Parenthood, Family Friendly Firms, and the Gender Gaps in Work Careers*

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Abstract

We consider the role that firm attributes play in accounting for the divergence in the careers of women and men, in terms of the wage and non-wage attributes of jobs, with the onset of parenthood. We exploit a matched employer-employee data set from Sweden that provides a rich set of firm and worker attributes. We index firms by their "family friendliness" and analyze the effect of firm family friendliness on the career gap between mothers and fathers. We find that women disproportionately sort into family friendly firms after first birth, and that the wage penalty to motherhood is counteracted by firm family friendliness. The smaller wage penalty, however, comes at the expense of occupational progression, due to that family friendly firms exhibit a lower-skilled workforce, lower wage dispersion, and less room for climbing the career ladder. Family friendly jobs are also shown to be more easily substitutable for one another, implying lower costs incurred on the employer by workers' family responsibilities. Given the policy context in Sweden, our findings also suggest that paid parental leave with job protection may not be sufficient to facilitate the combination of a career and family responsibilities, but that also the nature of one's job-tasks plays a crucial role.

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1 Introduction

Despite the gender convergence in labor force participation rates, educational levels, and occupations observed over the last few decades, significant gender gaps persist in all industrialized countries (Blau and Kahn, 1992, 1995, 1996, 2003, forthcoming). A large economics literature suggests that the earnings and wage growth of women are negatively affected by childbearing (see e.g. Angrist and Evans, 1998; Bronars and Grogger, 1994; Fitzenberger, Sommerfeld and Steffes, 2013),[1] and that male and female earnings diverge at the onset of parenthood (Kleven, Landais and Søgaard, 2016; Angelov, Johansson and Lindahl, 2016; Bertrand, Goldin and Katz, 2010).

In trying to explain the source of the wage penalty to mothers, much attention has been devoted to the role of employer discrimination (Becker, 1971; Neumark, Bank and Van Nort, 1996; Bertrand and Mullainathan, 2004) and foregone investments in human capital (Mincer and Polachek, 1974).[2] A more recent literature explores the role of sorting across jobs in explaining the gender wage gap, where women are less likely to transition into high-paying jobs compared to men (Loprest, 1992; Hospido, 2009; Del Bono and Vuri, 2011; Card, Cardoso and Kline, 2016). A related literature suggests that job amenities – in particular workplace flexibility – might explain differences in the occupational career choices of men and women (Goldin and Katz, 2011; Bertrand, Goldin and Katz, 2010; Goldin, 2014; Cardoso, Guimarãs and Portugul, 2016), and of women with and without children (Adda, Dustmann and Stevens, 2017; Felfe, 2012*b*,*a*).[3]

This paper considers the role that the *firms* and the *characteristics*, or *attributes*, *of firms* play in accounting for the divergence in the careers of women and men, in terms of the wage and non-wage attributes of jobs, with the onset of parenthood. We do so for at least three distinct, but related, reasons. First, recent studies by Goldin and co-authors (Goldin, 2014; Goldin and Katz, 2011, 2016; Bertrand, Goldin and Katz, 2010) have focused on the role of "workplace flexibility" or the "family-friendliness" of workplace amenities, as playing a large role in the gender differences in wages between women and men. Much of this work (see also Felfe (2012*b*,*a*)) has focused on differences across occupations in the intensity and flexibility of hours of work as a (dis)amenity of jobs to account for the gender gap in wages. But the jobs in which women work compared to those of men differ not only with respect to occupation but, as

[1] Using an alternative identification strategy, Hotz, McElroy and Sanders (2005) find that teenage childbearing does not have a persistent negative effect on earnings over teen mothers' life cycle.

[2] See Altonji and Blank (1999) for a survey of this earlier literature.

[3] Yet another recent approach to accounting for the gender wage gap considers gender differences in psychological traits (personality) and/or cultural norms and how these affect preferences for jobs and negotiating for pay and career advancement (Bertrand, 2011; Kleven, Landais and Søgaard, 2016; Bertrand, Kamenica and Pan, 2015).

we show below, also with respect to the establishments in which they work and the attributes of those workplaces.

Second, there is a much wider array of attributes of jobs than the intensity and flexibility of hours of work that may be valued differently by men and women and by parents and non-parents, including the structure of the management of firms, the skill and gender composition of a firm's workforce, the proximity of the workplace to workers' home, etc. Again, as we show below, differences in these attributes of jobs and firms play a central role in understanding gender gaps in early work careers.

Finally, our interest in the role of firms is motivated by the findings of Abowd, Kramarz and Margolis (1999)[4] with respect to the existence of firm-level premia in wages and by the recent work of Card, Cardoso and Kline (2016) who demonstrate that firm-level bargaining and sorting have an important impact on the gender wage gap. In closely related work, Cardoso, Guimarãs and Portugul (2016) and Bayard et al. (2003) show that part of the gender wage gap can be attributed to women being segregated into low-paying jobs and occupations within firms.

We contribute to this literature by examining the link between the transitions of men and women to different types of jobs and firms with the onset of parenthood, and analyze its consequences for the gender gap in early careers. We exploit very rich employer-employee matched data sets from Sweden. With respect to gender wage gaps and family friendliness, Sweden is a particularly interesting case to study. Since the 1970s, Sweden has introduced a series of policy reforms to facilitate the combination of parenthood and careers.[5] The financial support to workers with young children and mandated job protection during parental leave is universal, extensive, and covers both mothers and fathers. Despite the generous duration of job-protected parental leave with governmentally paid parental leave benefits, Sweden has a pronounced and persistent gender wage gap. Probing the effects of children on wages and non-wage attributes of workers' jobs in this policy context provides insights into the constraints faced by new parents – who are often trying to combine a career with family – over and above those that are addressed with universal family policies.

We find that childbearing has very different impacts on the careers of male and female workers, with women falling behind men in terms of wages, earnings and occupational progression after the onset of parenthood. While women are no less likely than men to switch jobs and/or firms, women's job mobility is closely linked to the timing of parenthood. To examine the role that the environments of workplaces

[4]See also Barth et al. (2016) and Card et al. (2016).

[5]See Björklund (2006) for a description of changes to the Swedish family policies from the 1960s onwards, and Jaumotte (2004) for a characterization of family leave policies in different OECD countries.

(firms) and the non-wage characteristics of the jobs in them play in accounting for the gender and parenthood differences in job sorting, wages and career advancement, we develop a model of job choice and timing of parenthood and estimate the preferences of women and men and mothers and fathers over wage and non-wage attributes of jobs in firms. We show that we can obtain unbiased estimates of these preferences, despite certain forms of unobserved heterogeneity, by exploiting job changes before and immediately after entry into parenthood. Our estimates of these preferences differ by gender and parenthood and are consistent with selective sorting across jobs by gender and parenthood, even after allowing for heterogeneity in worker productivity.

These job preference estimates directly characterize measures of the willingness to pay for the non-wage attributes of jobs and firms and we use those for mothers to form and index of the family friendliness of the firms and jobs that workers can choose. We find that more family friendly firms are characterized by lower- to medium-skilled and occupationally specialized workforces, lower within-firm wage dispersion, and less room for climbing the career ladder than firms that are less family friendly. We then analyze the effect of firm family friendliness on the gaps in wages, earnings and the career progression of jobs between mothers and fathers and find that the "penalties of parenthood" for wages are partially mitigated by working in more family friendly firms. However, the smaller motherhood wage penalty comes at the expense of occupational progression, the rate of which is slower for both mothers and fathers in family friendly firms compared to less family friendly firms. However, the gender gap in occupational skill level *within* jobs/firms is lower the more family friendly is the job.

To better understand these latter findings, we examine more closely what it is about working in family friendly firms that mothers value. Goldin (2014) argues that having flexibility in one's job when women enter parenthood, especially when their children are young, is crucial to reducing the gap in their wages relative to men. We use a supplementary data set which measures the flexibility of jobs, including control over the hours when one can work and periods when one can take time off. This data source also allows us to measure how easily jobs are substitutable for one another, by measuring the "autonomy" of jobs. We then compare these measures of job flexibility and substitutability with our measures of the family friendliness of firms. We find that there is a stark negative relationship between the extent of job autonomy and the family friendliness of jobs. Moreover, job flexibility is not increasing with the family friendliness of jobs. Job flexibility seems instead to be found in jobs that require intensive working hours (at the workplace or from home) with tasks that are not easily transferable across co-workers, and in extension perceived by mothers to be less easily combined with family responsibilities. These

findings are in line with those of Goldin and Katz (2016) with respect to the evolution of the pharmacist occupation. Goldin and Katz (2016) argue that, due to technological advances, the pharmacy occupation has increased in its extent of substitutability and thereby a low gender wage gap, little to no penalty to part-time work, and is now overall a family-friendly and gender egalitarian profession.

Moreover, our findings are also in line with those of Azmat and Ferrer (2017), who study gender gaps among associate lawyers in the U.S. Even though the work by lawyers may have changed by the advances made in information technology, substitutability is arguably low as it is hard to take over clients from colleagues. Azmat and Ferrer (2017) show that male lawyers work more hours than female lawyers, and that gender differences in performance (measured as annual hours billed and the amount of new client revenue brought to the firm) can explain around 50 percent of the earnings gap. These gender differences in performance are severely affected by the presence of preschool-aged children in the household. Our evidence points to a greater pervasiveness of the substitutability of workers and its consequences for the gender gaps in early careers, with it occurring not just within certain occupations but also within and across firms and workplaces in different industries and sectors.

Taken together, our findings indicate that family friendly firms and jobs are ones in which hours worked are lower than in less family friendly firms, where the skill content of jobs is lower, and where the extent of substitutability is higher. This implies that job flexibility alone may not be sufficient to close the gender wage gap in wages and, more generally, work careers. This is because flexibility is something that seems to be more common in more demanding jobs, but women – to a greater extent than men – opt out of such jobs after entering parenthood. Moreover, the generous and extensive family policies that characterize the social context in which the workers in our analysis reside may not fully address the challenges faced by women with young children in maintaining, let alone advancing, their work careers. As discussed in e.g. Gupta and Smith (2002), the Nordic model of family policies are mainly directed toward giving mothers right to job-protected part-time work arrangements and extended time off from work, which risks making mothers less valuable in a labor market that faces increasingly high adjustment costs and creates a glass ceiling. As our research shows, mothers can lessen the penalty to part-time work through their choice of employers or jobs, but such job choices are not likely to close the overall gender wage gap.

The remainder of the paper is organized as follows. In section 2 we describe the data we use in this paper. These data are drawn from Swedish population-wide longitudinal registers that match workers with firms and provide a wide set of both worker and workplace characteristics. In section 3 we present

results for the Swedish data on the differences in the wage and non-wage attributes of jobs by gender and parenthood, and descriptive results on how the wages and non-wage attributes of jobs change by gender as young women and men transition into parenthood. As we show, women and men end up in very different jobs and firms with the transition to parenthood. These transitions may be the result of women moving to more "family friendly" jobs and firms.

In section 4, we lay out a model of job and firm choice and the timing of parenthood in which women and men, before and after entering parenthood, value the wage and non-attributes of jobs and firms. We present estimates of the selection-adjusted marginal willingness to pay for these attributes by gender and parenthood and discuss the construction of our index of the family friendliness of the firms in our data. We show how this index captures the sorting of men and women by parenthood and the gender differences in wages, hours of work and labor earnings.

In sections 5.2.1 and 5.2.2, we examine the impacts of the family friendliness of firms in which one works can account for the gender gap in wages, hours of work and the labor incomes, respectively, of mothers and fathers early in their careers. In section 5.2.3, we show that the widening gender gap in wages after entry into parenthood is, in part, the result of differences in the rate of occupational upgrading between women and men and this slowing of occupational progression of mothers relative to fathers is a result of the firms in which women work. In section 6 we present results for assessing the relative importance of job flexibility, autonomy and substitutability for the jobs and firms in which mothers work. Finally, we offer a brief summary of our findings in section 7.

2 Data

The analysis is based on a matched employer-employee data set created by combining several Swedish population-wide administrative registers. We use the multi-generational register, which links all children to their biological parents, and provides information on the birth year, birth month, and birth parity of all children born before 2008 for the entire Swedish population. To these data we match individual longitudinal information on demographic and background characteristics - such as age, sex, region of residence, educational attainment, and country of origin - from the LOUISE register. LOUISE also includes annual labor income drawn from tax registers for each individual, with zero-income reported for periods of non-work. Using unique individual identifiers, we match this information to a linked employer-employee register that contains all employed individuals in Sweden, with unique identifiers

for their employers (firms) and workplaces. A person can have multiple employment spells for the same firm in a year, and more than one employer in the same year. To obtain one person-plant observation per year, we sum the income observations for the same employer per person-year, and retain the employer at which the worker earned their main income. In the majority of the cases, this implies that we retain one observation per person-workplace-year, which is our unit of analysis. For the very few cases of within-firm movers within a year, i.e., for individuals who have several workplaces within a firm and year, we keep the workplace where the individual earns their main income. Our analysis data thus identifies within- and between-firm movers across years, but not within-year/within-firm mobility.

For each person-plant-year pair, we then match information on wage rates and occupational codes from the Wage Structure Statistics, collected by the Swedish National Mediation Office. The Wage Structure Statistics is an annual survey of establishments that collects information on contracted work hours (reported as percent of full-time), occupation, and full-time equivalent monthly wage rates for each employee that worked at least one hour during the measuring month. Year-to-year variation in an individual's contracted work hours is generated by changes in the individual's employment contract to stipulate more, or fewer, hours of work, e.g, when changing from full-time to part-time, or by job-changes that result in a different contracted work time. However, contracted work hours do not give a complete picture of potential adjustments in hours worked, as it does not reflect temporary time off from work due to parental leave or sickness absence, for example. Therefore, in our analysis we also examine the relationship between parenthood and annual labor income, which is a good summary measure for labor supply as large individual-level fluctuations in this variable are more likely to reflect changes in hours worked than in hourly wages.

The occupational classification standard, SSYK, is a four-level hierarchical scheme that is based on the International Standard Classification of Occupations (ISCO), with some adaptations to the Swedish labor market. We use the first three digits of the SSYK to identify a person's occupation category. The skill requirements of the occupations range between 1 and 4, and correspond to the ISCED's categorization, where occupations with level 1 require skills comparable to those attained with only 5 years of schooling, and level 4 occupations require skills comparable to those attained from college education (although the skills need not be attained through formal education). Table A.2 in Appendix A describes the level of education corresponding to the skill requirements at each level of the skill content index of the occupational classification. Moreover, Table A.3 illustrates the skill level required for each major occupation group in the SSYK; for instance, the highest level of skill is required for occupations within the

group containing "legislators, senior officials, and managers". As we explain in detail in Appendix A, the educational level associated with each occupational skill level does not mean that the occupation requires the equivalent formal schooling; the worker may have obtained the required skills through work experience. This is important as it implies that variation in occupational skill content within individuals over their early careers is not primarily derived from obtaining more education; it is derived from moving up or down the occupational ladder, or altogether changing jobs.

