

DEMOGRAPHIC RESEARCH

A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 39, ARTICLE 19, PAGES 561–592

PUBLISHED 19 SEPTEMBER 2018

<https://www.demographic-research.org/Volumes/Vol39/19/>

DOI: 10.4054/DemRes.2018.39.19

Research Article

Family policies, childbearing, and economic crisis: The case of Iceland

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Family policies, childbearing, and economic crisis: The case of Iceland

Ari Klængur Jónsson¹

Abstract

BACKGROUND

In the early 2000s, Iceland implemented one of the most gender-equal parental leave systems in the world, and at the same time increased the volume of public childcare. A few years later, in 2008, Iceland experienced a major economic crisis that, among other things, led to cutbacks in governmental spending and decreased support to families with children.

OBJECTIVE

The objective of this study is to provide insight into recent childbearing dynamics in Iceland and how they may be linked to recent social-policy reforms and the intervention of the economic crisis in 2008.

METHODS

We use official individual longitudinal register data covering the total female population born in Iceland between 1953 and 1997. We analyse the data by means of event history techniques.

RESULTS

We find that changes in the standardized birth rates coincide with the emergence of the reformed family-policy package: A declining trend in the age-standardized first-birth rate came to a halt, and the propensity to have a second and a third child increased. After the onset of the crisis, a trend of decreasing first-birth intensities reemerged and, in 2011, a turnaround to declining second- and third-birth rates.

CONCLUSIONS

The development in the post-2008 period indicates that even in the most gender-equal settings, the gender balance in family care is still vulnerable, and that family policies cannot compensate in full for the impact of economic crisis on fertility.

CONTRIBUTION

The study highlights the interdependency of factors related to both social policy and the business cycle in relation to childbearing developments.

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1. Introduction

In a European context, Iceland has relatively high fertility. It is also among the most gender-equal countries in the world; few countries have a higher female employment rate than Iceland. With its population of around 350,000, Iceland is often grouped together with the other Nordic countries – Denmark, Finland, Norway, and Sweden – as belonging to the same welfare-state regime which, to a large extent, socializes the costs of family life and has strong egalitarian emphasis (Esping-Andersen 1990). Unlike the other Nordic countries, however, whose institutional settings have been catalysts for recent theoretical frameworks to explain changes in childbearing trends and other family-related affairs (McDonald 2000, 2013; Goldscheider, Bernhardt, and Lappegård 2015; Esping-Andersen and Billari 2015), the context of fertility in Iceland has received much less attention.

The aim of this study is to provide an overview of the developments in fertility and family policies in Iceland at the turn of the 21st century, which will give us a more comprehensive picture of the interplay of fertility and family policies in the Nordic countries. In 1997, the Icelandic parliament passed a resolution on formulating the first official policy on the family in the country, and in the same time agreed to take measures to enhance social support to families with children (Alþingistiðindi 1996–1997; Eydal and Ólafsson 2008). In the following years the parental leave program was reformed, and the supply of formal childcare provision was increased. With these two changes a reformed battery of formal support to (dual-earner) families came into effect, which further enabled parents to combine childrearing and employment. Then, in 2008, Iceland was hit by the most severe economic crisis in the country's modern history. Considering the magnitude of the crisis and the associated cutbacks in social spending, we take the crisis into consideration when discussing the context and subsequent outcomes.

In what follows, we treat the increase in formal childcare provisions and the reformed parental leave program as one comprehensive reform: They were to a large extent implemented at the same time; they share the same underlying logic, which entails promoting gender equality and helping parents to combine work and family life; and the two policies complement each other and form a succession of childcare provisions available to parents after childbirth.

Developments in the total fertility rate (TFR) indicate that the revisions were followed by elevated fertility. The TFR increased gradually from 1.93 in 2002 to 2.22 in 2009. However, as a period indicator, the TFR is restrictive and may even be misleading. It does not control for birth order or interval between births, and it is highly sensitive to changes in the timing of (first) births. Hence, it is unclear whether changes in the TFR are related to the propensity to become a mother, or developments in

continued childbearing. These limitations of the TFR can lead to false conclusions about the effectiveness of family policies (Sobotka and Lutz 2010).

To the extent possible, we take into consideration a research strategy proposed by Neyer and Andersson (2008) on how to best design studies that address the potential association between family policies and fertility, both conceptually and methodologically. In terms of theoretical considerations, they argue that any assessment of a relationship between family policies and fertility needs to be based on the broader social context, including a comprehensive understanding of the constellations and configurations of family policies, their contents, and their histories.

With regard to the method and data, we follow their suggestions as far as our data allows us. We apply event history analysis to longitudinal individual register data, covering the childbearing history of the total female population born in Iceland and of childbearing age (15–45 years). We present our findings as parity-specific relative risks of giving birth during 1998–2013, standardized for age of mother and age of youngest child (where applicable). This approach allows us to detect period effects in fertility by birth order and in relationship to the timing of births, and thus to investigate any potential changes in childbearing dynamics around the time of implementation of the reforms and during the economic crisis.

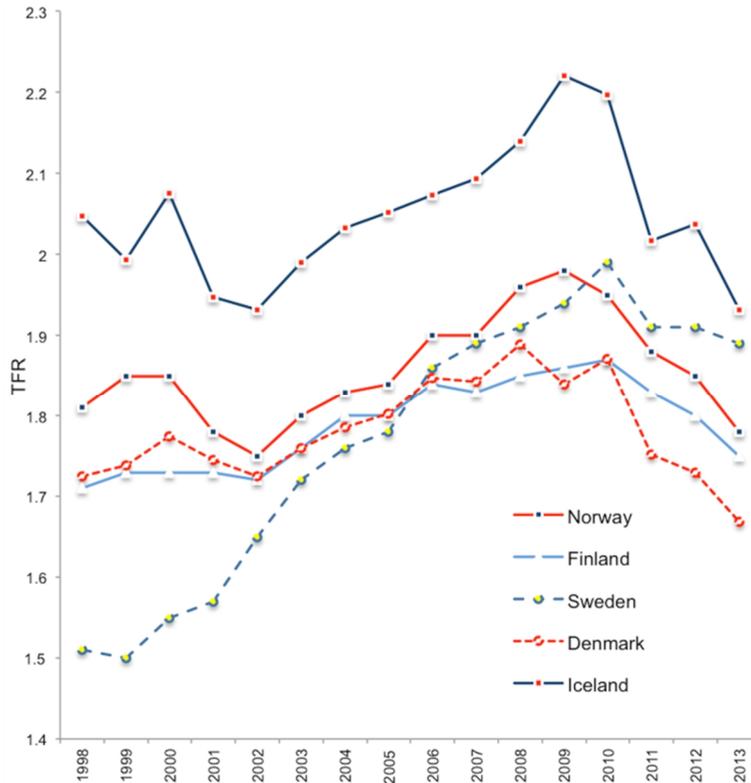
We begin our story with a discussion of theoretical considerations that accompany demographic studies of family policies, highlighting why the interaction between the broader social context, the business cycle, and policy objectives matters for potential outcomes. Subsequently, we describe the context in which the study takes place and provide an overview of the development in formal childcare during our study period and the main points of the parental leave legislation. After providing an overview of the data and methods, we conclude with the results and a discussion.

