EXPLORING THE CORRELATION BETWEEN SOCIODEMOGRAPHIC FACTORS AND WOMEN'S FERTILITY IN THE REPUBLIC OF MOLDOVA

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Abstract. The article aims to study the impact of sociodemographic factors on the probability of having children among women from the Republic of Moldova. The research is based on the data of the demographic study Generations and Gender conducted in Moldova in 2020. The probability of a woman having at least one child during her lifetime is influenced by her level of education and place of residence. Women with higher education and those from urban areas tend to have a lower probability of having a child at a young age. Women from the municipality of Chisinau also have a lower probability of having at least one child by the age of 30. Postponing the birth of the first child to older ages implies a lower probability for women to have children of higher birth orders. Women with higher education have a 65.6% probability of giving birth to two children and a 16.9% probability of giving birth to three children. Similarly, in urban areas, there is a significantly lower probability of having no less than two children (60.7%) and three children (16.4%). In the municipality of Chisinau, the probability of having a second child is 53.1% and the third child is 12.3%. The article was elaborated within the State Program Project (2020-2023) 20.80009.0807.21 „Migration, demographic changes, and situation stabilization policies".
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Introduction. Low fertility rates and a trend towards postponing births to older ages have affected most of the countries in Central and Eastern Europe (CEE). These countries entered the second demographic transition later than Western European countries. Sudden decreases in the total fertility rate (TFR) followed by stabilization are common trends in many European countries, including those in Western, Central, and Eastern Europe (Sobotka, 2004, 2008). However, there is a delay in the onset of these trends in the latter.

The Republic of Moldova has experienced a decline in the number of children born per woman of childbearing age over time. This trend can be attributed to several factors, such as an increase in the length of education, greater emphasis on personal and professional success, changes in attitudes towards having children, the tendency to delay childbirth to later ages, and a decrease in the desire to have more children. These factors often conflict with the desire to start a family and have children, leading to a reduction in reproductive intentions (Berrington, 2015).

The Republic of Moldova has been experiencing a total fertility rate below the replacement level of population reproduction, which is set at 2.1 children per woman of childbearing age for over two decades. This continuous low fertility rate has contributed to the decline in population, changes in the demographic structure, and the deepening of the demographic aging process. Studies have shown that the number of births will continue to decrease in the coming decades due to the population's structure and the entry into reproductive age of the few generations born in the late 90s and early 2000s.

Official statistical data from 1991-2020 shows a significant decline in fertility rates among women aged 15 to 24. In 1991, this age group accounted for 54.8% of all births, but by 2020, this number had decreased to 28.5%, a reduction of 26.3% percentage points.

It is currently observed that the majority of women who have high fertility rates fall between the ages of 25 and 34 years old. In 2020, this age group accounted for 57.6% of births, while in 1991, it was only 38.8%.

In the Republic of Moldova, delaying childbirth began in 1996. This was the first year when the average age of a mother at first birth increased by more than 0.3 years, according to the definition given by Kohler and Ortega in 2002 (Kohler, Ortega, 2002) Between 1996 and 2020, the age of mothers at first birth increased by 2.5 years.

These changes in the age distribution of mothers have had a significant impact on the total fertility rate in the Republic of Moldova. This can be seen by comparing specific fertility rates. From 1991 to 2020, specific fertility rates for young mothers (under 20 years old) decreased by 2.3 times, while for women aged 20 to 24, it decreased by precisely 2 times.

The number of births among younger women has decreased, resulting in a decrease in the number of children born by 0.68 children per woman being able to give birth to a child. However, in the older age group of 30 to 49 years, the birth rate has increased by only 0.23 children. As a result, the TFR value in 2020 was 0.49 children lower than in 1991 (1.78 and 2.3, respectively).

Literature review. Intergenerational fertility differences (older and younger generations), as well as those associated with women's level of education and place of residence, are driven by changes in the timing of births, particularly maternal age at first birth. Multiple studies (Frejka, 2001, 2010, 2012) demonstrate that having children at young ages usually leads to a higher number of children born during the reproductive life (Frejka, Calot, 2001; Götmark, Andersson, 2020) while postponing childbearing to older ages is one of the leading causes of the decrease in the number of children born (Sobotka, 2000). The decision to have a child of lower birth order can be influenced by a combination of factors such as higher education enrollment (Gustafsson, 2001; Kantorova, 2004; Muresan, Hoem, 2010), living in urban areas (George et all, 2013; Kulu, Boyle, 2009; Kulu, Washbrook, 2014; Mathias, 2019) and specific social norms (Goldscheider, Uhlenberg, 1969; Архангельский, 2006). These factors can have a strong synergistic effect on the decision-making process.

