Research Article

Educational differences in early childbearing:
A cross-national comparative study

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Abstract

BACKGROUND
Recent research on fertility in industrialized countries focuses primarily on delayed childbearing, despite the facts that large numbers of women continue to enter parenthood at relatively young ages and that early childbearing has been linked to economic disadvantage.

OBJECTIVE
This cross-national comparative study describes relationships between women's educational attainment and young age at first birth and evaluates the extent to which these differences have changed over time for women born 1955–1981.

METHODS
Defining 'early' childbearing as the age by which 20% of first births have occurred to women in a given birth cohort and country, we describe differences in early childbearing by educational attainment across three cohorts of women in 20 countries.

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RESULTS

We find a strong negative educational gradient in early childbearing across all 20 countries and some evidence of an increase in the relative prevalence of early childbearing among the least-educated women. In 10 countries, the relative prevalence of early childbearing among women with low education is significantly higher for one or both of the more recent birth cohorts compared to the earliest cohort. However, many countries show no significant change, and in one country (Poland) there is modest evidence of a decreasing educational gap.

CONCLUSIONS

Evidence that educational differences in early childbearing have grown in some countries is generally consistent with the notion of family bifurcation and 'diverging destinies' by socioeconomic status. However, the pattern is not universal and future work should examine the various factors that shape these patterns, including the role of public policies.

1. Introduction

Recent research on fertility trends in industrialized countries has focused primarily on delayed onset of childbearing (e.g., Frejka and Sobotka 2008; Morgan and Taylor 2006) and fertility recuperation at older ages (e.g., Lesthaeghe and Willems 1999). Studies of early childbearing are less common, despite the fact that large numbers of women continue to enter parenthood at relatively young ages. A better understanding of the patterns of early childbearing across a range of national contexts is important in light of evidence that, at least in the U.S. and the U.K., early first births are associated – and perhaps increasingly so – with socioeconomic disadvantage (Amato et al. 2008; Hobcraft and Kiernan 2001; Geronimus and Korenman 1992) and less favorable outcomes for both parents (Brien and Willis 1997; Taniguchi 1999) and children (Hoffman and Scher 2008).

There are reasons to believe that the growing divergence in age at childbearing by educational attainment observed in the U.S. and U.K. (Martin 2004; Robson and Pevalin 2007) may be part of a more general bifurcation in family patterns by socioeconomic status. For example, Sara McLanahan (McLanahan 2004; McLanahan and Percheski 2008) has argued that growing differences in maternal age (and other family characteristics and behaviors) between less-educated and more-educated women are part of a broader pattern of demographic change characterizing industrialized countries. Other studies offer reasons to expect that the extent of educational differences in early childbearing (and change therein) should differ systematically

across countries. For example, theories of "reproductive polarization" (Schulze and Tyrell 2002) posit that the extent to which public policy regimes effectively support women's balancing of work and family may be associated with growing socioeconomic differentials in the timing of births over time. Consistent with this hypothesis, Rendall and colleagues (Rendall et al. 2009, 2010) find that the positive association between educational attainment and age at first birth has diminished over time in several European countries with stronger work-family policies, but has remained unchanged in less generous welfare states: in other words, when women can more easily balance employment with childrearing, they do not wait as long to begin having children as in countries where there is less support. An alternative possibility is that the link between low educational attainment and early births may be more pronounced in countries where early childbearing has become a relatively rare, and thus non-normative, pathway to family formation. In such contexts it may be particularly difficult to combine childrearing with continued education. These three scenarios are not mutually exclusive – McLanahan's theory of "diverging destinies" (2004) recognizes that there may be cross-national differences in the pace and magnitude of change in educational differences, which might reflect differences in policy, demography, or social context.

The relatively narrow geographical focus on Western Europe and the U.S. in prior research is an important limitation. The absence of comparable evidence from low-fertility countries in other parts of the world makes it difficult to evaluate the extent to which increasing socioeconomic differences in early childbearing observed in the U.S. and Western Europe are indeed a general feature of recent family change in a broader context. Our goal in this paper is to extend existing cross-national research by providing new descriptive evidence about educational differences in early childbearing across three cohorts in 20 countries, as follows: first, we examine a wide range of low-fertility societies, including understudied countries in Eastern Europe and East Asia. Second, we examine change over time in the relationship between educational attainment and early childbearing. By examining data from three birth cohorts of women (over the years 1955–1981), we can more directly assess the generality of the growing differences observed in the countries considered in previous studies.

It is important to recognize that our descriptive approach cannot shed light on how the effects of education on early childbearing differ across countries and time, given that relationships between completed educational attainment and early childbearing operate in both directions. Theoretical emphases on opportunity costs (e.g., Becker 1991) and preferences (e.g., Hakim 2003) suggest that lower levels of educational attainment (or educational aspirations) should result in earlier transitions to parenthood. It is also clear that early parenthood results in lower educational attainment, given the difficulty of balancing student and parent roles (Thornton, Axinn, and Teachman 1995), and this may be particularly true in countries where early parenthood is relatively

uncommon. Disentangling these alternative causal linkages is not easy, but efforts to this end have made creative use of a range of data and statistical techniques (Snow et al. 1999), including sibling data (Hoffman, Foster, and Furstenberg 1993) and information on miscarriages (Hotz, Mullin, and Sanders 1997).

The primary objective of this paper is not to evaluate these causal linkages (for which we do not have the requisite data), but rather to establish an empirical basis for evaluating the extent to which the magnitude of educational differences in early childbearing differs across a wide range of countries, and whether and how those differences have changed over time. This information is of theoretical and substantive value. Broad theoretical claims regarding "diverging destinies" and "reproductive polarization" have received a good deal of attention and have motivated several ambitious cross-national comparative efforts to evaluate their generality (e.g., Perelli-Harris and Lyons-Amos 2014; Perelli-Harris et. al. 2010; Rendall et. al. 2010). Early childbearing is one understudied component of the family formation process central to these theoretical frameworks. Evidence that early childbearing is associated with subsequent disadvantage for both mothers and children in the U.S. and the U.K. also highlights the importance of understanding how patterns of early childbearing may be associated with cross-national differences in relationships between family behavior and processes of stratification and inequality. Future research can build on our descriptive portrait (and identification of broad policy environments across countries) to more fully consider the role of public policies and other contextual factors in shaping these patterns.

