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Research Article

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Caroline Berghammer

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Torkild Hovde Lyngstad

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Caroline Berghammer[1]

Anna Matysiak[2]

Torkild Hovde Lyngstad[3]

Francesca Rinesi[4]

Abstract

BACKGROUND
A central question in family research is whether parents' social disadvantages, such as being a single parent or having low education, are becoming more concentrated over time.

OBJECTIVE
We contribute to this literature by examining long-term trends in the gap in single parenthood between more educated and less-educated mothers since the 1970s to around 2015, placing special emphasis on children's age.

METHODS
To this end, we rely on a unique compilation of censuses as well as labour force surveys from eight European countries representing different institutional and cultural contexts: Austria, France, Germany, Ireland, Italy, Norway, Poland, and the United Kingdom. The data were analysed using logistic regression models.

RESULTS
Our results show that the gap in single motherhood between highly educated and less-educated women generally changed over the period: Single motherhood increased disproportionally among less-educated women. The gap widened most among mothers with young children (0 to 4 years) and somewhat less for mothers of children at age 5 to 9 years. For mothers with children aged 15+, the prevalence of single motherhood varied only moderately by the mothers' level of education.

[1] Vienna Institute of Demography, Austrian Academy of Sciences, Vienna, Austria.
Email: caroline.berghammer@oeaw.ac.at.
[2] LabFam, Faculty of Economic Sciences, University of Warsaw, Warsaw, Poland.
[3] Department of Sociology and Human Geography, University of Oslo, Oslo, Norway.
[4] Istituto Nazionale di Statistica (ISTAT), Rome, Italy.

CONTRIBUTION

These findings suggest that being a low-educated single mother and having responsibility for young children has become more tightly linked. This uncovers a double disadvantage in that low-educated single mothers who possess less resources also more frequently have younger-aged children in need of more time and other resources.

1. Introduction

The rise in divorce rates in recent decades has been accompanied by an increase in the prevalence of single parenthood. In 2023, 14% of households with dependent children across 27 European Union countries were single-parent households, mostly headed by mothers (Eurostat 2024a). Single parents typically have fewer financial and time resources than couple-parent households (Brown 2004; Craig and Mullan 2012; Maldonado and Nieuwenhuis 2015), making it a topic of high societal and policy relevance. In most countries, nowadays, there is a clear negative education gradient in single motherhood with lower-educated mothers being at a higher risk of being single mothers (Härkönen 2017). This implies a concentration of two disadvantages in these households, mostly so because single motherhood and low education have both been linked to high poverty risks (Brady, Finnigan, and Hübgen 2017). Previous research shows that the education gradient in single motherhood significantly increased over time, particularly in the United States (McLanahan and Jacobsen 2015). Concerns have been raised that this could mean – especially in combination with other family behaviours, such as lower age at parenthood or less employment – increasingly unequal life chances of children from families with different educational backgrounds. McLanahan aptly terms this development "diverging destinies" (McLanahan 2004). While research on family structure and social class has been abundant in the United States (e.g., Carlson and England 2011; Cherlin 2014; Ellwood and Jencks 2004), there is much less evidence for European countries. Recent research has examined time trends in single motherhood by education for Italy and Spain in 2005 and 2011 (Garriga, Sarasa, and Berta 2015) and Spain in 1991, 2001, and 2011 (Garriga and Cortina 2017). Härkönen (2017) analyses the education gap in single motherhood for 25 European countries (33 countries in total) from around the mid-1980s and early 1990s until 2015. Despite marked cross-country variation, this research generally finds a strengthening of the negative relationship between single motherhood and education, although the recent education gap is nowhere as large as in the United States.

Our study extends this research by concentrating on children's age in interaction with education. As previous research did, we show, for eight European countries since

the 1970s until around 2015, how the rate of single motherhood developed by educational level but also by children's age. Children's age matters for several reasons. Parents' time resources needed for children differ by their age. Younger children are much more care intensive and thus require significantly higher parental time investments (Milkie, Raley, and Bianchi 2009). Physical care of young children is generally demanding, and frequent illnesses and a lack of sleep can lead to feelings of exhaustion (Hagen et al. 2013). Furthermore, combining employment with childcare tends to be more challenging with young children especially in country contexts with a 'care gap' – that is, formal or informal care availability being insufficient for meeting carers' needs (Kröger 2010; Grönlund and Öun 2020). Indeed, studies report the highest levels of time-based work–family conflict among mothers with infants and in preschool age (e.g., Steiber 2009; Notten, Grunow, and Verbakel 2017). Consequences of union disruption for personal relationships also vary by children's age. If a divorce/separation takes place at a younger child's age, maintaining close contact with the nonresident parent over a longer period of time is more difficult (e.g., Meggiolaro and Ongaro 2015), and children may more often experience changing family arrangements (OECD 2011). For all these reasons we argue that an onset of single motherhood at young children's ages may exacerbate the existing disadvantages associated with lone motherhood in combination with low levels of maternal education. It thus warrants closer attention in the context of the discussion on diverging destinies.

We include eight European countries: Austria, France, Germany, Ireland, Italy, Norway, Poland, and the United Kingdom. We selected countries from various geographic regions with (partly) distinctive family behaviours: Nordic (Norway), Western (France, Ireland, United Kingdom), German-speaking (Austria, Germany), Southern (Italy), and Eastern (Poland) (Sobotka and Berghammer 2021). These countries also represent different welfare state regimes (Bambra 2007): Norway belongs to the social democratic regime; Austria, Germany, and France are assigned to the conservative cluster (although Austria and Germany are much more familialistic than France) and Italy to the Latin Rim; the United Kingdom and Ireland are liberal countries; and Poland falls between a conservative and liberal welfare state (Javornik 2014). The countries differ in their prevalence of single motherhood, as well as institutional context (e.g., support for single mothers, conditions for work–family reconciliation) and cultural context (e.g., attitudes towards single parents) (see Section 3). Our country selection was also constrained by data availability as we included only countries which dispose of a long time series, granted access to these data, and had information on family relationships in the dataset (for details, see Section 4). This comparative approach allows us to consider institutional and cultural factors on the country level. The research is exploratory in that we show cross-national differences and propose and discuss potential contextual factors that may explain them. However, because we follow a "small-country-sample approach"

(Yu 2015), including eight countries, we cannot formally test how country context shapes the observed patterns.

A unique feature of the study is also its database, which contains various high-quality data sources (censuses, labour force surveys) covering five decades. These data allow us to expand on previous efforts in two important ways: First, the sample sizes are large enough to examine the interaction between education and age of the youngest child, as well as changes over time, in detail. Since the data are cross-sectional, we cannot – similar to previous research (Garriga and Cortina 2017; Garriga, Sarasa, and Berta 2015; Härkönen 2017) – trace individuals' trajectories in and out of single motherhood, but we will show patterns by family life-course stage (age of the youngest child). Second, we can study a longer time period starting in 1971 to 1978 (for France, back to 1962) and thus complement prior contributions that have all examined later periods. This is important as the steepest rise in the European divorce rate took place during the 1970s. Early predictions presupposed that, in the initial phase, divorce rates will be higher among highly educated persons because they have more resources and are better able to defy obstacles such as strict divorce laws or social norms against divorce (Goode 1962).

The structure of the paper is as follows. In the next section, we provide an overview of previous research, focusing on evidence related to single motherhood, the education gradient, and the children's age (Section 2). Section 3 presents the institutional and cultural contexts of the eight countries under study. This is followed by a description of the data and methods in Section 4 and, subsequently, the empirical results in Section 5. The final section summarises the main findings and discusses implications for policies and future research (Section 6).

2. Background

2.1 Single motherhood and education

Although there has been a general increase in the prevalence of single parenthood across Europe, regional variation continues to persist. The Nordic countries, France, and Lithuania displayed the highest rates of more than 20% single-parent households (out of all households with dependent children) in 2023, while the rates were lowest in Southern Europe, some of the more traditional Eastern European countries (Poland, Romania, Slovakia) and the former Yugoslavian countries, where the range was around 5%–10% (Eurostat 2024a). Our study focuses on single mothers, because less than 10% of sole-parent families were headed by fathers (OECD 2011: 239). There are different pathways into single motherhood: single at childbirth, following a separation/divorce, or the death of a spouse. The by far most common pattern is through a separation or divorce

(Andersson, Thomson, and Duntava 2017; Perelli-Harris et al. 2012). In many European countries, children's mean age at their parents' union disruption was seven years (Andersson, Thomson, and Duntava 2017; Table A-33). In the years after the union disruption, the majority of single mothers enter another relationship while permanent single-parent households are rather infrequent (e.g., Bastin 2019).

