

THE RELATIONSHIPS BETWEEN CHILDLESSNESS AND EDUCATIONAL ATTAINMENT AMONG WOMEN BORN BETWEEN 1920 AND 1979 IN HUNGARY¹

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ABSTRACT

Using comprehensive, individual-level census and micro census data from 1970 to 2016, our analysis seeks to answer the question of how the level of childlessness has changed in Hungary among women born between 1920 and 1979. Are there any differences by educational attainment and how the extent of childlessness would have changed if there had been no expansion in education? Our results indicate that the proportion of childless women has changed over time, both overall and within each educational group. The level of childlessness among women with different educational attainment has become increasingly similar to that of women with secondary education. Convergence was strongest between those with primary and vocational education. The level of childlessness among women with secondary and tertiary education has also become similar, although it remained consistently higher for college and university graduates. We also set up two hypothetical childlessness scenarios. In the fixed education scenario, the educational composition of women born in 1945–1949 was held constant and was projected to all birth cohorts. In the fixed childlessness by education scenario, we held the childlessness rate constant within all educational categories of women born in 1955–1959 and projected it onto the other birth cohorts. For both scenarios we calculated the overall childlessness for each cohort. Our calculations indicate

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that the change in the composition of women by educational attainment had a smaller effect on overall childlessness rates than the change in the level of childlessness among women with different levels of schooling.

Keywords: childlessness, fertility, educational attainment, convergence, standardisation, Hungary

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INTRODUCTION

Before the 1990s in Hungary, as in other Central and Eastern European countries, the rate of female childlessness was relatively low (below 10%) compared to Western European rates (Sobotka, 2017); thus, the analysis of this issue, for a long time, did not seem to be of paramount importance. However, in the young female cohorts born after 1970, the proportion of those having no child at the age of 40 is already increasing. Recent studies also emphasize that childlessness is not necessarily intentional but women “slip” into the situation of remaining childless, with a negligible rate (below 5%) of voluntary childlessness (Pongrácz, 2011; S. Molnár, 2011; Miettinen and Szalma, 2014; Kapitány and Spéder, 2015, 2018), and only 7% of the population see childlessness as advantageous (Spéder, 2014). Nonetheless there are life events and circumstances which make women more likely to remain childless (for more on this, see the interviews in Szalma and Takács, 2014).

We have good reasons to expect an increase in female childlessness in the future, what may lead to a (further) decline of overall fertility.² An estimate made in 2014, for example, showed that the completed total fertility rate is strongly affected by the degree of female childlessness (Spéder, 2014). The estimate held parity progression ratios constant and only modified one factor: the proportion of childless women. If the rate of childlessness increased

² The relationship between childlessness and fertility rates are not necessarily negative. Firstly, there are the so-called polarized countries, such as the United Kingdom or Finland, which have a high proportion of both childless women and women with more than four children. And secondly, there are countries in Central and Eastern and Southern Europe, such as Spain or even Hungary, where both the rate of fertility and childlessness are low (Tanturri et al., 2015).

from 15% to 20%, the estimated total fertility rate decreased from 1.66 to 1.53.³ If the childlessness rate was set to 25%, the fertility rate dropped even more, to 1.44.

Among the individual covariates of female childlessness, researchers most often highlight women's educational attainment, based on the consideration that increasing levels of schooling (closely related to increasing employment rates) and declining rates of fertility seem to move together. Indeed, in recent scholarship, several volumes and studies presented results indicating a positive correlation between female childlessness and educational attainment in Western Europe (Andersson et al., 2009; Berrington, 2014, 2017; Bujard, 2015; Beaujouan et al., 2016; Köppen et al., 2017; Kreyenfeld and Koznietzka, 2017b), in Central and Eastern Europe (Sobotka, 2011; Kapitány and Spéder, 2015; Brzozowska, 2015; Beaujouan et al., 2016) and also in the United States (Livingston, 2015). At the same time, childlessness has stopped increasing among highly educated women for example in Germany (Bujard, 2015; Kreyenfeld and Koznietzka, 2017a). In Sweden and Finland, there was a U-shaped relationship between female childlessness and educational attainment (Andersson et al., 2009; Rotkirch and Miettinen, 2017). While in all four Nordic countries childlessness increased among the youngest low educated 1970–1972 cohorts, it remained stable, plateaued, or even slightly decreased among medium and highly educated women. As a result, childlessness is highest among the lowest educated in the above countries (Jalovaara et al., 2019).

Wood, Neels and Kil (2014) studied the relationship between education and childlessness among women born between 1940 and 1961. They argued that the weak correlation found in Central and Eastern European countries may have been due to the development of a uniform fertility behaviour in this region evolving during state socialism. Everyone, regardless of education, had children, because that was the social norm. Therefore, female childlessness was equally low in all educational groups (there were, of course, differences, for example, in the level of completed fertility). Among women born before 1965, the level of childlessness has become increasingly similar by educational attainment, mainly because of the convergence of childlessness rates of women with primary and secondary education (Brzozowska, 2015; Beaujouan et al., 2016; Szabó et al., 2016). Larger contextual differences started emerging in the 1980s, and these effects are most pronounced in the fertility behaviour of younger birth cohorts, i.e., those born after 1960 (Wood et al., 2014).

³ In the 1975 and subsequent birth cohorts.

In the present paper, we continue the works of Wood, Neels and Kil (2014), Brzozowska (2015) and Beaujouan, Brzozowska and Zeman (2016), who studied the demographic behaviour of female cohorts born before 1960. At the same time, we also rely on the results presented in recent comprehensive volumes and country-specific reports on childlessness (Tanturri et al., 2015; Miettinen et al., 2015; Kreyenfield and Konietzka, 2017b). With data on recent cohorts from Hungary, we contribute to this body of research by systematically reviewing how the proportion of (permanently) childless women has changed according to their educational attainment. We seek to answer the questions of how the level of childlessness among women born between 1920 and 1979 has changed, how differences by educational attainment have evolved over time, and how the extent of female childlessness would have developed had there been no educational expansion.

THEORETICAL BACKGROUND

In demography, the issue of childlessness is closely related to fertility. It seems natural then to go back to theories explaining fertility when examining the phenomenon of childlessness. We briefly address the economic and cultural theories of fertility change first.

In his model of family economics, Becker (1960) approached the question of fertility as if children were desirable but costly goods, and households would rationally decide whether or not to have a child by jointly weighting the costs and benefits of childbearing. How people with different educational attainment and income decide to have a child is affected, on the one hand, by their income (income effect) and, on the other hand, by the cost of raising a child (opportunity cost). Income can have a positive effect on childbearing, as higher income (which is associated with higher levels of education and employment) makes it easier to raise more children – unless parents want to raise fewer children but among better conditions (quality instead of quantity). However, an increase in the cost of raising children is negatively correlated with fertility. Highly educated parents and those having better jobs, especially women, may lose their favourable positions due to childbirth and parenting; thus, they may choose to have fewer children to avoid losing career opportunities and income. Women with lower educational attainment, however, have lower incomes and more unstable labour market positions than their educated counterparts, and they do not have the prospect to achieve a significant improvement in their

career with age; thus, it is relatively less costly for them to have a child at a younger age. These theoretical considerations suggest that highly educated women, who are most affected by the effect of lost income due to childbirth and parenting, will have lower fertility, while lower-educated women will have higher rates. Nevertheless, Brzozowska (2015) and Kantorová (2004) have drawn attention to the fact that in pre-transition Central and Eastern European countries, economic motivation and quantity-quality bargaining may have played a lesser role in childbearing decisions. There was almost full employment and relatively low incomes in all social groups; thus, the opportunity cost of having a child was significantly lower. Nevertheless, after the regime change in 1990, this may already have had an effect on fertility careers and, for example, on the postponement of childbearing (Kantorová, 2004). Furthermore, it should not be overlooked that during the transition to a market economy and entering a highly competitive labour market system in Hungary and other post-socialist countries in the 1990s, inflation, the declining real value of family benefits and income testing made it harder for many families to choose between higher individual consumption and childbearing (Spéder and Kamarás, 2008). This could have put families with lower income (and especially those with low educational attainment) in a serious dilemma, which could also have influenced their decision to have children.