2. Background

2.1 Early childbearing defined

It is important to first define what we mean by 'early' childbearing. Early childbearing may refer to births prior to some absolute age. Indeed, much of the discussion about early childbearing in the U.S. and U.K. focuses on teenage childbearing (i.e., births before age 20), reflecting concerns that teenage mothers do not have sufficient physical and emotional maturity to provide effective care for a child, and that they may not have adequate economic resources (or receive such from the child's father). However, teenage childbearing is relatively rare (and has been declining) in many countries, including the U.K. and the U.S. (where it has recently reached an historic low), and is thus unlikely to be a useful measure for comparing the prevalence and correlates of early childbearing cross-nationally.

Substantial variation in the timing of first births across countries, as well as the change in childbearing ages within countries across cohorts, motivates our decision to define early childbearing in relative terms, i.e., in relation to the observed/normative timing of childbearing within a given society and cohort. For example (and as shown in Table 1), women's mean age at first birth in 2005 ranged from 24 in Russia to over 30 in Australia. Furthermore, because postponement of childbearing has emerged only recently in Eastern European countries (Frejka and Sobotka 2008), what is considered 'early' differs both by society and over time. We examined both relative and absolute measures of early childbearing, but for the sake of simplicity, we use a single measure of early childbearing in our main analyses – the age by which the first 20% of women in a given cohort (and country) have become mothers. We discuss the ways in which the findings differed in analyses using an absolute measure of early childbearing (age 22 or younger) in the Results section, and tables summarizing these results are available upon request.

2.2 Early childbearing in cross-national comparative perspective

While research on early childbearing across multiple countries is limited, several recent studies have provided relevant information. Using cross-sectional data from the Luxembourg Income Study, McLanahan (2004) showed that young motherhood and other behaviors with potentially negative implications for the well-being of children and mothers (e.g., divorce and single parenthood) are more prevalent among women with lower levels of education in the U.S., Canada, and several Western European countries. Although the theoretical and empirical basis of McLanahan's argument comes primarily from research on the U.S. (and limited data from several European countries), she makes the broad and compelling argument that socioeconomic bifurcation in early childbearing and other family behaviors linked to well-being is a key feature of the 'second demographic transition'.[6] If the growing socioeconomic differences in family behavior observed in the U.S. since the late 20th century are indeed part of a broader transition in demographic behavior, we would expect similar patterns to characterize other low-fertility countries.

In a series of recent papers, Rendall and colleagues described socioeconomic differences in the timing of childbearing in a number of Northern and Southern

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[6] The term "second demographic transition" has been used in a number of ways, including characterization of the underlying reasons for changing family behaviors (Lesthaeghe 2010; Sobotka 2008). Here, we use the term to describe a set of family behaviors and not necessarily the social and ideational changes that may have produced them.

European countries (Rendall and Smallwood 2003; Rendall et al. 2005, 2009, 2010), providing evidence of an increasing concentration of relatively early childbearing among women with lower levels of education and occupational status in the English-speaking countries and Southern Europe. By contrast, they find evidence of declining educational differentials in age at first birth in France and Norway, reflecting increases in the age at childbearing among all women in France and particularly rapid decline in early childbearing among women with more limited educational attainment in Norway.

Continuous increase in the mean age at first birth in recent years across industrialized countries (Mills et al. 2011) implies that early childbearing (defined either in relative or absolute terms) has become an increasingly non-normative pathway to family formation. We would therefore expect women who give birth at younger ages – despite the societal trend toward older births – to be an increasingly select group with respect to both background and future prospects. Alternatively, policies may be less supportive of mothers' continued enrollment in school where early childbearing is uncommon. Both of these scenarios suggest that educational differences may be more pronounced in countries where early childbearing has become a relatively rare and thus non-normative pathway to family formation, such as those in Northern and Southern Europe as well as in East Asia. Just as socioeconomic differences are expected to decline or reverse as non-normative behaviors such as divorce become more common (Goode 1963; Härkönen and Dronkers 2006), differentials in formerly common behaviors such as early childbearing may grow as they become more non-normative, less consistent with existing policies, and increasingly associated with less favorable outcomes. Consistent with this hypothesis, one recent cross-national comparative study found that associations between teenage motherhood and unfavorable socioeconomic outcomes were strongest in countries where the prevalence of non-marital childbearing was lowest (Robson and Berthoud 2003).

2.3 Factors related to education and early childbearing

Research on socioeconomic differences in early childbearing emphasizes women's employment opportunities and social policy, especially welfare policy and policies designed to support work-family balance. Improved employment opportunities for women are thought to increase the returns to higher education and thus raise the opportunity costs of early childbearing (and early marriage) for highly-educated women to a greater degree than for women with less education (McLanahan 2004; McLanahan and Percheski 2008). For less-educated women, the high value of motherhood, combined with limited socioeconomic prospects, provides relatively strong incentives to have children at a young age and/or outside of marriage (Edin, Kefalas, and Reed

2004; Smock, Manning, and Porter 2005). Overall, women's labor market opportunities have expanded across low-fertility, industrialized countries, suggesting that the relative prevalence of early childbearing among less-educated women may be increasing, as women with moderate to higher education further delay childbearing. At the same time, career employment opportunities for women remain limited in some countries, especially those in East Asia and Southern Europe. An emphasis on the differential opportunity costs of early childbearing thus suggests that a negative educational gradient in early childbearing should be less pronounced in these societies to the extent that women, overall, are less able to work while raising children.

However, the work of Rendall and colleagues referenced above demonstrates an increasing concentration of early childbearing in societies where policies are relatively unsupportive of work-family balance for women. Employing the welfare regime typology developed by Esping-Andersen (and modified by others), they find that the negative educational gradient in early childbearing is now most pronounced in the 'conservative' welfare regimes of Southern Europe and least pronounced in 'universalistic' welfare societies (of Northern and Western Europe), with 'liberal' Anglo-American countries somewhere in between. The authors emphasize differences in work-family policy regimes, with universalistic support promoting delayed childbearing across the educational spectrum (thus reducing educational differences over time), and means-tested support providing incentives for early childbearing among women with lower levels of educational attainment who likely qualify for public assistance (thus increasing educational differences over time). This is consistent with the ideas of "reproductive polarization" put forth by Schulze and Tyrell (2002) and with McLanahan's (2004) emphasis on the role of means-tested welfare policies in generating educational differences in women's (dis)incentives to have early births, often outside of marriage.