All firms, establishments, and organizations within the public sector (government, county council, and municipality) are covered in the Wage Structure Statistics. Within the private sector, all private sector firms with 500 employees or more are covered, while a random sample is drawn on firms with fewer than 500 employees. The sampling is stratified based on a cross-classification of industry and establishment size, with the end result covering around 50 percent of all private sector workers in Sweden. The Wage Statistics also includes sample weights that allow calculation of aggregate statistics that are nationally representative.[6]

In terms of workplace characteristics, the linked employer-employee data set includes industry classification (NACE), establishment size, and establishment location (municipality). We exploit the richness of our data to construct a wide range of additional workplace attributes. Specifically, we characterize the workforce of individuals' establishment (excluding the focal worker's characteristics) using data on *all* individuals employed at their workplace, with the aid of the matched employer-employee data set combined with demographic information from LOUISE, and from the wage- and occupation information from the Wage Structure Statistics. This allows us to measure, e.g., the share of workers with a managerial position, the skill- and gender composition, and the occupational diversity at each workplace. Finally, for a sub-sample of firms in the manufacturing sector, our data includes information on value added per worker (both at the firm and establishment level).

The employer-employee, LOUISE, and Wage registers cover the time period 1985 through 2007. However, the occupational classification is only available from 1996 onwards.

[6]Part of our empirical strategy relies on within-person variation in the attributes of the firms in which they work, which means that only individuals who appear in the wage structure statistics multiple years help identify the coefficient of interest. To deal with the sampling issue, we use an imputed measure of wages for workers for whom we observe an employment in the employer-employee full-population data set, but who are missing in the wage structure statistics. In Appendix A we describe the imputation strategy and compare the wage structure with imputed missing wage information to the true wage distribution.

2.1 Analysis Sample & Summary Statistics

Our interest is in the analysis of wages, hours of work, income and the characteristics of jobs and firms and career progression at the outset of workers' careers. To this end, we construct a sample of individuals who first enter the labor market as of 1996 or later.[7] We restrict our analysis to cohorts of workers entering after 1996, since the earliest year we have data on workers' occupation is 1996. We further restrict the sample to individuals whose first child was born *after* entering the labor market. Thus, all individuals in our sample enter the labor market without children, and subsequently become parents at some point during the observation period. That is, our sample consists only of women and men who were observed to have become parents by 2008. Net of these sample restrictions, we end up with 328 812 unique individuals. In our analysis, we focus on the timing of individuals' first birth.

Table 1 shows summary statistics separately for the male and female workers in our sample, measured in the year of their labor market entrance. Comparisons of columns (1) and (2) show that female workers are slightly younger than male workers when they enter the labor market. The age difference might be attributed to women finding a first job more quickly compared to men, as shown by the average number of years between the completion of highest attained education and finding a first job. Consistent with Bertrand, Goldin and Katz (2010), wages of male and female workers in our sample are relatively similar at the onset of the career, with an initial raw wage gap of only 5 log points. Contracted work hours are somewhat lower for women, who work, on average, 87% of a full-time equivalent job compared to 0.95 for male workers. Despite a relatively small gender wage gap, there are large gender disparities in the sector of employment. Around 48 percent of women start their careers in the public sector (county council, municipality) or government sectors, with the remaining 52 percent working in the private sector. For men, the corresponding numbers are 27 percent in the public sector and 74 percent start out in the private sector.[8]

In Table 2 we take a closer look at the attributes of the jobs and firms in which they reside of female and male workers at the onset of their careers. The results show that the establishments at which the typical female worker is employed is characterized by a lower average wage, lower wage dispersion, lower contracted work hours and a larger number of employees compared to the typical male's work-

[7] We define labor market entry as the first job after completing the highest attained level of education, that lasted at least four months, and yielded earnings exceeding three times the 10th percentile of the full wage distribution. See Appendix A for details.

[8] The sample sizes vary in Table 1 and Table 2 due to some variables being drawn from population-wide data, and others from the Wage Structure Statistics which includes the universe of public sector employees, but only around half of all private sector workers. Therefore, we apply sample weights to all statistics calculated for variables drawn from the wage register. The reported sample sizes are, however, the unweighted sample sizes.

place. The difference in the share of female employees at men's and women's workplaces is striking, with roughly 66 percent of a woman's co-workers being female compared to 36 percent for men. Thus, there is significant gender segregation across workplaces. Moreover, women's workplaces seem to exhibit a flatter organizational structure, as the share of employees with a managerial position is lower at the typical female's workplace. There is also a somewhat lower occupational diversity at the workplace of women, measured as the number of distinct occupational titles. However, there is no large difference in the skill composition across men's and women's workplaces.[9]

Previous evidence on gender wage differentials show that wages are rather similar for men and women at the onset of their labor market careers, but that they soon start to diverge (See e.g. Bertrand, Goldin and Katz, 2010; Goldin, 2014) and that the divergence in wages can, to a large extent, be attributed to childbearing (Angelov, Johansson and Lindahl, 2016). The descriptive evidence provided in Table 1 and Table 2 suggests that while male and female wages do not differ to a large extent at the onset of the career, the jobs of men and women and the firms they work for differ with respect to several important non-wage attributes. In the next section, we take a closer look at how wages and non-wage attributes of men and women workers transition over the career.

3 Wage & Non-Wage Attributes of Jobs by Gender & Parenthood

In this section we provide an empirical description of the relationship between wages and the attributes of the jobs and firms in which men and women work and parenthood status. We make no attempt to adjust these estimates for selective differences in labor market productivity or tastes; such adjustments are developed in section 4.

3.1 Career Outcome Differences by Gender and Parenthood

To illustrate how wages and other career outcomes evolve for male and female workers in Sweden, Table 3 compares the log wages, contracted work hours, annual labor income and occupational skill-content of men and women, before and after becoming parents. Panel A displays the means and differential for all women and all men, while Panels B and C repeat these estimates for non-parents (i.e., men and women before they become parents) and as parents, i.e., after they have had children. The

[9]The proportion medium skilled workers in Table 2 refers to the fraction of an establishment's workers with occupations requiring skill level 2 in Table A.2; the share low-skilled refers to the fraction workers with occupations on skill level 1; professionals refer to the share of workers requiring skill level 3; and the share managers refers to workers categorized as managers and senior officials.

gender differences in this table are unadjusted, i.e., they are simple differences in means; later in the paper, we present comparable estimates that make adjustments for observed and unobserved differences in workers' productivity and tastes.

With respect to log wages, the overall gender gap for our sample is 13%; as one would expect, it is lower for non-parents [10.09%] and higher for parents [15.78%]. There is also an overall gender gap in contracted work hours of 9%, again with the gap for non-parents being smaller [6.09%] and for parents being larger [13.56%]. With respect to annual labor income, which reflects both wage rates and actual hours worked, we find an unadjusted overall gender gap of 141,288 SEK which is a 38% gap relative to men's income. The gap in labor income also is smaller among non-parents [59,548.8 SEK or 18.1% of men's income] and much larger among parents [225,739.6 SEK or 53% of men's income], where this latter gap in income between mothers versus fathers reflects the fact that mothers take much more time off in the form of parental leave than do fathers. Finally, with respect to the occupational skill-content index described in the previous section, there is a gender gap for all men and women [0.0498], one that is slightly smaller among non-parents [0.0403] and larger among parents [0.0645], although all of these gaps, as a percentage of men in each group are relatively small.

3.2 Differences in Firm Attributes by Gender and Parenthood

The jobs of men and women differ with respect to several non-wage attributes already at the start of their careers (see Table 2). Some of this may be attributed to gender differentials in the choice of field of education. But how do women's and men's job choices, i.e., choices of the non-wage attributes, evolve over the life cycle? We estimate a simple difference-in-differences specification, regressing a set of firm attributes on an interaction term between being female and having at least one child, while controlling for age and calendar year effects. The resulting coefficients on this interaction term from each regression are presented in Table 4. The presence of children is negatively associated with women's co-workers' wages and the average contracted work hours of one's co-workers. Parenthood is also negatively associated with the share of managers at mothers' firms, the share of the workforce with professional occupations, and the within-firm wage dispersion. Moreover, the share of female co-workers, share of part-time workers, and the share of female co-workers with young children are positively related with parenthood for female workers. Finally, the firm growth rate and the firm value added per worker is also negatively associated with parenthood for women, suggesting that women may be more likely to move to lower productivity firms after becoming parents than male workers. Thus, any initial differences in

job attributes observed at men's and women's labor market entrance may be exacerbated after the onset of parenthood.

3.3 Transition to Parenthood & Career Outcomes

To explore how men's and women's wages and contracted work hours evolve with time since first birth, we employ an event-study approach in the spirit of Kleven, Landais and Søgaard (2016). We restrict attention to individuals who entered the labor market without children and gave birth to at least one child during the first ten years after labor market entry.[10] Let G_{ist} denote an outcome for individual i occurring in calendar year s when i is age $t, t \geq t_0$, where t_0 is the age of entry into the workforce. We want to examine how outcomes change before and after the birth of i's first birth. Using the notation developed in section 4, we let κ_i denote the age at first birth, or the beginning of childrearing, for individual i. Then, we construct a (unbalanced) panel of observations for individuals over ages $\kappa_i - 5, ..., \kappa_i + 10$ and estimate the following equation:[11]

$$G_{ist} = \eta_0 + \sum_{j=-5}^{10} \eta_{1j} \mathbb{1}\{t = \kappa + j\} + \sum_{k=1}^{K} \eta_{2k} t^k + \sum_{\ell=0}^{L} \eta_{3s} \mathbb{1}\{s = Year_0 + \ell\} + \nu_{ist}, \tag{1}$$

for $t = \kappa_i - 5, ..., \kappa_i + 10$, where $\mathbb{1}\{t = \kappa + j\}$ is the indicator function for the event, $t = \kappa + j$, the term, $\sum_{k=1}^{K} \eta_{2k} t^k$, is a polynomial function of i's current age, and $\mathbb{1}\{s = Year_0 + \ell\}$ is an indicator function for whether the current year, s is $Year_0 + \ell$, where $Year_0$ is the year in which the oldest cohort in the sample was age 15. Thus, the η_{mj}s, $m = 1, ..., 3$, in (1) measure the deviation of outcome G at age $t = \kappa_i + j, j = -4, ..., -2, -1, 0, 1, ..., 10$, relative to five years before the child is born, i.e., $t = \kappa_i - 5$.[12] We estimate (1) for female (F) and male ($1 - F$) workers separately on a range of different outcome variables. With respect to outcomes (G), we examine wage rates, contracted work hours, the skill-level of their occupation, and the yearly income earned from market work.

Since almost all women are on parental leave during the year of childbirth,[13] we have very few observations on the variables obtained from the wage structure register in the year of childbirth for

[10] Figure B.1 in Appendix B shows the distribution of the timing of first births, defined as the number of years elapsed between labor market entry and the first birth for the men and women in our sample.

[11] While we do not observe the full panel of observations over ages $\kappa_i - 5, ..., \kappa_i + 10$ for each individual in our sample, we are able to construct synthetic life cycles due to that the inflow of individuals to the labor market and into parenthood occurs at different calendar points in time for our sample.

[12] The coefficients are then divided by the predicted outcome conditional on age and calendar year in order to obtain percentage effects.

[13] All parents in Sweden are entitled to up to 480 days of government-mandated paid parental leave with job protection, and nearly all mothers take-up parental leave benefits.

women. Moreover, those that are present at the workplace in the year of the birth are likely to be a select group of mothers.[14] To avoid this source of selectivity, we impute missing information in the year of childbirth using the preceding year's values of the workplace attributes and own wages, conditional on being employed in the same workplace in the two adjacent years. We perform this imputation for women only, since very few fathers are absent from the workplace for child rearing reasons in the year of childbirth.

Figure 1 depicts the coefficients on the $\mathbb{1}\{t = \kappa + j\}$ variables in the specification of (1) for individuals' wage, contracted work hours (percent of full-time), yearly labor income, and occupational progression outcomes. There is no gender difference in the trend of average wage rates before the first child is born, but immediately after first birth women's wages fall behind males' wages (which do not change after having their first child). Nine years after the first child is born, women have approximately 12 percent lower wages compared to five years before they gave birth to their first child. Panel (B) shows the corresponding results for contracted work hours, and shows that women resort to part-time work after the first child is born, whereas no change is found for men. Finally, panel (D) shows that, before first birth, the average skill-level of men's and women's occupations are parallel, but start to diverge in the second year after birth, with women's skill progression falling behind men's to an increasingly larger extent over time. These findings are suggestive that childbearing has very different impacts on the careers of male and female workers, with an apparent "mommy-track" consistent with evidence from previous studies.

3.4 The Transition to Parenthood & Job Switching

Consider how the jobs and firms in which they are located change for women and men from their entry into the labor force through the onset of parenthood. We are interested in whether women are more likely to move to more family friendly firms around the onset of parenthood compared to male workers. We estimate the change in the likelihood of changing jobs with respect to time before first birth, where a job change is defined as changing employer. Figure 2 presents results from the estimation of the specification in (1), where the outcome variable measures whether an individual's job changes from one year to the next. For women, job-changing appears to be closely linked to the timing of parenthood. They are

[14] Recall that the Wage Structure Statistics only covers workers with at least one hour of work during the survey month, so that wage observations for individuals on e.g., parental leave are censored. However, the matched employer-employee data set includes all individuals with an employment, allowing us to identify the workplaces of those that are absent from work during the survey month of the Wage Structure Statistics.

significantly less likely to change jobs in the year of childbirth, but 20 percent more likely to change jobs in the year after first birth, compared to five years before first birth. Moreover, the change in the probability of job-switching is higher for women post-birth compared to men. Thus, consistent with the descriptive evidence provided on the rate of job mobility over the career, women appear to be slightly more mobile than men, and women's job mobility is linked to the timing of parenthood.

4 Modeling Preferences for Jobs & Firms & Willingness to Pay for Family Friendly Firms

The descriptive analyses presented in section 3 suggest that the entry into parenthood results in differences in the attributes of jobs and workplaces, or firms, that men and women hold. In this section, we estimate marginal willingness to pay (MWP) for the attributes of jobs/firms, allowing them to differ by gender and parenthood status and use them to build an index of the family friendliness of jobs and firms using the preferences obtained for mothers. To identify these measures of preferences, we formulate a model in which the job and firm choices of mothers and fathers and non-parent women and men reveal their preferences and MWP for the attributes of chosen jobs and firms. Our model acknowledges the heterogeneity in individuals' work productivity and tastes and allow both to differ by gender and parenthood. Such heterogeneity gives rise to the potential of selection and endogeneity bias in the estimation of these preferences and how they differ by parenthood status and gender. We show that under a plausible set of assumptions about job changes among parents and non-parents, respectively, we can use a fixed-effect logit model of job changes to identify the MWP of wage and non-wage attributes of jobs and firms.

