SHARES OF WOMEN BY NUMBER OF CHILDREN EVER BORN, DIFFERENCES IN CZECH CENSUSES 2011 AND 2021

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Abstract

The 2021 Census data provides valuable insights into women's fertility patterns. This study examines the distribution of women in the reproductive age based on the number of live births, age groups and education. This contribution shows the difference in percentage points from the 2011 Census too. Up to age group 35–39, childlessness is most common, later shifting to two children as the predominant category. This underscores the enduring appeal of the two-child family model, even for women near the end of their reproductive years. In the 45–49 age group, notable is the rise in childlessness. Analysis reveals a declining trend in higher-order births, with most women having a maximum of three children. However, nuances exist, particularly in education levels. Women with basic and tertiary education see increases in childlessness and having three or more children. University-educated women differ primarily in fertility timing rather than lifelong proportions. Interestingly, among those with tertiary education, childlessness significantly decreases before age 30, offering fresh insights. The assumption of declining fertility with more tertiary-educated females in the population may not hold, which is a subject for further analysis.

Key words: fertility, live births, childlessness

JEL Code: J11, J13

Introduction

The demographic landscape of fertility in Czechia has witnessed significant shifts over the last decades (e. g. Sobotka et al., 2008; Fiala et al., 2018). This study delves into the distribution of women by the number of live births across different age groups, shedding light on the evolving trends in family planning. The 2021 Census data serves as the foundation for this analysis.

The aim of this post is to provide a previously unavailable basic description of these highly current data from the 2021 Population and housing census, and to compare them with the results of the 2011 Census by measuring the differences in percentage points between the

two Censuses. This is done with a focus on key demographic characteristics categorizing the population into several groups. In addition to age groups, the analysis is also differentiated by education, which is one of an important discriminator of family behaviour in the population. It may be mentioned that the level of education has emerged as an important factor in the 2011 Census as well (Kurkin et al., 2018). The analysis of education is particularly important regarding the growing share of university-educated women in the population and their specificity in terms of balancing family life with work (Hon et al., 2021).

The post is divided into two chapters. The first, shorter chapter defines the methodology used and explains the reason for employing specific approaches chosen for the analysis. The second, more comprehensive chapter directly addresses the results of the analysis.

1   Methodology of the analysis

From a statistical perspective, the simplest and widely known indicators were used to maintain good interpretability and clarity. These are the proportions of women with specific numbers of children out of the total number of women. Women with an undetermined number of children were naturally excluded from the denominator in the calculation of these proportions. The results are multiplied by one hundred and interpreted in percentages.

The differences between the 2011 and 2021 Censuses are characterized by the straightforward disparity of these proportions in the respective Censuses, expressed in percentage points. The presentation system of the results is kept uniform for all educational categories to ensure better comparability.

It is worth noting that, for the sake of clarity, the proportions were calculated individually only for mothers with a maximum of four children. Additionally, the category of women with five or more children, which constitutes a very small portion of the population, was included.

The analysis included only women in their reproductive years, and women from sparsely populated educational categories were not included. Specifically, this pertained to women without any education and those with higher vocational education. This was done in consideration of the limited space of the contribution and the previously defined goal of describing fundamental, yet unanalysed, current facts. The analysed categories include women with basic education (including incomplete), secondary education (without a high

school diploma), complete secondary education (with a high school diploma) including additional qualifications, and finally, women with tertiary education.

There were no significant methodological changes between the Censuses and the data can be considered comparable with the results of the 2011 Census (Krušinský, 2023). The small difference in the data could be found in the category of complete secondary education (with a high school diploma) including additional qualifications, where various postgraduate courses defined by Czech law were in addition included in the 2021 Census.

1   Fertility patterns by number of live births

The following sections will provide a comprehensive examination of fertility patterns, considering both the number of live births and the age of women. After the first two tables containing aggregated data without distinction of education, the following tables provide detailed information for each educational category, as elaborated on in detail in the methodology section above.

Tab. 1: Distribution of women by number of live births in the 2021 Census (shares in %)

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	98.8	87.8	62.2	34.2	18.6	12.1	8.8
1	1.0	9.0	24.0	30.2	24.8	21.9	21.4
2	0.1	2.5	11.2	29.0	44.1	50.3	52.6
3	0.0	0.5	1.9	5.0	9.8	12.3	13.3
4	0.0	0.1	0.5	1.0	1.8	2.4	2.7
5+	0.0	0.0	0.2	0.5	0.8	1.0	1.1

Source: Censuses 2011 and 2021

The results of the 2021 Census show many interesting facts in Table 1. For example, childlessness forms the modal category up to the age of 35 for women. Subsequently, in older age groups, the modal category becomes having two children. It can therefore be stated that even for women who are now approaching the end of their reproductive period, the two-child family model remains significantly dominant.

