Stockholm Research Reports in Demography | no 2017:31



# Policy support and impact on third births in post-socialist Hungary

Zsolt Spéder, Lívia Murinkó and Livia Sz. Oláh

ISSN 2002-617X | Department of Sociology

Stockholm University
Demography Unit

# Policy support and impact on third births in post-socialist Hungary*

Zsolt Spéder[1], Lívia Murinkó[1] and Livia Sz. Oláh[2]

[1]*Hungarian Demographic Research Institute;* [2]*Stockholm University*

**Abstract:** Since the early 1990s fertility fall steeply in Central-East European countries including Hungary where substantial governmental efforts sought to stop or at least reduce the decline. Specific policy measures have benefited parents with three or more children: i) the flat-rate child-raising support paid from the 3rd until the 8th birthday of the youngest child in large families (signalling recognition of '*motherhood as profession*') and ii) a comprehensive tax-relief system. The success of these measures, if any, is however difficult to detect in aggregate statistics. Here we rely on event-history methods analyzing data from the *Hungarian Generation and Gender Survey* to examine the effect of these policies and to reveal differences in higher-order childbearing behaviour among socio-economic groups related to the measures in question. The results indicate a significant and differentiated effect on third-birth risks. While the child-raising support increased third-birth risks among the least educated, the generous tax relief seems to have similar effect on parents with tertiary education.

**Keywords**: family policy, cash for care, tax relief, Hungary, third birth

* This SRRD is an enhanced version of "Spéder, Murinkó, Oláh (2017): Sailing close to the wind? The effects of third birth policies in post-communist Hungary. *Working Papers on Population, Family and Welfare*, No. 27, Hungarian Demographic Research Institute, Budapest.

Stockholm Research Reports in Demography 2017:31

ISSN 2002-617X

© Zsolt Spéder, Livia Sz. Oláh and Lívia Murinkó

This work is licensed under a Creative Commons Attribution 4.0 International License.

## INTRODUCTION

Two influential policy measures intended to encourage the birth and upbringing of *third* or further children were introduced in Hungary in the quarter century following the end of state socialism. In 1993, during the most intensive period of socio-political changes, the *child-raising support* was introduced, a monthly flat-rate cash benefit for parents with three or more children, paid from the third to the eighth birthday of the youngest child. A few years later, in 1999, a *comprehensive tax-relief system* came into effect benefiting especially parents of three or more children who had taxable income. Hence while the former measure aimed mainly to enhance well-being of disadvantaged large families, the latter can be considered more directly pronatalistic. In this analysis we seek to shed more light on the effects these measures had on fertility, specifically on third birth risks.

The transition period was hardly favourable to socio-political interventions. The child-raising support was introduced in the most intensive phase of the economic transformation, in the early 1990s. This was the time of privatization and initiation of a free market: the GDP decreased by 11.9 per cent in 1991 and 3.1 per cent in 1992 when also joblessness became a personal experience of many people with the rise of the unemployment rate from virtually zero to 12.7 per cent. The 1999 tax concessions appeared in time of major social challenges too. A few years earlier, in 1995, the family allowance system turned from universal to means-tested, but was reversed by the new government of 1998 to a more comprehensive system of universalism. This happened despite less advantageous economic development at the turn of the millennium. Although productivity increased and unemployment decreased, it was not until the year 2000 that the GDP returned to its 1989 level.

Thus questions and doubts on whether family-policy measures can be effective in a period of major changes in the societal structure and social coexistence are fully justified (Neyer and Anderson 2008; Gerber and Perelli-Harris 2012). Can family policy matter in a changing fertility regime when a society just started or is in the midst of a transition from an early to a late childbearing pattern? On the other hand, is it not the duty of the state to strengthen the safety net precisely when societal changes enhance unpredictability?

In any case, the literature on the effectiveness and efficiency of population policies does not offer convincing arguments (Demény 1987; Gauthier 2007). Although some family-policy measures were found to be influential in Sweden (Hoem 1993), Austria (Hoem et al. 2001; Lalive and Zweimüller 2009), Canada (Milligan 2005) and Israel (Cohen et al. 2013), the results of international comparative studies are mixed or inconsistent. As a

comprehensive study by Gauthier (2007) puts it, "…policies may indeed have an effect on families, but that effect tends to be [of] a small magnitude and [...] possibly have an effect on the timing of fertility, rather than completed family size" (p. 339).

Results of analyses on population policy interventions in various post-communist countries are mixed as well. Studies suggesting positive effects tend to refer overwhelmingly to periods before the regime change in the late 1980s (Lutz and Bütner 1990; Andorka 1996; Kapitány 2008; Gábos et al. 2009). Analyses of later periods indicate ineffectiveness of policy measures (Stropnik and Sircelj 2008; Frejka and Zakharov 2013). In contrast, the present study on Hungary suggests that despite unfavourable societal and economic conditions, relevant policy measures indeed influence third-birth risks although in different ways across socio-economic groups.

The study is structured as follows. After a non-exhaustive literature overview on the efficacy of monetary family-policy measures, we present key features of the family-support system in Hungary, including details on substantial institutional changes affecting the decision to have a third child. After our hypotheses related to these institutional changes, we describe the data, our analytical strategies, and the variables applied. In the discussion of the results we focus on the different policy periods, also addressing the relationships discovered via the control variables. Concluding thoughts end the paper.

## THE EFFECTS OF FAMILY-POLICY INTERVENTIONS – A BRIEF REVIEW

### *The comparative view*

This literature review is non-exhaustive, and refers to more comprehensive reviews by Gauthier (2007) and Thévenon and Gauthier (2011) as its point of departure. The latter articles indicate that family-policy interventions may influence fertility, but the effects are small and irregular, which may be due to the heterogeneity of policy measures, and the variations in the effects by parity and/or social status. A more recent analysis by Luci-Greulich and Thévenon (2013) addresses five types of family support measures that all affect fertility in developed countries. The conclusion points to the specific "mix" of the different measures that are influential. No such comprehensive analysis is available for the post-communist countries. Frejka and Zakharov (2013) identify a timing effect of the "baby bonus" introduced in Russia, but express scepticism with respect to the impact on cohorts. Frejka and Gietel-Basten (2016) employ an "intuitive" way to link fertility trends to the various approaches on state intervention in Central-East European countries underlining their

inefficacy in general (p. 35). In the following, we focus on studies of the effects of the extension *of childcare leave (covered by cash benefit)* and direct *monetary measures*, most specifically *increased tax-relief*, with emphasis on the third births.

*Leave for parents*

Paid leave for parents enables them to combine employment and child-raising responsibilities by i) making it possible for a parent to stay home with the child, ii) compensating for a sufficient share of lost earnings, and iii) guaranteeing return to the same job after the leave period. The program plays a key role in promoting high female employment levels and the dual-earner family model. Job guarantee is a general feature of such schemes, but cross-country variations are substantial with respect to the length of the leave period and levels of compensation. Their effect on fertility, if any, is also questioned. Moderate length of leave with high levels of income replacement is assumed to facilitate fulfilment of fertility plans and a return to the former job (D'Addio and D'Ercole 2005; Matysiak and Szalma 2014), hence reducing the opportunity cost of child-raising. Yet low levels or partial compensation, independently of leave lengths, would hardly reduce such costs. The drawbacks of long parenting leaves are long-lasting, such as lower chances to return to a former job and slower wage development.

Empirical results are more or less in line with the above reasoning. In Austria, the provision of a relatively high flat-rate parental payment (ca 40 per cent of female net income) was extended in 1990 from one to two years. Both Lalive and Zweimüller (2009) and Hoem, Prskawetz and Neyer (2001) concluded that this extension increased the chance of a third birth. In contrast, an analysis of this measure by Stasna and Sobotka (2009) considered it as timing-, rather than quantum effect. Lalive and Zweimüller (2009) analyzed the effect mechanisms and concluded that more highly paid leave and longer job-guarantee each had an effect separately. Also, the introduction of cash-for-care benefit in Finland increased the number of third children born (Vikat 2004). Similar findings were shown in Norway by Aassve and Lappegård (2009) for the home-care allowance, introduced to compensate parents staying at home with their child aged one to three..