We then characterize a measure of the "family friendliness" of all Swedish firms and jobs, using the resulting estimates obtained for mothers and the average of their attributes of firms to develop our index of family friendliness. To provide an initial assessment of the the plausibility of our approach to measuring firm family friendliness, we examine its association with gender gaps in wages, contracted hours of work, labor market earnings, and on the skill-content of jobs over one's career. We postpone to section 5 the discussion of how to identify more causal impacts of working in family friendly jobs and firms and how they differ by parenthood and gender.

4.1 The Choice of Jobs & Firms and Timing of Parenthood

In this section we layout a model of the decisions about when individuals choose their jobs and firms at different points over their lives. Because these job choices may differ depending on whether or not they are a parent, we also take account of their choices to begin parenthood or, more accurately, begin *trying to become a parent*. Our model starts at age t_0, the age at which an individual completes their education and enters the labor market. At each subsequent age, t, individual i chooses two things: (a) whether to begin parenthood; and (b) whether to change jobs. We characterize the definitions and assumptions for each of these decisions, after which we characterize their respective decision-rules.

4.1.1 Parenthood & Childbearing

Individual i in our model makes decisions about jobs and the firms they work in and parenthood. We index the gender of individual i with the indicator g_i, where $g_i = 1$ is a *female*, so that $1 - g_i = 1$ denotes a *male*. For now, we suppress the gender index to simplify notation, although we reintroduce it in the discussion of estimation below.

Let p_{it} denote the indicator of individual i being in the *state of parenthood* at age t. We define the state of parenthood ($p_{it} = 1$) as the ages at which an individual is either *trying to have their first birth* or *has succeeded* in doing so.[15] The choice of entering parenthood is an irrevocable decision. That is, once $p_{it} = 1$, $p_{i,t+s} = 1$ for $s = 1, 2, ..., T - t$, where T is the age of death. Thus, it follows that couples in the state of parenthood keep trying to have children until they succeed and the state of parenthood continues for the rest of their lives. Let τ denote the *age of the onset of parenthood*. That is, τ is the age such that $p_{i,\tau-k} = 0, k = 1, 2, ..., \tau$, and $p_{i,\tau+k'} = 1, k' = 0, 1, 2, ..., T - \tau$.

Once an individual decides to become a parent ($p_{it} = 1$), she begins trying to become pregnant and have a birth. Let $c_{it'}$ denote the indicator for being in the *state of having children* at age t. Similar to the state of parenthood, we define the state of having children ($c_{it} = 1$) as the ages from the *occurrence of i's first birth* to death, since we assume having children is a state that lasts the rest of one's life. Let κ denote the age at which i first has children, or i's *age at first birth*. It follows that $c_{i,\kappa-\ell} = 0, \ell = 1, 2, ..., \kappa$, and $c_{i,\kappa+\ell} = 1, \ell' = 0, 1, 2, ..., T - \kappa$.

It is important to note that our definition of the state of parenthood ($p_{it} = 1$) that includes not only the time since the arrival of one's first child ($c_{it'}, t' > t$) but also the preceding period of trying to conceive the first birth is not only non-standard but may be difficult to define operationally. But, we use it to

[15] Trying to have children can be characterized as couples no longer using contraception during sexual intercourse.

acknowledge that the actions young adults take, including changing one's job, may be the result of parenthood plans, even though one's first child only arrives later.

While individuals can choose when they start trying to be a parent, they cannot choose the exact date when they actually become one. In particular, while births can be avoided, i.e., contraception is assumed to be perfect, births are stochastic events, occurring at random after women start trying to become pregnant. Consider an individual at age t. Births occur probabilistically. Let $e, e \in (0,1)$, denote the probability that a pregnancy occurs at the end of period t. It follows that the probabilities for individual i to become pregnant and have their first birth, conditional on being and not being a parent as defined above is given by:

$$\begin{aligned} Prob(c_{it} = 1 \mid p_{it} = 0) &= 0, \\ Prob(c_{it} = 1 \mid p_{it} = 1) &= e. \end{aligned} \tag{2}$$

It follows that the probability that a parent who is trying to have their first birth will wait exactly k years before succeeding is given by:

$$Prob(c_{i,t+k} = 1 \mid p_{it} = ... = p_{i,t-k} = 1 \;\&\; c_{i,t+1} = 0 = ... = c_{i,t+k-1} = 0) = (1-e)^{k-1}e, \tag{3}$$

and that the difference between κ and τ, is a random interval governed by a stochastic birth process discussed above.[16]

Finally, while the actual occurrence of the first and subsequent births may affect parents' choices about jobs and firms over the remainder of their life cycles, we limit our modeling to the choice of entering parenthood and to how job and firm choices differ before and after entering it. We make this assumption given our focus on the differential consequences of parenthood for gender differences in work-related outcomes. But, as we discuss below, we maintain this assumption to simplify the modeling of how work and childbearing interact.

4.1.2 Jobs & Firms and Changing Them

Jobs are defined as positions located in *firms* that individuals occupy. The terms of a job that individual i holds, or may seek, at age t is completely characterized by the pair, $(w_{ift}, \mathbf{z}_{ift})$, where w_{ift} denotes the wage that i receives at age t from a job that is located at firm f and $\mathbf{z}_{ift}$ denotes the vector of non-wage

[16] We assume that all subsequent births after the first are governed by the same birth process defined in (2) and (3).

attributes of that job and firm. Note that the non-wage attributes of a job include characteristics that are specific to the person holding that job, such as the occupational category of the job, e.g., professional, technician, etc. But these attributes also may be specific to the firm f and its work environment, such as the sector in which the firm is located (e.g., private or public), the firm size or the gender composition of the firm's workforce. It follows that when we refer to a worker *changing jobs* below, this could refer to any of the following forms of change: (i) a worker changes the firm in which she works; (ii) she changes the tasks she does, i.e., her occupational title, either in the same firm or a new one; or (iii) that the firm/workplace in which the worker's job was located changed, e.g., it increased its size, it grew faster, or its share of workers with children changed.

We make the following assumptions about the processes that govern jobs and job changes over the life cycle in our model:

Assumption 1. *Individuals are always employed, i.e., there are no states of unemployment or not-in-the-labor-force. At every age t, individuals have some job, $(w_{ift}, \mathbf{z}_{ift})$, that is located at some firm f, even if they work zero hours in that particular period.*

Assumption 2. *There are no involuntary job changes, i.e., there are no layoffs or firings. Individuals can always choose to remain in their job from the previous period, $(w_{t-1,f}, \mathbf{z}_{t-1,f})$.*

Assumption 3. *In each period, individuals can choose to enter a **job lottery** to obtain a new job.*[17] *The cost of entering the lottery, denoted in units of utility, is r.*[18] *The lottery will produce a new job, $(w_{if't}, \mathbf{z}_{if't})$, that is drawn from a distribution of jobs, $F_t(w_{f'}, \mathbf{z}_{f'})$, which is known to agents. Individuals must decide to enter the lottery before seeing the actual draw and they must accept this new offer, regardless of whether it is dominated, ex post, by the terms of one's $t-1$ job, $(w_{if,t-1}, \mathbf{z}_{if,t-1})$.*

Assumptions 1 and 2 restrict the labor force movements of individuals to job-to-job transitions. While individuals in Sweden do experience spells of unemployment and being out of the labor force, most of the labor force movements that follow their post-education labor market entry are transitions between jobs. This is due, in part, to two key features of Sweden's parental leave program. First, the benefits received when someone take parental leave is a function of one's wage and employment history, creating

[17] Lotteries have been used as a mechanism in bargaining models of labor markets with on-the-job search to "convexify" the payoff space, where the lotteries are over wage offers (Shimer, 2006; Bonilla and Burdett, 2010). Employment lotteries are used in macro models of labor markets to deal with the indivisibility of labor supplied when all agents are homogeneous (Hansen, 1985; Rogerson, 1988; Ljungqvist, 2002). As explained below, our use of job lotteries is to allow for job-to-job turnover that is consistent with institutional features of the Swedish labor market and social welfare system noted below.

[18] At age t_0, we assume that everyone's first job, and its attributes, is generated by such a lottery.

a strong incentive to establish such a history before beginning parenthood and taking a parental leave. Second, when parents do take parental leave they remain an employee of the firm they left – albeit recorded as working zero hours – since, by law, they can return to the firm and their position at the end of their leave. Thus, most of the action in job turnover in Sweden around the onset of parenthood is concerned with changing jobs within a firm and/or between firms.

Assumption 3 provides for a mechanism for individuals to change jobs and allows us to account for job turnover and the properties of job turnover found in our data and data from other countries and contexts in a theoretically manageable way. In particular, this specification can produce job-to-job and firm-to-firm turnover that we saw in section 3 and can produce the finding that some workers change to jobs that have lower wages and/or less desirable job amenities relative to one's previous job, a phenomena found in job turnover data. And, while of a limited form, job lotteries do introduce a certain type of *friction* in the labor market activities of workers in that they cannot costlessly change jobs and cannot ensure that all transitions are utility improving, since the job attributes associated with a job change are generated stochastically.

A key feature of Assumption 3 is how workers form expectations about the jobs that this job lottery is expected to produce. Let $\big(E_{it}(w), E_{it}(\mathbf{z})\big)$ denote individual i's expectation at age t of the wage and non-wage amenities of the job that the lottery would produce. In particular, individuals are likely to use knowledge about themselves, such as their education, knowledge of local labor market conditions, etc. that affect their forecasts of the wages and non-wage attributes of jobs that would be generated if they engaged in a job lottery. Anticipating the estimation strategy we adopt below, we allow for individual differences in these expectations but, to simplify things, assume that these are temporally stationary, so that $F_t(w_{f'}, \mathbf{z}_{f'}) = F(w_{f'}, \mathbf{z}_{f'})$, so that $\big(E_{it}(w), E_{it}(\mathbf{z})\big) = \big(E_i(w), E_i(\mathbf{z})\big)$.

4.1.3 Preferences & Productivities

We assume that individuals make their parenthood and job choices so as to maximize expected utility. Furthermore, as noted above, we simplify the ways in which job and firm choices and childbearing interact over the life cycle in the way characterize individuals' per period preference functions.

Assumption 4. *Individuals' per period utility functions depend on the characteristics of the job and firm in which one works at age t, $(w_{ift}, \mathbf{z}_{ift})$; age-invariant preferences and productivities, ϕ_i; and transitory preference shocks,*

ζ_{it}. *More precisely, we assume that per-period payoffs take the form:*

$$U^p(w_{ift}, \mathbf{z}_{ift}, \phi_i, \zeta_{it}^p) \equiv \phi_i + \theta_0^p + \theta_1^p w_{ift} + \boldsymbol{\theta}_2^{p\prime} \mathbf{z}_{ift} + \zeta_{it}^p, \tag{4}$$

where the preferences for non-parenthood ($p = 0$) apply at ages where $p_{it} = 0$ and those for parenthood ($p = 1$) apply to all ages after τ where $p_{it} = 1$.

The specification in (4) allows the returns to utility of wages and job attributes, θ_1^p and $\boldsymbol{\theta}_2^p$, respectively, and idiosyncratic shocks to preferences, ζ_{it}, to differ by parenthood status ($p = 1$),[19] but, for now, assume that ϕ_i measure unmeasured (and measured) age-invariant individual-specific characteristics that influence one's utility payoffs.[20] Finally, the marginal utilities of wages and job attributes/amenities for working in job/firm f, θ_1^p and $\boldsymbol{\theta}_2^p$, respectively, can be used to define the following measures of the *marginal willingness to pay* (MWP) out of wages for attribute k of a job/workplace of parents and non-parents:

$$\boldsymbol{\theta}_{2k}^p / \theta_1^p, p = 0, 1, \tag{5}$$

We make the following assumption concerning the intertemporal properties of the transitory taste shocks, ζ_{it}^m:

Assumption 5. *The transitory component of utility, ζ_{it}^m is independently and identically distributed over time.*

Assumption 5 implies that there is no serial correlation in the payoffs to jobs and/or preference shocks, conditional on the person-specific fixed effects, ϕ_i.

4.1.4 Decision Rule for Job Changes

Consider first the decision rule for whether an individual changes jobs. Given Assumptions 1 - 5 and being in state $p, p = 0$ (non-parenthood) ad $p = 1$ (parenthood) individuals make a decision as to whether to change their job or remain in their incumbent job by comparing the utility of their incumbent job, $U_{if,t-1}^p \equiv U^p(w_{if,t-1}, \mathbf{z}_{if,t-1}, \phi_i)$, with the utility associated with the job they expect to realize from

[19] We allow these returns to change before the actual occurrence of a birth ($c_{it} = 1$) in order to capture responses in anticipation of first births.

[20] In principle, we can allow ϕ_i to vary with parenthood status, p_{it}. In the empirical analysis discussed below, we discuss the consequences of relaxing this invariance assumption on ϕ_i.

entering the job lottery,

$$\begin{aligned} EU_{it}^{p} &\equiv U^{p}\left(E_i(w), E_i(\mathbf{z}), \phi_i, \zeta_{it}^{p}\right) \\ &= \phi_i + \theta_0^{p} + \theta_1^{p} E_i(w) + \boldsymbol{\theta}_2^{p\prime} E_i(\mathbf{z}), \end{aligned}$$

given that $E_i(\zeta_{it}^{m}) = 0$. Let ΔJ_{it} denotes the indicator for ***whether individual*** i ***changes jobs at age*** t. It follows that $\Delta J_{it} = 0$, if and only if:

$$U_{if,t-1}^{p} \geq EU_{it}^{p} - r^{p}, \tag{6}$$

where we allow for the possibility that the costs of entering the job lottery, r, vary by parenthood status, m. Alternatively, $\Delta J_{it} = 1$, if and only if:

$$U_{if,t-1}^{p} < EU_{it}^{p} - r^{p}, \tag{7}$$

and i enters the job lottery and, in period t realizes the new job, $(w_{ift}, \mathbf{z}_{ift}) = (w_{if't}, \mathbf{z}_{if't}) \neq (w_{if,t-1}, \mathbf{z}_{if,t-1})$.