As with the United States, most European countries show a negative educational gradient regarding single motherhood, which has increased over the past decades (Härkönen 2017). This development corresponds to both a strengthening of the negative relationship between education and the likelihood of divorce (Härkönen and Dronkers 2006; Hudde and Engelhardt 2023; Kalmijn and Leopold 2021; Matysiak, Styrc, and Vignoli 2014) and single motherhood at birth, respectively (Brzozowska 2014; Koops, Liefbroer, and Gauthier 2017; Perelli-Harris et al. 2010). By contrast, in Southern Europe (Greece, Italy, Spain) and some Eastern European countries (Hungary, Romania), the rates of single parenthood have remained fairly consistent across educational groups (Garriga and Cortina 2017; Garriga, Sarasa, and Cortina 2015; Härkönen 2017). Lower education is linked on average to lower financial means and more strain from employment, health, social relations, and residence (such as poorer health and poorer quality housing) – while at the same time disposing with lower resources to adapt to and cope with these strains (for an overview, see Hogendoorn, Kalmijn, and Leopold 2022).

The US literature proposes rising economic inequalities as a main factor driving the increasing educational gap in single motherhood. Growing labour market uncertainties due to ongoing globalisation and a weak redistribution system from wealthy to poor population groups strongly contributed to a rise in the country's income inequalities (Blundell et al. 2018; Oppenheimer 1994). These uncertainties have placed additional strain on family relationships, as has also been documented for other country contexts (Hogendoorn, Kalmijn, and Leopold 2022). However, an economic explanation does not often coincide with patterns observed in Europe, as Härkönen notes (2017). The educational gaps in single motherhood are of similar size in the United Kingdom, the United States (both countries with relatively high income inequality) and the Nordic countries (low income inequality). In France, the gap expanded despite stable income inequality, while there is no gap in Italy despite high inequality (Härkönen 2017).

The growing education gap in single motherhood is of social and policy relevance because two disadvantages cumulate. Across the EU-27, single-parent households are the household type with the highest poverty risk of all (44% in 2023) (Eurostat 2024b). Single mothers also face more time pressures than mothers in couples (Craig and Mullan 2012; Kendig and Bianchi 2008). This situation tends to be exacerbated if single motherhood is more strongly concentrated among less-educated mothers, who are in more vulnerable labour market positions (e.g., lower activity rate, lower wages, higher unemployment risk, higher uncertainty) (Härkönen et al. 2021) and on average spend less time with their

children, in particular on developmental activities, such as reading or teaching (Altintas 2016; Kalil, Ryan, and Corey 2012).

In view of the ongoing educational expansion, we need to bear in mind that the group of low-educated single mothers is in decline and potentially rather small, yielding modest effects on the population level (Bernardi and Boertien 2017; Härkönen 2018). Still, at the individual level, the combination of two disadvantages may impact children's well-being and educational outcomes (Amato 2000, 2010; Raley and Sweeney 2020; Schulz 2022; Waldfogel, Craigie, and Brooks-Gunn 2010).

2.2 Single motherhood, education, and children's age

This study's focus is on education in interaction with children's age. We argue that children's age is an important yet often overlooked dimension. The amount of parents' childcare time needed depends on children's age. During a child's first years of life, demands for parental care are especially intense (Milkie, Raley, and Bianchi 2009). In many countries, the childcare system is not well-enough developed or too costly to significantly reduce parents' childcare burden or facilitate work–family combinations, resulting in a "care gap." This leads to weaker mothers' labour market attachment and lower income (Spitzer, Greulich, and Hammer 2022) and, at the same time, high work–family conflict (e.g., Steiber 2009). Hence, higher parental resources are most vital at this family life stage to afford, for instance, good quality childcare. A relationship breakdown at a child's younger age also implies that contact with the nonresident parent requires it to be maintained over a longer period. As research has shown, contact tends to decline over time, especially when the nonresident parent enters a new relationship or geographical distance increases (Meggiolaro and Ongaro 2015; Thomas, Mulder, and Cooke 2018). Younger children need a higher regularity of contact (Kelly and Lamb 2000) and, given the longer time period, they more often experience stepfamily formation or multiple transitions (parents entering and then exiting a new union) (OECD 2011). The kind of consequences also depend on children's age at relationship breakdown. Younger children may suffer, for instance, from separation anxiety or nightmares (Clarke-Stewart et al. 2000) or, as a longer-term consequence, a higher depression risk or lower attachment to both parents in teenage years (Allison and Furstenberg 1989; Steele, Sigle-Rushton, and Kravdal 2009; Kravdal and Grundy 2019; Woodward, Fergusson, and Belsky 2000). Consequences for older children may be more in the area of their school performance and behaviour at school (Cavanagh and Huston 2006, Francesconi, Jenkins, and Siedler 2010; Sigle-Rushton et al. 2014). Overall, we argue that single motherhood at a young children's age – especially if coupled with low education – may intensify the disadvantages related to single motherhood for both mothers and children.

3. Country characteristics

Since our research is exploratory, we do not formulate testable hypotheses but still discuss contextual factors and propose pathways relevant for the relationship between single motherhood and education. The description of the country contexts focuses on two types of resources critical for families (see Table A-1[5]): benefits and childcare. It also takes into account attitudes. Social benefits and alimony vary in amount and universality of access (general or means tested).[6] Following up on previous research findings showing that rates of single motherhood tend to be higher in countries with higher benefit levels (e.g., González 2007), we expect that single motherhood could be higher among low-educated single mothers (and thus the education gap larger) in countries where single mothers are better able to make ends meet through access to (means-tested) benefits. A secure financial basis is especially valuable for low-educated single mothers, who tend to be in economically more precarious positions than their higher-educated peers. As the indicator on social benefits shows (Table A-1, column 1), low-income single parents receive high amounts of (means-tested) benefits especially in the United Kingdom, Poland, and Ireland. Other countries, particularly Austria, provide more general benefits less targeted to this specific group. The share of social benefits is lowest in Italy, which spends a low share of its GDP on family benefits and mainly focuses on tax breaks, while there is limited cash support. In Austria, Poland, and Norway, high shares of lone parents receive alimony from the nonresident parent.[7] The at-risk of poverty rates before social transfers are highest in Ireland and the United Kingdom because of low employment rates among single mothers combined with their high shares of low education (Härkönen 2017), and lowest in Italy (with a weak single-motherhood education gradient). Despite marked differences in the at-risk of poverty rate before social transfers, the rate after social transfers is quite similar at around one-third in all countries (with the exception of Ireland, where it is higher). Ireland and Norway have the largest poverty gap relative to couples with children and Italy the lowest. To sum up, we expect that it will be easier for

[5] Due to data availability, the data presented in this section does not always cover the entire time span of the study.

[6] It would go beyond the scope of this paper to describe the social benefits available to single parents from different countries in detail. The specific policy mix may include family allowances supplements, tax breaks, parental leave policies, childcare benefits, social assistance or housing supplements, sole-parent income support and advances of maintenance payments (OECD 2011).

[7] Shared residence is a topic of growing relevance and important in terms of child well-being and contact to both parents; however, longer-term comparative data, especially by sociodemographic characteristics (such as education) are not available. A recent study documented equal joint physical custody of children in separated families of below 5% in Austria and Italy and around 15% in France (Hakovirta et al. 2023). Norwegian policies support the shared residence model, with shared physical (spending equal amounts of time at the mother's and the father's house) and judicial custody being much more common than the other countries; its share was about 30% in 2012 (Kitterød and Wiik 2017).

low-educated mothers to have a child when single or to leave a couple relationship after the child's birth if they receive a higher level of (means-tested) support (González 2007), which primarily applies to the United Kingdom, Ireland, and Poland, where the education gradient in single motherhood could thus be larger. In Italy, the level of social benefits is very low, which may prevent low-educated women from becoming single mothers, thus leading to a narrow education gap.

