Between Two Worlds: Fertility Dynamics of a Transitional Cohort of Women Born in Hungary between 1960 and 1969: a Decompositional Analysis

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1. Introduction

Several studies have analysed the relationship between education and cohort fertility in Central and Eastern Europe (CEE). Most of these studies focused on the socialist period and demonstrated that changes in education significantly impacted fertility (Zeman, 2018; Brzozowska, 2014, 2015; Wood, Neels & Kil, 2014). Our analysis aims to contribute to existing studies in CEE by examining the relationship between education and fertility in Hungary. Taking advantage of the time that has elapsed since the political regime change, as well as the Hungarian population census of 2022, we extend the time period to the 2000s and compare the effect of education on changes in fertility before and after the 1989 transition. Using a cohort approach, we study the quantum of fertility of women born between 1920 and 1982, examining full population census data at the individual level from 1970, 1980, 1991, 2001, 2011, and 2022. We categorise women into birth cohorts according to when they were in their main childbearing years, distinguishing between the periods before the 1989 regime change, the transition years, and the post-transition period to a market economy.

2. Contextual background

The Second Demographic Transition (Lesthaeghe 2010) in Hungary was characterised by rising divorce rates and cohabitation. While early marriage and childbearing were common during the period of state socialism, the postponement of childbirth became evident following the change in political regime, driven mainly by rising levels of education (Spéder, 2019). Higher levels of education were also found to correlate with lower fertility rates, as partnerships became more fragile (Spéder and Kamarás, 2008). Furthermore, a clear differentiation in fertility behaviour based on educational attainment emerged (Spéder et al., 2002, Spéder 2019). The transition from a socialist to a market economy exacerbated the conflict between work and family life, thereby influencing fertility decisions. Employment rates dropped markedly due to job losses and increased opportunity costs, particularly for higher-educated women. Education became more important, providing some protection against unemployment (Frey, 1997, 2011; Szántó & Tóka, 1990, Spéder et al. 2002). All of these factors may have contributed to women becoming less attached to the labour market, resulting in decreased labour market participation among mothers in the years following childbirth. This mainly affected women with low and medium levels of education (Makay, 2018), while childlessness became more prevalent among higher-educated women (Szabó, 2020).

3. Changes in education

After the 1950s, Hungary achieved significant educational expansion, including a common eight-year school for all children, more pre-school training, and full-time secondary education for 45% of pupils. Higher education also expanded rapidly (Richmond 1966). The proportion of pupils continuing in secondary school after the eight-year primary level rose from 80% in 1970 to 93.4% in 1990, while the proportion of those engaging in higher education increased

from 4.1% to 10.4% during the same period (KSH 1991). Following the political regime change in 1989, this expansion continued, especially in higher education, with half of 20-year-olds being full-time students (KSH 1991). The composition of women by educational attainment has therefore changed drastically across different birth cohorts (Table 1).

Table 1: The distribution of women aged 40–70 born in 1920–1982 by their highest educational attainment, %

Birth cohort	Total, N	Primary	Vocational	Secondary	Tertiary
1920–34	773 409	88.5		8.5	3.1
1935–59	1 108 950	47.4	10.2	29.3	13.0
1960–69	526 904	19.8	23.7	34.3	22.2
1970–82	669 823	13.3	21.3	34.3	31.1

Source: Population census 1970, 1980, 1990, 2001, 2011, 2022, Hungary.

4. Research objective

Our research aims to identify the influence of changes in educational composition (structural component) and education-specific fertility (direct component) on the overall change in CFR among women born between 1920 and 1982. The analysis compares birth cohorts of women whose main childbearing years occurred either before or after the political regime change in 1989. It specifically examines whether there is a clear difference in the impact of the direct and structural components on the change in CFR across these groups. Furthermore, the study aims to determine whether a 'transitional' cohort can be identified, demonstrating a shift in the impact of these components.