4.1.5 Decision to Enter Parenthood

In Appendix C, we characterize the decision-rule for choosing to *enter the state of parenthood at age* t, where $p_{i,k} = 0$ for $k = t_0, ..., t-1$. There, we establish the latter rule in terms of the per-period payoff function in (4) and its parameters. Thus, in principle, one use the latter rules in conjunction with those for the within-parenthood job change decision rule in (7) to characterize those job changes that coincide with the entry into parenthood. (Recall from Figure 2 that many job changes, especially for women, coincide with first births.) However, as we argue in Appendix C, the decision rule for the timing of first births are highly non-linear in the parameters of $U^{p}(w_{ift}, \mathbf{z}_{ift}, \phi_i, \zeta_{it}^{p})$ in (4), which greatly complicates their estimation. Accordingly, in the next section, restrict ourselves to data on within-parenthood job changes to identify these parameters.

4.2 Estimating Marginal Utility of the Wage & Non-Wage Attributes of Jobs & Firms

Maintaining Assumptions 1 – 5 and making two additional ones, we characterize the identification and a strategy for estimating the MWP parameters for parents, i.e., θ_1^{p} and $\boldsymbol{\theta}_2^{p}$. (Below, we consider the estimation of the MWP parameters for individuals *before* they enter parenthood.) Intuitively, we want to examine parents' decisions to change jobs, i.e., changes in $(w_{ift}, \mathbf{z}_{ift})$, since such changes induce observ-

able variation in w and $\mathbf{z}$ given our assumptions. Furthermore, treating the ϕ_is, as parent-specific fixed effects, we can hold constant the individual's permanent intrinsic productivity, workers' occupations and other factors, such as tastes, allowing the factors captured by ϕ_i to differ by parenthood status, i.e., ϕ_i^0 need not equal ϕ_i^1 for individual i. Furthermore, to avoid any confounding of behaviors of parents with and without children, we ideally want to focus on job changes occurring in the interval (τ, κ). We proceed to formalize this intuition.

As discussed in section 2, we use data for men and women all of which are observed to have become parents by 2008. Thus, the estimators we develop in this section and for the estimation of hedonic outcome equations described in section 5 below, are all conditional on the entry into parenthood.

Consider the choice of individual i to change jobs at age t between the onset of parenthood and childbearing, i.e., $t \in (\tau, \kappa)$. The condition for a change in job at t in (7) using the utility specification in (4) can be written as:

$\Delta J_{it} = 1, t \in (\tau, \kappa)$, if and only if:

$$\begin{aligned} U^p\left(E_i(w), E_i(\mathbf{z}), \phi_i\right) - U^p\left(w_{if,t-1}, \mathbf{z}_{if,t-1}, \phi_i, \zeta_{it}^p\right) &= \theta_0^p + \theta_1^p\left[E_i(w) - w_{if,t-1}\right] \\ &\quad + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{if,t-1}\right] + \zeta_{it}^p > 0, \end{aligned} \tag{8}$$

where $\theta_0^p = r^p$ and $(w_{if,t-1}, \mathbf{z}_{if,t-1})$ characterizes the terms of the incumbent job from age $t-1$. As a result of condition (8), parent i age t enters the lottery and obtains a job, $(w_{if't}, \mathbf{z}_{if't})$ in firm f'[21] and they are employed in that job at age t. In contrast, if condition (8) holds, parent i continues to work in their $t-1$ job, $(w_{if,t-1}, \mathbf{z}_{if,t-1})$.

To proceed, we also invoke a distributional assumption for the transitory taste shocks:

Assumption 6. *The transitory shocks, ζ_{it}^m, are assumed to have a type 1 extreme value distribution.*

Given Assumption 6, it follows that the probability of parent i working in job $(w_{if,t-1}, \mathbf{z}_{if,t-1})$ will change jobs at age t is:

$$Pr\Big(\Delta J_{it} = 1 \;\Big|\; (w_{if,t-1}, \mathbf{z}_{if,t-1}), p_{it} = 1\Big) = \frac{\exp\left[\theta_0^p + \theta_1^p\left[E_i(w) - w_{if,t-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{if,t-1}\right]\right]}{1 + \exp\left[\theta_0^p + \theta_1^p\left[E_i(w) - w_{if,t-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{if,t-1}\right]\right]} \tag{9}$$

[21] We allow for the possibility that the new job is actually in the same firm parent i was in at age $t-1$, in which case $f = f'$.

while the probability that she will remain in this job at age t is:

$$Pr\Big(\Delta J_{it} = 0 \;\Big|\; (w_{if,t-1}, \mathbf{z}_{if,t-1}), p_{it} = 1\Big) = \frac{1}{1 + \exp\Big[\theta_0^p + \theta_1^p\big[E_i(w) - w_{if,t-1}\big] + \boldsymbol{\theta}_2^{p\prime}\big[E_i(\mathbf{z}) - \mathbf{z}_{if,t-1}\big]\Big]} \tag{10}$$

While the term capturing individual differences in age-invariant productivity and tastes, ϕ_i, is differenced out of (8) and, thus, does not enter the expressions (9) and (10) for the job-change and no-change probabilities, respectively, it still is the case that these probabilities depend on the expected utility from terms of job offer, $\theta_1^p E_i(w) + \boldsymbol{\theta}_2^{p\prime} E(_i\mathbf{z})$, which varies across individuals and, for our purposes, is unobserved by the econometrician. To proceed, we treat the term,

$$\psi_i^p \equiv \theta_0^p + \theta_1^p E_i(w) + \boldsymbol{\theta}_2^{p\prime} E_i(\mathbf{z}), \tag{11}$$

that enters the decision rule (8) as an individual-specific fixed effect for the purposes of estimation.

Given Assumption 6 and the ψ_i^p in (11) and conditional on parenthood status, $p = 0$ for non-parents and $p = 1$ for parents, our model of job changes has a fixed-effects logit specification. It can be estimated using the conditional fixed effects estimation strategy of Chamberlain (1980),[22] where one can avoid having to estimate ψ_i^p, $i = 1, ..., N$, as incidental parameters by conditioning probabilities for an "appropriate" set of job change events on an "appropriate" dimension of an individual's sequence of events. In this case, the appropriate set of job change events are "pairs" of job change events for individual i for ages t and $t+1$, $t, t+1 \in (\tau, \kappa)$ and the appropriate dimension of the sequence of job events is when the first event of this pair of job change events is, a job change, i.e., $\Delta J_{it} = 1$. Conditioning job change events for t and $t+1$ that begin with a change of jobs "works" because the non-stochastic payoffs, $\theta_1^p w_{if,t-1}$ and $\boldsymbol{\theta}_2^{p\prime}\mathbf{z}_{if,t-1}$, vary across the two time periods for these two sequences of job events; in contrast, they do not for the pairs of job events, $(\Delta J_{it} = 0, \Delta J_{i,t+1} = 0)$ and $(\Delta J_{it} = 0, \Delta J_{i,t+1} = 1)$. Thus, by conditioning ordered pairs of person-specific job change choice probabilities, $(\Delta J_{i,t'}, \Delta J_{i,t'+1})$, for all $t' \in (\tau, \kappa)$ on the event $\Delta J_{i,t'} = 1$ (and $p_{ij} = 1$), one obtains the following conditional choice probability for joint event $(\Delta J_{i,t'} = 1, \Delta J_{i,t'+1} = 0)$:

[22] See Greene (2012) for textbook treatment of this method.

$$
\begin{aligned}
Pr\Big(\Delta J_{it'} &= 1 \;\&\; \Delta J_{i,t'+1} = 0 \;\Big|\; \Delta J_{it'} = 1, p_{it'} = 1\Big) \\
&= \frac{\exp\left[\theta_0^p + \theta_1^p\left[E_i(w) - w_{if,t'-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{if,t'-1}\right]\right]}{\exp\left[\theta_0^p + \theta_1^p\left[E_i(w) - w_{if,t'-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{if,t'-1}\right]\right] + \exp\left[\theta_0^p + \theta_1^p\left[E_i(w) - w_{ift'}\right] + \boldsymbol{\theta}_2^{p\prime}\left[E_i(\mathbf{z}) - \mathbf{z}_{ift'}\right]\right]} \\
&= \frac{\exp\left[\psi_i^p - \theta_1^p w_{if,t'-1} - \boldsymbol{\theta}_2^{p\prime}\mathbf{z}_{if,t'-1}\right]}{\exp\left[\psi_i^p - \theta_1^p w_{if,t'-1} - \boldsymbol{\theta}_2^{p\prime}\mathbf{z}_{if,t'-1}\right] + \exp\left[\psi_i^p - \theta_1^p w_{ift'} - \boldsymbol{\theta}_2^{p\prime}\mathbf{z}_{ift'}\right]} \\
&= \frac{\exp\left[\theta_1^p\left[w_{ift'} - w_{if,t'-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[\mathbf{z}_{ift'} - \mathbf{z}_{if,t'-1}\right]\right]}{1 + \exp\left[\theta_1^p\left[w_{ift'} - w_{if,t'-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[\mathbf{z}_{ift'} - \mathbf{z}_{if,t'-1}\right]\right]},
\end{aligned}
\tag{12}
$$

where the third line of (12) substitutes ψ_i^p for the righthand side terms in (11) for the corresponding terms in the second line of (12) and the fourth line results from multiplying the numerator and denominator of the third line by the term: $\exp\left[-\psi_i^p + \theta_1^p w_{ift'} + \boldsymbol{\theta}_2^{p\prime}\mathbf{z}_{ift'}\right]$. It follows that the corresponding conditional probability for the joint event $(\Delta J_{it'} = 1, \Delta J_{i,t'+1} = 1)$ is:

$$
Pr\Big(\Delta J_{it'} = 1 \;\&\; \Delta J_{i,t'+1} = 1 \;\Big|\; \Delta J_{it'} = 1, p_{it'} = 1\Big) = \frac{1}{1 + \exp\left[\theta_1^p\left[w_{ift'} - w_{if,t'-1}\right] + \boldsymbol{\theta}_2^{p\prime}\left[\mathbf{z}_{ift'} - \mathbf{z}_{if,t'-1}\right]\right]}. \tag{13}
$$

Since neither of these probabilities depend on the person-specific fixed effects, ψ_i^p, estimation of the marginal utilities, θ_1^p and $\boldsymbol{\theta}_2^p$, proceeds by applying standard logit methods to the probabilities in (12) and (13). Denote the resulting conditional maximum likelihood estimators as $\widehat{\theta}_{1,CML}^p$ and $\widehat{\boldsymbol{\theta}}_{2,CML}^p$.

Unfortunately, we do not directly observe the onset of parenthood for women in our sample, i.e., we don't observe the age τ such that $p_{i,\tau-1} = 0$ and $p_{i\tau} = 1, t = 0, 1, ..., T - \tau$. All we observe is the age of the onset of childbearing, i.e., κ. To solve this problem, we make the following assumption about ages the interval (τ, κ).

Assumption 7. *The age $\kappa - k$, where k is a fixed lag length, falls in the interval (τ, κ) for all i.*

Assumption 7 allows us to make use of all of the above results by using $\tilde{\tau} = \kappa - k$ in place of τ and appropriately redefining the interval of parenting without the arrival of the first birth from (τ, κ) to $(\tilde{\tau}, \kappa)$. But, the key issue is what is the appropriate lag length, k. We explored different values for k, examining whether the pre-parenthood and immediate post-parenthood changes in jobs for men and women looked markedly different, i.e., produced different estimates of the parameters in 4. Based on this "informal" assessment strategy, we settled on using $k = 2$ as the lag length for defining $\tilde{\tau}$. We note

that we did not obtain substantially different results for a lag length of $k = 1$.

Finally, the same fixed-effects logit strategy can be applied to the job changes of women and men before they enter parenthood, i.e., during the period $(t_0, \tilde{\tau})$.

4.3 Estimates of MWP for Non-Wage Job & Firm Attributes

In Table 5 we present estimates of the marginal utility parameters, $\theta_1^{(g,p)}$ and $\boldsymbol{\theta}_2^{(g,p)}$, in the per period utility function in (4) for women *before* they enter parenthood [$(g,p) = (1,0)$ and $= (0,0)$] in columns (1) and (2), respectively, and for women and men *after* they enter parenthood [$(g,p) = (1,1)$ and $= (0,1)$] in columns (3) and (4), respectively. Looking across the estimated marginal utilities for wages and non-wage attributes of jobs, there appears to be substantial differences by gender and by parenthood status. For example, that the marginal utility of the (log) wage worker i received, is higher for non-parents than for parents and for women versus men, although the gender gap is larger among non-parents than parents. Given these differences in the estimated marginal utilities of wages, we focus on assessing the gender and parenthood status differences in the estimated MWPs of these attributes.

Using these parameter estimates and the formula in (5), we construct estimated MWPs for each of the non-wage attributes by gender and parenthood status. These estimates are displayed in Table 6, again separately for mothers and fathers and women and men who have not yet reached parenthood. In addition, we provide, in columns (5) – (8), gender differences in MWPs for non-parents and parents [columns (5) and (6)] and differences by parenthood status within genders [columns (7) and (8)]. Finally, at the bottom of each column in Table 6, we evaluate the implied "aggregate" MWP over all of the non-wage attributes of jobs and firms, evaluating these MWPs at the mean attributes, $\overline{\mathbf{z}}_f$, taken over all workers, female and male, in our sample.

Given our estimation strategy, these estimates net out differences in productivity between women and men and parents and non-parents. Furthermore, our fixed-effects estimation strategy nets out any of the differences in occupations by gender and parenthood that might bias how women and men and mothers and fathers value attributes of jobs and firms. Examining the MWP estimates in Table 6, it is clear that notable gender and parenthood differences in the valuation of jobs and firms remain. Looking at the the aggregate MWP, while women and men value jobs differently before they enter parenthood [-0.046 in column (5)], these gender differences in aggregate MWP are almost double in absolute value after entering parenthood [0.088 in column (6)]. These parenthood differences are even more pronounced within genders, with aggregate MWP differences of -0.158 between mothers and non-mothers [column

(7)] and -0.292 between fathers and non-fathers [column (8)].

Looking more closely at the MWP for particular attributes, we see that parents, regardless of gender, value firms that have a larger share of co-workers with young children and firms with less wage dispersion than do non-parents. At the same time, mothers relative to fathers value workplaces with a higher share of female workers, even as non-mothers value such workplaces less than non-fathers. Finally, it is interesting to note that mothers place a higher value in working in a larger firms (in terms of numbers of workers) than do fathers, while the valuation is just the opposite for women relative to men before entering parenthood.

Taken together, the estimates of the MWPs in Table 6 indicate that gender and parenthood both matter in what individuals value in jobs and their workplaces. Furthermore, as noted above, these differences are over and above any differences in preferences for jobs, and possibly workplaces, that are attributable to gender differences in preferences, as has been the focus of much of the earlier literature (Bertrand, Goldin and Katz, 2010; Goldin and Katz, 2011; Goldin, 2014; Goldin and Katz, 2016).