2. Background

Parallel to the widespread fertility recuperation in Europe at the turn of the century and the changing macro- and micro-level relationships between female labour force participation and fertility, the possible association between social policies and childbearing behaviour has gained considerable attention (Neyer 2003; Adserà 2004; Gauthier 2007; Andersson 2008; Hoem 2008; Neyer 2013). The universal welfare regime in the Nordic countries, whereby social policies are formulated to enable women and men to combine work and family life, with the aim of increasing gender equality, has commonly been linked to the relatively high fertility in the region, displayed in Figure 1 (e.g., McDonald 2000, 2013; Neyer 2006; Garðarsdóttir 2008; Rønsen and

Skrede 2008; Esping-Andersen and Billari 2015; Goldscheider, Bernhardt, and Lappegård 2015).

Figure 1: Total fertility rate in the Nordic countries, 1998–2013



Source: Statistics Norway (2016), Statistics Finland (2016), Statistics Sweden (2016), Statistics Denmark (2016), Statistics Iceland (2018).

Family policies – such as parental leave benefits, available and highly subsidized childcare for young children, and flexible employment opportunities – have been found to dampen the negative effects of childbearing on women’s labour force opportunities (Korpi 2000). Policies that provide women with increased labour market security and enable them to combine work and family life tend to reduce the opportunity cost of having children and may thus have a considerable impact on fertility (Luci and Thévenon 2012).

McDonald (2000, 2013) argues that modern fertility outcomes are the product of how individuals perceive their opportunities and the actual possibilities mothers have to combine work and family life; therefore, family-oriented institutions need to support mothers so that they can take advantage of opportunities offered to them by individually oriented institutions (e.g., education and employment) (McDonald 2013: 983). Likewise, Goldscheider and her colleagues (2015) argue that the gap in the family-care responsibilities of mothers and fathers needs to level out for fertility to increase. The constellation and design of childcare policies may thus be instrumental for fertility outcomes. Arriving from a similar standpoint, Esping-Andersen and Billari (2015) argue for a framework that considers the importance of gender roles in society and how changes in norms related to gender affect the family. When gender egalitarian norms become a dominant normative status in a society, the social institutions need to reconcile with women's opportunity to combine work and family for fertility to increase.

Drawing on these theoretical perspectives, we can assume that policies that offer support to the dual-earner family form and motivate gender equality encourage women's employment, reduce unpaid care-work responsibilities of mothers, and address parents at an individual level (individual right) rather than as a couple (Neyer 2006). We can also assume that such policies may be influential in supporting fertility in the context of high female labour force participation and gender egalitarian attitudes. This assumption may be especially relevant in the Icelandic context, where female labour force participation is almost as high as that of males, and the 'dual earner family model' is the social norm. The relevant reforms, implemented at the turn of the 21st century in Iceland, were a response to ongoing social development and public demand. At the time of implementation, the parental leave legislation was met with almost universal acceptance both in Parliament and in society (Eydal and Gíslason 2008a, 2014). As "the effects of a given policy may be strongly dependent upon the social context in which it is implemented" (Hoem 2008: 255), this acceptance may be interpreted as an indication that the public was willing and able to conform to the behaviour supported by these policies.

2.1 Parental leave and day-care provisions in a Nordic context

Our focus is on a specific area of family policies – i.e., formal childcare at young age and the parental leave program – policies that are an integral element of the dual-earner model (Korpi 2000) and that have been studied as an intermediate mechanism between female labour force participation and childbearing. Repeated findings in the Nordic countries indicate that parental leave use is associated with higher subsequent birth

intensities, especially if the father uses part of the leave (Duvander, Lappegård, and Andersson 2010; Lappegård 2010); Duvander and her colleagues (2016) found the same for Iceland. It is not always certain whether these findings relate to earlier arrival of a next child or to quantum changes, as model estimates capture both timing and number of births. Several studies have shown how a policy intervention in the parental leave ('the speed premium') lead to a higher tempo of childbearing in Sweden (Hoem 1993; Andersson 2004), and thus an increase in the period fertility.

The interplay of parental leave use, father's family involvement, and continued childbearing appears complex. The duration of the fathers' leave use has been found to matter, but how and to what extent depends on parity. In a comparative study of Norway and Sweden, the authors found that one- and two-child mothers in both countries had a higher risk of subsequent birth if the father used parental leave with the previous child (Duvander, Lappegård, and Andersson 2010). Similarly, Duvander and Andersson (2006) found that fathers that took long parental leave with their second child had the highest third-birth risk, compared to other groups, but the effects disappeared when they controlled for socioeconomic variables. Other definitions of variables and study designs may produce partly different results (Lappegård 2010; Duvander et al. 2016).

Findings on the potential association between day-care provisions and fertility are even more ambiguous. In low day-care coverage areas in Norway, Kravdal (1996) found evidence that indicates that the volume of day care may have elevating effects on third births, but first and second birth probabilities decline with increasing provision of day care. A study on Sweden found no or counterintuitive effects of day-care provision on continued childbearing (Andersson, Duvander, and Hank 2004). Another study on Norway by Rindfuss and colleagues (2007) with stronger research design more clearly shows positive effects of childcare provisions on fertility outcomes.

Thus, while several studies have shown an association between family policies and childbearing behaviour, others have found only weak associations, controversial ones, or none at all. (For an overview see Neyer 2003; Gauthier 2007; Hoem 2008.) Hence, there is still controversy over the effectiveness of family policies to influence fertility, and in cases where association has been found, some have argued that the effects of policies tend to be small, that they affect the timing of births rather than completed fertility, and that policies are thus hard to justify given their high costs relative to their success (e.g., Gauthier 2007).