Data and methodology. To investigate how sociodemographic factors, affect the likelihood of having children of different birth orders and how these factors

relate to the timing of the first child's birth, we analyzed the GGS dataset. We calculated the probabilities of having children of different birth orders and the average age of mothers at the time of the first child's birth for various sociodemographic groups, including women of different education levels, women from rural and urban areas, and those residing in the municipality of Chisinau.

When selecting women for this analysis, it was considered that the study period ends by the age of 24, including university studies. At the same time, specific for the Republic of Moldova is the fact that up to the age of 24, the young population, as a rule, settles down to live either in the urban or rural environment. To calculate the probabilities of having children of different orders, women aged between 40-49 years who completed their studies by the age of 24 were selected. The choice of this age group of women was determined by the fact that they have completed or are at the stage of completion of the reproductive period, which allowed us to track the probabilities of giving birth to children of different orders during their reproductive life and to highlight the differences in fertility depending on the level of education of women and the place of residence. To calculate the probability of having at least one child during their lifetime for women from different social groups, two sub-samples were selected: women by education level, aged 40-49 (N=733), and women by place of residence including the municipality of Chisinau, aged 40-49 (N=546). Women aged 40-49 recorded at the time of the GGS refer to female cohorts born in 1970-1980 who were in their prime reproductive age in the late 1980s and throughout the last decade of the century past as well as in the first decade of the current century.

Thus, their reproductive behavior was under the influence of several factors, such as family policies to stimulate the birth rate, the socioeconomic crisis of the 90s, the relative stabilization of the socioeconomic situation in the 2000s, the transformation of value orientations, and the diminishing of social control over behavior reproductive.

Despite the extensive sample of the GGS, including the subsample of women of reproductive age, it was not possible to explore the probabilities of having children of different orders according to women's ethnicity. The GGS questionnaire only included the question on spoken language and did not include the question on ethnicity. Attempts to limit respondents speaking Romanian and other languages did not give reliable results.

Main results. The results clearly show that the likelihood of having at least one child at a certain age varies significantly depending on the level of education of women (as illustrated in Figure 1). Women with higher levels of education have a lower probability of having a child at a young age. For instance, the chances of having a child at the age of 24 for women with higher education are only 50%, while for women with average and low levels of education, the chances are 70%. However, the probability of having at least one child increases for women with higher education from the age of 25 and reaches 70% by the age of 28. By the age of 33, the probability of having at least one child becomes equal for women with different levels of education, and by the age of 35, it reaches 90%.

Despite the lower probability of giving birth to a child at a young age for women with higher education, a significant number of them still give birth to at

least one child by the age of 35. On the other hand, women with medium and low levels of education tend to start having children at a younger age, with a 50% chance of having at least one child by the age of 20, and an 80% chance by the age of 26. This gives them more time to have second and third children before the end of their reproductive period.
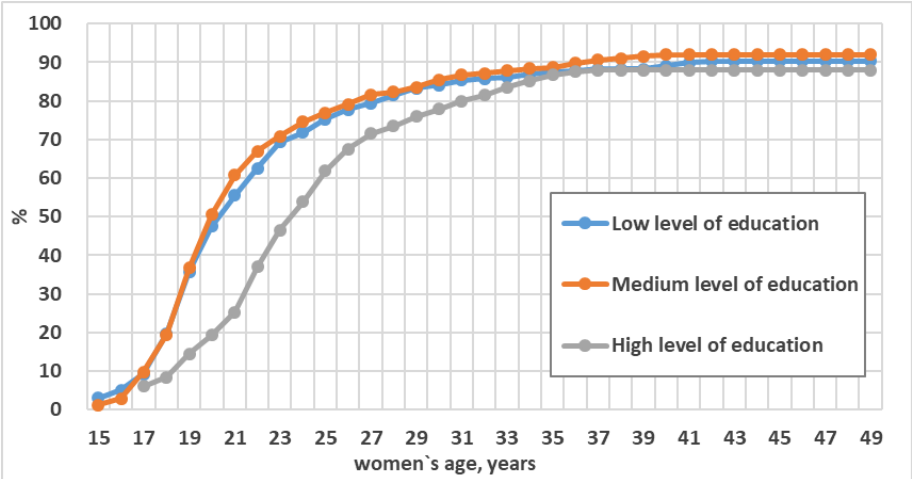

Figure 1. **Probability of having at least one child at a given age by women's level of education**

Source: calculated by author based on GGS data,
The basis of calculation: Women aged 40 to 49

Research has shown that most women realize their reproductive intentions by the age of 35, with over 90% of the total fertility rate formed by this point. However, certain circumstances such as education, employment, or housing may cause some women with higher education to delay the birth of their first child. In such cases, compensatory fertility occurs between the ages of 25 and 33, with these women striving to achieve multiple births within a shorter span of time. Nevertheless, this timeframe is too brief, and those who gave birth to their first child before the age of 24 have approximately 10 years to give birth to children of higher ranks, while those who gave birth at the age of 28-30 years have only 5-7 years. Consequently, there may be an incomplete realization of reproductive intentions, making it hard to eliminate differences in the probabilities of having at least one child at a young age.