5. Source of data

Our analysis is based on data from the last six complete individual-level censuses: 1970, 1980, 1990, 2001, 2011 and 2022. We selected five variables for each census year: sex, year of birth, age, educational attainment, and number of live-born biological children. We will analyse female birth cohorts aged between 40 and 70 in a given year, born between 1920 and 1982. We used data from the Human Fertility Database to determine the women's main childbearing years, as our analysis focuses on women's childbearing patterns across three critical periods in Hungarian history: state socialism, the transition years, and the transition to a market economy and democracy.

6. Data and methods

We explored the birth patterns for each cohort by recording the number of children born at each maternal age. We then calculated the cumulative distribution of births and identified the key percentiles (25th, 50th and 75th) to determine the period during which the majority of births occurred for each cohort. By focusing on the second and third quartiles of the birth distribution, we established a proxy for the core childbearing years within each cohort. The results show that for almost every cohort 50% of childbirths fall within a seven-year period, primarily between the ages of 21 and 28. We defined women as having had their children before the transition if the calendar year corresponding to the 75th percentile of the births was before 1987. (Scholars often date the beginning of Hungary's transition to an earlier point than the formal regime change in 1989 as several of the political forces that would later become dominant parliamentary parties had already been founded by 1987, see Ripp, 2006). This category includes cohorts born in 1935–1959. Two-thirds of the births in the period under discussion took place between 1981 and 1996. These were classified as experiencing the transition period, a time when Hungary was nearing the completion of its market transition (Buss 2000). This includes women born in 1960–1969. Finally, women born in 1970–1979 had their children primarily after the transition period.

Table 2: The period and maternal age at which women had 50% of their children in each cohort.

	1. Pre-transition cohort	2. Transitional cohort	3. Post-transition cohort
Birth cohorts	1935–1959	1960–1969	1970–1979
Main childbearing age of women between Q25-Q75	21–27y	21–27y	22–31y
Period of main childbearing years	1956–1986	1981–1996	1992–2010

Source: Human Fertility Database. Data downloaded on 04.06.2025.

The variables used in decomposition analysis were the number of live-born children collected from all women aged 40–70 in all censuses (Eijkemans et al., 2014; Leridon, 2008), as well as the highest educational attainment of women aged 40–70 in all censuses. There were no missing data. To decompose the change in CFR, we calculated the mean number of children and women by aggregating individual-level data by birth cohort, educational level, and parity from the pulled database of six censuses. For this step, we employed the four groups of birth cohorts (1920–1934, 1935–1959, 1960–1969, 1970–1982), a four-category version of educational attainment (primary, vocational, secondary and tertiary) and a four-category version of parity (childless, parity 1, parity 2 and parity 3+).

7. Statistical analysis

The change in women's completed fertility can be decomposed into structural and direct components. We decompose the change in the overall CFR based on the variation in the educational composition of cohorts, and the education-specific CFR. The direct component can be further decomposed into the effects of childlessness and of different parities. We used the symmetrical Kitagawa decomposition method, which involves equally dividing the interaction term between the direct and structural components (Kitagawa, 1955).

8. Results

The decline in the childlessness rate was most evident among pre-war cohorts, with notable disparities emerging according to educational attainment. Childlessness was approximately twice as prevalent among women with secondary or tertiary education as among those with primary education (Table 3). The CFR decreased from 2.02 for the oldest cohorts (born in 1920–1934) to 1.66 for the youngest (born in 1970–1982). The highest CFR is among women with primary education, the average among those with vocational education, and the lowest among those with tertiary education, across all birth cohorts. While these trends converge among women born in 1920–1959, they diverge for those born after 1960, mainly due to the fertility increase among those with only primary education born in 1960–1969.