Comparing usage and costs of formal childcare between countries gives an idea about the 'care gap.' We expect that in countries with a well-developed childcare infrastructure, with good access also for low-income families, the education gradient in single motherhood could be larger. A well-developed, affordable childcare infrastructure is particularly important for supporting low-educated mothers' employment as they often do not have the means to buy care services at the private market (Scherer and Pavolini 2023). In terms of childcare, enrolment rates of three- to five-year-olds are highest in full-time in Norway, followed by Italy, France, and Germany (mostly Eastern), while they are much lower in the other countries. For below three-year-olds, enrolment rates are highest in Norway, France, UK, Germany and Italy, although full-time enrolment is only high in Norway and France. Very high childcare costs in the United Kingdom and Ireland (along with Poland) pose a key obstacle for single mothers and hinder mothers' employment (although this is moderated in the United Kingdom by income-based fee subsidies) (OECD Family database 2017). Combining work and family and thus coping financially is thus easiest for low-educated single mothers in countries like Norway and France, where the education gradient in single motherhood could in consequence be larger.

Besides resources in terms of benefits and childcare, we briefly discuss cultural attitudes towards single parents (Rijken and Liefbroer 2012). Attitudes are most favourable in the United Kingdom, Ireland (despite its Catholic tradition),[8] and Norway, and least favourable in Poland, where 93% agree in 2008 that a child needs both a mother and father (closely followed by Italy). Generally, lower-educated persons agree more often to this statement. Educational differences are largest in Ireland and France and, in 2008, also in Italy and Norway. However, there are no clear predictions as to how attitudes (and educational differences therein) relate with the education gap in single motherhood.[9]

[8] Ireland did not grant the right to divorce until 1997; as in Poland, there is no opportunity for a unilateral divorce (i.e., divorce without the consent of the other partner). Before 1997, single mothers were generally never married.

[9] In Ireland, the ban on abortions until 2018 and in Poland the highly restricted access to abortions since 1993 could have also resulted in a larger education gap, as having an abortion abroad (for Ireland in the United Kingdom) is costly and therefore typically affordable only for more affluent women. Within this context, Ireland has a history of (forced) adoptions: In the early 1970, still 60%–70% of nonmarital birth were put up for adoption (Adoption Board 2008).

4. Data and methods

We analysed changes in the educational gradient in single motherhood since the 1970s until around 2015 based on a comprehensive compilation of different data sources (i.e., censuses, national labour force surveys, and the harmonised European labour force surveys (EU-LFS)) (see Table 1). The data were obtained from different databases (e.g., IPUMS, UK Data Archive), national statistical offices, and Eurostat. Requirements related to data use differed by country; for instance, the Norwegian data could be accessed only in Norway, or the off-site use of German data necessitated remote data processing. Another obstacle was that some of the older datasets received little harmonisation or that the data documentation was available in only the national language, which was the case for Italy and Poland. Hence, we compiled a unique database, which we ensured contained countries from all European regions. We prioritised datasets that have information available on family relationships (in addition to household information) to be able to unambiguously identify single mothers that live in multifamily households. Families are defined as head, possibly partner, and child(ren) – including stepchildren and adopted children – and several families can form a household. Because we dispose with such information, we can, for instance, identify single mothers who live in multigenerational households together with their parents.[10] The EU-LFS has family information dating back to only 1998, which is why we partly rely on national labour force surveys.

The large sample sizes of censuses and LFS are an advantage that allow us to differentiate between single mothers by their education and age of the youngest child. The high LFS response rates are another advantage. Participation is compulsory in five countries (Austria, France, Germany, Italy, and Norway) and voluntary in the other three (United Kingdom, Ireland, and Poland). Accordingly, response rates are very high and nonresponse bias is low. For example, between 2003 and 2015 (the period for which comparable documentation is available), they were on average 97% in Germany, 90% in Austria, 89% in Italy, 85% in Norway, 82% in France and Ireland, 75% in Poland, and 65% in the United Kingdom (Eurostat 2004–2016). A limitation of the LFS is that the

[10] If information on only household relationships is provided in a dataset, single mothers in multifamily households cannot be unambiguously identified. For instance, single mothers who live with their parents (the children's grandparents) will themselves be coded as 'child,' their children as 'other,' and their parents as 'head' and 'head's partner.' In case that several adult persons coded as 'child' live in the household (that is, siblings), it cannot be clearly identified who is the parent of the young 'other.' Similarly, if an adult person coded as 'other' lives in the household, we would have to assume she/he is the partner of the adult 'child' (and, in case there are several, which one's). Bradshaw and colleagues (2018) show that differences in rates of single motherhood between the household and the family definition may be considerable, in particular for Central Eastern European countries, the Balkan, and Southern European countries. The household definition for some of these countries underestimates single-parent families by 40%–50%. In addition, the education effect may be biased, as lower-educated single mothers probably more often live in a household with their parents in order to share resources.

data are cross-sectional, which prevents us from studying mothers' pathways into and out of single motherhood (Garriga and Cortina 2017; Garriga, Sarasa, and Cortina 2015; Härkönen 2017). Because of the predefined age brackets of five years by Eurostat (e.g., ages 0 to 4), we cannot provide more fine-grained analyses (e.g., births by single mothers). We are also unable to distinguish between two biological parents and step-parent families. For these reasons, we cannot know, for instance, to which extent a decline in the share of single mothers with children's age is due to repartnering. Furthermore, it is a limitation of compiling different data sources over a long period of time that only a small set of variables, measured in comparable ways, is available in all datasets. For instance, we could neither include country of birth nor urban/rural region because those variables were not comprised in some of the older datasets and/or not measured similarly.

Table 1: Overview of survey characteristics

	Survey	Years	Overall size of analytical sample (mothers with or without partner)
Austria	Population census	1971	277,620
	National LFS	1984–2017	
France	Population census	1962, 1968, 1975, 1982, 1990, 1999, 2006, 2011	7,566,192
	EU-LFS	2012–2015	
Germany	National LFS	1973, 1980, 1985, 1990, 1995, 2000	609,551
	EU-LFS	2005–2015	
Ireland	Population census	1971, 1981, 1986, 1991, 1996, 2002, 2006, 2011	518,364
	EU-LFS	2012–2015	
Italy	National LFS	1977–2017	4,978,235
Norway	National LFS	1976–2016	116,524
Poland	Population census	1978	1,106,855
	National LFS	1993–1999	
	EU-LFS	2003–2015	
United Kingdom	National LFS	1975, 1977, 1979, 1983–1991, 1994, 1995	639,212
	EU-LFS	1998–2015	

Note: Population censuses are 10% samples from IPUMS (Ruggles et al. 2024). Exception is France, e.g. 5% in 1962–1982 and 1999.

Single mothers are denoted as women (of all ages) who live with their biological and nonbiological child(ren) up to age 19, but without a partner in the family. We disregard women's marital status – that is, we include single, divorced, widowed, and married women.[11] The censuses and LFS are standardised, allowing us to apply this

[11] This is a broader definition of single mothers than Härkönen (2017) and Garriga and Cortina (2017), who exclude widowed women, and Konietzka and Kreyenfeld (2017), who consider women who live without a partner in the household but are married as being in a partnership (rather than single mothers). The rationale for including widowed women is that many of the everyday parenting challenges are similar for widowed and nonwidowed single women and that, in any case, we cannot distinguish between different pathways into single motherhood (single mother at childbirth, death of a partner, or due to a separation or divorce). Widowed women represent a very small group, typically comprising less than 5% of all single mothers. Women who live as single

definition uniformly across all eight countries. It can unfortunately not be determined whether children alternate between two households (mothers', fathers'). According to the EU-LFS guidelines, children are reported to live in the household that they spend most of the time in (usual residence concept). If they spend equal amounts of time in two places of residence, they are counted towards the household where they are present during the reference week.

Our analytical approach is as follows: As descriptive analyses, we present changes in the shares of single mothers by education and age of the youngest child over time. All descriptive analyses are weighted using weights combining a correction for the sampling design and sociodemographic characteristics (e.g., varying by country, sex, age, urban/rural) (Eurostat 2004–2016). Subsequently, we estimated logistic regression models separately for each country, pooling all years, with single mothers versus partnered mothers as the dependent variable.[12] Unfortunately, we cannot provide multivariate analyses for Germany because, for legal reasons, the national LFS (1973–2000) and the EU-LFS (2005–2015) cannot be pooled. As Germany is a very large country in terms of population size in Europe – and besides Austria, the only familialistic conservative country we can include – we still retained it for the descriptive part. Because we do not include a sufficient number of countries, we are unable to formally test with multilevel models how the education gap in single motherhood (and the change therein) depends on country-level factors. Another restriction is that few indicators in comparative policy databases are available for a period of around five decades. We hence follow an exploratory approach, where we suggest and discuss contextual factors (as presented in Section 3), without stating or formally testing hypotheses.