4.4 An Index of Family Friendliness of Firms

As noted above, we use the estimates, $\widehat{\theta}^{p}_{1,CML}$ and $\widehat{\boldsymbol{\theta}}^{p}_{2,CML}$, that were estimated with data on the job choices of mothers during the interval $(\tilde{\tau}, \kappa)$ to form the index of the family friendliness of firm f in year s, FF_{fs} as follows. First, for each worker k in firm f in year s, we calculate the following worker-specific index:

$$FF_{kfs} = \left[1 + \exp\left[\left(\frac{\widehat{\boldsymbol{\theta}}^{(1,1)}_{2,CML}}{\widehat{\theta}^{(1,1)}_{1,CML}}\right)' \mathbf{z}_{kfs}\right]\right]^{-1}, \tag{14}$$

which measures a transformation of the valuation worker k would place on the non-wage attributes of their job in firm f ($\mathbf{z}_{kfs}$), where the valuation is based on the willingness to pay that a mother $[(g,p) = (1,1)]$ has for these attributes. Then the family friendly index for the job/firm f in which a particular individual i in our analysis sample is working in year s,i,e., FF_{ifs}, is defined as the average of the FF_{kfs}s for *all* N_{fs} workers – women and men – working in firm f in year s:[23]

$$FF_{ifs} \equiv \frac{1}{N_{fs} - 1} \sum_{k \in (f,s) FF_{kfs}}. \tag{15}$$

[23]We have also created versions of $FFifs$ below where we sum the individual indices over all workers in each firm except for individual i:s index, and note that our results are not sensitive to the inclusion of i in forming the firm-level family friendliness index.

We use the MWPs estimates for mothers in Table 6 to construct the worker-specific FF_{ifs} in (14) – regardless of the gender of worker i – and, thus, to construct the FF_{fs}s for each firm f in year s. We do so for the following reason. While the dual earner family is now the most common family form in the OECD countries,[24] there is a great deal of evidence indicating that the responsibilities for childrearing, especially the time-intensive components, continue to not be shared equally by mothers and fathers. Women are both active in the labor market and perform the majority of household work, while men predominantly specialize in market work (Boye, 2008; Booth and Van Ours, 2009; Evertsson and Duvander, 2010; Tichenor, 1999). More effort in home production in general implies less time and effort is available to spend in market work. Time use studies in Sweden consistently show that time spent on market work is higher for men, but that total time worked (market and non-market work) is about the same for women as for men (Statistics Sweden, 2009). This result is well in line with time-use studies from the U.S., Germany, and the Netherlands (Burda, Hamermesh and Weil, 2008). It is also well established that an unequal gender division of household and market work emerges first when couples become parents (Van Der Lippe and Siegers, 1994; Sanchez and Thomson, 1997; Gauthier and Furstenberg, 2002; Gjerdingen and Center, 2005; Baxter, Hewitt and Haynes, 2008), and that fertility decreases women's labor supply.[25]

4.4.1 Characteristics of Firms across Distribution of FF

In Table 7, we examine characteristics of firms located at different places in the distribution family friendliness, FF_f. We divide firms into quartiles of the family friendliness index distribution and display the firm attributes for each quartile. In Panel A of Table 7 we display 4 of the characteristics of firms that were included in the index, while Panel B displays firm characteristics that were not included in the index.[26] We include this second set of characteristics to see if our FF index indeed manages to capture heterogeneity across firms in their non-wage attributes beyond those used in its construction.

Examining Table 7, one sees that the within-firm wage dispersion is almost monotonically decreasing with firm family friendliness. Moreover, family friendly firms appear to be more specialized, as the share

[24]The median employment rate for partnered mothers in the OECD was 66.5 percent in 200 (REF), and according to the U.S. Bureau of Labor Statistics (2011), the U.S. labor force participation of rate of mothers with children under the age of 18 was 71.3 percent in March 2010.

[25]See, for example, Angelov, Johansson and Lindahl (2016); Angrist and Evans (1998); Jacobsen, III and Rosenbloom (1999); Fitzenberger, Sommerfeld and Steffes (2013).

[26]The firm attributes included to estimate the parameters for the MWP of mothers, θ_1^p and $\boldsymbol{\theta}_2^p$ in (4), are not all the same as those listed in Table 7. This is because to construct the FF index, we include firm attributes for which we have full coverage due to being drawn from the population-wide data.

of co-workers with the same occupational title increases monotonically with the firm family friendliness index, and the number of occupational titles decreases monotonically. That is parents, especially mothers, may be more likely to work in firms in which multiple workers have the occupation and do the same or similar tasks. There are also differences with respect to the skill composition of the firms' employees: more family friendly firms are associated with a lower fraction of workers with highly skilled occupations, such as professionals and associate professionals and technicians, and significantly higher fraction of workers with medium-skilled jobs. The similarity of occupations and their skill content are consistent with family friendly firms having relatively compressed within-firm wage distributions. At the same time, this similarity of occupations suggest that there is less scope for climbing the career ladder – and, thus, for wage growth – within family friendly firms. Finally, more family friendly firms are more likely to be located in the private, rather than government or municipal, sectors.

4.4.2 Gender & Parenthood Differences in Distribution of Firms' Family Friendliness

Recall from Section 3.4 how various attributes of jobs were increasingly different by gender as women transitioned from not having children ($c_{it} = 0$) to having them ($c_{it} = 1$). In the remainder of this section, we re-examine these patterns using our index of the family friendliness (FF) of firms developed in Section 4.2.

We begin by examining how the family friendliness of firms of men and women change as each gender transitions into parenthood. To do so, we estimate a version of the event-study model in specification (1) with firm family friendliness index, FF, as the outcome variable. Specifically, we classify firms by whether their index is above the 50th or 75th percentile cut points. The results are presented in Figure 3 and show that there is a clear increase in the probability of working at a family friendly firm among women after they have their first child. This difference in the change between male and female workers is larger the higher is the threshold defining family friendliness, indicating that women move to the upper tail of the distribution.

To summarize, all of the evidence points to women transitioning to family friendly firms as they become mothers. Such firms may be more accommodating to workers with children, in terms of attributes that make market work more easily combined with family responsibilities. In Table 7, we found that firms in the upper part of the family friendliness distribution were characterized by a larger fraction of part-time workers, a lower wage dispersion, and a lower skilled and more specialized workforce.

4.4.3 Gender & Parenthood Differences in Career Outcomes by Family Friendliness of Firms

We now examine how wages, contracted work hours,[27] labor income, and the skill-content of workers' occupations vary by the percentile rank of the family friendliness index of the firm/job in which they were employed (FF) by gender and parenthood status. The results are presented in Figure 4 – Figure 7. For each of these outcomes, we examine how their averages and the gender gaps differ across the FF distribution. We make no adjustments for individual differences in workers that may characterize non-random sorting of workers across firms and jobs, postponing such adjustments to section 5.

For both all gender and parenthood groups, wage rate levels tend to increase over the bottom quartile of the FF distribution, then flatten out, although primarily for mothers and fathers, before declining across firms above the 50th percentile (Figure 4). Note that this finding that wage rates decline with the family friendless of firms, is consistent with a compensating differential in wages for working in more family friendly work environments, especially for parents. But this result also is consistent with sorting of workers across firms based on differences in their productivities, i.e., less productive workers entering parenthood earlier and working in more family friendly firms sooner than more productive workers. We address this issue in section 5.

For both parents and non-parents, the gender gap in wage rates appears to be largest between the 20th to 50th percentile of family friendliness, and lowest at the most family friendly firms. The gender wage gap is larger among parents than non-parents, but it decreases with the family friendliness of the firm. Finally, we find that there does not appear to be a "parenthood wage penalty" for either women or men, in that the graph of wage rates by FF distribution results in Panel (A) lie below those in Panel (B) for men and women, respectively. In fact, there seems to be a "parent wage premium." As we show in section 5, the higher levels of wage rates associated with parenthood are due, in large part, to the fact that individuals have also accumulated more work experience by the time they reach parenthood and more experienced workers tend to receive higher wages, all else equal.

In contrast to wage rates, there is a marked difference by gender, and somewhat by parenthood, in how contracted work hours varies across the FF distribution (Figure 5). In particular, among men, there is a increase in contracted hours over the bottom quartile of the FF distribution and virtually no change across the top three quartiles. In contrast, average contracted hours for non-parent females fluctuate around 0.95 through the 40th percentile of the FF distribution, then decline precipitously through the 75th percentile, then bounce around at the very top of the FF distribution. In contrast, contracted

[27] See the discussion of contracted work hours in section 2.

hours of work among mothers bounce around across the FF distribution, rising between the 25th and 50th percentiles, falling over the 50th and 75th percentiles, and then flattening out over the top quartile of the FF distribution. With respect to gender gaps, the contracted hours of non-parent men and women differ very little across the bottom quartile of the FF distribution. Men's contracted work hours are constant with respect to firm family friendliness, but women's contracted work hours appear to be decreasing across firms that are more family friendly. What's striking is that the difference between childless women's contracted hours and the contracted hours of mothers is greatest in the least family friendly firms. That is, mothers who are employed in the least family friendly firms work fewer hours compared to childless women in the same type of firms, while we see no difference in contracted hours between mothers and non-mothers in the most family friendly firms.

The pattern to the variation in average annual labor income across the FF distribution is qualitatively similar to that of wage rates for non-parent men and women and mothers and fathers, respectively (Figure 6). The same is true for the gender gaps in labor income by parenthood status, with the largest gender gaps among both parents and non-parents occurring between the 20th to 50th percentiles. At the same time, the "size" of the gender gap in labor income is considerably larger among parents than non-parents. Recall that an individual's labor income is the product of their hourly wage rates and the number of hours they *actually* work in a year, rather than their contracted hours of work. Thus, it appears that while non-parent women working in high FF firms have much lower levels of contracted work hours than non-parent men, it would appear that actual hours of work for non-parents working in these firms do not differ all that much between men and women. In contrast, the gap in actual hours of work between mothers and fathers is sizable, even at more family friendly firms.

Finally, the average occupational skill requirement of workers' jobs across the FF distribution is displayed in Figure 7 for non-parent women and men and mothers and fathers. (Recall that this measure of the skill requirement of an individual's occupation has a scale of 1 to 4, with 1 denoting occupations that require no formal training or experience and those with a value of 4 are professional occupations with formal requirements.) For both men and women, there is a clear negative relationship between the occupational skill content and firm family friendliness. Just as we could see for wages and contracted work hours, the gender difference in occupational skill content is highest in the second and third quartiles of the distribution, while there is virtually no gender difference in the tails. The patterns are relatively similar across parents and non-parents, but for workers with children, there is a flattening of the profile between the 20th and the 40th percentile of the family friendliness distribution.

5 Effects of Working in Family Friendly Firms & Jobs on Career Outcomes by Gender & Parenthood

The evidence that we have presented so far shows that women are more likely to work in firms characterized as family friendly after the onset of parenthood (Section 4.3). A similar, but much less pronounced, pattern is found for male workers after they become fathers. We now ask whether working in family friendly firms has a differential impact on wages, contracted hours of work, actual labor earnings and the skill-content of jobs of mothers and fathers and how these impacts compare with those prior to entry in enter parenthood.

The descriptive results displayed in Figures 4 – 7 (Section 4.4.2) indicated that most of the above labor market outcomes, especially for women and parents, were *lower*, on average, for those working in *more* family friendliness firms. (The exception was for contracted hours of work among non-parent men and fathers.) Recall that our index of the family friendliness of firms was derived from the revealed preferences of women for the firms in which they chose to work as they began parenthood. Thus, with the exception of contracted hours of work, the correlations displayed in these figures suggest that working in jobs and firms that mothers choose may *reduce* the labor market successes of parents (and non-parents), at least as measured by wages, labor income and the skill level of their jobs. Such findings for wages and labor income of parents are consistent with the theory of equalizing, or compensating, differences (Rosen, 1974, 1986) in which wages adjust to equalize the monetary and non-monetary amenities and disamenities of jobs across workers, where parents value working in firms that are conducive – i.e., more friendly – to family life.

But the empirical associations displayed in these figures may not represent unbiased (consistent) estimates of the true, or structural, returns of different types of individuals working in family friendly firms. Individual differences in workers' unmeasured (by the econometrician) productivities can directly influence one's labor market outcomes as well as lead to sorting across jobs or firms that produce negative associations between labor market outcomes and the attributes of firms that appear to make them more family friendly.

In the following section we outline an estimation strategy that accounts for such unobserved heterogeneity in worker productivities and preferences and discuss its theoretical foundations in the model of job choice developed in section 4.1. We then present our estimates and results from a set of robustness checks.

5.1 Estimating the returns to being in FF job/firm on labor market outcomes

To fix ideas, consider a simplified version of an index for working in a family friendly firm and its effect on the outcomes (e.g., wages, contracted work hours, labor income and skill-content) of women and men and parents vs non-parents. In particular, suppose that there are only two types of firms/jobs, family friendly ones and non-family-friendly ones. Accordingly, define:

$$FF_{it}^{*} = \begin{cases} 1, & \text{if individual } i \text{ works in a family friendly firm or job at age } t, \\ 0, & \text{otherwise.} \end{cases} \tag{16}$$

The arguments developed below can be readily extended to deal with estimating the returns to either a continuous index or a (multiple) categorical measure, such as quartiles of the FF distribution, of firm family friendliness. Let y_{it} denote individual i's outcome (e.g., wages, earnings, etc.) at age t, where, when appropriate, we further index these outcomes by (g, p) for the gender and parenthood status of individual i at age t, i.e., $y_{it}^{(g,p)}$.

Our interest is in estimating (identifying) the impact on y_{it} of being (randomly) assigned to work in a family-friendly firm ($FF_{it}^{*} = 1$) relative to working in a non-friendly one ($FF_{it}^{*} = 1$). We want to measure these impacts separately for parents ($p = 1$) and non-parents ($p = 0$) and by gender ($g = 1$ for women and $g = 0$ for men). To proceed, we define the factual and counterfactual outcomes, y_{1it} and y_{0it}, as the outcomes of being assigned to a family-friendly firm and a non-family firm, respectively. Then the gender- and parenthood status-specific (g, p) *impact of being assigned to a family friendly firm/job* (FF^{*}) on labor market outcomes is defined as:[28]

$$\varphi^{(g,p)} \equiv E\left(y_{1it}^{(g,p)} - y_{0it}^{(g,p)}\right), \tag{17}$$

In addition, we are interested in the *gender differential in the impacts of* FF on labor market outcomes for parenthood status. We define this impact of interest as:

$$\begin{aligned} \lambda^{p} &\equiv E\left([y_{1it}^{(1,p)} - y_{0it}^{(1,p)}] - [y_{1it}^{(0,p)} - y_{0it}^{(0,p)}]\right) \\ &= \varphi^{(1,p)} - \varphi^{(0,p)}, \end{aligned} \tag{18}$$

where our primary focus is on the gender differential for parents, i.e., for $p = 1$.

