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# THE RELATIONSHIPS BETWEEN CHILDLESSNESS AND EDUCATIONAL ATTAINMENT AMONG WOMEN BORN BETWEEN 1920 AND 1979 IN HUNGARY<sup>1</sup>

Laura Szabó

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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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<sup>1</sup> The study is a slightly revised English version of the following article: Szabó, L. (2019). Gyermektelenség és iskolai végzettség összefüggései Magyarországon. *Demográfia*, 62(2–3), 199–233.

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.<sup>2</sup> 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

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<sup>2</sup> 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.<sup>3</sup> 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).

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<sup>3</sup> 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).<sup>4</sup> 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.

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<sup>4</sup> 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).

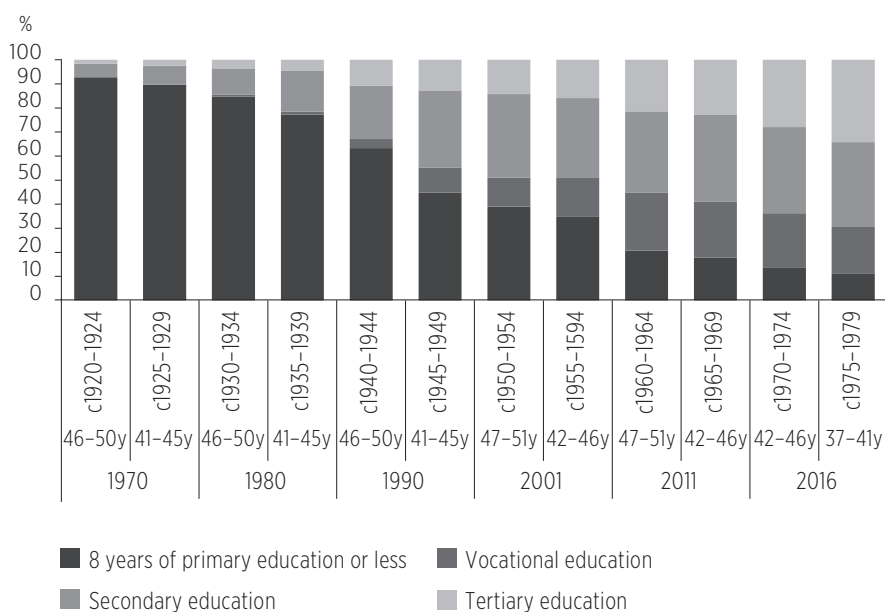
## The expansion of education

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.<sup>5</sup> The fertility patterns of the oldest birth cohorts can be calculated from the 1970 census, and we can analyse the youngest

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<sup>5</sup> 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 population<sup>6</sup> 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.<sup>7</sup> (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;

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<sup>6</sup> 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).

<sup>7</sup> 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 Mencarini, 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 <sup>a</sup>	2016	37-41	407,935	20.8

Notes: <sup>a</sup> 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*).<sup>8</sup>

<sup>8</sup> 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.<sup>9</sup> 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.

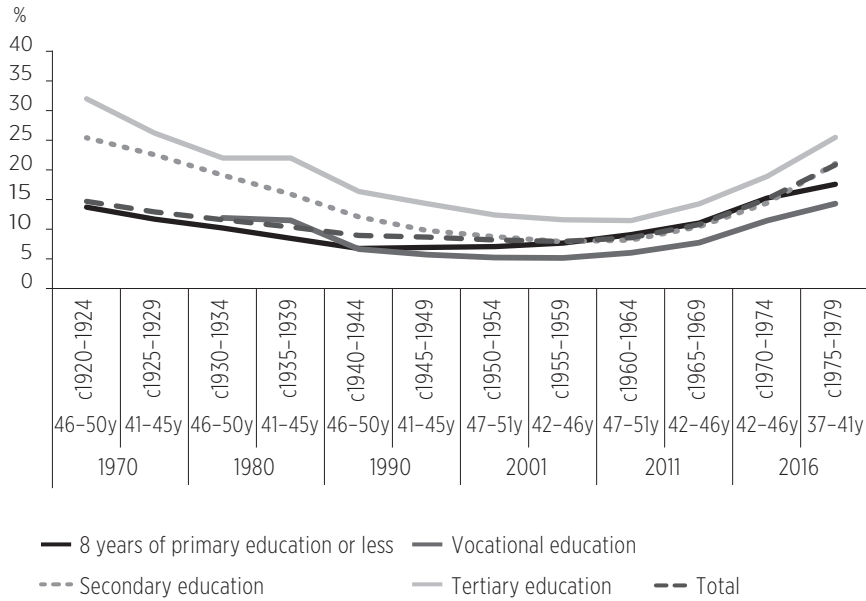
Moving from the oldest cohorts to the youngest ones, we see a U-shaped relationship: the proportion of childless women is the highest among the oldest and youngest birth cohorts studied and flattens around the “middle” generations. 15% of women born between 1920 and 1924 were childless.<sup>10</sup> 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.

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<sup>9</sup> 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).

<sup>10</sup> 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.

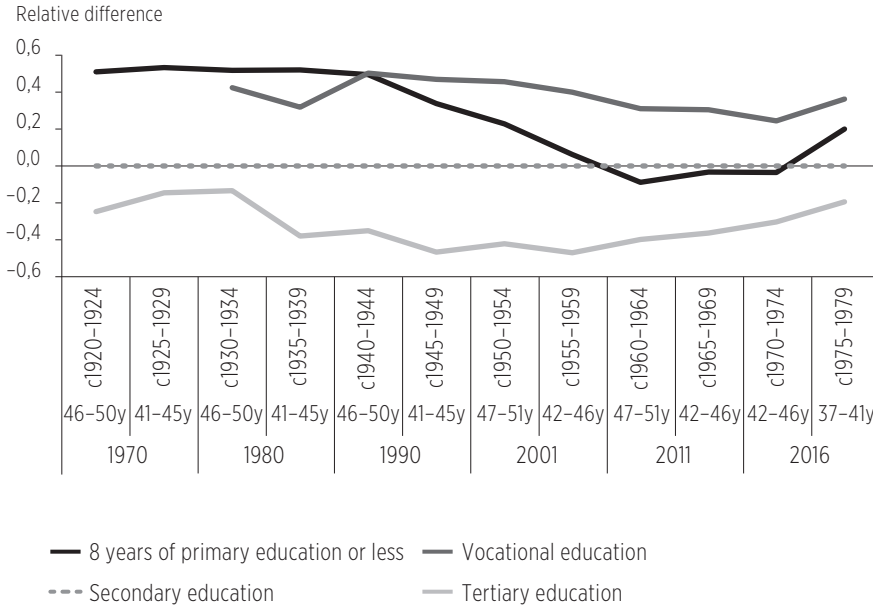
The data in *Figure 3* clearly indicate that among women with primary education at most born after 1935, relative childlessness has become more and more similar (from generation to generation) to that of women with secondary education. While the proportion of childless women with at most primary education 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%).<sup>11</sup> 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%).

<sup>11</sup> 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:

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

where  $HCh_{fix\_edu}$  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:

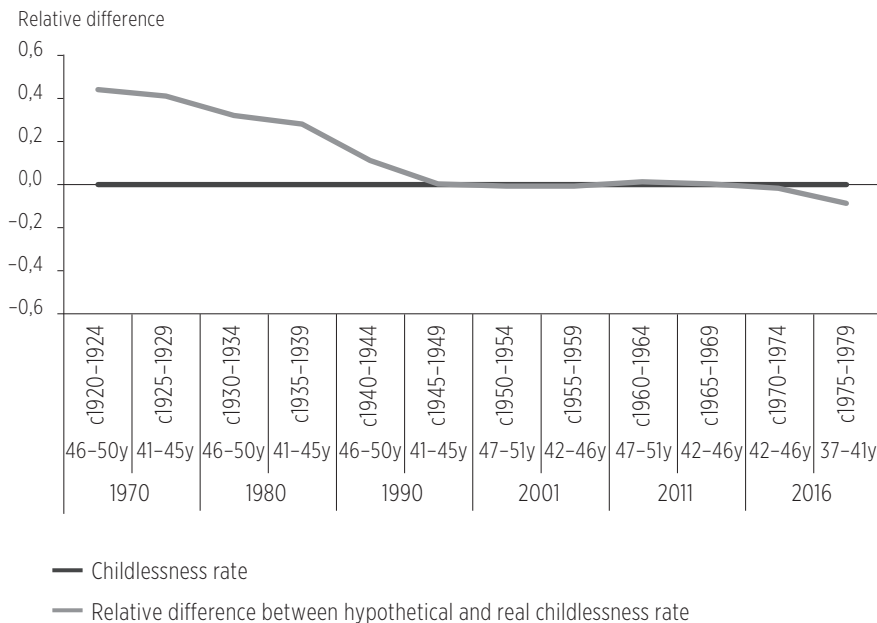
$$\text{relative difference in } c \text{ cohort} = \frac{HCh_c - Ch_c}{Ch_c} \quad (3)$$

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:

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

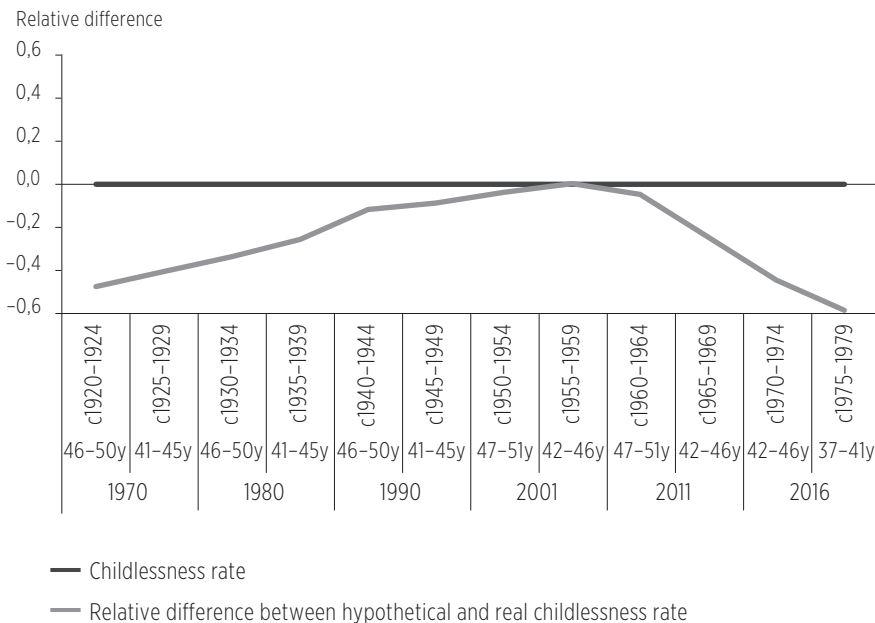
where  $HCh_{fix\_childless}$  is the indirectly standardised childlessness rate in  $c$  birth cohort, calculated on the basis of the childlessness rate fixed according to the educational attainment of the 1955–1959 cohort ( $c_{1955-1959}$ ),  $i$  is educational attainment,  $\frac{N_i(c)}{N(c)}$  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 evolvement 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.<sup>12</sup> 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

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<sup>12</sup> 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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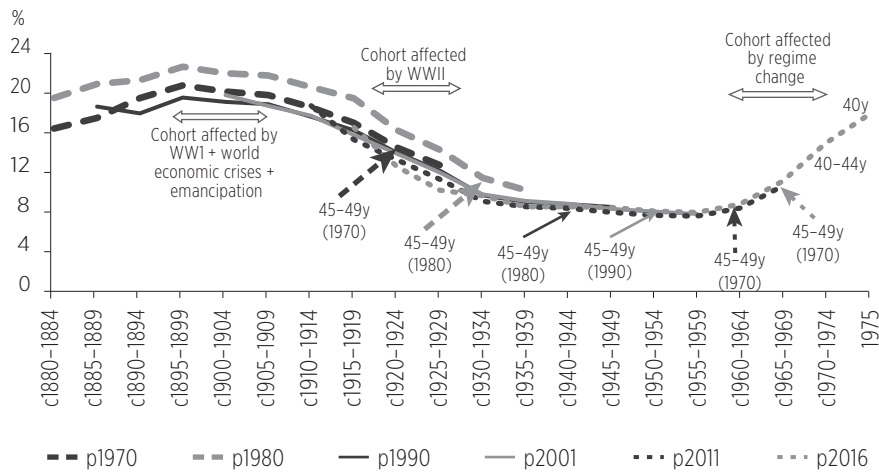
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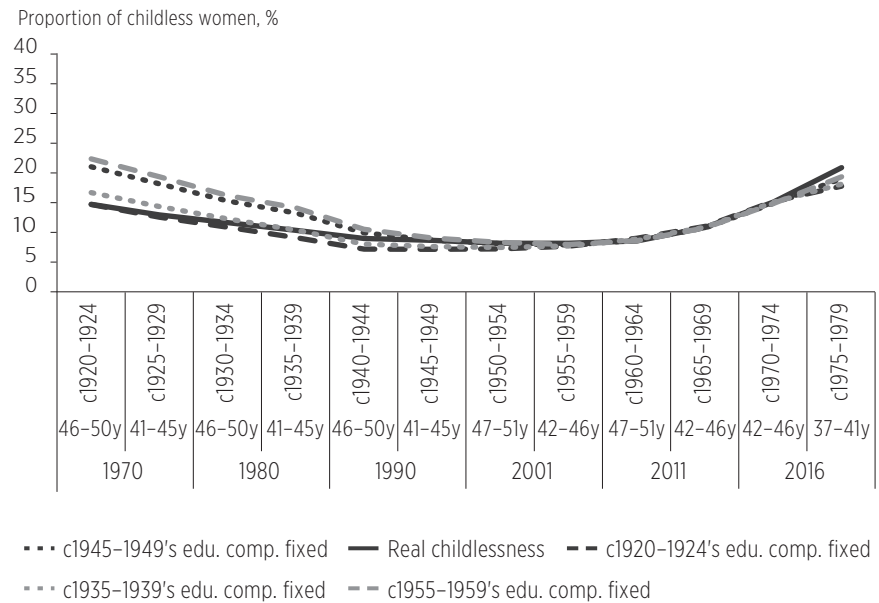
APPENDIX

