Educational Differences in Early Childbearing: A Cross-national Comparative Study

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James M. Raymo[1]

So-jung Lim[1]

Brienna Perelli-Harris[2]

Marcia J. Carlson[1]

Miho Iwasawa[3]

1: Department of Sociology and Center for Demography and Ecology, University of Wisconsin-Madison

2: Max Planck Institute for Demographic Research, Rostock, Germany

3: National Institute of Population and Social Security Research, Tokyo

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Abstract

This cross-national comparative study describes relationships between educational attainment and early age at first childbirth and seeks to lay an empirical foundation for further research on the ways in which these relationships are shaped by national context. To this end, we describe educational differences in early childbearing and the extent to which those differences have changed across cohorts in twelve countries (Bulgaria, France, Germany, Hungary, Japan, the Netherlands, Poland, Romania, Russia, Spain, the U.K, and the U.S.). We find that a negative educational gradient in early childbearing is common across all ten countries, whereas an increasing concentration of early childbearing among women with less education across cohorts is observed in only two of the ten countries. Consistent with earlier studies, we find evidence of growing educational differences in the U.K. but we do not find a similar pattern in other countries. Japan is the only country in which we find evidence of a decline in educational differences. We discuss possible explanations for these observed patterns of change.

Introduction

Recent research on fertility trends in industrialized countries primarily emphasizes delayed onset of childbearing (e.g., Frejka and Sobotka 2008; Morgan and Taylor 2006) and the extent of fertility recuperation at older ages (e.g., Lesthaeghe and Willems 1999). In most countries, attention to early childbearing is limited despite the fact that large numbers of women continue to enter parenthood at relatively young ages. The U.S. and the U.K. are notable exceptions, with recent research devoting a great deal of attention to early childbearing, especially teenage childbearing and its relationship with socioeconomic disadvantage. This work shows not only that early first births are more common among women with more limited socioeconomic resources (Amato et al. 2008; Hobcraft and Kiernan 2001; Geronimus and Korenman 1992), but also that early parenthood is negatively associated with the well-being of children (Hoffman and Scher 2008) and with less favorable outcomes for both mothers and fathers (Brien and Willis 1997; Taniguchi 1999). Increasing concentration of early parenthood among women with lower levels of educational attainment in recent years (Martin 2004; Robson and Pevalin 2007) thus has potentially important implications for trends in inequality and the reproduction of disadvantage.

Growing educational differences in early childbearing in the U.S. and U.K. appear to be part of a more general socioeconomic bifurcation in family behavior and an associated pattern of "diverging destinies" (McLanahan 2004). McLanahan argues that family behaviors with potentially negative implications for women's and children's well-being (including, but not limited to, early childbearing) are increasingly concentrated among the less educated, while behaviors with potentially positive implications for well-being are increasingly concentrated among more highly-educated women. Although McLanahan's (2004) primary focus is on the U.S., she makes the provocative and important claim that socioeconomic bifurcation in family

behavior is a key feature of the second demographic transition and, as such, should characterize other countries experiencing prolonged below-replacement fertility and the emergence of new family behaviors.[1]

These are profoundly important ideas that deserve, and have received, a great deal of attention. However, it is important to recognize that the theoretical and empirical basis of McLanahan's (2004) argument relies primarily on studies of family change in the U.S. Her cross-national comparative evidence provides an important, but limited, demonstration of the broader generality of patterns observed in the U.S. Our goal in this paper is to build upon the ideas and evidence presented by McLanahan (2004) to more thoroughly examine the generality of growing educational differences in age at first birth observed in the U.S. We do this by extending her cross-national comparative analyses in the following ways. First, we extend the range of low-fertility societies examined to include countries in Eastern Europe and East Asia. Including countries outside of the U.S. and Western Europe, especially those where cultural and historical contexts suggest that educational differences in family behavior may be relatively limited, is essential for making claims about the broader generality of family changes. Second, we address the limitations inherent in McLanahan's (2004) reliance on cross-national comparative evidence of educational differences at a single point in time. By examining data

[1] The second demographic transition can be characterized in a number of ways, including theorization about the underlying reasons for changing family behaviors (Sobotka 2008, Lesthaeghe 2010), but here we use the term second demographic transition to describe a set of family behaviors and not necessarily the social and ideational change that may have produced them.

from multiple cohorts, we can more directly assess the generality of the *growing* bifurcation observed in the U.S. Third, we focus on variation across countries in educational differences in early childbearing and its change over time in an effort to better understand the mechanisms that underlie observed patterns of change and the ways in which those relationships may be shaped by context. By extending McLanahan's research in these ways, our descriptive analyses will provide an empirical basis for evaluating the extent to which differences in early childbearing by education do indeed exist—and may be growing—across a wide range of countries. This evidence will, in turn, facilitate informed speculation about potential explanations for any cross-national differences we do observe and about the ways in which changes in family behaviors may be increasing stratification and inequality, both within and across generations.