As explanatory variables, we used educational attainment (in the first set of models), an interaction between educational attainment and age of the youngest child (in the second set of models), and a three-way interaction between educational attainment, year, and age of the youngest child (in the third set of models). For control variables, we included the number of children, mother's age, and mother's age squared. Independent variables are defined as follows: Year is centred around the first survey year in a country. Education is categorised into low (ISCED 0–2), medium (ISCED 3–4), and high (ISCED 5–6). Low education denotes primary and lower secondary education, medium education denotes upper secondary and post-secondary nontertiary education, and high education denotes tertiary education. Age of the youngest child is defined as 0–4 years, 5–9 years, 10–14 years, and 15–19 years (in line with the age brackets available in the EU-LFS).

but are married were also included, because, depending on the legal framework in a country, many of them may be in the process of divorce. We cannot distinguish them from stable living-apart relationships, but we assume that those are less prevalent, particularly in the earlier periods.

[12] Because of the large differences in sample sizes between censuses and the LFS in Austria, France, and Poland, we weighted the data for the multivariate analyses so that sample sizes were comparable (5,000 per year in Austria, 100,000 in France, and 30,000 in Poland).

The number of children is grouped into 1, 2, and 3 or more. Mother's age is centred around the country mean. As robustness checks, we also estimated models where we excluded the number of children and mother's age and children's age, respectively (see supplementary material).

Although all countries in this study witnessed a major increase in the share of highly educated women and a related drop in the share of the low-educated, regional specificities regarding education structure remain (see Appendix Table A-2). Ireland, Norway, the United Kingdom, and France display the largest shares of highly educated women, while medium education is widespread in Austria, Germany, and Poland, and Italy has the largest share of low-educated women. The far-reaching educational expansion in all the countries likely altered the selection of women into different educational groups (the low-educated became more selected, the highly educated became less selected), but also changed the signalling effect of educational degrees towards employers (Gesthuizen, Solga, and Künster 2011). In order to address the issue of changes in the educational structure empirically, we estimated logit models exemplary for Austria and France, where we added a control for the share of low-educated mothers at the regional level (NUTS 2) in each year (to avoid collinearity with the individual-level education measure). The results are displayed in the Appendix (Table A-3) and discussed briefly in footnote 13.

5. Empirical results

First, we demonstrate trends in single motherhood by mother's education and age of the youngest child. Figure 1 shows the share of single mothers among low, medium, and highly educated mothers in families where children are of any age (panel A), where the youngest child is age 0 to 4 (B), and where the youngest child is age 15 to 19 (C). As Figure 1, panel A depicts, the education gap between low- and highly educated women expanded most strongly in the United Kingdom and Ireland (approximately 20 percentage points around 2015), followed by France, Norway, and Poland (10–15 percentage points). Educational differences are least distinctive in Austria and Italy (< 5 percentage points). The education gap is nowhere close to the US value of around 40 percentage points (McLanahan and Jacobsen 2015). Figure 1, panels B and C reveal that there is sizeable variation by children's age (Table A-4 in the Appendix shows the results for all children's age groups). These two figures clearly describe that the increase in single motherhood among low-educated mothers predominantly concerns those with younger children (below age 5). The most marked widening in the education gap over the period for this age group was observed in Ireland, followed by the United Kingdom and Poland. Teenage childbearing plays a role for the two latter countries in particular (Brzozowska 2014; Sigle-Rushton 2008). For all countries, the education gradient

becomes less negative or more positive with each higher age group. For children aged 15 to 19, the gradient is either positive over (most of) the period (Austria, France, Italy) or quite weakly negative (United Kingdom, Ireland, Poland, Norway).

Regarding changes over time, Figure 1, panel A shows hardly any differences by education group or a very slight positive education gradient (of 2–3 percentage points in Austria and Poland) during the 1970s and a negative education gradient for the more recent data. Only in the United Kingdom and Norway, the early education gradient was visibly negative. In the United Kingdom, it is likely related to high rates of teenage childbearing among low-educated mothers in the 1950s and 1960s birth cohorts (Sigle-Rushton 2008). Depending on the country, the turn towards a negative relationship occurs at different points in time: at the earliest during the early 1980s in Ireland, but only in the most recent period for Italy (2015–2017). As Figure 1, panels B and C demonstrate, the early positive education gradient is in most countries strongest with older children. However, the latter shift towards a negative relationship is due largely to an increase in single motherhood among low-educated mothers, and to a lesser degree medium-educated mothers, with young children. Conversely, the rate of single motherhood has been remarkably stable among highly educated mothers with young children (except for a slight rise in the United Kingdom). Increasingly, highly educated mothers tend to dissolve their unions only when their children get older and, consequently, the differences in single motherhood by level of education shrink with older children.

The latest data suggest that the education gap may continue to grow, with the exception of Norway, where its growth stagnated in the mid-1990s at around 25% among low-educated mothers, and in the United Kingdom, where the increase among low-educated mothers levelled off in the most recent period at around 40%.

Figure 1: Single motherhood by mother's education and age of the youngest child (in %)

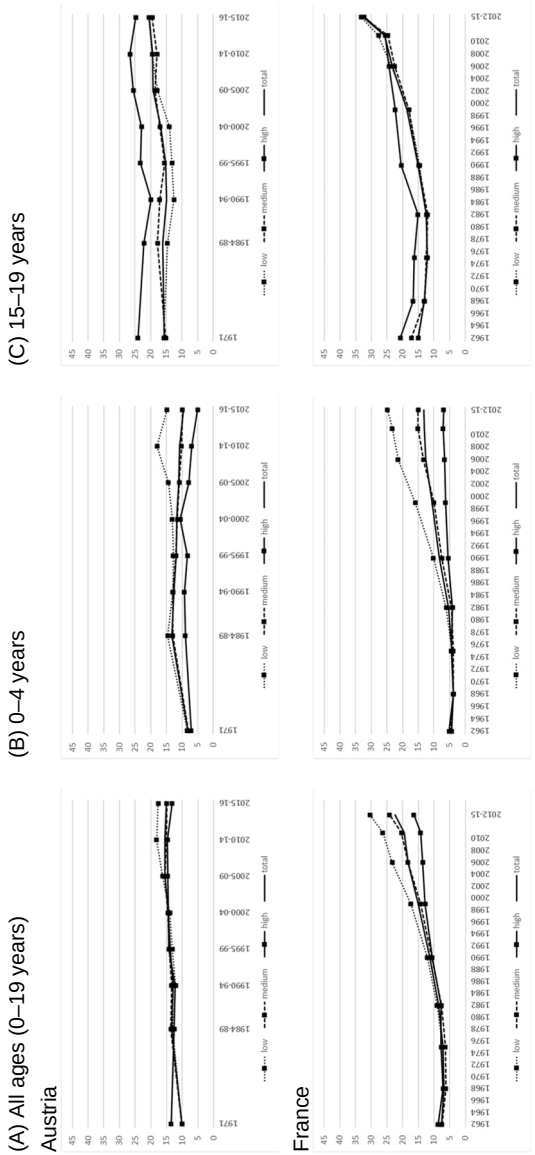


Figure 1: (Continued)

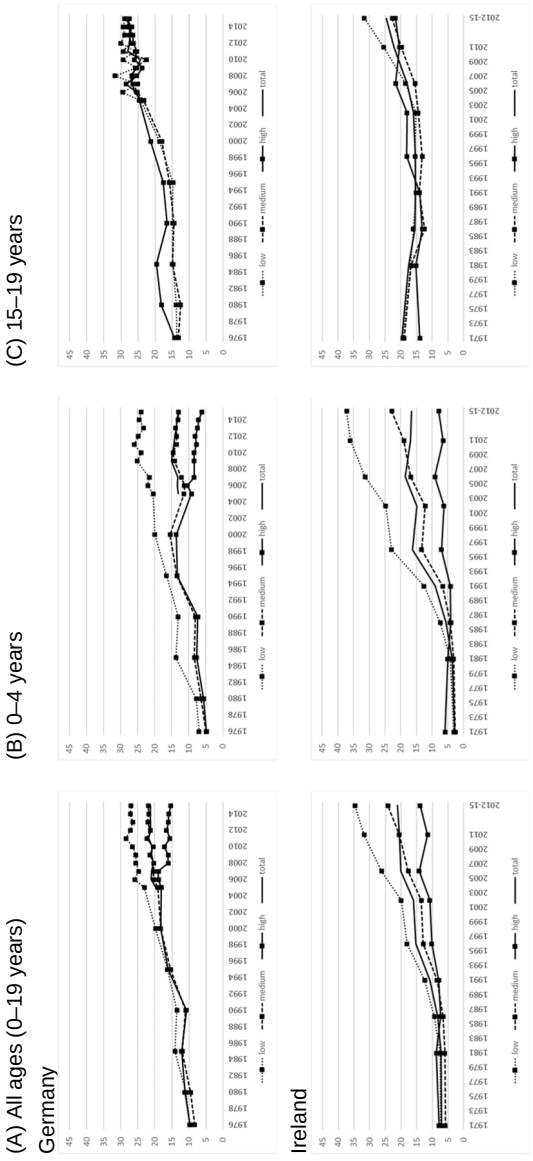


Figure 1: (Continued)