With respect to former socialist countries, Andorka (1996) found that the introduction of paid parental leave in Hungary in the late 1960s raised fertility even among the more highly educated. Kapitány (2008) showed that the earnings-related parental benefit, introduced in 1985, raised the number of children born between 1986 and 1996 by around 10.2 per cent, and timing of births notwithstanding, fertility increased for older cohorts. A

comparative study by Matysiak and Szalma (2014) demonstrated greater chances of second births in Hungary, where parents received parental benefit for up to 36 months after a birth, than in Poland, where a benefit was paid for 6 months only. Studies by Gerber and Perelli-Harris (2012) suggest that parental leave in Russia had a decisive effect on second births in the "turbulent" period of social changes, by easing considerably the costs for those who chose to bear children.

*Cash benefits*

Cash benefits in various forms aim to reduce the direct costs of child-raising. The regular monthly benefits until age 18 decrease such costs independently of being direct payments or tax relief. One-time benefits relate to the birth as key event diminishing financial difficulties around that time. More recently substantial amounts are paid as "baby bonus", but as international comparisons suggest fertility may be stimulated only by the scale (size) of such payments (D'Addio and D'Ercole 2005; Thévenon and Gauthier 2011; Luci-Greulich and Thévenon 2013).

For our paper, studies focusing on such changes, either in form of a new scheme or the increase of benefit level under an existing one, are of special interest. France is especially often cited given its long history of generous family benefits, and rather frequent changes in the benefit system. French family policy is generally considered playing a key role in keeping fertility reasonably high, by European standards (Toulemon et al. 2008; Thévenon 2011). Breton et al. (2005) addressed the effects of measures introduced in 1978–82, on fertility, notably favourable to third births with respect to the increase of monetary benefits and tax concessions alike. The study showed that the parity progression ratio for the third birth increased. Also Laroque and Salanié (2008) identified positive effects related to the tax relief on the births of first and third children.

In contrast, a mixed picture emerges for fertility effects of the Working Family Tax Credit introduced in the United Kingdom in 1999, which increased child-related tax relief for the lower income brackets. Brewer et al. (2009) concluded that fertility in lower-income dual-earner families increased as a result, but Ohinata (2008) found the fertility effect imperceptible and a timing effect at best. A very limited rise in fertility was also shown related to tax relief in Spain (Azmat and González 2010). Examining the impact of monetary benefits and tax concessions on total fertility rate in Hungary, Gábos et al. (2009) found that a change in the real value for these measures produced a change in fertility the following year.

Several analyses address fertility effects of one-time lump-sum payments associated

with birth event. The Allowance for Newborn Babies (ANB) introduced to stimulate fertility in Quebec, Canada, was examined by Milligan (2005) using the difference-in-differences method. This benefit was to be paid once for first and second children and a larger amount to be paid several times to parents having a third child. The analysis showed that ANB encouraged third births. The "baby bonus" introduced in Australia and subsequently elsewhere was also found to promote fertility (Drago et al. 2011; Sinclair et al. 2012), unlike the "maternal capital" resembling its logic and introduced in Russia with the explicit aim to raise fertility. The sizeable monetary support offered affected only the timing of births (earlier) as shown by Frejka and Zakharov (2013). Thus despite numerous family-policy changes introduced in the former socialist countries since the early 1990s, the empirical evidence regarding their effectiveness or lack of it is scarce (Frejka and Gietel- Basten 2016).

*Social status and its effects on fertility*

It seems feasible that the impacts of policy incentives for childbearing, in this case the birth of a third child, vary across socio-economic groups. Flat-rate and/or lump-sum support tend to encourage childbearing in low-income groups, whereas income-related support can trigger those with middle or high incomes. The extension of parental leave and related benefit in Austria was associated with a greater rise in fertility among low-income groups (Lalive and Zweimüller 2009). Similarly in Norway, the home-care allowance increased second and third childbearing among those with low income (Aassve and Lappegård 2009).

In Hungary, the abolishment of the earnings-related benefit during parental leave, and turning the flat-rate benefit into a means-tested payment in 1996 led to a dramatic decline in first childbirths among higher income groups. Their childbearing behaviour changed to its earlier level after the measure was reversed in 1998 (Aassve et al. 2006). The French analysis did not deal explicitly with the structural effects of policy, assuming that all socio-economic groups would be affected equally. The models show that highly educated two-child parents were more likely to have a third child in France; and this pattern remained. The Australian studies found larger effects for the "baby bonus" on further childbearing among lower income groups (Drago et al. 2011). In Quebec, on the other hand, the very similar ANB measure tended to increase fertility more among higher income groups (Milligan 2005). Thus the findings are somewhat inconsistent, possibly due to the lack of attention to the substantial differences regarding the welfare mix in the countries studied. Specific welfare schemes may very well have differentiated effects on childbearing.

## THE HUNGARIAN FAMILY SUPPORT SYSTEM

### *General features at the turn of the millennium*

Hungarian family policy can be considered rather generous (Szelewa and Polakowski 2008; Thévenon 2011; Makay 2015), but less predictable (Spéder and Kamarás 2008).[1] The longest-standing and best-known benefit is the *family allowance*, with no specific eligibility criteria (i.e. universal benefit), paid monthly to the family until the 18th birthday of the child. In addition, mothers are entitled to a birth-grant, a one-off lump-sum payment at birth. *Parental leave*, usually used by mothers although fathers are eligible as well, allows parents to care for their children at home up to the third birthday of a child. An income-related benefit is attached to the leave, equalling 75 per cent of previous earnings for six months for employed parents, 65 per cent *with a ceiling* from the seventh to 24th months, and a flat rate payment provided from the 25th to 36th months. If no previous employment, only flat-rate payment (childcare allowance) is provided throughout. Parents decide how long they will stay at home with the child and when they will return to their job. Family policies also support parenting through *the tax system* in Hungary albeit to a varying extent. State assistance is also given through various *housing-support schemes* at family formation. Finally, several types of in-kind assistance are provided, such as nearly free day care, pre-school and school education. The cash benefits provided in Hungary are rather generous among OECD countries, equalling 3.57 per cent of the GDP in 2013.

Given the number of radical changes in family-policy support in Hungary in the last quarter-century (Spéder 2016), it can be considered *unpredictable*. It is a prominent subject in election campaigns, and each new government leave their marks on the scheme. The early transition period brought an extension of *universal* benefits, replaced by mean-tests in 1995. In 1999, an even broader *universalism* was implemented along with tax concessions. The shift towards universalism continued with the 2002 and 2006 governments. These two decades were a period of stop-and-go in Hungarian family policy, which may have concealed the generosity of the scheme to its beneficiaries as the frequent changes and heated debates formed an image of unreliability.

### *"Motherhood as profession" – basic income-support for large families (1993)*

The first freely elected government (1990–94) followed a route of political conservativism, with restructuring of the labour market and widening income inequalities that impacted

[1] See Spéder (2016) on the long-term development in the links between demography, fertility and state intervention.

especially large families hard. However, the government also prepared the way for a new kind of family policy. *Child-raising support (GYET)*, introduced in 1993, provided a kind of basic income, a *monthly flat-rate amount* for families with stay-at-home mother and at least three children, from the third until the eighth birthday of the youngest child. The payment matched the childcare allowance *(GYES)* available until the age of three (i.e. 36 months) for the newborn. When it was introduced, the amount was about two-fifths (39 per cent) of the average female wage and from the year of 2000 about one-third (33 per cent) of it.[2] Hence it was not a negligible amount, in fact may be considered quite generous. Only those with previous employment were eligible (i.e. socially insured) and from June 1995 only if the family's per capita income did not exceed three times the minimum old-age pension (i.e. income tested). However, the latter criteria hardly reduced the number of claimants in practice as given the low wages very few large families would reach the per capita income ceiling. The requirement of a previous job (social insurance) was dropped in 1999, but the income ceiling remained. Nonetheless, the number of potential claimants increased somewhat. The scheme works as an alternative to employment and also to unemployment, and the expression *"motherhood as profession"* has become widely accepted.

