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Venke Furre Haaland
Mari Rege
Kjetil Telle
Mark Votruba

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Abstract

Despite well-documented convergence during the later years of the 20th century, labor force attachment remains markedly higher for men than for women. The current paper employs rich longitudinal registry data to investigate the intergenerational transfer of the gender gap in labor force participation. We explore the extent that family- and community-level characteristics, measured in childhood, differentially predict the likelihood of employment for adult Norwegian men and women. Drawing on theories pertaining to the importance of information, skills and gender norms transfer, our empirical analysis demonstrates that a parsimonious set of family- and community-level characteristics can explain a substantial part of the gender gap. These results suggest that female labor force participation is constrained by the intergenerational transfer of beliefs and expectations about family and work.

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Venke Furre Haaland
University of Stavanger / Norway
venke.f.haaland@uis.no

Mari Rege
University of Stavanger / Norway
mari.rege@uis.no

Kjetil Telle
Statistics Norway
Oslo / Norway
tel@ssb.no

Mark Votruba
Case Western Reserve University
USA - Cleveland, OH 44106
mark.votruba@case.edu

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1 Introduction

Over the last century there has been a dramatic increase in female labor force participation. The increase has been particularly large among married women with children. In the United States in 1940 only ten percent of married women with children were working (Fogli and Veldkamp, 2011), whereas in 2010 nearly 70 percent were working.[1] Studies investigating this transformation suggest it was driven by increases in women's opportunity set, resulting from technological changes in the workplace and household, reduced fertility, decreased discrimination, increased marital instability and wider availability of childcare.[2]

Despite the dramatic increase in women's labor market opportunities, a large gender gap in labor force attachment remains.[3] In the United States, nearly 90 percent of men but only 75 percent of women are working, with little change in the magnitude of this gender gap in labor force participation since the mid-1990s (Blau et al., 2010). Why this gender gap persists remains unclear. One possibility, consistent with seminal work by Gary Becker, is that the changes mentioned above have reduced without eliminating the potential utility gains from marital specialization, with women's relative skill (to men) in household production activities leading to lower labor force attachment (Becker, 1991). In a related vein, some argue that persistency in the employment gender gap suggests it is in women's nature to devote themselves to household production and child rearing, and give less priority to market production and careers (e.g. Hakim, 2000). In contrast, a growing literature suggests that female preferences and perceptions about working outside the home continue to be shaped by beliefs and expectations about work and family passed on from prior generations (e.g. Crompton and Harris, 1998; Antecol, 2000; Fernandez et al., 2004; Fogli and Veldkamp, 2011; Fernandez, 2013; Alesina et al., 2013).

The distinction between these two broad sets of arguments is important for policy. Under the first set of arguments, policies designed to increase female labor participation are expected to decrease aggregate welfare by diverting women

[1] U.S. Bureau of Labor Statistics: "Women in the Labor Force: A Databook", Report 1034, December 2011.

[2] See e.g. Goldin (1992); Galor and Weil (1996); Costa (2000); Goldin and Katz. (2002); Jones et al. (2003); Greenwood et al. (2005); Knowles (2007); Attanasio et al. (2008); Albanesi and Olivetti (2009a,b); Gayle and Golan (2012).

[3] A gender gap is also evident in earnings, work hours, and leadership positions (see e.g. Blau et al., 2010).

from efficient labor force participation decisions. Under the second set of arguments, beliefs and attitudes about female labor participation are malleable and, to some degree, determined by previously made choices (or previously established attitudes) of others. If historical experience and past norms continue to influence current labor participation decisions of women, a welfare argument can be made for policies that address female under-representation in the labor force.

The current paper seeks to inform this debate by exploring the extent that specific family and local childhood community characteristics can explain the gender gap in labor force attachment. The context for our investigation is Norway, where female labor force participation has risen rapidly over the latter part of the 20^{th} century; today 77 percent of women between the ages of 20 and 66 years are working.[4] However, even though Norway has one of the world's highest rates of female labor force participation, a pronounced gender gap persists in labor force attachment in the country; 36 percent of employed women work part-time, whereas only 14 percent of employed men do the same. Our analysis utilizes high-quality registry data covering the entire Norwegian population between the years 1967–2009. Crucial to our investigation, this data provides us with parental work history for a substantially larger number of adults than would be available in existing U.S. datasets. Our analysis uses different measures of labor market attachment; however, the key dependent variable we investigate is full-time employment measured in early adulthood (at age 35).

Drawing on theories pertaining to the influence of information, skills and gender norms transfer, we focus on a parsimonious set of family and childhood community characteristics that should, in theory, moderate the size of the gender gap in labor market attachment. As family characteristics, we employ maternal labor force participation (during childhood) and parental education. As childhood community characteristics, we utilize the employment rate of mothers, the share of voters for the Christian Democrat Party (the party that most explicitly embraces traditional family values), and the share of adults with high levels of education.

Our findings are consistent with the hypothesis that female labor force participation is constrained by the intergenerational transfer of beliefs and expectations about family and work. Specifically, we find that characteristics such as mother's

[4] All numbers in this paragraph are obtained from the "Bank of Statistics" (Statistikkbanken) at Statistics Norway's internet page for year 2011. See also Kitterød and Rønsen (2012) for an overview of female labor force participation and home production in Norway.

employment and parental education are strong, negative predictors of the magnitude of the gender gap, while local area support for the Christian Democrats is a strong, positive predictor. Thus, our results indicate wide differences in the employment gender gap across children raised in different environments. By one measure, children raised in “high gap” conditions demonstrate an employment gender gap almost four times larger than those raised in “low gap” conditions.

While our results document the extent that our set of family and community characteristics is *predictive* of the gender gap, we do not claim to estimate the causal effect of these specific characteristics. The family and community characteristics we focus on were chosen as indicators for the underlying mechanisms motivating our investigation, not because we believe these characteristics to be proximate causes of the gender gap. For instance, local support for the Christian Democrats is hypothesized to predict reductions in the gender gap because of its association with local area gender norms. Even if this is true, we would have no reason to expect an *exogenous* change in Christian Democrat support to affect the employment gender gap (unless, of course, that change reflected an exogenous change in local gender norms).

Nevertheless, interpreting our results as support for theories pertaining to the intergenerational transfer of information, skills and gender norms raises concerns about potential confounding factors, such as unobserved genetic endowments and strictly economic factors and institutions. Our rich dataset allows us to include gender-specific controls for measures of genetic factors and community characteristics capturing structural differences. Moreover, when investigating differences in the gender gap across family characteristics, we include gender-specific fixed effects of municipality, thus controlling for any differences across municipalities that may affect women and men differently. While our results are sometimes modestly sensitive to these additional controls, our set of family and community characteristics remain strong predictors of the gender gap.

This study contributes to the recent economics literature investigating the role of environment and culture in explaining differences in attitudes and behavior (see e.g. Carroll et al., 1994; Gneezy et al., 2009). Particularly relevant is the theoretical and empirical literature (reviewed in the next section) investigating how information, skills and gender norms passed on from the previous generations affect female labor force participation (e.g. Antecol, 2000; Fernandez et al., 2004;

Fernandez and Fogli, 2009; Fogli and Veldkamp, 2011; Fernandez, 2013; Alesina et al., 2013). By utilizing rich micro-data, our study adds to this literature by documenting that a parsimonious set of family- and community-level characteristics can explain a substantial part of the gender gap. The rich registry data also allow us to address confounding influences more carefully than previous studies.

2 Conceptual Framework

Below we discuss various mechanisms through which the family and the local childhood community could moderate the gender gap in labor force participation. Our starting point is that people choose to enter the labor force if the expected benefit from labor market entry is higher than the expected benefit from exclusively working in the home. Division of work within the family may affect how the partners divide their time between household and market work, and initially small differences in skills between the partners could result in large differences in time allocations through specialization (Becker, 1991). We discuss how information, skills and gender norms—transferred from the family and community—may affect this tradeoff differently for women and men.

2.1 Information Transfer

Two recent economic studies suggest that growing up in a community with high rates of local female labor force participation may affect women's expected benefit from labor market entry, and thereby increase their propensity to enter the labor force. Fernandez (2013) presents a theory in which women have imperfect information about the long-run consequences that employment has on a woman's identity, her marriage, and her children. Women hold heterogeneous beliefs regarding the relative payoff of working in the market versus the home, and these beliefs evolve in an intergenerational learning process. Under certain conditions this learning process implies that a woman's propensity to work is higher if the local labor force participation of women of the previous generation is higher. Similar to Fernandez (2013), Fogli and Veldkamp (2011) present a theory in which girls learn about the effect of maternal employment on children by observing nearby employed women. In communities with high maternal employment, the effects of maternal employment become less uncertain, which leads more women in these regions to participate in the labor market. Fernandez (2013) and Fogli and Veldkamp (2011) demonstrate the empirical relevance of their theories by comparing the dynamic properties of their calibrated model to the time-series and geographic patterns of female labor force participation.

The intergenerational community learning processes described in Fernandez (2013) and Fogli and Veldkamp (2011) may also be relevant within the family. Daughters of working mothers are familiar with the costs and benefits of combining work in the labor market and at home. This hypothesis is consistent with previous studies finding a positive correlation between the mother's and the daughter's labor market attachments (Almquist and Angrist, 1970; Rapoport and Rapoport, 1971; Vento Bielby, 1978; Kaufman and Richardson, 1982; Sanders, 1997; Hendrickx and de Graaf, 2001; van Putten et al., 2008). Specifically for labor market participation, Del Boca et al. (2000) find that in Italy the mother's labor force participation is a significant predictor of the daughter's labor force participation, even when controlling for a rich set of observables.

2.2 Skill Transfer

Parents' abilities and skills are strong predictors of the abilities and skills of their children. A vast literature demonstrates positive correlations between the economic, educational, social, and behavioral outcomes of parents and children (see Björklund and Salvanes (2011); Black and Devereux (2011) for recent reviews). It is also well documented that occupation, including non-participation in the labor force (housework), is transferred from parents to children (Stevens and Boyd, 1980; Aschaffenburg, 1995; Crook, 1995; Khazzoom, 1997; Ermisch and Francesconi, 2002; Hellerstein and Morrill, 2011; Nordström Skans and Kramarz, 2011).