According to the cultural theory of fertility change, families do not rationally calculate how many children to have on the basis of economic considerations but follow the changes in the culture, values and behavioural norms of their social environment. The theory of second demographic transition suggests that the evolved modern values promoting self-realisation reduce fertility and increase childlessness, as modernization, economic growth, broadening career opportunities and changing individual aspirations weaken traditional family formation processes (van de Kaa, 2002; Sobotka, 2008). These changes have a uniform effect on demographic behaviour regardless of educational levels, as the demographic transition has, at a rapid pace, influenced all social groups equally. Living standard goals, such as improving one's housing situation, purchasing durable consumer goods, educating children, and upward mobility are almost completely uniform lifetime goals within Hungarian society (Andorka, 1995). Based on these aspects, fertility may decrease both among low- and higher-educated women. However, empirical studies have indicated that postmaterialist attitudes are not related to the ideal number of children: highly educated women do not want fewer children than their lower-educated

counterparts (Wood et al., 2014).⁴ Fertility rate, both among low- and high-educated women, depends much more on the institutional context, family and social policy instruments available in a given country (Lesthaeghe, 2010). In our study, we cannot test the effect of norms and values on childlessness. Emphasising these factors, nevertheless, have a place here because their effect on fertility cannot be independent from structural “constraints” such as education (or occupation). Higher-educated people have more opportunities to behave rationally by planning and learning relevant skills and have more access to effective methods of contraception than their less-educated counterparts (Wood et al., 2014).

Of further theories explaining fertility, we consider important to highlight the theory of uncertainty as well. The uncertainty or risk-aversion theory argues that when the consequences of economic, social and individual factors are uncertain, decision-makers tend to avoid taking risks, especially with respect to making an irreversible decision such as having a child. Among uncertain social and economic conditions, it is primarily young people who postpone starting a relationship and having a child. However, Kreyenfeld (2010) found that both objective economic uncertainty (unemployment) and subjective (concerns about the economic situation and job security) had little effect on postponing childbearing because they exerted their impact primarily through educational attainment. While women with low education responded to economic insecurity by preferring to have children and raise them, those with higher educational attainment tended to postpone motherhood.

We rely on these theoretical considerations when seeking explanations for the relationship between educational attainment and childlessness among women born between 1920 and 1979 in Hungary, without ignoring the fact that this relationship is deeply embedded into the socio-economic, educational and policy contexts.

THE SOCIAL, STRUCTURAL AND INSTITUTIONAL CONTEXT OF CHILDBEARING IN HUNGARY

Our study focuses on the development of female childlessness by educational attainment in a long-term perspective. In order to interpret the issue in the right context, it is essential to review some of the relevant processes of the past eighty years that may have influenced childbearing in the studied female birth cohorts.

⁴ However, macro-level analyses show that childlessness is higher in countries where post-materialist values are more prevalent (Miettinen et al., 2015).

Employment

A path to employment was opened for women when the Public Education Act of 1868 allowed the establishment of public (in Hungarian “polgári”) schools for girls, along with those already existing for boys. In the first two decades of the 20th century, the public school and the teacher training institute were the most dominant secondary education options for girls (Pukánszky, 2013). In the 1920s and 1930s, the teaching profession clearly became more and more popular among women: increasing numbers of women worked as teachers, and social norms considered this profession compatible with parenting and attending to family duties (Pukánszky, 2013). During these years, the ever-increasing employment of women at schools and offices seemed like an unstoppable process. Even if upper-class women did not, but an increasing proportion of lower middle-class women took up office work. At the same time, these positions were located at lower levels of the bureaucratic hierarchy; thus, employed women could not compete with men in an economic sense. The situation of women looking for work in the private sphere was even more difficult. However, as Hungary was a dominantly agrarian country before 1945, the agrarian population provided the main source of female employment both in agriculture and urban domestic service between 1900 and 1930 (Gyáni, 1998).

In parallel with this trend and with the strengthening of the patriarchal family model, the gradual exclusion of women from the labour market began between the two world wars (Gyáni, 1998). Paradoxically, the opportunity for women to become more independent through employment was created by the world wars. Because of a high demand for factory workers, women worked in arms and ammunition factories to substitute men who were sent to the front lines. Even though they were employed as unskilled trained workers, as military workers they earned twice as much as they did in their pre-war civilian occupations. Many also worked as volunteer nurses on the battlefields. The tendency of growing female employment in Hungary is also indicated by the increasing number of female workers in different industrial sectors between 1890 and 1910: in clothing industry from 48,288 to 103,487; in food industry from 14,374 to 27,405 or in textile industry from 3,252 to 20,726 (Acsády, 2019).

In the state socialist period, the employment of women steadily increased (Koncz, 1983). Between 1949 and 1960, the number of employed women doubled, and it grew more dynamically in industry in the 1960s and in the service sector in the 1970s. By 1980, female employment reached full employment levels (Fóti and Lakatos, 1998). By this decade the employment rate of women in in-

dustrial fields was similar to the average of the industrially developed European countries.

After the regime change in 1990, the labour market underwent a major transformation. The labour market collapsed between 1992 and 1997, during which time nearly one million former employees disappeared from the labour market. The rate of female unemployment was around 10% between 1992 and 1996. The rate decreased to 6–7% in the early 2000s, but it went back to 10–11% again in the late 2000s (Spéder and Kamarás, 2008) and to 3.5% in 2018 (HCSO LFS). Until 2018 the rate of female employment was lower and part-time work was much less common in Hungary than in Western and Northern Europe (Makay, 2018). The narrowing and structural reorganization of the labour market have created new conditions for female employment and childbearing, and the willingness of employed women to have children has clearly decreased (Spéder, 2003).

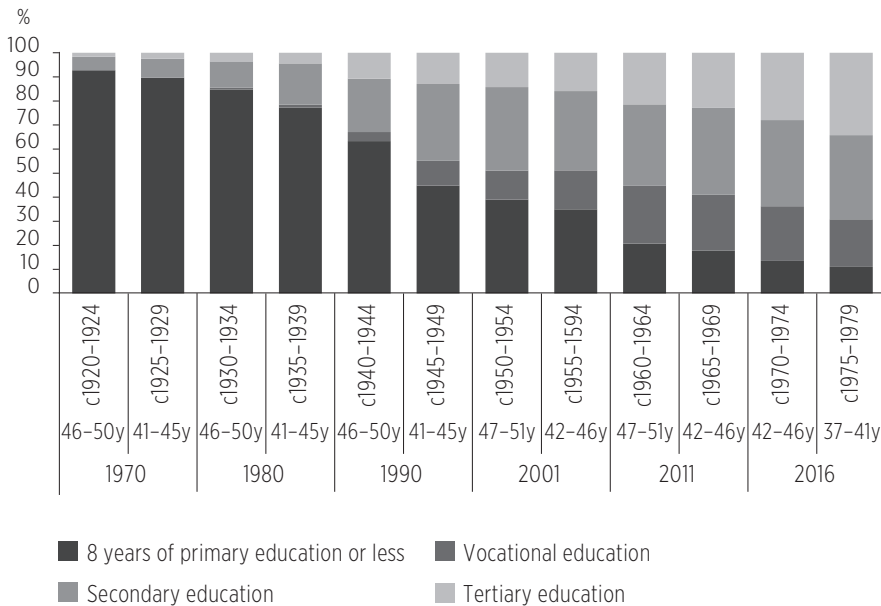
The expansion of education

The effect of the educational expansion in Hungary is well illustrated by *Figure 1*, which shows the distribution of women born between 1920 and 1979 according to their highest educational attainment at the age of 41–51. The proportion of women with a university or college degree rose from 2% to 34% and the share of secondary educated women increased from 6% to 35% between 1970 and 2016. The proportion of those with eight years of primary school or less fell from 90% to 11% during the same period.

More than 90% of women born between 1920 and 1929 completed only up to eight years of elementary school (*Figure 1*). Three-quarters (77%) of the 1935–1939 cohort and only two-thirds (63%) of the 1940–1945 cohort had completed primary education. The proportion of women with primary education continued to decline sharply, reaching a mere 11% among those born between 1975 and 1979. Only 4% of women born between 1940 and 1944 completed vocational education and this proportion (partly due to party political pressure) was steadily increasing, reaching 23–24% among women born between 1960 and 1974. Among the youngest generation, women with secondary education form the largest group (35–36%). The share of women with secondary education began to rise sharply from 2–3% among those born in the early 20th century: almost one-fifth (22%) of women born between 1940 and 1944 and nearly one-third

(32%) of those born between 1945 and 1949 had a secondary education. In the case of the 1950–1954 cohort, the joint proportion of women with vocational and secondary education (47%) already exceeds the share of women with primary education (39%). Among women born before 1929, the proportion of those with a university or college degree was less than 2%. However, one tenth of those born between 1940 and 1944 already have a university/college diploma, and since then their proportion has increased to 34% in the youngest cohort.