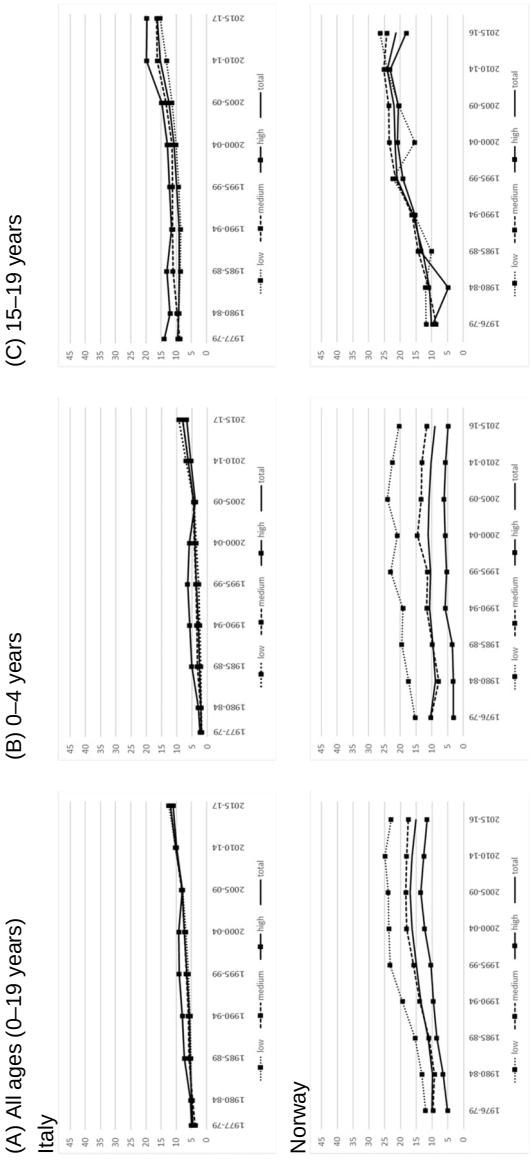


Figure 1: (Continued)

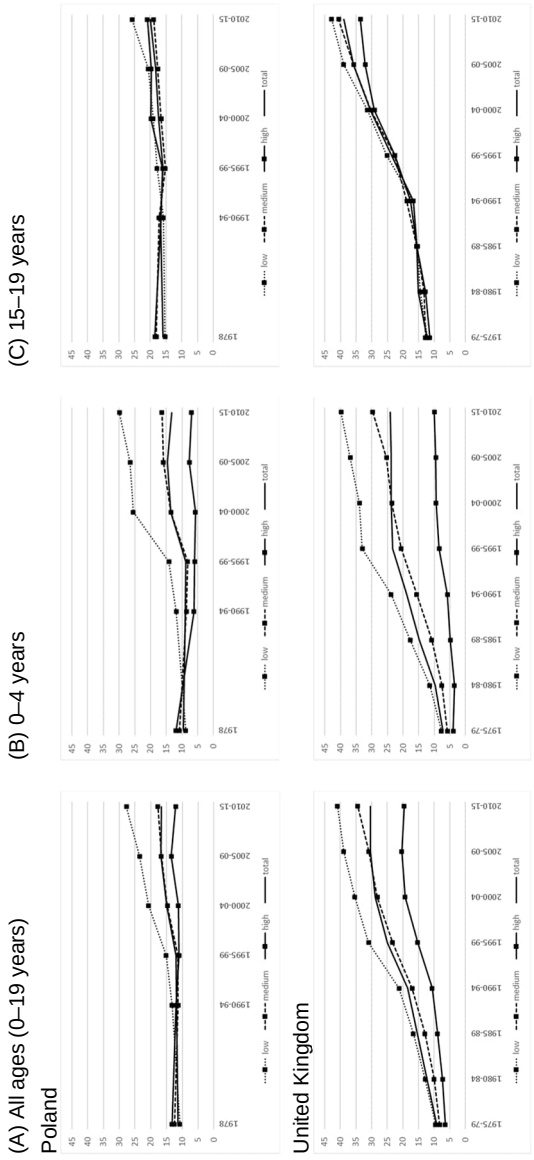


Table 2 depicts the results from the logistic regression models, estimating the odds of being a mother in a couple versus a single mother. Model 1, containing only main effects, shows negative education effects of relatively similar size, with the exception of Austria and Italy. Regarding the age of the youngest child, the odds of being a single mother with a child of 0 to 4 years are low compared to mothers with older children. In some countries, there is a U-shaped relationship where the highest odds of single motherhood are observed for children aged 10 to 14 (Austria, France, Poland), while in the other countries, they are similar with children aged 10 to 14 and 15 to 19 (Ireland, United Kingdom, Italy, Norway). In all countries, the odds of being a single mother are higher for mothers with one child than with two or more children, and being a single mother is more common among younger mothers than among older mothers (see Table S2). As a robustness check, we estimated models where we excluded the number of children because single mothers and highly educated mothers on average have fewer children (see supplementary material Table S1). The results are robust to this modification (see Table S2). Moreover, we show that the relationship between the mother's age and children's age is strong and that single mothers and low-educated mothers, on average, are younger than mothers in couples and with a higher level of education (Table S3). When either mother's age (and mother's age squared) or children's age, respectively, are excluded from the regression models, the education effect gets more strongly negative (Table S4).[13]

[13] In the models that control for education at the regional level (see Appendix Table A-3), we find that the education gap in single motherhood between the low and highly educated declines in Austria and France.

Table 2: Predictors of (0) mothers in couples vs. (1) single mothers, logistic regression models (odds ratios; 95% confidence intervals)

	Austria		France		Ireland		Italy		Norway		Poland		UK	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Year	1.017	1.016	1.040	1.040	1.048	1.049	1.026	1.026	1.026	1.025	1.028	1.029	1.060	1.060
	[1.015, 1.018]	[1.015, 1.017]	[1.040, 1.040]	[1.040, 1.040]	[1.048, 1.049]	[1.048, 1.050]	[1.026, 1.027]	[1.026, 1.027]	[1.024, 1.027]	[1.023, 1.027]	[1.027, 1.029]	[1.028, 1.030]	[1.060, 1.061]	[1.060, 1.061]
Education (ref. Low)														
Medium	1.018	0.744	0.785	0.632	0.650	0.589	1.144	1.156	0.773	0.571	0.712	0.562	0.773	0.613
	[0.985, 1.051]	[0.701, 0.790]	[0.777, 0.794]	[0.619, 0.644]	[0.638, 0.662]	[0.571, 0.608]	[1.132, 1.156]	[1.132, 1.180]	[0.738, 0.809]	[0.527, 0.620]	[0.694, 0.731]	[0.538, 0.588]	[0.760, 0.786]	[0.596, 0.629]
Higher	1.124	0.571	0.568	0.281	0.472	0.293	1.336	1.312	0.631	0.290	0.555	0.264	0.525	0.263
	[1.062, 1.189]	[0.513, 0.637]	[0.559, 0.576]	[0.273, 0.288]	[0.460, 0.485]	[0.280, 0.306]	[1.315, 1.358]	[1.274, 1.352]	[0.599, 0.665]	[0.262, 0.320]	[0.536, 0.574]	[0.250, 0.280]	[0.514, 0.536]	[0.253, 0.274]
Age of the youngest child (ref. 0–4)														
5–9	1.760	1.307	2.251	1.643	2.857	2.392	1.858	1.848	3.146	2.019	1.535	1.140	2.647	2.107
	[1.683, 1.841]	[1.210, 1.412]	[2.218, 2.286]	[1.610, 1.676]	[2.789, 2.927]	[2.305, 2.482]	[1.830, 1.887]	[1.811, 1.885]	[2.991, 3.310]	[1.820, 2.240]	[1.492, 1.580]	[1.071, 1.214]	[2.593, 2.703]	[2.052, 2.164]
10–14	2.231	1.462	2.758	1.898	4.258	3.317	2.400	2.360	3.764	2.040	1.894	1.240	3.724	2.737
	[2.114, 2.354]	[1.346, 1.588]	[2.707, 2.809]	[1.855, 1.943]	[4.134, 4.385]	[3.183, 3.455]	[2.357, 2.444]	[2.307, 2.413]	[3.533, 4.010]	[1.821, 2.286]	[1.829, 1.960]	[1.161, 1.324]	[3.634, 3.817]	[2.656, 2.820]
15–19	1.929	1.249	2.490	1.682	4.450	3.591	2.395	2.440	3.727	1.735	1.797	1.125	3.784	2.734
	[1.812, 2.054]	[1.144, 1.364]	[2.436, 2.545]	[1.639, 1.726]	[4.289, 4.617]	[3.428, 3.761]	[2.347, 2.443]	[2.383, 2.498]	[3.416, 4.064]	[1.466, 2.048]	[1.726, 1.872]	[1.051, 1.203]	[3.673, 3.899]	[2.639, 2.831]