Although innate talents and abilities is one plausible reason for such correlations,[5] it is also likely that children learn skills from their parents. Thus, if the mother is specialized in home production, her domestic skills can be transferred to the children. This would provide the children of domestic-working mothers with relatively better skills in home production than children of mothers in the labor

[5]Such traits might be particularly strong between mothers and daughters (and fathers and sons). Anger and Heineck (2010), for example, use German data and find strong correlations in transmission of mother's and father's IQs, although mothers influence daughters more than fathers influence their sons.

force. This could be particularly true for daughters. For example, even when parents express egalitarian gender norms, daughters do more housework than sons, providing them with skills in line with the gendered division of labor in adulthood (Raley and Bianchi, 2006). As a result, daughters of domestic-working mothers may be more likely to specialize in household production themselves, not necessarily because they hold preferences or attitudes binding them to the home, but simply because they hold skills of higher quality in home production than daughters of employed women.

2.3 Gender Norms Transfer

Growing up with parents who believe that the woman's most important role is to raise children may affect the daughter's future attachment to the labor force. Several studies document a positive correlation between gender-role attitudes of mothers and daughters (Burt and Scott, 2002), and children of working mothers tend to have more egalitarian gender-role attitudes than children of stay-at-home mothers (Wright and Young, 1998).[6] Such gender norms may affect girl's expectation about the perceived relative payoff from market versus home production. Similarly, according to "doing-gender" theories (West and Zimmerman, 1987), being the breadwinner could be important for men's gender identity construction in some families or cultures, while home production could strengthen it for women (Bittman et al., 2003). Women may, thus, experience or expect negative feelings such as guilt or distress when trying to combine the competing needs of career and family Bertrand (2013).

Both the family and the community may be important for the transmission of gender norms. Comparative studies show that couples' time allocation between market and household production differs across countries, and the differences have been argued to be influenced by prevalent social norms about the appropriate roles for men and women (Esping-Andersen et al., 2013). A particularly compelling paper by Alesina et al. (2013) empirically examines the origins of gender roles. They demonstrate that the descendants of societies that traditionally practiced plow-based agriculture—which required significant upper-body strength—today have a

[6](Mayer et al., 2004) find strong correlations between mothers' and daughters' characteristics and behaviors and attitudes. Recent studies have argued for intergenerational family cultures in attitudes toward welfare and work (Altonji and Dunn, 2000; Dahl et al., 2013).

larger gender gap in labor force participation than the descendants of societies who practiced shifting cultivation. This evidence is consistent with Ester Boserup's (1970) hypothesis that gender roles, historically generated by the introduction of the plow, have been passed down across generations. Also consistent with the intergenerational transfer of gender norms, Antecol (2000) demonstrates that for first generation U.S. immigrants, more than half of the overall variation in the gender gap in labor force participation is attributable to female labor force participation in the home country.

Boyd and Richerson (1985) and Alesina et al. (2013) present an explanation for why gender norms may be passed down through generations. They argue that cultural beliefs are decision-making heuristics or "rules-of-thumb" that are employed in uncertain or complex environments. By relying on decision-making rules-of-thumb, individuals may not always behave in a manner that is optimal, but they save on the costs of obtaining the information necessary to behave optimally. An alternative mechanism is modeled by Bisin and Verdier (2001). They present a theoretical model in which parents purposely socialize and transmit their cultural traits to their offspring, motivated by a form of paternalistic altruism.

Growing up with a working mother could also reduce the gender gap by affecting sons' perceptions of gender norms. Fernandez et al. (2004) find that a mother's labor force participation can affect the son's preferences for particular types of women, making him less averse to having a working wife. Alternatively, men brought up by working mothers may have greater household production skills. Either story suggests an increase in a woman's expected benefit from labor market participation when a larger percentage of men in her marriage market were raised by working mothers. Thus, an important implication of Fernandez et al. (2004) is that the proportion of boys raised by a working mother in one given generation increases the proportion of women who work outside the home in the next generation.

2.4 Measures

The above theoretical perspectives lead us to form the following two hypotheses:

- Hypothesis 1: Growing up with a working mother or growing up in a community with high local female labor force participation reduces the gender gap in labor force attachment.

- Hypothesis 2: Growing up in a community with traditional gender norms or with parents who possess more traditional gender norms increases the gender gap in labor force attachment.

Notably, both hypotheses are consistent with the information, skills and gender norm mechanisms. The goal of our analysis is not to distinguish between these mechanisms, but rather to explore the cumulative relevance of these mechanisms in explaining the size of the employment gender gap.

In terms of investigating Hypothesis 1, the measures of maternal labor force participation in the family and the childhood community are readily constructed from our registry data. In contrast, direct measures of gender norms (related to Hypothesis 2) do not exist and thus can only be measured indirectly. As a proxy for gender norms in the childhood community, we measure the level of support for the Christian Democratic Party (*Kristlige folkeparti*) in the childhood municipality. Among the Norwegian political parties, the Christian Democrats (CD) are the most pronounced defender of traditional gender norms. Additionally, we use the educational attainment of adults in the childhood municipality as a proxy for gender norms in the childhood community. It is well established that education levels strongly correlate with gender norms for both men and women (Bolzendahl and Myers, 2004).

Measuring gender norms in the family raises a challenge of even greater difficulty. Of course, within a family the likelihood the mother works is probably strongly correlated with the gender attitudes held by her and her husband. Similarly, maternal labor force participation measured at the community level is likely correlated with community gender norms. As such, evidence consistent with Hypothesis 1 is also consistent with Hypothesis 2. As mentioned above, education levels also strongly correlate with gender norms for both men and women (Bolzendahl and Myers, 2004). Thus, in considering the role of gender norms, we also estimate how the gender gap differs by paternal and maternal education.

Notably, these estimates have to be interpreted with caution, since several studies suggest a causal effect of parental education on child outcomes (see review in Björklund and Salvanes 2011), which may differ across gender. Moreover, some literature suggests that parental investment of time and money differs across the level of parental education and the child's gender (Lundberg and Rose, 2007; Baker and Milligan, 2013). Thus, even if parental education correlates with gender norms, it is also correlated with several other aspects of child environment, which may affect boys and girls differently.

To summarize, for family characteristics we employ maternal labor force participation and parental education levels, and for community characteristics we employ the maternal employment rate, the share of votes cast for the CD, and adult education levels, each measured for a child's childhood municipality.

A finding where the gender gap is positively associated with the CD vote share and is negatively associated with these other measures would be consistent with the intergenerational transfer of gender norms, skills, and information. However, we cannot rule out that the differences in the gender gap across families and communities can also be driven by other, non-observable factors that correlate with our community and family characteristics. We estimate the extent to which these family and community characteristics are predictive of differences in the gender gap, but do not claim the ability to estimate the causal effect of these specific characteristics. Nevertheless, our rich dataset allows us to investigate whether our results are robust to the inclusion of gender-specific controls for a rich set of non-nurturing factors that could possibly affect the gender gap, such as genetic endowment and strictly economic factors and institutions.

3 Data

We utilize several registry databases provided by Statistics Norway, yielding a rich longitudinal dataset containing records for every Norwegian from 1970 to 2009, including individual demographic information (sex, age, marital status, number of children), and socioeconomic data (years of education, earnings). The dataset also includes personal identifiers for one's parents, allowing us to link children to their parents and siblings. Our analysis is restricted to native-born Norwegians and excludes immigrants.

3.1 Sample

We focus on individuals born in 1960–1974 to ensure availability of outcome measures when individuals reach the age of 35, and so that we can observe their parent's labor force participation at ages 10–16. These birth cohorts include 903,622 native-born children who can be matched to both biological parents. In order to ensure clean covariates for birth order and parity, we exclude 66,334 children whose mother had children by more than one man. To avoid issues that might arise from parental absence, we restrict the sample to children whose parents were married and alive at age 16 (excluding 77,710 children). Finally, to ensure availability of the outcome measures, we drop 19,495 children who died before the age of 35. These sample restrictions gives us a sample of 740,079 children.

3.2 Variable Definitions

Our key dependent variables include an indicator for full-time employment, an indicator for employment (part-time or full-time), log earnings, and years of education.[7] Additional dependent variables include an indicator for married with children, number of children, age at birth of first child, and log spousal earnings. All dependent variables are measured at age 35 with the exception of educational attainment, which is measured at age 33 due to data availability. Notably, the data do not cover work hours for the relevant time period; we therefore capture labor force participation based on annual earnings records.[8] We follow previous studies (Havnes and Mogstad, 2011a,b) and refer to an individual as full-time employed in a given year if he or she is earning more than four "basic amounts," and as employed (part-time or full-time) if he or she is earning more than two "basic amounts".[9] The "basic amount" is defined by the Norwegian Social Insurance Scheme.[10] In 2000, one "basic amount" corresponded to 72,000 NOK measured in 2009 prices (approximately 12,200 USD). At the same time, mean and median earnings (of persons with earnings) in our sample were 379,000 and 372,000 NOK, respectively.

[7] To keep zero earners, earnings below 100,000 NOK is replaced by this amount. This log earnings model produces essentially the same estimates as the calculated semi-elasticity from a linear model. Earnings are also censored from above at the 99th percentile of the earnings distributions to prevent arbitrarily high earnings from driving our estimates.

[8] Annual earnings include wages, earnings from self-employment, and work-related transfers such as sickness benefits, parental leave benefits, and unemployment benefit.

[9] For a smaller sample, we have looked at full-time employment based on hours worked (contracted working hours of 30 or more per week). The estimate from this model is essentially the same as the estimate from a model where full-time employment is approximated by four basic amounts.

[10] The "basic amount" is used by the Norwegian Social Insurance Scheme to determine eligibility for and magnitude of benefits like old age pension, disability pension, and unemployment compensation. The "basic amount" is adjusted annually by the Norwegian Parliament to account for inflation and general wage growth.

The key explanatory variables are gender, in addition to the family and municipality characteristics used to capture the transfer of information, skills, and norms discussed in Section 2.