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



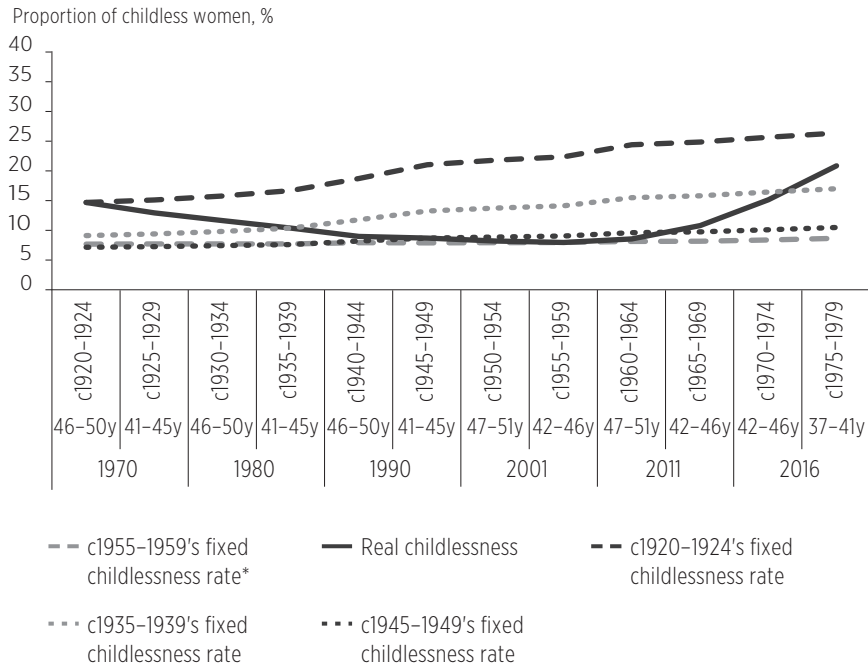
Source: Own calculation, based on the 1970, 1980, 1990, 2001 and 2011 censuses, the 2016 micro census and HCSO Vital Statistics 1970–2015.

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.





# FINANCIAL REMITTANCES AND ELECTION TURNOUT IN THE MUNICIPALITIES OF THE REPUBLIC OF SERBIA: THE ECONOMY OF VOTING

Miloš Milovanović

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## ABSTRACT

This paper investigates possible evidence on whether remittances from abroad have had a significant influence on the outcome of Serbia's presidential elections. Using the linear random-intercept model and based on presidential-election data for municipalities between 2002 and 2017, the study finds that voter turnout rates were positively related to the share of remittances in the municipalities' GDP per capita. For a 1% increase in the share of remittances in municipalities' GDP, the voting turnout increases by 0.31% on average. Also, regarding the within-municipality effect, as the share of remittances in GDP increases over time by 1%, voter turnout decreases by 0.42%. Further, it reveals how the size of the population temporarily abroad had a negative effect on voter participation throughout the entire period examined across both municipalities and time. The study also captures the effects of education and ethnicity. Specifically, as the share of highly educated people increases by 1% over time, so the election participation rates in a particular municipality also increase by 0.83%. After introducing categorical variables for the ethnic composition of the municipality, the study finds that in municipalities with a non-Serb majority, the level of participation was on average 3.31% lower, from 2002 to 2017. Finally, a statistically significant difference in voter turnout was recorded between the economically most developed and the least developed regions: the most developed region had on average 7.71% higher election participation than the region characterized by high emigration and large financial inflows. As far as Serbia is concerned, the final results confirm the findings of

previous literature that the economical vacuum, created by the disappearance of state support, is filled by remittances. Possible reasons for the results are discussed.

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Keywords: Republic of Serbia, temporary migrants, financial remittances, voter turnout, municipality

## INTRODUCTION

Today, the world's population is characterized by an extraordinary degree of spatial mobility in its various forms (Stanković, 2014). Over the past twenty years, two major shifts have influenced the spatial distribution of population: the development of transportation and communication; and the opening up of national economies (Montesinos et al., 2020). Both changes have reshaped the nature and composition of migratory flows and have made it easier for migrants to cross borders, and perhaps more importantly, to stay in touch with their communities of origin (Massey et al., 1993). Subsequently, the stability of these connections has enabled the sharing of resources across borders, most notably remittances.

In the last few decades, Serbia has had extensive emigration flows. As a result, among other things, it has created a relatively large diaspora (Penev and Predojević-Despić, 2012): between the 1991 and the most recent 2011 census, on average, 4% of the total population of the Republic of Serbia was temporarily abroad for reasons of work or study (Penev and Predojević-Despić, 2012). One of the effects of labour emigration has been the substantial inflow of remittances from abroad: since 2000, there has been an increase in the volume of remittances to Serbia, and this has become one of the most stable sources of external financing for the economy. Up to the outbreak of the Global Financial Crisis (GFC), in 2008, remittances accounted for more than 10% of GDP, placing Serbia among the leading countries of the world in this respect (Peković, 2017). Today, Serbia is one of Europe's largest recipients of remittances (Eurostat, 2020) along with North Macedonia, Albania, and Bosnia and Herzegovina. Arguably, remittances to Serbia have been many times higher than foreign

direct investment (Bukvić, 2016). As in other developing countries, unlike formal assistance and aid, it has reached the communities targeted, rather than the local officials (Krilova, 2009).

*Table 1: Migrant remittance inflows to Serbia, 2007–2020*

Year	Migrant remittance inflow (USD million)
2007	3.76
2008	3.55
2009	4.65
2010	4.12
2011	3.96
2012	3.55
2013	4.03
2014	3.97
2015	3.37
2016	3.21
2017	3.59
2018	4.32
2019	4.16
2020	3.87

Source: The World Bank <https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?locations=RS>

Despite a significant influx of financial remittances, very few studies have analysed their more profound effect, even though there is an ever-increasing interest in research into so-called ‘political remittances’. In particular, various studies have suggested how migration might change the patterns of political participation both among emigrants and in the home communities (Ahmadov and Sasse, 2015; Krawatzek and Müller-Funk, 2019; Batista et al., 2019). Whereas the research has mostly emphasized the economic consequences of international migration and remittances, there is a noticeable gap in the knowledge concerning the relationship between emigration, remittances and political effects in Serbia. This gap is rather unexpected, given that the country has a long tradition of out-migration (*Table 2*), both economic and political, and has a significant number of its citizens abroad (Brunnbauer, 2016). Arguably, it offers a classic ‘lab’ in which to study the impact of out-migration and to construct a solid foundation for inferences about the interconnection between emigration, remittances and political participation.

Table 2: *Emigration stock from the Republic of Serbia, 1971, 1981, 1991, 2002, and 2011*

Census year	Total population	Abroad, %
1971	7 202 898	2.8
1981	7 729 236	3.5
1991	7 822 795	3.5
2002	7 892 813	5.3
2011	7 414 711	4.0

Source: Statistical Office of Serbia <https://www.stat.gov.rs/en-us/oblasti/stanovnistvo/>

The study is motivated by the simple observation that voter turnout in those municipalities from which many emigrants originate appears to have been significantly lower than in those that have a more modest number of their citizens living abroad. Thus, the study aims to gain insight into the scope and impact of remittances as an instrument for shaping political participation in Serbia. Empirical research will determine whether and to what extent remittances contribute to the difference in electoral participation, given that the concentration of emigration flows in certain regions of Serbia suggests that the effect of remittances could be greater in those areas than in regions that have significantly fewer remittances.

In the next sections, I present the theoretical framework and the research questions, followed by the limitations of the study, the hypothesis, the research design and the data analysed. I then introduce the methodology and present the results. The paper closes with a discussion and a brief conclusion.

## THE THEORETICAL FRAMEWORK OF REMITTANCES AND VOTING BEHAVIOUR

Before trying to understand the complexity of the relationship between remittances and the voting of those who are left behind, I must emphasize the existence of endogeneity regarding the connection between out-migration and voting practice. Back in the 1970s, in his seminal book *Exit, Voice, and Loyalty*, Albert Hirschman (1970) conceptualized voting with the feet as one aspect of political behaviour and pointed to the distinction between exit and voice. He later argued that the availability of exit, in opposition to voice, requires more time and greater effort. Furthermore, he emphasized that in most cases a productive voice demands teamwork, in contrast to exit, which does not require any teamwork (Hirschman, 1993). Hence, in the case of Serbia, the relation between emigration

motivation and voting and the corresponding endogeneity problem should not remain unaddressed. Basically, the nature and composition of the out-migration flow, which consist largely of young and educated people who do not agree with the dominant political views, impose the problem of a possible correlation between migration motivation and voting behaviour, for which the study cannot offer a proper control variable. This inferential challenge that we face implies that the results of the study should be regarded as inconclusive and should be treated with a dose of caution.

Much ink has been spilt over whether the remittances sent home have affected voter turnout in the home country's elections, and there are many possible explanations for the varying levels of emigrants' transnational engagement in the politics of their homeland. These could include demographic characteristics, such as age or gender (Burgess, 2012; Guarnizo et al., 2003); socioeconomic characteristics, such as education and occupation (Borjas, 1987; Guarnizo et al., 2003); homeland ties and social arrangements (Burgess, 2012); and the political climate in the host society (Ciornei and Østergaard-Nielsen, 2020). Also, researchers have investigated the impact of migration and remittances on the political behaviour of those who have stayed behind (Meseguer and Burgess, 2014). A central premise in the literature is that remittances empower recipients, by making them less dependent on the state. Hence, by providing some level of financial autonomy, as several authors have suggested, financial remittances could undermine electoral participation among non-migrants (Goodman and Hiskey, 2008; Krilova, 2009; Hiskey and Córdova, 2012; Abdih et al., 2012; Ahmadov and Sasse, 2016).

Having said that, some researchers have explored the political effects of remittances at the national level (Abdih et al., 2012; Pfutze, 2014; O'Mahony, 2013; Ahmed, 2012), but we still have only a small number of studies that explore the effect of financial remittances on individual-level political attitudes and behaviour (Meseguer et al., 2016; Germano, 2013). Some of this work has connected remittances to economic voting, i.e., where voters penalize a governing party for poor economic performance and reward them when the economy is doing reasonably well (Roberts, 2008; Germano, 2013; Ahmed, 2017). Other studies have considered how fluctuations in remittance volume might affect the political attitudes of recipients with regard to welfare (Tertychnaya et al., 2018).

Using two sorts of homeland-related political activity – electoral and community –, Ahmadov and Sasse (2016) demonstrated that the experience and settings in the destination country are crucial components of emigrants' engagement. They used data from a survey of Ukrainian migrant voters in fifteen

different countries, conducted during the 2010 Ukrainian presidential election. Interestingly, they discovered that the rates of electoral engagement among temporary migrants was around 1.24 times that of respondents who planned to stay permanently (all other variables being held constant). Furthermore, they showed that the level of assimilation and destination features are good predictors of transnational political commitment among those emigrants who show at least a modicum of interest in the politics of their homeland. Importantly, the study shows that higher remittances from the host countries may relate to both less electoral and less community commitment. But we cannot easily interpret the relationships detected as causal, since one cannot exclude a selection-bias effect: as the authors emphasized, the survey was conducted exclusively among emigrants who turned up at polling stations, and thus the sample may not be representative (of the Ukrainian immigrant population in the selected countries), since it mostly includes those who are at least minimally politically active.

According to Goodman and Hiskey (2008), a combination of factors may make the citizens of high-migration towns less engaged in politics than people who live in towns with limited migratory activity. First, those who migrate may also be those most prone to political participation. Consequently, all else being equal, high-emigration towns may be left with lower levels of participation in formal politics, i.e., a political brain drain (Goodman and Hiskey, 2008). The second factor is that, by sending economic and social remittances back home, those who are already abroad satisfy the essentials of the town. As this process occurs, those left behind may become disengaged from formal politics and more dependent on remittances from abroad that serve as developmental aids. Thus, according to Goodman and Hiskey (2008), one must ask how these emigration flows have affected the democratization and voting behaviour of those who have stayed behind. Furthermore, since the number of those temporarily working abroad is going to increase, remittances are unlikely to weaken as an income source. Analysing the aggregate data, the study confirmed that voter turnout rates for the 2000 presidential election in Mexico were negatively affected by the percentage of households receiving remittances at the municipal level. Unfortunately, as the authors admitted, the cross-sectional nature of the study limited the ability to capture changes over time and the results need to be treated with caution.

Likewise, by using data for ten rural communities in Michoacan, Germano (2013) showed that those dependent on financial remittances are less likely to require economic support from local officials. He also found that those receiving financial remittances were more satisfied with the performance of the incum-

bent(s) and chose not to get involved in local politics. Arguably, due to the social safety-net effect of the remittances, their recipients in Mexican municipalities are less likely than non-recipients to identify the economy as a pressing problem and more likely to have a more positive view of incumbent politicians (Germano, 2013).

Abdih et al. (2012) came to a similar conclusion, arguing that financial flows allowed households to acquire assets without government help, which consequently reduced their motivation to hold the government to account. These results were justified by the evidence that emigrants have become the main providers of economic security (Meseguer and Burgess, 2014). This means that remittance recipients had fewer criticisms of the government and fewer incentives to engage in the election. Hence, increasing dependence on remittances and alienation from political participation threaten to undermine democratic progress since governments are faced with idle citizens (Krilova, 2009). Taken together, these studies suggest that remittances may discourage non-migrants from becoming involved in politics and that a dependence on money from abroad could lead to a passive citizenship and a decline in voter turnout.

