629	-0.00227	0.07450	0.12177	0.03211
Beat2= justified	-0.75103	-0.10183	0.00183	-0.06007	-0.09818	-0.02589
Beat3= not justified	0.97641	0.15388	0.00900	0.10188	0.11418	0.03268
Beat3= justified	-0.71464	-0.11262	-0.00659	-0.07457	-0.08357	-0.02392
Beat4= not justified	0.83620	0.12264	0.01277	0.08438	0.09743	-0.01899
Beat4= justified	-0.79568	-0.11669	-0.01215	-0.08030	-0.09270	0.01807
Beat5= not justified	0.42422	0.09325	0.00290	0.02206	0.01552	-0.03360
Beat5= justified	-1.11318	-0.24470	-0.00760	-0.05789	-0.04072	0.08816
Decision 1= husband/other alone	-0.12262	-0.99068	0.10405	-0.04606	-0.04317	-0.02804
Decision 1= respondent alone	0.09720	0.53428	-2.29843	0.07447	0.08856	-0.01477
Decision 1= joint	0.10160	0.88567	0.48589	0.02837	0.02175	0.03279
Decision 2= husband/other alone	-0.14061	-0.94602	0.08287	-0.04971	-0.07376	-0.02534
Decision 2= respondent alone	0.07712	0.61822	-2.91981	0.04396	0.02165	0.08756
Decision 2= joint	0.13761	0.90795	0.43699	0.04565	0.07558	0.01152
Decision 3= husband/other alone	-0.15904	-1.07794	0.07420	-0.04831	-0.04274	0.01739
Decision 3= respondent alone	0.07083	0.53532	-2.79430	0.01526	0.05704	0.04095
Decision 3= joint	0.10851	0.72714	0.36515	0.03390	0.02344	-0.01919
Work= no	0.00263	-0.05804	0.05613	-0.09564	-0.12963	-0.18438
Work= yes	-0.01373	0.30364	-0.29362	0.50032	0.67814	0.96458
Read= infrequent	0.54820	0.18017	-0.00349	0.46046	1.33715	-1.96125
Read= not at all	-0.15968	-0.05291	0.00267	-0.10336	-0.35587	0.00807
Read = frequent	0.67661	0.22579	-0.01742	0.32397	1.38342	2.05222
Cronbach's α statistic	**Scale reliability coefficient:**		**0.86**			

As shown in Table 6:

1. The first dimension was found to be correlated with age at first marriage, age at first birth, and the age difference between spouses as well as work status: it reflects 'women's social independence,' which shows the degree of non-compliance with social norms

2. The second dimension opposes women who are illiterate and have the same level of education as their partners to women who are literate or have at least primary schooling and whose level of education is higher than that of their husbands: this dimension is referred to as 'educational resources.'

3. The third dimension opposes women who discuss the desired number of children with their husbands and participate jointly in family planning decision making to those who do not discuss it and whose decision making is up to them: we labeled it 'joint or isolated decision making around the fertility project.'

4. The fourth dimension opposes women whose mobility is a major obstacle to receiving health care and whose decision about family planning is made by the husband or other person, against women who decide alone on family control and for whom mobility is not a major problem for access to health facilities: it is therefore supposed to indicate 'mobility freedom and unilateral decision making on birth control.'

5. The fifth dimension opposes working women, with a secondary or higher degree and whose level of education is equal or higher than that of their husbands, to women who do not work, whose level of education does not exceed primary school and is lower than that of their spouses: we named it 'economic resources of educated women.'

6. The sixth and last dimension is between women with little education who rarely discuss family planning with their husbands and those who are educated and discuss family planning frequently: this dimension refers to the 'frequency of discussion about birth control among educated women.'