Maternal labor force participation during childhood is one of our key explanatory variables. For each child, we calculate the number of years the mother is employed (full-time or part-time)[11] when this child is between 10–16 years of age,[12] and then calculate the mean of this variable for siblings from the same family (mean mother employment years). We then group the families into three categories as follows:

- Always working mother (AWm): Mean mother employment years > 4
- Non-working mother (NWm): Mean mother employment years < 3
- Irregularly employed mother (IRm): Mean mother employment years ≥ 3 and ≤ 4

By using the sibling mean of maternal employment years rather than the individual measure, our analysis focuses on the fact that there are different types of families (those where the mother commonly works, where she commonly does not work, and an intermediate case), rather than focusing sibling-specific exposure to a working mother. While within-family variation is potentially more relevant to theories pertaining to the transfer of information and skills (and less relevant to theories pertaining to family gender norms), exploiting within-family variation raises endogeneity issues that are avoided by focusing on family types.[13]

Additionally, we use maternal and paternal education as key family characteristics. For both the mother and father we construct an indicator variable for a completed high school degree (≥ 12 years of education). We refer to this indicator as "high education." We use high-school completion as the threshold for high education, as this is a relatively high education for the parents in our sample. As

[11] As very few women were working full-time in the early 1970s, we use the measure for part-time or full-time employment (i.e. more than two basic amounts).

[12] Maternal employment during childhood is measured at the child's age from 10–16 years because information about maternal employment is not available before the child is 10 years for younger cohorts in our sample (we have information on earnings from the time period 1970–2009).

[13] For instance, the extent to which a mother work during the childhood of a specific sibling could be affected by unobserveable attributes of that sibling (see Ruhm, 2004). We have also estimated models constructing the AW/IR/NW categories based on individual measures of maternal employment, which produced very similar results.

our summary statistics in Table 1 will demonstrate, only 19 percent of the mothers and 41 percent of the fathers have completed high school.

Our key municipality characteristics are maternal labor force participation (LFP), the percentage of voter support for the CD,[14] and the fraction of adults with "high education" in the childhood municipality, with municipality determined by the child's municipality of residence at age 16. Covariates for these measures are constructed as means for all children who share the same childhood municipality. For maternal LFP, this covariate is based on the employment rate (full-time or part-time) of mothers of children age 0–16.

Our dataset allows us to construct several variables for capturing important child characteristics. Unless otherwise stated, we include the following set of control variables in all regression models: indicators for birth cohorts; indicators for birth order and birth order/family size interactions; an indicator for twin/triplet births; and quadratic terms for mother's age at child birth. Additional controls, included to evaluate the robustness of our estimates, will be described in the presentation of those robustness tests (Section 5).

3.3 Summary Statistics

Table 1 presents summary statistics for key variables used in the analysis, presented separately for males and females in the sample. As expected, our key outcome variable documents a large gender gap in the full-time employment rates (at age 35), with female rates at 31.5 percentage points lower than those of males. Sizable gender gaps also exist for a broader measure of employment and for earnings. Females average 0.2 more years of education and have their first child about 2 years earlier than males in the sample. At age 35, females are 13 percentage points more likely to be married (or cohabiting) with children.

It is perhaps unsurprising that males and females, on average, inhabit very similar childhood environments, as measured by the parental, family and municipality characteristics. There is virtually no gender difference in employment and education of the father, the mother's age at first childbirth, the child's birth year, or childhood municipality characteristics. Nonetheless, some significant differences do emerge across males and females. Mothers of females are slightly more likely to have worked during the child's adolescence, which contributes to somewhat

[14] CD vote share is based on municipal elections occurring in 1975, 1979, 1983 and 1987.

higher parental income for female subjects. Mothers of females are less likely to have completed high school, although the difference in completion rates is very small. Mean family size and birth order are also slightly higher for females, which is consistent with the selection process described in Andersson et al. (2006), who report evidence that larger Nordic families are more likely to stop producing children after the birth of a female child than after the birth of a male child.[15] Still, it is noteworthy that all of these differences are very small in magnitude, especially relative to the size of the employment gender gap.

The fact that females and males inhabit similar childhood environments indicates that differences in those environments are unlikely to explain much of the gender gap in employment. Instead, it would seem that the employment gender gap arises from how the two sexes respond differently to similar environmental features.[16]

In Table 2, we present the cross-correlations for our key covariates of interest. These demonstrate that the features we focus on are, in general, closely related to one another. In particular, maternal education is closely correlated with both mother's employment and with paternal education, and the correlations across municipality features are particularly strong. This fact raises potential multicollinearity issues (as we shall see) when we attempt to estimate the joint contribution of these features in explaining the gender gap.

3.4 Correlation of Key Characteristics and the Employment Gender Gap

In figures 1–3, we present graphs depicting the (unconditional) relationship between the key parental characteristics and the employment outcomes for males and females in our sample. Doing so reveals that each is strongly predictive of the gender gap. Figure 1 documents that rates of full-time employment among men are only weakly related to the employment of their mothers during childhood. In

[15]This fertility pattern is found to hold in Norway, Denmark and Sweden, but not in Finland (see Andersson et al., 2006).

[16]Due to the highly similar characteristics across males and females, we explicitly elected not to present our analysis in the framework of a Oaxaca-Blinder decomposition, commonly used to analyze differences across groups. See Fortin et al. (2011) for a discussion of that framework. In the jargon of the decomposition literature, our analysis focuses on the "structural" determinants of the gender gap, since "compositional differences" are minimal and explain virtually none of the gender gap.

contrast, female full-time employment rates rise substantially when their childhood was accompanied by a working mother. Empirically, the results indicate that the employment gender gap among children raised by a working mother is about 10 percentage points smaller than for those raised by a non-working mother. A similar pattern is found for both mother's education (Figure 2) and father's education (Figure 3). In each case, parents with a higher education are only slightly more likely (than low educated parents) to produce full-time employed sons, but are substantially more likely to produce full-time employed daughters.

In figures 4–6, we turn our attention to municipal-level characteristics, which are also found to be strongly predictive of the gender gap. Figure 4 reveals that the full-time employment rate of females rises substantially when mothers' LFP is higher in the childhood municipality, while the correlation is small and negative for males. As we might expect, this pattern operates in reverse for the level of municipality support for the CD. When the CD's vote share increases, the full-time employment rates for females decline sharply, while rising modestly for males (see Figure 5). Finally, full-time employment rates are higher for children raised in municipalities with higher adult education levels, but that relationship is pronounced among females while barely evident among males (see Figure 6).

What we find in these simple correlations, then, is that the environmental factors we focus on—chosen as proxies for the intergenerational transfer of information, skills and/or gender norms—are predictive of the magnitude of the employment gender gap in a manner consistent with those theoretical mechanisms. Moreover, these factors are predictive of the gender gap primarily through their correlation with the employment rate of females. The correlation of these factors with the full-time employment rate of males is substantially weaker and, interestingly, takes the opposite sign in two cases—the municipal-level measures for mother's LFP and CD vote share.

4 Regression Results

4.1 Empirical Framework

We now move beyond the simple correlations presented in figures 1–6 to quantify the joint contribution of these parental and municipality features in predicting the employment gender gap, and to evaluate the robustness of those relationships to the inclusion of competing explanatory variables. We do so by way of straightforward linear probability models.[17]

To fix ideas, consider the main specification employed in our analysis, where the linear probability of child i being full-time employed (at age 35) is specified as follows:

$$Y_{im} = \beta_m + \beta_1 Female_i + \beta_2 X_i + \beta_3 Female_i \tilde{X}_i + \beta_4 Female_i X_m + \varepsilon_i, \qquad (1)$$

where β_m is a vector of municipality fixed effects; $Female_i$ is an indicator for female; X_i is a vector of parental and personal characteristics; $\tilde{X}_i$ is the subset of parental characteristics for which we posit some relationship with the gender gap (i.e. maternal work history[18] and parental education); and X_m is a vector of childhood municipality characteristics for which we posit some relationship with the gender gap (i.e. CD vote share, mothers' LFP rate and education). As X_i, we control for birth order and birth order/family size interactions, indicators for birth year, an indicator for twin/triplet status, and quadratic terms in mother's age at birth, in addition to the parental covariates in $\tilde{X}_i$.

The β_3 and β_4 coefficients are our primary estimates of interest, capturing the differential associations of key parental and municipality factors with the employment rate of females relative to males. Positive coefficients in β_3 and β_4 identify features (conditionally) predictive of a smaller employment gender gap. We can therefore interpret the β_3 and β_4 coefficients as evidence of the importance of intergenerational transfers operating within families and municipalities. We will address potential confounders to this interpretation during the presentation of our results.

4.2 Main Results

Table 3 reports the main results from our regression analysis. As a starting place, model 1 reports estimated coefficients from a restricted version of equation (1) by

[17] Logit regression models were also estimated for binary outcomes and produced qualitatively similar results.

[18] Covariates for paternal work history are also included as a robustness check in Table 4. However, we do not include these covariates in our main model, as rates of paternal employment are very high in our sample (see Table 1). Our results are robust to excluding these controls or to dropping children whose father was not identified as "always working."

omitting the female interaction terms. Notably, the coefficient on Female (0.315) is identical in magnitude to the gender gap reported in Table 1. This confirms that virtually none of the observed employment gender gap can be explained by the (small) gender differences in some covariates, as discussed earlier.

Model 2 expands to include interactions between female and the parental characteristics of interest (i.e. the $Female_i\tilde{X}_i$ terms). The coefficients on these interaction terms are each highly significant and substantial in magnitude. Among children raised by an employed mother (AWm), the gender gap is 7.4 percentage points smaller than it is for children raised by a mother who never worked. The gender gap is also substantially smaller for children raised by parents with a higher education, especially for the mother.[19] Together, these three factors explain a substantial share of the employment gender gap. The Female coefficient in model 2 implies a gender gap of 38.8 percentage points among children of low-educated parents with a non-working mother. For children of high-educated parents with a working mother, the gap is predicted to be 22.4 percentage points smaller (0.074 + 0.080 + 0.070), or less than 42 percent as large.

Drawing strong conclusions from these results raises a host of issues. Among these issues is the likelihood that the role of parental characteristics in explaining the gender gap is confounded by factors operating in the local community rather than within the family. If social norms, the composition of available jobs, or overt discrimination reduces the employment of women in certain communities, then mothers living in such communities would be less likely to work as would their daughters, independent of any role that intergenerational transfers within families might play. Models 3–8 address this issue by adding controls for municipal-level characteristics interacted with female.