Some studies have gone beyond identifying just a correlation between remittances and turnout. Using data for all Mexican municipalities that had municipal elections in 2010–2012 and the presidential election of 2012, López García (2018) confirmed the existence of a negative relationship between the proportion of households receiving remittances in a municipality and voter turnout. Additionally, she revealed that the negative effects decline as the proportion of households with return migrants in a municipality raises. Further, using municipality-level data from Mexico and individual-level data from Latin America and sub-Saharan Africa, López García and Maydom (2019) found that both remittances and crime reduced inclination to vote.

The so-called political autonomy argument has emphasized that remittances could raise the price of recipients' votes (González-Ocantos et al., 2018). While previous literature used aggregated data, this study employed individual-level survey data from Latin America and a case study of El Salvador. The researchers examined the relationship between remittance receipt and party targeting, by focusing on whether political parties regarded recipients as a target for political strategies. The research supported the claims that remittance recipients were attractive targets for parties. Finally, by using differences in the levels of development achieved in 24 Latin American countries, Córdova and Hiskey (2019) found confirmation of an inverse correlation between levels of development and the extent to which remittance users participate in politics.

On the other side, Pfutze (2012) recognized, in the case of Mexican municipal elections for the period 2000–2002, that international remittances had a positive effect on electoral competitiveness by reducing the power of the dominant party. Furthermore, he identified a strong positive relationship between average remittances per household and electoral support for opposition party candidates at the local level. Besides, the study presented evidence of a causal link between migration to the United States and the electoral triumph of the opposition to the Institutional Revolutionary Party (PRI – Partido Revolucionario Institucional) in Mexican local elections. Using elections data of 2000–2002, he showed that international migration significantly increased the probability that a party other than the PRI would win an election for the first time: a 1% increase in the proportion of migrant households in a municipality was estimated to raise the probability of an opposition party victory in a hitherto continuously PRI-ruled town by more than 0.5% (Pfutze, 2012). In addition, the paper showed that high levels of migration were a powerful predictor of an earlier opposition victory: a 1 percentage point upsurge in the share of migrant households lifted the likelihood that a municipality had a non-PRI government before 1994 or 1997 by 1.7% and 3.4%, respectively (Pfutze, 2012). Also, a later paper confirmed the possibility that economic remittances can reduce support for the incumbent (Pfutze, 2014).

Recent analysis by Ciornei and Østergaard-Nielsen (2020) highlights the role of democratic institutions in influencing the decision of emigrants to participate in the elections of their country of origin. The study found that transnational turnout is moulded by both political and institutional contexts (Ciornei and Østergaard-Nielsen, 2020). It argues that emigrant communities from developing democracies experience a sharp political learning curve that leads to their participation in the politics of their home country, particularly if they live in countries with solid democratic practices and established connections with their homelands. Most importantly, the study showed that, besides being an indicator of commitment to family back home, remittances also increase the levels of expatriates' involvement in the home country's politics. Moreover, the effect of remittances remains notable after controlling for the number of economic activities between the home and the host society. Arguably, this finding proves that the link between remittances and turnout is not solely a sign of broader transnational participation, but is also an important determinant in itself (Ciornei and Østergaard-Nielsen, 2020). The paper exploited a dataset covering the aggregate turnout of emigrant citizens from 25 countries of Europe, Africa and Latin America. Although the researchers started with 100 countries, data on elections



held between 2009 and 2016 were found for 27 countries, and full data – with explanatory variables – were only available for 25 countries.

Regarding the nexus between the governing party and remittances, by drawing on a four-wave panel study of Kyrgyz citizens between 2010 and 2013 and a cross-sectional sample of 28 countries of Central Eastern Europe, the Caucasus and Central Asia, Tertytchnaya et al. (2018) revealed how remittances could induce fluctuations in support for the incumbent in developing countries. Specifically, the researchers expected a positive correlation between remittances, on the one hand, and economic evaluations and incumbent approval, on the other: they showed that when people experience a decrease (increase) in remittances, they become less (more) satisfied with their household's economic situation and pin responsibility on the party in power. Their reasoning confirmed the analysis of economic voting, which emphasizes "the importance of pocketbook assessments for incumbent approval" (Tertytchnaya et al., 2018:3). It is argued that voters judge the incumbent government's achievements on the weight of their purses, but those who receive remittances "may be rewarding or punishing incumbents at home for economic developments abroad, in remittance sending economies, that are largely outside of the incumbent's control" (Tertytchnaya et al., 2018:3). The authors bolster the external validity of their judgements by enriching their analysis with cross-national data from the 28 countries of Central Eastern Europe, the Caucasus and Central Asia covered in the 2010 European Bank for Reconstruction and Development (EBRD) *Life in Transition* surveys. The results of the analysis strongly support the main theoretical claim by establishing a strong connection between variations in remittances, economic evaluations and incumbent endorsement.

Intriguingly, Campello and Zucco (2016) explored the idea, in the Latin American context, suggested by Kramer (1971) regarding economic voting: that voters sometimes do not recognize the situation in which economic performance is determined by factors beyond government control. Similarly, remittance flows could be seen as an exogenous factor, beyond government control, that could improve or damage voters' assessments of presidential performance, thus determining the outcome of the election (Tertytchnaya et al., 2018). Moreover, an analysis of the Serbian context shows how remittances are pro-cyclical (Lerch et al. 2007), i.e., they tend to increase with wage rises and tend to slow down in times of higher unemployment in Serbia. One explanation might be that more remittances are sent in periods of relative prosperity (Lerch et al., 2007). The other rationale, however, would suggest that remittances themselves lead to this higher prosperity (Jovicic and Dragutinovic Mitrovic, 2006). Specifically, if the

living standards of people in Serbia depend on the level of remittances, then a higher inflow of remittances means higher living standards and, according to the logic of economic voting, implies an increase in voter turnout (Verba et al., 1995).

Escribà-Folch et al. (2015) suggested that remittances stimulate democratization in dictatorships. Similarly, using data from 133 developing countries for 1972–2012, Deonanan and Williams (2017) found that remittances from abroad enhance the quality of democratic institutions in those developing countries.

All in all, the effects of financial flows on election participation depend heavily on the observed socio-demographic and political characteristics of both the countries of origin of the remittances and their destination. Consequently, remittances could increase voter turnout in the homeland communities by improving the engagement of residents in political decisions. By contrast, in some countries and communities the opposite occurs: the remittances satisfy the essential needs of the receiving communities, making them disengaged from politics and more dependent on remittances from abroad.

In light of the above, this study expects to position the Republic of Serbia somewhere between the two opposing outcomes in terms of the effect of remittances on voters' participation. Due to the great socio-demographic and socio-economic diversity at the municipality level, the paper expects significant variation from one municipality to another in both the size and the nature of the association between remittances and voting.

## RESEARCH HYPOTHESES

The substantial financial flows sent by migrants may challenge the state as an exclusive welfare provider. Previous studies, albeit in the context of Mexico, confirm this (Goodman and Hiskey, 2008; Germano, 2013). In contrast, those who do not have a household member working abroad, especially those from economically deprived municipalities, must enter into regular contacts and establish political relations with the local administration and bureaucrats in order to acquire certain goods and benefits or, in the event of economic problems, aid.

This paper argues that the negative impact of remittances on voter turnout is more powerful where emigration patterns are historically rooted in municipality development, because financial remittances constitute the lion's share of GDP per capita and because international migration has become the only feasible way to survive for increasing numbers of households (Burgess, 2012). The argument behind this is that remittance beneficiaries have fewer incentives

to hold state authorities responsible, since they no longer depend on the state for assistance (López García, 2018). Consequently, those municipalities where remittances generate a significant percentage of GDP per capita are likely to have a significant portion of the country's remittance-dependent population, and that population is likely to be politically passive. By contrast, those people who are not recipients of financial inflows from abroad will take more interest in politics, and turnout will be higher among them.

Briefly, then, remittances may reduce the incentive for recipients to vote, because they no longer have to rely on local government assistance. In light of this, the study expects a negative effect of remittances on electoral participation.

Thus, I propose the following hypothesis:

*H<sub>0</sub>: Voter turnout is lower in municipalities with higher remittance inflows as a share of GDP per capita.*

Also, knowing how workers' remittances can improve democratic institutions back home (Deonanan and Williams, 2017) and challenge dictatorships (Escribà-Folch et al., 2015), one cannot exclude the alternative hypothesis:

*H<sub>a</sub>: Voter turnout is higher in municipalities where the inflow of remittances accounts for a higher share of GDP per capita.*

## LIMITATIONS

Given the ongoing difficulty of properly recording the outflow of emigrants from, and the inflow of remittances to, Serbia, it is a problem to gain much insight into the past, present and potential future roles and functions of remittances. Although Serbia is characterized by a specific economic and political emigration context and has plenty of its citizens abroad, the database has its limitations (Penev and Predojević-Despić, 2012). The main reason – the lack of trustworthy sources of migration data – largely arises from the complex character of this demographic component (Nikitović et al., 2015). Furthermore, according to Nikitović et al. (2015), comparison of the census data against the immigration statistics of destination countries (so-called mirror statistics) revealed that the 2002 census, and particularly the 2011 census, both underestimated the number of emigrants from Serbia. The foreign registers and statistics are based on the criterion of an individual's nationality, not ethnicity. And additional problems are posed by the frequent changes in the name of the state and its territory: first Yugoslavia, then Serbia and Montenegro, and finally the Republic of Serbia (Penev and Predojević-Despić, 2012).

Since the Republic of Serbia does not have adequately efficient legislative mechanisms to encourage Serbian citizens to deregister their residency when they plan to go abroad for a longer spell, the official statistics on migration streams do not really cover the cross-border migration of Serbian citizens, and we can only trace this mobile group of people through the census (Nikitović et al., 2015). Therefore, this study uses only official data obtained from the Statistical Office of Serbia, and only the data referring to that portion of the population temporarily residing or working abroad that still possesses Serbian citizenship. Finally, the census definition of those persons 'working, staying abroad' includes persons working for a foreign employer; persons working abroad in their own workshop or office; persons working as crew members of foreign ships and aircraft; and persons residing abroad as family members of those persons working abroad, listed previously.

Unlike all previous censuses, according to the methodology of the 2011 survey, the contingent of persons working and staying abroad includes persons studying abroad, provided they do not return daily or weekly to Serbia, as well as persons who are living abroad for some other reason (Stanković, 2014).

Importantly, the supplementary census forms for those people working and living abroad, which, with minor variations in organization and methodology, were used in the 1981, 1991 and 2002 censuses, were abandoned in 2011 for lack of financial resources. Therefore, the basic source of information about this emigrant contingent were those members of their household left in Serbia if, of course, they were present at the time of enumeration. Basically, in order to emphasize that the majority of migrants recorded in the census are in regular contact with their families back home and have a deep-rooted connection to their municipality of origin, this paper still uses the term 'temporary', even though this practice has been largely abandoned in recent decades (Stanković, 2014). Arguably, the temporary nature of migration increases the motivation to remit money (Merkle and Zimmermann, 1992).

Furthermore, the decline in the number of the temporarily absent population in the 2011 census would probably have been somewhat smaller, had more Albanian migrants been included from the municipalities of Bujanovac and Preševo, where the Albanian population boycotted the 2011 census (Stanković, 2014).

Also, due to the inability of the Serb authorities to conduct the census across the whole territory of the country, the following tables and graphs do not contain data related to the Autonomous Province of Kosovo and Metohija.

Finally, regarding data on financial remittances, it is important to emphasize some limitations that are embedded in the chosen approach to their estimation. Namely, the paper uses data from Petree and Baruah's 2006 study, which

surveyed 343 migrant-sending households in two rural regions of central and eastern Serbia. Given that the survey was carried out only in agrarian provinces, the data are confined to the perceptions of rural families that were in receipt of remittances from Switzerland (Petree and Baruah, 2006). Thus, the differences between regions regarding both volume and frequency of financial streams were not accounted for. Furthermore, the household survey was conducted over eight weeks, from the beginning of February to the end of March 2006, i.e. they do not offer a realistic picture of patterns of remittance for the whole of the period that this paper covers, but provide only a snapshot of remittance flows. Also, while our model assumed that the level of remittances was stable across the time period observed (adjusted only for the size of the household between two successive censuses), the World Bank estimated that remittance flows to developing countries declined by 23% (on average) between 2008 and 2009 (Tertytchnaya et al., 2018), and in the case of Serbia they increased. Finally, by adopting this method of calculation, the study expected a decline in the significance of remittances, as a consequence of the economic development of Serbia (i.e. an increase in its GDP).

## DATA

The data used in the analysis came from official state sources (*Table 3*). Information on electoral participation rates and electoral outcomes was collected from the Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs/sr-Latn/oblasti/izbori/predsednicki-izbori>). Data on the socio-demographic structure of the population in selected municipalities and on the population temporarily abroad that has registered (permanent) residence in the territory of Serbia, and citizenship of the Republic of Serbia, were obtained from the population censuses conducted in 2002 and 2011 by the Statistical Office of the Republic of Serbia (<https://www.stat.gov.rs/sr-Latn/oblasti/popis>). Due to methodological and practical difficulties in collecting data on the volume of remittances to Serbia, the only foreign source of data used in the paper was a study concerning the remittance corridor between Switzerland and Serbia.

Because municipal-level data on international migration and demographic indicators were gathered by population census every ten years, the cross-sectional nature of the data is not going to limit the study. Thus, the paper utilizes panel data analysis – i.e., a random-intercept or so-called unified model (Bartels, 2009) – in order to examine the ways in which remittances affect voter turnout

rates. There is more information about the statistical method adopted in the section devoted to methodology. Finally, all estimations were conducted using the STATA 16 statistical software package.