In this paper, we do not directly test the role of policy context but examine changing patterns of early childbearing across a broad array of countries in an effort to shed further light on the posited role of social policies offering more or less support for work-family balance. This approach is similar to that employed by Rendall and colleagues, including their focus (in some papers) on fertility among those with moderate education – a sub-group of growing interest to family scholars in the U.S. (e.g., Cherlin 2014). We extend prior research in two key respects. The first is our inclusion of several countries in Eastern Europe and East Asia that have, heretofore, been absent from research on early childbearing and educational differences. Single-country studies suggest an accelerating concentration of early childbearing among women with lower levels of education (e.g., see Perelli-Harris 2008 on Ukraine and Shirahase 2000 on Japan), but systematic, comparative evidence is very limited. The second is our use of a scheme for classifying countries with respect to the policy

measures of primary theoretical relevance – policies that support the ability to balance work and family. Thévenon's (2011) recent paper uses 23 different indicators to classify OECD countries on two dimensions – the comprehensiveness and the generosity of public support for families with children under the age of three. This provides a useful framework for evaluating our results from 20 different countries, in that it is based on data from a large number of countries (including OECD countries in East Asia and Eastern Europe) and employs information on a wide range of policies relevant to the theoretical frameworks described above.

2.4 Research questions and hypotheses

Building upon the earlier cross-national studies noted above, we use comparable data from 20 low-fertility countries to address two research questions. First, we ask whether a negative educational gradient in early childbearing is a general characteristic of low-fertility, industrialized countries and whether/how the magnitude of educational differences in early childbearing varies across countries. Second, we examine whether the relative likelihood of early childbearing among women with lower levels of education has increased over time.

The different theoretical frameworks summarized above suggest several related hypotheses. First, if socioeconomic bifurcation in family behavior is indeed part of universal changes in the family, as suggested in McLanahan's (2004) discussion of "diverging destinies", we should see an increase in the relative prevalence of early childbearing among less-educated women in all countries (i.e., an increasing negative educational gradient). This framework recognizes that the magnitude of educational differences and their pace of change may differ across countries, with the concentration of early childbearing among the less educated expected to be most pronounced in settings characterized by means-tested welfare (family support) policies. Second, the reproductive polarization framework leads to a similar hypothesis about means-tested policies, but also suggests a more general relationship between the degree of policy support for work-family balance and the educational gradient in early childbearing. Third, if non-normative behaviors are more likely to be concentrated at the lower end of the socioeconomic spectrum, we should see more pronounced relationships between low education and early childbearing in countries where the age at which 20% of first births have occurred is highest (or equivalently, where the prevalence of early births defined with reference to some absolute age such as 20 or 22 is lowest) and support for balancing education and motherhood may be weakest (e.g., East Asia and Southern Europe).

3. Data and methods

We use data from 20 industrialized countries: Australia, Austria, Belgium, Bulgaria, Estonia, France, Hungary, Italy, Japan, Korea, Lithuania, the Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden, the U.K., and the U.S. For the majority of countries, data come from the first round of the UN Generations and Gender Surveys (GGS) conducted between 2003 and 2011. The GGS was developed by the United Nations Economic Commission for Europe as a key element of the Generations and Gender Programme (GGP), launched in 2000. In the context of declining fertility and changing union formation patterns, the GGP is designed to improve understanding of demographic and social patterns across Europe and factors that may influence their development, including public policy (United Nations 2000). As described by Vikat and colleagues (2007), the GGS uses comparable survey designs, definitions, and questionnaires across countries, and the surveys cover a wide array of topics related to economic status, education, social networks, families, relationships, fertility, housing, transfers, and health. The GGS collects nationally-representative samples of non-institutionalized men and women age 18 and older (Simard and Franklin 2008).

Since GGS data are currently available only for a sub-set of countries, we use alternative data sources for Japan, Korea, Spain, Sweden, the U.K, and the U.S. Data for Japan come from the 2002 and 2005 National Fertility Surveys; data for Korea come from the 2006 National Survey on Fertility, Family Health, and Welfare; data for Spain come from the 2006 Spanish Survey of Fertility and Values; data for Sweden come from the Swedish Level of Living Survey; data for the U.K. come from the British Household Panel Survey; and data from the U.S. come from the combined 1995 and 2006–2008 rounds of the National Survey of Family Growth. The European and American surveys have been harmonized according to the procedure outlined in Perelli-Harris, Kreyenfeld, and Kubisch (2010) (see www.nonmarital.org for further information about each survey).[7] As a result of these harmonization procedures, we are able to analyze comparable data on age at first birth and educational attainment for similar cohorts of women across the 20 countries. Table 1 provides information about the survey(s) for each of the countries, as well as information about fertility, educational attainment, and general policy environment across countries.

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[7] The Japanese data are limited by the absence of information on the childbearing histories of formerly married and never-married women. However, the number of currently unmarried women with any children is very small relative to the number of married women with children.

Table 1: Country-specific data source and sample information

Country	Survey	Survey year(s)	Ages interviewed	Sample size		TFR (2005)[1]	Average number of years completed education (2005)[2]	Mean age at first birth (2005)[3,4]	Policy environment[5]
				Total	Women				
Australia	Generations and Gender Survey (GGS)	2005–2006	15–99	7,125	3,944	1.8	11.63	30.5	Anglo-Saxon
Austria	Generations and Gender Survey (GGS)	2008–2009	18–46	5,000	3,001	1.4	8.48	27.3	Continental Europe
Belgium	Generations and Gender Survey (GGS)	2008–2010	18–82	7,163	3,728	1.8	10.41	27.9	Continental Europe
Bulgaria	Generations and Gender Survey (GGS)	2004	17–85	12,858	7,007	1.3	9.64	24.8	Eastern Europe[6]
Estonia	Generations and Gender Survey (GGS)	2004–2005	21–81	7,855	5,034	1.5	12.07	25.2	Eastern Europe[6]
France	Generations and Gender Survey (GGS)	2005	17–79	10,079	5,708	1.9	9.47	28.5	Continental Europe
Hungary	Generations and Gender Survey (GGS)	2004–2005	20–79	13,540	7,517	1.3	11.30	27	Eastern Europe
Italy	Generations and Gender Survey (GGS)	2003	18–102	21,454	10,546	1.3	8.60	29.6	Southern Europe and East Asia
Japan	National Fertility Surveys	2002, 2005	18–49	14,725	9,752	1.3	10.76	29.4	Southern Europe and East Asia
Korea	National Survey on Fertility, Family Health, and Welfare	2006	15–59	8,815	7,001	1.1	10.32	29.6	Southern Europe and East Asia
Lithuania	Generations and Gender Survey (GGS)	2006	18–79	10,036	5,037	1.3	10.52	24.9	Eastern Europe[6]
Netherlands	Generations and Gender Survey (GGS)	2002–2004	18–79	8,161	4,741	1.7	10.67	28.9	Continental Europe
Norway	Generations and Gender Survey (GGS)	2007–2008	19–81	14,881	7,541	1.8	12.70	28.1	Nordic
Poland	Generations and Gender Survey (GGS)	2010–2011	18–79	19,987	11,578	1.2	9.71	25.8	Eastern Europe
Romania	Generations and Gender Survey (GGS)	2005	18–80	11,986	6,009	1.4	9.77	24.9	Eastern Europe[6]