In models 3–5, we extend model 2 by including female interaction terms individually for each of the key municipality characteristics (i.e. the $Female_iX_m$ in equation 1). In each case, the coefficient on the municipality characteristics (interacted with female) takes the anticipated sign. CD vote share and mothers' LFP rate are particularly strong predictors of the gender gap, with a one standard devi-

[19]Interestingly, father's education, when compared to mother's education, is predictive of a larger increase in daughter's employment likelihood (0.081 versus 0.070), but mother's education is more strongly predictive of a reduction in the employment gender gap. This arises because father's education is// associated with an increase in son's employment (0.011), while mother's education is associated with a decrease in son's employment (-0.012).

ation change predictive of a 4.4 and 4.2 (respectively) percentage point change in the gender gap for children raised in that municipality. The educational attainment of municipality adults is a somewhat weaker predictor of the employment gender gap (model 5). In model 6, when the three municipal-level interaction terms are jointly included, the coefficient on municipality education (interacted with female) switches signs and grows substantially in magnitude, which we interpret as an artifact of the high correlation between the municipal-level covariates (see Table 2). For this reason, we omit the municipality education term in our preferred specification. The results from this specification, reported as model 7, indicate that a one standard deviation increase in CD vote share predicts an increase in the employment gender gap of 3.2 percentage points, while a one standard deviation increase in the mothers' LFP rate predicts a 2.4 percentage point reduction in the gap.

Due to the sizable correlations between the parental and municipality characteristics, it is unsurprising that the apparent effect of the parental characteristics on the gender gap attenuates when the municipal-level interactions terms are included. The coefficients on the relevant interaction terms are especially sensitive to controls for mothers' LFP rate in the municipality (model 4), with the coefficient on *Female*AWm* declining by almost 22 percent. However, coefficients on the parental characteristic terms are largely unchanged when additional municipal-level terms are included; those coefficients are nearly identical across models 4, 6, and 7. Moreover, despite this attenuation, those coefficients remain sizable. The parental characteristics continue to explain a large share of the gender gap difference observed across various family types. In our preferred specification (model 7), the children of high-educated parents with a working mother are predicted to have an employment gender gap of 19.6 percentage points smaller than the children of low-educated parents with a non-working mother.

Testing the robustness of the parental characteristic estimates to control for municipal-level characteristics can be taken a step further by including municipality fixed effects that vary by gender, as we do in model 8. Importantly, the coefficients on the parental characteristic terms barely change relative to model 7. Apparently, once we control for female interacted with mothers' LFP in the municipality, the coefficients on the parental characteristics terms are not confounded by omitted municipal-level characteristics that differentially affect females and males.

Interestingly, we see that when moving from model 2 to model 7 (our preferred specification), the value of the adjusted R-squared increases from 0.136 to 0.139. Including the full set of *Munic*Female* interactions (model 8) increases the adjusted R-squared further, but only to 0.141. Thus, it appears that these two municipality features (*VoteCD* and *MLFP_Munic*) are powerfully related to the forces that moderate the size of the gender gap for children raised in different municipalities.

Models 9 and 10 demonstrate that these estimates are also robust to the inclusion of family fixed effects, which explicitly control for family-level unobservables under the assumption that these unobserved features operate similarly on the employment likelihood of sons and daughters. Model 9 replicates model 8, restricting the sample to families with at least one child of each sex, and produces nearly identical estimates to model 8.[20] Model 10 then adds family fixed effects. Coefficients on the parental characteristic terms (interacted with Female) are again unchanged.

In Table 4, we use a variety of other specifications to further explore the robustness of these findings, with model 1 replicating the results from our preferred specification (Table 3, model 7) for comparison. A particular concern regarding our main results is the potential confounding influence that *ability* transfers could have on our results. This concern particularly applies to the female interactions with parents' education. While we earlier discussed parental education as a plausible proxy for more modern gender attitudes (see Section 2.4)—expected to differentially effect of the subsequent employment of daughters versus sons—parental education is more commonly perceived as a proxy for human capital. As higher ability parents produce higher ability children, it is conceivable that this could lead to smaller gender gaps among the children of higher ability parents if "ability" is a stronger determinant of female employment than it is for male employment.

Ideally, we would like to test this possibility by including (as covariates) an accurate measure of each child's ability and its interaction with female. Unfortunately, we do not have such measures in our data. However, the Norwegian military service does collect measures of IQ for nearly every male around the age of 19.[21]

[20] This is the sample relevant for identifying the female interaction coefficients in a model with family fixed effects and is therefore presented to evaluate the impact of including family fixed effects, as we do in model 10.

[21] The test is based on the sum of scores from three tests—math, figures, and word similarities. The score ranges from 1 to 9, and follows the Stanine method (Standard NINE), which scales test scores with a mean of five and a standard deviation of two. The military conscription is mandatory for every Norwegian man, but not for the cohorts of women in our data period. We would like to

Because IQs are highly correlated across siblings,[22] we can use the IQ of a subject's brother (when available) to serve as a proxy for one's own ability.[23] Doing so requires us to drop from our sample those subjects who do not have at least one brother represented in our sample. The remaining subjects are assigned the IQ of a randomly selected brother when more than one brother is present.

Model 2 demonstrates that when we restrict our sample to those subjects for whom a measure of brother's IQ is available, our coefficients of interest are largely unchanged. Including brother's IQ and female interacted with brother's IQ as covariates to our model also has rather modest effects on our coefficients of interest (see model 3). Coefficients on the female interaction terms with mother's employment and the municipality characteristics show minimal attenuation. The coefficients on the parental education terms (interacted with female) each decrease modestly, by about 17 percent, but remain sizable. Presumably, these coefficients would have declined even further if less noisy measures of own ability could have been employed. We therefore conclude that part of the reason for why children of high-educated parents generate a smaller employment gender gap likely arises from the transfer of ability. Nonetheless, these results are largely reassuring.

Using the full sample, model 4 extends by including fixed effects for the interaction between birth year with female. By including these interactions, we effectively difference out an important source of variation in mother's employment (AW/IR) status that is directly related to the intergenerational transfer mechanisms we are interested in quantifying. That is, later birth cohorts are more likely to be born to a working mother. Under the dynamic intergenerational learning models of Fernandez (2013) and Fogli and Veldkamp (2011), the work participation of the last generation's mothers is expected to co-trend with the subsequent gender gap of their offspring—a prediction one would expect to hold for the transmission of gender norms as well. For that reason, the inclusion of female/birth year interactions likely provides a "too strong" test of robustness. On the other hand, if exogenous

thank the Norwegian Armed Forces for access to these data. Views and conclusions expressed in this paper are those of the authors and cannot in any way be attributed to the Norwegian Armed Forces.

[22]In our sample, the correlation in IQ across brothers is 0.45. As noted by Bouchard and McGue (1981) the correlation in siblings IQ across same sex and opposite sex are almost identical (0.48 and 0.49, respectively), suggesting that brother's IQ is a good proxy for own IQ.

[23]For male subjects, we could use their own IQ measure, but doing so would create a measurement error issue we wish to avoid (i.e. brother's IQ is a noisier proxy for the ability of females than own IQ is for the ability of males).

economic forces (unrelated to intergenerational transfers of information, skills, or gender norms) have made the workplace more amenable to female employment over time, this too would lead mother's employment to co-trend with the gender gap. If so, the omission of sex-specific time trends would, for our purposes, lead to inflated estimates for the interactions between female and mother's employment.[24] Consistent with this discussion, we do in fact find that the female/mother's employment interactions attenuate somewhat with the inclusion of female/birth year interactions, with the coefficient on *Female*AWm* decreasing by almost 21 percent and *Female*IRm* by 30 percent. The other coefficients of interest are largely unchanged. This continues to imply an important role for intergenerational transfers related to a mother's employment, but a somewhat less important role than implied by our preferred specification.

Another concern about the preferred specification is that the mother's employment and parental education are both predictive of higher family income, and it is conceivable that higher family income differentially affects the subsequent employment of sons and daughters. Model 5 therefore extends our model by controlling for family income, measured over child ages of 10-16, and its interaction with female.[25] We find that family income is predictive of a significant gender gap reduction, and its inclusion attenuates the female interactions with mother's employment and parental education, but only slightly. Model 6 extends our model by including controls for paternal work history and its interaction with female. We can see that our coefficients of interest are largely unchanged.

Model 7 addresses potential confounders related to the municipality characteristics. We are particularly concerned about the possibility that the predicted effect of mother's LFP and CD vote share arises not from intergenerational transfers, but rather from differences in local economic conditions that differentially affect female employment. To address this, we include female interactions with the following variables: municipal-level mean male earnings (intended to proxy for area

[24] The coefficient on female interacted with mother's LFP in the municipality might also be expected to be sensitive to the additional fixed effects, except that these measures were constructed to be equal across all children from a given municipality regardless of birth year.

[25] We censor parental earnings from below at 100,000 NOK and from above at the 99th percentile of the earnings distribution. Because of Norway's generous welfare state, families in the lowest range of the earnings distribution rely to a great extent on social benefits that are not captured in our earnings measure, and therefore differences within the low range of earnings translate only weakly into differences in families' economic welfare.

wages), municipality population (in logs, intended to proxy for urbanity), female LFP in the region (to proxy for local labor market opportunities for women), and the regional unemployment rate.[26] The municipality and regional characteristics are initially measured at the time the child is 16 years old, then averaged over children sharing the same municipality or region (as in our other municipality measures). The inclusion of these additional predictors reduces the magnitude of the coefficient on CD vote share by 50 percent, but doubles the magnitude of the coefficient on mother's LFP. Thus, the pair of municipality characteristics continues to play a large role in predicting the magnitude of the gender gap, although the inclusion of other local area economic characteristics changes the apparent relative importance of each.

If region is the correct level for measuring local economic conditions, then the predicted effect of mother's LFP might be confounded by differences in the local region not controlled for in model 7. As an additional robustness test, model 8 extends our preferred model by including regional fixed effects that vary by gender. By comparing the coefficient on *Female*MLFP_munic* in model 1 and model 8, we see that it is unchanged when adding controls for region/female interactions. Assuming economic region is a good proxy for the boundaries of the local labor market, this suggests the MLFP coefficient is not driven by variation in labor market conditions.