Figure 1: The educational distribution of women born between 1920 and 1979 by birth cohort, 1970–2016, %



Note: 8 years of primary education or less (ISCED 1997: 0-1-2); vocational education (ISCED 1997: 3C); secondary education (ISCED 1997: 3A-3B-4); tertiary education (ISCED 1997: 5-6).

Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

However, these time series comparisons should be treated with caution, as a given educational attainment category had different content and meaning in different periods. For example, vocational education was only introduced in 1938 in Hungary, before that there was apprenticeship training, but the number of apprentices is not included separately in these statistics. As a result, the figure for those with vocational education (apprentices) among women born

before 1940 is missing. There are also things to consider regarding the number of people completing up to eight primary school years. Until the end of the Second World War, there were so-called six- and eight-grade secondary schools and eight-grade grammar schools, to which one could enrol after completing four grades of primary school (called elementary). Educational statistics thus bring together different qualifications among those who have completed up to eight years: the fifth–eighth grades of the current school system, the former public school, and the first four years of the former grammar school (Andorka, 1995, 2006).

As part of an educational reform between the two world wars, the four-grade elementary school was transformed into an eight-grade primary school, the four-grade so-called public school first into a secondary level school (in 1927) and later into a unified general secondary school (in 1934), and, as indicated before, secondary level vocational education was also established around that time (1938). The Act of 1926 defines the function of the secondary school for girls as to help them prepare for higher education, and the secondary school certificate has since granted the same right to enter higher education for girls as it did for boys. In 1934, however, the government began to restrict the admission of female students to university. While in the 1925/26 academic year the number of female university students was 1633 (their ratio to male students was 10%) and in the 1930/31 academic year it was 2248 (13.4%), in the 1937/38 academic year it was only 1750 (12.4%) (Pukánszky, 2013, p.181).

In the late 1940s and early 1950s, strong industrialization began in Hungary, as in most Central and Eastern European socialist countries, thus new skilled labour was badly needed in the factories and plants. Not only men but also women were strongly encouraged to work as workers in agricultural cooperatives or factories. In line with this, the expansion of education was also promoted, especially vocational education, to meet the demands of industry. In the socialist period in Hungary, the number of secondary school graduates that could be admitted to universities was determined by the state. This proportion was about 10% within each cohort (Spéder and Kamarás, 2008). Between 1949 and 1963, the state socialist party determined the criteria of who could be admitted to higher education. Party employees and their descendants were able to enrol in unlimited numbers, while the remaining seats were distributed primarily among children of workers and peasants, then – if seats were still available – among intellectuals and those of “other origin” (see also Kiss, 2014; Kantorová, 2004; Zeman, 2018). While in the early 20th century mainly men studied for longer periods, with the spread of female employment and the expansion of education, more and more

women could also study, graduate from secondary school or from university. By 1980, the number of women entering secondary education had already exceeded the number of men (Fóti and Lakatos, 1998).

After the regime change, the capacities of colleges and universities expanded as the demand for higher education graduates increased and time spent in education have started to play a decisive role in one's occupational career. Opportunities have opened up for young people, so the number of students enrolled in tertiary education jumped up, and the proportion of secondary school graduates started to exceed the proportion of those with lower levels of education (OECD, 2014, 2018). All these factors have driven young people to continue their studies and postpone family formation and childbearing (Spéder et al., 2002).

Family and social policy

Over the past hundred years, significant government measures and financial support have been introduced and provided to stop fertility decline (Spéder et al., 2002). The presentation of these policies and their impact on fertility goes beyond the scope of our study; thus, we only briefly review certain family support schemes and their possible impact on women's childbearing (for more details see Tárkányi, 1998; Gábos, 2005; Kapitány, 2015).

Already the Act XIX of 1907 offered sickness benefits for members of the families of industrial and commercial workers, and family allowance for public servants and railway workers appeared in its first form as early as 1912. Pregnancy and breastfeeding benefits were introduced in 1922. Family allowance – the most popular element of family policy for a long time – was made available to the wider population in 1938, helping raise children under the age of 16 through providing a fixed monthly allowance. Initially, only those working in the public sector were eligible, then in 1946 the eligibility was extended to all other employees, and in 1966 to agricultural workers as well. Between 1995 and 1998, its value was means tested, but then it became universal again. Its amount, which has not changed since 2008, is 12,200 HUF (appr. 30 Euros) for one child. Family allowance increases based on the number of children (e.g., it is 16,000 HUF per child for families with three or more children), on whether the child is permanently ill or severely disabled (23,300 HUF), and on whether one parent is raising the child alone.

We need to mention the abortion ban that was introduced in 1953 and repealed in 1956. At the same time, the number of hospital maternity wards was

expanded, more and more births were carried out in hospitals, and efforts were made to increase the number of nurseries and kindergartens (Spéder et al., 2002).

In 1967, the childcare allowance (gyes) was introduced. Mothers employed continuously for a given time before pregnancy (it changed a number of times how long it took to qualify) could stay at home with their children for two and a half years, and later for three years. In essence, they received a fixed amount of allowance per month. Since 2008, the monthly gross rate is HUF 28,500. And from 1982 onwards fathers also became eligible for this form of support.

In 1973, the government introduced a complex population policy program, an important element of which was the improvement of the demographic incentives. The amounts of existing subsidies were increased, housing subsidies were introduced to help families with three or more children to gain access to municipal housing. Moreover, non-refundable subsidies were also offered to families planning to have children. At the same time, the authorization of planned abortions become more stringent yet again, and instead, the use of contraceptives as a means to avoid unplanned pregnancies were promoted.

In 1985, the childcare benefit (gyed) was introduced: the mother received 65–75% of her salary – depending on the length of her previous employment – until the child became two years old. This form of support was suspended between 1996 and 1999 but was reinstated in 2000, albeit with an upper limit linked to the prevailing minimum wage. The average amount disbursed was HUF 81,356 (around 300 Euros) gross in 2010. In 2014, the role of gyed changed significantly: from then on, it could be used in addition to wages, paid as an additional benefit complementing the income even in the case of full-time employment. This policy was a strong employment incentive for mothers to re-enter the labour market before their child turns two (Makay, 2018).

It is also important to mention maternity leave, which is available to working mothers. The so-called industry law granted working women four weeks of maternity leave after giving birth in 1884. Act no. XXI in 1927 on compulsory sickness and accident insurance provided that the maternity allowance should be paid in the six weeks before the birth and the birth allowance in the six weeks after, both of which granted that the mother received an amount equal to 100% of her previous average earnings (Tárkányi, 1998). Currently, this form of benefit is provided for 24 weeks after childbirth if the mother was insured for at least 365 days within two years before childbirth. Meanwhile, mothers receive an infant care allowance (csed), amounting to 70% of their average daily earnings,

with no upper limit. The average monthly gross amount was HUF 153,161 (almost 500 Euros) in 2016.

The personal income tax system was introduced in 1988 and employed women with children were eligible for a tax benefit. Between 1995 and 1999, the family tax benefit was abolished and then reinstated in 1999. Initially, the amount of the deduction was higher after the birth of the third and fourth child, but from 1992 this deduction was available already after the birth of the second and the first child. Childcare support (*gyet*) was introduced in 1993, which actually institutionalized the system of full-time motherhood for mothers of three or more children. Between 2002 and 2006 there were significant changes (reductions) only in the area of family tax benefits. Since 2010, the government has supported childbearing in a number of areas (such as work-life balance, child day care, home and housing assistance, subsidies and services) that may affect the demographic behaviour of the youngest cohorts analysed in our study.

Here, we need to briefly address the situation of nurseries and kindergartens. As female employment increased, so did the number of children being enrolled in nurseries and kindergartens. While in 1960 7.4% of children under the age of two went to nurseries, 9.5% in 1970, 14.8% in 1980, and 11.7% after the regime change (Spéder et al., 2002). The proportion of kindergarten attendants is higher among 3–5-year-olds: in 1970, 57.7% of them went to kindergarten, in 1980 79.8%, and in 1990 87.1%. Currently, nearly nine out of ten children aged three to five go to kindergarten.