It is also confirmed that lifelong childlessness is on the rise. Currently, in the age group of 45–49 years, the values are approaching 9 percent. Similarly, the proportion of women with only one child is slightly higher in younger generations, with most women having just one child shortly after turning 30, and older women are more likely to have two children. As for the fertility of the third order, many women have a child of that order even

around the age of 40. Having four or more children is significantly unusual in the Czech population, with about 95 percent of women giving birth to a maximum of three children.

Tab. 2: Change in women's distribution by number of live births from the 2011 Census (in percentage points)

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	0.7	0.8	0.9	8.2	7.6	4.9	2.5
1	-0.6	-1.2	-1.0	-1.1	0.7	0.7	3.0
2	-0.1	0.2	-0.5	-7.2	-7.3	-4.0	-3.5
3	0.0	0.1	0.4	-0.2	-1.0	-1.1	-1.7
4	0.0	0.0	0.1	0.1	-0.1	-0.4	-0.3
5+	0.0	0.0	0.1	0.2	0.1	-0.1	0.0

Source: Censuses 2011 and 2021

Table 2 adds a temporal dimension to the aforementioned facts. The table displays the change in the proportion of women in different groups since the 2011 Census in percentage points.

This output provides interesting information about both the changes in fertility timing and in lifelong characteristics. For instance, it can be seen in age intervals around 45 years that both lifelong childlessness and lifelong single-child families are increasing. On the other hand, lifelong fertility of higher orders is decreasing.

Childlessness is on the rise, especially between the ages of 30 and 40, indicating that many women are delaying their first reproduction until a relatively late age. This recuperation trend is likely slowing down the growth of lifelong childlessness, which is consistent with some other studies describing relatively intensive recuperation in Czechia (see Sobotka et al., 2011; Šprocha, 2014; Šťastná et al., 2017). This may also be related to the increase in the proportion of one child women at higher ages, where more women are leaving childlessness than those having a second child. Regarding single-child families, it is interesting to note that there was a roughly one percentage point decrease among the youngest women, which is likely primarily due to the continued rise in childlessness. However, it should be noted that between the ages of 20 and 29, the proportion of single-child families decreased more than childlessness increased.

As for second-order fertility, the proportion decreased especially among women between the ages of 30 and 40. However, when looking at women in age groups beyond their forties, assuming similar reproductive behaviour among neighbouring generations, there is

still hope for a relatively successful recovery. With some caution and without further data, it can be deduced that many of those women are simply adjusting their reproductive plans by postponing them to a later age, but eventually achieve the desired number of children. The situation is different for third-order fertility, where the largest decline in percentage points can be observed in age intervals around 45 years. On the contrary, it is interesting that in the youngest generations, the proportion of women with three children is slightly increasing or remains almost constant.

Tab. 3: Distribution of women by number of live births in the 2021 Census (shares in %) - Education level: Basic including uncompleted

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	99.2	64.4	33.1	21.4	16.9	13.5	12.7
1	0.7	23.8	29.1	23.5	20.0	19.4	17.7
2	0.1	9.3	25.5	31.9	33.2	36.2	37.4
3	0.0	1.9	8.7	14.9	17.7	18.4	18.9
4	0.0	0.4	2.5	5.2	7.2	7.4	8.0
5+	0.0	0.1	1.1	3.2	5.1	5.0	5.3

Source: Censuses 2011 and 2021

Among women with a basic education level, there is a relatively high rate of childlessness over their lifetime, as evident from Table 3. Fewer women in the population have one or two children. Conversely, there are a notable number of women with at least three children.

This leads to an intriguing paradox, where compared to the overall population, there are more both childless and high-parity women within this educational category. In terms of fertility timing, the reproductive behaviour appears similar; however, there is understandably a more pronounced decline in the proportion of childless women starting around the age of twenty, attributed to women planning to have a large number of children.