Background

Early childbearing

When discussing early childbearing, it is important to keep in mind what is meant by this term. Early childbearing can refer to an absolute age, for example, teenage childbearing (ages 15-19). Much of the discussion about early childbearing in the U.S. and U.K. focuses on teenage childbearing, reflecting concerns that the physical and emotional maturity of teenage mothers is not sufficient to provide effective care for a child, and that they may not have the necessary economic resources or support from the child's father. Yet teenage childbearing is relatively rare in countries outside of the U.S. and U.K., and therefore may not be a useful measure for comparing the prevalence and correlates of early childbearing cross-nationally. Nonetheless, the concept of an absolute age of early childbearing is still valuable, since it may be universally associated with certain characteristics, such as socioeconomic disadvantage. A slightly older age may be a good indicator of disadvantage, if the majority of childbearing continues to occur to

women older than that age. This is particularly true to the extent that childbearing prior to these ages may be incompatible with continued schooling.

Early childbearing can also be defined relative to the normative timing of childbearing in a given society. Given the variation in mean age at first birth across countries, especially in light of differences in the extent to which childbearing has been postponed of over the past few decades, it is important to recognize that relative measures of early childbearing differ across countries. The mean age at childbearing in Eastern Europe has remained young relative to that in Western Europe and Japan. For example, in the mid-1990s, the mean age at first birth in Russia was around 23, while it was over 29 in Spain (Council of Europe 2004), and over 27 in Japan (National Institute of Population and Social Security Research 2011). Postponement of childbearing has emerged only recently in Eastern European countries (Frejka and Sobotka 2008). Thus, what is considered "early" differs by society and over time. Although the actual age of early childbearing may differ across countries, its implications may be similar. Because the mean age of childbearing has continuously risen in recent years in all industrialized countries, early childbearing has become an increasingly non-normative pathway to family formation. We therefore expect that those women who continue to give birth at younger ages may be an increasingly select group with respect to both background and future prospects.

Early childbearing in the U.S.

Given that most research on early childbearing has been conducted in the U.S., and that McLanahan's argument derives from the American context, we also draw on this research to describe the potential associations and ramifications of early childbearing. In the U.S., a substantial proportion of women continue to give birth at relatively young ages. For example, 23% of women born in 1973 had given birth by age 20 and 50% had given birth by age 25

(Casper and Bianchi 2002: 72). Although these figures are substantially lower than for women who reached adulthood during the peak of the baby boom, it is clear that early motherhood remains common in the U.S. Reflecting the general trend toward later fertility and the continued prevalence of early childbearing, the age pattern of fertility rates in the U.S. has been characterized by a bimodal distribution, with a small peak in the early twenties, and a larger peak in the late twenties (Sullivan 2005). Perhaps the most important change in early childbearing is in the marital status of mothers. In 2007, 60% of births to women age 20-24 were to unmarried mothers (Ventura 2009), reflecting the fact that the decline in marriage rates at young ages has been more pronounced than the corresponding decline in fertility rates. The proportion of births to unmarried mothers has increased at all ages, but births at young ages are much more likely than births at older ages to involve unmarried mothers (Ventura 2009).

Importantly, socioeconomic differences in marriage and fertility trends have resulted in an increasing concentration of early childbearing among American women with lower levels of education. Age at marriage has increased for all educational groups, but the increase in age at first birth has been substantially more pronounced among the more educated, resulting in an increasing concentration of early (often nonmarital) births among women with lower levels of education (Ellwood and Jencks 2004; Sullivan 2005). Among women born from 1960 to 1964, 78 percent of those with less than high school education had a first birth by age 25, compared to only 20 percent of those with a college degree (Ellwood, Wilde, and Batchelder 2009). Explanations for increasing educational differences in early childbearing have emphasized growing educational differences in labor market opportunities and the continued normative importance of motherhood. 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 and Percheski 2008). Limited labor market opportunities and economic resources make it particularly difficult for young men and women with lower levels of educational attainment to marry or remain in stable partnerships. At the same time, however, the fact that motherhood remains a key marker of the transition to adulthood and a central source of identity for women across the socioeconomic spectrum provides less-educated women with strong incentives to have children at a young age or outside of marriage (Edin, Kefalas, and Reed 2004; Smock, Manning, and Porter 2005).

Growing socioeconomic differentials in early childbearing have important implications for processes of stratification, given documented linkages between early parenthood and subsequent outcomes. For example, several studies have demonstrated that teenage mothers are less likely to graduate from high school (Hoffman, Foster & Furstenberg 1992). Women who become mothers at younger ages also earn less, on average, than their counterparts who delay childbearing (Hofferth 1984; Hotz, McElroy, and Sanders 2008; Taniguchi 1999), presumably as a result of career interruption during prime ages of human capital accumulation. Furthermore, early childbearing is associated with a lower likelihood of stable marriage (Cherlin 2005). At the same time, it is important to note that those women who have children at early ages are typically socioeconomically disadvantaged even before giving birth; hence, some studies have cautioned against attributing causal effects to childbearing that is instead due to social selection (Furstenberg 2007).

Importantly, linkages between early childbearing and subsequent disadvantage appear to have become stronger over time (Hoffman and Scher 2008), perhaps reflecting increasingly adverse selection into this now non-normative step in the transition to adulthood (Hotz, McElroy

and Sanders 2008). The growing concentration of early parenthood among more disadvantaged women makes these linkages between early parenthood and subsequent well-being particularly salient for understanding processes of stratification in the U.S. The concentration of early childbearing at the lower end of the socioeconomic spectrum may also have important implications for the intergenerational transmission of disadvantage, given evidence that the children of young mothers fare less well than their counterparts born to older mothers (Hoffman and Maynard 2008). Despite the centrality of these questions in research on childbearing at young ages in the U.S., little attention has been paid to cross-national differences in the prevalence, correlates, and consequences of early childbearing. Although it is clear that relatively high rates of teenage childbearing are a distinctive feature of the U.S. context, the lack of cross-national research limits our understanding of the extent to which growing educational differences observed in the U.S. are also distinctive or are part of a more general pattern of family change as suggested by McLanahan (2004).