Part of the ambiguous findings surrounding the association between family policies and fertility can be attributed to methodological issues and inadequacy in accounting for variation in the design and underlying objectives of family policies (Neyer and Andersson 2008). Different policies (e.g., income-related parental leave and parent's quota; homecare allowance; public day care) may affect different groups of

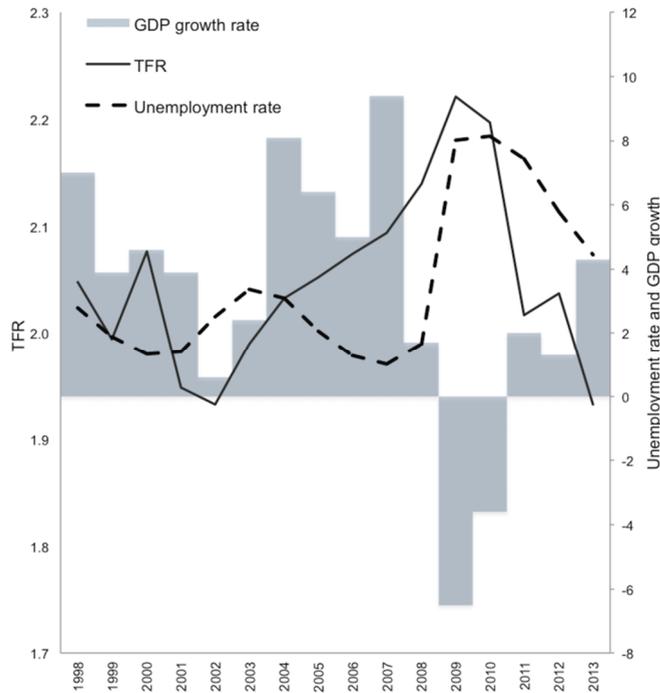
people differently (Lappegård 2010). Findings could be determined by norms and attitudes or selection effects (Duvander and Andersson 2006; Lappegård 2010), socioeconomic status (Duvander and Andersson 2006), or migration background (Andersson, Hoem, and Duvander 2006; Andersson and Scott 2005). The constellation, configuration, and generosity of policies – the complete package (the total coverage and whether policies support or counteract one another) – may matter for potential relationships as well, which could explain some of the controversial findings on potential association between volume of day care and the propensity to have another child (Hank and Kreyenfeld 2003; Andersson, Duvander, and Hank 2004). A potential connection between two-child norms and the norm of fathers being engaged in childrearing has been suggested to foster the link between fathers' parental leave use and second birth intensities in the Nordic countries (Duvander and Andersson 2006; Duvander et al. 2016).

2.2 A few words on the interplay of family policies and economic trends

Before turning to the characteristics of the reform in the 2000s, a few words on the potential interaction between economic trends, family policies, and fertility outcomes are appropriate – especially considering that a major economic crisis hit Iceland in late 2008, which is likely to have had an impact in the final years of our study period.

The economic crisis was without precedent in Iceland and was even impressive from an international perspective. The exchange rate of the Icelandic currency (ISK) fell by 50%, resulting in a massive decrease in the general public's purchasing power. At the same time, roughly 90% of the country's financial system collapsed. The gross domestic product (GDP) contracted by 12% and, between September 2008 and April 2009, unemployment increased by almost eight percentage points, from 1.3% to 9.1% (Statistics Iceland 2018; Einarsson et al. 2015; Directorate of Labour 2015) – the highest unemployment rate recorded in modern Icelandic history.

Figure 2: Total fertility rate, unemployment rate, and gross domestic product growth rate in Iceland, 1998–2013



Source: Statistics Iceland (2018), Directorate of Labor (2015).

If we accept that “institutional factors and policies intervene at every step in the link between economic downturn and fertility behavior” (Sobotka, Skirbekk, and Philipov 2011: 293), the same is true for economic downturn and the link between family policies and fertility. This connection is especially relevant when parental leave benefits are income related and full eligibility is to a large extent dependent on labour market participation (Andersson 2000; Hoem 2005), as is the case with the Icelandic parental leave program after the reform in the early 2000s.

Our methodological approach depends on, among other things, other potential fertility determinants remaining relatively stable during the study period, an assumption that we believe holds until the onset of the crisis. The development in the post-2008 period should therefore be interpreted with caution as any potential link between family policy and childbearing behaviour is likely to be disturbed by the turbulence during the

recession. The economic crisis provokes questions that we are unable to address in the present study, in part due to data limitations.

2.3 Increased support to the dual-earner model in Iceland

The employment rate for Icelandic men and women of childbearing age is, and has been, very high in an international comparison. According to a Statistics Iceland Labour Market Survey, around 90% in the age group 25–54 are active on the labour market: The employment ratio ranged from 85–88% among women during the 1990s and 2000s, and 92–97% among men. On average, women work around 37 hours per week, and men work around 49; however, during the course of the study period, more variation in the ranges occurred (Statistics Iceland 2018). Nevertheless, in the latter part of the 1990s, when the Icelandic parliament passed a resolution on formulating the first official family policy in the country, expenditure on welfare-related issues was relatively low, even by European standards, and the country offered less support to families with children than the other Nordic countries (Eydal and Ólafsson 2008; Eydal 2008). Iceland spent 2.4% of the annual GDP on children and families, compared to around 3.5–4% spent by its Scandinavian neighbours. In 2004, the share of the GDP devoted to family-related issues increased to 3.6%. This increase in expenditure was, to a large extent, a consequence of new parental leave legislation and an increase in the availability of publicly provided childcare (Eydal and Ólafsson 2008) – our events of interest.

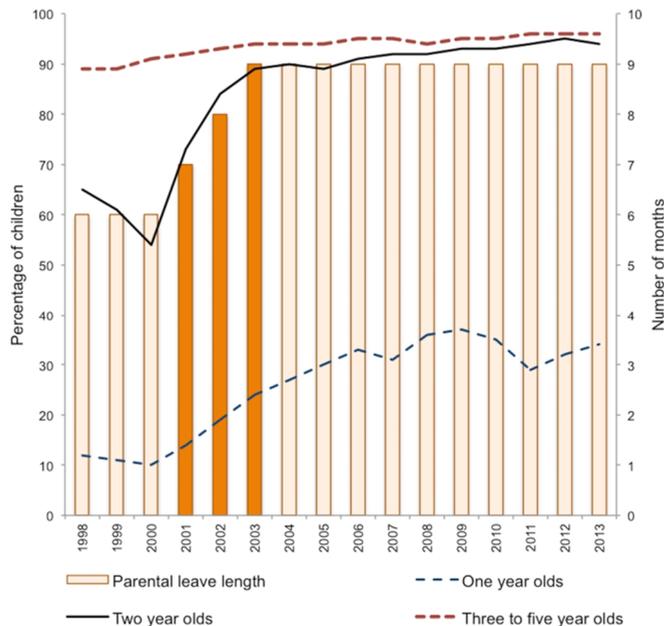
2.3.1 Formal childcare provisions – playschools

Formal childcare institutions are referred to as playschools (*leikskólar*) in Iceland, both formally and informally. There is no universal right to childcare in Iceland, and playschools are not mandatory, but they are defined as the first level of schooling – with their own curriculum and regulated by the Ministry of Culture and Education. Playschools provide high-quality care for children under the age of six (when school attendance becomes mandatory) and are based on pedagogical aspects of learning through play, and becoming a certified ‘playschool-teacher’ requires five years of university education. The vast majority of playschools are operated by the municipalities, but some are privately run, with a licence from the respective municipality. The number of places offered, the age at which children are enrolled in playschools, and the fees differ between municipalities and by the length of daytime

care acquired (Alþingi 2008; Eydal and Ólafsson 2008). Parents pay only a fraction of the costs of publicly run day care.