With the child-raising support (GYET) women had a *choice*: either sending a third or subsequent child at age three to kindergarten while the mother returns to the labour market, or raising the children at home. There were no constraints by childcare availability, and mothers could return to their previous job after the 36-month long parental leave given the job-guarantee attached to the leave. Although labour-market fluctuations presented obstacles in some cases, families were free to decide whether to take advantage of the child-raising support and extend the stay-at-home period for the mother, especially when formal childcare was not the preferred alternative. Also, the scheme provided an alternative to *unemployment* in periods of recession. Hence extending the family beyond two children may also be related to labour-market problems, with the leave covered by the child-raising support offering an alternative to unemployment and inactivity in form of acceptance of the more traditional stay-at-home mother role (as comparison see Vikat 2004).

To be sure, the child-raising support does not rule out employment entirely. It can be combined with limited number of paid work hours; at its introduction it allowed up to 20 hours work a month. This restriction has been eased since then. At present it can be combined

[2] This was a time of strong inflation in the Hungarian economy (CPI 1993: 22.5%; 2000: 9.8%), to which the benefits were adjusted occasionally, not continuously.

with full-time job carried out at home where the children are taken care of.[3] Alternatively, the employer and employee can agree on the mother taking unpaid leave for as long as she wants.

Despite the unpredictability of family policy in Hungary given the frequent changes between 1990 and 2010, the basic income to large families *(GYET)* until the eighth birthday of the youngest child was never questioned or disputed. Throughout the period, the child-raising support scheme remained a reliable element of Hungarian family policy. In times of stop-and-go policy development, birth postponement is not only advantageous, but rational (Rodin 2011), but the unquestioned support to large families may well have *increased the willingness to have a third child (*this posits our *1st hypothesis).*

Whereas we emphasized the universalism of "motherhood as profession" we expect to find differences by socio-economic status given the substantial opportunity cost it may involve. A long break in working career may lead to the loss of workplace promotion or reduced life-time earnings for some, while it may result in exclusion from the labour market among the least qualified. For career-oriented women, decade(s) of absence from the labour market is not a feasible option, neither for those aiming at a high living standard. In contrast, those without a job or in precarious labour market position may find the child-raising support a lucrative solution. Thus we assume that the measure have differential effects across socio-economic groups with respect to their willingness to have a third birth. More specifically, we assume that this policy measure influenced mainly *those with lower income – in our case lower educational attainment – increasing their chances of a third birth (*this posits our *2nd hypothesis).*

*Child-related tax concessions (1999)*

Personal income taxation was introduced in Hungary in 1988. Different concessions on various grounds were made available, but child-raising costs were considered only symbolically at first. The personal income tax paid was largely unaffected by the number of the children raised by the taxpayer.[4] This has changed in 1999. In line with new rules, from January 1, 2000, child-raisers could claim a tax rebate depending on the *number of children they had*. The amount of concession per child increased with the number of children. This progressiveness was enhanced in 2001: the monthly amount of relief for a one-child family reached 3000 HUF, for a two-child family 4000 HUF per child, and for three or more

[3] In 2005, 8.6% of beneficiaries did paid work regularly and 8.5% occasionally (Váradi 2006).

[4] For details on the tax system see Kupa (1988); EC (2016: 106-111).

children 10,000 HUF per child (see Table A1 in the Appendix for details on the scale and developments of the tax relief). Hence large families clearly benefited of the scheme. The full concession for a three-child family in 2000 equalled to almost one-eighth of the average female earnings (18 per cent) and in 2001 to *half of it (51 per cent*).

The relief for a three-child family functioned similarly to a *universal, flat-rate* benefit, *yet its effect was strongly differentiated,* as the family income had to be quite high for the whole amount of tax relief being possible to claim. This still applies. Those in the lower income brackets pay either no tax or a low amount, thus the maximum tax relief offered cannot be claimed by them. There are no data available on what proportion of families with children came up short to earn enough for the full concession, but certainly those in the lowest third of income dispersion have been unable to claim the full amount, unlike those with medium or high taxable income. Flat-rate benefits generally encourage those of lower income and/or social status to have more children (Aassve and Lappegård 2009; Thévenon and Gauthier 2011), and the tax concession followed a format similar to those benefits. Nevertheless under the prevailing income distribution the Hungarian taxation system enabled especially those with *medium or higher income* (in this case medium or higher educational attainment) *to benefit from the tax relief and may have thus encouraged them to have the third child (*this posits our *3rd hypothesis).*

## ANALYTICAL STRATEGY AND DATA

### *Data and methods*

For the analysis we rely on an event-history database created from the first four waves of the Hungarian Generations and Gender Survey (Vikat et al. 2007; Murinkó and Spéder 2016). The first wave of the survey took place in 2001 and the fourth wave in 2011–12 (for details see Table A2 in the Appendix). Our sample for the analysis is confined to women and men who had two children in 1980, onwards and who took part in the first and second waves of data collection. The dependent variable in our event-history models is *the conception of the third child* (i.e. date of the third birth minus nine months), but will be referred to in the study as third birth. The risk period, measured in months, starts at the birth of the second child and ends at the conception of the third. The total exposure time equals 148,825 person-months. Observations are censored if i) the event failed to occur within eight years after the second birth, ii) the spouses/partners broke up, or iii) at the time of the last interview, whichever happened first. Thus 2,329 respondents were included in the analysis, and a third

child was born in 745 cases. Table A3 in the Appendix shows the number of excluded cases and the reasons for exclusion. Piecewise-constant proportional-hazards model is our tool of analysis, which assumes that the risk is constant in each category of the pre-selected time intervals of our time variable, the age of the second child.

*The main variable of interest: policy period*

In our analysis of the period in focus (i.e. 1980–2012) we distinguish between shorter policy-periods based on policy measures related to third births (see Table 1). We assume that if the risk of third births increased or decreased significantly (controlling for the effects of other factors relevant for fertility), this was linked to *measures introduced at the beginning of the policy-period*. We are aware that numerous other events in the same period (confounding factors) may have also influenced birth risks (cf. Milligan 2005), but this is an analytical strategy successfully applied in many other studies examining policy effects on fertility (see Hoem 1993; Hoem et al. 2001; Oláh 2003; Aassve et al. 2006). We expect the child-raising benefit introduced in 1993 to have increased third-birth risks across two-child families (H1).

----- Table 1 about here-----

*Control variables*

As far as possible, the models include control variables relevant for the third birth based on the literature (Hoem et al. 2001; Corman 2002; Breton et al. 2005; Berghammer 2009). Here we do not discuss the reasons for the specific control variables included, as they are not of primary interest for this study. For descriptive statistics see Table A4 in the Appendix.

The strictly demographic variables included in the analyses are: sex of the respondent, age at second birth (a categorical, dynamic variable), the sex of the first two children (whether the same or different sex), and the number of the respondent's siblings (cf. Breton et al. 2005). It should be stressed that the age at second birth was specified in relation to educational attainment of the respondent. Childbearing is strongly linked to completion of schooling (and related labour-market establishment), and in line with the relevant literature (see Hoem et al. 2001; Corman 2002; Breton et al. 2005), relative age categories were specified (*early, average, late*) instead of using the absolute age of respondent (see Table 2). Thus the variable is set as a function of educational attainment, with groups of respondents having a second child at an early, average or late stage in their life. The literature shows that parents whose second child was born in an early stage of their life-course, which implies relatively young age, are more likely to have a third child.

----- Table 2 about here -----

Much attention has been paid in recent demographic literature to whether it is more common for the divorced and re-partnered individuals to have a second or third child than in intact relationships (Billari 2005). We do not include in the analysis parents who separated and established a new relationship after the birth of the second child as such third-birth conceptions may be rather related to having a new partner (for overview of relevant studies see Holland and Thomson 2011) instead of the policies. Such cases are censored, unlike those when the relationship dissolved between the first two births, and the second child was born in a new union. We assume that the third birth propensity is higher for the latter group because it would mean having the second common child in the new relationship.