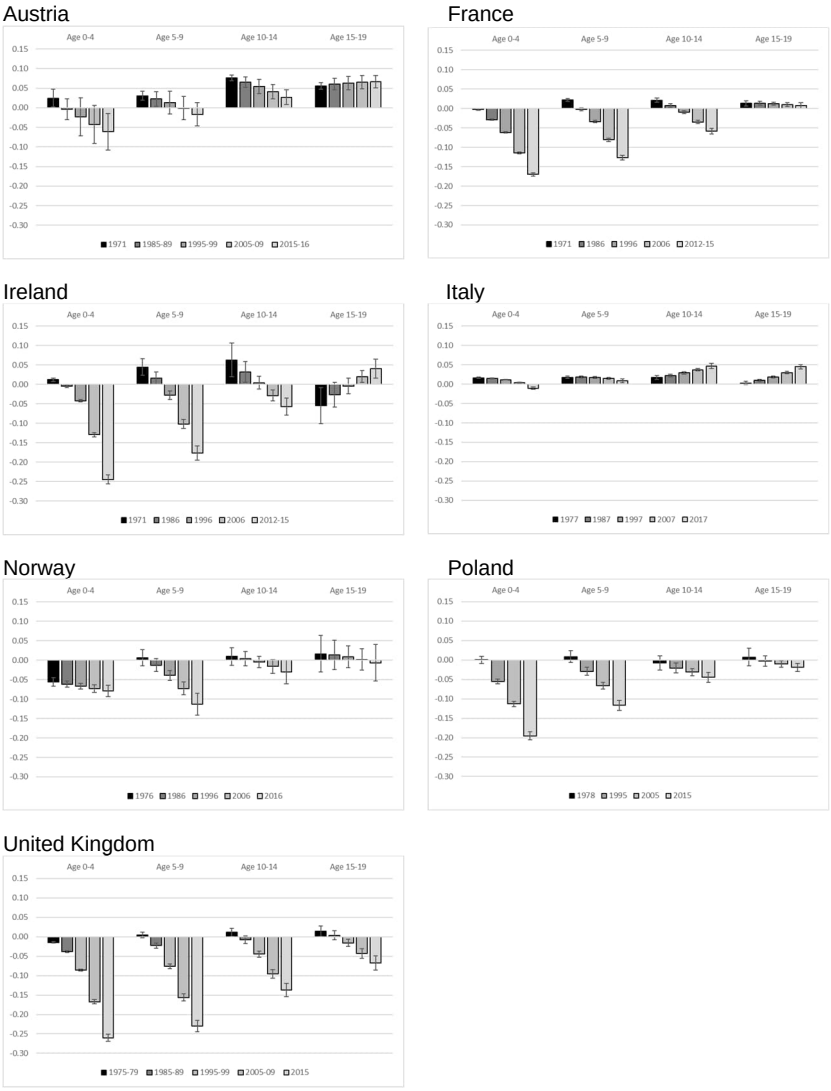
Table 2: (Continued)

	Austria		France		Ireland		Italy		Norway		Poland		UK	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Age of the youngest child × Education (ref. 0–4 × Low)														
5–9 × Medium	1.365	1.334		1.111		1.014		1.377		1.237		1.333		
	[1.250, 1.490]	[1.298, 1.371]		[1.060, 1.165]		[0.986, 1.043]		[1.229, 1.544]		[1.156, 1.324]		[1.280, 1.388]		
5–9 × High	2.010	2.122		1.789		1.001		2.331		2.171		2.102		
	[1.729, 2.336]	[2.049, 2.197]		[1.682, 1.904]		[0.960, 1.045]		[2.040, 2.663]		[2.000, 2.357]		[1.991, 2.220]		
10–14 × Medium	1.564	1.312		1.180		1.013		1.511		1.363		1.428		
	[1.435, 1.705]	[1.276, 1.349]		[1.123, 1.239]		[0.984, 1.043]		[1.344, 1.698]		[1.275, 1.458]		[1.369, 1.490]		
10–14 × High	2.576	2.676		2.235		1.135		3.283		2.918		2.836		
	[2.215, 2.996]	[2.581, 2.773]		[2.095, 2.385]		[1.087, 1.186]		[2.869, 3.758]		[2.685, 3.171]		[2.686, 2.995]		
15–19 × Medium	1.568	1.311		1.100		0.948		1.972		1.424		1.480		
	[1.442, 1.705]	[1.274, 1.349]		[1.045, 1.157]		[0.923, 0.974]		[1.649, 2.363]		[1.336, 1.518]		[1.414, 1.550]		
15–19 × High	2.943	3.053		2.144		0.976		3.513		3.146		3.086		
	[2.528, 3.425]	[2.940, 3.171]		[2.002, 2.296]		[0.936, 1.017]		[2.880, 4.292]		[2.900, 3.414]		[2.911, 3.271]		
N	*277,620*	*277,620*	*7,564,803*	*7,564,803*	*501,976*	*501,976*	*4,978,235*	*4,978,235*	*116,524*	*116,524*	*1,104,823*	*1,104,823*	*567,628*	*567,628*
Pseudo R2	*0.048*	*0.050*	*0.083*	*0.086*	*0.112*	*0.101*	*0.046*	*0.048*	*0.072*	*0.072*	*0.030*	*0.038*	*0.095*	*0.098*

Notes: Year is centred around first survey year in a country. Mother's age is centred around country mean. Controlled for number of children, mother's age, and mother's age squared (results see Table S2).

Model 2 includes an interaction between education and age of the youngest child. Note that this model does not allow any conclusions regarding the changes in this interaction over time. The results demonstrate that the main effect of education gets more strongly negative compared to model 1. This implies that with a youngest child age 0 to 4 (the reference category), the chance of being a single mother is much higher among lower-educated mothers compared to their highly educated counterparts. The positive interaction effect indicates that with increasing children's age, this negative education effect gets weaker: the older the child and the higher educated the mother, the higher the chance of being a single mother. This observation signifies an accumulation of disadvantages as lone motherhood coincides with low resources and challenges of raising a small child. The results also show that the relative increase in single motherhood for those who are medium educated compared to low educated is less strong (they develop more in parallel), while the gap opens up most strongly for the highly versus low educated. Italy constitutes an exception. Finally, we estimate models using three-way interactions between education, year, and age of the youngest child in order to investigate changes over time. The results are displayed in Figure 2 as marginal effects at representative values (mother of mean age with two children) for the first period, mid-1980s, mid-1990s, mid-2000s, and the most recently available period. The figure may be read as follows: The bars show differences in percentage points between the predicted probability of being a single mother for high- minus low-educated mothers. A negative value therefore signifies that low-educated ones have a higher chance of being single mothers compared to the higher educated. Taking the example of Austria for mothers with a youngest child aged 0 to 4, the gap was positive in 1971 (higher-educated mothers were more likely to be single mothers), but the gap turned negative in the subsequent decades. Means across periods were calculated from the models that include year in numeric form (see Table 2). The results reaffirm that in all countries, the growth in the negative education gradient in single motherhood is strongest among mothers with young children (0 to 4 and 5 to 9). This also holds for countries with positive gradients at children's older ages, such as Austria or Italy.