Table 1:   (Continued)

Country	Survey	Survey year(s)	Ages interviewed	Sample size		TFR (2005)[1]	Average number of years completed education (2005)[2]	Mean age at first birth (2005)[3,4]	Policy environment[5]
				Total	Women				
Russia	Generations and Gender Survey (GGS)	2004	17–81	11,261	7,038	1.3	11.45	24.1	Eastern Europe[6]
Spain	Spanish Survey of Fertility and Values (SFS)	2006	15–98	9,737	9,737	1.3	9.41	29.3	Southern Europe and East Asia
Sweden	Level of Living Survey (LNU)	1991, 2000–2001	18–76	6,686	3,292	1.8	11.92	28.6	Nordic
UK	British Household Panel Survey (BHPS)	2005–2006	16–80	14,539	7,856	1.8	9.03	30	Anglo-Saxon
US	National Survey of Family Growth, (NSFG) 1995, 2007	1995, 2006–2008	15–45	24,342	20,599	2.1	13.18	25.2	Anglo-Saxon

[1] World Bank (2014).
[2] Barro and Lee (2013).
[3] United Nations Economic Commission for Europe (2014).
[4] The World Factbook (2014).
[5] Thévenon (2011).
[6] Thévenon (2011) does not include these countries in his analysis of family policies; given their geographic location, we include such with Eastern Europe.

3.1 Measures

Early childbearing: We use retrospective fertility history data collected in each of the surveys to calculate respondents' age at first birth and define early childbearing in reference to country- and cohort-specific distributions of age at first birth. In particular, we define early births as those occurring prior to the age at which 20% of women have a first birth for a given cohort of women in each country.[8]

Cohort: Because our interest is in relatively recent change, we limit our attention to women born since 1955. In the analyses reported below, we examine three recent birth cohorts; 1955–1963 (cohort 1), 1964–72 (cohort 2), and 1973–1981 (cohort 3). Respondents in cohort 3 who had not yet reached the threshold age for identifying early

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[8] We also replicated our analyses using an absolute measure of early childbearing (age 22). Results of these analyses were qualitatively similar to those presented below and are discussed as results not shown in the Results section.

births are excluded from the analyses. As shown in Table 2, the proportion of respondents in the youngest cohort excluded by this age restriction is 0% in 13 countries, less than 10% in France, Korea, Spain, and Sweden (1964–1972 cohort), 30%–45% in Italy, the Netherlands, and the U.S., and 63% in Sweden. Because we have excluded over half of the respondents in the youngest Swedish cohort we suggest interpreting the results for Sweden with caution.

    <u>Educational attainment</u>: Because cross-country differences in educational systems are substantial, we follow prior research (e.g., Rendall et al., 2010) by drawing upon existing efforts to generate comparable measures of educational attainment. In the GGS, comparable measures have been created according to the International Standardized Classification of Education (ISCED). We collapse these measures into three categories: low education – less than secondary school; moderate education – completed secondary school or some college; and high education – completed tertiary education or higher. Given cross-country differences in both levels of educational attainment and the meaning of educational qualifications, this method cannot produce perfectly comparable measures of educational attainment (nor can any other method), and our results should be evaluated with this caveat in mind. Using years of completed education to generate country- and cohort-specific measures of relatively low and high education would be another useful strategy; however, these data are not available for most countries in our analysis.

3.2 Methods

We estimate logistic regression models predicting the log odds of having an early birth separately for each country. Model 1 includes measures of women's educational attainment and cohort, and Model 2 adds interactions between education and cohort. The first model allows us to estimate the direction and strength of educational differences in early childbearing and to observe similarities and differences in these relationships across countries. Results from the second model describe the extent to which differences by educational attainment in early childbearing have changed over time, allowing for an assessment of the generality of patterns discussed by McLanahan (2004) and others.

4. Results

Table 2 presents the proportion of women with the three levels of educational attainment across cohorts in each of the 20 countries, as well as the early birth age

threshold by country and cohort (i.e., the age at which 20% of women had given birth). Not surprisingly, we see notable differences in the early birth thresholds across both countries and cohorts, ranging from age 19.5 to age 26.5. In general, the early birth threshold has gotten older across cohorts, as women are delaying childbearing, although this is not consistently true; in some countries the age threshold has gotten younger (Australia and Lithuania) or stayed about the same (many Eastern European countries, the U.K., and the U.S.).