[28] We can allow $\varphi^{(g,p)}$ in (17) to vary with age, t, or a worker's potential work experience, i.e., $Exp \equiv t - t_0$.

But, as noted above, identifying the impacts defined in (17) and (18) is not straightforward. As developed in section 4, workers are likely to sort across jobs and firms and to time their entry into parenthood endogenously, based on their preferences and productivities, and these traits may, themselves, directly affect one's labor market outcomes. Furthermore, the latter traits are likely to be persistent over one's life cycle and not completely measured by observable worker traits. As a result, the estimation of $\psi^{(g,p)}$s is potentially subject to endogeneity and heterogeneity biases, which is a common concern when estimating hedonic wage returns to job amenities and disamenities (Hwang, Reed and Hubbard, 1992; Bonhomme and Jolivet, 2009).

In Section 4.1, we developed a model of job choices and the timing of parenthoood over the life cycle and used it to characterize a strategy for estimating individuals' preference parameters for job attributes (see Section 4.2). A key feature of that model and estimation strategy was capturing persistent sources of unobserved differences in individuals' preferences and productivities using person-specific fixed effects and allowing for differences in the utility returns to job/firm attributes by gender and parenthood status. This specification implied that controlling for person-specific fixed effects in an econometric model of job changes within gender and parenthood status groups identified the gender- and parenthood-specific MWP for wage and non-wage attributes of working in jobs and firms. We now adapt these features to structure a strategy for estimating the impacts in (17) and (18).

To fix ideas, consider the following gender-specific specification of the hedonic regression function for labor market outcome, y_{it}:

$$y_{it} = \alpha_i + \gamma_1^g c_{it} + \gamma_2^g FF_{it}^* + \gamma_3^g FF_{it}^* c_{it} + \varepsilon_{it}^g, \tag{19}$$

for each gender g, $g = 0, 1$, where α_i is an person-specific fixed effect and c_{it} is the indicator for whether person i has entered childbearing by age t.[29] Based on the regression specification in (19), our estimates of the impacts of FF on outcomes, separately by gender, and the differential gender impacts for parents

[29] In Section 4 we focused on distinguishing parenthood, as opposed to childbearing, status in modeling individuals' preferences over firm/job attributes. As we noted there, the primary difference between these two statuses is an initial period of parenthood when individuals decide they want to have children but have to wait for the (random) arrival of the birth. In this section, we focus on the status we can observe, i.e., the presence or absence of a child, in modeling labor market outcomes.

are given by:

$$\begin{aligned}\varphi^{(1,1)} &= \gamma_2^1 + \gamma_3^1, \\ \varphi^{(0,1)} &= \gamma_2^0 + \gamma_3^0, \\ \lambda^p &= \gamma_3^1 - \gamma_3^0.\end{aligned}$$

The specification in (19) that includes person-specific fixed effects, α_i, presumes the variation in workers changing jobs and/or firms or in changes in a workers' firm (e.g., it changes the occupational or skill composition of its work force) that generate changes in the value of FF_{it}^* over time is random vis-á-vis the other unobserved factors captured in ε_{it}. To simplify, suppose there we have data for a worker at two ages, $t-1$ and t. Then taking first-differences of (19) to net out α_i we obtain:

$$y_{it} - y_{i,t-1} = \gamma_1^g \left(c_{it} - c_{i,t-1}\right) + \gamma_2^g \left(FF_{it}^* - FF_{i,t-1}^*\right) + \gamma_3^g \left(FF_{it}^* c_{it} - F_{i,t-1}^* c_{i,t-1}\right) + \left(\varepsilon_{it}^g - \varepsilon_{i,t-1}^g\right), \tag{20}$$

for $g = 1$ for women and $= 0$ for men. Our model assumes that:

$$\begin{aligned}E\left[\left(\varepsilon_{it}^g - \varepsilon_{i,t-1}^g\right)\left(FF_{it}^* - FF_{i,t-1}^*\right)\right] &= 0, \\ E\left[\left(\varepsilon_{it}^g - \varepsilon_{i,t-1}^g\right)\left(FF_{it}^* c_{it} - F_{i,t-1}^* c_{i,t-1}\right)\right] &= 0,\end{aligned} \tag{21}$$

for $g = 1, 0$. The exogeneity conditions in (21) require that any changes in FF_{it}^* and c_{it} for individuals is not a response to innovations in the idiosyncratic components of y. For example, if y is an individuals' wage rate, (21) requires that any idiosyncratic changes in an individual's wages, such as a cut in one's wages, does not generate a worker's decision to change firms and, thus, result in a change in the family friendliness of their workplace. Similarly, (21) requires that such a wage change (cut) does not lead to a workers decision to have a child. Rather, our model assumes that the decisions to change jobs or have a birth at age t are driven by a combination of an individual's permanent factors that affect their preferences and productivities, as well as totally random factors that result from the stochastic process generating birth occurrences (see equation (2) in Section 4.1.1).

In subsection Appendix B, we provide some evidence to assess the reasonableness of the conditions in (21) that need to hold for identification strategy based on controlling for person-specific fixed effects. We return this discussion in subsection 5.3.

Finally, the empirical results presented below are based on a modified version of the specification in

(19), where we consolidate both genders in a single regression function, allow the effects of the family friendliness of one's job/firm to vary by the quartiles of the FF distribution of firms and control for individuals' cumulative work experience:[30]

$$\begin{aligned} y_{it} &= \alpha_i^{\dagger} + \delta_1 c_{it} + \delta_2 c_{it} \mathbb{1}\{g_i = 1\} + \sum_{k=2}^{4} \delta_{3+k-2} FF_{it}^k + \sum_{k=2}^{4} \delta_{6+k-2} FF_{it}^k \mathbb{1}\{g_i = 1\} + \sum_{k=2}^{4} \delta_{9+k-2} FF_{it}^k c_{it} \\ &\quad + \sum_{k=2}^{4} \delta_{12+k-2} FF_{it}^k c_{it} \mathbb{1}\{g_i = 1\} + \pi_1 Exper_{it} + \pi_2 Exper_{it}^2 + \varepsilon_{it}^{\dagger}, \end{aligned} \tag{22}$$

where FF_{it}^k is an indicator variable that denotes that person i works in a firm/job in the k^{th} quartile of the FF distribution, $k = 1, ..., 4$ at age t; $\mathbb{1}\{g_i = 1\}$ is an indicator for whether person i is a woman; and $Exper_{it}$ is the amount of work experience i has accumulated by age t. It follows that the impacts of being in a firm/job of family friendliness FF^k relative to the least family friendly firms/jobs in FF^1 for mothers and fathers and the gender differentials in these impacts among parents are given by:

$$\begin{aligned} \varphi_k^{(1,1)} &= \delta_{3+k-2} + \delta_{6+k-2} + \delta_{9+k-2} + \delta_{12+k-2} \text{ (mothers)}, \\ \varphi_k^{(0,1)} &= \delta_{3+k-2} + \delta_{9+k-2} \text{ (fathers)}, \qquad (23) \\ \lambda_k^1 &= \delta_{6+k-2} + \delta_{12+k-2}, \text{ for } k = 2, ..., 4, \qquad (24) \end{aligned}$$

where $\varphi_k^{(g,p)}$ is the impact for gender j and parenthood status p of being assigned to a firm/job in FF quartile k relative to being assigned to quartile $k = 1$ and λ_k^p is the differential gender impact of being in quartile k relative to quartile 1.

5.2 Estimates

In this section we present the results of the estimation of selection-adjusted effects of FF on the monthly wage rates, contracted working hours, annual labor income, and the occupational skill content for mothers and fathers. We measure the extent of family friendliness of an individual i's job with indicator variables for the firm's position in the FF distribution; FF_{itq} is an indicator for worker i employed at a firm in the qth quartile of the FF distribution at age t. All estimations use firms in the lowest quartile as the baseline (reference group). We note that the index, FF_{it} and thus FF_{itq}, varies not only

[30] We have tested this model specification against one that allows for individual- *and* parenthood-specific fixed effects for each of these outcomes. We reject the more restrictive model for wage rates and labor income, and marginally reject it for contracted working hours and occupational skill content. The F-statistic for these tests are 0.97, 0.84, 1.17, and 1.35 for wages, labor income, contracted working hours, and occupational skill content, respectively. The results are available upon request.

across firms, but within firms over time. As a result, the variation in FF for a person i that identifies the treatment effects of working in more family friendly firms arises either by i switching firms, or by individual i:s firm changing with respect to its family friendliness.

In Table 8 we present the coefficient estimates for the hedonic regression specification in (22) for each of the four labor outcomes.

5.2.1 Impact of FF on Wages

Column (1) in Table 8 presents the coefficient estimates for individual-fixed effects model in (22) for monthly full-time equivalent wage rates. The coefficients of interest are those for the triple interaction terms between the FF quartile indicators, parenthood status indicator, and the female indicator, which are interpreted as the effect of working in a more family friendly firm (relative to firms in FF Q1) after entering parenthood, by gender. First, however – and consistent with our descriptive evidence – we note that parenthood has very different impacts on the wages of men and women, with an estimated motherhood penalty of 8.2 percent.

The coefficients on the triple interaction terms between FF, parenthood status, and gender, however, suggest that the parenthood gap in wages may be counteracted by job family friendliness: women gain by moving from FF Q1 to FF Q3 and Q4 after they become mothers relative to men after they become fathers. As the effect of moving from FF Q1 to Q2 is negative, the gains appear to be nonlinear with respect to family friendliness, which is consistent with the descriptive pattern given by Figure 4, which showed that the highest wage rates are observed in the 20th percentile of the FF distribution for both men and women, parents and non-parents.

In Table 9 we present estimates of the impacts of being assigned to firms/job in FF Q2, Q3, and Q4 relative to FF Q1 have on the wages of *mothers* and *fathers* separately, i.e., $\varphi_k^{(g,1)}, g = 1, 2$ for mothers and fathers, respectively, using the estimates obtained in column (1) of Table 8. Two interesting patterns emerge. First, in terms of wages, mothers always gain by moving up the FF distribution, with the largest gain observed between the lowest and the highest quartile of job family friendliness. Second, fathers also gain by moving from FF Q1 to Q2, while working in the upper tail of the FF distribution has *negative* effects on their wages. This suggests that job family friendliness – while in principal a gender neutral, but parenthood specific job attribute – primarily benefits women, likely because they are the main caretakers of children and thus the ones for which family friendliness will lower the burden of combining market work and family.

In summary, while parenthood exacerbates the gender wage gap, mothers do seem to mitigate this

increase by working in firms and jobs that are more family friendly. This latter finding is consistent with our finding in section 4.3 that mothers value the non-wage attributes of family friendly firms and jobs and that, as a result, sort to them. As we now have found, such sorting helps to reduce the "adverse" consequences of parenthood for women's wage rates as compared to those for men.

5.2.2 Impact of FF on Contracted Work Hours & Labor Income

We now turn to presentation of the estimated effects of working in more family friendly firms and jobs on the gender gap in contracted working hours and labor income. The descriptive evidence on the relationship between the percentile rank of the FF-index and contracted work hours (see section 4.4.3) suggested that the negative effects of parenthood on contracted work hours is more pronounced in less family friendly firms. To explore this conjecture, we estimate the treatment effect of the extent of firm family friendliness on the contracted work hours, denoted h_{it}.

But, as we have discussed earlier, contracted work hours do not give a complete picture of adjustments that individuals make to how much they work when they enter parenthood, since they do not reflect temporary time off from work due to parental leave or sickness absence, or temporary over-time work. That is, labor income is a function of the number of hours one *actually* works. Accordingly, we also estimate the effect of FF on annual labor income, denoted y_{it}. We note that changes in y_{it} reflect changes in both actual hours worked and one's wage rate, but large fluctuations in y_{it}, especially after one becomes a parent, are likely to reflect changes in hours of work more than in wage rates. Thus, examining the gender and parenthood gaps in labor income and how it is affected by working in jobs and firms of differing degrees of family friendliness provides a good proxy for how actual labor supply responds to these forces. In addition, from the viewpoint of individual welfare, it is interesting in itself to analyze how women's and men's total income from market work is affected by working in different types of firms.

Columns (2) and (3) of Table 8 show the results for contracted work hours and labor income, respectively. For work hours, the results show that women work more intensively in more family friendly firms after entering parenthood relative to men after they become fathers. This is consistent with our previous descriptive evidence that average work hours are lower in more family friendly firms, and the working time reduction upon becoming a parent is more severe in the least family friendly jobs. For labor income, the results show a non-monotonic effect, with a negative effect of moving from FF Q1 to Q2, but positive effects of moving to the upper tail of the FF distribution for women after they become

mothers, relative to the corresponding difference for men. Nevertheless, the results are largely consistent with the effects on contracted working time in that both suggest that the labor supply reduction after entering parenthood is smaller in the more family friendly firms.

In Table 9 we note that annual contracted working hours are positively affected by working in more family friendly firms for both mothers and fathers, but by significantly more for mothers. Interestingly, however, mothers always gain in terms of total labor income by working in more family friendly firms, whereas fathers' income is significantly negatively affected by moving up the FF distribution. Thus, these results show that women, when they become parents, have reduced labor income gaps if they work in more family friendly firms when compared to fathers. As is true for the impact of working in family friendly firms and jobs on wages, women have an incentive to work in firms that ameliorate their income losses when they become mothers. And, as our findings for what mothers value in jobs made clear, women are likely to sort into these firms and jobs when they become mothers.

Taken together, these findings confirm the conjecture noted above that wage penalties to motherhood are lower in firms that are characterized as family friendly. The evidence presented in this section suggests that hours worked may be a key mechanism; mothers may be able to more easily maintain her pre-parenthood working hours in family friendly firms, while less family friendly jobs may be harder to combine with family responsibilities without working time reductions.

5.2.3 Impact of FF on Occupational Skill Upgrading

In section 4.4.3, we found that the skill requirement of one's occupation was negatively related with firm family friendliness. In Table 7, we also find that firms in the upper end of the family friendliness distribution were characterized by a specialized workforce, with fewer distinct occupational titles within the firm. Thus, while the cost of motherhood – in terms of wage penalties – may be lower in family friendly firms, there might be less scope for occupational upgrading.

To examine how career progression – in terms of occupational upgrading – differs between mothers and fathers working in more or less family friendly firms, we estimate the fixed-effects specifications with the occupational skill level, denoted by occ_{it}, as the outcome variable. The results are presented in column (4) of Table 8. There are several notable findings.