Figure 2: Difference between higher (tertiary) and lower (primary and lower secondary) educated in single motherhood by age of the youngest child (in percentage points; 95% confidence intervals), marginal effects at representative values (mothers of mean age with two children)



6. Concluding discussion

This study assessed changes in the educational gradient in single motherhood by children's age over five decades. Previous research shows that in the United States, as well as in most European countries (Härkönen 2017; McLanahan and Jacobsen 2015), the education gap in single motherhood has substantially grown over time, resulting in 'diverging destinies' for children with parents of different educational backgrounds. Our findings, going back to the 1970s, demonstrate that in all countries, except for Norway and the United Kingdom, the education gradient was nonexistent (or even very slightly positive in Austria and Poland) (Goode 1962) until around the 1980s, when it became visibly negative. The Norwegian trend is distinctive in that the education gap among single mothers was already pronounced in the mid-1970s. Italy and Austria, on the other hand, have the narrowest overall educational gap in single motherhood. In Italy, we observe only a negative educational gradient in the last few years, which has not yet been captured in previous research (Garriga, Sarasa, and Berta 2015; Härkönen 2017) and which might be due to a gradually disappearing but previously positive educational gradient in divorce (Matysiak, Styrc, and Vignoli 2014; Salvini and Vignoli 2011).

This study's main contribution is to reveal that the education gap varies greatly by children's age, especially in the countries with larger gaps, and that single motherhood has become increasingly concentrated among low-educated mothers with young children (possibly being single at childbirth). This finding implies, from a social relevance perspective, that low-educated mothers increasingly face a double disadvantage. Not only do they possess fewer resources – fewer financial resources, higher labour market uncertainty, and less time with their children (Dotti Sani and Treas 2016) – they more frequently than their higher-educated peers have younger-aged children who need more resources. At the same time, it must be noted that the size of this group is rather modest: The overall risk of being a single mother with a young child is considerably lower compared to mothers with older children, and lower-educated mothers are on the decline. Still, our findings imply that, over time, a specific risk profile has emerged, where several factors cumulate. The observed pattern is especially pertinent to the United Kingdom and Ireland (which are thus closest to the US pattern), to a lesser degree in Poland, and, since around 2000, also in France and Germany. For both Italy and Austria, the education gap for mothers with children below age 5 is also narrow, while the gradient with older children is actually positive. In terms of older children (primarily 10 to 19 years), we find that rates of single motherhood in all countries are much more similar across educational groups. The converging rates of single motherhood may most likely be explained by partnership transitions: Many of the low-educated single mothers with young children will eventually repartner and form step-families, while highly educated mothers catch up

with separations when children are older (although we cannot corroborate this with the cross-sectional data used in this study).

How do these findings link to the contextual variables? We proposed that the education gap in single motherhood could be higher in contexts with high financial support, strong means-testing, and good childcare provision. Indeed, the large education gaps in the United Kingdom, Ireland, and Poland correspond to the availability of a high degree of means-tested family support, which could make it easier for low-educated women, relative to higher-educated women, to decide to have a child while being single or to leave an undesired relationship. Consistently, the education gap is lowest in Austria, which is oriented towards general benefits, and Italy, where there is a low level of financial support. In line with our suggestion, we also find high education gaps in Norway and France, where owing to a well-developed, affordable childcare infrastructure, the combination of work and family is easier.

Which policy lessons can be learned from our study? In general, the described risk profile calls for resources to be targeted to low-educated single mothers with younger children. This includes a high-quality, comprehensive, flexible, and affordable childcare infrastructure, particularly for below 3-year olds, and parental-leave laws which provide adequate wage replacement, secure mothers' ties to the labour market, and are not restricted to those formerly employed (Dobrotić and Blum 2019; Nieuwenhuis 2020). Shared custody can be a means to increase and secure contact with both parents (Kelly and Lamb 2000). Child benefits have been described as the most effective measure to reduce poverty among single parents and their children (Nieuwenhuis 2020).

Future research could complement our study in several ways. First, our study was limited by the use of cross-sectional data. We could therefore not investigate transitions into and out of single motherhood, as would be possible with panel data or retrospective life histories. Such data would, in particular, be useful for looking into repartnering and stepfamily formation. Second, due to data availability, we could include only a restricted set of variables. In particular, it would be relevant to study the role of migration/ethnic background. The growing proportion of migrants (and their descendants) in many European countries might have affected rates of single motherhood (e.g., Lindley, Dale, and Dex 2004). Third, our research design was exploratory, and we did not formally test the role of contextual factors.

Despite these limitations, our study of large scope – eight countries over five decades – has shown that country diversity in the education gap in single motherhood persists in Europe, and that in some countries – especially in the United Kingdom and Ireland – inequality in family structures has risen. This paper's specific contribution is to show that single motherhood has increasingly cumulated among low-educated mothers with young children.

7. Data availability

Population censuses were obtained from IPUMS International (Ruggles et al. 2024). The data were originally produced by National Bureau of Statistics (Austria), National Institute of Statistics and Economic Studies (France), Central Statistics Office (Ireland), and Central Statistical Office (Poland).

Further, the paper is based on data from Eurostat and EU labour force surveys, reference years 1998–2015. The responsibility for all conclusions drawn from the data lies entirely with the authors.

National labour force surveys were obtained from the following agencies: Statistics Austria (Austria), Research Data Centre of the Federal Statistical Office (Germany), Italian National Institute of Statistics (Italy), Statistics Norway (Norway), Central Statistical Office (Poland), and UK Data Archive; Office of Population Censuses and Surveys, Social Survey Division (United Kingdom).

8. Acknowledgement

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Appendix

Table A-1: Overview of country characteristics

	Benefits								Childcare							Attitudes			
	Social benefits as % of net income, single parents (1)			Alimony obligation, % of lone parents receiving child maintenance (2)		At-risk-of-poverty rate (in %) before and after social transfers, single parents (3)			Childcare enrolment rate (in %), 3–5-year-olds; in brackets: 0–2-year-olds (4)		Childcare costs as % of family net income (5)			"A child needs a home with both a mother and a father to grow up happily" (6)			
	2016			1994	2000	2016			Mid-1980	2014–2016 (average)	Full-time 2014–2016 (average)	2016			1981			2008	
	Average wage	50% of average wage	Ratio "50% of average wage" to "average wage"			Before	After	% lifted out of poverty	Poverty gap after transfers to couples with children (percentage points)			Single parent	Couple parent	% tend to agree	% tend to agree	Diff L-H (percentage points)	% tend to agree	Diff L-H (percentage points)
Austria	13	20	1.5	52	70	59	30	49	16	60	90 (20)	27 (7)	6	3	94	–1	81	0
France	12	35	2.9	56	46	62	35	44	21	98	96 (43)	58 (28)	3	10	87	15	82	12
Germany	17	38	2.2	-	30	57	33	42	22	66	91 (28)	54 (18)	1	5	92	4	86	4
Ireland	13	46	3.5	24	20	84	47	44	34	51	87 (23)	22 (9)	42	26	75	15	66	8
Italy	8	18	2.3	12	25	42	33	21	9	-	92 (28)	71 (18)	-	-	92	6	90	9
Norway	8	21	2.6	81	81	58	34	41	29	38	92 (53)	78 (46)	1	5	79	6	69	10
Poland	14	52	3.7	46	73	51	34	33	15	49	59 (6)	43 (5)	33	16	99	-	93	5
UK	6	39	6.5	20	22	79	32	59	18	47	81 (29)	46 (4)	23	41	69	2	59	–1

Notes and sources:
(1) Pertains to single parents with two children at average wage (first column) or 50% of average wage (second column). Social benefits include housing benefits, family benefits, and in-work benefits. Sum of all social benefits as % of net income. OECD Social Expenditure Database (2017).
(2) OECD Family Database (PF1.5B).
(3) Eurostat database (ilc_li09b: At-risk-of-poverty rate before social transfers (pensions included in social transfers) by household type; ilc_li03: At-risk-of-poverty rate by poverty threshold and household type). Poverty threshold is 60% of median equivalised income. "Couples with children" refer to households with two or more adults with dependent children.
(4) (a) Mid-1980s: Chapter 5: Childcare in OECD countries (OECD 1990). Poland pertains to 1989 (United Nations 1999: Annex Table 7.1). Norway pertains to 1985 (Ellingsæter 2012); (b) 2014-2016 (average): Eurostat database (ilc_caindformal: Children in formal childcare or education by age group and duration; full-time pertains to 30 and more hours).
(5) Out-of-pocket childcare costs (a) for a single-parent family: Net childcare costs for a two-child (aged 2 and 3), single-parent family with full-time earnings at 50% of average earnings, as a % of average earnings. (b) For a two-earner couple family: Net childcare costs for a two-earner two-child (aged 2 and 3) couple family with full-time earnings at 100+67% of average earnings, as a % of average earnings. Austria refers to Vienna; Germany to Hamburg, UK to England, and Poland to Warsaw. OECD Family database (PF3.4B and PF3.4C).
(6) European Values Study 1981 and 2008 (for Austria and Poland: 1990 and 2008); own computations (weighted). Question wording "If someone says a child needs a home with both a father and a mother to grow up happily, would you tend to agree or disagree? Tend to agree; tend to disagree." Level of education is not available for 1981 and 1990, which is why we used age at completion of education. Low education is defined as up to age 16, high education is defined as age 21+.