Notably, the coefficient *Female*VoteCD* is substantially smaller in model 8 compared to model 1. This could suggest that local area gender norms have a smaller effect on the gender gap than suggested by our preferred model. However, even if local area gender norms are important, there are two reasons for why it's not surprising that the *Female*VoteCD* coefficient decreases when adding gender-specific regional fixed effects: (1) *VoteCD* is only a proxy for local gender norms, so controlling for other covariates that correlate with local gender norms would be expected to attenuate the *VoteCD* coefficient; and (2) local gender norms are likely correlated across municipalities in the same region. In model 9 we explore this by controlling for *voteCD* at the regional level, finding that the *Female*VoteCD* attenuates by a similar amount under this specification as in model 8.

To summarize our main results, we find that the size of the employment gender

[26] Economic regions are a geographical unit between the county and municipal levels. There are 89 economic regions in Norway, defined by patterns of trade and labor market flows. They are commonly used by Statistics Norway to denote labor markets, as we use them here.

gap varies substantially across different sorts of families and municipalities. At the family level, mother's employment and parental education predict large reductions in the size of the gender gap. The gender gap is also substantially smaller in municipalities where more mothers work and where CD support is lower. We can demonstrate the collective importance of these predictors by comparing the predicted gender gap across children raised under different family and municipality conditions. Drawing on the results of our preferred model, we predict an employment gender gap of 46.4 percentage points among children of low-educated parents with a nonworking mother, and who are raised in a municipality at the 10^{th} percentile for mother's LFP and at the 90^{th} percentile for CD vote share. In contrast, we predict an employment gender gap of only 12.4 percentage points among children of high-educated parents with a working mother, and who are raised in a municipality at the 90^{th} percentile for mother's LFP and at the 10^{th} percentile for CD vote share. In other words, under "low-gap" conditions, the gender gap is barely one-quarter as large as it is under "high-gap" conditions.[27]

As an empirical matter, then, we can conclude that the employment gender gap in early adulthood is a highly variable phenomenon, and that a parsimonious set of family and (childhood) municipality characteristics are predictive of large differences in the gender gap. Since the family and municipality characteristics we concentrate on were explicitly chosen for their presumed relationship with the intergenerational transfer of information, skills, and gender norms, these findings are consistent with the idea that such mechanisms play a substantial role in determining the employment gender gap.

That said, we must be cautious not to over-interpret these findings. As evidence for the importance of intergenerational transfer mechanisms, the correlations we document are likely confounded by competing influences we are unable to adequately adjust for. With respect to the family-level covariates, we can have relative confidence that the correlations estimated in our preferred model are not confounded by factors operating within local communities. If they had been, the relevant coefficients in Table 3, model 8 should have attenuated relative to those in

[27] Clearly, the calculations depend on our choice of comparisons, especially our decision to define "high/low" municipality conditions based on mother's LFP and CD vote share at the 10^{th} and 90^{th} percentiles. If we instead use percentiles further in the tails of the covariate distribution, the predicted gender gap under "high-gap" conditions would be larger, and the predicted gender gap under "low-gap" conditions would have been smaller.

our preferred model (Table 3, model 7). However, the mechanisms behind these robust correlations cannot be definitively established. A plausible explanation for why mother's employment predicts a smaller gender gap lies in the notion of innate preferences. If mothers vary in their innate preferences toward work and leisure, and such preferences transfer more strongly between mothers and daughters than between fathers and sons, we would expect the employment of mothers to be more strongly correlated with the employment of daughters than sons. Such a mechanism could also confound the municipality coefficients through the self-selection of families to municipalities. For instance, mothers who desire to work could relocate to municipalities where the job market is more conducive to working mothers.

As we noted above, the role of parental educational is potentially confounded by its relationship to children's ability. Indeed, the coefficients on the parental educational terms are modestly attenuated when a proxy for children's ability is controlled for. Moreover, parental education may be a signal of parents with higher (innate) tastes for professional careers. If such tastes are transferred to children, and if tastes for career exert more influence on the employment decisions of females than males, this could lead to the positive coefficients we observe on the parental educational terms.

Turning to the municipal-level variables, our central concern is that some omitted third factor is predictive of both mother's LFP (or CD vote share) and the subsequent employment of daughters. For instance, the local labor market in some areas may be more conducive to female employment than others, leading to higher mother's LFP in some municipalities. Assuming such labor market conditions are slow to evolve over time, we would also expect higher LFP among the daughters raised in such areas. Similarly, local CD support might be a consequence of gender-specific labor market conditions rather than a reflection of gender norms.

4.3 Alternative Outcomes

In tables 5 and 6, we explore the association of the key family and (childhood) municipality characteristics and gender differences observed along other outcomes. Throughout, the estimation models are analogous to our preferred specification. Table 5 focuses on additional labor-related outcomes beyond full-time employment. We present results for log earnings in model 1, any employment in model 2, and years of education in model 3. The observed role of the family-level characteristics is similar to what we observed for full-time employment. Mother's employment and parental education are each predictive of a differential increase in the earnings, employment, and educational attainment of females. Mother's education is particularly important (and the role of father's education somewhat muted) in predicting gender differences in education. The CD vote share also takes the expected (negative) sign and is sizable in magnitude across different outcomes. The results for mother's LFP (in the municipality) are more surprising. Mother's LFP (in the municipality) appears to have a minimal effect on the gender gap in earnings and employment. In fact, the relevant coefficient in the employment model is negative, although very small in magnitude. Taken at face value, it appears that the LFP of local area mothers reduces the large gender gap in full-time employment while having virtually no effect on the smaller gender gap in any employment. Most surprising is that mother's LFP is predictive of a differential increase in the education of males. We have no compelling explanation for this result.

In Table 6, we turn to outcomes of family formation and spousal employment. Model 1 captures the probability that the subject is married (or cohabitating) with children at age 32,[28] an outcome that is 12.2 percentage points more common among females in our sample. Mother's employment, parental education, and mother's LFP (in the municipality) are associated with modest reductions in this difference, while the CD vote share coefficient is insignificant. This potentially reflects a relationship between these variables and the career orientation of females, leading to differential delays in family formation. The remaining models in Table 6 restrict the sample to subjects who are married with children, and therefore require cautious interpretation, especially for covariates taking significant coefficients in model 1. In model 2, we find that our covariates of interest tend to be more strongly predictive of the gender gap in full-time employment in the restricted sample (compared to our preferred model)—especially so for the mother's employment (AW/IR) covariates. Notably, we find the opposite pattern in modeling the likelihood of full-time employment of the subject's spouse (see model 3). This is an important finding, suggesting that intergenerational transfers play a role in the assortative mating process. Consistent with Fernandez et al. (2004) males raised under "low-gender gap" conditions tend to match to wives who are more

[28]We measure married or cohabitating at age 32 as we do not have this measure available at age 35 for all cohorts.

likely to work full-time at age 35 (and v.v.), while the opposite is true of females. Finally, in model 4 we find that factors predictive of a smaller employment gender gap are also predictive of a smaller gap in the age at first birth.

4.4 Subsample Analyses

In Table 7, we investigate whether the predictive power of family-level features in explaining the employment gender gap varies across different sorts of municipalities. To do so, we present estimates over subsamples defined by the municipal vote share for the CD and by mother's LFP in the municipality. For the purpose of these regressions, gender-specific municipality fixed effects are included throughout, as in Table 3, model 8.

The first three columns of Table 7 present results for the CD vote share subsamples. In general, these give the impression that the family-level predictors of the gender gap operate more strongly in municipalities with the highest levels of CD support. For instance, the coefficient on *Female*AWm* is 15 percent larger for subjects raised in municipalities in the top quartile of CD vote share compared with those in the bottom quartile. Maternal education is also a much stronger predictor of the gender gap in municipalities in the top quartile of CD vote share. In contrast, the family-level predictors of the gender gap appear to be reasonably similar across municipalities in the lowest quartile of CD vote share and those in the middle two quartiles.

The next three columns present results over subsamples defined by mother's LFP. Here we find that correlations of the family-level predictors with the gender gap are consistently smaller in municipalities with higher measures of mother's LFP, and especially small in municipalities in the highest quartile. Together, these results suggest that family-level predictors of the gender gap are more influential in municipalities with characteristics predictive of a larger gender gap.

Table 8 presents subsample results of earlier and later birth cohorts, with estimates presented under our preferred specification (Table 3, model 7). As the employment gender gap is declining over later birth cohorts in our sample, we might expect that the family-level predictors of the gender gap would weaken in later cohorts. Such a result would be consistent with our finding in Table 7, that family-level predictors are weaker when municipality features are predictive of a smaller gender gap. However, evidence from Raaum et al. (2006) indicates that family-level determinants explain an increasing share of the variance in children's economic outcomes in Norway over time, while community-level determinants explain a decreasing share. In light of these findings, we might anticipate that family-level factors would grow more predictive of the gender gap over time, while community-level features should decrease in importance.

Our results appear consistent with those of Raaum et al. (2006) in this regard. For instance, the coefficient on *Female*AWm* is over 50 percent larger for subjects in the latest five birth cohorts relative to those in the earliest five cohorts. Paternal education also appears more strongly predictive of a smaller gender gap over time, although the same does not appear true for maternal education. Moreover, we find that municipal-level features become (modestly) less important predictors of the gender gap over time.

We should also note the relevance of these results with respect to those in Table 4, model 5. As discussed previously, the inclusion of gender-specific fixed effects for birth year weakens the apparent importance of mother's employment, a result consistent with the dynamic effects of intergenerational transfers (but also potentially explained by exogenous economic forces that have made the workplace more amenable to female employment over time). Predictably, then, the coefficients related to mother's employment (in Table 8) are closer in magnitude to those in Table 4, model 5 than to our preferred specification. Nonetheless, we estimate sizable coefficients on the mother's employment terms even when the sample is restricted to narrower bands of birth cohorts.

5 Conclusion

The current paper employs rich longitudinal registry data to investigate the intergenerational transfer of the gender gap in labor force participation. Drawing on theories pertaining to the information, skills and gender norms transfer, we focus on a parsimonious set of family and childhood community characteristics that should, in theory, moderate the size of the gender gap in labor market attachment. Consistent with the hypothesis that the women's labor force participation is constrained by the intergenerational transfer of beliefs and expectations about family and work, we demonstrate that the size of the gender gap in full-time employment varies substantially across different sorts of families and municipalities. Mother's employment and parental education predict large reductions in the size of the gender gap. The gender gap is also substantially smaller in municipalities where more maternal LFP is higher and where support for the Christian Democrat Party is lower.