ANALYTICAL AND METHODOLOGICAL CONSIDERATIONS

In our current analysis, we use data from the national censuses conducted by the Hungarian Central Statistical Office (HCSO) over the past 50 years, as well as from the 2016 micro census. Individual data on the full populations of the 1970, 1980, 1990, 2001 and 2011 censuses and the complete database of 2016 micro census are available to us.⁵ The fertility patterns of the oldest birth cohorts can be calculated from the 1970 census, and we can analyse the youngest

⁵ We used databases available in the research room of the HCSO. Here, we would like to thank the staff of the HCSO User Relations Department for checking our large amount of research results and for handing over the output tables in a seamless fashion.

birth cohorts through using the most recent 2011 census and the 2016 micro census data. We consider census data sources to be of primary importance for measuring the prevalence of childlessness, because they cover the entire population⁶ and they also contain a number of background variables related to childbearing.

Demographers specify the reproductive age for women to be between 15 and 49 and consider the fertility career complete after this age. In practice, however, most women end their childbearing period much earlier: in 2015 only 1.2%, in 2016 1.4% and in 2017 1.6% of children were born to mothers older than 40 (HCSO, vital statistics, 2015–2017, own calculation). Based on these criteria, we consider those women to be permanently childless who have not had a child until the age of 46–50, but practically we can also include the age group of 41–45.⁷ (The youngest birth cohort analysed in our paper is women born in 1975–1979, who were 37–41 years old in 2016 [*Table 1*], i.e., their reproductive history was not yet completed. The results for them thus should be considered accordingly.) We can select this population from census data, as all censuses inquire about the number of live births. Those who answered zero to this question are considered childless at that age. This is the dependent variable in our analysis.

Our independent variables include age, birth cohort and highest educational attainment. Comparing the population by educational attainment over time is difficult because the actual content of a given education level changes over time (see “The expansion of education” section above). However, HCSO has harmonized the educational attainment observed in different periods; thus, we rely on and use these categories. In our analyses, we measure the highest educational attainment of women according to four categories: (a) eight years of primary education or less, covering the ISCED 1997 categories of 0-1-2; (b) vocational education (with a vocational certificate but not with a secondary school certificate), covering the ISCED 1997 category of 3C; (c) secondary education (with a secondary school certificate), covering the ISCED 1997 categories of 3A-3B-4;

⁶ The micro census was carried out in October–November 2016 on a 10% sample of households and about 440,000 households were interviewed in 2,148 settlements in the country. After weighting, the data can be projected onto the total population (Hungarian Central Statistical Office [KSH], 2016).

⁷ We are, of course, aware that there are a number of factors within women’s life courses that may contribute to becoming childless, such as education, employment and partnership trajectories (Spéder, 2014; Hoem et al., 2006; Neyer et al., 2017; Tanturri and Menchini, 2008). We know that even if not having biological children, one can still become a parent and raise children. We are familiar with the literature making a distinction between voluntary and involuntary childlessness, as well as the problem of timing: intentions can change over the life course and temporary childlessness may turn to permanent childlessness due to running out of time (Miettinen and Szalma, 2014; Szalma and Takács, 2012, 2018; Pongrácz, 2011). All these aspects are not included in our current analysis, as census databases do not allow to make such distinctions.

(d) tertiary education (university or college degree), covering the ISCED 1997 levels of 5-6 (Hungarian Central Statistical Office [KSH], 2011). We consider the level of education of women recorded at the age of 41-51, i.e., after the end of their fertility careers.

Demographic analyses are rather complex because at the time of a cross-sectional survey (such as census years, i.e., periods), the characteristics of the population born in different years (birth cohorts) and the population of different ages (age groups) have to be examined simultaneously, as they are affected by demographic events differently (*Table 1*).

Table 1: Number of women (persons) included in the analysis, their age at observation and the proportion of childless women among them (%) by birth cohort

Birth cohort	Period of observation	Age group	Number of women	Proportion of childless women, %
1920-1924	1970	46-50	385,288	14.6
1925-1929	1970	41-45	378,476	12.8
1930-1934	1980	46-50	357,253	11.5
1935-1939	1980	41-45	339,368	10.2
1940-1944	1990	46-50	346,810	8.8
1945-1949	1990	41-45	361,232	8.5
1950-1954	2001	47-51	415,868	8.0
1955-1959	2001	42-46	384,156	7.8
1960-1964	2011	47-51	309,220	8.4
1965-1969	2011	42-46	340,277	10.7
1970-1974	2016	42-46	371,210	15.0
1975-1979 ^a	2016	37-41	407,935	20.8

Notes: ^a The youngest women, born in 1975-1979, have not yet reached the end of their fertility careers, i.e., the final rate of childlessness may become lower among them.

Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

Completed fertility for the same birth cohort may differ in two consecutive censuses. The population of a given birth cohort surveyed at a given time $t+1$ does not necessarily coincide with the population of the same birth cohort reached at time t , since many cohort members could die, emigrate, or immigrate between the two dates. Therefore, we did not calculate the completed fertility of the different birth cohorts from only one census but analysed the female cohorts at each of the available census years, at the ages of 41-45 and 46-50 (*Table 1*).⁸

⁸ Childlessness rates for the same birth cohorts calculated from different census and micro census databases do not differ significantly from each other, so we could have reliably calculated childlessness rates of older birth cohorts from a single census, such as the 2011 census (see *Figure A-1* in the Appendix).

Finally, we need to mention an effect that may distort our data. It is possible that respondents (or certain demographic groups) are unwilling or unable to answer the question referring to their number of children.⁹ Makay (2016) showed that the answers to the question on number of children strongly depend on the form of the question itself. The collection of data on deceased children is particularly problematic: they are often not reported, which distorts the number of children ever born among the respondents. Also, the information on children may be false or incomplete if the parents' relationship has soured, they are living separately or possibly with a new family.

RESULTS

The changing relationship between education and childlessness

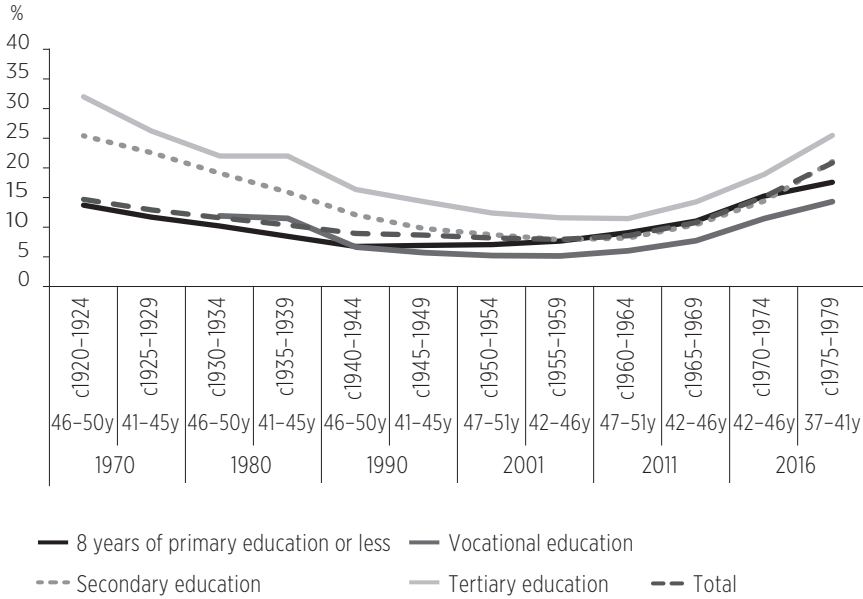
We measured similar trends of the relationship between education and childlessness in Hungary to the results presented in the international literature (*Figure 2*). First, we look at the overall proportion of childless women, regardless of educational attainment.

Moving from the oldest cohorts to the youngest ones, we see a U-shaped relationship: the proportion of childless women is the highest among the oldest and youngest birth cohorts studied and flattens around the “middle” generations. 15% of women born between 1920 and 1924 were childless.¹⁰ This proportion begins to decline, reaching 8% for women born between 1950 and 1964, and then starts to rise again to 11% for those born between 1965 and 1969, 15% for those born between 1970 and 1974, and it is already 21% among the youngest studied cohort of 1975–1979 – albeit, at the time of the micro census, this age group was only 37–41 years old, i.e., they were still far from the end of their reproductive years.