Table 2:   Country- and country-cohort-specific descriptive statistics

		Education level				Age of total cohort eligible interviewed sample		
	N	Low (%)	Moderate (%)	High (%)	Early birth age threshold[1]	Mean	(SD)	% excluded from analytic sample due to age below early birth threshold
Australia								
Total	2,020	27.4	30.6	42.0				
Cohort 1 (1955–1963)	743	30.7	27.7	41.6	25.0	46.14	(2.62)	0.0
Cohort 2 (1964–1972)	699	31.3	29.3	39.3	22.0	37.32	(2.60)	0.0
Cohort 3 (1973–1981)	578	18.5	35.8	45.7	23.0	28.46	(2.66)	0.0
Austria								
Total	2,160	12.6	67.2	20.3				
Cohort 1 (1955–1963)	NA	NA	NA	NA	NA	NA		NA
Cohort 2 (1964–1972)	1,219	14.9	66.8	18.3	21.5	40.62	(2.59)	0.0
Cohort 3 (1973–1981)	941	8.8	67.9	23.3	23.0	31.51	(2.60)	0.0
Belgium								
Total	1,984	21.7	34.1	44.3				
Cohort 1 (1955–1963)	709	32.4	31.9	35.7	22.0	49.59	(2.71)	0.0
Cohort 2 (1964–1972)	669	17.9	38.1	43.9	23.5	41.08	(2.77)	0.0
Cohort 3 (1973–1981)	606	13.2	32.2	54.6	24.5	31.73	(2.74)	0.0
Bulgaria								
Total	4,161	18.6	51.1	30.3				
Cohort 1 (1955–1963)	1,142	19.4	53.2	27.5	19.5	44.42	(2.42)	0.0
Cohort 2 (1964–1972)	1,571	16.6	54.4	29.0	19.5	36.23	(2.58)	0.0
Cohort 3 (1973–1981)	1,448	20.2	45.8	34.0	19.5	27.82	(2.55)	0.0
Estonia								
Total	2,421	8.7	50.9	40.4				
Cohort 1 (1955–1963)	830	6.6	48.9	44.5	20.5	45.66	(2.55)	0.0
Cohort 2 (1964–1972)	812	7.0	54.9	38.1	20.0	36.57	(2.69)	0.0
Cohort 3 (1973–1981)	779	12.7	48.8	38.5	20.5	27.84	(2.56)	0.0
France								
Total	2,733	19.9	41.0	39.1				
Cohort 1 (1955–1963)	940	29.9	39.5	30.6	21.5	46.34	(2.61)	0.0
Cohort 2 (1964–1972)	1,023	18.9	43.6	37.5	23.5	37.40	(2.58)	0.0
Cohort 3 (1973–1981)	770	9.2	39.4	51.4	24.5	28.40	(2.72)	7.9
Hungary								
Total	3,665	15.8	61.3	22.8				
Cohort 1 (1955–1963)	1,180	22.4	58.1	19.6	19.5	45.77	(2.60)	0.0
Cohort 2 (1964–1972)	1,099	15.8	62.1	22.0	20.5	36.27	(2.65)	0.0
Cohort 3 (1973–1981)	1,386	10.2	63.5	26.3	22.5	27.47	(2.54)	0.0

Table 2: **(Continued)**

		Education level				Age of total cohort eligible interviewed sample		
	N	Low (%)	Moderate (%)	High (%)	Early birth age threshold[1]	Mean	(SD)	% excluded from analytic sample due to age below early birth threshold
Italy								
Total	8,438	41.3	45.0	13.7				
Cohort 1 (1955–1963)	3,430	48.8	40.3	10.9	21.5	44.36	(2.58)	0.0
Cohort 2 (1964–1972)	3,430	40.5	45.4	14.1	24.0	35.59	(2.57)	0.0
Cohort 3 (1973–1981)	1,578	26.7	54.7	18.6	26.5	26.73	(2.58)	45.4
Japan								
Total	4,160	2.9	83.0	14.1				
Cohort 1 (1955–1963)	1,822	3.7	83.7	12.6	24.0	43.77	(4.81)	0.0
Cohort 2 (1964–1972)	1,689	2.5	84.3	13.2	25.0	35.62	(4.40)	0.0
Cohort 3 (1973–1981)	649	1.8	77.8	20.3	25.0	31.17	(2.67)	0.0
Korea								
Total	7,150	14.4	64.4	21.2				
Cohort 1 (1955–1963)	2,525	32.2	54.6	13.3	23.0	46.16	(2.13)	0.0
Cohort 2 (1964–1972)	3,067	6.2	70.1	23.7	24.5	37.85	(2.56)	0.0
Cohort 3 (1973–1981)	1,558	1.9	69.1	29.0	25.0	30.27	(2.30)	2.0
Lithuania								
Total	2,331	5.7	63.1	31.2				
Cohort 1 (1955–1963)	821	3.4	66.5	30.1	21.5	47.04	(2.56)	0.0
Cohort 2 (1964–1972)	818	4.9	70.2	24.9	21.0	38.22	(2.53)	0.0
Cohort 3 (1973–1981)	692	9.2	50.9	39.9	20.5	29.12	(2.53)	0.0
Netherlands								
Total	2,358	25.1	37.7	37.1				
Cohort 1 (1955–1963)	939	31.1	34.6	34.3	25.0	43.61	(2.62)	0.0
Cohort 2 (1964–1972)	1,057	22.9	40.1	37.0	26.0	35.04	(2.61)	0.0
Cohort 3 (1973–1981)	362	16.3	39.0	44.8	26.0	26.53	(2.51)	39.5
Norway								
Total	3,892	15.2	36.9	47.9				
Cohort 1 (1955–1963)	1,307	21.7	41.1	37.3	21.5	48.06	(2.61)	0.0
Cohort 2 (1964–1972)	1,470	13.0	37.8	49.2	22.5	39.12	(2.51)	0.0
Cohort 3 (1973–1981)	1,115	10.4	30.8	58.8	24.0	30.60	(2.66)	0.0
Poland								
Total	4,940	9.4	64.7	25.9				
Cohort 1 (1955–1963)	1,868	14.2	69.7	16.1	20.5	51.76	(2.59)	0.0
Cohort 2 (1964–1972)	1,353	7.5	68.4	24.1	20.5	42.08	(2.60)	0.0
Cohort 3 (1973–1981)	1,719	5.7	56.3	38.0	21.0	33.48	(2.58)	0.0
Romania								
Total	2,685	29.1	58.2	12.7				
Cohort 1 (1955–1963)	893	31.9	57.2	10.9	20.0	46.80	(2.56)	0.0
Cohort 2 (1964–1972)	1,044	27.4	60.4	12.2	20.0	37.21	(2.31)	0.0
Cohort 3 (1973–1981)	748	28.1	56.3	15.6	20.0	28.82	(2.55)	0.0
Russia								
Total	3,349	4.3	70.3	25.4				
Cohort 1 (1955–1963)	1,334	2.4	75.0	22.6	20.5	45.03	(2.47)	0.0
Cohort 2 (1964–1972)	1,024	3.3	72.2	24.5	19.5	36.06	(2.63)	0.0
Cohort 3 (1973–1981)	991	7.8	62.1	30.2	20.0	27.12	(2.58)	0.0

Table 2:   (Continued)