*Table 3: Summary statistics of municipal-level variables*

Variable	Mean	Standard Deviation	Minimum	Maximum
Share of remittances in GDP, %	35.39	13.21	1.74	76.39
Share of people with higher education, %	9.69	7.39	0.48	60.56
Share of unemployed in total population, %	11.40	4.35	1.13	25.13
Urban/rural (1 for urban administrative units, 0 for rural)	0.25	0.44	0	1
Share of unmarried in total population, %	39.90	4.52	27.72	54.37
Ethnic minorities make up the majority in the municipality (1 for municipalities in which ethnic minorities make up a majority, 0 for those in which Serbs are in the majority)	0.11	0.31	0	1
Share of population abroad, %	5.57	6.86	0.19	57.50
Life expectancy at birth (in years)	73.92	2.55	69.10	80.22
Average age (in years)	42.45	3.11	29.30	55.56

*Source:* Data on the share of the unemployed, the population abroad, life expectancy at birth, average age, ethnic composition, the share with higher education, and the rural/urban division are drawn from the 2002 and 2011 census files. Data on the share of remittances in GDP per capita was calculated by the author, based on the field research of the Switzerland–Serbia remittances corridor (Petree and Baruah, 2006:36);  $n = 966$ .

To understand the causal relationship, the study examined 161 municipalities and cities. In addition to the capital Belgrade and 28 cities, the territory of Serbia consists of 145 municipalities, making 174 territorial units in total. Some units were excluded, as their administrative status changed during the observed period, and thus, it was not possible to collect the necessary data for statistical analysis. In the end, the study sample size included around 93% of territorial units, both cities and municipalities.

## VARIABLES

### THE DEPENDENT VARIABLE

**Voter turnout** This variable designates the rate of registered participation (at the municipal administrative level) in the presidential elections of 2002, 2003, 2004, 2008, 2012, and 2017 (labelled ‘*Voter turnout*’). Whereas in some municipalities,

political participation was as high as 83.8%, in others the level was as low as 5.5% (*Table 4*).

Voter turnout at the municipal level is the percentage of eligible voters who participated in an election. It ranges from 0 to 100. Further, the study is limited to presidential elections and only uses the level of participation in the first electoral round. The Republic of Serbia is an electoral democracy, and the president is elected by popular vote to serve a five-year term. Finally, all people with Serbian citizenship and over 18 years of age are eligible to vote, and their names can be found on the electoral roll.

*Table 4: Descriptive statistics of voter turnout at the municipal level, 2002–2017*

		(%)
Statistics	Value	
Number of observations	966	
Standard Error	−0.34	
Median	54.90	
Mean	53.64	
Deviation	10.87	
Variance	118.25	
Kurtosis	4.23	
Skewness	−0.48	
Minimum	5.55	
Maximum	83.87	

Source: Statistical Office of Serbia (<https://www.stat.gov.rs/en-us/oblasti/izbori/>)

Generally, there are two reasons why researchers use the vote as a form of political engagement. First, voting is a form of participation that is defined as being highly accessible to the average citizen: it requires a low investment of resources, both time and money, unlike other forms, such as party activism or protests. Second – and a more practical reason –, it is the only form of political engagement in the Republic of Serbia for which official data exists.

## INDEPENDENT VARIABLES

**Remittances** The size of the remittance (labelled '*Share of remittances in GDP*') was based on an evaluation provided by Petree and Baruah's (2006) field research: an estimated CHF 4,600 per year to individual households in Serbia (Petree and Baruah, 2006:36). This research, within the remittance corridor be-

tween Switzerland and Serbia, using a sample of agricultural household types (343 households), showed that almost all the surveyed families in Serbia that had sent family members abroad received remittances (91%). Almost half of the surveyed households (40%) had been in continuous receipt of remittances for 20 years, and on average those remittances accounted for 40% of the income of recipient families (Petree and Baruah, 2006). Using the average exchange rate in 2018, the annual average value of the remittances was EUR 4,426 per recipient household. I then divided that sum by the average number of household members, based on census data from 2002 and 2011. Finally, this figure was used to calculate the share of remittances in the GDP per capita of a particular municipality. Further, the share of remittances in the municipality's GDP is calculated based on the trend observed from 2002 to 2011. Namely, after splitting the difference in the value of remittances between 2002 and 2011 by the number of years between the two observed points (9), the study managed to calculate the share of remittances in the municipality GDP for every election year, by filling the rest of the values for election years 2003, 2004, 2008, 2012 and 2017 through interpolation. The municipality GDP per capita was obtained from the Statistical Office of Serbia, separately for 2002 and 2011 (<https://www.stat.gov.rs/sr-Latn/oblasti/nacionalni-racuni/regionalni-podaci>).

It is extremely difficult to gain an accurate assessment of the financial stream to Serbia. Official figures published by the National Bank of Serbia and the International Monetary Fund have drastically underestimated the total flow, due to the large portion of remittance transfers made through informal channels, which are difficult (if not impossible) to estimate. As an illustration, the National Bank of Serbia estimates that about 550,000 people send remittances; the official data suggest that, on average, these amount to about EUR 6,500 annually. Meanwhile, the former minister of diaspora and religion confirmed in the media that the volume of remittances in 2009 was about USD 5 billion, and that, on average, each member of Serbian society gets a bonus of about EUR 780 from abroad (Bobić, 2009). Back in 1972, Ivo Vinski (1972) calculated the average guest worker's economic remittances to Yugoslavia. He found that, on average, a Yugoslav worker in Germany produced a net monthly worth of 1,250 Deutsche Mark (DM), of which he or she remitted DM 265 back home; this worked out at DM 3,180 per year (Vinski, 1972).

**Population temporarily abroad** The second independent variable is the share of the population temporarily abroad (labelled '*Share of population abroad*'). This is the proportion of the total population of the municipality (according to the census results) that is working or studying abroad. It reveals the relative (numerical) importance of the observed emigrant contingent in the municipalities.



Although this definition has limited the pool of possible remitters and excludes many of those who regularly remit money to family and friends, this very mobile group of remitters has still maintained the narrative of return, by making financial flows consistent over time (Bauböck, 2003; Sinatti, 2011; Silva, 2014; Gherghina and Propeanu, 2020).

**Age** In addition to education, age (labelled '*Average age*') is one of the primary socio-demographic characteristics of the population. This study explores the influence of the age structure of the respective municipalities, using the average age of municipality residents. The average age was calculated by dividing the total sum of their ages by the number of people in the municipality.

Differences in age-specific voting behaviour are becoming more and more significant, making it an issue of growing importance to both social and political scientists. It can contribute to our understanding of the participation of older people and their impact on election turnout and political outcomes (Goerres, 2009; Vanhuysse and Goerres, 2011). Thus, the importance of introducing an independent variable that captures the impact of ageing on voting patterns is immense. The average age of those who are temporarily resident abroad is 34.7 years, which makes them considerably younger than the resident population, with its average age of 42.2 years (Stanković, 2014); meanwhile, the average age of eligible voters is around 47, according to the results of the last census.

**Education** The share of people with higher education (approximately 15–16 years of education) in the population of the municipality aged over 15 (labelled '*Share of those with higher education*'), serves as an indicator of the level of development. Information regarding the level of education at the municipality level was obtained for the census year, and was then calculated for each election year (in the same way as in the case of remittances). According to the development theory, marginalized or deprived people are less likely to vote than their more educated compatriots. Thus, better education leads to an increased propensity to vote (Kaplan and Venezky, 1995). Consequently, the study argues that economically developed municipalities, with a more-educated population, will record higher voter turnout. Arguably, individuals with higher education are more involved in political activities than are those with less education (Verba et al., 1995; Franklin, 2004; Schlozman et al., 2012).

**Minority** Of the 161 municipalities in the Republic of Serbia that were observed in the course of this study, 17 had an absolute or relative non-Serbian majority in both censuses (labelled '*Minority/majority*'). Knowing the political role of ethnic minorities is essential for their integration into any community; thus, by using this categorical variable ('1' for a municipality where the non-Serbian

ethnic group is in the majority and '0' if Serbs make up the majority), the research will be able to control for the effect of ethnic composition on voting behaviour. Since the study examined only presidential elections, it was expected that there would be a notable voting gap between the participation rate of the majority and the minorities. I based this assumption on the recent history of inter-ethnic disputes (Bosnia and Kosovo wars) between Serbs, on the one hand, and Albanians and Bosniaks, on the other.

**Unmarried** By using a variable regarding the proportion of those who are not married (labelled '*Share of unmarried*') in the population aged over 15 years, the study intends to explore the existence of a marriage gap in voting behaviour. It is important to note that this group of unmarried people includes both those who have never been married and those who have been married at some point (divorcees, widows and widowers). According to Nicholas and Raymond Wolfinger (2008), married people are more likely to vote than those who have never been married. Similarly, Denver (2008) has found evidence that single, divorced, or separated people had a lower turnout ever since the 1970s in Britain. Finally, the 2016 CNN Exit Poll found that the marriage gap is more telling than the gender gap (CNN Exit Poll, 2016).

**Life expectancy** Research suggests that public health (labelled '*Life expectancy at birth*') is also relevant socially and politically at the aggregate level: various studies have explored the interconnection between health and voting. Using the National Longitudinal Study of Adolescent Health and the General Social Survey, Pacheco and Fletcher (2015) found that people who self-reported excellent health are more prone to vote.

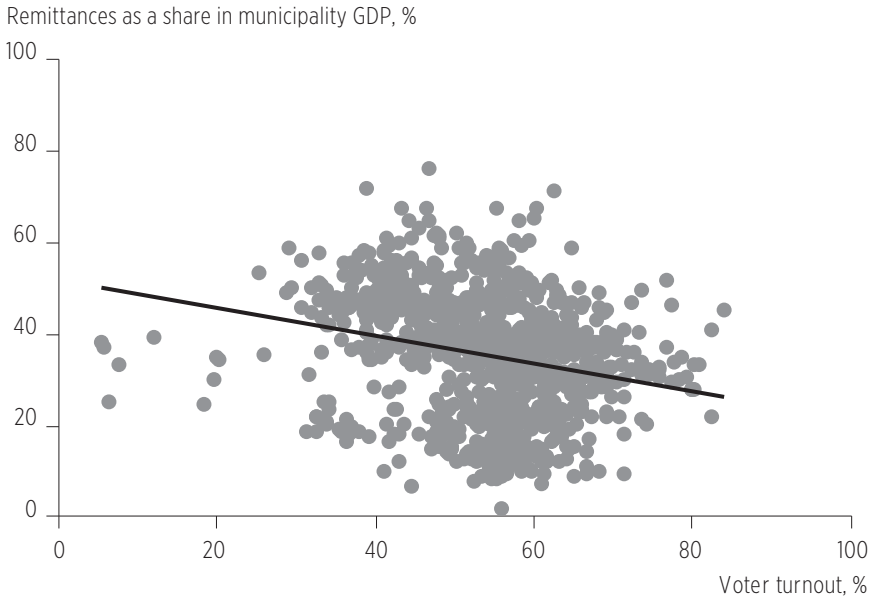
**Unemployment rate** The unemployment rate (labelled '*Unemployment rate*') represents the share of those without a job in the population aged over 15. The study expects to find that higher unemployment rates motivate voters (Cebula, 2008, 2017).

**Urban/Rural division** The paper uses a categorical variable (labelled '*Urban/rural*') where '1' is for an urban municipality and '0' for a rural municipality; this is used here to identify any rural-urban voting gap. Although previous literature was vague about the relationship between urban/rural residence and voting turnout, and about the fact that rural areas have more moderate levels of education and income, the study expects to find lower levels of turnout in rural municipalities.

## METHODOLOGY<sup>1</sup>

Since the study expects the share of financial remittances in the municipality GDP per capita and voter turnout to have a linear relationship (i.e., be related in such a way that their values form a straight line when plotted on a graph; see *Figure 1*), the study will utilize a linear random-intercept model (maximum likelihood – ML). Because this model is a simple random-intercept model fitted by ML, I am going to use the ‘xtreg’ Stata command with the ‘mle’ option.

*Figure 1: Correlation between voter turnout rates and remittances as a share in municipality GDP*



Source: Author's calculation.

By using a multilevel modelling setup, we introduce the issue of unobserved heterogeneity in the following equation format:

$$Y_{ij} = \beta_{0j} + \beta_1 X_{1ij} + \beta_2 X_{2ij} + e_{ij} \quad (\text{Level-1 equation})$$

$$B_{0j} = \gamma_{00} + \gamma_{01} Z_{1j} + u_{0j} \quad (\text{Level-2 equation})$$

<sup>1</sup> This section is based on Bartels (2009).

In panel data,  $i$  represents measurement occasions and  $j$  represents individuals or municipalities. Two variables,  $X_{ij}$  and  $X_{2ij}$ , are fitted at level 1. For our dataset (i.e., panel data), these are time-varying variables.  $Z_{ij}$  is a time-constant level-2 variable that is a municipality-specific variable in our dataset and  $e_{ij}$  represents the level-1 error. Finally,  $u_{0j}$  represents unobserved heterogeneity across clusters, and there are three general paths available for treating it: ordinary least squares (OLS), fixed effect (FE), and random effect (RE) (see Bartels, 2009).

The statistical approach used in this study is the so-called unified statistical model. This simple but efficacious procedure can solve a considerable number of statistical problems associated with other statistical models, while keeping their positive aspects. The strategy resolves interpretation problems if one assumes that the within- and between-cluster effects are equal; it accounts for unobserved heterogeneity; it satisfies the assumption that the level-1 variables should be uncorrelated with the random effects term; it allows for the introduction of level-2 variables; and finally, it permits statistical tests of cluster confounding. Finally, to account for dynamics in the panel data, I added within-cluster operationalization of the lagged dependent variable (i.e., voter turnout) at the municipality level. Arguably, it represents how, for a given country, past values of the dependent variable influence current values. Furthermore, the lagged dependent variable models are a statistical tool that helps to understand the dynamics of politics (Keele and Kelly, 2006).