⁹ There were 1213 non-responses on the number of children question in the 2011 census, of which 477 were among the 30–59 female age group. The missing data were corrected by the HCSO: data on both partners and the number of children living in the family were taken into account, and a value of 0 was introduced if a given person could not have had a child due to their young age (HCSO Methodology Department, personal communication).

¹⁰ The rate of childlessness is even higher among women born in the early 1900s: 19.2–22.1%, depending on the census database, i.e., the age at which women are considered (see Appendix, *Figure A-7*). However, the highest value was most likely produced by female cohorts born before the turn of the century (19.7–22.8%), before which it may have been lower, as the data on the oldest, yet, selective birth cohorts suggest (16.5–19.6%).

Figure 2: Proportion of childless women by birth cohort and educational attainment at certain ages; 1970, 1980, 1990, 2001, 2011, 2016, %



Note: 8 years of primary education or less (ISCED 1997: 0-1-2); vocational education (ISCED 1997: 3C); secondary education (ISCED 1997: 3A-3B-4); tertiary education (ISCED 1997: 5-6).

Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

Now let us look at how the rate of childlessness of successive birth cohorts has evolved by educational attainment. Within each educational group, the relationship between birth cohort and childlessness rate is U-shaped. Among women with up to eight years of primary school, the proportion of childless starts at 14% in the 1920-1924 birth cohort. It decreases continuously until it reaches its minimum value in the 1940-1944 cohort (7%). It starts to increase from here and is already high among those born between 1970 and 1974, at 15%, and 18% among those born between 1975 and 1979.

The demographic behaviour of women with vocational education should be examined from the 1940-1944 cohort onwards. The proportion of childless women in this birth cohort is 6% and ranges around this value all the way up to the cohort born between 1960 and 1964. Then, within this group as well, the proportion of childless women starts to increase, and among the 1970-1974 cohort the value is already 11%, and for the 1975-1979 generation it is 14%.

The rate of childlessness among women with secondary and with tertiary education moves almost in parallel over time. Among secondary school graduates born in 1920–1924, 25% had no children, then this indicator reached its minimum among women born between 1960–1964 (8%), increasing to 14% for those born between 1970 and 1974, and 21% for women born in 1975–1979, which is to be considered a rather high proportion. Values for the same birth cohorts among women with university and college degrees are 32, 11, 19, and 25%, respectively.

Among women born between 1920 and 1944, there is a clear educational gradient of childlessness. That is, the proportion of the childless is lowest among women with the lowest educational attainment, higher among women with secondary education, and highest among the narrow group of tertiary educated women. If we look at women born in 1920–1924, the proportion of childless people with primary, secondary and tertiary educational attainment are 14, 25 and 32%, respectively. For women born between 1940 and 1944, who were the first cohort who could go to the newly established vocational schools, we see the first reversal of the trend: the childlessness rate of women with vocational education become lower and lower per birth cohort, while the proportion of childless women with up to eight completed primary school years starts to increase and even exceed the value measured among women having vocational education. We believe that due to the extensive industrialisation, more and more workers – especially skilled workers – were needed and vocational education was encouraged, so more and more women of lower social status did not stop at primary education but also completed vocational school, while at the same time maintained the fertility behaviour of women with primary education. Therefore, the proportion of childless women among those with vocational education decreased and became lower than in all the other educational groups. At the same time, the overall number of those who had only primary education decreased; thus, they became more and more selective in terms of their childbearing behaviour (due to some latent aspect, such as health status, family background or economic situation, etc.). As a result, the rate of childlessness was even higher among women with primary than with secondary education already in the 1960–1964 cohort (9% vs. 8%), and this remained the case up to the 1970–1974 cohort. However, the behaviour of women with university or college degree remained distinct across all birth cohorts: the proportion of childless women among the tertiary educated in all birth cohorts is higher than among women with other attainments, despite the

fact that not only more women with lower social background acquired vocational education, but the group of secondary school and university graduates also expanded.

Our descriptive analysis thus shows that the proportion of childless women varied from generation to generation, and there has been change within each educational group. It is important to note that each educational group reached the lowest rates in different birth cohorts: among women with primary education it was the lowest for the 1940–1944 birth cohort, among women with vocational and secondary education it was lowest among those born between 1955–1959, and among university and college graduates it was lowest among those born between 1960–1964.

Convergence in the level of childlessness by education

Educational differences in childlessness are decreasing from generation to generation. The oldest female cohort in our analysis – born between 1920 and 1924 – has the largest *absolute differences*: while the proportion of childless women in the lowest educational group is 14%, the proportion among those with a secondary education is 25%, and it is 32% among those with a university or college degree. And the absolute differences are the smallest among women born between 1960 and 1964 (from lowest to highest levels of education, the rates of childlessness are 8, 6, 9, and 11%, respectively). In the younger cohorts, differences by educational attainment begin to widen again, but the youngest cohort (1975–1979) has not reached the level we saw among the oldest generation: the proportion of those without children is 17% for women with up to eight primary school years, it is 14% for those with vocational education, it is 21% for secondary education and it is 25% for university/college graduates.

We use the *relative childlessness index* to check if childlessness rates have converged among women with different educational attainment (Beaujouan et al., 2016). Within each birth cohort, we compare the childlessness rate among women with different educational attainment to that measured in the group of women with secondary education. In other words, we create an index that measures how much lower or higher is the rates of childlessness among women with a given educational attainment compared to that of women with secondary education:

$$\text{relative childlessness index} = \frac{\left(\frac{N_i^0}{N_i}\right) - \left(\frac{N_{\text{secondary education}}^0}{N_{\text{secondary education}}}\right)}{\left(\frac{N_{\text{secondary education}}^0}{N_{\text{secondary education}}}\right)} \quad (1)$$

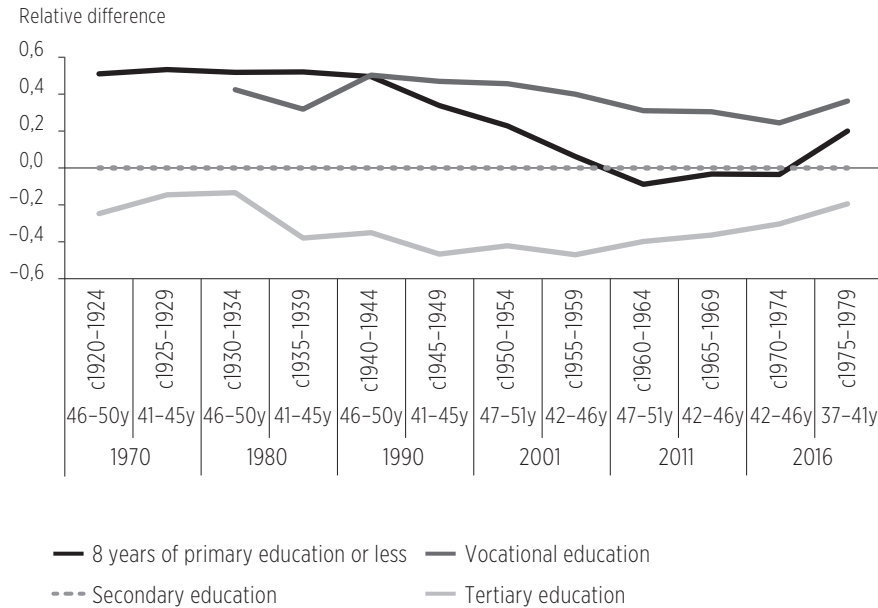
where N_i is the number of women with i educational attainment; N_i^0 is the number of childless women with i educational attainment, $N_{\text{secondary education}}$ is the number of women with secondary education, $N_{\text{secondary education}}^0$ is the number of childless women with secondary education.

The data in *Figure 3* clearly indicate that among women with primary education at most born after 1935, relative childlessness has become more and more similar (from generation to generation) to that of women with secondary education. While the proportion of childless women with at most primary education born between 1920–1924 was half the rate of those with a secondary school diploma born in the same period, in the birth cohort of 1955–1959 this difference disappeared. Among younger birth cohorts, the rate of childlessness among women with primary education first slightly exceeded that of women with secondary education and then, yet again, dropped below it in the youngest cohort we studied. That is, the proportion of childless women with primary and with secondary education clearly converged among those born between 1940 and 1959, and moved in parallel for women born between 1960 and 1974.