As we have indicated throughout the course of this paper, we cannot definitively conclude that the associations we estimate strictly arise through the intergenerational transfer of information, skills, and gender norms. However, we do find that our results are largely robust for additional controls intended to address the most likely potential confounders. Our findings therefore provide additional support to a growing literature which finds that female preferences and perceptions about working outside the home are shaped by beliefs and expectations about work and family passed on from prior generations (e.g. Crompton and Harris, 1998; Antecol, 2000; Fernandez et al., 2004; Fogli and Veldkamp, 2011; Alesina et al., 2013; Fernandez, 2013)

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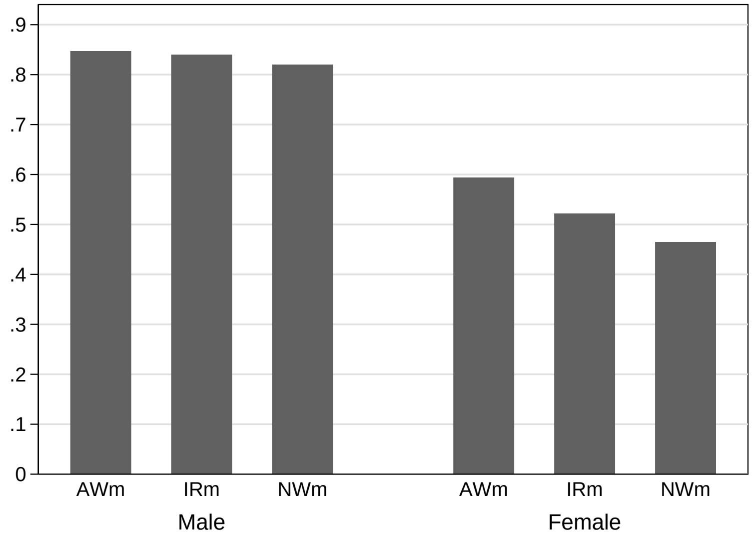
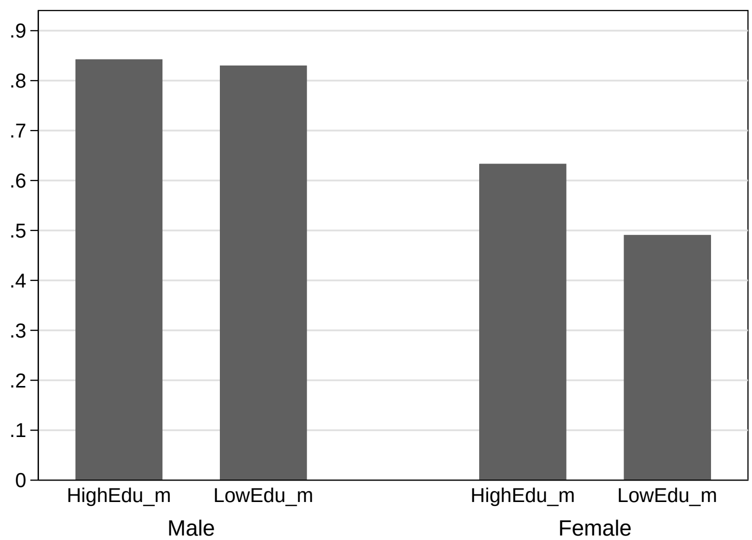
Figure 1: Maternal employment and employment outcomes for males and females



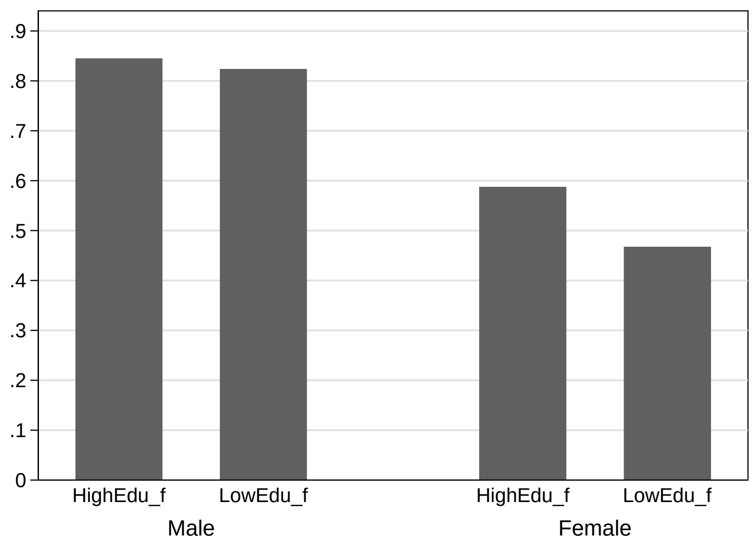
Notes: Female and male employment rates by parental employment during childhood. Letters m and f indicate mother and father respectively. AW and IR indicate family type, as described in Section 3.2.

Figure 2: Maternal education and employment outcomes for males and females



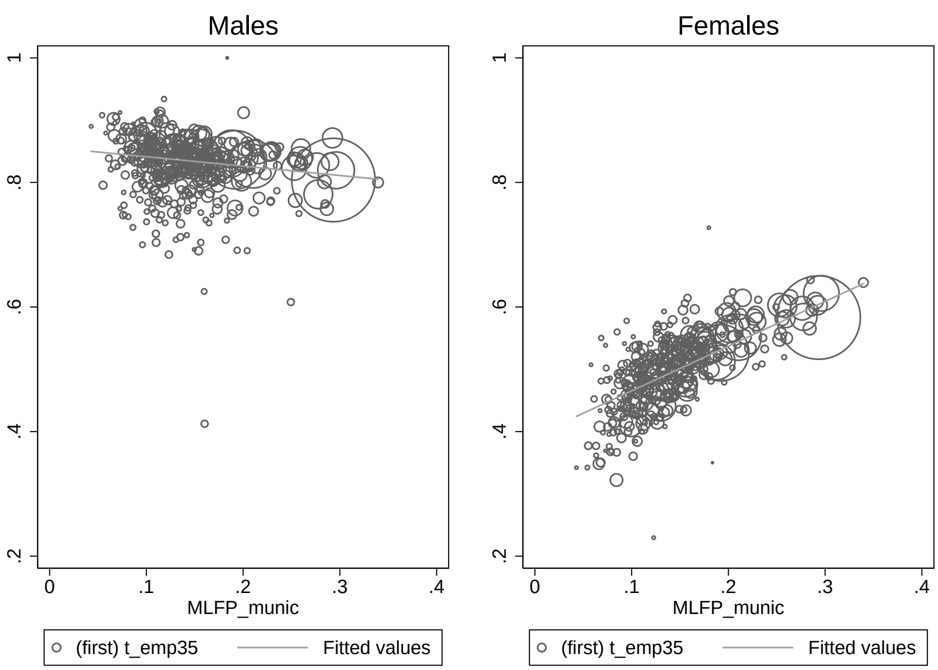
Notes: Female and male employment rates by maternal education during childhood. HighEdu_m and LowEdu_m indicate mothers education, as described in Section 3.2.

Figure 3: Paternal education and employment outcomes for males and females



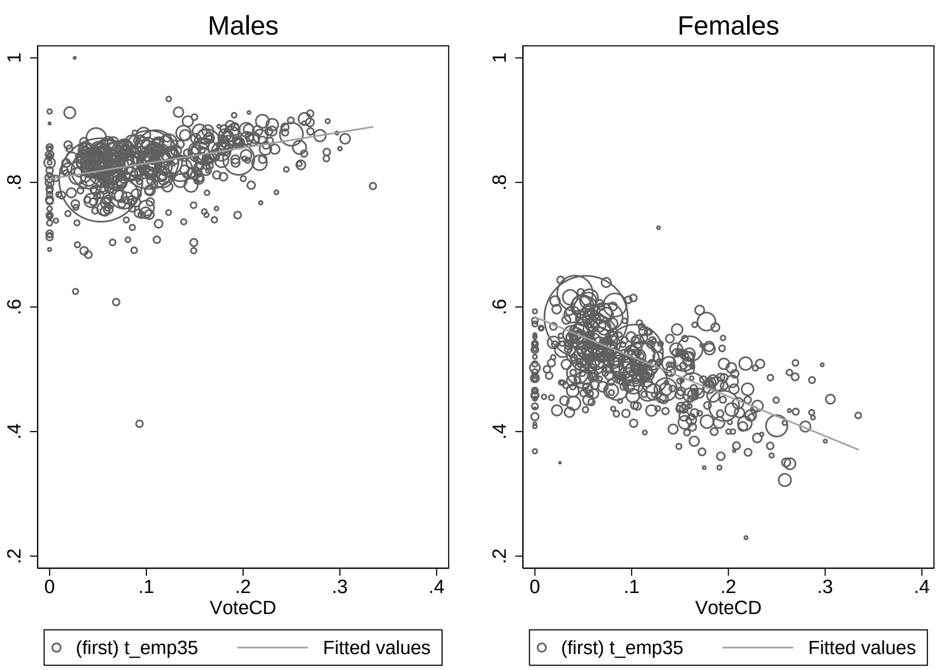
Notes: Female and male employment rates by paternal education in childhood. HighEdu_f and LowEdu_f indicate fathers education as described in Section 3.2.