## RESULTS

The results are presented in *Table 5*. The total number of observations has been reduced from 966 to 805 because of the creation of a lag variable for the past values of voter participation rates that eliminated one observation per municipality. First, one can see that the within-municipality lag of the vote exhibits a statistically significant effect: i.e., for a given municipality, higher voter turnout in the previous election implies 0.25% lower election participation in the subsequent one. Consequently, one can infer that the level of election participation in the earlier election damages current voter turnout. Thus, by choosing non-participation, voters express their dissatisfaction with the existing political situation or the current presidential candidates. By choosing not to cast their ballot, they send a message to the current political actors.

Moving on, remittances have an effect at a 0.05 alpha level both between municipalities and within a municipality. In the 'Absolute difference' column of the table, one can find the results for the test of cluster confounding, suggesting that the difference between these two effects is statistically significant. Because the within-municipality effect is greater, the results should be interpreted in the following way: for a given municipality, as the share of remittances in GDP increases over time by 1%, so voter turnout falls by 0.42%. Here, the opposite sign in both the between- and within-municipality (i.e., time-series association) requires more attention.

First, in order to provide more precise results, and since the coefficient of correlation is higher for the time-series analysis, one should interpret the results as a time-series association. One should not forget that a cross-section represents just a snapshot of a single point in time, which is useful for comparing and analysing the effect of different factors on one another; meanwhile, a time series involves repeated sampling of the same data over time and – unlike cross-sectional data, which provide essentially just a slice of a time series, – allows a researcher to make more credible causal assertions.

*Table 5: Results of a linear random-intercept model (maximum likelihood) of voter turnout (for the 2002, 2003, 2004, 2008, 2012 and 2017 elections)*

	Between-municipality effect			Within-municipality effect			Absolute difference (within-between)		
	Coef.	SE	p	Coef.	SE	p	Coef.	SE	p
Voter turnout (t-1)	–	–	–	–0.25	0.04	0.00	–	–	–
Share of remittances in GDP	0.31	0.09	0.002	–0.42	0.08	0.00	0.29	0.09	0.001
Unemployment rate	–0.01	0.12	0.93	0.16	0.16	0.30	0.13	0.19	0.48
Share of population temporarily abroad in total population	–0.43	0.06	0.00	–0.84	0.27	0.002	–0.17	0.25	0.49
Average age	0.05	0.17	0.78	0.70	0.49	0.15	–0.06	0.47	0.90
Share of people with higher education	–0.07	0.08	0.38	0.83	0.24	0.00	–0.54	0.22	0.013
Share of unmarried in the total population	–0.26	0.18	0.15	0.10	0.30	0.73	–0.006	0.32	0.98
Life expectancy at birth	0.43	0.38	0.24	0.03	0.33	0.92	0.40	0.49	0.41
The ethnic minority makes up the majority in the municipality	–3.15	1.21	0.009	.	.	.	.	.	.
Urban/rural division	–0.38	1.03	0.71	.	.	.	.	.	.
Regions:									
North (2)	7.30	2.17	0.001						
West (1)	1.73	1.01	0.09						
Number of observations		805							
Model ( $X^2$ )	469.30	p<0.001							
Rho		0							

In *Table 6*, I present the correlation between voter turnout and remittances for every election year and region. Just a glance reveals that a positive (i.e. direct) correlation was recorded in the majority of election years.

*Table 6: Correlation between voter turnout and remittances inflow for every election year and region*

	Coef.	Robust SE	95% CI		p	t
			LL	UL		
Share of remittances in GDP						
2002	0.01	0.04	-0.08	0.10	0.84	0.20
2003	0.05	0.04	-0.03	0.15	0.25	1.16
2004	-0.11	0.04	-0.21	-0.02	0.01	-2.56
2008	0.08	0.07	-0.05	0.22	0.24	1.17
2012	0.34	0.09	0.15	0.53	0.00	3.62
2017	-0.06	0.10	-0.26	0.13	0.53	-0.62
Regions		2.55	69.10	69.10	69.10	80.22
South-East	-0.24	0.05	-0.36	-0.13	0.000	-4.26
West	-0.43	0.05	-0.55	-0.32	0.000	-7.65
North	-0.14	0.04	-0.23	-0.06	0.001	-3.46

Notes: CI = confidence interval; LL = lower limit; UL = upper limit.

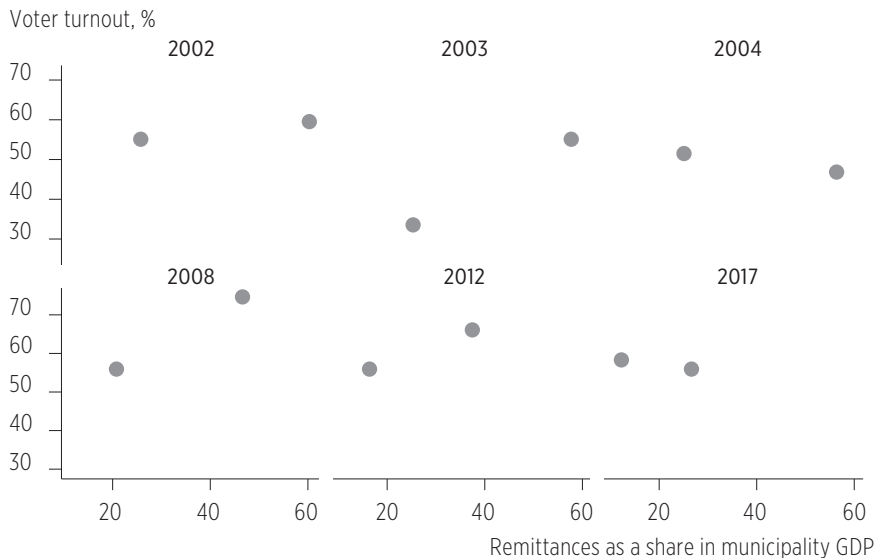
The correlation between the inflow of remittances and turnout was positive in the 2002, 2003, 2008 and 2012 Serb presidential elections, whereas in 2004 and 2017 the sign of the correlation across municipalities was negative. Although, the study records a negative association on the regional level for all periods, by separating the analysis for each election cycle, the paper is able to demonstrate a direct (i.e. positive) association between election participation and share of remittances in municipality GDP.

The positive sign of the cross-municipality association between voting and remittances is due to a combination of two elements. First, there are election-cycle effects, which in some years cause the participation of the electorate to be higher or lower. A good example is so-called voter fatigue – i.e. when those eligible to vote are asked to do so too often, which could be the reason for abstention (Germano, 2013). Four presidential elections were held in the Republic of Serbia between 2002 and 2008. Also, in the Serbian context, the maximum values – recorded in the 2008 and 2012 elections – are closely connected to the implementation of new methods of political campaigning, adopted by the marketing agencies, featuring extensive use of opinion polls and surveys. Last but not least, of some importance is the support for a particular presidential candidate that came from foreign political institutions or prominent figures in the election run-up to the elections (EU, US or Russian presidents, etc.).

Second, the magnitude of the positive association in 2012 is greater than the negative effects recorded in both 2004 and 2017. And the negative time-series association between voting and remittances is weaker for 2017 than for 2004 (Table 6). Importantly, the fact that the magnitude of the negative cross-municipality association between election participation and the share of remittances in GDP is falling is good news for politicians, since it reduces the effect of this exogenous factor (over which they have little or no control). Both elements jointly produce a positive sign in the cross-municipality association between voting and remittances, while for each region the association in the time dimension is negative.

As a graphical illustration, Figure 2 presents the correlation between voting and remittances for a municipality that belongs to a developed region labelled 'North' (id=1) and a municipality from the 'South' region (id=144), which is characterized by a higher share of remittances in the municipality GDP. One can easily see how, for 2002, 2003, 2008, and 2012, the higher values of remittances are associated with higher values of voting turnouts.

Figure 2: Voter turnout rates and share of remittances in municipality GDP for two selected municipalities, by election year



Source: Author's calculation.

Also, the share of the population temporarily abroad exhibits an effect both within and between municipalities at the conventional level of significance. Since

the time-series coefficient of association is almost twice as high as the cross-sectional coefficient, one can interpret the result in the following way: for a given municipality, as the share of the total population that is temporarily resident abroad increases over time by 1%, voter turnout decreases by 0.84% (see *Table 5*).

The next predictor to exhibit a statistically significant effect was the share of people with higher education. According to the results, for any given municipality, as the proportion of the total population with higher education increases over time by 1%, voter turnout also increases by 0.83% (see *Table 5*).

Of the two level-two variables whose inclusion allows the selected statistical model to be used, only the ethnic composition of the municipality shows an effect at the 0.05 alpha level: if ethnic groups other than Serbs make up a majority in the municipality, one can expect political participation in the presidential election to drop by 3.15% on average (see *Table 5*), compared to those municipalities where ethnic Serbs are the majority.

Finally, we added a categorical variable for regions in Serbia in order to check whether there is a difference between regions in terms of voting behaviour. The study separates the Republic of Serbia into three different regions. The first, labelled the 'North' region, is the most prosperous part of the country and includes the capital, Belgrade. The 'West' is the label for the Western region of Serbia, which is much less economically developed than the North. And 'South' indicates the South-East region, which is the least developed and has the greatest share of people living abroad temporarily and the highest percentage of financial remittances in GDP. Furthermore, the South-East region is selected as the base value, against which voter participation rates are compared, after controlling for the regions. According to the results presented in *Table 5* above, the North has a statistically different voter turnout rate that is 7.3% higher than in the South.

Regarding model fit, a small value for the likelihood ratio (LR) test ( $H_0$ : Level-2 Error=0.46930,  $p<0.001$ ) does not totally support specification of the random-intercept model over a completely pooled approach. Furthermore, rho is equal to 0, which indicates that there is no variation induced by between-municipality differences, so the municipality-level terms will be very close to one another; in OLS, they are required to be exactly equal, so there is little difference between using OLS and a linear random-intercept model. Although preferred by many researchers because of its simplicity, unfortunately, the nature of the OLS method means that the interpretation of the effects is not precise – i.e., one is not able to break down the effects on the 'between' and the 'within' components. Consequently, the superiority of the linear random-intercept model (maximum likelihood) with decomposed effects makes it the first choice for interpreting the results.



## DISCUSSION

The results of the linear random-intercept model (maximum likelihood) with decomposed effects for the entire period (2002–2017), as presented in this paper, showed that municipalities with a higher share of financial remittances in their GDP recorded a lower level of electoral participation. Furthermore, by including additional socio-demographic and socio-economic variables, the model results informed us of additional factors that shaped voting patterns in the Serbian presidential elections from 2002 until 2017.

Based on the results, one can accept the null hypothesis that remittances from abroad make those who have stayed behind more indifferent to political participation. This finding is in line with that of Burgess (2012), who suggested that the damaging effect of remittances on voter turnout is stronger where emigration practices are historically rooted in municipality development, because financial remittances make up the lion's share of GDP per capita and international migration provides the only possibility many households have to survive. Arguably, remittance recipients have less motivation to hold political leaders to account, because they no longer depend on state-provided assistance (Goodman and Hiskey, 2008; Germano, 2013; López García, 2018).

Importantly, the paper identified the fact that those municipalities where a higher proportion of the total population was temporarily resident abroad had a lower level of election participation. Here, the result tallies with Kostelka's (2016) argumentation that emigrants are less influenced by government policy in their country of origin (since they pay taxes abroad) and consequently feel less concerned about the outcome of the election; this, in turn, reduces the benefits and increases the costs of voting.

Furthermore, the analysis shows that the share of educated people had a significant effect on the level of voter turnout only within a municipality. Arguably, the positive sign for the correlation between voter turnout and level of education is in line with assumptions regarding the logic of development theory. Consequently, a high level of education promotes increased election participation (Kaplan and Venezky, 1995), since people with higher education are more engaged in political activities than are those with fewer years of schooling (Verba et al., 1995; Franklin, 2004; Schlozman et al., 2012).

The opposite sign of association was observed for the ethnic structure of the municipality's population. This is not surprising, if one is aware of the history of inter-ethnic relations in Serbia, especially in municipalities with an Albanian majority. One of the three municipalities where the Albanian ethnic group is

numerically dominant recorded the lowest ever turnouts: just 5.86% in 2004 and 7.68% in 2008.

## CONCLUSIONS

By employing a municipality-level research strategy, the study found that one consequence of the extensive out-migration – alongside population ageing – is that remittances affect the level of election participation in the Republic of Serbia. Given the strongly negative effects of both emigration and the proportion of ethnic minorities in a municipality on election participation, the paper offers additional value by enabling the identification of fresh avenues for future research into turnout fluctuations within multi-ethnic emigrant-sending countries.

The evidence corroborates arguments contained in previous literature that the existence of an additional household income may reduce the propensity of recipients to vote. The logic behind this – in the case of Serbia – is dictated by improvement in the economic situation (formulated in this research as GDP per capita). It is conceivable that, during the 2012 and 2017 presidential election cycles (i.e., after the 2007–2008 global financial crisis), GDP per capita increased and, consequently, reduced the median value of the share of remittances in GDP per capita from 47.01% to 31.73% since the previous period.

Subsequent studies should further investigate how the connection between remittances and voter turnout varies according to destination country (e.g. the West–East distinction; democratic and non-democratic states; geographical proximity to the homeland; etc.). They should also look at how low voter turnout could cast a shadow over the mandate of an elected candidate (Rosema, 2007) and open the door to democratic – but, more likely undemocratic – alternatives and solutions.