The childlessness rate of those with vocational education born after 1940 also gradually resembled that of women with secondary education, but not as steeply as that of those with primary education. While in the group of women with vocational education born between 1940–1944, childlessness was close to half of the rate observed among women with secondary education, in the 1970–1974 cohort it was only 21% lower. However, in the youngest cohort, childlessness is higher among women with secondary education than among those with vocational education (by 32%).

Overall, childlessness observed in the group of women with tertiary and with secondary education also converged, although it remains consistently higher among university and college graduates. First, the childlessness rates of women with secondary and with tertiary education started to converge among those born between 1920 and 1934. Then, in the birth cohort of 1935 to 1959, the behaviour of these two groups diverged. However, convergence is clear among those born after 1959: while female university/college graduates born between 1955–1959 had a 48% higher rate of childlessness than secondary school graduates, this was only 32% and 21%, respectively, in the two youngest cohorts.

Figure 3: Difference in the levels of childlessness relative to secondary school graduates by educational attainment; 1970, 1980, 1990, 2001, 2011, 2016



Note: 8 years of primary education or less (ISCED 1997: 0-1-2); vocational education (ISCED 1997: 3C); secondary education (ISCED 1997: 3A-3B-4); tertiary education (ISCED 1997: 5-6).

Source: Own calculation based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

Direct and indirect standardisation: childlessness scenarios

Figure 1 shows how the educational composition of women aged 41–51 has changed over time. As we have seen, women born between 1950 and 1954 were the first cohort in which the combined proportion of those with vocational and secondary education already exceeded that of those with at most primary education (47% vs. 39%).¹¹ And Table 1 showed how the proportion of childless women changed over time at the end of their fertility careers. In the 1920–1924 cohort, this proportion was relatively high (15%) and then gradually decreased until it reached its minimum among women born in 1955–1959 (8%).

¹¹ In the following, we will treat women with vocational and secondary education as one single group and call them as women with *medium education*. Women with college or university degree are defined as women with *higher education*.

Then it started to rise again, until it exceeded 20% among the youngest analysed cohort, 1975–1979. Did the rate of childlessness develop this way because the composition of women by educational attainment changed over time? Or because there was an actual change in the childless rate of each educational group, i.e., there was a shift in their fertility behaviour? With the help of direct and indirect standardisation, we can answer these questions by looking at the hypothetical overall proportion of childless women in different birth cohorts if a) the composition of women by educational attainment would not have changed (direct standardisation), or if b) the proportion of childless women within a given education group would not have changed (indirect standardisation).

Let us first look at the rate of childlessness estimated by *direct standardisation*. We assume that the composition of women aged 41–51 by educational attainment is constant over time, and that the proportion of women with primary, medium and higher education in each birth cohort is the same as that of women born in 1945–1949. 45% of women born between 1945 and 1949 had primary education, 42% had medium education, and finally, 13% had higher education at age 41–45 (*Figure 1*). Childlessness rates were calculated using direct standardisation by educational attainment with the following formula:

$$HCh_{\text{fix_edu}}(c|c_{1945-1949}) = \sum_i \left[\frac{N_i(c_{1945-1949})}{N(c_{1945-1949})} * \frac{N_i^0(c)}{N_i(c)} \right] \quad (2)$$

where $HCh_{\text{fix_edu}}$ is the directly standardised childlessness rate in c birth cohort, compared to the fixed educational composition of the 1945–1949 cohort ($c_{1945-1949}$), i is the level of education, $\frac{N_i(c_{1945-1949})}{N(c_{1945-1949})}$ is the proportion of women with i educational attainment among women born in 1945–1949, and $\frac{N_i^0(c)}{N_i(c)}$ is the proportion of childless women in the c birth cohort with i education.

The relative difference between hypothetical (HCh) and real (Ch) childlessness rates was calculated by using the following formula for c birth cohort:

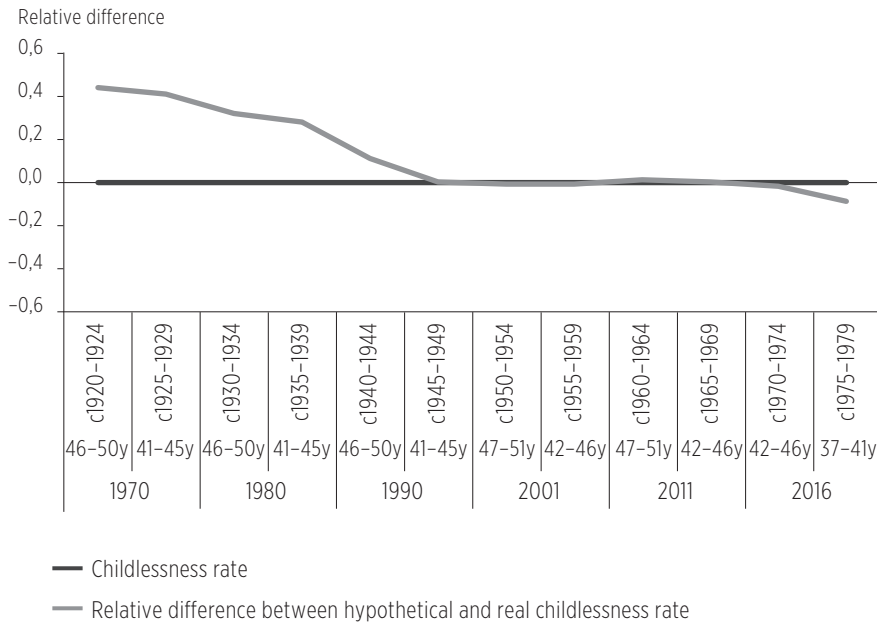
$$\text{relative difference in } c \text{ cohort} = \frac{HCh_c - Ch_c}{Ch_c} \quad (3)$$

If the educational composition of women did not change over time, childlessness (HCh) would have been higher in the pre-1945 cohorts than in reality (Ch): for example, by 44% among women born in 1920–1924 (*Figure 4*). However, it would not have changed among those born after 1945. There is

no difference between actual and estimated childlessness rates, except in the youngest cohort. If the composition of this cohort by educational attainment were the same as that of women born in 1945–1949, the proportion of childless women among them would be slightly lower (by 9%) than in reality (but we know that in this cohort women have not yet reached the end of their fertility career).

Thus, the fact that the composition of women by educational attainment changed over time hardly changed the level of childlessness among women born after 1945 and, as we can see, only slightly increased it in the youngest cohort. For those born before 1945, the change in the composition by educational attainment, however, did in fact have an effect on the development of childlessness: it “reduced” it retrospectively, i.e., the measured, real childlessness rates were lower than they would have been if the educational composition of these cohorts had not changed (see also *Figure A-2* in the Appendix).

Figure 4: Relative difference in real and hypothetical childlessness rates estimated by using direct standardisation (fixed education scenario)



Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

In our pursuit of *indirect standardisation*, we select the birth cohort with the lowest childlessness rate: women born between 1955 and 1959. Their average childlessness rate is 8%, and the proportion of childless women is 7–7% among women with primary and with medium education and it is 11% among those with higher education in this cohort (*Figure 2*). These childlessness rates by educational attainment were fixed and projected onto the other cohorts, and the childlessness rates estimated by indirect standardisation were calculated using the following formula:

$$HCh_{\text{fix_childless}}(c|c_{1955-59}) = \sum_i \left[\frac{N_i(c)}{N(c)} * \frac{N_i^0(c_{1955-1959})}{N_i(c_{1955-1959})} \right] \quad (4)$$