The high employment rate among people of childbearing age has not been entirely reflected in the volume of public day care offered to parents with young children (Eydal and Ólafsson 2008). Nevertheless, significant ameliorations were made to the formal childcare system in the early 2000s. In 1994, the number of playschools was 178 (Broddadóttir et al. 1997), but ten years later it had increased to 262; during the same time the number of full-time equivalent working staff units in formal childcare increased by roughly 60% (Statistics Iceland 2018). In 2000, around 68% of 1–5 year-old children were enrolled in playschools: 10% of one-year-olds and 54% of two-year-olds (Figure 3). In 2003, the figure had increased to 80%: 25% of one-year-olds and 90% of two-year-olds (Statistics Iceland 2018). Parents were thus relieved much of the unpaid care work, especially as the coverage for two-year-old children increased by 35 percentage points during a period of just three years, during which time the coverage for one-year-old children also increased from one-in-ten to one-in-four.

Figure 3: Percentage of children attending playschools in Iceland by age, and length of the parental leave, 1998–2013



Source: Statistics Iceland (2018), author's calculations.

As is discussed below, the parental leave was extended from six to nine months between 2001 and 2003. The ‘childcare gap,’ the period from the end of the parental leave until the beginning of public day care, has thus not yet been eliminated (at least for majority of parents), but nevertheless, it was greatly reduced during the early to mid-2000s. In order to bridge the remaining gap between parental leave and formal childcare, roughly half of parents take advantage of home-care facilities, privately run care centres at higher costs than the heavily subsidised playschools. Others rely on various means of unofficial support, including grandparents and other relatives, or resort to lower or more flexible working hours – the majority of which are women (Eydal and Gíslason 2014).

2.3.2 The parental leave program

In the year 2000, the legislation from 1981 on a universal right for all mothers to paid parental leave was revised, and a new Act was passed, fundamentally transforming the parental leave scheme in Iceland. The new legislation was explicitly aimed at enabling mothers as well as fathers to be active participants in childrearing and offering them equal opportunities to coordinate family and working life. The purpose of the legislation was not pronatalist, or simply to compensate parents economically after childbirth and facilitate a balance between family and work – but rather to promote gender equality and to encourage fathers to contribute more to the domesticity (Alþingi 2000; Eydal and Gíslason 2008a, 2008b).

Under the previous parental leave regime, the total leave length was six months, of which two weeks were allotted to the father (from 1998 and onwards). The benefits were usually paid at a low flat rate and thus not income related (Eydal and Gíslason 2014). The main points of the reformed legislation were that parental leave was extended in steps from six months to nine – with the father’s entitlements gradually increased over a period of three years through the addition of one month per year during 2001–2003. Iceland thus tied as large a part of the leave to the father as to the mother (an inalienable individual right of either parent) – a total of one third each of the leave (Alþingi 2000). The entitlements to fathers were manifested as an increase in the parental leave benefits, as the mother’s entitlements were not affected by the reform. Parents had up to 18 months from the childbirth to utilize the leave,² and both could be on leave at the same time if they so wished. The benefits available to parents active in the labour market were 80% of their prebirth average salaries, and initially there was no ceiling on these benefits. A birth grant, a considerably lower amount, was paid to those

² During the economic crisis, parents were allowed to take advantage of the parental leave for up to 36 months from birth, instead of the previous 18.

not active in the labour market (as defined by the Act) and to students. The Act provided increased labour market security for pregnant women, parents could not be fired (unless under specific circumstances), and they maintained all occupational rights while on leave (Alþingi 2000; Eydal and Gíslason 2008b). After the implementation, Iceland had the shortest parental leave among the Nordic countries, but the longest untransferable leave time for either parent (Moss and O'Brien 2006; Eydal and Gíslason 2014).

The parental leave scheme, after it was reformed, provided financial incentives for men to contribute more to the childrearing – an inducement that had commonly been lacking (Goldscheider, Bernhardt, and Lappegård 2015). As the Nordic parental leave model in general, the reformed policy in Iceland thus addresses two aspects of parenting – ‘practical parenting’ and ‘economic parenting,’ to use the terminology of Lappegård and her colleagues (2011). The first term relates to childrearing and the availability to take care of one’s child (leave length and parent’s quota), while the second relates to the parents’ financial obligations to the family (manifested in generous income-related parental leave benefits).

2.3.3 Use of leave and the emergence of the economic crisis

The parent’s quota appears to have been successful in increasing the fathers’ use of the parental leave. In 2000, fathers used only 3% of the total leave days – the lowest among the Nordic countries (Nordic Statistics 2016). Three years later, in 2003, fathers used around one-third of the leave – the highest in the world to our knowledge – and around 90% of fathers took parental leave (Statistics Iceland 2018; Gíslason 2007). There is no available information about the proportion of mothers who use the leave, but aggregate figures indicate that the coverage is close to 100%, and around 85% of leave-users were active in the labour market before taking leave (Statistics Iceland 2018). Table 1 contains year-by-year information on mothers’ and fathers’ use of parental leave.

In 2005, a ceiling was introduced at €2,780 per month before income tax. The maximum benefits followed the consumer price index, and the ceiling was thus gradually raised on yearly basis, right until the financial crisis hit in late 2008. During 2009–2010 the ceiling was lowered in steps, and instead of providing parents with 80% of previous income as before, the rate was lowered to 75% of income over €1,158, up to the maximum of €1,737. Almost half of the fathers and around 20% of mothers were affected by these changes (Eydal and Gíslason 2014).

Table 1: Average number of parental leave days used by fathers and mothers and benefit ceiling by year in Iceland 2000–2013 by birth year of child

Year	Fathers	Mothers	Maximum benefits (EUR/month)**
2000	5*	156*	Low flat rate
2001	39	186	None
2002	67	187	None
2003	95	183	None
2004	96	182	None
2005	101	187	2,780
2006	100	185	2,919
2007	100	181	3,000
2008	102	178	3,102
2009	99	178	2,316 / 2,027
2010	93	179	1,737
2011	90	180	1,737
2012	88	180	1,737
2013	88	182	2,027

Note: *Estimated number of days. **We used the 2009 average exchange rate between ISK and EUR in our calculations.
Source: Statistics Iceland (2018) and Ministry of Welfare (2016).