Our analysis suggests that the education level of women has an impact on the likelihood of having multiple children. We found that the age of the mother at the time of her first childbirth significantly affects the probability of having more children. As the age of the mother increases at the time of her first childbirth, the likelihood of having two or three children decreases. Additionally, we noticed a correlation between the average age of women at the completion of their studies and the average age of first-time mothers. The average age of first-time mothers tends to be higher. Women with lower education levels tend to have their first child at the age of 21.7 years, which results in a 74.3% probability of having at least two children and a 36.5% probability of having three children. This, in turn, determines the average number of children born per woman, which stands at 2.15.

Table 1. **The probability of having two or three children depends on the level of education of women**

Level of education	Mean age at the birth of the first child		Probability of having children, %		Mean number of children born
	At the end of the studies	At the birth of the first child	Not less than two children	Not less than three children	
Higher level of education	22.8	24.7	65.6	16.9	1.78
Medium level of education	20.5	22.3	73.5	24.4	1.96
Low level of education	19.2	21.7	74.3	36.5	2.15

Source: calculated by the author based on GGS data, 2020

The basis of calculation: women aged 40 to 49, women who completed their education by the age of 24 (N = 733).

On average, women with an intermediate level of education typically give birth to their first child at 22.3 years of age. Interestingly, these women have a similar likelihood of having at least two children as women with low education levels, which stands at 73.5%. Nevertheless, the probability of having three or more children is notably lower, at 24.4%. The mean number of children born to these women is less than two, with 1.96 children per woman.

In contrast, women with higher education tend to have their first child at a later average age of 24.7 years. They are less likely to have at least two children (65.6%) and three children (16.9%). Consequently, the average number of children born to women with higher education is only 1.78 children per woman.

The age at which a woman has her first child can impact the number of children she has throughout her reproductive lifetime, and this can vary depending on her location. The probability of having a child by a certain age can differ significantly based on where a woman resides, resulting in varying probability curves (*Figure 2.*). Notably, the most significant differences are observed in women under 25. For those living in rural areas, the probability of having a child by the age of 26 is 80%, while for those in urban areas, it is below 70%. In the municipality of Chisinau, the probability is slightly over 60%. Although the differences between women in rural and urban areas become smaller after the age of 28, they remain significant for those in Chisinau. However, after the age of 29, the probability of having at least one child for women in the municipality of Chisinau exceeds that in the urban environment, indicating a later onset of fertility for women in Chisinau. By the ages of 40-49, the probability of having at least one child for women in rural and urban areas is approximately 90%. In contrast, for women in Chisinau, it is slightly higher than 80%. It is worth noting that women in urban areas, particularly in Chisinau, have a lower probability of having at least one child before the age of 30, which can decrease their likelihood of having two or more children.
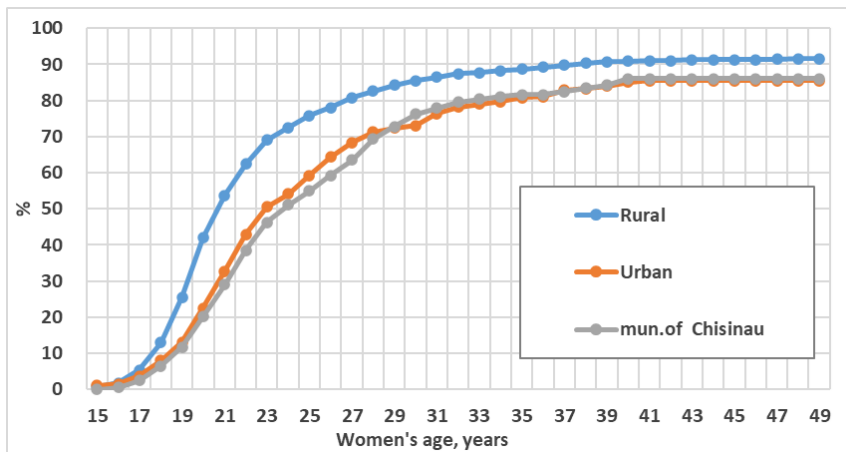
Figure 2. **Probability of having at least one child by a given age of a woman by area of residence**

Source: calculated by the author based on GGS data, 2020
The basis of calculation: women aged 40 to 49

Table 2, presents data illustrating the impact of delaying childbearing to older ages on the probabilities of having second-order and third-order births, as well as on the average number of children born. The lowest average age of mothers at the birth of their first child is recorded in rural areas, at 22.26 years old. In rural areas, there are also higher levels of probability of giving birth to a second child (78.4%) and a third child (31.9%). On the other hand, in urban environments, the average age of mothers at the first birth is higher, at 24.07 years old.