The Second Demographic Transition and "Diverging Destinies"

The most compelling and provocative cross-national evidence of growing educational differences in family behavior comes from Sara McLanahan's (2004) presidential address to the Population Association of America, in which she argues that the growing socioeconomic bifurcation in family behavior in the U.S. is part of the broader "second demographic transition." She supports this argument by demonstrating that early parenthood and other behaviors with potentially negative implications for the well-being of women and children (e.g., divorce and nonmarital childbearing) are concentrated among women with lower levels of education in Canada and several Western European countries. In addition to the economic factors mentioned above, her explanations for this trend highlight the role of policies that provide stronger

incentives for early childbearing among the less educated, attitudinal shifts that have made career development and delayed family formation more normatively acceptable (especially among the highly educated), and improved birth control technology and access to abortion that has facilitated delayed parenthood. Although McLanahan did note the potential importance of differences in public policy for understanding cross-national variation in some aspects of family behavior, the primary goal of her research was to demonstrate cross-national similarity in the relationship between educational attainment and family behaviors.

Building upon McLanahan's (2004) work, we draw broadly from other comparative studies of fertility timing and other family behaviors associated with the second demographic transition to develop a more general set of expectations about factors that might contributed to growing educational differences in early childbearing and cross-national differences therein. We pay particular attention to labor market dynamics and the returns to education, public policies supporting work-family balance, and the prevalence and normativity of early childbearing. We then proceed to provide comparable, cross-national evidence regarding change over time in the relationship between women's educational attainment and multiple measures of early childbearing. By evaluating this empirical evidence in light of the posited explanations summarized in the next section, we seek to provide a basis for informed speculation about how relationships between educational attainment and early childbearing may depend upon economic, political, and social context.

Posited explanations

As noted above, growing economic inequality and the increasing difficulty that low-educated men and women face in achieving stable employment and economic independence is central to explanations of growing educational differences in family behavior in the U.S. With respect to

early childbearing, these trends are thought to increase the opportunity costs of early transition to parenthood for the well educated to a greater extent than for the less educated.

Socioeconomic differences in the returns to education and levels of income inequality differ markedly across countries (Alderson and Nielsen 2002). Along with the U.S. and other English-speaking countries, increase in income inequality has been pronounced in countries like Japan and more limited in Northern and Western Europe. After the collapse of communism, income inequality rose steeply across Central and Eastern Europe, but with considerable variation across the region (Bandelj and Mahutga 2010). To the extent that high levels of inequality and limited economic opportunities among the less educated have played a central role in shaping educational differences in early childbearing, we would expect these differences to be most pronounced in countries like the U.S. and Japan and less pronounced in countries like France and Germany.

Policy differences are also likely to play an important role. In a series of comparative studies, Rendall and colleagues (Rendall et al. 2003, 2005, 2009) describe socioeconomic differences in the timing of childbearing in the U.K., France, and Norway. They find that the U.K. resembles the U.S. in having an increasing concentration of relatively early childbearing among women with lower levels of education and occupational status. In contrast, educational differentials are limited in France and Norway as a result of rising age at childbearing among all women in France and particularly rapid decline in early childbearing among women with more limited educational attainment in Norway. Their explanation for these cross-national differences emphasizes policy incentives regarding childbearing. In particular, they emphasize the differences between universalistic welfare regimes (e.g., France and Norway) which encourage stable employment among all women prior to family formation and means-tested welfare

regimes (e.g., U.K. and U.S.) which may encourage early childbearing among women who qualify for public childcare support (i.e., those with the most limited economic prospects). As noted by Rendall et al. (2009), similar hypotheses have been articulated in other studies of first birth timing in the U.S. (e.g., Hoffman and Foster 2000; Rosenzweig 1999).

As in the U.S. and the U.K., public support for women's employment across the life course is limited in familistic countries in Southern Europe and East Asia (Dalla Zuanna and Micheli Eds. 2004). In these countries, a large proportion of women at all educational levels continue to exit the labor force for some period of time at childbirth and the employment opportunities for mothers returning to the labor force are largely limited to low-paying, non-standard work. The implications of these factors for educational differences in early parenthood are ambiguous. On one hand, the fact that relatively few highly-educated women in familistic societies like Japan and Italy pursue continuous, full-time employment following the transition to motherhood suggests that differences in the long-term opportunity costs of early childbearing are unlikely to contribute to educational differences in early childbearing. On the other hand, the extreme difficulty of balancing motherhood with career employment in countries where work-family balance is most difficult suggests that highly-educated women may have strong incentives to delay childbearing while maximizing short-term investments in personal and occupational pursuits prior to parenthood.