The role of *educational attainment* in childbearing decisions, including a third child, has been frequently studied. Numerous analyses have shown fertility being inversely proportionate to female educational attainment, also with respect to third births. However, several studies found higher third-birth rates among the more highly educated than for those with medium education (Kravdal 2001; Breton et al. 2005). Hoem et al. (2001), in examining changes in family policy in Austria, found no significant effect of women's educational level on third-birth propensities. Based on earlier studies for Hungary (Kapitány and Spéder 2008; Bartus et al 2012), we expect the lowest risk of having a third birth among those with a medium education.

The analyses assign a central role to the educational attainment variable, more specifically to *the combined effect of educational attainment and policy periods*. We hypothesize that the flat-rate child-raising support increases the propensity of third birth among those with lower socio-economic status the most *(H2)*, as does the tax relief among those with medium and/or higher status and income *(H3)*. Since no data on income or social stratification are at hand, the income status is proxied with an educational attainment variable distinguishing between primary, secondary and tertiary levels. We expect to find different effects of education for third birth in different policy periods.

Finally, ethnicity and religiosity are also included as control variables. It is expected that those of *Roma ethnicity* (Koycheva and Philipov 2008) and the more *religious* groups will have a higher chance to have a third child (Berghammer 2009).

## ANALYSIS AND RESULTS

Our models are built in a stepwise manner. As our main goal is to have a better understanding of the period effects, our first model includes only the policy periods variable. Thereafter the control variables are added step by step, and finally the interaction effects with the periods (see Table 3).

---- Table 3 about here ----

The first model, including only the family-policy periods, suggests that, compared with the socialist period, fewer two-child families eventually had a third birth in the transition period, that is from 1989 onwards. This model indicates that the two policy measures examined here have been less successful to increase third-birth propensities.

In the next step we include the demographic variables in the model, for which the results are in line with the expectations. The risk of a third birth is higher for those who had the first two children relatively early and who have two children of the same sex. The risk of a third-child conception is highest at 15 - 27 months after the second birth (see a more detailed discussion on this later in the study.) There are higher risks of a third child if the parents come from large families (4+ children), but the risk is lower if they were only children. Third-birth propensity rises also if the first two children were born in different partnerships. The third model includes both the policy-period and the demographic variables, with hardly any change for the latter in the direction, scale and significance of the effects, but for policy-periods the results are no longer statistically significant.

Next, *ethnicity and religiosity* are added to the model as time-constant variables. The effects are in line with our expectations with higher third-birth risk among the Roma and among religious believers. We see little changes in the effects for the policy-periods, and the effects are not significant although the p-value for the period of tax-relief (January 1999 – December 2005) approaches the level of 0.1 (0.113).

In the final step we also include *educational attainment* in the model, for which we find a U-shape pattern of third-birth risks with the lowest propensity seen for those with vocational training or secondary education. In this model, the risk of having a third child becomes significantly higher (about one-and-a-half times) for the period with highly increased tax relief (January 1999 – December 2005) and that with universal family allowance (January 2006 – March 2009), than in the period of state socialism. This suggests that the introduction of tax relief increased third-birth propensities, but the child-raising support (with the possibility of stay-at-home motherhood until the 8$^{th}$ birthday of the

youngest child) had no such effect.

Figure 1 demonstrates the effect of the policy periods by comparing coefficients of the first model (without controls) with the last model (containing all the control variables). The declining proportions of two groups – those with only primary education and those having a second child relatively early – cause the effect to be reversed when the control variables are omitted. These two groups steadily decrease in size over time, while the chance of a third childbirth among them remains relatively high.

---- Figure 1 about here ---

Further childbearing behaviour among two-child families differs clearly by educational attainment (see Model 5 in Table 3). The medium educated (vocational training school or secondary education) are the least likely to opt for a third child, while those with lowest attainment are more than twice as likely to do so (2.122), and the highly educated are somewhat more likely (1.317).

In the Introduction we discussed possible differences in the effects of the policy measures addressed here – the flat-rate child-raising support attached to a longer leave ("motherhood as profession"), and the tax relief – by social status *(also see hypotheses 2 and 3).* The former measure was expected to motivate lower-status groups and the latter to influence those with medium or higher status. To test these hypotheses, interaction terms between policy-periods and education are added to the last model (i.e. Model 5 in Table 3). We display the interaction effects by a variable consisting of 18 (6 x 3) categories, assessing the effect of educational attainment for each policy period. Table 4 (and Figure 2) presents the coefficients for the interaction term (results for the other variables in the model are not presented).

----- Table 4 about here -----

Those with a medium (vocational and secondary) education in the socialist period are our reference category. We see that even then the least educated two-child parents had the highest chance to have a third child. In the early 1990s (January 1991–January 1993), we do not find differences for third births among those with various educational attainments compared to the reference category. Later on however, the patterns differ among those with primary and with medium levels of education: the risk of a third birth among the less educated is much higher (up to three times) in three consecutive periods, than for the reference group, as seen also in Figure 2.

The flat-rate child-raising support until the 8th birthday of the youngest child for large families was introduced in the beginning of 1993, at the start of the period with three times as high third-birth risks as for the reference category. Figure 2 shows that this measure *increased the fertility of lower-status groups especially*. However, their third-birth propensity decreased in the last policy period examined, when the 36-month long paid leave (GYES) was shortened to 24 months in April 2009. This change marked a clear break in family-policy provisions in Hungary in general and for the group in question in particular.

For the highly educated in contrast we see a pronounced increase in third-birth risks at the introduction of a substantial tax relief in 1999. Their third-birth propensity remained significantly higher than that of the reference group throughout (see Figure 2). Third-birth risks among those with medium educational attainment changed hardly across policy-periods. These findings show that *fertility was influenced by the introduction of the tax relief, especially among* the most educated.

------ Figure 2 about here -----

As for the impact of the Hungarian family-benefit system, especially the paid parental-leave, it is worth recalling the pattern seen for our time variable, the time since the birth of the second child (Table 3). The results showed that the chance of a third child being conceived was greatest when the second child was about two years old (15–27 months), indicating the birth of the third child before the third birthday of the second child (controlling for other factors). This is likely to be related to the possibility for parents in Hungary to use a leave of at most 36 months after a birth, covered by benefit payment and job-guarantee. Hence, the third child seems to be *timed carefully*, when the benefits for the second child are (nearly) fully used. This is in line with the findings of Makay (2017) showing highest chance for a woman to return to work after parental leave at the 37th month after giving birth. Similar results were found for the second birth in Hungary (see Matysiak and Szalma 2014), and Vikat (2004) showed that the introduction of the home-care allowance in Finland raised the chance of a third child being born around the 36th month after which the benefit would be no longer provided. These findings suggest that the family-benefit system and the length of paid leave for parents matter for the timing of a third birth.

## CONCLUDING REMARKS

The period of very low fertility generated much attention towards policy measures, particularly in the former state-socialist countries of Central-Eastern Europe, irrespective of the values or motives behind particular policy interventions. However, the impact of such policies is difficult to assess. Only few studies demonstrate empirically the success of such interventions. Even in more affluent contexts of Western Europe with calculable economic growth, the effectiveness of family -policy interventions for fertility is difficult to prove (but see Hoem 1993; Hoem et al. 2001; Lalieve and Zweimüller 2009). Our analysis faced additional complexities addressing policy impacts on fertility during the transition from state socialism to a market economy, accompanied by a process towards new, later childbearing patterns in the Hungarian population (Sobotka 2004). Successive changes of governments brought frequent family policy changes, although the proportion of family-benefits to the GDP remained high by OECD standards (OECD 2011). Previous research indicated reactions among the population to key family-policy changes: the abolition of earnings-related parental benefit during the leave of absence from work to care for a child induced a radical fall or postponement of parenthood among more educated women (Aassve et al. 2006). Other studies in contrast suggested little potential reward for demographic policy measures amidst turbulent economic transformation and an unstable institutional environment (Spéder 2016).