Table 2. **The probability of having two or three children depends on Women's living place of residence**

Place of residence	Mean age at the birth of the first child	Probability of having children, %		The mean number of children
		Not less than two children	Not less than three children	
Rural	22.26	78.4	31.9	2.29
Urban	24.07	60.7	16.4	1.85
Chisinau Mun.	24.12	53.1	12.3	1.76

Source: calculated by the author based on GGS data, 2020
The basis of calculation: women between 40 and 49 years inclusive (N = 751)
Note: When calculating this probability, women who gave birth to 2 or more children were selected as the numerator, and all women according to the corresponding place of residence were selected as the denominator.
When calculating this probability, as the numerator, all women who gave birth to 3 or more children were selected; as the denominator, all women living in the corresponding area of residence were selected.

The probability of giving birth to the following children decreases in urban areas, with 60.7% for the second child and 16.4% for the third child. In Chisinau, the highest average age of mothers at the first birth is 24.12 years old. Consequently, the probability of giving birth to subsequent children is lower, at 53.1% for the second child and 12.3% for the third child. The average number of children born per woman is 2.29 in rural areas, 1.85 in urban areas, and 1.76 in Chisinau.

The traditional model of reproductive behavior is prevalent in rural areas, where there is a high proportion of the population. This contributes to higher fertility rates. The mother's age at the time of the first child's birth is linked to the number of children born in the later stages of a woman's reproductive period. Women who live in urban areas and have higher education tend to have their first child at an older age. However, the most significant difference in the proportion of women who have given birth to at least one child is observed in the age group under 25. By the age of 49, most women, regardless of their education level or place of residence, have given birth to at least one child.

Conclusions. Various factors, including educational level and place of residence, influence the decision to have children. Many people delay starting a family until later in life, particularly among young adults up to 25 years old. Interestingly, the probability of having a child is equal for women of different educational levels up to 35. However, by the ages of 40-45, the chance of having at least one child for women living in villages and cities is almost 90%, while for those residing in Chisinau, the rate is slightly above 80%. It's worth noting that women in urban areas, particularly in Chisinau, face a lower probability of having a child by 30.

The study found that a woman's probability of giving birth to at least one child during the reproductive period is influenced by her place of residence and level of education. The likelihood of these outcomes varied significantly at different stages of life. Women with higher education and from the urban place of residence, including the municipality of Chisinau, are characterized by low probabilities of having a child at a young age. The probability of having a child at the age of 24 for women with a higher level of education is 50%, while for women with an average and low level of education – 70%. Women with higher education in rural areas give birth to their first child at 24.7 years, having significantly lower probabilities of having no less than two children (65.6%) and three children (16.9%). The probability of having at least one child by the age of 26 for women from rural areas is 80%, while for those from urban areas - under 70%, and from Chisinau - just over 60%. Women from the urban place of residence, especially from the city of Chisinau, stand out with lower probabilities of having at least one child until the age of 30, which reduces the probability of having two or more children. In the urban environment, the probability of giving birth to the second child is 60.7%, and for the third child - 16.4%. In the municipality of Chisinau, the probability of having the following children registers lower levels (53.1% - the second child and 12.3% - the third child).

Regarding political implications, our recommendation is to offer aid to families and couples, with a particular emphasis on supporting women in balancing the demands of raising children with their careers. This assistance must extend to women with higher educational attainment, as they typically have the lowest

average number of children born during their lifetime. Additionally, it should encompass employed women and those who desire a second child but have only one. Our suggested policies should primarily concentrate on women with higher education, working women, and those seeking to expand their families. It is essential to shape public opinion about the demographic standards that can help create awareness regarding childbirth and the choice of intervals between births in rural areas. In addition, there is a need to implement gender-sensitive policies that encourage fathers to participate in their children's education.

Improving the well-being of parents and children is a crucial element in enhancing human capital. By doing so, we can increase the value of human capital for future generations. Additionally, we should prioritize policies aimed at improving education for those who may have received less education in the past. This can lead to improved prospects in education, employment, and wages for their children over the long term. These policy interventions can help boost the country's human capital resources, resulting in increased productivity in both the short and long term. We consider it essential to strengthen human capital, through policy measures that would improve the well-being of parents and children, which could increase the value of the human capital of the next generations. At the same time, policies should be balanced by strengthening education for the less educated, which could improve their children's long-term prospects regarding education, employment, and wage rewards. These policy interventions will ultimately increase the country's human capital resources and, as a result, its productivity not only in the short term but also in the long term.

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