Figure 4: Maternal full-time employment rate in childhood municipality (MLFP_munic) and employment outcomes for males and females



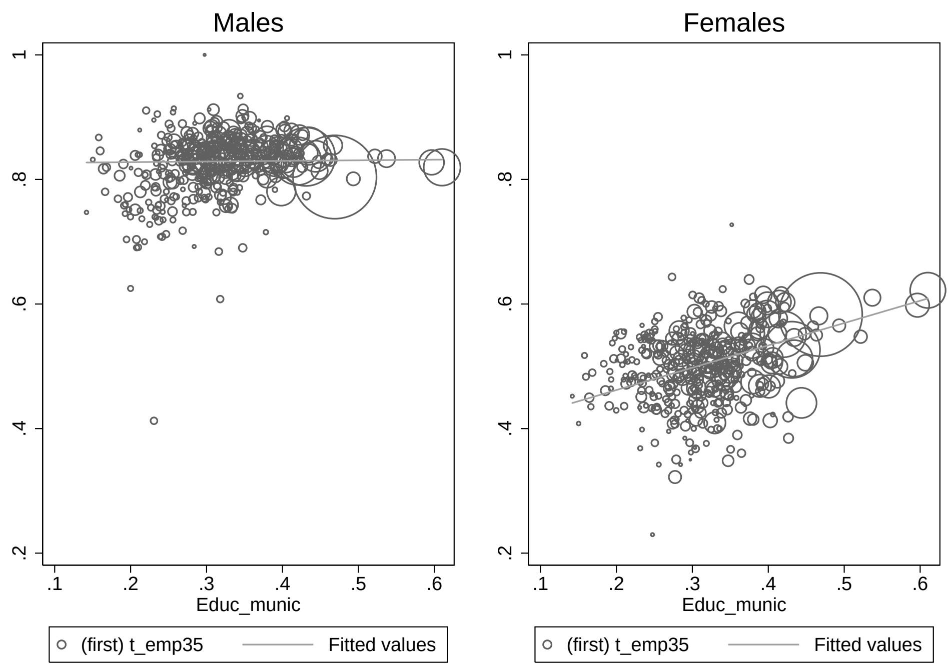
Notes: Scatter and fitted line of female and male employment rates against maternal full-time employment rates in childhood municipality, weighted by the municipality population. Scatters are marked by circles where circle size mirrors the population size in municipality. The correlation coefficients of the fitted line for females and males are 0.72 and -0.15 (standard errors are 0.024 and 0.024) respectively.

Figure 5: The share of voters for the Christian Democrats (VoteCD) in childhood municipality and employment outcomes for males and females



Notes: Scatter and fitted line of female and male employment rates against the share of voters for the Christian Democrats, weighted by the municipality population. Scatters are marked by circles where circle size mirrors the population size in municipality. The correlation coefficients of the fitted line for females and males are -0.64 and 0.25 (standard errors are 0.034 and 0.023) respectively.

Figure 6: The educational attainment in childhood municipality (Educ_munic) and employment outcomes for males and females



Notes: Scatterplots and fitted lines for female and male employment rates against the educational attainment in childhood municipality, weighted by the municipality population. Scatterplots are marked by circles, where circle size mirrors the population size in the municipality. The correlation coefficients from the fitted line for females and males are 0.36 and 0.01 (standard errors are 0.023 and 0.02), respectively.

Table 1: Summary statistics

	Males		Females		
	Mean	SD	Mean	SD	p-value
Outcome variables					
Full-time employed at age 35	0.832		0.517		0.0000
Employed at age 35	0.906		0.794		0.0000
Earnings at age 35	452.5	(219.8)	285.2	(174.9)	0.0000
Education years	13.21	(2.252)	13.41	(2.411)	0.0000
Age at birth of first child	27.49	(3.900)	25.55	(4.247)	0.0000
Married/cohabiting with children	0.517		0.646		0.0000
Employment mother					
AW	0.308		0.314		0.0000
IR	0.203		0.205		0.0386
NW	0.490		0.481		0.0000
Mother's education ≥12 years	0.185	(0.389)	0.183	(0.387)	0.0151
Employment father					
AW	0.913		0.912		0.2623
IR	0.0615		0.0618		0.6503
NW	0.0257		0.0262		0.1911
Father's education ≥12 years	0.413	(0.492)	0.412	(0.492)	0.5768
Parental earnings (Child's age 10-16)	302.4	(97.01)	303.4	(97.01)	0.0001
Child characteristics					
Mother's age at birth	27.04	(5.760)	27.06	(5.767)	0.3122
Birth order	2.086	(1.149)	2.094	(1.151)	0.0050
Family size	3.022	(1.152)	3.031	(1.157)	0.0006
Birth cohort (year)	1966.8	(4.205)	1966.8	(4.210)	0.8218
Municipality characteristics					
Mother LFP	0.170	(0.0599)	0.170	(0.0599)	0.8553
Educ_munic	0.362	(0.0790)	0.362	(0.0791)	0.3839
Share of voters CD	0.101	(0.0596)	0.101	(0.0595)	0.4577
Observations	377,533		362,546		

Notes: Standard deviation in parentheses for mean statistics. Mother's and father's earnings reflect mean earning from the period when the child is 10-16 years of age, measured in NOK (2009)/1,000. The p-value reflects the t-test of difference between females and males. AW and IR indicate family type and LFP, Educ, and Voters CD are municipality characteristics, all described in Section 3.2.

Table 2: Cross-correlation

	AWm	HighEdu_m	HighEdu_f	MLFP_munic	VoteCD	Educ_munic
AWm	1.000					
HighEdu_m	0.250**	1.000				
HighEdu_f	0.115**	0.318**	1.000			
MLFP_munic	0.178**	0.130**	0.157**	1.000		
VoteCD	-0.103**	-0.053**	-0.042**	-0.546**	1.000	
Educ_munic	0.123**	0.171**	0.234**	0.677**	-0.147**	1.000

Correlation across variables. Letters m and f indicate mother and father, respectively. AW and IR indicate family type, as described in Section 3.2. HighEdu denotes at least 12 years of schooling. MLFP_munic and Educ_munic are continuous variables for the mean share of full-time employed mothers and the mean share of highly educated population for all represented children growing up in the same municipality. VoteCD is a continuous variable for the mean municipal share of support to the Christian Democrats for all represented children growing up in the same municipality.

Table 3: Main results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Female	-0.315**	-0.388**	-0.307**	-0.494**	-0.419**	-0.349**	-0.392**			
	(0.0010)	(0.0017)	(0.0025)	(0.0031)	(0.0049)	(0.0056)	(0.0051)			
Female*AWm		0.074**	0.064**	0.058**	0.073**	0.056**	0.057**	0.058**	0.059**	0.059**
		(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0036)	(0.0036)
Female*IRm		0.029**	0.024**	0.020**	0.028**	0.020**	0.020**	0.021**	0.024**	0.025**
		(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0037)	(0.0038)
Female*HighEdu_m		0.080**	0.078**	0.075**	0.079**	0.079**	0.076**	0.079**	0.080**	0.084**
		(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0041)	(0.0041)
Female*HighEdu_f		0.070**	0.068**	0.060**	0.067**	0.068**	0.063**	0.070**	0.067**	0.067**
		(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0032)	(0.0032)
Female*VoteCD			-0.044**			-0.023**	-0.032**			
			(0.0010)			(0.0013)	(0.0012)			
Female*MLFP_Munic				0.042**		0.046**	0.024**			
				(0.0011)		(0.0018)	(0.0013)			
Female*Educ_munic					0.007**	-0.027**				
					(0.0011)	(0.0015)				

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Table 3: Continued from previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AWm	0.047**	0.011**	0.016**	0.019**	0.011**	0.020**	0.019**	0.018**	0.019**	
	(0.0013)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0022)	
IRm	0.028**	0.014**	0.017**	0.019**	0.015**	0.019**	0.019**	0.018**	0.019**	
	(0.0014)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0022)	
HighEdu_m	0.026**	-0.013**	-0.012**	-0.011**	-0.013**	-0.013**	-0.011**	-0.013**	-0.013**	
	(0.0014)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0025)	
HighEdu_f	0.046**	0.011**	0.012**	0.016**	0.013**	0.012**	0.015**	0.011**	0.012**	
	(0.0011)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0019)	
Added FEs										
Munic	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Munic*Female								Y	Y	Y
Family										Y
Sample restrictions										
Both sexes									Y	Y
R_squared adjusted	0.130	0.136	0.139	0.138	0.136	0.139	0.139	0.141	0.149	0.194
Observations	740,079	740,079	740,079	740,079	740,079	740,079	740,079	740,079	361,223	361,223

Notes: OLS regressions with robust standard errors in parentheses. Dependent variable is full-time employment at child-age 35. Full-time employment is based on earnings threshold, as defined in Section 3.2. Letters m and f indicate mother and father, respectively. AW and IR indicate family type, as described in Section 3.2. All models include indicators for birth order and birth order/family size interactions, indicators for twin/triplets, indicators for birth cohorts, and quadratic terms for mother's age at child birth as well as municipality fixed effects. Birth order and family size are indicator covariates representing (2,3,4,5,6+). MLFP_munic and Educ_munic are continuous variables, normalized to show one SD change for the mean share of full-time employed mothers and the mean share of highly educated population for all represented children growing up in the same municipality. VoteCD is a continuous variable normalized to show one SD change for the mean municipal share of support to the Christian Democrats for all represented children growing up in the same municipality. HighEdu denotes at least 12 years of schooling. The "both sexes" restriction refers to restricting the sample to siblings from families where a child of each sex is represented.