In any case, the present empirical analysis suggests that certain population-policy interventions had a clearly positive effect on third-birth fertility in Hungary. This may be related to the sizeable scale, predictability and purposiveness of the policy measures studied here. As for the first aspect, *scale*, the period during which cash support for home care of children was offered to families with at least three children was of substantial length (from the third up to the 8$^{th}$ birthday of the youngest child), equalling about half of the average female wage, and previous labor force participation was an eligibility criteria. No less significant was the scale of tax relief, which was around 50 per cent of average female earnings in 2001. Second, despite frequent changes in family policy in the period, the withdrawals of some measures and reductions of particular benefits did not affect the provisions for three-child families. Family-policy support for large families remained *relatively predictable* even in the period of general unpredictability. Third, the measures examined were *aimed at* families with three or more children. This group too was affected by the unstable economic conditions, yet fertility postponement was not an option for them, unlike for childless couples who could respond to uncertainties by delaying parenthood. The

decision to have a third child was not about timing, but the realization of quantum-desires and intentions under supportive policy conditions.

The effects of the policy measures in question were shown to be *differentiated* and in line with our initial expectations. Those of lower socio-economic status have been motivated to have more children due to the flat-rate child-raising support (i.e. cash for care provision) during a prolonged leave. The measure may have even protected them from some negative consequences of the economic transition such as unemployment, while recognizing 'motherhood as profession'. Such fertility response was not confined to the East-European context, as similar explanation was offered in Finland with respect to the home-care benefit provided there (see Vikat 2004). It is in line with the general theoretical assumption that low-income families respond to lump-sum benefits. The prospect of appreciable tax relief in contrast seems to have encouraged two-child parents with high educational attainment to have a third child, with little influence on parents with low socio-economic status. In the high social strata, the mother staying home from the labour market for an extensive period to care for her children as her profession (i.e. the possibility offered by the child-raising benefit), is less appealing. The comprehensive tax relief may have not only stimulated third childbearing in such families but also supported mothers strengthening their labour market position so the family income would reach the levels that allow taking full advantage of the tax concessions offered.

## ACKNOWLEDGEMENTS

This research was supported by the Linnaeus Center on Social Policy and Family Dynamics in Europe, SPaDE (grant number 349-2997-8701) at Stockholm University Demography Unit, and by the Hungarian Science Foundation "Families in Transition" project (K109397). We are indebted for excellent suggestions received at various workshops in Stockholm, Budapest and Berlin.

## REFERENCES


Aassve, A.; Billari, F. C. & Spéder, Zs. 2006. Societal transition, policy changes and family formation: Evidence from Hungary. *European Journal of Population*, 22(2), 127–152.

Aassve, A. & Lappegård, T. 2009. Childcare cash benefits and fertility timing in Norway. *European Journal of Population*, 25(1), 67–88.

Andorka, R. 1996. Demographic Changes and Their Main Characteristics from 1960 to our days. in. Tóth, P. P., Valkovics, E., eds. *Demography of Contemporary Hungarian Society*. Atlantic Research and Publication, Highland Lakes.

Azmat, G. & González, L. 2010. Targeting fertility and female participation through the income tax. Labour Economics, 17(3), 487-502.

Bartus, T.; Murinkó, L.; Szalma, I., & Szél, B. 2013. The effect of education on second births in Hungary: A test of the time-squeeze, self-selection and partner-effect hypotheses. *Demographic Research*, 28(1), 1-32.

Berghammer, C. 2009. Religious Socialisation and Fertility: Transition to the Third Birth in the Netherlands. *European Journal of Population*, Vol. 25, 297–324.

Billari, F. C., 2005. Partnership, Childbearing, Parenting: Trends of the 1990s. In. Macura, M., MacDonalds, A.L., Haug, W. (eds.) *The New Demographic regime. Population Challenges and Policy Responses.* UN: New York and Geneva, 63–94.

Brewer, M., Ratcliffe, A. & Smith, S, 2009. Does welfare reform affect fertility? Evidence from the UK. *The Institute of Fiscal Studies*, WP, 08/09. p.42.

Breton, D., Prioux, F. & Dutreuilh, C. 2005. Two Children or Three? Influence of Family Policy and Sociodemographic Factors. *Population English Edition*, 60(4), 415–445.

Cohen, A., Dehejia, R. & Romanov, D. 2013. Financial incentives and fertility. *The Review of Economics and Statistics*. Vol. XCV, No. 1, 1–20.

Corman, D. 2002. Family policies, work arrangements and the third child in France and Sweden. In. Kijzing, E., Corijn, M., (eds.) *Dynamics of fertility and partnership in Europe. Insights and lessons from comparative research* Vol. II. UN: New York and Geneva, 59–71.

D'Addio, A. & d'Ercole, M. 2005. Trends and determinants of fertility rates: The role of policies (OECD Social, *Employment and Migration Working Papers* 27). Paris: OECD.

Drago, R., Sawyer, K., Sheffler, K., Warren, D. & Wooden, M. 2011. Did Australia's baby bonus increase the fertility intentions and Births? *Population Research and Policy Review*, 30(3), 381–397.

Demény, P. 1987. Pronatalist policies in low-fertility countries: patterns, performances and prospects. in. Davis, K., Bemstan, M.S., Ricardo-Campbell, R. eds. *Below-Replacement Fertility in Industrial Societies: Causes, Consequences, Policies.* Cambridge University Press, 335-358

EC, 2016. *Taxation Trends in the European Union*. Luxembourg: Publications Office of the European Union

Frejka, T. 2008. Determinants of family formation and childbearing during the societal

transition in Central and Eastern Europe. *Demographic Research*, Volume 19, Article 7, 139–170.

Frejka, T. & Gietel-Basten, S., 2016. Fertility and Family Policies in Central and Eastern Europe after 1990. *Comparative Population Studies*. Vol. 41, No. 1 p. 3.

Frejka, T &, Zakharov, S. 2013. The apparent failure of Russia's pronatalist family policies. *Population and Development Review,* 39(4), 635–647.

Gábos, A., Gál, R. I &, Kézdi, G., 2009. Birth order fertility effects of child-related benefits and pensions . A test on Hungarian data. *Population Studies* 63(3), 215–231.

Gauthier, A. H. 2007. The impact of family policies on fertility in industrialized countries: a review of the literature. *Population Research and Policy Review*, 26(3), 323–346.

Gerber, T. & Perelli-Harris, B. 2012. Maternity leave in turbulent times: effects on labor market transitions and fertility in Russia, 1985–2000. *Social Forces*, 90(4), 1297–1322.

Holland, J.A. & Thomson, E. 2011. Stepfamily childbearing in Sweden: quantum and tempo effects, 1950-99. *Population Studies*, 65(1), 115–128.

Hoem, J. 1993. Public policy as the fuel of fertility: Effects of a policy reform on the pace of childbearing in Sweden in the 1980s. *Acta Sociologica*, 36(1), 19-31.

Hoem, J. M., Prskawetz, A. & Neyer, G. 2001. Autonomy or conservative adjustment? The effect of public policies and educationel attainment on third births in Austria, 1975–96. *Population Studies*, 55(3), 249–261.

Kapitány B. 2008. A gyed-hatás. Az 1985 és 1996 közötti családtámogatási rendszer termékenységre gyakorolt hatása [The gyed-effect. The impact of the family allowance sytem on fertility between 1985 and 1996] *Demográfia* Vol. XLIX, No. 4, 383–401.

Koycheva, E. & Philipov, D., 2008. Bulgaria: Ethnic differentials in rapidly declining fertility. *Demographic Research,* 19 (13), 361-401.

Kravdal, O., 2001. The High Fertility of College Educated Woman in Norway: An artefact of the Separate Modelling of Each Parity Transitions. *Demographic Research*, 5 (6). 187-216.

Kupa, M. ed. 1988. *A személyi jövedelmadórendszer Magyarországon. [The personal icome-tax system in Hungary]*, Budapest, KJK

Lalive, R. & Zweimüller, J. 2009. How does parental leave affect fertility and return to work? Evidence from two natural experiments. *The Quarterly Journal of Economics*, August 2009. p. 1363-1402.

Laroque, G. & Salanié, B. 2008. Does fertility respond to financial incentives? *IZA Discussion Paper* 3575. Bonn: IZA. p.43

Luci-Greulich, A & Thévenon, O. 2013. The impact of family policy packages on fertility trends in developed countries. *European Journal of Population*, 29(4), 387-416.