Research on the emergence of new family behaviors also suggests that the levels and trends in educational differences in early childbearing may be associated with its prevalence and normativity. For example, in a recent cross-national study of educational differences in divorce, Härkönen and Dronkers (2006) found that concentration of divorce among the less-educated was more pronounced in settings where family behaviors such as nonmarital childbearing, divorce,

and cohabitation were more common. Of course, early childbearing is somewhat different than divorce in that it is not an "innovative" behavior but rather a formerly common behavior that has become increasingly non-normative in low-fertility societies. However, it may be that, just as negative selection and unfavorable outcomes associated with previously uncommon family behaviors such as cohabitation or divorce appear to decline as these behaviors become more prevalent (McKeever and Wolfinger 2001; Schoen 1992), previously common behaviors such as early marriage and early childbearing may be increasingly associated with adverse selection and less favorable outcomes as they become more non-normative. By extension, it may be that increasingly non-normative family behaviors such as early childbearing may have particularly pronounced implications for subsequent well-being in societies in which those behaviors have become most uncommon. Consistent with this hypothesis, a recent cross-national comparative study found that associations between teenage motherhood and unfavorable socioeconomic outcomes were strongest in countries where the prevalence of nonmarital childbearing is lowest (Robson and Berthoud 2003).

Data and methods

In this paper, we take a first step toward developing a cross-national comparative understanding of socioeconomic differences in early childbearing by examining relationships between women's educational attainment and early childbearing, and changes therein, across twelve countries: Bulgaria, France, Germany, Hungary, Japan, the Netherlands, Poland, Romania, Russia, Spain, the U.K., and the U.S. In many cases, data come from the first round of the UN Generations and Gender Surveys (GGS) conducted between 2003 and 2005.

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). There is a particular focus on relationships between parents and children ('generations') and between partners ('gender') (Macura 2002). The GGS is a prospective survey across twenty countries (data are currently available for eleven) aimed at better understanding the causal factors that influence demographic behaviors. As described by Vikat and colleagues (2007), the GGS uses comparable survey design, 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 between the ages of 18 and 79 (Simard and Franklin 2008).

Since GGS data are not available outside of Europe, we use alternative data sources for Japan, the Netherlands, the U.K, and the U.S. Data for Japan come from the 2002 and 2005 National Fertility Surveys, data for the Netherlands come from the 2003 Family and Fertility Survey, data for the U.K. come from the first and second waves of the British Household Panel Survey, and data from the U.S. come from the combined 2002 and 2006-2008 rounds of the National Survey of Family Growth (Cycles 6 and 7). The European and American surveys have been harmonized according to a standard procedure outlined in Perelli-Harris, Kreyenfeld, and Kubisch (2010), but each survey also has limitations. Please see www.nonmarital.org for further information about each survey. We have made efforts to ensure the comparability of the Japanese data, although strict comparability is limited by the absence of information on the childbearing histories of formerly married and never-married women. 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 twelve countries.

Measures

Early childbearing: We use retrospective family history data collected in each of the surveys to calculate respondents' age at first birth. We use two definitions of 'early' first birth—one relative measure and one absolute measure. Because the age of childbearing varies substantially across both countries and cohorts, our relative measure defines early childbearing in reference to country- and cohort-specific distributions of age at first birth: childbirth occurring before the age at which 25% of women in a given cohort in each country have given birth. Recognizing that childbirth that occurs before one has had the opportunity to complete tertiary education may impede educational attainment and long-range economic outcomes, we also use an absolute measure of early childbearing, defined as childbirth that occurs before age 22. We define our dependent variables as 0-1 indicators of early childbearing according to these two definitions and estimate logistic regression models for the log-odds of having an early birth by these different ages.

For each definition of early birth, we estimate two models. In the first model, we include educational attainment and birth cohort; in the second model, we include an interaction between these two independent variables to ascertain whether educational differences in early childbearing have changed over time. The first model allows us to estimate the direction and the strength of educational differences in early childbearing and to observe similarities and differences in these relationships across countries. The second model allows us to identify countries in which educational differences in the likelihood of early childbearing have changed over time. In which countries do we observe growing educational differentials, shrinking

differentials, or no change in educational differentials? We can then informally classify countries according to the magnitude of educational differences in early childbearing (and their change across cohorts).

Analyses of these two outcomes are based on slightly different samples. For analyses of the relative measure of early childbearing, country-specific samples are comprised of all women who were greater than or equal to the age by which 25% of the women in their cohort had given birth. In other words, we restrict our analytic sample to women for whom the outcome can be observed. Similarly, for analyses of the absolute measure of early childbearing, we restrict the samples to women who were at least age 22 at the time of the survey. In countries where the relative age of early childbearing is less than (greater than) 22 years old, the analytic sample for models using the relative measure will be larger (smaller) than models using the absolute measure.

Cohort: Because our interest is in relatively recent change, we limit our attention to women born since 1950. In the analyses reported below, we use a three-category measure of birth cohort – 1955-1964 (cohort 1), 1965-74 (cohort 2), and 1975-1984 (cohort 3). (Note that for some countries for cohort 3, 25% of respondents had not yet had a birth by the time of the survey. For this cohort, we therefore aggregated consecutive single-year birth cohorts within each country that met the 25% threshold, ranging from 1975-79 to 1975-84 across specific countries.

Educational attainment: Because cross-country differences in education systems are substantial, we draw 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). Following Perelli-Harris et al. (2010), we collapse these measures into three categories: less than secondary school, completed secondary school and any

additional education less than the completion of a four-year university degree (including vocational and technical schools), and university degree and higher. We use this basic classification scheme to construct measures for the U.S. and a slightly different measure for Japan, which reflects the rather different distribution of educational attainment in that country. Because there are very few women who do not complete high school in Japan, we define low education as high school or less, medium education as vocational school or junior college, and high education as university or higher. This method of constructing educational measures results in different levels of attainment and different meanings of education across countries. However, because our main goal is to determine whether early childbearing is associated with lower education within a given country, we believe that these categories are adequate for our purposes.