First, the treatment effect of a more family friendly firm on the occupational skill requirement is negative for women after they become mothers, relative to men after they become fathers. This is consistent with our descriptive evidence on the relationship between firm family friendliness and occupational skill

requirements. Second, looking at columns (7) and (8) of Table 9, we find that the negative effects of firm family friendliness on the career progression is of similar magnitude for mothers and fathers. To the extent that women (with children) disproportionately sort into more family friendly jobs, this may explain the overall gap in occupational skill progression over the career between men and women. However, as we have shown, there is no gender difference in the treatment effect of firm family friendliness on the occupational skill progression of mothers and fathers.

5.3 Robustness Checks

In this section, we present results from several checks on the robustness of our findings presented above on the effects of working in more family friendly firms on the labor market outcomes of mothers and fathers.

We begin by examining the extent to which the effects of working in family friendly firms are largely driven by the occupations, industries and/or sectors individuals work in, rather than the characteristics and nature of workplaces, *per se*. Even within firms, men and women may work in different occupations. This raises the question of whether some of the difference in the effect of firm family friendliness on the wages of male and female workers are due to differences in the distribution of occupations across gender, rather than gender differences the value of firm family friendliness *per se*. We investigate this issue by re-estimating the individual-specific fixed effects specifications in Table 8, but now including 29 dummy variables for occupation group (e.g. corporate managers, teaching professionals, office clerks).[31] The results are presented in Table B.1 and are very similar to our main findings, suggesting that occupational differences across the genders is not a key factor in explaining the gender differences in the effects of firm family friendliness.

We also examined the robustness of our results to the inclusion of controls for industry affiliation and sector classification (private, public, and governmental sector jobs). The results, displayed in Table B.2 are qualitatively and quantitatively similar to our main results.

5.3.1 Exogenous Job Mobility

The exogeneity conditions in (21) require that any changes in FF_{it}^{*} for individuals is not a response to innovations in the idiosyncratic components of the outcome variable. Here, we provide some evidence

[31] For this exercise, we cannot study the effects on occupational skill content because this measure is derived from the occupational title that workers hold.

to assess the reasonableness of the conditions in (21) that need to hold for an identification strategy based on controlling for person-specific fixed effects. The strategies that we use for assessing the plausibility of the exogeneity conditions after controlling for fixed effects are similar to those used in Card, Cardoso and Kline (2016). Specifically, we note that if workers' decisions to change jobs are driven by their permanent factors that affect their preferences or productivities, and not by responses to idiosyncratic changes in, say, their wage rates, the wage trends should be stable - and not exhibit e.g., dips or peaks - prior to changing jobs. Moreover, we expect no systematic difference in the wage trends prior to job changes between individuals switching between different firm types defined by FF. To assess the validity of the exogeneity condition, we thus study the wage trends in the three years prior to, and one year after a job switch, for individuals who switch from firms in the lowest quartile of the FF distribution to firms in the upper part of the distribution. Similarly, we look at the same trends of workers switching from firms in the uppermost quartile of the FF distribution to firms in the lower ends. We separate between job changes made before parenthood (non-parents), and the job changes that we observe during the first three years after individuals have given birth to their first child (parents). The results of this exercise are presented in Figure B.2 and Figure B.3 for non-parents and parents, respectively, in subsection Appendix B.

We make several notes based on these graphs. First, the wage trends prior to changing jobs are very stable for both genders and for all types of job-switchers, suggesting that individuals are not changing jobs as responses to idiosyncratic changes to the wage rate. Second, although there are differences in the wage levels between workers moving from FF Q1 to firms with a higher extent of family friendliness, and between those moving from the uppermost quartile of the FF index, the *trends* are very similar across all types of switchers, and across gender. Third, with few exceptions, the wage trends are roughly parallel not only within but also across parenthood status. Finally, we note that job changes - for most parenthood-gender-firm-type combinations – appear to be associated with wage increases, suggesting that workers make decisions about job changes based on comparative advantage. This poses no issues for the identification strategy that we use due to the triple differencing of such increases by gender- and parenthood statuses.

6 Firm Family Friendliness, Job Flexibility and Substitutability

Recent studies suggest that *job flexibility* may be a key determinant of differences in the occupational career choices of men and women, and of women with and without children (see e.g. Goldin, 2014, on the importance of temporal flexibility of jobs and the gender wage gap). Our paper analyzes the importance of the *family friendliness* of workplaces for women's and men's job mobility, as there is a wide set of additional attributes of jobs than the intensity and flexibility of hours of work that may be valued differently by men and women. Nevertheless, it is interesting to examine more closely what goes into our family friendliness index, in terms of flexibility and substitutability of jobs, as it might provide insights into the mechanisms by which the motherhood wage penalty may vary with our FF index.

To this end, we use a supplementary data set; the Swedish Living Conditions Survey (SILC/ULF), to study how job flexibility and the degree of substitutability varies with our index. The SILC survey is conducted annually and covers 11,000–13,000 nationally representative individuals per year. Respondents are asked about various issues concerning their health status, financial situation, housing arrangements, and the characteristics of their jobs. The survey is matched with individual register data on occupation and industrial classification. We extract four variables that measure different dimensions of job flexibility: the extent to which workers are free to decide (a) when to start and end their workday, (b) when during the day to take breaks, (c) when during the year that their vacations are scheduled, and (d) the physical location of work (e.g., the possibility to work from home). To obtain a measure of whether jobs are easily substitutable, we extract a separate set of variables from SILC that measure varying dimensions of job "autonomy;" they measure the extent to which the worker is free to (i) plan their own work, (ii) to structure their own work, (iii) to decide how to allocate hours across different tasks, and (iv) to decide the general direction of their work. Jobs that give workers more autonomy are arguably less substitutable, as they imply more discretion on the part of the worker in how the tasks should be structured and performed. We also extract an additional set of variables from SILC that describe the time pressure of jobs and whether the main hours of work for a job or firm are during the day, evenings/nights, or in shifts.

The SILC survey does not contain firm identifiers, and cannot be matched on an individual level to our main data set. Instead, we collapse these job characteristics by (2-digit) industry affiliation, which are then matched to our analysis data. The variation in job characteristics derived from SILC are thus at the industry level. Nevertheless, because our main data set covers firms in all sectors and industries, we

are able to analyze how firm family friendliness varies with the job characteristics in SILC.

Table B.3 in Appendix B shows how the job attributes from ULF described above varies with the family friendliness quartiles. Jobs in the upper end of the family friendliness distribution tend to be less stressful, are more likely to have irregular hours of work or shifts, and give workers less freedom to structure and plan their work.

To arrive at a summary measure of job flexibility and job autonomy, we construct indices of the two variables using principal components analysis.[32] Table 10 and Figure 8 show the average of these indices over the FF quartiles and over the entire distribution of the FF index, respectively. With respect to job autonomy, there is a stark negative relationship between the extent of job autonomy and the family friendliness of jobs for both women and men. Thus, jobs that score higher on the family friendliness index are arguably substitutable across workers to a higher extent than jobs in the lower tail of the family friendliness distribution. Interestingly, family friendly jobs do not seem to be equivalent to flexible jobs; our evidence suggest a non-monotonous relationship, with the most flexible jobs appearing between the 20th and the 40th percentiles of the FF distribution, i.e., in the same part of the distribution where wages were observed to be the highest. Hence, contrary to what might be expected, family friendliness does not necessarily entail job flexibility, but the latter may instead well be found in jobs that require intensive work schedules (at the workplace or from home) with tasks that are not easily transferable across co-workers, and in extension less easily combined with family responsibilities.

To further validate our FF index and describe what goes into a family friendly job, we return to the SILC database and construct the same indices of job flexibility and job autonomy, and tabulate these across occupational categories. The results are presented in Table B.6 and show that jobs that score highly on the job autonomy and job flexibility indices tend to be jobs with high skill requirements: Legislators, senior officials and managers, professionals, technicians etc., while jobs that require little or no formal training or experience, or jobs that are likely to be of a routine or manual nature - e.g., plant and machine operators and assemblers and elementary occupations - score lower on both job autonomy and job flexibility. These findings are well in line with our previous results showing that family friendly firms are characterized by predominantly private sector firms with a lower- to medium-skilled workforce.

Taken together, our results suggest that the most flexible jobs are not necessarily the most family friendly jobs. Rather, job flexibility seems to go hand-in-hand with the non-substitutability of jobs, which potentially increases what Goldin (2014) refers to as the non-linearity of wages with respect to

[32]The results used in this construction are found in Table B.4 and Table B.5 of Appendix B.

hours worked. Instead, our analysis identifies family friendly establishments as those in which hours worked are, on average, lower than in less family friendly jobs and, thus, where further reductions in the number of hours one works upon becoming a parent is less necessary. Moreover, family friendly firms also seem to entail working in jobs with a lower skill requirement, which also tends to increase the substitutability of such jobs. This implies that job flexibility alone may not be sufficient to close the gender wage gap. These findings are in line with those of Goldin and Katz (2016) with respect to the evolution of the pharmacist occupation. Goldin and Katz (2016) argue that the pharmacy occupation has increased in its extent of substitutability due to technological advancements, and thereby exhibits a low gender wage gap, little to no penalty to part-time work, and is now overall a family-friendly and gender egalitarian profession. Our evidence points to that the importance of substitutability of workers and its consequences for the gender gaps in early careers applies more than just to occupations, but also, it appears, to work places as well.

7 Conclusion

The last several decades have seen a closing of the gender gaps in labor force participation and in educational attainment. However, significant gender gaps in wages persist in all industrialized countries. Recent evidence suggest that the remaining gender wage gap can almost be fully accounted for by the adverse effects of children on the wages of women, who continue to take the main responsibility for child rearing. Along with the other Nordic countries, Sweden has long been at the forefront of introducing policies aimed at facilitating the combination of a career and family. To date, Sweden offers job protected parental leave with governmentally paid leave benefits to both mothers and fathers.

Despite these universal and gender neutral family policies, the gender wage gap in Sweden is pronounced and persistent. This suggests that new mothers who are trying to combine family responsibilities with market work face additional constraints than those addressed by family policies. This paper considers the role played by the nature of the workplace environment and of jobs in accounting for the divergence in the careers of women and men, with the onset of parenthood. To this end, we exploit a rich matched employer-employee, longitudinal data set from Sweden that includes a wide range of both worker- and firm wage and non-wage attributes.

We find that childbearing has very different impacts on the careers of male and female workers, with women falling behind men in terms of wages, working hours, labor income, and occupational

progression after the onset of parenthood. Women are as likely to switch firms as men over their career, but the *timing* of women's job mobility is closely linked to the timing of parenthood. To examine the roles for the workplace environment in affecting where parents work and in explaining the wage differences of men and women and of mothers and fathers, we index firms by their "family friendliness," where the latter is a function of a large set of firm-level characteristics that seem to differentially attract men and women based on their parenthood status.

We find that women disproportionately switch to more family friendly firms after first birth and that the wage penalty to motherhood is counteracted by firm family friendliness. Moreover, the gender wage gap is found to be least pronounced in the most family friendly firms. However, the lower penalty to childbearing for mothers comes at the expense of occupational progression, the rate of which is slower for both mothers and fathers in family friendly firms. This may be due to the fact that – as our data shows – family friendly firms exhibit a lower- to medium-skilled, and occupationally specialized workforce, lower within-firm wage dispersion, and have altogether less room for climbing the career ladder. These patterns in the attributes of family friendly jobs and firms suggest that it is relatively easy to substitute for workers in "family friendly" jobs, thereby reducing the potential losses incurred on employers of workers with family responsibilities. To corroborate this conjecture, we use data from a supplementary survey data set that measure the "autonomy" of jobs, which is arguably correlated with the degree of substitutability of jobs.

To examine more closely what it is about working in family friendly firms that mothers value, we also extract measures of job flexibility from the supplementary data set, including control over the hours when one can work and the periods when one can take time off. We find that there is a stark negative relationship between the extent of job autonomy and the family friendliness of jobs. Moreover, job flexibility is not increasing with the family friendliness of jobs. Flexibility seems instead to be found in jobs that require intensive working hours with tasks that are not easily transferable across co-workers, and in extension perceived by mothers to be less easily combined with family responsibilities.

Taken together, our analysis identifies family friendly establishments as those in which hours worked are lower than in less family friendly firms, where the skill content of jobs is lower, and where the extent of substitutability is lower. This implies that job flexibility alone may not be sufficient to close the gender wage gap, and – given the policy context in which our analysis is based – neither is access to paid parental leave with job protection.

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TABLE 1.
Workers' characteristics at *labor market entry* by gender

	Women (1)	Men (2)	Observations (3)
Log monthly wage	10.07	10.12	146,571
	(0.208)	(0.246)	
Contracted work hours, % of full-time	0.867	0.946	146,571
	(0.241)	(0.161)	
Occupational skill content	2.194	2.247	141,065
	(0.549)	(0.574)	
Annual labor income	185,524.4	209,964.6	328,812
	(89,283.4)	(117,499.5)	
Compulsory schooling	0.049	0.069	327,255
	(0.215)	(0.254)	
High school	0.354	0.396	327,255
	(0.478)	(0.489)	
College	0.597	0.535	327,255
	(0.490)	(0.499)	
Government sector	0.087	0.115	328,667
	(0.282)	(0.319)	
Municipal sector	0.397	0.142	328,667
	(0.489)	(0.349)	
Private sector	0.516	0.743	328,667
	(0.500)	(0.437)	
Foreign born	0.111	0.124	324,712
	(0.314)	(0.330)	
Age	24.04	24.57	328,812
	(3.818)	(4.371)	
Years btw graduation & 1st job	1.291	1.620	328,812
	(1.878)	(2.333)	
Number of individuals in full sample at entry	146,218	182,594	328,812

NOTE: The sample consists of individuals born 1957-1986, who entered their first employment in 1996-2007, and who had their first child after entering the labor market. The summary statistics are measured in the year of labor market entry for each individual. Wages and labor income are denominated in Swedish Kronor (SEK) and are deflated using 2013 consumer price index. The sample sizes vary due to some variables being drawn from population-wide data and some variables from the wage structure statistics, which includes the universe of public sector workers but only around half of all private sector workers. We therefore apply sample weights to the statistics calculated for variables from the wage register.