Table 6: Indicators' Loadings for the Formation of Factorial Axes Selected in the FAMD, 2011

Indicators	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Age at 1st marriage	0.9683	0.0603	0.0165	0.0163	0.0050	-0.0003
Age at 1st birth	0.9683	0.0603	0.0165	0.0163	0.0050	-0.0003
Age difference	0.4371	-0.1369	0.0598	-0.0768	0.0069	-0.0003
Work= no	-0.1673	-0.0813	0.0278	-0.1034	-0.2110	-0.1243
Work= yes	0.5001	0.2431	-0.0831	0.3090	0.6307	0.3716
Education= no education	-0.1230	-0.7990	-0.1118	-0.0958	-0.0044	0.0677
Education= literacy/primary	-0.0850	0.8315	-0.1246	-0.1167	-0.7749	-0.5729
Education= secondary/higher	0.3415	0.8858	0.3560	0.3146	0.7556	0.4090
Education difference= lower	0.0704	-0.2635	0.0897	0.1018	-0.9967	0.1664

Indicators	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Education difference= equal	-0.0736	-0.4568	-0.0629	-0.0588	0.7191	-0.1791
Education difference= higher	0.0396	1.9064	-0.0361	-0.0761	0.3433	0.1084
Discussion on FP= more than twice	-0.0153	0.1020	0.5391	-0.0983	-0.0713	0.8818
Discussion on FP = never	-0.0056	-0.1505	-0.8457	0.1071	0.0347	-0.0544
Discussion on FP = once or twice	0.0389	0.1065	0.6601	-0.0287	0.0630	-1.5070
Discussion on the ideal number of children= no	-0.0724	-0.1111	-1.0604	-0.0901	-0.0538	-0.0843
Discussion on the ideal number of children= yes	0.0311	0.0478	0.4560	0.0388	0.0231	0.0362
Decision on FP= husband/ other alone	-0.0327	0.0350	-0.3342	-1.5120	-0.1563	0.4134
Decision on FP= respondent alone	-0.0210	0.0595	-0.8067	0.5519	0.2527	-0.0387
Decision on FP= joint	0.0225	-0.0426	0.5259	0.2800	-0.0688	-0.1326
Mobility freedom= a major problem	-0.0458	-0.2226	0.1286	-1.4293	0.2997	-0.3729
Mobility freedom= is not a major problem	0.0115	0.0558	-0.0323	0.3585	-0.0752	0.0935
Cronbach's α statistic	**Scale reliability coefficient: 0.7**					

Impact of women's empowerment on the ideal number of children

In both surveys, the ideal number of children decreases as the empowerment index increases (Tables 7 and 8, Model 1), which confirms our working hypothesis that the more empowered a woman is, the smaller her desired family size. However, the association between the dimensions of women's empowerment and the preferred number of children is not verified for all dimensions, and the associations vary according to the period studied. For the 2003-2004 PFHS, the dimensions 'joint or isolated decision-making' and 'women's economic and cultural resources' are not significantly associated (Table 7, Model 2). On the other hand, 'attitude towards domestic violence,' 'participation in decision-making,' 'social independence' and 'women's educational and cultural resources' contribute significantly and negatively to the ideal number of children. In 2011, 'women's educational resources,' 'joint or isolated decision making around the fertility project,' 'mobility freedom and unilateral decision making on birth control' and 'economic resources of educated women' are negatively associated with the ideal number for children. 'Social independence' and 'the frequency of discussion on birth control among educated women' were found to be non-significant (Table 8, Model 2).

Moreover, regardless of the measure of women's empowerment (aggregate or disaggregated model), rural women are more likely to have a higher desired number of children than those living in urban areas (Tables 7 and 8). Furthermore, the higher women's parity, the more children they desire in both surveys (Tables 7 and 8, Models 1 and 2). For household wealth, only the 'richest' modality is not significant in 2011 in the disaggregated model, while the other modalities are negatively associated with the ideal number of children, which indicates that the wealthier the household is, the more woman idealizes a smaller family size.