Lutz, W. & Büttner, T. 1990. Estimating fertility responses to policy measures in the German Democratic Republic. *Population and Development Review*, 16(3), 539-555.

Makay, Zs. 2015. Family support system, childraising, employment. In J. Monostori, P. Őri,

Zs. Spéder (Eds.), *Demographic Portrait of Hungary*, 2015. Budapest: Hungarian Demographic Research Institute. (pp.57-74) On-line: http://demografia.hu/en/publicationsonline/index.php/demographicportrait/article/view/885/647

Makay, Zs., 2017. *Parental Leave and Career Interruption of Mothers in France and Hungary.* Régnier-Loilier, Arnaud (Ed.): *A Longitudinal Approach To Family Trajectories In France. The Generations and Gender Survey*. Paris, INED/Springer, p.173-197.

Matysiak, A. & Szalma, I. 2014. Effects of parental leave policies on second birth risks and women's employment entry. *Population English Edition*, 69(4), 599–636.

Milligan, K. 2005. Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and Statistics*, 87(3), 539–555.

Murinkó, L. & Spéder, Zs. (eds),2016. *Felhasználói kézikönyv az Életünk fordulópontjai panelkutatás 1–4. hullámához [Users' Guide for Waves 1–4 of the Turning Points of the Life Course Panel Survey*]. NKI Kutatási jelentések 97. KSH Népességtudományi Kutatóintézet, Budapest.

Neyer, G. & Andersson, G. 2008. Consequences of family policies on childbearing behaviour: Effects or artefacts? *Population and Development Review*, 34(4), 699–724.

OECD, 2011. *Doing Better for Families*, OECD Publishing.

Ohinata, A., 2008. Fertility Response to Financial Incentives. Evidence from the Working Families Tax Credit in the UK. University of Warwick: Warwick Economic Research Papers, No.851. p.35.

Oláh, L. Sz. 2003. Gendering fertility: Second births in Sweden and Hungary. *Population Research and Policy Review*, 22(2), 171-200.

Rodin, J. 2011. Fertility intentions and risk management: Exploring the fertility decline in Eastern Europe during transition. *Ambio*, 40, 221–230.

Sinclair, S., Boymal, J. & De Silva, A. 2012. A Re-Appraisal of the Fertility Response to the Australian Baby Bonus. *Economic Record*, 88(S1), 78–87.

Sobotka, T., 2004. *Postponement of Childbearing and Low Fertility in Europe*. Amsterdam: Dutch University Press.

Spéder, Zs., 2016. Fertility decline and the persistence of low fertility in a changing policy environment-a Hungarian case study. In: Rindfuss, R.Choe, M, eds.,*Low Fertility Institutions, and their Policies.* Springer, p.165-194.

Spéder, Zs. & Kamarás, F. 2008. Hungary: Secular fertility decline with distinct period fluctuations. *Demographic Research*, 19(18), 599-664.

Szelewa, D. & Polakowski, M. P., 2008. Who cares? Changing patterns of childcare in Central Eastern Europe, *Journal of European Social Policy*, 18(2),115–131.

St'astná, A. & Sobotka, T. 2009. Changing Parental Leave and Shifts in Second and Third-Birth Rates in Austria. *VID Working Papers*. No. 9. p. 27.

Stropnik, N. & Sircelj, M., 2008. Slovenia: Gnerous family policy without evidence of any fertility impact. *Demographic Research*, 19(26). 1019-1057.

Thévenon, O. 2011. Family policies in OECD countries: A comparative analysis. *Population and Development Review*, 37(1), 57–87.

Thévenon, O. & Gauthier, A., 2011. Family Policies in developed countries: a 'fertility-booster' with side effects. *Community, Work & Family*, 14(2), 197-216.

Toulemon, L., Pailhé, A. & Rossier, C., 2008. France: High and stable fertility. *Demographic Research*, 19(16). 503-555.

Váradi, L., 2006. *Visszatérés a munkaerőpiacra gyermekvállalás után. [Returning to the labour market after childbearing].* Központi Statisztikai Hivatal, Budapest, 17.

Vikat, A. 2004. Women's labour force attachment and childbearing in Finland. *Demographic Research, Special Collection*, 3(1), 175–212.

Vikat, A., Spéder, Zs., Beets, G., Billari, F. C., Bühler, Ch., Désesquelles, A., Fokkema, T., Hoem, J. M., MacDonald, A., Neyer, G., Pailhé, A., Pinnelli, A., Solaz, A. 2007. Generations and Gender Survey (GGS): Towards a Better Understanding of Relationships and Processes in the Life Course. *Demographic Research*, 17(14), 389–440.

TABLES AND FIGURES

Table 1: Distinguishing between policy periods in the time period studied

| *Policy periods* | *Main features of family policy changes* |
|---|---|
| January 1980 – December 1988 | Period of state socialism: comprehensive policy support to families with children |
| February 1989 – January 1993 | Major social transformation but unchanged institutional setting for family policy |
| February 1993 – December 1998 | Introduction of 'child-raising support' signaling the recognition of "motherhood as profession": flat-rate monthly payment for third or subsequent children from age 3 up to the 8th birthday of the youngest child |
| January 1999 – December 2005 | Generous increase in the tax relief for families with three or more children |
| January 2006 – March 2009 | Substantial rise of universal family allowance – doubled amount from 2006 onwards (no change in child-raising support, reduced tax concessions) |
| April 2009 onwards | The length of parental leave shortened to 24 months (from 36 months) |

Table 2: Age categories for the variable "relative age at second birth" by sex and education

| | Women | | | Men | | |
|---|---|---|---|---|---|---|
| | Early | Average | Late | Early | Average | Late |
| Primary or less schooling | 16–19 | 20–23 | 24+ | 16–22 | 23–26 | 27+ |
| Vocational training school or secondary education | 16–22 | 23–27 | 28+ | 16–25 | 26–30 | 31+ |
| Tertiary education | 16–24 | 25–30 | 31+ | 16–27 | 28–33 | 34+ |

Table 3: Determinants of third births: results of event-history models

| | *Model 1* | | *Model 2* | | *Model 3* | | *Model 4* | | *Model 5* | |
|---|---|---|---|---|---|---|---|---|---|---|
| *INDIVIDUAL COVARIATES* | | | | | | | | | | |
| *Age of the second child in months* | | | | | | | | | | |
| <15 | | | 0.648 | *** | 0.651 | *** | 0.631 | *** | 0.627 | *** |
| 15–27 | | | (ref.) | | | | | | | |
| 28–51 | | | 0.733 | ** | 0.726 | ** | 0.744 | ** | 0.745 | ** |
| 52+ | | | 0.455 | *** | 0.440 | *** | 0.455 | *** | 0.458 | *** |
| *Sex* | | | | | | | | | | |
| Woman | | | (ref.) | | | | | | | |
| Man | | | 1.122 | | 1.090 | | 1.115 | | 1.145 | |
| *Relative age at second birth* | | | | | | | | | | |
| Early | | | 1.520 | *** | 1.594 | *** | 1.512 | *** | 1.590 | *** |
| Average | | | (ref.) | | | | | | | |
| Late | | | 0.836 | † | 0.805 | * | 0.811 | † | 0.741 | ** |
| *Sex of the first and the second child* | | | | | | | | | | |
| Different | | | (ref.) | | | | | | | |
| The same | | | 1.333 | *** | 1.327 | ** | 1.327 | ** | 1.351 | *** |
| *Number of siblings the respondent grew up with* | | | | | | | | | | |
| 0 | | | 0.626 | ** | 0.634 | * | 0.623 | ** | 0.636 | * |
| 1 | | | (ref.) | | | | | | | |
| 2 | | | 1.124 | | 1.119 | | 1.035 | | 1.015 | |
| 3 or more | | | 2.132 | *** | 2.185 | *** | 1.564 | *** | 1.370 | ** |
| *Union dissolution between the first and the second birth* | | | | | | | | | | |
| No | | | (ref.) | | | | | | | |
| Yes | | | 1.798 | *** | 1.793 | *** | 1.671 | *** | 1.679 | *** |
| *Ethnicity* | | | | | | | | | | |
| Non-Roma | | | – | | – | | | | | |
| Roma | | | | | | | 2.804 | *** | 1.929 | *** |
| *Religiosity (follows the teaching of the church)* | | | | | | | | | | |
| No | | | – | | – | | (ref.) | | | |
| Yes | | | | | | | 1.499 | *** | 1.471 | *** |
| *Highest educational attainment at second birth* | | | | | | | | | | |
| Primary or less schooling | | | – | | – | | – | | 2.122 | *** |
| Vocational training school or secondary education | | | | | | | | | (ref.) | |
| Tertiary education | | | | | | | | | 1.317 | * |
| *POLICY VARIABLES* | | | | | | | | | | |
| *Policy period* | | | | | | | | | | |
| 1980–1988 | (ref.) | | – | | (ref.) | | | | | |
| January 1989 – January1993 | 0.736 | † | | | 0.930 | | 0.970 | | 1.078 | |
| February 1993 – December 1998 | 0.704 | * | | | 1.066 | | 1.108 | | 1.259 | 0.138 |
| January 1999 – December 2005 | 0.728 | * | | | 1.254 | 0.159 | 1.290 | 0.113 | 1.456 | * |
| January 2006 – March 2009 | 0.677 | * | | | 1.250 | 0.254 | 1.298 | 0.183 | 1.481 | * |
| April 2009 – | 0.521 | ** | | | 1.106 | | 1.148 | | 1.351 | 0.202 |
| *Log likelihood* | | | –1890.0 | | –1887.2 | | –1843.4 | | –1823.4 | |
| *N (person months)* | | | 145,825 | | 145,825 | | 145,825 | | 145,825 | |