Combined with a drop in income and increased insecurity in the labour market in general, the decrements in benefits seem to have had negative effects on fathers' use of parental leave (Sigurðardóttir and Garðarsdóttir 2018). In Table 1 we can see that the absolute number of parental leave days used by fathers, for children born in the respective years, fell by 14% between 2008 and 2013 – from 102 to 88 days, after a period of constant increase in fathers' uptake before the crisis. Mothers, on the other hand, still used the same levels of parental leave days for children born in 2013 as in 2008. At the same time, several municipalities decreased the length of daytime care available to children and/or increased their fees (Eydal and Gíslason 2014). Combined, the measures taken during the economic crisis thus had deteriorating effects on the overall support to families and appear to have increased the gender gap in parental leave use (Sigurðardóttir and Garðarsdóttir 2018).

3. Methodological approach

In what follows, we treat the increased support to families as a form of critical juncture – a short period of time at which a change occurs that is likely to lead to changes in behaviour. In other words, we assess fertility outcomes at the time of and after the

reform in relation to prior behaviour, which minimizes the role of endogeneity (Neyer and Andersson 2008; Blossfeld, Golsch, and Rohwer 2007).

In the analysis we approach the childbearing dynamics from three directions: First, we produce standardized parity-specific birth intensities and present them as annual indices of first, second, and third birth rates. This presentation gives us a comprehensive overview of the underlying childbearing behaviour during the study period (1998–2013). Second, as the standardized rates do not distinguish adequately between timing and quantum of births, we analyse first-birth risks by age of women, and second- and third-birth risks by the age of the youngest child. In addition to providing us with information about developments in the timing of births and birth intervals over time, the findings indicate whether changes in fertility are related to tempo or quantum changes. Third, we follow real cohorts of women who gave birth to their first or second child in 1998–2005, and present Kaplan–Meier nonparametric estimates to see what the actual outcomes are in terms of second and third births.

3.1 Data

We used official longitudinal register data from the Icelandic National Registry in the analyses. We have access to the full childbearing history of the total female population born in Iceland between 1953 and 1997, the birth order of every child born to these women and, where appropriate, their complete migration history and the time of any death with monthly precision. The study thus draws its strength from its population-based time-series format, and accuracy of information: Hence, statistical power is of little concern; sampling biases and errors are irrelevant. One of the limitations that often accompany the use of population register data in research entails a restriction in the number of available explanatory variables. In our case, we do not have access to micro-level socioeconomic data that we might have employed in our analysis if not for data protection stipulations.

3.2 Method

By the means of event history analysis, we estimate the relative risks of giving birth derived from parity-specific, piecewise constant exponential models. The risk of giving birth in any given year is presented relative to the risk in the year 2000, unless otherwise specified, and is standardized for age and, when appropriate, duration since previous birth. In later sections the risk is interchangeably referred to as hazard, birth intensity, standardized birth rate, or propensity to give birth. In the analysis of first-birth

intensities, women become exposed at age 15 and stay exposed until they give birth, or are censored, or reach the end of the study period on 31 December 2013, whichever comes first. For second- and third-birth intensities, the ‘exposure clock’ starts running at the time of the previous birth and stops when women give birth the second or third time, when they are censored, or at the end of the study period, as before. When analysing first-birth intensities, women are precensored if they gave birth before 1998, before turning 15, or on the grounds of international migration if they did not return before their 15th birthday. With regard to second and third births, mothers are precensored if they had multiple births the first or second time, gave birth to a second or third child before 1998, emigrated before having their first or second child, or if they gave birth to their first or second child after age 46. In all the parity-specific analyses, women are right-censored at time of death or emigration, or when they turn 46. Observational spells that refer to periods before 1998 are excluded from the analysis (left-truncated).

4. Results

4.1 Annual indices of first, second, and third births

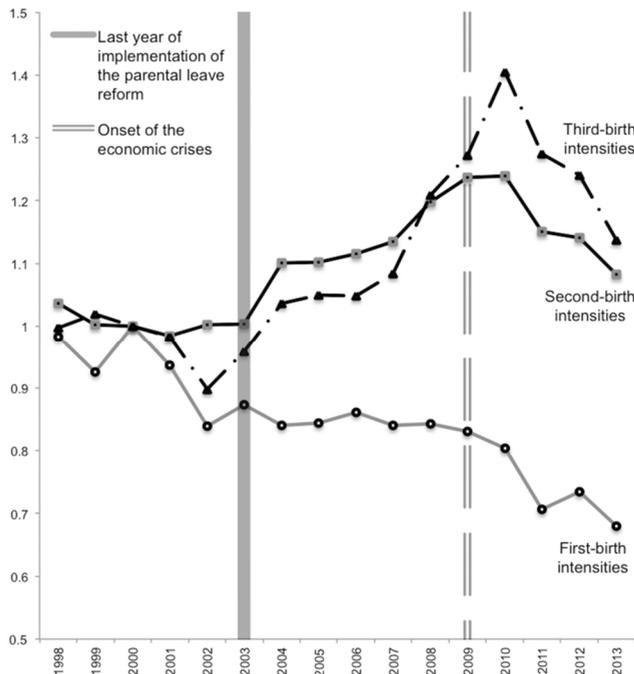
Figure 4 features the standardized annual indices of first-, second-, and third-birth rates between 1998 and 2013. The relative risks are comparable within each specific birth order but offer no information on the absolute differences between the propensity to give birth to a first, second, and third child. (For an overview of standardized second- and third-birth rates relative to higher order births, see Jónsson 2017.)

Albeit with some random variation from one year to the next, the first-birth intensities declined between 1998 and 2002, when they were approximately 85% of what they had been in 2000. After this, a period of stability took over. Almost nothing happened in the first-birth rate between 2004 and 2009; in 2009 the propensity to become a mother was 17% lower than in 2000, compared to 16% lower in 2004. However, in 2010 the birth intensities again began to decline, and in 2013 they were around 30% lower than in 2000 and almost 20% lower than in 2009.