Results

Table 1 describes the characteristics of women in each of the twelve countries. Not surprisingly, we see notable differences in the timing of first births across both countries and cohorts. The first row of both the upper and lower panels presents the country- and cohort-specific mean age by which the first 25% of first births occurred.[2] Considering all three birth cohorts, childbearing has occurred earliest in the U.S. and the eastern European countries and latest in Japan and the Netherlands, with the U.K. and the other Western European countries falling somewhere in between. Among women born in 1955-64 in the U.S., Bulgaria, Romania and Russia , 25% gave birth by ages 20-21. At the other extreme, the corresponding ages were four to five years older,

[2] We calculated these thresholds of early childbearing to the nearest half-year of age. We include only single-year cohorts within countries where at least 25% of respondents had experienced a birth by the time of the survey.

at 24-25 for the Netherlands and Japan. In several countries, there is a substantial increase across the three cohorts in the ages by which a quarter of women reported childbearing, indicating a clear trend toward delayed childbearing. The upward trend in age at first birth is most pronounced in France, Hungary and Spain, where the age thresholds increased by 3 to 4 years across cohorts. In the other countries, there is either some smaller rise in the mean age over time (1.5-2 years in Japan and the Netherlands), or no evidence of change in the timing of first birth (Bulgary, Romania, Russia, the U.K., and the U.S.).

The fourth row shows the mean age of women across the three cohorts in each country. These figures provide aggregated information about the age distribution of the cohorts across contexts—and hence, the comparability of the data across countries. For all but two countries, the mean age of cohort 1 is 43 to 46 years (the exceptions being Japan at 42 and the U.S. at 36). For cohort 2, the mean age ranges from 33 to 36 (except the U.S. at 30). For cohort 3, the mean age ranges from 26 to 29 (except Russia at 25).

[Table 1 about here]

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., France, Japan, the Netherlands, Poland, Romania and Spain), especially for the cohort born 1955-64, whereas others have much larger proportions in the highest category (e.g., the U.K. and the U.S.). However, the fact that ISCED classification schemes do not produce strictly comparable categories (Perelli-Harris et al. 2010) suggests that we should probably not read too much into international comparisons of educational distributions. In most countries, there is evidence of substantial improvement in women's education across cohorts (especially in France and Spain). In some countries, there is less extensive change, and in Germany, the proportion

with high education actually declines over time. This may reflect problems with the representativeness of young women in the German survey or it may reflect the fact that women in the third cohort are still young and may still be completing their education at the time of observation.

Turning to our absolute measure of early childbearing (before age 22) shown at the bottom of the upper and lower panels (and using a slightly different sample as noted above), we see that the eastern European countries had the highest proportion of women in the oldest cohort with a first birth by age 22 – ranging from 42% in Romania to 50% in Bulgaria. By contrast, only 5% of women in Japan and 11% of women in the Netherlands in the earliest cohort had their first birth by age 22; the U.K., the U.S., and the central European countries fall somewhere in between (19-35%). In most countries, the proportions having had a birth by age 22 declined across cohorts—in some cases dramatically; the exceptions are Germany, Japan, the U.K., and the U.S., for which the figures remained about the same.

In Tables 2 and 3, we present results from logistic regression models for the risk of an early birth in the form of log-odds ratios, where early childbearing is defined as being among the first 25% of one's cohort to give birth (relative measure) and giving birth before age 22 (absolute measure), respectively. In each table, Model 1 (shown in the top panel) includes measures of education and cohort, and Model 2 (shown in the bottom panel) adds the interaction between education and cohort to ascertain whether educational differentials have changed over time.

Results for Model 1 (in both Tables 2 and 3) show that across all countries, those in the middle and lower education categories are significantly more likely to have an early birth than those with higher education. The magnitude of the difference is larger for those in the lowest category than those in the middle category, indicating that a negative educational gradient in the

likelihood of early first birth is common across these industrialized nations. The pattern of educational differences is similar using both the relative and the absolute measure, although the magnitude of the coefficients depends on the difference between the age at which 25% of the population and age 22. For countries with a mean age for the 25% threshold that is less than age 22, the educational differences are greater using the relative measure, whereas for countries with a mean age for the 25% threshold that is greater than age 22, the educational differences are greater using the absolute measure. Although we do not conduct any formal tests of cross-country differences, across both measures, educational differences (for one or both outcomes) appear to be most pronounced in Bulgaria, Hungary, Japan, and Romania.

[Tables 2-3 about here]

Because the dependent variable for the relative measure (Table 2) is constructed from country- and cohort-specific distributions of age at first birth, there should be no cohort differences in the likelihood of early childbearing. The fact that some of the cohort coefficients are significantly different from zero reflects cohort differences in "heaping" at the threshold ages. Because we measure the threshold ages for early childbearing to the nearest half-year (rather than the nearest month), there are some cases in which relatively large concentrations of births at the threshold ages result in more than 25% of births being classified as early. In Model 1, the cohort variable therefore primarily reflects cross-cohort differences in heaping at the threshold ages.