	N	Education level			Early birth age threshold[1]	Age of total cohort eligible interviewed sample		% excluded from analytic sample due to age below early birth threshold
		Low (%)	Moderate (%)	High (%)		Mean	(SD)	
Spain								
Total	4,364	39.7	35.4	24.9				
Cohort 1 (1955–1963)	1,432	52.7	28.4	18.9	21.0	46.66	(2.50)	0.0
Cohort 2 (1964–1972)	1,594	38.5	37.6	23.9	23.0	37.78	(2.57)	0.0
Cohort 3 (1973–1981)	1,338	27.2	40.2	32.6	25.0	28.85	(2.68)	8.0
Sweden								
Total	1,171	15.6	50.6	33.8				
Cohort 1 (1955–1963)	488	18.0	49.6	32.4	22.0	39.98	(3.90)	0.0
Cohort 2 (1964–1972)	532	15.2	47.9	36.8	23.0	30.62	(4.33)	7.8
Cohort 3 (1973–1981)	151	9.3	62.9	27.8	24.0	22.86	(2.65)	62.9
UK								
Total	3,580	9.9	36.0	54.1				
Cohort 1 (1955–1963)	1,170	14.5	35.3	50.2	21.5	46.04	(2.57)	0.0
Cohort 2 (1964–1972)	1,328	9.0	38.1	52.9	21.5	37.49	(2.61)	0.0
Cohort 3 (1973–1981)	1,082	5.9	34.3	59.8	21.5	28.34	(2.58)	0.0
US								
Total	12,291	14.7	62.6	22.8				
Cohort 1 (1955–1963)	4,141	12.8	65.1	22.0	19.5	36.25	(3.23)	0.0
Cohort 2 (1964–1972)	5,038	14.4	60.7	24.9	19.5	31.60	(6.45)	0.0
Cohort 3 (1973–1981)	3,112	17.4	62.2	20.4	19.5	24.56	(6.16)	29.2

Note: NA - not applicable/data not available
[1] Calculated as the age at which 20% of the cohort has had a first birth

There is substantial variation in the educational distributions across countries. Some countries have relatively large proportions of women in the lowest educational category (e.g., Italy and Spain), especially for the cohort born 1955–63, whereas others have much larger proportions in the highest category (e.g., Norway and the U.K.). However, it is important to note that ISCED classification schemes do not necessarily produce strictly comparable categories (Perelli-Harris et al. 2010), so we suggest caution in comparing educational distributions across countries. In most countries there is evidence of substantial improvement in women's education across cohorts, especially in the Western European countries (such as Belgium, France, and Spain). In other countries, such as the U.S., the change is less pronounced or negligible.

In Figures 1 through 3 we summarize results from logistic regression models for the risk of an early birth in the form of log odds, where early childbearing is defined as the age at which 20% of first births have occurred. Model 1 (Figure 1) includes only measures of educational attainment and birth cohort, and Model 2 (Figures 2 and 3) adds the interactions between education and cohort to ascertain whether differences by educational attainment in early childbearing have changed over time. For Model 2 we

only present the estimated interactions between education and cohort: complete results are available in the Appendix.

Figure 1: **Log-odds ratios of early birth, by level of education**
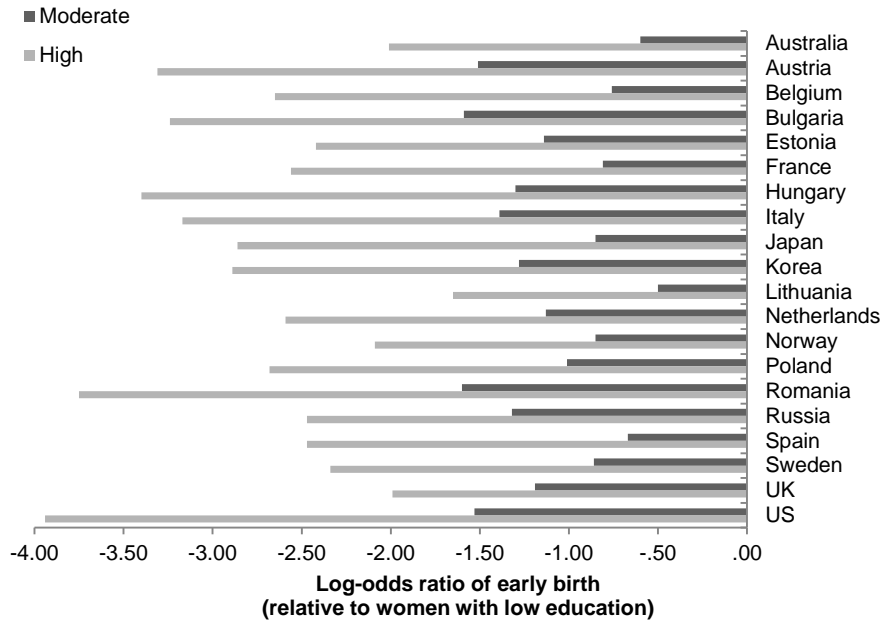

As shown in Figure 1, across all 20 countries, women in the moderate and high education categories are significantly less likely to have an early birth than those with low education (log-odds ratios are less than zero in all cases). In all countries, the coefficient associated with the high educational category is also significantly different from that associated with the moderate category, thus indicating that a negative educational gradient in the likelihood of early first birth exists in each of these countries. Although we do not conduct formal tests of cross-country differences, educational differences (between the highest and lowest educational categories) appear to be most pronounced in Austria, Bulgaria, Hungary, Romania, and the U.S.

Because the number of women with both high education and an early birth is very small in several countries, we are concerned that small fluctuations in the numbers of early births across cohorts may lead to erroneous conclusions about the extent to which educational differences in early childbearing have changed. To avoid over-interpreting

results, we collapsed moderate- and high-education categories in countries where fewer than 10 highly-educated women in each birth cohort had an early birth. This recoding of education applies to Austria, Hungary, Italy, Japan, Romania, and Sweden in Model 2. Additionally, highly-educated women in the youngest cohort in Sweden have very few early births; thus we suggest interpreting results for these countries with caution. Even with these restrictions, results from Model 2 provide evidence (though not entirely consistent) of an increase in the relative prevalence of early childbearing among the least-educated women (as compared to those with moderate and high education).

Figures 2 and 3 display the estimated cohort interactions (in log odds ratios) for women in the moderate and high education groups, respectively. In these figures, negative coefficients indicate larger educational differences in the second cohort (dark gray bars) and the third cohort (light gray bars) relative to the first cohort (patterned bars indicate coefficients that are statistically different from zero at *p* < .05). From both figures it is clear that almost all of the interaction coefficients are negative (although not always statistically significant), suggesting a pattern of growing educational differences in the likelihood of early motherhood across cohorts.