Table 3: The change in the share of childless women and education specific CFR for women aged 40–70 born in 1920–1982

Birth cohort	Share of childless women					Education specific CFR				
	Total	Primary	Vocational	Secondary	Tertiary	Total	Primary	Vocational	Secondary	Tertiary
1920–34	12.8	11.6		20.6	23.9	2.02	2.10		1.41	1.36
1935–59	8.4	6.8	5.2	9.7	13.6	1.89	2.10	1.92	1.67	1.61
1960–69	9.6	10.1	6.6	9.2	12.8	1.90	2.36	1.95	1.74	1.70
1970–82	16.9	14.6	12.5	16.9	20.7	1.66	2.29	1.74	1.52	1.50

Source: Population census 1970, 1980, 1990, 2001, 2011, 2022, Hungary

Our first calculations demonstrate that an increase in educational attainment has led to a decline in the overall CFR across all cohorts (Table 4/1). This effect is particularly pronounced among women born in 1920–1934. However, the change in education-specific fertility increased the overall CFR in the first two groups while decreased it in the youngest cohort born in 1970–1982. While the (absolute value of) structural effect is larger than the direct effect among women in the pre-transition cohort (-0.34 vs. 0.17), it is smaller among those in the post-transition group (-0.05 vs. -0.19); however, the two effects are almost equally low in the transitional group (-0.12 and 0.13, respectively).

Further calculations show that primary education has been the driving force behind the change in the overall CFR for almost all birth cohorts, particularly the older ones. It accounted for 54% of the change in the CFR in the 1935–1959 group, 49% in the 1960–1969 group and 39% in the 1970–1982 group (Table 4/2). All of these effects were negative. While vocational, secondary, and tertiary education have a positive effect on CFR change in both the pre-transitional and transitional cohort groups, thereby increasing the overall CFR, only the effect of tertiary education remained positive in the post-transitional cohort. In this latter birth cohort, all other educational groups have a negative effect on CFR change. Thus, the transitional groups differ from the post-transitional cohort in this respect, but not from the pre-transitional one (Table 4/2).

Table 4: Results of decomposition analysis

1. CFR and decomposition of its change into direct and indirect (structural) components, for women aged 40–70 born in 1920–1982

Birth cohort	Total effect	Changing educational attainment (indirect or structural effect)	Changes in fertility within the educational groups (direct effect)
1920–34	—	—	—
1935–59	-0.18	-0.34	0.17
1960–69	0.01	-0.12	0.13
1970–82	-0.24	-0.05	-0.19

2. The role of each educational group in the change of overall CFR for women aged 40–70 born in 1920–1982

Birth cohort	Total effect	Primary	Vocational	Secondary	Tertiary
1920–34	—	—	—	—	—
1935–59	-0.18	-0.86	0.20	0.37	0.17
1960–69	0.01	-0.53	0.26	0.11	0.17
1970–82	-0.24	-0.16	-0.09	-0.08	0.09

3 Decomposition of the direct effect by number of children for women aged 40–70 born in 1920–1982

Birth cohort	Total effect	Effect of change in childlessness	Effect of change in parity 1	Effect of change in parity 2	Effect of change in parity 3
1920–34	—	—	—	—	—
1935–59	-0.18	0.18	-0.05	0.22	-0.17
1960–69	0.01	-0.03	-0.02	-0.12	0.30
1970–82	-0.24	-0.14	0.07	-0.15	0.02

Source: Population census 1970, 1980, 1990, 2001, 2011, 2022, Hungary

The results of the decomposition analysis, broken down by educational attainment and parity, show that the change in childlessness had a positive impact on the overall change in CFR among women in the pre-transition group, while a negative effect among women in the post-transition group (Table 4/3). However, there is a negligible effect on the CFR change among women born in 1960–1969. The transitional cohort group is indeed behaving as a transition group with regard to the effect of childlessness on the overall change in CFR. The change in parity 1 only slightly affects the overall change in CFR. However, the effects of parity 2 and parity 3+ on the

overall CFR change are again completely different in the transition group compared to the pre-transition group, but not compared to the post-transition group.