The evidence suggests that there is more to the remittance story than just the effects of development. While poverty reduction, an increase in everyday consumption and health benefits are certainly the main positive effects of these long-lasting financial remittances, researchers and policymakers should not neglect the negative aspects of cash inflows. Carl Schierup (1973) identified some of these negative effects in rural Serbia. For example, young people started to disdain both agriculture and jobs in the public sector, finding that such jobs did not pay enough to satisfy their new consumption needs and patterns. Even marriage behaviour altered, as girls started to prefer the sons of emigrants, who pos-

sessed Western goods (Schierup, 1973). These findings revealed the onion-like layers of transformations that remittances have on recipient societies, with their potential to polarize the social structure.

Finally, it needs to be said that it is too early to draw any firm conclusions, as Serbian democracy is still young. Generally, the study finds some evidence that financial remittances can alter recipients' electoral behaviour; but the whole story is likely to be far more complex than that. Remittances provide security to those who receive them, without the need for government support; but this gambling strategy requires open doors around the world (Brunnbauer, 2016).

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# THE LOCKDOWN EXPERIENCE OF HUNGARIAN MOTHERS WITH YOUNG CHILDREN FACING THE COVID-19 PANDEMIC<sup>1</sup>

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## **ABSTRACT**

The COVID-19 pandemic brought about unprecedented changes to everyday life, presenting a range of emotional and practical challenges. This paper aims to identify burdens that Hungarian mothers of two-year-old children faced during the spring of 2020 and to examine the impact of employment on mothers' adaptive behavior during the pandemic. The data presented here are based on the fourth wave of the Cohort '18 Growing Up in Hungary longitudinal research study. The analysis uses weighted data (n = 4,408), collected between October 2020 and May 2021, covering experiences during the spring 2020 state of emergency. Besides descriptive statistics, a K-means cluster analysis was performed to identify groups of mothers with similar experiences. The correlates for the resulting clusters were analyzed using both bi- and multivariate methods. Four clusters were identified: mothers experiencing 'mental distress

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and life-management difficulties' (16.8%), 'mental distress' (33.7%), 'life-management difficulties' (15.8%) and 'seamless adaptation' (33.7%). In predicting cluster membership, maternal employment situation, partner's employment, increased housework tasks, external childcare assistance, previous anxiety symptoms and previous depressive symptoms were significant. It can be concluded that the first wave of the pandemic had a marked effect on the lives of mothers raising young children, though experiences varied. On-site work was found to reduce both mental distress and life-management difficulties during the pandemic for women with young children, but for those working from home, no such adaptation effect was identified.

Keywords: COVID-19, lockdown, mothers with young children, difficulties, adaptation, Hungary

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## INTRODUCTION

The COVID-19 pandemic changed everyday life to an unprecedented extent. Parents faced specific challenges, as the outbreak was accompanied by an increase in time spent at home and looking after children, while most parents also worked actively. The pandemic, coupled with government-imposed measures to mitigate its spread, caused difficulties in the daily lives of mothers and fathers around the world. This disrupted the balance between paid and unpaid work and the mental well-being of parents. The lifestyles of mothers with young children and the difficulties they experienced were influenced by whether they were active workers or still on paid maternity leave during the pandemic.

In Hungary, mothers typically stay on maternity leave until their children are three years old (Blaskó, 2011; Makay, 2018), during which time they are responsible for the majority of childcare and household tasks (Makay & Spéder, 2019). In addition, previous international research has found that paid maternity leave has a positive effect on maternal mental and physical health (Aitken et al., 2015; Van Niel et al., 2020), but after the child is six months old, taking maternity leave may no longer have a positive effect on the mental health of mothers (Baker & Milligan, 2008; Dagher et al., 2014). Indeed, Dagher et al. (2014) found among mothers in Minnesota that leave duration in the first postpartum year had a U-shaped relationship with depressive symptoms, with the lowest symptom level at six months postpartum.

Hungarian mothers with young children may have already been in a burdensome situation when the outbreak forced them into social isolation. Therefore, the goal of this study was to describe the mental distress and life-management difficulties faced by mothers raising two-year-old children during the first wave of the pandemic in the spring of 2020 and to investigate the differences in mothers' burden according to their employment situation.

## THE BEGINNING OF COVID-19 IN HUNGARY

As in all countries of the world, including Hungary, the COVID-19 pandemic posed significant challenges. In May 2022, the total number of COVID-19 cases in Hungary was 1,9 million, while the number of deaths was around 46,000 (Worldometer, 2022).

In the first wave, Hungary had a relatively low number of cases compared to Western or Southern Europe (Aidukaite et al., 2021). The first cases were

announced on 4 March 2020, while the first coronavirus-related death occurred on 15 March. According to a cross-sectional survey of a representative sample of the Hungarian population aged 14 years and older, the number of confirmed cases was stable and low (active infection rate: 2.9/10,000; prevalence of prior SARS-CoV-2 exposure: 68/10,000) after 50 days of restrictions (Merkely et al., 2020). During subsequent waves of the pandemic, the number of positive cases and coronavirus deaths was unexpectedly high, but these periods are outside the scope of our study.

Despite the low number of cases in the first wave of the pandemic, the Hungarian government responded quickly to the crisis, deploying a range of regulatory instruments. On 11 March 2020, the administration declared a state of emergency, a form of special legal order provided for in the Fundamental Law (Láncos & Christián, 2021). As in other Central and Eastern European countries, lockdown was declared in Hungary as part of the containment measures (Aidukaite et al., 2021). In addition, day cares, schools and universities were closed, shop opening hours were restricted, public gatherings were banned, public events were cancelled and travel from the worst-affected regions was restricted (OECD, 2020). The government also extended the duration of maternity benefits (Magyar Közlöny, 2020). The lockdown measures were eased in the countryside at the end of April (and in Budapest from 18 May), and the state of emergency was lifted on 16 June.

Probably related to the pandemic and these restrictions, the employment rate in Hungary fell by 2.8 percentage points between April and June 2020, compared to the previous two months (Köllő, 2020; Központi Statisztikai Hivatal, 2020). The pandemic has also affected working arrangements: although working from home (WFH) is not widespread in Hungary, there was an increase in this atypical form of work (Köllő, 2020).

## DIFFICULTIES OF MOTHERS DURING THE PANDEMIC

The lockdown experience hit Hungarian families with young children at a special stage in their lives, as most of the women in our study, who were raising children almost 2 years old, were still at home on maternity benefits. In Hungary, mothers can take maternity leave until the child is 2 years old, while receiving 70% of their previous salary through the child-care benefit (GYED). Mothers can then receive the child-care allowance (GYES) for another year, which fosters the belief that mothers should stay at home until the child is 3 years old (Hungler & Kende, 2019; Makay, 2017; Máté, 2019). It is during this

period that gender differences in labor income and household production are at their greatest (Vargha & Gál, 2019).

A number of studies have examined the relationship between work and mental and physical health, but the results have been mixed. While some studies have found that working mothers are less affected by depression, stress and other psychosomatic illnesses (McLoyd et al., 1990; Rout et al., 1997, Frech & Damaske, 2012), others have found the opposite, namely that non-working women have better mental health (Mistry et al., 2007).

According to the recent literature on COVID-19, the pandemic can be regarded as a special case because it was accompanied by an increase in time spent at home and looking after children (due to the closure of day-care and educational institutions). There was thus a significant readjustment in the daily lives of families. The direction of this readjustment is still being debated. Canadian research has shown a widening of the gender gap between parents of young children during this period (Fuller & Qian, 2021). Hjálmsdóttir and Bjarnadóttir (2021), using Icelandic data, also show stronger gender norms for women and increased stress as a result. The increase in the burden on mothers with young children has been confirmed (Farré et al., 2020; Hipp & Bünning, 2021; Sevilla & Smith, 2020). Although several studies have also revealed an increase in fathers' involvement in childcare activities (Alon et al., 2020; Craig, 2020), this has not significantly compensated for the increased responsibilities of mothers, given the low starting point (Andrew et al., 2022; Fodor et al., 2021).

In addition to increasing gender inequalities in unpaid work (Biroli et al., 2021; Del Boca et al., 2020), the pandemic has resulted in many other difficulties in parents' daily lives. During the lockdown period in Germany from April to May 2020, the majority of parents with a child under the age of 18 felt restricted in everyday life (72%), in pursuing hobbies (72%), in maintaining social and friendly relationships (92%), in contact with family (86%), in voluntary or political work (52%), and in their professional activities (47%) (Jellen & Ohlbrecht, 2020). In a qualitative study of mainly Bulgarian mothers of young children (Paunova-Markova, 2020), mothers reported a wide range of perceived threats and difficulties in March 2020. As for the perceived difficulties, the five most frequently mentioned were that the child does not go outside (65%), lack of social contacts (29.5%), the mother herself does not go outside (26%), boredom (12.5%), and getting the child to understand the restrictions (8%).

As previously suggested (Brooks et al., 2020; Ornell et al., 2020), the pandemic and the related restrictions appear to have had a negative impact on

people's mental health and led to higher levels of distress in general (Burkova et al., 2021; Mazza et al., 2020). Its impact, however, was not uniform. In the study by Gloster et al. (2020), conducted between April and June 2020 in 78 countries including Hungary, 10% of the respondents were especially suffering, 50% had moderate well-being, while 40% were flourishing. In addition, those who left their homes more than three times per week had higher levels of positive affect than those who did not, indicating the negative effect of isolation.

Regarding other predictors of distress during the pandemic, being a woman and young (Kowal et al., 2020; Qiu et al., 2020; Szabo et al., 2020), having stopped working (Zhang et al., 2020), having a lower level of education, being single, living with several children, living in a country or area where COVID-19 was more severe (Kowal et al., 2020), and perceiving one's health to be average or below average (Szabo et al., 2020) were identified as risk factors.

The negative impact of the pandemic on psychological well-being has also been observed specifically among parents and mothers (Cameron et al., 2020; Di Giorgio et al., 2021; Jellen & Ohlbrecht, 2020; Ohlbrecht & Jellen 2021). According to the findings of Jellen and Ohlbrecht (2020), stress and exhaustion decreased during the crisis overall, but increased among parents, especially mothers. A number of studies found that among mothers with young children, the risk of mental health problems was higher for those who were not working. Cameron et al. (2020) found that depression was associated with job loss and/or financial strain among mothers of children aged 0–1.5 and 1.5–4 years. Guo et al. (2022) compared three countries in their analysis and found that in the Netherlands maternal unemployment was associated with mental health symptoms, whereas in Italy and China other factors such as poor physical health and higher maternal education were more important in identifying mothers at risk. An analysis based on the UK Longitudinal Household Study (Pierce et al., 2020) showed that mental health generally deteriorated compared to the pre-COVID-19 period, and the decrease was most pronounced among mothers with young children and those who were employed before the pandemic. In a study of Jordanian mothers (Malkawi et al., 2021), non-employed participants reported having more depression, anxiety, and stress symptoms. In a study by Crescentini et al. (2020), being a woman and having a high level of fear of coronavirus infection positively predicted parents' internalizing symptoms, whereas continuing to work and exercise during the health emergency protected them. Being a woman and a young parent (Chartier et al., 2021), fear of losing one's job among working mothers (Benassi et al., 2020), having lower income, being unemployed, living in a city other than the

capital, devoting more time to childcare and education as a mother (Malkawi et al., 2021), and finding it difficult to cope with the stress of quarantine as a parent (Spinelli et al., 2020) were all associated with higher levels of internalizing symptoms. Working from home could also lead to psychological distress for mothers during the pandemic (Zamarro & Prados, 2021). In addition, prior psychopathology was a significant risk factor for both depression and anxiety in mothers of children aged 1.5–4 years in April 2020 (Cameron et al., 2020).

## RESEARCH QUESTIONS

Evidence shows that the first wave of the pandemic – which had a low number of cases but strict regulations in Hungary – burdened mothers in many countries. This study aims to identify these burdens among Hungarian mothers of two-year-old children for descriptive purposes. As a second aim of the investigation, we examine the impact of employment on mothers' adaptive behavior during the pandemic, focusing on its potential role in reducing the difficulties experienced.

## DATA AND METHODS

### STUDY DESIGN AND PARTICIPANTS

Participants in this study were drawn from a cohort of women enrolled during pregnancy in the Cohort '18 Growing Up in Hungary study (Szabó et al., 2021; Veroszta, 2018; Veroszta et al., 2020), henceforth referred to as Cohort '18. Cohort '18 is a large-scale, longitudinal, nationwide, and multidisciplinary survey, initiated by the Hungarian Demographic Research Institute (HDRI). Observations began among 8,287 pregnant women with an expected due date between 1 April 2018 and 30 April 2019.

Participation in Cohort '18 was voluntary, and written informed consent was obtained from all participants. The research methodology conformed to the Declaration of Helsinki and was approved by an Ethics Committee (reference number 2022/1), set up for Cohort '18, which included experts from outside the study group. Detailed descriptions of the sampling procedure and the study design, including the characteristics of the sample, have been published in two research reports (Szabó et al., 2021; Veroszta, 2018).

This study is based on data from the first, second and fourth waves of Cohort '18. Recruitment and data collection in the first two waves were carried

out by local health visitors trained by HDRI. Data collection took place in the family's home or in the health visitor's office during the third trimester of pregnancy (wave 1) and when the child was approximately 6 months old (wave 2), using either computer- or paper-assisted personal interviewing (CAPI/PAPI) and a self-administered paper-and-pencil questionnaire. Data collection in the fourth wave was carried out by professional interviewers via computer-assisted telephone interviewing (CATI), when the children were aged between 26 and 33 months. The questionnaire was previously designed as an employment-focused survey, but in light of the COVID-19 outbreak, it was extended to include a COVID-19 research module to retrospectively record events during the three months of the spring lockdown. Thus this analysis uses pandemic-related data collected between October 2020 and May 2021 and covers experiences during the state of emergency in spring 2020, during the first wave of the coronavirus pandemic. Data collection of wave 4 continued until September 2021 with a change in focus, but this later data are not analyzed in this study.