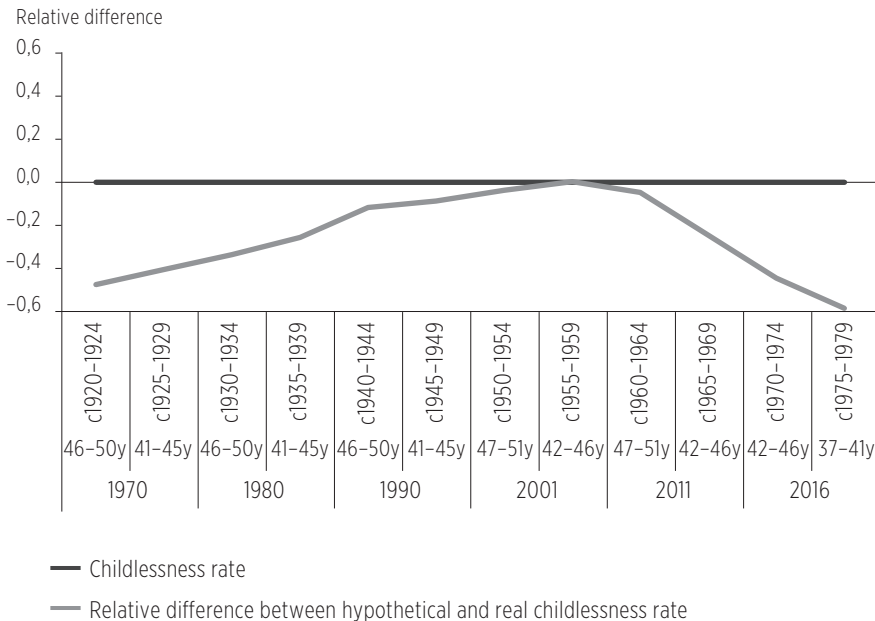
where $HCh_{\text{fix_childless}}$ is the indirectly standardised childlessness rate in c birth cohort, calculated on the basis of the childlessness rate fixed according to the educational attainment of the 1955–1959 cohort ($c_{1955-1959}$), i is educational attainment, $\frac{N_i(c)}{N(c)}$ is the proportion of women with i education in the c birth cohort, and $\frac{N_i^0(c_{1955-1959})}{N_i(c_{1955-1959})}$ is the rate of childlessness among women with i education born between 1955 and 1959. The relative difference between hypothetical (HCh) and real (Ch) childlessness rates is also calculated by using formula (3) (as in the case of direct standardisation). *Figure 5* shows the relative difference between the estimated and actual childlessness rates calculated accordingly.

The inverted U-shaped curve indicates that the change in childlessness rate within educational groups did have an effect on the development of overall childlessness (*Figure 5*). If, in each birth cohort, at a given level of education, the proportion of childless women had been the same as that of the different educational groups of women born in 1955–1959 – when overall childlessness was at an all-time low –, both among the older and the younger generations the proportion of childless women would have been lower than in reality (by 48% among the oldest and by 59% among the youngest birth cohort). Thus, the changing proportion of childless people within a given educational group has “increased” the level of childlessness among both those born before 1955 and after 1959 by a much higher percentage than the change in the composition by educational attainment would have justified (see also *Figure A-3* in the Appendix, which compares standardised and actual childlessness rates).

We have also repeated our analyses by standardising for different birth cohorts. Among female cohorts born after 1945, the estimated level of childlessness calculated accordingly would have been the same as in reality, regardless of which birth cohort’s educational composition was held constant (direct standardisation, fixed education scenarios). Unsurprisingly, among women born be-

fore 1945, the estimated childlessness rates came closest to the real ones when we standardised on the basis of the educational composition of the 1920–1924 and 1935–1939 birth cohorts. If, on the other hand, we held childlessness rates by educational attainment constant for different birth cohorts (indirect standardisation, fixed childlessness by education scenarios), then we obtained different hypothetical curves depending on which birth cohort's data was used for standardisation. Holding the childlessness rates by educational attainment of the older birth cohorts (1920–1924 or 1935–1939) constant, we obtained higher-than-real childlessness rates, while keeping the childlessness rates of the 1945–1949 cohort constant by educational attainment, we obtained lower-than-actual childlessness rates. These differences are due to the fact that overall childlessness and childlessness within each educational category decreased sharply between the birth cohorts of 1920–1924 and 1945–1949. These results support our hypothesis that the change of childlessness was influenced more by changing childlessness rates within educational groups than by the changing educational composition of birth cohorts (see also *Figures A-2 and A-3* in the Appendix).

Figure 5: Relative difference in real and hypothetical childlessness rates estimated by using indirect standardisation (fixed childlessness by education scenario)



Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

CONCLUSIONS

In our analysis, we sought to answer how the proportion of childless women has changed in the last eighty years in Hungary, how it has developed among women with different education born between 1920 and 1975, and how the extent of childlessness would have changed if there had been no educational expansion.

The change in the distribution of women by educational attainment was spectacular between 1970 and 2016. The proportion of women with university or college degree rose from 1–2% to 34%, and the proportion of women with secondary education rose from 2–3% to 35% during the same period. At the same time, the proportion of those with up to eight completed primary school years fell from 90% to 11%. We may think that all these changes in educational composition most likely influenced the development of the rate of childlessness as well.

As a first question we asked how the rate of childlessness evolved among women born between 1920 and 1975 (i.e., from another perspective, between the periods of 1970 and 2016). Moving from the oldest cohorts to the youngest, we see a U-shaped trend: the proportion of childless women is highest among the oldest and youngest birth cohorts studied, and is the lowest among the “middle” generations. If we look at the development of childlessness among women with different educational backgrounds, we see the same U-shaped relationship.

Among women born between 1920 and 1940, the rate of childlessness is the lowest among those with up to eight years of primary school and the highest among those with university or college degree. However, among women born after 1940, those with vocational education have the lowest rate. We believe that as the state socialist regime required more and more skilled workers as a necessary instrument for extensive industrialisation, with increasing pressure to join training, more and more women of lower social status completed vocational school but retained their fertility pattern and behaviour (acculturation). Or it could be also the case that those with vocational education did not need to give up their family formation and fertility behavioural norms (they could combine family with work easier) because of (institutional and employment) stability and little career competition. As the number of those with at most primary education steadily declined, this group may have become more selective in terms of some latent, as of yet undiscovered criteria (such as health status, disability, family or economic background). The childlessness rate of those with primary education began to increase so that the rate among women born in 1960–1964 was even

higher than that measured in the group of women with secondary education (8%, compared with 9%), and this remained the case up to the 1970–1974 cohort. However, the behaviour of women with university or college degree remained distinct within each birth cohort: they had the highest rate of childlessness in all birth cohorts.

Our analyses indicate that the proportion of childless women varied from generation to generation, and this change was also present within all educational groups. However, childlessness rates of women with different educational attainment also converged. The differences were much larger between different educational groups in the older cohorts than in the younger ones. For example, while in the group of women with vocational education born between 1940–1944, childlessness was close to half the rate of women with secondary education, in the 1970–1974 cohort it was only 21% lower. We can only observe a divergence among the youngest cohort of women (born between 1975 and 1979) with primary and vocational education, but as their fertility careers are not yet completed, we cannot be sure if their childlessness rate will be similar or not to the childlessness of those with secondary education at the end. We tend to believe that some acculturation effects may explain that these convergences among women born in 1940–1974 are mostly due to the expansion of education. As groups of women with secondary and high education became larger, they also became less selective as they absorbed people from lower strata thus their family formation and fertility behaviour converged.

Has childlessness evolved in this way because the composition of women by educational attainment changed over time? Or because there was a change in the rate of childlessness in each educational attainment group, i.e., in the fertility behaviour? In the last part of our paper, we sought answers to these questions. Based on our analyses, we concluded that the temporal evolution of childlessness was influenced more by the development of childlessness rates within the educational attainment groups than by the change in the composition of birth cohorts by education. If the educational composition of women had been the same as the educational composition of women born in 1945–1949, childlessness would have been higher among women in pre-1945 cohorts than in reality (by 44% among women born in 1920–1924). However, it would not have changed in the cohorts born after 1949: there is no difference between actual and estimated childlessness rates among them (except for the youngest cohort born in 1975–1979, who have not yet reached the end of their fertility careers, among whom the rate of childlessness would have been 9% lower than in reality). If, however, the proportion of childlessness by education had been held constant

in all cohorts, the proportion of childless women in both the older and younger generations would have been lower than in reality (by 48% in the oldest and 59% in the youngest birth cohorts).