Table 4: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	-0.392**	-0.412**	-0.471**	-0.439**	-0.649**	-0.359**	-0.244**		-0.383**
	(0.0051)	(0.0074)	(0.0083)	(0.0064)	(0.0478)	(0.0083)	(0.0138)		(0.0051)
Female*AWm	0.057**	0.060**	0.059**	0.045**	0.052**	0.058**	0.057**	0.058**	0.057**
	(0.0024)	(0.0037)	(0.0037)	(0.0025)	(0.0026)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
Female*IRm	0.020**	0.025**	0.024**	0.014**	0.018**	0.021**	0.021**	0.021**	0.020**
	(0.0027)	(0.0038)	(0.0038)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0027)
Female*HighEdu_m	0.076**	0.076**	0.065**	0.069**	0.073**	0.076**	0.077**	0.079**	0.076**
	(0.0028)	(0.0042)	(0.0042)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)
Female*HighEdu_f	0.063**	0.063**	0.052**	0.058**	0.058**	0.065**	0.068**	0.070**	0.064**
	(0.0022)	(0.0032)	(0.0033)	(0.0022)	(0.0023)	(0.0022)	(0.0022)	(0.0022)	(0.0022)
Female*MLFP_Munic	0.024**	0.028**	0.027**	0.027**	0.023**	0.024**	0.048**	0.025**	0.024**
	(0.0013)	(0.0019)	(0.0019)	(0.0013)	(0.0013)	(0.0013)	(0.0021)	(0.0022)	(0.0013)
Female*VoteCD	-0.032**	-0.032**	-0.032**	-0.032**	-0.032**	-0.031**	-0.016**	-0.015**	-0.016**
	(0.0012)	(0.0017)	(0.0017)	(0.0012)	(0.0012)	(0.0012)	(0.0014)	(0.0022)	(0.0018)
Female*IQ			0.013**						
			(0.0009)						
Female*Ln(FamInc)					0.021**				
					(0.0039)				
Female*AWf						-0.038**			
						(0.0069)			
Female*IOf						-0.011			
						(0.0080)			
Female*MaleInc_munic							-0.031**		
							(0.0015)		
Female*pop_munic							-0.021**		
							(0.0016)		

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Table 4: Continued from previous page

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female*FemaleLFP_Reg							0.012**		
							(0.0025)		
Female*UR_Reg							0.007**		
							(0.0014)		
Female*VoteCD_Reg									-0.020**
									(0.0017)
IQ			0.010**						
			(0.0005)						
AWf						0.130**			
						(0.0047)			
IOf						0.052**			
						(0.0054)			
Sample restrictions									
IQ non-missing		Y	Y						
First-born child									
Added FEs									
Female*IQ			Y						
Female*birth year				Y					
Female*region								Y	
Observations	740,079	344,726	344,726	740,079	740,079	740,079	740,079	740,079	740,079

Notes: OLS regressions, with robust standard errors in parentheses. All models are identical to column 7, Table 3 but with different outcome variables and sample restriction. The direct effect of AWm, IRm, HighEdu_m, and HighEdu_f are all included in columns 1-9. IncMales_munic and pop_munic are normalized to show one SD change for mean male income and population in the municipality for all represented children growing up in the same municipality. FemaleLFP_Reg is a continuous variable, normalized to show one SD change for the mean share of full-time employed females for all represented children growing up in the same region. UR_Reg is a continuous variable, normalized to show one SD change for the mean unemployment rate for all represented children growing up in the same region.

Table 5: Alternative outcome variables: Earnings, employment, and education

	(1) Ln(earn)	(2) Employed	(3) EducYrs
Female	-0.381**	-0.102**	0.397**
	(0.0063)	(0.0040)	(0.0241)
Female*AWm	0.055**	0.041**	0.132**
	(0.0031)	(0.0019)	(0.0120)
Female*IRm	0.016**	0.020**	0.048**
	(0.0034)	(0.0022)	(0.0131)
Female*HighEdu_m	0.046**	0.022**	0.176**
	(0.0038)	(0.0022)	(0.0139)
Female*HighEdu_f	0.012**	0.024**	0.027*
	(0.0028)	(0.0017)	(0.0108)
Female*MLFP_Munic	0.000	-0.002*	-0.073**
	(0.0016)	(0.0010)	(0.0060)
Female*VoteCD	-0.060**	-0.021**	-0.044**
	(0.0015)	(0.0010)	(0.0058)
AWm	0.041**	0.010**	0.207**
	(0.0022)	(0.0012)	(0.0084)
IRm	0.035**	0.012**	0.131**
	(0.0024)	(0.0013)	(0.0090)
HighEdu_m	0.033**	-0.012**	0.863**
	(0.0027)	(0.0013)	(0.0099)
HighEdu_f	0.081**	0.004**	0.920**
	(0.0020)	(0.0010)	(0.0075)
Observations	740,079	740,079	734,579

Notes: OLS regressions with robust standard errors in parentheses. All models are identical to column 7, Table 3, but with alternative outcome variables. Label ln_(earn) refers to log of annual income at age 35. EducYrs is child years of education at child-age 33.

Table 6: Alternative outcome variables: Children, marriage, and spouse

	(1)	(2)	(3)	(4)
	MwChild	FTemp	FTemp_spo	AgeBirth 1ch
Female	0.170**	-0.487**	0.540**	-2.387**
	(0.0055)	(0.0061)	(0.0064)	(0.0557)
Female*AWm	-0.008**	0.081**	-0.058**	0.160**
	(0.0027)	(0.0029)	(0.0031)	(0.0270)
Female*IRm	-0.006*	0.038**	-0.028**	0.026
	(0.0030)	(0.0032)	(0.0034)	(0.0297)
Female*HighEdu_m	-0.015**	0.079**	-0.058**	0.494**
	(0.0032)	(0.0034)	(0.0036)	(0.0309)
Female*HighEdu_f	-0.012**	0.069**	-0.044**	0.405**
	(0.0024)	(0.0026)	(0.0028)	(0.0242)
Female*MLFP_Munic	-0.009**	0.019**	-0.037**	0.110**
	(0.0014)	(0.0015)	(0.0016)	(0.0138)
Female*VoteCD	-0.001	-0.037**	0.033**	-0.012
	(0.0013)	(0.0014)	(0.0015)	(0.0132)
AWm	0.016**	0.006**	0.061**	0.054**
	(0.0020)	(0.0016)	(0.0027)	(0.0196)
IRm	0.014**	0.006**	0.031**	0.020
	(0.0021)	(0.0018)	(0.0029)	(0.0213)
HighEdu_m	-0.019**	-0.003	0.057**	0.495**
	(0.0023)	(0.0018)	(0.0032)	(0.0223)
HighEdu_f	-0.004*	0.015**	0.058**	0.527**
	(0.0018)	(0.0014)	(0.0024)	(0.0174)
Sample restriction:				
Married/cohabiting with children		Y	Y	Y
Observations	740,079	429,214	429,214	429,214

Notes: OLS regressions with robust standard errors in parentheses. All models are identical to column 7, Table 3 but with different outcome variables and sample restriction. MwChild indicates being married or cohabiting and having children by age 32. FTemp indicates full-time employment at age 35. Full-time employment is based on earnings threshold defined in Section 3.2. FTemp_spo is an indicator variable for the spouse being full-time employed at age 35. AgeBirth 1ch is a continuous variable for the age at the time of birth of first child.

Table 7: Subsample analysis: Municipality characteristics

	VoteCD			MLFP_Munic		
	≤25p	>25p & <75p	≥75p	≤25p	>25p & <75p	≥75p
Female	-0.372**	-0.399**	-0.481**	-0.403**	-0.407**	-0.359**
	(0.0142)	(0.0138)	(0.0571)	(0.0420)	(0.0138)	(0.0311)
Female*AWm	0.060**	0.052**	0.071**	0.065**	0.061**	0.045**
	(0.0054)	(0.0033)	(0.0051)	(0.0053)	(0.0034)	(0.0048)
Female*IRm	0.021**	0.017**	0.029**	0.020**	0.023**	0.016**
	(0.0062)	(0.0037)	(0.0052)	(0.0053)	(0.0038)	(0.0058)
Female*HighEdu_m	0.073**	0.074**	0.095**	0.097**	0.085**	0.058**
	(0.0062)	(0.0037)	(0.0059)	(0.0063)	(0.0040)	(0.0051)
Female*HighEdu_f	0.076**	0.063**	0.081**	0.079**	0.072**	0.056**
	(0.0052)	(0.0030)	(0.0043)	(0.0045)	(0.0031)	(0.0045)
AWm	0.017**	0.022**	0.011**	0.020**	0.016**	0.023**
	(0.0033)	(0.0020)	(0.0029)	(0.0031)	(0.0021)	(0.0030)
IRm	0.013**	0.023**	0.011**	0.016**	0.019**	0.018**
	(0.0038)	(0.0022)	(0.0030)	(0.0031)	(0.0022)	(0.0035)
HighEdu_m	-0.009*	-0.012**	-0.016**	-0.017**	-0.012**	-0.011**
	(0.0038)	(0.0023)	(0.0034)	(0.0037)	(0.0024)	(0.0031)
HighEdu_f	0.009**	0.015**	0.003	0.005*	0.013**	0.013**
	(0.0031)	(0.0018)	(0.0025)	(0.0026)	(0.0018)	(0.0028)
Observations	145,754	408,282	186,043	187,035	375,275	177,769

Notes: OLS regressions with robust standard errors in parentheses. Dependent variable is full-time employment at child-age 35. All models are identical to model 8, Table 3, but with different sample restrictions. The samples are broken down based on different percentiles of VoteCD and MLFP_Munic, where, for example, VoteCD≤25p is a sample of children growing up in a municipality with less than 25th percentile of the Christian Democrat voter share based on voting pattern for all represented children growing up in the same municipality. MLFP≤25p is a sample of children growing up in a municipality with less than the 25th percentile of maternal employment rates based on the maternal employment rate for all represented children growing up in the same municipality.

Table 8: Nonlinear effects

	(1)	(2)	(3)
Female	-0.426**	-0.391**	-0.356**
	(0.0087)	(0.0086)	(0.0092)
Female*AWm	0.033**	0.047**	0.059**
	(0.0045)	(0.0041)	(0.0043)
Female*IRm	0.010*	0.013**	0.025**
	(0.0046)	(0.0045)	(0.0050)
Female*HighEdu_m	0.072**	0.070**	0.066**
	(0.0055)	(0.0048)	(0.0045)
Female*HighEdu_f	0.051**	0.061**	0.066**
	(0.0039)	(0.0037)	(0.0038)
Female*MLFP_Munic	0.030**	0.026**	0.023**
	(0.0022)	(0.0021)	(0.0023)
Female*VoteCD	-0.034**	-0.034**	-0.028**
	(0.0021)	(0.0020)	(0.0021)
AWm	0.026**	0.027**	0.019**
	(0.0027)	(0.0025)	(0.0025)
IRm	0.024**	0.022**	0.017**
	(0.0028)	(0.0027)	(0.0029)
HighEdu_m	-0.013**	-0.006*	-0.006*
	(0.0033)	(0.0029)	(0.0027)
HighEdu_f	0.024**	0.017**	0.009**
	(0.0023)	(0.0022)	(0.0023)
Sample restriction:			
Birth cohort	1960-1964	1965-1969	1970-1974
Observations	251,221	265,788	223,070

Notes: OLS regressions with robust standard errors in parentheses. Dependent variable is full-time employment at child-age 35. All models are identical to model 7, Table 3, but with different sample restrictions.