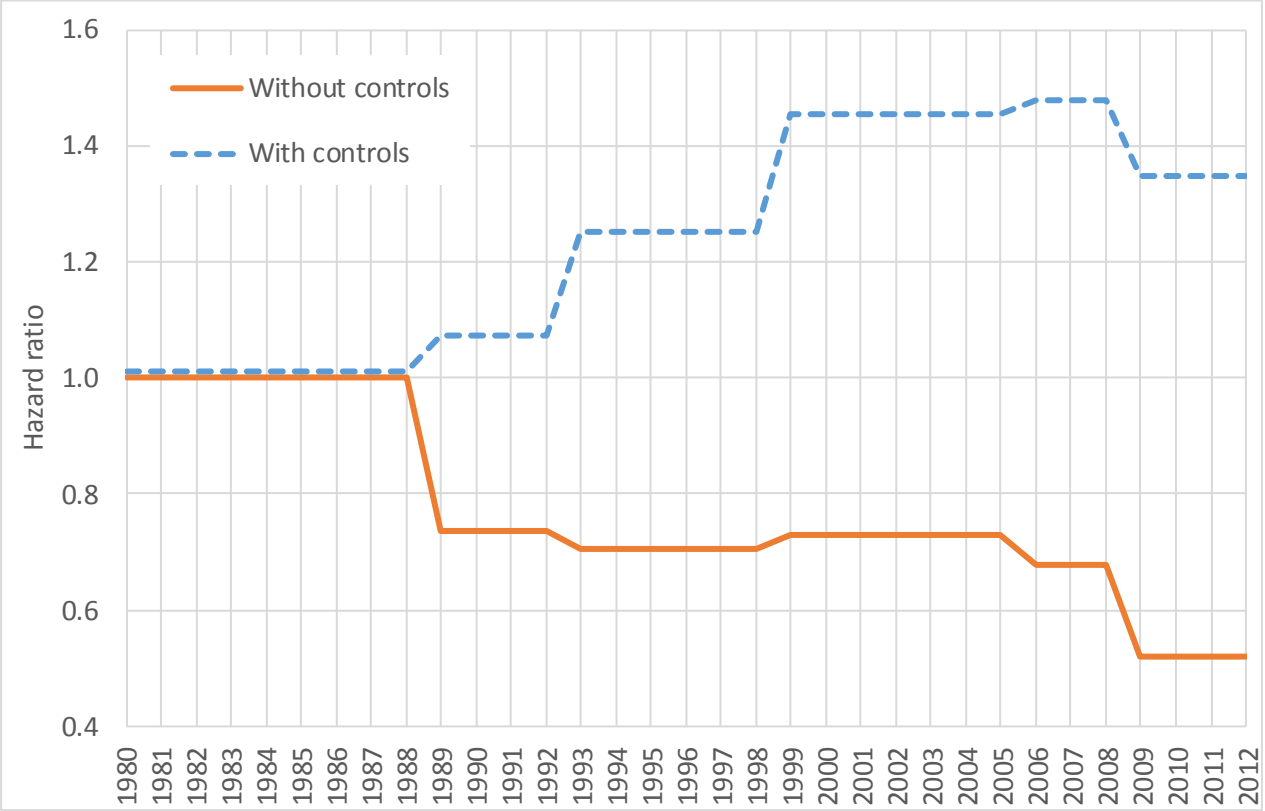
Notes: hazard ratios; † p<0.1; * p<0.05; ** p<0.01; *** p<0.001

Table 4: Interaction between policy period and educational attainment

| | *Hazard ratio* | *p* |
|---|---|---|
| *Policy period & education interaction* | | |
| Before 1989 # primary or less | 2.022 | 0.014 |
| Before 1989 # vocational or secondary | (ref.) | |
| Before 1989 # tertiary | 1.500 | 0.416 |
| Jan 1989 – Jan 1993 # primary or less | 1.468 | 0.283 |
| Jan 1989 – Jan 1993 # vocational or secondary | 1.395 | 0.222 |
| Jan 1989 – Jan 1993 # tertiary | 1.013 | 0.978 |
| Feb 1993 – Dec 1998 # primary or less | 3.022 | 0.000 |
| Feb 1993 – Dec 1998 # vocational or secondary | 1.191 | 0.474 |
| Feb 1993 – Dec 1998 # tertiary | 1.355 | 0.292 |
| Jan 1999 – Dec 2005 # primary or less | 3.183 | 0.000 |
| Jan 1999 – Dec 2005 # vocational or secondary | 1.310 | 0.282 |
| Jan 1999 – Dec 2005 # tertiary | 2.106 | 0.007 |
| Jan 2006 – March 2009 # primary or less | 2.937 | 0.003 |
| Jan 2006 – March 2009 # vocational or secondary | 1.390 | 0.267 |
| Jan 2006 – March 2009 # tertiary | 2.104 | 0.024 |
| Apr 2009 – interview # primary or less | 1.396 | 0.599 |
| Apr 2009 – interview # vocational or secondary | 1.468 | 0.247 |
| Apr 2009 – interview # tertiary | 1.881 | 0.082 |