Table 7: Coefficient Estimates from Generalized Poisson Regression Analysis, Morocco, 2003-2004

Dependent variable: Ideal number of children		
	Model 1	**Model 2**
Women's Empowerment		
Empowerment index	-0.210***	
	(-6.41)	
Attitude towards conjugal violence		-0.068***
		(-5.63)
Participation in decision making		-0.041**
		(-3.23)
Joint or isolated decision making		-0.006
		(-0.51)
Social independence		-0.042**
		(-3.03)
Educational and cultural resources		-0.039*
		(-2.59)
Economic and cultural resources		-0.006
		(-0.37)
Control variables		
Place of residence		
Urban	-0.235***	-0.239***
	(-3.69)	(-3.74)
Wealth index		
Poorer	-0.142*	-0.138*
	(-2.25)	(-2.18)
Middle	-0.187*	-0.177*
	(-2.53)	(-2.38)
Richer	-0.199*	-0.178*
	(-2.28)	(-2.01)
Richest	-0.240**	-0.193*
	(-2.64)	(-2.06)
Parity	0.262***	0.258***
	(27.14)	(25.27)
_cons	2.779***	2.779***
	(50.67)	(49.67)
Number of women	8,222	8,222

t statistics in parentheses * $p<0.05$, ** $p<0.01$, *** $p<0.001$
Note: **Model 1**: Aggregate Model, **Model 2**: Disaggregate Model

Table 8: Coefficient Estimates from Generalized Poisson Regression Analysis, Morocco, 2011

Dependent variable: Ideal number of children		
	Model 1	**Model 2**
Women's Empowerment		
Empowerment index	-0.157***	
	(-4.30)	
Social independence		-0.010
		(-0.84)
Educational Resources		-0.057***
		(-3.63)
Joint or isolated decision making around the fertility project		-0.048**
		(-3.02)
Mobility freedom and unilateral decision making on birth control		-0.064***
		(-3.65)
Economic resources of educated women		-0.045**
		(-2.68)
Frequency of discussion about birth control among educated women		0.006
		(0.41)
Control variables		
Place of residence		
Urban	-0.176***	-0.173***
	(-3.65)	(-3.57)
Wealth index		
Poorer	-0.193**	-0.179**
	(-3.00)	(-2.77)
Middle	-0.183**	-0.156*
	(-2.73)	(-2.30)
Richer	-0.198**	-0.160*
	(-2.73)	(-2.16)
Richest	-0.168*	-0.121
	(-2.18)	(-1.55)
Parity	0.253***	0.255**
	(24.53)	(23.88)
_cons	2.740***	2.707***
	(48.41)	(46.76)
Number of women	9,586	9,586

t statistics in parentheses * $p<0.05$, ** $p<0.01$, *** $p<0.001$
Note: **Model 1**: Aggregate Model, **Model 2**: Disaggregate Model

Discussion

Our first conclusion is that despite the variability of indicators used in constructing the empowerment index (2003-2004 and 2011), the same results are obtained in the association analysis with the ideal number of children.

As measured in this study, it seems that women's empowerment is significantly associated with the desire for reduced fertility in Morocco in both 2003-2004 and 2011. The ideal number of children decreases as the empowerment index increases. These findings are consistent with most studies that have found an inverse relationship between the desired number of children

and women's empowerment as well as with most of the dimensions that compose it (Atake & Gnakou Ali, 2019; Balk, 1994; Steele et al., 1998; Upadhyay & Karasek, 2012; Upadhyay et al., 2014; Woldemicael, 2009).

Education, rejection of domestic violence, participation in decision-making, and social independence, which reflect women's empowerment, promote their tendency towards a fertility model that breaks with traditional norms and values of large families. When women have more decision-making power, their fertility ideal becomes concordant with modern fertility patterns based on fewer children (Phan, 2016). This is also the case for educated women with economic resources and, therefore, probably some financial participation in the domestic sphere, which gives them high social status. 'Education' emerges as the critical factor in the question of women's empowerment, the dimensions of which can be mainly affected (Asaolu et al., 2018; Jejeebhoy & Sathar, 2001; Mason & Smith, 2003; Upadhyay & Karasek, 2012;). This result can be part of the resource theory which states that the more cultural and economic assets a person has, the more decision-making power they have (Barney, 1991).

Women who reject male violence are more likely to be aware of gender relations and gender inequalities, be committed to their equality rights, and, therefore, have decision-making power over their sexual and reproductive trajectory (Upadhyay & Karasek, 2012).