Results of Model 2 indicate that there is limited evidence of change in the relationship between women's educational attainment and the likelihood of early childbearing across cohorts, and the pattern differs by the measure of early childbearing. In the model for the first 25% of births, the strongest evidence of increasing concentration of early births is among women in the

U.K., where having low or middle education (relative to high education) is associated with a greater likelihood of having an early birth for both later cohorts compared to the first cohort (although low education for the 1975s cohort does not reach statistical significance). These results are consistent with the findings of Rendall and colleagues (2003; 2005 and 2009) summarized above. In Germany, low education (but not medium education) is linked with a greater likelihood of having an early birth in the two later cohorts as compared to the first cohort. By contrast, in Japan, educational differences appear to be significantly diminishing, as having low education (for the latest cohort) or medium education (for the middle and latest cohort) is *less* strongly linked to having an early birth. In other countries, interactions between cohort and educational attainment do not consistently approach statistical significance, suggesting that we cannot draw strong conclusions about changes over time in how SES is associated with early births.

Turning to the absolute measure, again, the most consistent evidence about growing differentials by education in early childbearing are found for the U.K., where three out of four cohort-education interactions are positive and statistically significant. For Bulgaria, France, Germany and Hungary, low education is more strongly linked to an early birth in the 1975s cohort—but not the 1965s cohort—as compared to the 1955s cohort; medium education does not appear to be more strongly related to early childbearing over time with the exception of France, where moderate education has a greater association with early births in the 1975s than the 1955s.

Overall, our results suggest that we cannot draw strong conclusions about growing stratification in early childbearing by SES across this range of industrialized countries. The strongest evidence is found for the U.K., but only select other cohort-education coefficients are significant within particular countries. None of the interaction terms is significant for the U.S.,

so we conclude that although early childbearing is much more common for those with moderate or low education, socioeconomic stratification in the risk of an early birth does not appear to be growing over time.

Discussion

In an effort to lay a foundation for further research on the correlates and consequences of early parenthood, we have used comparable data from twelve countries to describe educational differences in early childbearing and the extent to which those differences have changed over time. Not surprisingly, we find that early childbearing is significantly more common at lower levels of education in all twelve countries. More importantly, we also find that these educational differences in early childbearing have remained stable in most countries. The most notable exception is the U.K., where early childbearing is increasingly concentrated among women with lower levels of education. Japan is the only country where the concentration of early childbearing at lower levels of education has become less pronounced, although this result is only observed using the relative definition of early births; the difference in findings may be because so few women have had births before age 22 (our absolute measure)—about 5% across all three cohorts, and the characteristics of those experiencing this relatively rare event have not notably changed over time. One possible explanation for this pattern of change is the rapid increase in women's educational attainment which has presumably made the most highly educated women a less select group.

To the extent that relationships between early childbearing and subsequent outcomes in the countries we examined are similar to those observed in the U.S. (e.g., lower earnings and income), our findings have potentially important implications for our understanding of the role that family behavior plays in processes of social and economic stratification. Casual inspection

of our results suggests that the educational gradient in early childbearing is particularly strong in eastern Europe (Bulgaria, Hungary, and Romania) as well as Japan (for the absolute measure). The fact that these countries vary with respect to the economic and policy factors emphasized in interpretations of patterns in the U.S. makes it difficult to speculate about the mechanisms that may underlie the educational gradient in early childbearing. 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 well-being of mothers and children, to see if the (negative) outcomes associated with early childbearing are similar to those observed in the U.S. The clustering of strong educational gradients in the eastern European countries may be a particularly important source of insight into the roles of policy, labor market circumstances, as well as social selection into early motherhood.

Evidence that early childbearing is becoming more common among women with less education in the U.K. is consistent with the findings of previous studies (Robson and Pevalin 2007). Evidence of limited change across cohorts in the relationship between educational attainment and early childbearing in the other countries is consistent with Rendall's findings based on a much smaller number of countries (Rendall et al. 2003, 2005, 2009); the change in the U.K. suggests the potential importance of substantial labor market returns to higher education and associated disincentives for highly-educated women to have children at younger ages combined with relatively rapid decline in the social stigma surrounding early or nonmarital childbearing. However, the fact that we observe this pattern primarily in the U.K.—and not at all in the U.S. and not consistently in other industrialized countries—is not in accord with McLanahan's (2004) emphasis on a more universal concentration of family behaviors with

potentially negative implications for well-being (including early parenthood) at the lower end of the educational spectrum. It is also somewhat unexpected in light of the increasingly negative educational gradient in childbearing within cohabitation observed across a number of European countries by Perelli-Harris et al. (2010). For the U.S., we note that McLanahan (2004) focused on mothers' overall median ages—as opposed to the age at *first* birth. Since high-SES—but not low-SES—women are increasingly delaying childbearing in the U.S., it is possible that the median age of all mothers is increasingly differentiated by education, while early childbearing remains—but not increasingly so—concentrated among those with less education.

Important extensions of this work will include the incorporation of additional countries. We now have comparable data for Austria, Italy, Norway, and Switzerland and hope to also add data from Korea and Sweden in the near future. As noted above, the data from these different countries are not strictly comparable in terms of sampling frames or measurement of key variables (including educational attainment), but we believe that the value of comparative analyses involving a wide range of industrialized countries far outweighs the limitations imposed by the lack of strict comparability. The fact that comparable measures of theoretically-relevant country-level characteristics such as income inequality, returns to education, gender equality, and social policies are available will allow us to move beyond the descriptive comparisons presented in this paper to more rigorous, multi-level analyses of the ways in which relationships between education and early childbearing are shaped by national context.