Although the developments over time in the second- and third-birth rates are similar, we can see that the changes in the third-birth rate are more intense (Figure 4). The second-birth rate starts rising in 2004, after a relatively stable period of six years. The upward trend continues for six years with a similar intensification, before coming to a halt in 2010, when the propensity to have a second child was around 25% higher than in 2000. The third-birth rate shows a similar pattern (but the elevation in the rate takes off a year earlier, in 2003). Compared to the year 2000, the propensity to have a

third child was almost 40% stronger in 2010, after continuous intensification from 2002 onward. The rise in both rates conforms to the timing of the reform, and they continue to climb until 2010. In 2011 the second- and third-birth rates begin to decline and continue to do so until the end of the study period in 2013, when the rates are 8% and 14% higher than in 2000, respectively, but 13% and 19% lower than in 2010.

Figure 4: Relative risks of first, second, and third births in Iceland 1998–2013. Standardized for age of woman and age of youngest child. Rates are relative to birth rates in 2000 for each birth order (separate models)



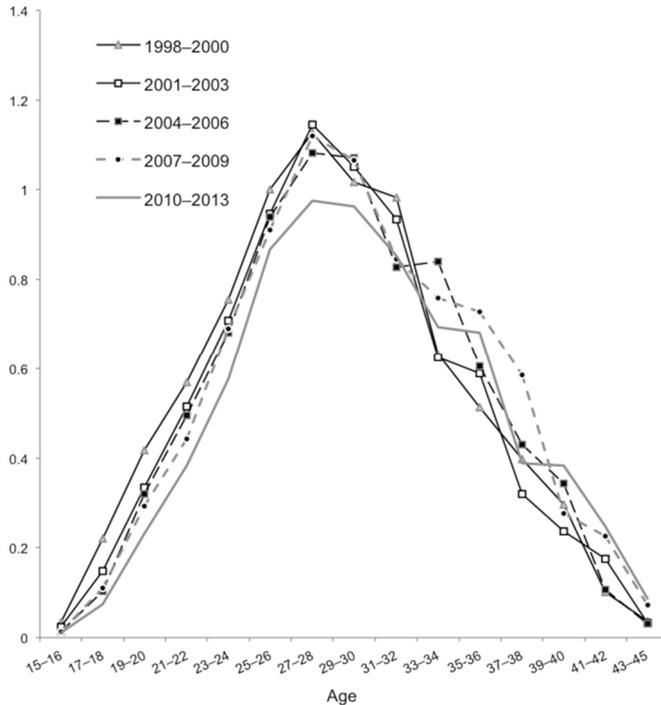
Source: Icelandic register data, author's calculations.

4.2 Developments in the timing of births and birth spacing by parity

Figure 5a indicates that the stability in the first-birth rates during 2003–2009 (Figure 4) is connected to invariability in the age-specific birth risk at ages below 30 in particular. In other words, the ongoing postponement in first-birth fertility comes to a halt during

these years. In 2010–2013 there is a drop in the age-specific birth risk among women under the age of 32, indicating a renewed state of postponement of parenthood.

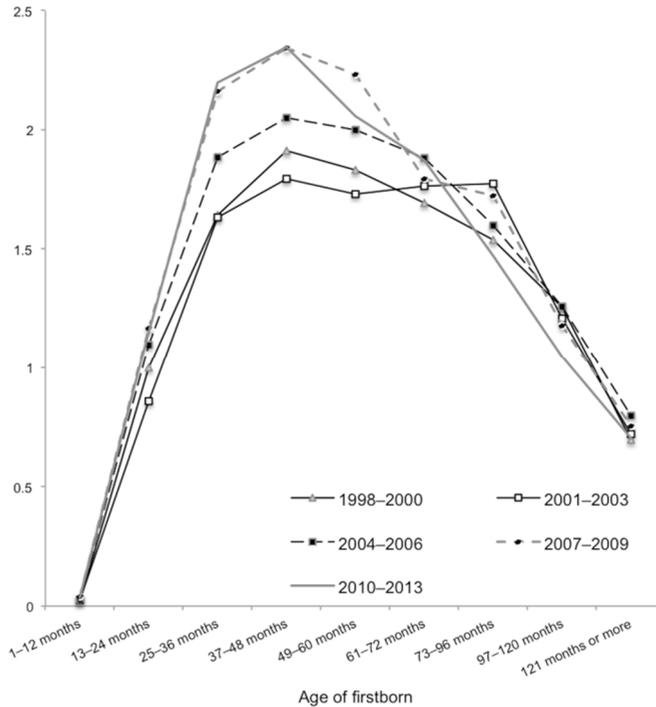
Figure 5a: First-birth rates in Iceland by age of woman 1998–2013. Rates are relative to first-birth rates of 25–26-year-olds in 1998–2000



Source: Icelandic register data, author's calculations.

When we compare similar groups with respect to the mother's age over time, it is evident that the birth spacing patterns between the first and the second child began to change after the implementation of the reform (Figure 5b). With regard to the birth risks over duration since first birth, the interval between the first and the second child was smaller after the implementation of the reform than before or during it, indicating a change in tempo – intensifying with time. The new birth spacing patterns do not seem to have vanished during the economic crisis; they are similar to the ones in 2007–2009.

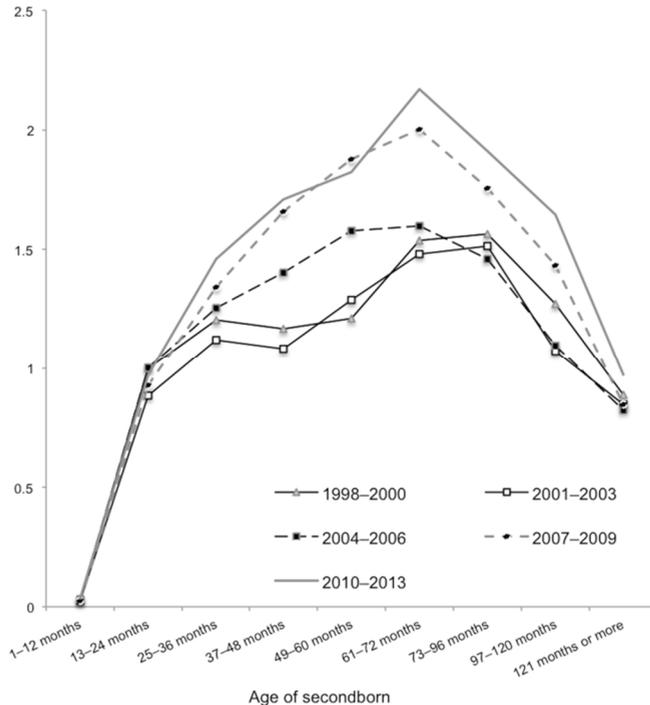
Figure 5b: Second-birth rates in Iceland 1998–2013 by time since previous birth. Standardized for age of mother. Rates are relative to duration 13–24 months in 1998–2000



Source: Icelandic register data, author's calculations.