The fertility theories highlighted in our study, referring to cost-benefit considerations, values, attitudes and uncertainty, assumed that fertility was lower among women with higher levels of education than among their lower-educated counterparts. Our results also indicate that highly educated women are indeed a distinct group in terms of fertility (at least from the aspect of childlessness) and that childlessness is highest among them, regardless of birth cohort. Albeit, with time this rate is becoming more and more similar to the rate measured among women with secondary education, i.e., convergence is becoming stronger. However, the demographic behaviour of women with the lowest educational attainment does not necessarily correspond to conclusions of these theories, at least from the point of view of childlessness, as the proportion of childless women among them is almost the same as among secondary school graduates in younger birth cohorts.¹² These results, although somewhat surprising, are not unique: previous studies also found similar relationship in other countries and in terms of other birth cohorts (Andersson et al., 2009; Rotkirch and Miettinen, 2017; Beaujouan et al., 2016; Szabó et al., 2016).

Childlessness is on the rise in younger birth cohorts, meaning that this trend cannot simply be assigned to the ‘cohort trauma’ of those experiencing regime change (Spéder, 2014). One might think that it has already been similarly high in the past, as the proportion of childless women born in the early 20th century was similarly high as in the case of the youngest cohorts analysed in our study. But as several analyses have indicated, the reasons behind childlessness then and now are different (Berrington, 2014; Zeman, 2018). The reason it was high among women born in the early 20th century, at least in Western Europe, was that people got married late, the rate of the never-married was high, there were high rates of various fertility-related infections, health problems, and there were also fewer men (thus fewer potential fathers) after the First World War (Berrington, 2014). In Hungary, childlessness had more or less similar reasons at that time. Although raw marriage rate was higher than in Western Europe, the age at first marriage was lower and barely 4–5% of the population did not marry during their lifetime, the age at first marriage and the proportion of those who

¹² However, completed cohort fertility and the proportion of women with three or more children are also highest among women with primary education in Hungary and other former socialist countries. Women with vocational education also have high completed cohort fertility and a higher rate of women with three children, but not to the same extent as those with primary education (Brzozowska, 2015).

never married increased also in Hungary during this period (Hajnal, 1965, 1983; Andorka, 1995; Tomka, 2000).

Advances in the treatment of infertility and the reduction of sexually transmitted diseases only helped to reduce childlessness after the Second World War (Tomka, 2000). Today, however, one of the primary reasons of childlessness among the youngest cohorts may be the postponement of partnership formation (be it marriage or cohabitation) and childbearing, or perhaps more and more women express a conscious decision to not have children – although voluntary childlessness is rare. These changes can also be related to some aspects of the second demographic transition, i.e., to increasing tolerance in family matters and of women's increasing autonomy or to the increasing difficulties of the reconcilability of family and work.

The expected demographic behaviour based on the uncertainty hypothesis does not necessarily only occur among young and educated adults, who were assumed to have a greater interest in and profiting more from the postponement of childbearing than lower-educated women. Under market economy conditions, the childlessness has increased in the most socially vulnerable, low-educated groups and become relatively high, either due to economic difficulties and the resulting uncertainty, or some other selectivity effect not yet revealed.

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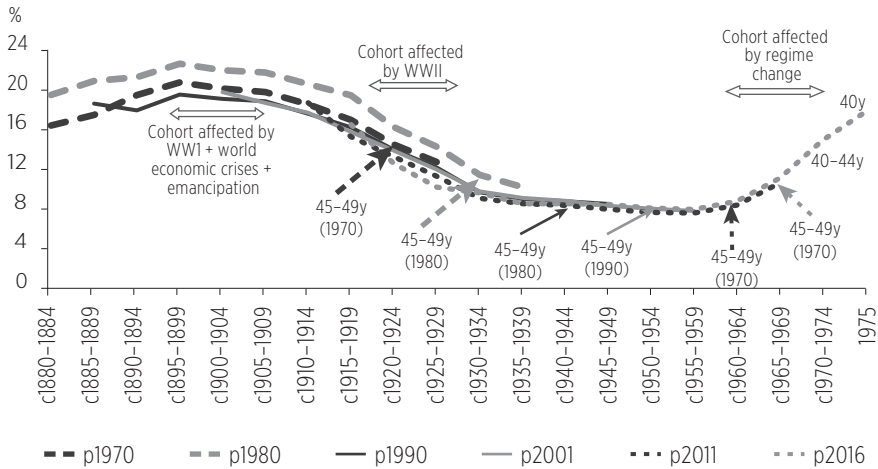
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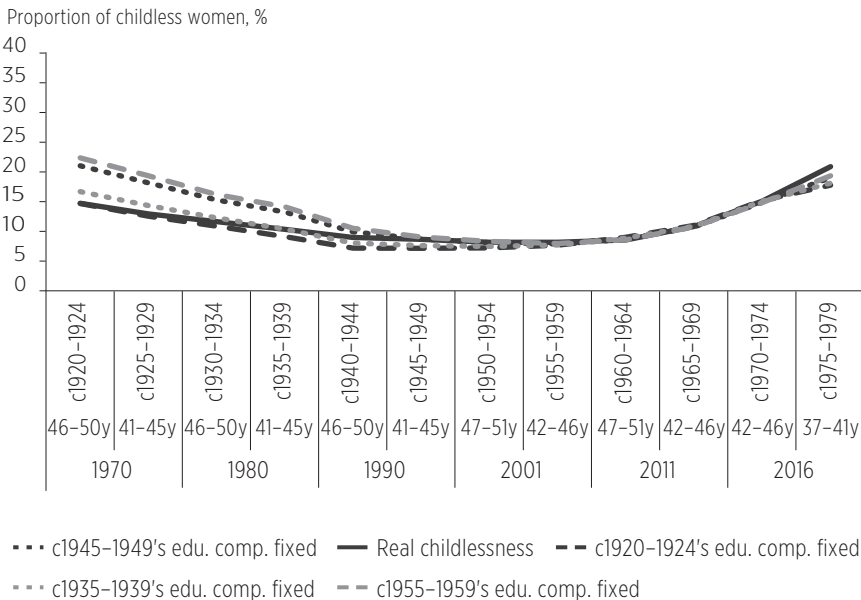
APPENDIX

Figure A-1: Proportion of childless women by birth cohort (1880–1975) and by period (1970–2016), %



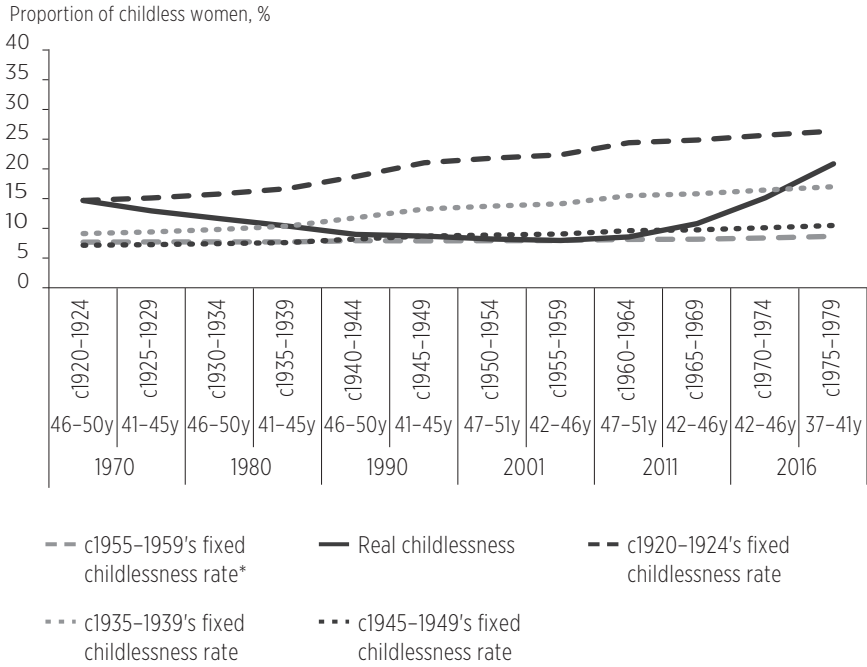
Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses, the 2016 micro census and HCSO Vital Statistics 1970–2015.

Figure A-2: Real and estimated (direct standardisation, fixed education) proportion of childless women per birth cohort, %



Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.

Figure A-3: Real and estimated (indirect standardisation, fixed childlessness rate) proportion of childless women per birth cohort, %



Note: *Childlessness rates within the different educational groups are held constant.

Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses and the 2016 micro census.