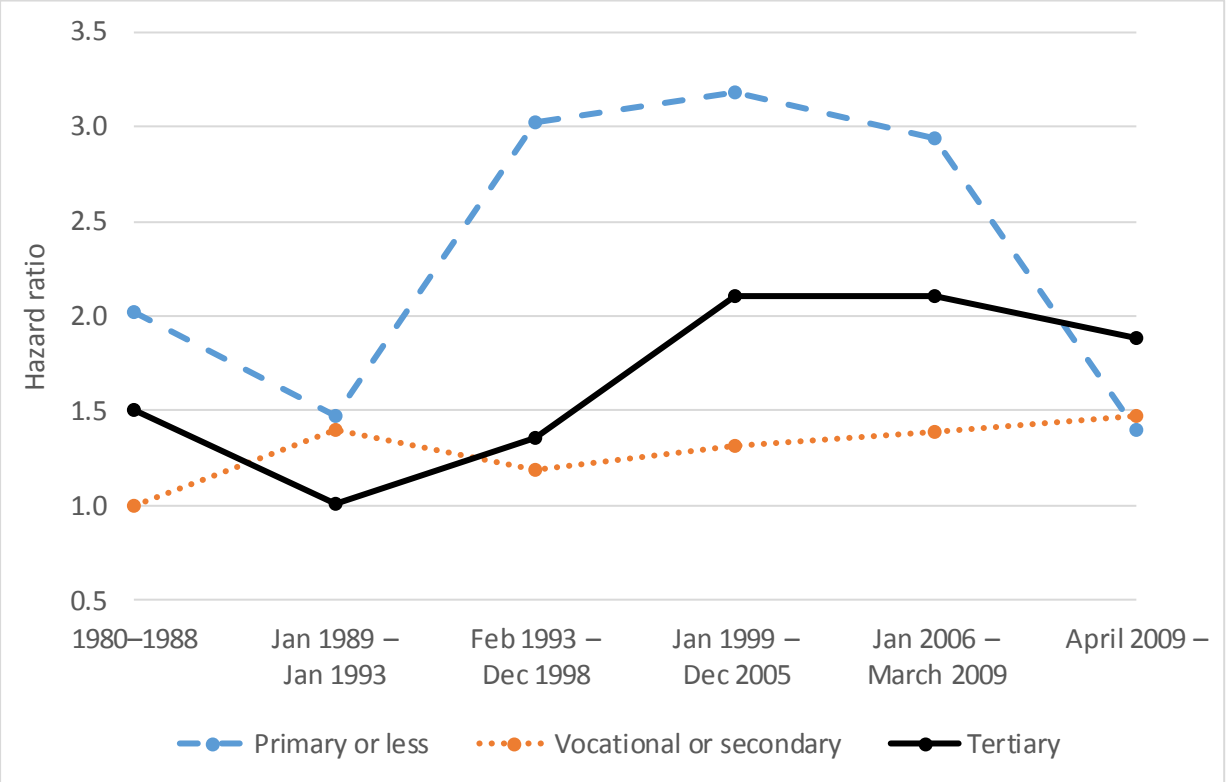
* The control variables in the model are sex, relative age, age of second child, sex of 1st and 2nd child, number of siblings, union dissolution, ethnicity, and religiosity.

Figure 1. Risk of third birth by policy periods, 1980–2012 (regression estimates)




Note: The model without control variables depicts Model 1, Table 3, and the one with controls depicts Model 5.

Figure 2. Interaction effects of policy period and educational attainment (results of the event-history modelling)



**APPENDIX**

Table A1. The changing amount of tax relief (or the decrease of taxable income), by the number of children in families, Hungary, 1988–2015

| Year | Number of children | | | Remarks |
|---|---|---|---|---|
| | 1 child | 2 children | 3+ children | |
| 1988– | NO | NO,<br>but 1000 HUF/child<br>for lone parents | 1000 HUF/child | decrease taxable income |
| 1991 | 1300 HUF/child | 1300 HUF/child | 1300 HUF/child | decrease taxable income |
| 1993 | 300 HUF | 300 HUF/child | 400 HUF/child | tax relief |
| 1995–1998 | **NO** | **NO** | **NO** | |
| 1999 | 1700 HUF | 1700 HUF/child | 2300 HUF/child | tax relief |
| 2000 | 2200 HUF | 2200 HUF/child | 3000 HUF/child | tax relief |
| 2001–2004 | 3000 HUF | 4000 HUF/child | 10,000 HUF/child | tax relief |
| 2005 | 3000 HUF | 4000 HUF/child | 10,000 HUF/child | tax relief, income ceiling |
| 2006–2010 | **NO** | **NO** | 4000 HUF/child | tax relief |
| 2011– | 10000 HUF | 10,000 HUF/child | 330,000 HUF/child | tax relief |

Table A2. Main characteristics of the "Turning Points of the Life Course" (Hungarian Generations and Gender Survey) panel survey

| *Waves* | *Dates of fieldwork* | *N* | *Response rate (%)** | *Response rate excluding deaths (%)* | *Age range* |
|---|---|---|---|---|---|
| Wave 1 | November 2001 – February 2002 | 16,363 | 67.9 | – | 18–75 |
| Wave 2 | November 2004 – May 2005 | 13,540 | 82.7 | 85.8 | 21–78 |
| Wave 3 | November 2008 – February 2009 | 10,641 | 78.6 | 83.3 | 25–82 |
| Wave 4 | November 2012 – March 2013 | 8,103 | 76.1 | 82.2 | 29–86 |

Note: * compared to the reference population (in Wave 1) or to the previous wave.

Table A3. Reasons for exclusion from the working sample and the number of cases

| *Reasons for exclusion* | *n* |
|---|---|
| Respondent was born before January 1960 | 7,418 |
| Invalid partnership history (negative union length, marriage before the start or after the end of the union, no end date but there is a next relationship, union without start date but with end date, start of a union precedes the end of the previous one) | 584 |
| Respondents who have had only one or no biological children | 2,945 |
| Women older than 35 and men older than 38 years at second birth | 64 |
| Not living in a co-residential union at second birth or by at most 12 months after the second birth | 82 |
| Having the second child before January 1980 | 5 |
| Having twins at first or second birth | 83 |
| Invalid birth history (9 months or less difference between births, respondent was younger than 15 years at any of the births) | 24 |
| The first or the second child was adopted | 6 |
| Total number of excluded cases | 11,211 |
| Final n of the working sample | 2,329 |

Note: the initial working sample included those respondents who participated in Wave 1 and 2 of the survey.

Table A4. Descriptive statistics of the independent variables (%)

| | *Total* | *Women* | *Men* |
|---|---|---|---|
| *INDIVIDUAL COVARIATES* | | | |
| *Age of the second child in months (duration; dynamic)* | | | |
| <15 | 21.6 | 21.2 | 22.1 |
| 15–27 | 17.9 | 17.9 | 17.8 |
| 28–51 | 27.6 | 27.6 | 27.6 |
| 52+ | 32.9 | 33.2 | 32.5 |
| *Sex of the respondent (time-constant)* | | | |
| Woman | 60.4 | – | – |
| Man | 39.6 | – | – |
| *Relative age at second birth (time-constant)* | | | |
| Early | 20.9 | 17.7 | 25.7 |
| Average | 50.3 | 53.1 | 46.0 |
| Late | 28.8 | 29.2 | 28.3 |
| *Sex of the first and the second child (time-constant)* | | | |
| Different | 49.3 | 48.8 | 50.1 |
| The same | 50.7 | 51.2 | 49.9 |
| *Number of siblings the respondent grew up with (time-constant)* | | | |
| 0 | 10.7 | 11.2 | 10.0 |
| 1 | 48.9 | 48.7 | 49.3 |
| 2 | 21.5 | 21.6 | 21.3 |
| 3 or more | 18.9 | 18.6 | 19.4 |
| *Union dissolution between the first and the second birth (time-constant)* | | | |
| No | 92.4 | 91.9 | 93.1 |
| Yes | 7.6 | 8.1 | 6.9 |
| *Ethnicity (time-constant)* | | | |
| Non-Roma | 91.5 | 92.3 | 90.5 |
| Roma | 8.5 | 7.7 | 9.5 |
| *Religiosity (follows the teaching of the church; time-constant)* | | | |
| No | 86.7 | 85.3 | 88.7 |
| Yes | 13.3 | 14.7 | 11.3 |
| *Highest educational attainment at second birth (time-constant)* | | | |
| Primary or less | 16.5 | 17.1 | 15.6 |
| Vocational training school or secondary | 62.5 | 59.6 | 66.9 |
| Tertiary | 21.0 | 23.3 | 17.5 |
| *POLICY VARIABLE* | | | |
| *Policy period (dynamic)* | | | |
| 1980–1988 | 7.2 | 9.5 | 3.5 |
| January 1989 – January1993 | 9.3 | 10.6 | 7.3 |
| February 1993 – December 1998 | 35.0 | 35.6 | 34.2 |
| January 1999 – December 2005 | 30.2 | 27.4 | 34.6 |
| January 2006 – March 2009 | 10.5 | 9.5 | 12.0 |
| April 2009 – | 7.8 | 7.4 | 8.4 |

Note: % for time-constant covariates, % distribution of exposure time for dynamic covariates

Stockholm Research Reports in Demography

Stockholm University, 106 91 Stockholm, Sweden
www.su.se | info@su.se | ISSN 2002-617X

Stockholm University

Demography Unit