We can see changes over time in birth spacing between the second and third births as well, but these changes are more extensive and also relate to the levels of fertility (Figure 5c). The relative third-birth rate increased during the first five to six years from the birth of the second child after the implementation of the reform, and over most of the duration in the years after 2006. Hence, we see strong indications of a change in tempo and also indications of changes in levels in the third-birth rate when we adjust for compositional changes in age during the calendar periods.

Figure 5c: Third-birth rates in Iceland 1998–2013 by time since previous birth. Standardized for age of mother. Rates are relative to duration 13–24 months in 1998–2000



Source: Icelandic register data, author's calculations.

When it comes to both parities, the hazard is lowest during the implementation of the reform (2001–2003). The difference between 1998–2000 and 2001–2003 is only marginal. In contrast, subsequent patterns are very different, and they intensify over time. This difference can be taken as an indication that the reforms are, at least in part, associated with the new patterns – especially considering that the old childbearing patterns had been relatively homogeneous from the 1980s until the turn of the century (Jónsson 2017). The slight decrease in first- and third-birth rates between 2001 and 2003 (Figure 4) may indicate that some of the women waited with having (another) child until full benefits' rights came into effect.

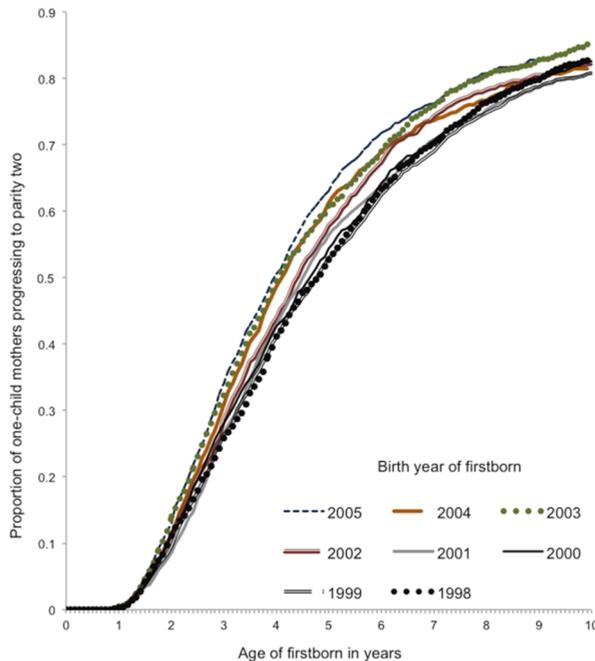
To sum up, our findings indicate that the first-birth intensities declined during most of the study period – albeit a period of stability in the standardized first-birth rate is evident after the reform. Hence, we can assert that neither earlier entry into

parenthood, or potential recuperation effects stemming from previously delayed parenthood are the main driving forces behind the elevated (aggregate) fertility after the reform. Fertility changes in the 2000s, as depicted in Figure 1, appear to be mostly related to the developments in higher order births. We thus proceed to present Kaplan–Meier estimates for these birth orders.

4.3 Realized fertility

The Kaplan–Meier nonparametric estimates (Figures 6a and 6b) coincide with our previous observation regarding changes in the birth intervals (Figures 5b and 5c). Developments over time in second births appear to be closely related to fertility timing (i.e., a faster progression to parity two), while the developments in third births appear to be associated with both tempo and quantum effects in fertility.

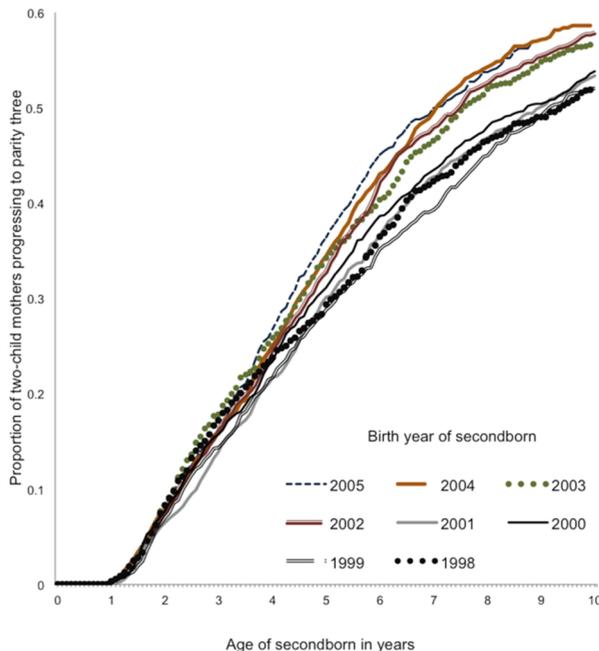
Figure 6a: Second-birth Kaplan–Meier cumulative probability estimates in Iceland by age and birth year of firstborn



Source: Icelandic register data, author's calculations.

The estimates indicate that changes in the timing of second births materialize with mothers who gave birth to their first child in 2002. Mothers who gave (first) birth in 2002–2005 progress faster to parity two than mothers who had their first child in 1998–2001. The estimates suggest that it took 56 months for half of the mothers of the 2000 birth cohort to proceed to parity two, compared to 49 months for women who became mothers in 2003.

Figure 6b: Third-birth Kaplan–Meier cumulative probability estimates in Iceland by age and birth year of second born



Source: Icelandic register data, author's calculations.

There are more profound changes in the estimates of two-child mothers progressing to parity three. A new pattern emerges with mothers who had their second child in 2002. The behaviour among mothers who gave birth during 1998–2001 is very similar, both with regard to timing and final progression rate, measured ten years after previous birth. Already after the second-born turns four, two trajectories begin to form: one constituting mothers who gave birth to their second child before 2002, and the other constituting of mothers who gave (second) birth in subsequent years. Ten years from

previous birth, 57–59% of mothers whose second child was born after 2001 had given birth to a third child, compared to 52–54% of mothers who gave birth to their second-born before 2002. Furthermore, it took 105 months for half of the women who gave birth to their second child in 2000 to proceed to parity three, compared to 91 months for mothers who gave birth to their second child in 2003.

5. Discussion and limitations

At the turn of the century, the Icelandic authorities enforced a double strategy – consisting of a reformed parental leave program and an increase in the volume of public day care – to support the dual-earner family model in Iceland. The reforms shared the same underlying principle, they were implemented stepwise around the same time, and together they form a holistic (improved) childcare-package available to parents in Iceland, making it hard to disentangle one policy from the other.