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Table1: Sample characteristics

	Bulgaria			France			Germany			Hungary			Japan			Netherlands		
	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3
Age of 25% births[1]	20.0	20.0	20.5	22.5	24.5	25.5	23.0	23.5	22.5	20.0	21.0	24.0	25.0	26.5	27.0	24.5	26.5	26.0
Mean age	43.5	34.3	25.8	45.3	35.5	28.5	44.6	35.3	26.4	44.9	34.2	26.6	41.6	32.9	28.2	42.9	33.1	26.7
Education																		
Low	19.3	16.0	22.5	29.4	16.5	11.4	9.2	11.3	17.8	22.3	15.3	9.1	52.8	46.8	35.5	39.2	25.1	20.6
Medium	53.1	52.2	49.1	39.3	43.7	37.7	62.7	62.7	67.7	58.2	62.1	62.5	34.4	38.4	42.2	38.7	50.1	51.8
High	27.7	31.8	28.4	31.3	39.8	50.9	28.1	26.1	14.4	19.6	22.7	28.4	12.8	14.7	22.3	22.2	24.8	27.7
N	1,302	1,792	1,212	1,061	1,113	334	1,206	1,117	527	1,293	1,270	952	11,378	10,606	1679	1,116	1,060	170
% of total	30.2	41.6	28.2	42.3	44.4	13.3	42.3	39.2	18.5	36.8	36.1	27.1	47.3	45.5	7.2	47.6	45.2	7.3
Had a birth <22 (%)	49.6	48.5	36.9	22.2	11.6	9.7	19.0	17.2	20.3	45.1	32.8	15.3	5.3	4.6	5.3	10.7	6.3	5.9
N[2]	1,302	1,792	1,208	1,061	1,113	794	1,206	1,117	622	1,293	1,270	1,239	11,024	10,606	4,206	1,116	1,060	471

	Poland			Romania			Russia			Spain			UK BHPS			US NSFG		
	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3	Cohort1	Cohort2	Cohort3
Age of 25% births[1]	N/A	21.0	22.0	20.5	20.5	20.5	20.5	20.0	20.5	22.0	24.5	26.0	22.5	22.5	23.0	20.5	20.5	20.0
Mean age	N/A	35.8	27.8	45.9	35.6	26.9	44.1	34.0	24.8	45.7	35.9	28.5	45.0	35.6	26.5	35.7	29.9	27.1
Education																		
Low	N/A	41.9	26.0	31.3	28.0	27.6	2.7	3.4	8.6	51.8	36.1	27.4	14.2	8.3	6.0	13.0	14.7	17.6
Medium	N/A	36.1	38.0	57.5	60.2	55.3	74.4	72.2	63.1	29.0	38.9	39.7	35.2	38.1	35.1	39.2	32.3	26.3
High	N/A	22.0	36.1	11.3	11.8	17.2	22.9	24.4	28.3	19.2	25.0	32.9	50.6	53.7	59.0	47.8	52.9	56.0
N	N/A	1,533	1,472	966	1,175	588	1,470	1,118	939	1,599	1,755	775	1,332	1,419	907	4,778	5,365	2,659
% of total	N/A	51.0	49.0	35.4	43.1	21.6	41.7	31.7	26.6	38.7	42.5	18.8	36.4	38.8	24.8	37.3	41.9	20.8
Had a birth <22 (%)	N/A	37.6	24.7	42.3	38.9	31.7	43.2	52.7	38.2	24.8	13.7	11.4	21.3	21.4	20.1	35.1	33.6	38.9
N[2]	N/A	1,533	1,472	966	1,175	641	1,470	1,118	809	1,599	1,755	1,468	1,332	1,419	1,034	4,778	4,939	2,649

[1]Figure corresponds to the mean age by which 25% births within a given country and cohort occurred.

[2]Sample size (N) is slightly different for analyses of childbearing prior to age 22.

Table 2: Log-odds of being among the first 25% to have a birth

Model 1

	Education			Cohort				
Country	Low	Medium	High	1955s	1965s	1975s	N	Log-Likelihood
Bulgaria	3.02 **	1.64 **			0.17	0.01	4306	-2069.54
France	2.27 **	1.56 **			0.32 **	0.50 **	2508	-1270.60
Germany	1.97 **	0.88 **			-0.03	-0.29 *	2850	-1526.07
Hungary	3.33 **	2.11 **			0.12	0.40 **	3515	-1719.49
Japan	1.90 **	1.06 **			0.19 **	0.34 **	21064	-11053.65
Netherlands	2.50 **	1.54 **			0.18	0.26	2346	-1201.92
Poland	2.31 **	1.35 **			(omitted)	0.26 **	3005	-1523.84
Romania	3.66 **	2.25 **			0.09	0.05	2729	-1339.74
Russia	2.36 **	1.14 **			0.20 *	-0.02	3527	-1857.18
Spain	2.43 **	1.79 **			0.12	0.39 **	4129	-2094.53
UK	1.98 **	0.84 **			0.10	0.28 **	3658	-1890.67
U.S.	2.55 **	1.41 **			-0.04	-0.01	12802	-6250.23