Figure 2:   Log-odds ratio of early birth: Interaction between moderate education and cohort
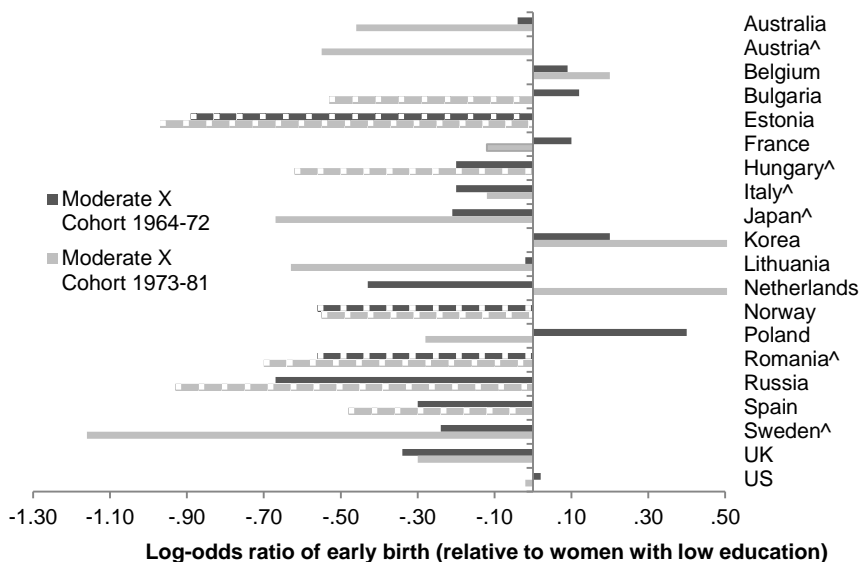
^*Note*: Results combine women in the moderate and high education categories due to few early births (less than 10) among women with high education in each cohort

Another interesting finding is that differences between the moderate and low education groups have remained unchanged across time in the U.K and the U.S. (as well as a number of other countries). This is consistent with emerging family scholarship about the (growing) behavioral similarities of the less educated and moderately educated in the U.S. (Cherlin 2010, 2014), but begs the question of why we see growing gaps between these two groups in some of the other countries we examine (and in the prior U.S. literature).

Cross-national differences also raise important questions about the underlying mechanisms. In terms of overall differences in early childbearing by education across countries as classified by policy environments (shown in Table 1), the reproductive-polarization hypothesis would suggest a larger educational gradient in countries where balancing work and family is more difficult. As classified by Thévenon (2011), the Nordic countries are at the top of the spectrum of providing public support for balancing work and family, while the Anglo-Saxon countries along with Southern Europe and East Asia are at the bottom, continental Europe is somewhere in the middle, and the Eastern European countries are in a separate transitional category. In general, the data on the overall gradient fits these expectations – gradients are especially large in some of the Anglo-Saxon, Southern European, and East Asian countries (as well as some Eastern European countries).

Our analysis of change in educational gradients over time, however, does not necessarily suggest a strong patterning by these broad policy contexts. For example, we observe notable growth in the gap between the high- and low-education groups in Australia, Estonia, Russia, and the U.K. (countries with relatively weak work-family policies), but also in Norway (a nation with strong work-family policies). The fact that for at least one of these countries – Australia – the age by which 20% of women have had a child has declined across cohorts would appear to be more consistent with the hypothesis about the increasing non-normativity of early childbearing emphasized in our third hypothesis. In order to fully consider the role of public policy over time in shifting the education gradient in early childbearing, one would want to consider more detailed information about how policies have changed within and across countries over time.

Figure 3:   **Log-odds ratio of early birth: Interaction between high education and cohort**
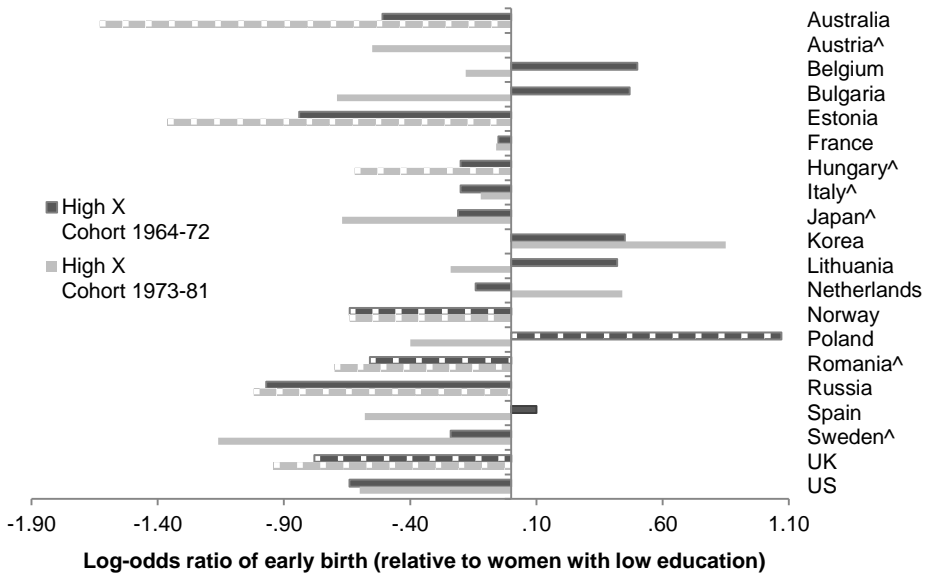
Log-odds ratio of early birth (relative to women with low education)

^*Note*: Results combine women in the moderate and high education categories due to few early births (less than 10) among women with high education in each cohort

Overall, our results suggest that across all 20 countries examined there is a striking educational gradient in early childbearing – women with high education are much less likely to have children at an early age, compared to women with low or moderate education. In terms of change over time, we find that in the majority of industrialized countries we examined there appears to be some evidence of an increasing gradient by education in early childbearing across cohorts. Where there are statistically significant differences, with one exception (Poland for cohort 2 compared to cohort 1) they always point to an increasing negative educational gradient. The general pattern of results in Figures 2 and 3 is thus largely in accord with McLanahan's (2004) description of a universal concentration of family behaviors with potentially negative implications for well-being (including early parenthood) at the lower end of the educational spectrum. Paradoxically, however, we do not observe a significant increase in the gap by education in the U.S., where we would have expected such, but this may reflect differences in the outcome: McLanahan (2004) focused on mothers' overall median ages, as opposed to the age at first birth. Our results are also generally consistent with the negative educational gradient in childbearing within cohabitation observed across a

number of European countries by Perelli-Harris et al. (2010), although we do not necessarily observe the expected differences across public policy contexts.