Table A-2: Educational attainment (in %)

	Low	Medium	High		Low	Medium	High		Low	Medium	High		Low	Medium	High
Austria				France				Germany				Ireland			
1971	69	30	1	1962	90	9	1	1976	48	47	5	1971	75	24	1
1985–89	43	53	4	1982	64	28	7	1985	36	56	9	1986	58	39	3
1995–99	30	63	7	1990	50	37	13	1995	18	63	19	1996	48	44	8
2005–09	21	66	13	2006	27	43	30	2005	21	60	20	2006	32	50	18
2015–16	17	65	19	2012-15	20	42	38	2015	17	60	23	2012–15	16	39	45
Italy				Norway				Poland				United Kingdom			
1977	89	9	2	1976–80	34	54	12	1978	69	26	5	1975–79	83	10	6
1987	78	18	4	1985–89	19	60	20	-	-	-	-	1985–89	76	13	11
1997	60	32	8	1995–99	11	58	31	1995	20	72	8	1995–99	44	36	20
2007	44	43	14	2005–09	11	46	42	2005	11	72	17	2005–09	31	41	28
2017	35	43	22	2015–16	15	29	56	2015	7	56	37	2015	21	39	40

Table A-3: Predictors of (0) mothers in couples vs. (1) single mothers with(out) control for education on the regional level (odds ratios; 95% confidence intervals)

	Austria		France	
	M1	M2	M1	M2
Year	1.020	1.008	1.041	1.073
	[1.016,1.024]	[0.993,1.023]	[1.036,1.046]	[1.055,1.092]
Education (ref. Low)				
Medium	1.136	1.067	0.760	0.820
	[1.021,1.263]	[0.943,1.206]	[0.692,0.835]	[0.751,0.895]
Higher	1.787	1.599	1.265	1.465
	[1.325,2.410]	[1.204,2.125]	[1.143,1.401]	[1.306,1.642]
Year × Education (ref. Year × Low)				
Year × Med	0.996	0.997	1.001	1.000
	[0.992,0.999]	[0.993,1.002]	[0.999,1.002]	[0.998,1.001]
Year × High	0.986	0.989	0.983	0.981
	[0.978,0.994]	[0.981,0.997]	[0.981,0.986]	[0.979,0.983]
Low educated at regional level		0.990		1.024
		[0.981,1.000]		[1.013,1.035]
n	*277,620*	*277,620*	*7,349,413*	*7,349,413*
Pseudo R2	*0.048*	*0.049*	*0.083*	*0.087*

Notes: Controlled for age of the youngest child, number of children, mother's age, mother's age squared. Year is centred around first survey year in a country. Mother's age is centred around country mean.

Table A-4: Single motherhood by mother's education and age of the youngest child (in %)

	Age 0–4				Age 5–9				Age 10–14				Age 15–19			
	Low	Medium	High	*Diff. high-low*	Low	Medium	High	*Diff. high-low*	Low	Medium	High	*Diff. high-low*	Low	Medium	High	*Diff. high-low*
Austria																
1971	8	8	7	*–1*	9	10	13	*+4*	11	13	19	*+8*	16	15	24	*+8*
1985–89	15	13	8	*–7*	10	11	15	*+5*	12	14	15	*+3*	15	18	19	*+4*
1995–99	13	12	8	*–5*	14	14	17	*+3*	13	17	18	*+5*	13	16	23	*+10*
2005–09	14	11	8	*–6*	18	16	14	*–4*	16	18	19	*+3*	18	19	26	*+8*
2015–16	15	10	5	*–10*	21	16	17	*–4*	15	16	21	*+6*	21	19	25	*+4*
France																
1962	4	5	5	*+1*	7	8	10	*+3*	10	11	14	*+4*	15	17	21	*+6*
1982	6	4	4	*–2*	9	9	10	*+1*	10	10	13	*+3*	12	12	15	*+3*
1990	10	7	5	*–5*	12	12	12	*+0*	12	13	16	*+4*	15	15	20	*+5*
2006	21	13	7	*–14*	24	20	17	*–7*	24	21	21	*–3*	24	23	24	*0*
2012–15	25	15	7	*–18*	32	26	18	*–14*	34	30	25	*–9*	33	33	32	*–1*
Germany																
1976	7	5	5	*–2*	8	8	11	*+3*	10	10	15	*+5*	14	13	14	*0*
1985	14	8	8	*–6*	14	12	11	*–3*	14	13	16	*+2*	15	15	20	*+5*
1995	17	14	13	*–4*	18	17	17	*–1*	16	16	18	*+2*	15	16	18	*+3*
2005	20	11	9	*–11*	25	20	17	*–8*	24	23	25	*+1*	24	23	25	*+1*
2015	24	13	6	*–18*	28	24	17	*–11*	29	26	21	*–8*	29	29	28	*–1*
Ireland																
1971	3	2	5	*+2*	7	5	8	*+1*	13	11	11	*–2*	20	19	14	*–6*
1986	7	4	4	*–3*	8	7	9	*+1*	10	10	17	*+7*	16	13	13	*–3*
1996	23	13	7	*–16*	18	13	11	*–7*	14	12	14	*+0*	16	13	18	*+2*
2006	32	17	9	*–23*	31	20	20	*–11*	23	18	19	*–4*	19	16	22	*+3*
2012–15	37	23	8	*–29*	37	27	18	*–19*	32	25	22	*–10*	32	23	22	*–10*
Italy																
1977	2	2	2	*0*	4	4	4	*0*	6	7	6	*0*	10	9	16	*+6*
1987	2	3	5	*+3*	4	6	7	*+3*	6	10	9	*+3*	9	11	12	*+3*
1997	3	4	6	*+3*	5	7	11	*+6*	7	9	13	*+6*	9	11	13	*+4*
2007	4	5	4	*0*	7	8	10	*+3*	9	10	12	*+3*	11	13	15	*+4*
2017	8	8	7	*–1*	12	11	11	*–1*	15	15	16	*+1*	17	18	19	*+2*
Norway																
1976–79	15	10	3	*–12*	11	8	6	*–5*	10	11	9	*–1*	12	9	10	*–2*
1985–89	20	10	4	*–16*	16	12	10	*–5*	13	11	17	*+5*	10	14	13	*+3*
1995–99	23	11	5	*–18*	27	19	14	*–13*	20	18	15	*–5*	22	21	19	*–3*
2005–09	24	13	6	*–18*	27	20	17	*–10*	22	20	20	*–2*	20	24	21	*0*
2015–16	20	12	5	*–16*	27	17	11	*–16*	21	21	20	*–1*	26	24	18	*–8*
Poland																
1978	9	11	12	*+3*	10	12	12	*+2*	12	15	14	*+2*	15	18	19	*+4*
1995	13	8	6	*–7*	11	9	11	*0*	13	13	12	*–1*	18	17	21	*+3*
2005	24	16	6	*–18*	18	16	13	*–5*	23	16	13	*–10*	20	17	18	*–2*
2015	33	18	7	*–26*	37	20	14	*–23*	27	19	20	*–7*	29	20	23	*–6*
UK																
1975–79	8	6	4	*–4*	9	9	8	*–1*	10	11	8	*–2*	12	13	11	*–1*
1985–89	18	11	5	*–13*	17	16	10	*–7*	16	13	13	*–3*	15	16	16	*+1*
1995–99	33	21	8	*–25*	34	27	18	*–16*	28	25	20	*–8*	25	23	23	*–2*
2005–09	37	25	10	*–27*	39	33	23	*–16*	41	35	30	*–11*	39	36	32	*–7*
2015	40	30	10	*–30*	38	36	24	*–14*	38	36	26	*–12*	44	45	34	*–10*