Tab. 4: Change in women's distribution by number of live births from the 2011 Census (in percentage points) - Education level: Basic including uncompleted

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	0.8	8.8	6.2	6.0	5.5	3.9	4.6
1	-0.7	-6.0	-2.9	-2.0	-0.6	2.9	3.1
2	-0.1	-2.4	-3.2	-5.7	-5.9	-2.7	-4.1
3	0.0	-0.3	0.2	0.8	0.1	-2.0	-3.8
4	0.0	-0.1	-0.1	0.5	0.4	-1.4	-0.6
5+	0.0	0.0	-0.3	0.5	0.6	-0.6	0.8

Source: Censuses 2011 and 2021

Table 4 illustrates that in this educational category, the number of children born to women decreases significantly more intensively than in the overall population. Notably, there is a substantial increase in childlessness among women aged 20 to 40. Surprisingly, around the age of 30, the proportions of women with multiple children either slightly increase or remain constant.

Tab. 5: Distribution of women by number of live births in the 2021 Census (shares in %) - Education level: Secondary including vocational (without maturity)

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	97.7	78.0	44.1	24.3	15.4	10.3	6.9
1	2.2	17.9	34.0	31.6	26.7	23.2	20.9
2	0.1	3.7	18.8	34.7	43.5	49.3	53.5
3	0.0	0.3	2.6	7.8	11.6	13.5	14.8
4	0.0	0.0	0.3	1.3	2.2	2.7	2.9
5+	0.0	0.0	0.1	0.4	0.7	0.9	1.0

Source: Censuses 2011 and 2021

Among women with secondary education but without a high school diploma, Table 5 shows quite significant differences compared to Table 1. The difference is particularly pronounced in the proportion of childless twenty-year-olds, which decreases substantially faster than in the overall population. Simultaneously, there are more women with two children around the age of thirty. Interestingly, in terms of the age range at the end of the reproductive period, the proportions are nevertheless similar to those in the overall population.

Tab. 6: Change in women's distribution by number of live births from the 2011 Census (in percentage points) - Education level: Secondary including vocational (without maturity)

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	1.7	5.6	4.2	7.8	7.8	5.2	2.6
1	-1.7	-5.2	-1.8	1.0	4.0	4.5	5.5
2	-0.1	-0.5	-2.8	-9.6	-10.8	-6.9	-4.2
3	0.0	0.0	0.2	0.4	-1.1	-2.4	-3.4
4	0.0	0.0	0.1	0.3	0.1	-0.3	-0.5
5+	0.0	0.0	0.0	0.1	0.0	0.0	0.0

Source: Censuses 2011 and 2021

Based on Table 6, the most notable observation is the significant decrease in the proportion of women with two children in the 35–39 age group, which exceeds ten percent. The proportion of women with one child in this age range has increased significantly compared to the overall population. Childlessness among twenty-year-olds is more pronounced. In terms of the age range at the end of the reproductive period, it can be stated that the increase in childlessness is at the same level as in the overall population. However, the increase in lifelong single-child households is substantially more pronounced.

Tab. 7: Distribution of women by number of live births in the 2021 Census (shares in %) - Education level: Complete secondary (with maturity) including post-secondary

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	99.7	94.9	60.6	32.0	18.1	11.4	8.1
1	0.3	4.5	26.7	31.5	26.6	23.2	22.9
2	0.0	0.6	11.7	31.9	45.9	53.3	55.4
3	0.0	0.0	0.9	4.1	8.2	10.4	11.4
4	0.0	0.0	0.1	0.4	1.0	1.4	1.8
5+	0.0	0.0	0.0	0.1	0.2	0.4	0.4

Source: Censuses 2011 and 2021

Table 7 provides insights into the fertility patterns of women with complete secondary education including a high school diploma. There are fewer women with three or more children compared to less educated women, and slightly more women with two children

compared to the overall population. Otherwise, the results closely resemble the relative frequencies without distinguishing by education.

Tab. 8: Change in women's distribution by number of live births from the 2011 Census (in percentage points) - Education Level: Complete secondary (with maturity) including post-secondary

Number of children	Age						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
0	0.2	0.6	0.0	6.7	7.5	5.2	2.9
1	-0.2	-0.7	-0.8	-0.9	1.1	0.2	3.0
2	0.0	0.0	0.5	-6.1	-7.9	-3.8	-4.6
3	0.0	0.0	0.2	0.2	-0.7	-1.2	-1.2
4	0.0	0.0	0.0	0.1	0.0	-0.3	-0.1
5+	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1

Source: Censuses 2011 and 2021

However, in terms of differences over the last ten years, based on Table 8, it is possible to observe more variations from Table 2. Especially up to the age of thirty, there are significantly smaller changes in the recorded proportions between the Censuses. Once the age of thirty is reached, the recorded values are mostly similar to those in Table 2.