Model 2

	Education			Cohort			Education *Cohort						
Country	Low	Medium	High	1955s	1965s	1975s	Low * 1965s	Low * 1975s	Medium * 1965s	Medium * 1975s			1
Bulgaria	2.66 **	1.61 **			-0.06	-0.05	0.37	0.61	0.19	-0.26	4306	-2060.71	**
France	2.28 **	1.62 **			0.19	0.89 **	0.24	-0.63	0.13	-0.55	2508	-1268.05	
Germany	1.30 **	0.81 **			-0.20	-1.14 *	0.92 **	1.76 *	0.08	0.70	2850	-1517.64	**
Hungary	3.42 **	2.34 **			0.51	0.49	-0.22	0.09	-0.48	-0.15	3515	-1718.27	
Japan	2.17 **	1.37 **			0.50 **	1.05 **	-0.30	-0.75 **	-0.37 *	-0.83 **	21064	-11046.42	**
Netherlands	2.34 **	1.50 **			-0.14	0.61	0.45	-0.15	0.23	-0.59	2346	-1200.22	
Poland	2.01 **	0.99 **			(omitted)	-0.22		0.49		0.61 *	3005	-1521.76	
Romania	3.23 **	2.18 **			0.28	-13.41	0.11	13.79	-0.46	13.22	2729	-1332.84	**
Russia	1.87 **	1.08 **			-0.05	0.02	0.84	0.51	0.25	-0.11	3527	-1855.18	
Spain	2.23 **	1.84 **			0.21	-0.23	0.02	0.93 *	-0.31	0.37	4862	-2088.89	*
UK	1.60 **	0.33 *			-0.26	-0.23	0.61 *	0.63	0.62 **	0.96 **	3658	-1880.20	**
U.S.	2.63 **	1.35 **			-0.12	0.04	-0.01	-0.31	0.15	0.04	12802	-6246.51	

*p < .05, **p < .01

Notes: 1: p values for likelihood ratio t

Table 3: Log-odds of having a birth before age 22

Model 1

	Education			Cohort				
Country	Low	Medium	High (omitted)	1955s (omitted)	1965s	1975s	N	Log-Likelihood
Bulgaria	2.44 **	1.47 **			0.04	-0.63 **	4302	-2610.60
France	2.84 **	1.89 **			-0.58 **	-0.49 **	2968	-1060.10
Germany	2.17 **	1.03 **			-0.18	-0.17	2945	-1377.72
Hungary	3.05 **	1.87 **			-0.47 **	-1.44 **	3802	-1972.10
Japan	3.46 **	1.87 **			-0.10	0.23 **	25084	-4830.21
Netherlands	2.83 **	1.32 **			-0.33 *	-0.26	2923	-709.46
Poland	2.24 **	1.40 **			(omitted)	-0.37 **	3005	-1650.61
Romania	3.05 **	1.94 **			-0.11	-0.40 **	2782	-1661.40
Russia	1.93 **	1.03 **			0.41 **	-0.20 *	3397	-2221.49
Spain	2.45 **	1.76 **			-0.59 **	-0.66 **	4822	-1951.23
UK	1.99 **	0.87 **			0.14	0.14	3785	-1811.62
U.S.	2.48 **	1.42 **			-0.02	0.27 **	12366	-6912.51

Model 2

	Education			Cohort			Education *Cohort					
Country	Low	Medium	High (omitted)	1955s (omitted)	1965s	1975s	Low * 1965s	Low * 1975s	Medium * 1965s	Medium * 1975s	Person-years	Log-Likelihood 2
Bulgaria	1.96 **	1.40 **			-0.11	-0.89 **	0.39	1.03 **	0.14	0.06	4302	-2599.21 **
France	2.35 **	1.58 **			-0.78 *	-2.10 **	0.46	2.07 **	0.02	1.61 *	2968	-1052.91 **
Germany	1.60 **	0.99 **			-0.37	-0.66	0.74	1.27 *	0.10	0.30	2945	-1372.78 *
Hungary	2.79 **	1.89 **			-0.26	-2.62 **	0.05	1.83 **	-0.31	1.08	3802	-1963.86 **
Japan	2.87 **	1.52 **			-0.79	-1.15	0.75	1.50	0.37	0.97	25084	-4824.31 *
Netherlands[1]												
Poland	2.02 **	1.20 **			(omitted)	-0.75 **		0.48		0.40	3005	-1648.99
Romania	2.76 **	2.01 **			0.05	-1.11	0.11	1.33	-0.32	0.41	2782	-1653.39 **
Russia	1.42 **	0.84 **			0.09	-0.37	0.61	0.75	0.40 *	0.18	3397	-2218.54
Spain	2.23 **	1.84 **			-0.52	-1.24 **	0.03	0.92	-0.31	0.16	4822	-1943.92 **
UK	1.57 **	0.40 *			-0.29	-0.30	0.80 **	0.58	0.66 **	0.76 **	3785	-1803.43 **
U.S.	2.43 **	1.34 **			-0.13	0.24 **	0.15	-0.04	0.17	0.08	12366	-6910.71

*p < .05, **p < .01

Notes: 1: There are not enough births prior to age 22 in the Netherlands to estimate Model 2.

2: p values for likelihood ratio test comparing model 2 with model 1.