9. Conclusion

Our analysis reveals a clear generational shift in the relationship between education and fertility in Hungary. This shift is driven by structural and behavioural dynamics that have unfolded across three historical periods: state socialism; the transition to a market economy; and the post-transition era. Women born in 1960–1969 differ from the group of women born in 1935–1959 due to opposite effects of childlessness, parity 2, and parity 3+ on the change in overall CFR. Therefore, we can identify this group as transitional based on its deviating fertility behaviour compared to previous birth cohorts. However, the difference between this group and the post-transition group is only in the effect of parity 1 on the CFR change. The effects of different parities on the overall CFR change are consistent across educational levels (results not presented). This study is limited by its reliance on census data, which restricts our ability to capture changes in values and aspirations, or the qualitative aspects of decisions about having children.

References

Brzozowska, Z. (2014). Fertility and education in Poland during state socialism. Demographic Research, 31, 319-336.

Brzozowska, Z. (2015). Female Education and Fertility under State Socialism in Central and Eastern Europe. Population, 70(4): 689–725.

Buss, T. F. (2000). Economic development in Hungary: The transition years--1989 to 1998. International Journal of Economic Development, 2(1), 12–35.

Eijkemans, M. J. C., van Poppel, F., Habbema, D. F., Smith, K. R., Leridon, H., and te Velde, E. R. (2014). Too old to have children? Lessons from natural fertility populations. Human Reproduction, 29(6): 1304–1312.

Frey, M. (1997). [Employed and unemployed persons in the labor market of the 1990s]. Vezetéstudomány, 28(10): 35–47.

Frey, M. (2011). [Women and men in the labor market, with particular regard to the effects of crisis management]. In: Nagy, I., Pongrácz T., Tóth, I. Gy. [ed.] Szerepváltozások. Jelentések a nők és a férfiak helyzetéről. Budapest: TÁRKI-Nemzeti Erőforrás Minisztérium, 17–48.

Human Fertility Database. Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at www.humanfertility.org (data downloaded on 04.06.2025).

Kitagawa, E. M. (1955). Components of a difference between two rates. Journal of the American statistical association, 50(272): 1168–1194.

KSH (1991). [Hungarian Statistical Yearbook], Hungarian Central Statistical Office, 1990. https://adt.arcanum.com/hu/view/MagyarStatisztikaiEvkonyv_1990/?pg=58&layout=s

Leridon, H. (2008). A new estimate of permanent sterility by age: Sterility defined as the inability to conceive. Population Studies, 62(1): 15–24.

Lesthaeghe, R. (2010). The Unfolding Story of the Second Demographic Transition. Population and Development Review, 36(2): 211–251.

Makay, Zs. (2018). The family support system and female employment. Demographic Portrait of Hungary, 85-105.

Richmond, W. K. (1966). Educational planning in Hungary. Comparative Education, 2(2), 93-105.

Ripp, Z. (2006). [System change in Hungary, 1987–1990]. Napvilág Kiadó, Budapest, 2006.

Spéder, Zs. (2019). [Domestic fertility behavior in international comparison. Doctoral thesis.]. Hungarian Academic of Sciences, Budapest, 2019.

Spéder, Zs. (2023). A Quarter Century of Change in Family and Gender-Role Attitudes in Hungary. Comparative Population Studies, 48.

Spéder, Zs. and Kamarás, F. (2008). Hungary: Secular fertility decline with distinct period fluctuations. Demographic Research, S7(18): 599–664.

Spéder, Zs., Elekes, Z., Harcsa, I., and Róbert, P. (2002). Hungary: The Outlines of the Transformation. In W. Adamski, P. Machonin, and W. Zapf (ed.), Strucutral Change and Modernistaion in Post-Socialist Societies. 79–154.

Szabó, L. (2020). The relationships between childlessness and educational attainment among women born between 1920 and 1979 in Hungary. Demográfia, 63(5): 5–39.

Szántó, J. and Tóka, G. (1990). [Public Opinions about State, Policy and Privatization]. Budapest: Tárki.

Wood, J., Neels, K., & Kil, T. (2014). The educational gradient of childlessness and cohort parity progression in 14 low fertility countries. Demographic Research, 31, 1365–1416.

Zeman, K. (2018). Cohort fertility and educational expansion in the Czech Republic during the 20th century. Demographic Research, 38, 1699–1732.