Tab. 9: Distribution of women by number of live births in the Census 2021 (shares in %) - Education level: Tertiary (higher education)

Number of children	Age					
	20–24	25–29	30–34	35–39	40–44	45–49
0	97.0	78.3	42.2	21.0	13.7	11.1
1	2.8	16.8	30.1	23.3	19.8	20.9
2	0.2	4.5	24.6	45.4	51.2	52.8
3	0.0	0.3	2.8	9.0	12.9	12.8
4	0.0	0.0	0.2	1.1	1.9	2.0
5+	0.0	0.0	0.0	0.2	0.5	0.5

Source: Censuses 2011 and 2021

Table 9 displays the results for women with tertiary education. It's important to note the absence of the category of 15–19-year-olds, which is of course omitted because at this age, tertiary education has only just begun for the vast majority of individuals.

It is evident that women in tertiary education remain childless significantly longer compared to the rest of the population. The proportions begin to approach the values for the population without distinguishing by education around the age of forty. The same can essentially be said for other numbers of children. For instance, it's interesting to note that the proportion of women aged 35–39 with tertiary education who have two children is higher than in the population without distinguishing by education. If we were to sum up the category of two or more children for this age group, the differences are also minimal, with 56.5 percent in the entire population and 55.7 percent among those with tertiary education.

Tab. 10: Change in women's distribution by number of live births from the 2011 Census (in percentage points) - Education level: Tertiary (higher education)

Number of children	Age					
	20–24	25–29	30–34	35–39	40–44	45–49
0	-1.1	-5.5	1.8	3.6	3.7	2.9
1	1.0	3.8	-0.9	-0.9	-3.9	-2.0
2	0.1	1.6	-1.0	-2.5	-2.6	-3.8
3	0.0	0.1	0.0	-0.1	2.3	2.5
4	0.0	0.0	0.0	0.0	0.5	0.4
5+	0.0	0.0	0.0	0.0	0.1	0.0

Source: Censuses 2011 and 2021

In terms of differences in Table 10, there is an interesting significant decrease in childlessness among women aged 25–29. Conversely, for older women, childlessness increases, indicating notable differences in reproductive behaviour among generations of women with tertiary education.

Interpreting the proportions of women at the end of their reproductive years is complex, as the proportion of both childless women and women with three or more children increases in the population. It can be considered that tertiary education is more accessible, and perhaps more meaningful, compared to the past even for women planning to have a large family. Consequently, women with tertiary education are becoming increasingly stratified in terms of the number of children within this educational category.

Conclusion

In conclusion, presented tables offer a comprehensive view of fertility trends among different educational groups, highlighting the intricate interplay between education, career goals, and

family planning decisions. The data underscores the importance of considering education as a key factor in shaping demographic patterns and informs discussions on policies related to family planning and women's education.

The data indicates that childlessness is the modal category for women up to the age of 35. Subsequently, the modal category shifts to having two children in older age groups. This suggests that the two-child family model remains prominent even among women approaching the end of their reproductive years.

In the age group of 45–49, it is noteworthy that the prevalence of childlessness has increased. Approximately 9 percent of women in this age group are childless. The analysis of higher-order births in the same age group reveals a declining trend, with the majority of women having a maximum of three children.

The situation, however, is not as straightforward as it may seem. There are significant differences between various levels of education, and sometimes even within these levels. For instance, interesting facts emerged regarding women with basic and tertiary education, where both childlessness and the proportion of women with three or more children are increasing.
It is evident that female university students currently differ from the rest of the population more in terms of fertility timing rather than in terms of lifelong proportions. Moreover, it is intriguing that among women with tertiary education, the proportion of childless individuals significantly decreased before the age of 30. These youngest generations evidently bring new, less described information to fertility trends. Overall, the reproductive behaviour of university-educated women is stratified compared to the past

It seems that a potentially simplifying view, which automatically expects declining fertility with an increasing number of female university students in the population, may not necessarily be true. Whether these changes are a result of an improving alignment of motherhood with education, or whether the completion of tertiary education is currently more meaningful for women with quantitatively ambitious reproductive plans in connection with the job market, is a question for further analysis.

Acknowledgment

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