Socially independent women, who are married to a partner of roughly the same generation - thus rejecting a kind of consensual domination between spouses (Bozon, 1991) - and who delay their marriage and first birth, are more likely to be educated women and therefore to opt for smaller families. The current high educational level may indicate that they had postponed their family and reproductive careers to a more extended period of study and afterward to professional integration. Consequently, they present a profile with requirements regarding partner choice, predisposition to motherhood, and the fertility project. Whether educated or not, if the woman has a relative or absolute say in the family project and discusses it with her husband, the desired number of children will be reduced. Thus, when spouses discuss, this reflects on the one hand, a certain degree of woman's empowerment, and on the other, the couple is more likely to reach an agreement (Hindin, 2000; Hogan et al., 1999; Upadhyay et al., 2014). There are many ways in which the lack of communication within couples affects the ideal number of children. The lack of discussion about the family project can distort the mental representations that the woman has of her husband's function. A study conducted in the United States by Turk and Bell (1972) showed that one-third of the configurations of husband and wife responses are entirely contradictory. In Ethiopia, 28.4% of the responses from both spouses disagree on the ideal family size reported, where the husband wants more children than the wife in 14.5% of cases, and 13.9% represents the opposite (Diro & Afework, 2013). The issue is less a matter of the opposition of individual ideals than a lack of communication to find common ground around the reproductive project. The ideal of high fertility reported by women in these conditions may be the expression of normative tensions and the representations that women make of the husband's or society's desire and not of their expectations, a kind of ideal chosen under constraints.

Similarly, when lack of communication is combined with unilateral decision making, it may reflect a strong patriarchal environment that makes a woman economically and socially dependent on male family members for her survival. This encourages her to value large numbers of children as a means of reducing the risk of insecurity and improving their social status (Mason & Taj, 1987). Education is crucial since the frequency of discussion about the fertility project does not affect the preferred number of children among educated women.

It is also important to notice that women who have mobility freedom are more likely to want fewer children even when their husbands are not involved in family planning decision-making. This finding may be supported by preference theory, which states that after the contraceptive revolution and women's empowerment, control over births by women replaced men's control over fertility (Hakim, 2003). With no movement freedom or decision-making power and therefore in a highly unequal marital relationship to the benefit of the husband, women tend to opt for traditional fertility norms by desiring a high number of children. This may be related to specialized areas within the domestic realm in conventional families where some decisions are women's domain, such as provisioning, and others are men's domain, such as decisions about family size (Glaude & de Singly, 1986).

It also shows that women with high fertility also express a higher desired number of children, while women with fewer children tend to have smaller families. This positive relationship between the number of children already achieved and the desired number of children may indicate that these women could achieve their goals for a large family according to traditional social standards to which they adhere. But it may be the result of selection effects, which means that women generally tend to adjust the ideal number of children to the offspring achieved for fear of declaring that some of their children are not desired (Hin et al., 2011).

Urban women express a lower ideal number of children than their rural peers, other things being equal. As in rural areas, particularly in agriculture, prevailing social norms encourage high fertility as outlined in the intergenerational theory of wealth flows, which views children as an old-age insurance policy and free workforce for parents (Caldwell, 1982). Thus, even when women have educational and economic resources and therefore have a smaller ideal number of children, it is the social standard that prevails over individual beliefs.

The richer the household, the more the woman chooses an ideal of low fertility. Poor couples seem to benefit from a large family size in the medium- and long-term perspective of household income from child labor (Atake & Gnakou Ali, 2019). Couples who have more economic capital and therefore do not need to rely on child labor tend to prefer investing in the quality of children rather than in their quantity (Becker & Lewis, 1973).

In conclusion, given that high fertility has a negative impact on women's reproductive health (Dixon-Mueller & Germain, 2007; Sully & Walters, 2001), empowerment contributes significantly to changing fertility preferences toward fewer children. Enhancing women's access to both educational and economic resources will, on the one hand, strengthen their social independence, their participation in decision-making in the family sphere, and their rejection of domestic violence, and on the other hand, enable them to adhere to fertility norms based on reduced family size. Improving the social status of women will thus lead to the preservation of their health capital.

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