A total of 4,408 women who participated in the data collection of the fourth wave until May 2021 were included in this study. Missing data were not imputed. The database was weighted to be representative of the population of women who gave birth in Hungary in 2018 in terms of education, parity, official marital status, age, and a development indicator of the place of residence. The children of mothers participating in Cohort '18 were aged between 25 and 33 months at the time of the telephone survey ( $M = 28.45$ ,  $SD = 1.02$ ), which means that they were aged between 16 and 27 months at the end of spring 2020 ( $M = 20.79$ ,  $SD = 2.74$ ). By that time, 5.8% of the mothers had also had a younger child, born after the cohort child.

## MEASURES

As for the difficulties experienced by mothers, 11 items examined whether certain challenges had caused difficulties for the mothers or their families during the first wave of the pandemic. Response categories included 'Yes', 'To a small extent' and 'No'. For items where it was relevant, a 'Not applicable' response was also available.

In order to explain differences in the difficulties that mothers with young children faced during the pandemic, we prepared a set of predictor variables according to our research questions. As the database is part of a longitudinal



cohort study, we were able to work with data also from the pre-pandemic period. This allows for a dynamic interpretation of lockdown difficulties, embedded in the family life course. These predictor variables cover the employment situation of the mother and her partner during the lockdown, changes in the mother's daily life, her previous health and mental state, her level of education, her relationship status, her age, her parity, the family income, and the size of the settlement where the family lives.

As for the family circumstances during the lockdown, we relied entirely on the COVID-19 research module of Cohort '18 when designing the variables. The employment situation of the mother during the lockdown is represented by a nominal variable with three categories: inactive (mostly due to child-care leave), works from home (WFH), and works on site. The employment status of the partner was coded using a dummy variable, where 1 indicated 'yes, employed' and 0 indicated 'no, not employed/refused to answer/single mother'. The same logic was used to create additional dummy variables (but only if the refusal rate was very low). Based on this principle, we developed dummy variables for 'increased housework during lockdown' and 'external childcare assistance during lockdown' in the COVID-19 database.

Regarding the mother's previous mental and physical health, data from the second (6-month) wave of the Cohort '18 study were included in the analysis. Of these, the dummy variable 'fewer than three close friends' was generated according to the above principle. Depressive symptoms were measured using the eight-item version (CES-D-8; Bracke et al., 2008) of the self-administered Center for Epidemiologic Studies Depression Scale (Radloff, 1977), based on its Hungarian translation (Szeifert, 2010). Respondents indicated the perceived frequency of certain feelings or behaviors over the previous week on a four-point Likert scale (0 = None or almost none of the time (less than 1 day), 3 = All or almost all of the time (5–7 days)). A higher total score indicates a higher frequency of depressive experiences (Cronbach's  $\alpha = 0.770$ ). Anxiety symptoms were measured using the Hungarian translation (downloadable from <https://www.phqscreeners.com/>) of the self-administered, two-item Generalized Anxiety Disorder-2 (GAD-2) scale (Kroenke et al., 2007). Respondents indicated the perceived frequency of anxiety and uncontrollable concern on a four-point Likert scale (0 = Not at all, 3 = Nearly every day). A higher total score implies a higher prevalence of anxiety and concern (Cronbach's  $\alpha = 0.591$ ). Both mental health variables were dichotomized for further analysis. In the absence of validated Hungarian cut-points, the top 20th percentiles were applied, i.e. a cut-point of 6 for the CES-D-8 and 2 for

the GAD-2. Non-respondents were assigned to the asymptomatic groups in order to reduce the proportion of missing cases in the multivariate analysis. Perceived health status was surveyed by asking respondents how they perceived their health in general, using one of the following answer categories: very good, good, fair, poor, or very poor. The five categories were dichotomized into a negative (poor/very poor) and a positive (fair/good/very good) category. The variable refers to health in general, rather than present (perhaps temporary) health status, and includes physical, social and emotional functioning, as well as biomedical signs and symptoms.

The explanatory models were adjusted for several variables describing the socio-demographic characteristics of the family and the mother, and for the timing of data collection.

## DATA ANALYSES

All analyses were performed using SPSS 22 software. The characteristics of the mothers and their difficulties during the first wave of COVID-19 were analyzed by descriptive statistics. Correlations between the pandemic-related difficulties were analyzed by Spearman's rank correlation. Then, K-means cluster analysis was performed on four clusters in order to identify non-overlapping subgroups along the difficulties experienced. The procedure was applied after a pre-selection of 7 difficulty types from a set of 11 variables that were applicable to all respondents. Two preliminary reductions were performed in preparation for the cluster analysis. Non-respondents ( $n = 134$ ) were assigned a missing value. In addition, four variables were not included in the set of clustering variables due to the high proportion of 'not applicable' answers: 'Altered working conditions', 'Caring for elderly family members', 'Altered learning conditions', and 'Dealing with health problems'. We interpreted the groups based on the final cluster centers. The distributions of these clusters along the examined predictor variables were analyzed using Pearson's chi-squared tests. Cramer's V-values were calculated as effect sizes. Finally, the effects of the predictor variables on cluster membership were analyzed using multinomial logistic regression. Predictor variables were previously tested for multicollinearity by analyzing their bivariate associations. Two-sided statistical significance was evaluated at the 5% level.

## RESULTS

### CHARACTERISTICS OF PARTICIPANTS AND THEIR EXPERIENCES

#### Daily life before and during the pandemic

*Table 1* summarizes the characteristics of the sample. The use of child-care benefits was still common among mothers raising two-year-old children during the first wave of the pandemic in Hungary. Overall, only 11.3% of the participating mothers worked actively throughout the pandemic in spring 2020, when their children were aged between 16 and 27 months, and 3.2% worked from home. 82.9% of partners were employed. Although the children of 20.4% of the respondents had turned two years old by late spring 2020, the mothers were still able to benefit from GYED thanks to the extended deadline. As a result, they did not have to face the challenges of participating in the labor market, which the pandemic had made enormously difficult.

The lockdown had a significant impact on daily life. Families raising children were particularly affected by the closure of day-care centers and educational institutions. Regular assistance with childcare was in short supply, with 25.3% of mothers using childcare assistance during lockdown. In addition to the burden of childcare responsibilities, 39.2% of the mothers reported that their domestic workload had increased.

*Table 1: Descriptive statistics of mothers in the analytical sample*

	n	%
Mothers' employment status during lockdown (wave 4)		
Employed, working from home (WFH)	140	3.2
Employed, on site	358	8.1
Inactive	3,757	85.2
No answer	153	3.5
Total	4,408	100.0
Partner's employment during lockdown (wave 4)		
Employed	3,652	82.9
Unemployed	531	12.1
No answer or not applicable (no partner)	225	5.0
Total	4,408	100.0
Changes in mothers' household work during lockdown (wave 4)		
More frequent	1,727	39.2
With the same frequency	2,635	59.8
Less frequent	43	1.0
No answer	3	0.0
Total	4,408	100.0

*Table 1: Descriptive statistics of mothers in the analytical sample (continued)*

	n	%
External childcare assistance during lockdown (wave 4)		
Yes	1,114	25.3
No	3,290	74.7
No answer	3	0.1
Total	4,408	100.0
Previous anxiety symptoms (wave 2)		
Yes	981	22.2
No	2,818	63.9
No answer	609	13.8
Total	4,408	100.0
Previous depressive symptoms (wave 2)		
Yes	956	21.7
No	2,996	68.0
No answer	455	10.3
Total	4,408	100.0
Number of close friends (wave 2)		
0	206	4.7
1	376	8.5
2	911	20.7
3	885	20.1
4	526	11.9
5+	1,277	29.0
No answer	228	5.2
Total	4,408	100.0
Perceived health status (wave 2)		
Very good	1,340	30.4
Good	2,432	55.2
Satisfactory	474	10.8
Bad	44	1.0
Very bad	4	0.1
No answer	114	2.6
Total	4,408	100.0

*Notes:* The survey waves used as sources of variables are indicated in the table. Time of data collection: wave 2 – 6 months after birth, wave 4 – on average 28.5 months after birth.

*Source:* Cohort '18 Hungarian Birth Cohort Study, waves 2 and 4, authors' calculations.

## Difficulties experienced

As regards the specific difficulties faced by mothers during the emergency period, psychological problems were the most common, followed by life-management difficulties, such as doing the necessary shopping and performing the usual tasks. As shown in *Table 2*, 59% of mothers felt that loneliness had been somewhat difficult for them or their family, while 53.7% reported the same about feelings of confinement and anxiety, and 46.4% about the lack of a useful pastime. The least commonly reported difficulty was caring for elderly

family members: 90.1% said they either did not find it difficult or it did not apply to them.

*Table 2: Prevalence of certain difficulties that mothers of young children faced in the spring of 2020*

	No difficulty	Small difficulty	Difficulty	Not applicable	Don't know or no answer	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Altered working conditions	2,444 (55.5)	638 (14.5)	468 (10.6)	852 (19.2)	6 (0.2)	4,408 (100.0)
Reduced household income	3,321 (75.3)	461 (10.5)	498 (11.3)	-	128 (2.9)	4,408 (100.0)
Dealing with health problems	2,828 (64.2)	366 (8.3)	578 (13.1)	629 (14.3)	6 (0.1)	4,408 (100.0)
Childcare	3,486 (79.1)	538 (12.2)	378 (8.6)	-	6 (0.1)	4,408 (100.0)
Caring for elderly family members	2,395 (54.3)	201 (4.6)	225 (5.1)	1,579 (35.8)	8 (0.1)	4,408 (100.0)
Altered learning conditions	1,512 (34.3)	231 (5.2)	563 (12.8)	2,095 (47.5)	7 (0.2)	4,408 (100.0)
Doing the necessary shopping	2,679 (60.8)	916 (20.8)	807 (18.3)	-	5 (0.1)	4,408 (100.0)
Performing the usual tasks	3,153 (71.5)	702 (15.9)	548 (12.4)	-	5 (0.1)	4,408 (100.0)
Loneliness, lack of social connections	1,727 (39.2)	1,149 (26.1)	1,452 (32.9)	75 (1.7)	5 (0.1)	4,408 (100.0)
Feeling of confinement and anxiety	2,037 (46.2)	1,221 (27.7)	1,145 (26.0)	-	5 (0.1)	4,408 (100.0)
Lack of a useful pastime	2,359 (53.5)	985 (22.4)	1,057 (24.0)	-	6 (0.2)	4,408 (100.0)

Source: Cohort '18 Hungarian Birth Cohort Study, wave 4, authors' calculations.

An examination of the associations between these variables shows the following significant and meaningful ( $\rho > 0.2$ ) correlations. Difficulties related to altered working conditions were positively correlated with those related to reduced household income ( $\rho = 0.350$ ). Problems with altered learning conditions were associated with childcare difficulties ( $\rho = 0.247$ ). Doing the necessary shopping was more difficult for those who found it hard to perform the usual tasks ( $\rho = 0.627$ ). Finally, the psychological difficulties were intercorrelated: the difficulties of loneliness were positively correlated with the more disturbing feelings of confinement and anxiety ( $\rho = 0.563$ ) and with the burden

of not having a useful pastime ( $\rho = 0.434$ ); the latter two were also intercorrelated ( $\rho = 0.479$ ).

Based on the prevalence of the difficulties experienced, mothers were grouped into four non-overlapping subgroups by applying the K-means algorithm to 7 clustering variables from the variable set presented above (*Table 2*).

Based on the responses to the remaining seven items, the centers of the four clusters formed after the series of iterations are shown in *Table 3*. Higher values represent a higher frequency of each difficulty in a given group. By interpreting the clusters as 'mental distress and life-management difficulties' (cluster 1), 'mental distress' (cluster 2), 'life-management difficulties' (cluster 3) and 'seamless adaptation' (cluster 4), subgroups were prepared for further analysis.

*Table 3: Final cluster centers based on difficulties experienced*

	Cluster 1 n = 719 (16.8%)	Cluster 2 n = 1,441 (33.7%)	Cluster 3 n = 674 (15.8%)	Cluster 4 n = 1,442 (33.7%)
Reduced household income	1.56	1.31	1.36	1.25
Childcare	1.60	1.32	1.20	1.17
Doing the necessary shopping	2.51	1.12	2.56	1.11
Performing the usual tasks	2.14	1.04	2.20	1.04
Loneliness, lack of social connections	2.76	2.48	1.57	1.15
Feeling of confinement and anxiety	2.58	2.27	1.40	1.14
Lack of a useful pastime	2.41	2.01	1.33	1.23

Source: Cohort '18 Hungarian Birth Cohort Study, wave 4 (n=4,276), authors' calculations.

## CLUSTER DISTRIBUTIONS IN THE SAMPLE OF MOTHERS

The distribution of the clusters within the sample shows that, overall, 33.7% of the mothers were assigned to the 'seamless adaptation' cluster during the first wave of COVID-19, 16.8% belonged to the 'mental distress and life-management difficulties' cluster, 33.7% to the 'mental distress' cluster, and 15.8% to the 'life-management difficulties' cluster. The distributions of the predictor variables by cluster show a significant relationship for most of the variables, as verified by the Pearson chi-squared test and Cramer's V values (*Table 4*). Significant differences at the cellular level (based on the value of the adjusted standardized residuals) are indicated in italics in *Table 4*.