After the implementation of the parental leave reform, around one-third of the total leave days were used by fathers – as compared to just 3% in 2000. Hence, the changes appear to have succeeded in increasing fathers' participation in early childrearing and thus fulfilling one of the main aims of the reform. Arguably, the changes also may have led to higher levels of gender equality in family-oriented institutions. Around the same time, the portion of one-year-old children admitted to playschools increased from one-in-ten to one-in-four, and the coverage for two-year-old children increased by 35 percentage points between 2000 and 2003 – presumably relieving parents of much of their previous family-care responsibilities.

In terms of the childbearing dynamics, our analysis indicates that the change in fertility development coincides rather closely with the emergence and development of the reformed family-policy regime. We observe a reversal of the previous (declining) fertility trend occurring at the same time as the provisions came into effect. The propensity to have a second and a third child intensified constantly from 2003 to 2010, after a period of relatively stable and even declining birth intensities before that. In particular, there was an increase in second- and third-birth intensities at shorter birth intervals after the reform, and the new birth spacing patterns were maintained until 2013 at least. With some good will, one can see indications of changes in the development of the first-birth rate as well. The first-birth intensities were quite stable during 2004–2009, after a declining trend before this, and did not decrease again until after the economic crisis hit. Perhaps the most important observation is that the childbearing behaviour did not begin to change until after the implementation of the family-policy package began, and that the change was not temporary but evolved into almost a decade-long trend of gradual fertility increase.

We should keep in mind that, even though the timeline of family policy changes corresponds fairly well to changes in the birth rates, our data does not allow us to distinguish between the influence that the reforms may have had on childbearing dynamics and the effect of other potential influences such as the economy – or any other unobserved determinants, for that matter. Almost parallel to the reforms in the parental leave and childcare system, there was an upswing in the economy, which presumably worked as another possible positive influence. The TFR in the other Nordic countries rose at the same time, and most of Europe experienced increased fertility during this period of economic upswing. It has been proposed that a positive economic situation and family policies worked together in elevating the TFR in Sweden in the 1980s (Hoem 2005) and, given the similarities of the Nordic countries and the design of their childcare policies, the findings here suggest that a similar development may have taken place in Iceland.

We observed that the average number of parental leave days used by fathers began to decrease around the same time as the crisis hit: Fathers used 14% fewer days for children born in 2013 than for those born in 2008. This difference could be related to ‘breadwinner sensitivity,’ a reaction to economic hardship triggered by the crisis, and perhaps an indication that more couples decided to postpone or discontinue their childbearing, and fathers, especially, could not afford the cut in income that the use of leave would entail. This reaction may suggest that the monetary part of the benefits is no less important than the quota given to fathers in terms of benefit days, and that the former also influences the number of days fathers will exploit (see e.g., Eydal and Gíslason 2014; Sigurðardóttir and Garðarsdóttir 2018). Furthermore, this reaction could be seen as an indication that policies that exclusively go in the direction of practical parenting (of fathers) but neglect the part of economic parenting may prove less successful.

Albeit our data does not allow for detailed analysis, the overall decline in birth intensities after 2010 implies that the economic crisis did more than trigger a decline in the use of parental leave by fathers: It may also have played a decisive part in reversing the previous fertility trend that started in 2003. All the parity-specific birth rates began to drop stepwise around the same time and continued to do so until the end of the study period in 2013. The most profound decline was in the third-birth rate, but the first- and second-birth rates fell sharply as well.

We cannot with full conviction explain why the turnaround occurred when it did (i.e., in 2011 but not in, for instance, 2010). Economic crises can influence childbearing behaviour through various ways,³ for instance, through a loss of income and increased

³ The impact of economic recessions may depend to some extent upon parity, gender, the individual’s socioeconomic status, governmental support, and the nature of the recession itself (see e.g., Andersson 2000;

financial hardship; less secure working environment and scarcer employment opportunities; cuts in government-sponsored social policies; and a decrease in affordable housing – or to put it a bit more vaguely, simply through people’s perception of their present possibilities and future risks. Social policies – components of the Nordic welfare system – including the design of the parental leave scheme and unemployment benefits, may have acted as a cushion at the beginning of the crisis. Figure 1 shows that the total fertility rates in the other Nordic countries declined together with those of Iceland (even though the recession was much less severe in Scandinavia). Another possibility is that it took some three years for the impact of the crisis to materialize, step by step, through increased unemployment, financial insecurity, and sceptical views about the future in 2009; time to react to the changes in 2010; and, finally, nine months of pregnancy ending in 2011.

The development during the last years of observation indicates that family policies cannot compensate in full for the impact of economic crisis on fertility. It also implies that the family-care gender balance, and its correlates, is still fragile in one of the most gender-equal countries in the world during economic turbulence. However, considering the magnitude of the crisis in Iceland and the complex relationship between economic trends, family policies and fertility, both at the micro- and macro-level, as well as any potential individual effects of both family policies and economic cycles on fertility, our data is limited and reveals only the very tip of the iceberg – full-scale fertility decline, irrespective of parity, leaving us with speculative assumptions at best.

With regard to the childbearing trends after the crisis hit and the persistent fertility decline in Iceland despite a subsequent turnaround to renewed booming economy⁴, more research with richer data is required to gain better insight into the mechanisms at play. We leave it to future research to investigate whether there are social differentials in the childbearing behaviour in Iceland and to study the interplay of socioeconomic status and childbearing context. Little is known about the dynamics behind education and childbearing in Iceland and, considering the large increase in university education during the initial years of crisis, future research should consider whether this development may have had an impact on fertility outcomes – both during and in the aftermath of the economic crisis.

Sobotka, Skirbekk, and Philipov 2011; Kreyenfeld, Andersson, and Pailhé 2012; Kreyenfeld and Andersson 2014).

⁴ In the aftermath of the crisis, the Icelandic TFR fell below 1.9 for the first time in history. In 2016, it fell below 1.8 – during a GDP growth of 7.4% – and to 1.71 in 2017 (Statistics Iceland 2018).

6. Acknowledgements

Special gratitude goes to Gunnar Andersson and Gerda Neyer for their valuable help, comments, and guidance throughout the work. I also thank Ann-Zofie Duvander, my other colleagues at SUDA, and Ólöf Garðarsdóttir for their assistance, as well as my anonymous reviewers for their suggestions on how to improve the paper. I am grateful to Statistics Iceland and Guðjón Hauksson for preparing the data files, and the Data Protection Board (Trúnaðargagnanefnd) for approving this study (Application 7/2014). This work was supported by the Swedish Research Council (Vetenskapsrådet) via the Swedish Initiative for Research on Microdata in the Social and Medical Sciences (SIMSAM) under grant 340-2013-5164; and the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 320116 for the research project FamiliesAndSocieties, to which I am grateful.

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