In order to consider the sensitivity of our results to the use of a relative measure of early childbearing, we also estimated models using an absolute measure of early childbearing (results not shown). Here, we defined 'early' births as those occurring by age 22, the typical age of completion of tertiary education in many countries and an age before which mothers may not have attained the level of socio-emotional maturity and socioeconomic resources that promote positive child development. The pattern of results we observe is largely similar to that just described for models using the relative measure of early childbearing (the age by which 20% of each cohort has experienced a birth), although we find somewhat stronger evidence of a growing educational gradient over time using the absolute measure. When using age 22 as the threshold to define early childbearing, 14 countries have at least one statistically significant estimate for moderate or high education (as compared to low education) for cohort 2 or 3 (as compared to cohort 1). Also, some of the coefficients are slightly larger than the corresponding coefficients from models using our relative measure, while a few become smaller or are no longer statistically significant. The difference in the estimates for the relative versus absolute measure depends on how close age 22 is to the age at which 20% of the cohort has had a first birth. Where the relative age is substantially older than 22 and the absolute threshold for early childbearing results in a more selective group of mothers (e.g., in Japan, only 6%–7% of women across all three cohorts have had a birth by age 22), results using the absolute measure tend to be stronger than those for the relative measure. By contrast, results using the absolute age are generally weaker when age 22 does not represent a particularly young age at birth (e.g., in Estonia, 29%–45% of women across the three cohorts have had a birth by age 22).

5. Discussion

In an effort to extend previous research and lay an empirical foundation for further research on the correlates and consequences of early parenthood, we have used comparable data from 20 countries to describe educational differences in early childbearing and the extent to which those differences have changed over time. Notably, we found that early childbearing is significantly more common at lower levels of education in all 20 countries. The strong negative gradient in the U.S. is consistent with prior research and is thus not surprising, but evidence of pronounced educational differences in early childbearing in Eastern European and East Asian countries is an important addition to an empirical foundation upon which to develop hypotheses about the mechanisms underlying such differences.

Marked differences in the overall magnitude of the negative educational gradient across countries are largely consistent with hypotheses emphasizing the role of public policy (e.g., Rendall et al. 2010). For example, the negative gradient is particularly pronounced in Japan, Korea, the U.S., and Italy, where support for work-family balance is relatively limited (Gornick and Heron 2006; Thévenon 2011). There are exceptions to this general pattern, however, with a large gradient observed in some countries that do not have weak work-family policies (e.g., Belgium) and smaller gradients in countries with less generous work-family policies (e.g., the U.K.). In the Eastern European countries the magnitude of the negative gradient varies greatly, perhaps reflecting the diverse and transitional nature of social policies in this region (Thévenon 2011). The role of public policies and other contextual factors in shaping patterns of early childbearing is an important topic for future investigation.

Evaluating change over time, we found that the educational gradient in early childbearing has increased in the majority of countries considered and remained stable in the rest. We found almost no evidence that education is becoming a less important correlate of early childbearing over time across this wide array of industrialized countries with very different cultural backgrounds and policy regimes. Evidence that early childbearing is becoming more common among women with less education in countries like Italy suggests the potential importance of growing labor market returns to higher education and associated disincentives for highly-educated women to have children at younger ages, or perhaps the increasing social and economic costs of engaging in an increasingly non-normative pathway to family formation. Incorporation of direct measures of social, economic, and policy context into multi-level models is thus a potentially fruitful avenue for subsequent research. It will also be imperative to study outcomes following early births, such as the subsequent economic well-being of mothers and children, to determine if the (negative) outcomes associated with early childbearing are similar across contexts.

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Appendix

Table A1: **Log-odds ratio of women having an early birth using a relative threshold (country-cohort-specific age at which 20% of women have had a birth). Model 1**

	Model 1: Education and Cohort									
	Education (Ref=Low)				**Cohort (Ref=1955–1963)**					
	Moderate		**High**		**1964–1972**		**1973–1981**		**Constant**	
	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Australia	-0.60	<.001	-2.01	<.001	-0.24	.08	-0.04	.806	-0.46	<.001
Austria^	-1.51	<.001	-3.31	<.001	REF		0.19	.095	-0.01	.953
Belgium	-0.76	<.001	-2.65	<.001	0.24	.104	0.66	<.001	-0.61	<.001
Bulgaria	-1.59	<.001	-3.24	<.001	0.08	.461	0.07	.541	-0.05	.618
Estonia	-1.14	<.001	-2.42	<.001	-0.20	.124	-0.28	.033	0.16	.332
France	-0.81	<.001	-2.56	<.001	0.28	.021	0.53	<.001	-0.60	<.001
Hungary^	-1.30	<.001	-3.40	<.001	0.32	.005	0.35	.001	-0.38	<.001
Italy^	-1.39	<.001	-3.17	<.001	0.20	.002	0.60	<.001	-0.86	<.001
Japan^	-0.85	<.001	-2.86	<.001	0.17	.049	0.09	.463	-0.52	.006
Korea	-1.28	<.001	-2.89	<.001	0.55	<.001	0.68	<.001	-0.45	<.001
Lithuania	-0.50	.011	-1.65	<.001	0.29	.022	0.22	.117	-0.85	<.001
Netherlands	-1.13	<.001	-2.59	<.001	0.18	.132	0.44	.008	-0.39	<.001
Norway	-0.85	<.001	-2.09	<.001	0.20	.044	0.42	<.001	-0.44	<.001
Poland	-1.01	<.001	-2.68	<.001	0.17	.073	0.48	<.001	-0.46	<.001
Romania^	-1.60	<.001	-3.75	<.001	0.22	.074	0.04	.749	-0.37	<.001
Russia	-1.32	<.001	-2.47	<.001	-0.30	.005	-0.16	.136	0.26	.161
Spain	-0.67	<.001	-2.47	<.001	0.25	.009	0.45	<.001	-1.10	<.001
Sweden^*	-0.86	<.001	-2.34	<.001	0.00	.984	-0.05	.837	-0.27	.107
UK	-1.19	<.001	-1.99	<.001	0.14	.188	0.22	.053	-0.17	.157
US	-1.53	<.001	-3.94	<.001	-0.11	.056	0.02	.773	0.09	.117

^*Note*: Model 2 results combine women in the moderate and high education categories due to few early births (less than 10) among women with high education in each cohort

*Note: Early births are extremely rare (only 1) in the 1973–1981 cohort

REF: in Austria the reference category is the 1964–1972 cohort