Table 4: Distributions by difficulty-based cluster

Characteristics of mothers	Difficulty clusters				Significance test results	
	Mental distress and life-management difficulties	Mental distress	Life-management difficulties	Seamless adaptation	Pearson chi-square	Cramer's V
	n (row %)	n (row %)	n (row %)	n (row %)		
Mothers' employment status during lockdown (n = 4,128)						
Employed, WFH	32 (23.2)	47 (34.1)	18 (13.0)	41 (29.7)	43.274***	0.072***
Employed, on site	40 (11.4)	95 (27.1)	47 (13.4)	168 (48.0)		
Inactive	632 (17.4)	1,277 (35.1)	575 (15.8)	1,156 (31.8)		
Total	704 (17.0)	1,419 (34.4)	640 (15.5)	1,365 (33.1)		
Partner was employed during lockdown (n = 4,278)						
Yes	589 (16.7)	1,226 (34.7)	531 (15.0)	1,188 (33.6)	13.429**	0.056**
No	130 (17.5)	216 (29.0)	144 (19.4)	254 (34.1)		
Total	719 (16.8)	1,442 (33.7)	675 (15.8)	1,442 (33.7)		
Increased household work during lockdown (n = 4,277)						
Yes	345 (20.3)	624 (36.6)	268 (15.7)	466 (27.4)	61.401***	0.120***
No	374 (14.5)	817 (31.7)	406 (15.8)	977 (38.0)		
Total	719 (16.8)	1,441 (33.7)	674 (15.8)	1,443 (33.7)		
External childcare assistance during lockdown (n = 4,277)						
Yes	182 (16.8)	325 (30.0)	154 (14.2)	424 (39.1)	20.576***	0.069***
No	537 (16.8)	1,116 (35.0)	520 (16.3)	1,019 (31.9)		
Total	719 (16.8)	1,441 (33.7)	674 (15.8)	1,443 (33.7)		
Previous anxiety symptoms (n = 4,278)						
Yes	201 (21.0)	313 (32.7)	162 (16.9)	281 (29.4)	21.218***	0.070***
No	518 (15.6)	1129 (34.0)	513 (15.4)	1,161 (35.0)		
Total	719 (16.8)	1,442 (33.7)	675 (15.8)	1,442 (33.7)		
Previous depressive symptoms (n = 4,277)						
Yes	203 (21.8)	338 (36.2)	115 (12.3)	277 (29.7)	34.266***	0.090***
No	516 (15.4)	1,104 (33.0)	559 (16.7)	1,165 (34.8)		
Total	719 (16.8)	1,442 (33.7)	674 (15.8)	1,442 (33.7)		
Fewer than 3 close friends (n = 4,277)						
Yes	214 (14.8)	455 (31.6)	250 (17.3)	523 (36.3)	15.687**	0.061**
No	505 (17.8)	987 (34.8)	424 (15.0)	919 (32.4)		
Total	719 (16.8)	1,442 (33.7)	674 (15.8)	1,442 (33.7)		
Perceived health status poor/very poor (n = 4,277)						
Yes	99 (19.7)	158 (31.4)	91 (18.1)	155 (30.8)	7.087	0.041
No	620 (16.4)	1,283 (34.0)	583 (15.4)	1,288 (34.1)		
Total	719 (16.8)	1,441 (33.7)	674 (15.8)	1,443 (33.7)		

Notes: Values in italics indicate significant associations at the cell level. \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

Source: Cohort '18 Hungarian Birth Cohort Study, waves 2 and 4, authors' calculations.

Among these results, we highlight the fact that the employment situation of mothers was significantly associated with perceived difficulties. Seamless adaptation was more frequent among mothers employed on site and less frequent among inactive ones (mostly receiving childcare benefit). WFH was not significantly associated with difficulties. Inactive employment status also significantly correlates with psychological difficulties. The association of partners' activity with psychological burdens is positive but negative with life-management problems. The positive correlation of increased housework during lockdown with both overall problematic adaptation and psychological burdens is significant. The mother's previous anxiety and depressive symptoms both show a positive association with her problematic adaptation to pandemic conditions.

## EXPLANATORY MODEL OF MATERNAL DIFFICULTIES DURING LOCKDOWN

To explain the difficulties encountered, a multinomial logistic regression model was built, in which the base category was the group of mothers who reported seamless adaptation to conditions of lockdown (cluster 4). In total, the model contains data from 3,839 respondents. The full model predicts the dependent variable better than the intercept-only model alone ( $p < 0.001$ ; see *Table 5* for results). Based on the value of the Nagelkerke (pseudo)  $R^2$ , the model explains 13% of the variance. Among the predictor variables, the overall effect of maternal employment situation ( $p < 0.001$ ), employment of the partner ( $p = 0.030$ ), increased housework ( $p < 0.001$ ), external childcare assistance ( $p = 0.030$ ), previous anxiety symptoms ( $p = 0.002$ ), and previous depressive symptoms ( $p < 0.001$ ) were found to be significant in predicting which cluster a mother belonged to.



Table 5: Multinomial logistic regression model for clusters of maternal difficulties during lockdown

	Mental distress and life-management difficulties (cluster 1)		Mental distress (cluster 2)		Life-management difficulties (cluster 3)	
	Exp(B)	95% CI	Exp(B)	95% CI	Exp(B)	95% CI
Mother's employment status during lockdown (ref.: inactive)						
Employed, WFH	0.816	[0.486, 1.372]	0.776	[0.489, 1.230]	0.723	[0.393, 1.332]
Employed, on site	0.422***	[0.286, 0.621]	0.543***	[0.404, 0.729]	0.566**	[0.391, 0.820]
Partner was employed during lockdown	0.712*	[0.529, 0.957]	1.044	[0.806, 1.352]	0.780	[0.578, 1.052]
Increased housework during lockdown	2.035***	[1.662, 2.492]	1.724***	[1.457, 2.039]	1.388**	[1.127, 1.710]
External childcare assistance during lockdown	1.006	[0.800, 1.265]	0.779*	[0.643, 0.943]	0.824	[0.650, 1.046]
Previous anxiety symptoms	1.491**	[1.162, 1.913]	1.135	[0.917, 1.405]	1.479**	[1.143, 1.914]
Previous depressive symptoms	1.680***	[1.303, 2.167]	1.464**	[1.179, 1.818]	0.707*	[0.530, 0.943]
Fewer than 3 close friends	0.814	[0.656, 1.010]	0.888	[0.747, 1.056]	1.067	[0.863, 1.318]
Perceived health status poor/very poor	1.260	[0.932, 1.704]	1.092	[0.844, 1.413]	1.398*	[1.036, 1.888]
Constant		-0.233		0.030		-0.254

Notes: Adjusted for educational attainment, monthly net household income quintile, residential population, relationship status, age, parity, and the timing of data collection. The reference category is 'seamless adaptation' (cluster 4). CI = confidence interval, \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

Model statistics: pseudo R<sup>2</sup> (Nagelkerke) = 0.130; df = 102; likelihood ratio  $\chi^2$  = 495.8\*\*\*; -2 log likelihood = 9,487.7.

Source: Cohort '18 Hungarian Birth Cohort Study, waves 2 and 4 (N = 3,838), authors' calculations.

## DISCUSSION

This study aimed to investigate the psychological and practical difficulties experienced by mothers raising young children during the first wave of COVID-19 in Hungary, taking into account their paid and unpaid work, socioeconomic, demographic, physical or mental health characteristics. In doing so, we hypothesized that not all mothers experienced the same burdens; some were able to adapt better, while others found it more difficult; and we clustered mothers based on whether their difficulties were more psychological or practical.

During the first wave of the pandemic, most mothers in the Cohort '18 study were claiming GYED and were thus inactive in the labor market; only a relatively small proportion (11.3%) worked actively during the first wave of COVID-

19. Among the actively working mothers, 28.1% worked entirely from home during the spring of 2020.

Although the existing literature is mixed on the effect of the increased time spent at home on the division of housework and childcare tasks, it shows that the housework of mothers may have increased during the lockdown (Farré et al., 2020; Hipp & Bünning, 2021; Sevilla & Smith, 2020). The same is true for the respondents of Cohort '18: according to our results, 39.2% of mothers reported that their domestic workload had intensified.

As emphasized by numerous studies (Brooks et al., 2020; Burkova et al., 2021; Di Giorgio et al., 2021; Jellen & Ohlbrecht; Mazza et al., 2020; Ornell et al., 2020), the pandemic and its related restrictions could have a negative impact on people's mental health, especially among mothers; and indeed, mental distress were the most common difficulty experienced in our study during the first wave of the pandemic. According to our results, 59% of mothers were faced with a sense of loneliness, which they described as difficult for them or their families. Furthermore, 53.7% had similar feelings of confinement or anxiety, and 46.4% of the lack of a useful pastime. Moreover, these difficulties were interrelated.

As hypothesized based on Gloster et al. (2020), not all mothers experienced the same burdens. Four subgroups of mothers were identified: those who adapted to the pandemic without major difficulties; those who experienced mainly psychological problems (mental distress); those for whom life-management difficulties were the most burdensome; and those who experienced both mental distress and life-management difficulties.

As for maternal employment, mothers who worked on site were less likely to experience any kind of difficulty compared to inactive mothers, based on both bi- and multivariate analysis. These results confirm the protective effect of work (Crescentini et al., 2020; Malkawi et al., 2021; Zhang et al., 2020) and may be related to the positive impact of leaving the house and social interaction with co-workers (Gloster et al., 2020). Contrary to our expectations based on Zamarro and Prados (2021), WFH as a mother was not significantly associated with difficulty clusters. Although the association of partners' activity was positive with mental burdens and negative with life-management difficulties in the bivariate analysis, the partner's employment may also serve as a protective factor against overall difficulties, based on the results of the multivariate analysis.

The correlation of increased household work during the lockdown with both overall difficulties and mental distress was significant in bivariate analysis,

and experiencing an increased burden of housework was also clearly related to mothers' mode of adaptation in multivariate analysis. Given that the division of housework is already unequal in Hungary (Makay & Spéder, 2019), it is perfectly understandable that a further increase in an already heavy burden should have contributed to the difficulties. The positive impact of external childcare assistance on psychological adaptation, which could have eased the burden on mothers during this isolated period, was confirmed by both bi- and multivariate analysis.

Previous mental health problems may also affect the ability to cope with the COVID-19 situation (Cameron et al., 2020). Previous anxiety and depressive symptoms both showed a positive association with problematic adaptation in bivariate analysis, which was confirmed in multivariate analysis. In addition, previous depressive symptoms led to higher chances of mental burden and a lower likelihood of life-management difficulties in multivariate analysis, while previous anxiety was related to a higher risk of life-management problems. Hence it seems that previous depressive and anxious symptoms, in addition to hindering overall adaptation, may contribute to somewhat different difficulties for mothers with young children during a lockdown period. Poor general health was only significantly associated with life-management difficulties in the multivariate model, showing that despite the previously identified association with distress (Szabo et al., 2020), poor health was more of an obstacle to carrying out everyday tasks for mothers with young children in the present study. Having fewer than three close friends seemed to be correlated with less overall difficulties in the bivariate analysis, but this relationship was no longer significant in the multivariate analysis, so it is likely that it was explained by other sociodemographic variables (e.g., small settlement, low education).

Overall, our study provides much-needed empirical evidence on the circumstances of families with young children during the first lockdown in Hungary among in the spring of 2020. According to our findings, although the majority of families were affected, inactive mothers on maternity leave faced more severe difficulties, as did those mothers who experienced an increase in their domestic workload and who faced the pandemic with poorer mental and physical health. Research findings suggest a psychological protective effect of active employment during the pandemic among women raising young children.

## **STRENGTHS AND LIMITATIONS**

Our study had a number of notable strengths. First, we could describe the difficulties experienced by mothers with young children during the lockdown on a representative sample, as part of a nationwide longitudinal study, which also made it possible to compare results before and during the pandemic. We were also able to examine the relationship between work characteristics and potential difficulties.

However, the methodological choices of the study necessarily imposed certain limitations. While the use of telephone interviews allowed us to gain an in-depth insight into the specific life situation of mothers with young children during COVID-19 without violating the rules of lockdown with face-to-face interviews, this method necessarily resulted in a selective sample, as we reached only those who could be contacted by phone. Also, given that our focus was on mothers with children aged 16–27 months, our sample was not necessarily representative of all mothers with children. Another potential limitation is that we collected data on the lockdown experience retrospectively, which could influence data validity (due to recall bias). Furthermore, because the time of data collection was determined by the actual age of the children (who were born within a one-year period), the first wave of the pandemic became increasingly distant in time for mothers who were interviewed later. This could have biased the retrospective recall in unpredictable ways. However, interview timing was included as a control in the multivariate model.

## **CONCLUSIONS, IMPLICATIONS, AND FUTURE DIRECTIONS**

For millions of people, the pandemic disrupted their daily lives and presented them with challenges they had never faced before. By examining the experiences of Hungarian mothers with young children during the COVID-19 pandemic, this study sheds light on the multiple challenges this group faced. Our findings demonstrate that mothers were particularly affected by the pandemic and the lockdown. The COVID-19-related measures had a marked impact on their daily lives. Only one-third of the study participants were identified as adapting particularly well, while the others experienced significant life-management difficulties, mental distress, or both. We identified several correlates of maternal difficulties during lockdown. Of these, focusing on maternal em-

ployment, results suggest that on-site work during the pandemic period reduced both mental distress and life organization difficulties for women with young children. No such adaptive association was found for WFH.

The results of our research have contributed to the knowledge of the subject and also provided a Hungarian reference point for future studies. The findings of the study can inform the development of policies aimed at supporting mothers and families during future public health crises or emergency situations.

Possible future studies might explore the mechanism by which on-site employment could promote the well-being of mothers raising young children during the pandemic; strategies to promote a more equitable division of household tasks and care responsibilities between parents; or how cultural norms, societal expectations, and institutional structures influence parents' experiences.

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