TABLE 2.
Firm Attributes for workers' *entry jobs* by gender

	Women (1)	Men (2)	Observations (3)
Log mean co-worker wages	10.24	10.32	146,525
	(0.225)	(0.237)	
Mean work hours, % of full-time	0.874	0.938	205,126
	(0.124)	(0.092)	
Share managers	0.043	0.063	141,064
	(0.067)	(0.100)	
Share professionals	0.206	0.207	141,054
	(0.265)	(0.288)	
Share technicians	0.174	0.181	141,056
	(0.210)	(0.229)	
Share medium skilled	0.484	0.475	141,044
	(0.343)	(0.364)	
Share low skilled	0.0728	0.0517	141,063
	(0.175)	(0.149)	
Share with same occupation	0.488	0.496	141,021
	(0.332)	(0.326)	
Number of occupational titles	11.84	12.20	328,812
	(10.51)	(10.39)	
Wage dispersion p90/p50	1.364	1.396	205,126
	(0.294)	(0.313)	
Wage dispersion p90/p10	1.671	1.737	205,126
	(0.486)	(0.529)	
Share part-time workers	0.395	0.301	146,525
	(0.286)	(0.311)	
Share female co-workers	0.663	0.361	328,812
	(0.233)	(0.249)	
Share females with young kids	0.152	0.084	328,812
	(0.095)	(0.077)	
Share compulsory schooling	0.165	0.186	327,803
	(0.141)	(0.151)	
Share high school	0.444	0.458	327,803
	(0.193)	(0.203)	
Share college	0.369	0.333	327,803
	(0.263)	(0.281)	
Share foreign born	0.133	0.126	324,712
	(0.150)	(0.153)	
Number of employees	726.4	628.5	328,812
	(1,941.0)	(1,685.4)	
Growth rate	0.143	0.173	306,563
	(0.555)	(0.556)	
Number of individuals in full sample at entry	146,218	182,594	328,812

NOTE: The sample consists of individuals born 1957-1986, who entered their first employment in 1996-2007, and who had their first child after entering the labor market. The summary statistics are measured in the year of labor market entry for each individual. Wages and labor income are deflated using 2013 consumer price index. The sample sizes vary due to some variables being drawn from population-wide data and some variables from the wage structure statistics, which includes the universe of public sector workers but only around half of all private sector workers. We therefore apply sample weights to the statistics calculated for variables from the wage register.

TABLE 3.
Gender & Parenthood Differences in Work Career Outcomes

	Women (1)	Men (2)	Difference (1) − (2)
A. All women & men			
Log monthly wage	10.29	10.42	-0.1301***
	(0.314)	(0.337)	[0.0006]
Contracted work hours, % of full-time	0.881	0.971	-0.0900***
	(0.214)	(0.118)	[0.0003]
Labor Income	230,108.8	371,397.2	-141,288.4***
	(161,178.3)	(251,167.0)	[250.6]
Occupational skill-content index	2.305	2.354	-0.0498***
	(0.579)	(0.622)	[0.0011]
B. Non-parents			
Log monthly wage	10.21	10.31	-0.1009***
	(0.252)	(0.303)	[0.0007]
Contracted work hours, % of full-time	0.907	0.968	-0.0609***
	(0.205)	(0.126)	[0.0004]
Labor Income	269,548.6	329,097.3	-59,548.8***
	(145,107.2)	(215,781.2)	[308.4]
Occupational skill-content index	2.261	2.301	-0.0403***
	(0.563)	(0.591)	[0.0014]
C. Parents			
Log monthly wage	10.40	10.56	-0.1578***
	(0.260)	(0.332)	[0.0009]
Contracted work hours, % of full-time	0.838	0.973	-0.1356***
	(0.217)	(0.109)	[0.0005]
Labor Income	200,157.8	425,897.4	-225,739.6***
	(174,134.9)	(289,617.1)	[460.0]
Occupational skill-content index	2.361	2.425	-0.0645***
	(0.594)	(0.655)	[0.0018]

NOTE: The sample consists of individuals born 1957-1986, who entered their first employment in 1996-2007, and who had their first child after entering the labor market. 655,480 observations are used in Panel A, and 467,893 observations are used in Panel B. Wages are deflated using 2013 consumer price index. Standard deviations in parentheses, and standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 4.
Differences in Firm Characteristics for Mothers:
Difference-in-differences estimates

Dependent variable:	Differential for Mothers (1)	Observations (2)
Log mean co-worker wages	-0.0101***	1,119,466
	(0.0008)	
Mean contracted work hours, % of full-time	-0.0070***	1,524,230
	(0.0003)	
Share managers	-0.0013***	1,099,553
	(0.0003)	
Share professionals	-0.0054***	1,099,540
	(0.0010)	
Share technicians	-0.0039***	1,099,546
	(0.0008)	
Share medium skilled	0.0184***	1,099,491
	(0.0012)	
Share low skilled	-0.0071***	1,099,566
	(0.0005)	
Share with same occupation	0.0193***	1,099,392
	(0.0012)	
Number of occupational titles	0.1830***	1,592,812
	(0.0322)	
Wage dispersion p90/p10	-0.0156***	1,524,230
	(0.0017)	
Share part-time workers	0.0291***	1,119,466
	(0.0009)	
Share female co-workers	0.0132***	2,394,781
	(0.0006)	
Share females with young kids	0.0065***	2,394,781
	(0.0002)	
Share compulsory schooling	0.0023***	2,392,378
	(0.0003)	
Share high school	-0.0003	2,392,378
	(0.0005)	
Share college	-0.0011	2,392,378
	(0.0006)	
Share foreign born	-0.0006	2,373,937
	(0.0004)	
Number of employees	25.500***	2,394,781
	(4.323)	
Firm growth rate	-0.0103***	2,257,439
	(0.0013)	
Value added per worker	-48.930***	822,430
	(5.260)	

NOTE: The table reports the coefficients on an interaction term between an indicator variable for *Female* and an indicator variable for being a *Parent*, in separate regressions using the variables listed in each row as dependent variables on gender and parenthood status, controlling for calendar year and age. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 5.
Fixed effects logit estimates of parameters of per period utility function in (4) by gender and parenthood status

	Non-Parents		Parents	
	Women (1)	Men (2)	Women (3)	Men (4)
Log wage	14.03***	12.82***	11.60***	10.74***
	(0.185)	(0.186)	(0.090)	(0.089)
Private sector	1.273***	0.653***	0.410***	0.407***
	(0.107)	(0.147)	(0.044)	(0.073)
Government sector	0.899***	0.650***	0.516***	0.391***
	(0.139)	(0.159)	(0.065)	(0.084)
Share female co-workers w. young kids	-2.436***	-2.555***	-0.470***	-0.537**
	(0.260)	(0.479)	(0.117)	(0.192)
Share female co-workers	1.279***	1.406***	0.268***	-0.378***
	(0.190)	(0.246)	(0.074)	(0.097)
Firm wage dispersion, p90/p10	0.539***	0.350***	0.051	-0.162***
	(0.066)	(0.071)	(0.028)	(0.029)
Firm growth rate	-0.347***	-0.252***	-0.141***	-0.161***
	(0.032)	(0.034)	(0.013)	(0.014)
Firm size (in 1,000s)	0.006	0.012	0.037***	0.006
	(0.019)	(0.025)	(0.011)	(0.014)
Share high school educated co-workers	2.864***	4.055***	1.827***	1.266***
	(0.281)	(0.374)	(0.112)	(0.101)
Share college educated co-workers	4.478***	4.888***	3.009***	2.674***
	(0.256)	(0.329)	(0.105)	(0.108)
Share foreign-born co-workers	1.484***	2.764***	0.962***	0.742***
	(0.249)	(0.355)	(0.111)	(0.125)
Observations	53,474	41,986	185,828	162,924

NOTE: Fixed effects logit estimates of the parameters for the MWP of mothers, β_1^p and β_2^p that enter the job change choice probabilities (13) and (13) for mothers and fathers. The estimations also includes 21 dummy variables that capture industry affiliation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 6.
Marginal Willingness to Pay (MWP) estimates and Differences in MWP by gender & parenthood

	MWP ($\widehat{\theta}_{2k}/\widehat{\theta}_1$):				Differences in MWP:			
	Non-Parents:		Parents:		Non-mothers −	Mothers −	Mothers −	Fathers −
	Women	Men	Women	Men	Non-fathers	Fathers	Non-mothers	Non-fathers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Private sector	0.091	0.051	0.035	0.038	0.040	-0.003	-0.055	-0.013
Government sector	0.064	0.051	0.044	0.036	0.013	0.008	-0.020	-0.014
Share female co-workers w. young kids	-0.174	-0.199	-0.041	-0.050	0.026	0.009	0.133	0.149
Share female co-workers	0.091	0.110	0.023	-0.035	-0.019	0.058	-0.068	-0.145
Firm wage dispersion, p90/p10	0.038	0.027	0.004	-0.015	0.011	0.019	-0.034	-0.042
Firm growth rate	-0.025	-0.020	-0.012	-0.015	-0.005	0.003	0.013	0.005
Firm size (in 1,000s)	0.0004	0.0010	0.0032	0.0006	-0.0005	0.0026	0.0028	-0.0003
Share high school educated co-workers	0.204	0.316	0.158	0.118	-0.112	0.040	-0.047	-0.198
Share college educated co-workers	0.319	0.381	0.259	0.249	-0.062	0.010	-0.060	-0.132
Share foreign-born co-workers	0.106	0.216	0.083	0.069	-0.110	0.014	-0.023	-0.147
$\frac{\widehat{\boldsymbol{\theta}}_2}{\widehat{\theta}_1}' \overline{\mathbf{z}}_f$ at $\overline{\mathbf{z}}_f$ for all workers	0.218	0.130	0.376	0.422	-0.046	0.088	-0.158	-0.292

NOTE: Calculations of MWP use the marginal utility estimates, $\widehat{\boldsymbol{\theta}}_2$ and $\widehat{\theta}_1$, in Table 5.

TABLE 7.
Firm Attributes by Quartile of *FF*

	FF Q1 (1)	*FF* Q2 (2)	*FF* Q3 (3)	*FF* Q4 (4)
A. Firm characteristics used to estimate FF:				
Private sector	0.425	0.669	0.682	0.789
	(0.494)	(0.470)	(0.466)	(0.408)
Government sector	0.218	0.148	0.065	0.054
	(0.413)	(0.355)	(0.247)	(0.225)
Municipal sector	0.357	0.183	0.253	0.157
	(0.479)	(0.386)	(0.435)	(0.364)
Wage dispersion p90/p10	1.931	2.026	1.759	1.554
	(0.574)	(0.573)	(0.462)	(0.343)
B. Firm characteristics not used to estimate FF:				
Share managers	0.052	0.064	0.060	0.054
	(0.098)	(0.087)	(0.073)	(0.062)
Share professionals	0.495	0.396	0.154	0.048
	(0.255)	(0.275)	(0.206)	(0.125)
Share technicians	0.222	0.275	0.222	0.122
	(0.198)	(0.221)	(0.216)	(0.175)
Share medium skilled	0.182	0.226	0.508	0.680
	(0.163)	(0.235)	(0.313)	(0.291)
Share low skilled	0.033	0.021	0.039	0.081
	(0.047)	(0.052)	(0.102)	(0.192)
Share part-time workers	0.248	0.177	0.230	0.262
	(0.167)	(0.181)	(0.253)	(0.295)
Share with same occupation	0.362	0.381	0.403	0.504
	(0.257)	(0.292)	(0.323)	(0.338)
Number of occupational titles	17.24	16.76	15.15	11.61
	(10.60)	(12.20)	(11.72)	(8.634)

NOTE: The table reports firm attributes separately for firms belonging to different quartiles of the family friendliness index (*FF*) distribution.

TABLE 8.
Treatment Effects on Career Outcomes of being Assigned to Family Friendly Firms

	Log monthly wage (1)	Contracted Work hours (2)	Annual labor income (3)	Occup. Skill Content (4)
Parent	0.0508***	0.0011	43.4272***	0.0015
	(0.0019)	(0.0020)	(2.0607)	(0.0062)
Female × Parent	-0.0817***	-0.1374***	-142.5053***	-0.0015
	(0.0026)	(0.0042)	(2.4891)	(0.0083)
FF Q2	-0.0006	-0.0033***	-17.1294***	-0.0253***
	(0.0011)	(0.0011)	(1.5523)	(0.0033)
FF Q3	0.0008	-0.0084***	-19.2547***	-0.0586***
	(0.0012)	(0.0013)	(1.2990)	(0.0042)
FF Q4	0.0233***	-0.0155***	-8.2474***	-0.0639***
	(0.0014)	(0.0015)	(1.2939)	(0.0048)
FF Q2 × Female	0.0105***	0.0033**	23.0367***	-0.0132***
	(0.0014)	(0.0016)	(1.6599)	(0.0041)
FF Q3 × Female	0.0073***	-0.0059***	16.9031***	0.0065
	(0.0015)	(0.0020)	(1.4463)	(0.0051)
FF Q4 × Female	-0.0007	-0.0220***	5.0209***	0.0109*
	(0.0017)	(0.0025)	(1.4785)	(0.0059)
FF Q2 × Parent	0.0053***	0.0062***	7.3538***	0.0264***
	(0.0013)	(0.0012)	(1.6069)	(0.0040)
FF Q3 × Parent	-0.0117***	0.0137***	-2.1278	0.0331***
	(0.0013)	(0.0013)	(1.4068)	(0.0046)
FF Q4 × Parent	-0.0327***	0.0209***	-11.7012***	0.0119***
	(0.0013)	(0.0013)	(1.3770)	(0.0044)
FF Q2 × Parent × Female	-0.0068***	0.0052**	-11.9714***	-0.0023
	(0.0016)	(0.0021)	(1.8043)	(0.0051)
FF Q3 × Parent × Female	0.0049***	0.0223***	6.1679***	-0.0179***
	(0.0017)	(0.0024)	(1.6356)	(0.0058)
FF Q4 × Parent × Female	0.0201***	0.0354***	22.2454***	-0.0114*
	(0.0018)	(0.0027)	(1.6202)	(0.0059)
Individual-specific FE:s	✓	✓	✓	✓
Observations	1 356 131	866 853	1 356 131	847 683

NOTE: Additional controls (not reported in the table) include polynomials in experience, experience interacted with parenthood status, with gender, and interacted with gender × parenthood indicators. Standard errors are clustered at the individual level (reported in parentheses). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

TABLE 9.
Treatment Effects on Career Outcomes of being Assigned to More Family Friendly Firms: separately for mothers and fathers

	Log monthly wage		Contracted Work hours		Annual labor income		Occup. Skill Content	
	Mothers (1)	Fathers (2)	Mothers (3)	Fathers (4)	Mothers (5)	Fathers (6)	Mothers (7)	Fathers (8)
Difference from Q1								
FF Q2	0.0085***	0.0047***	0.0114***	0.0030***	1.2897*	-9.7756***	-0.0144***	0.0011
	[0.000]	[0.000]	[0.000]	[0.001]	[0.072]	[0.000]	[0.000]	[0.731]
FF Q3	0.0014***	-0.0109***	0.0217***	0.0053***	1.6885**	-21.3825***	-0.0369***	-0.0255***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.030]	[0.000]	[0.000]	[0.000]
FF Q4	0.0100***	-0.0094***	0.0188***	0.0054***	7.3177***	-19.9486***	-0.0525***	-0.0520***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

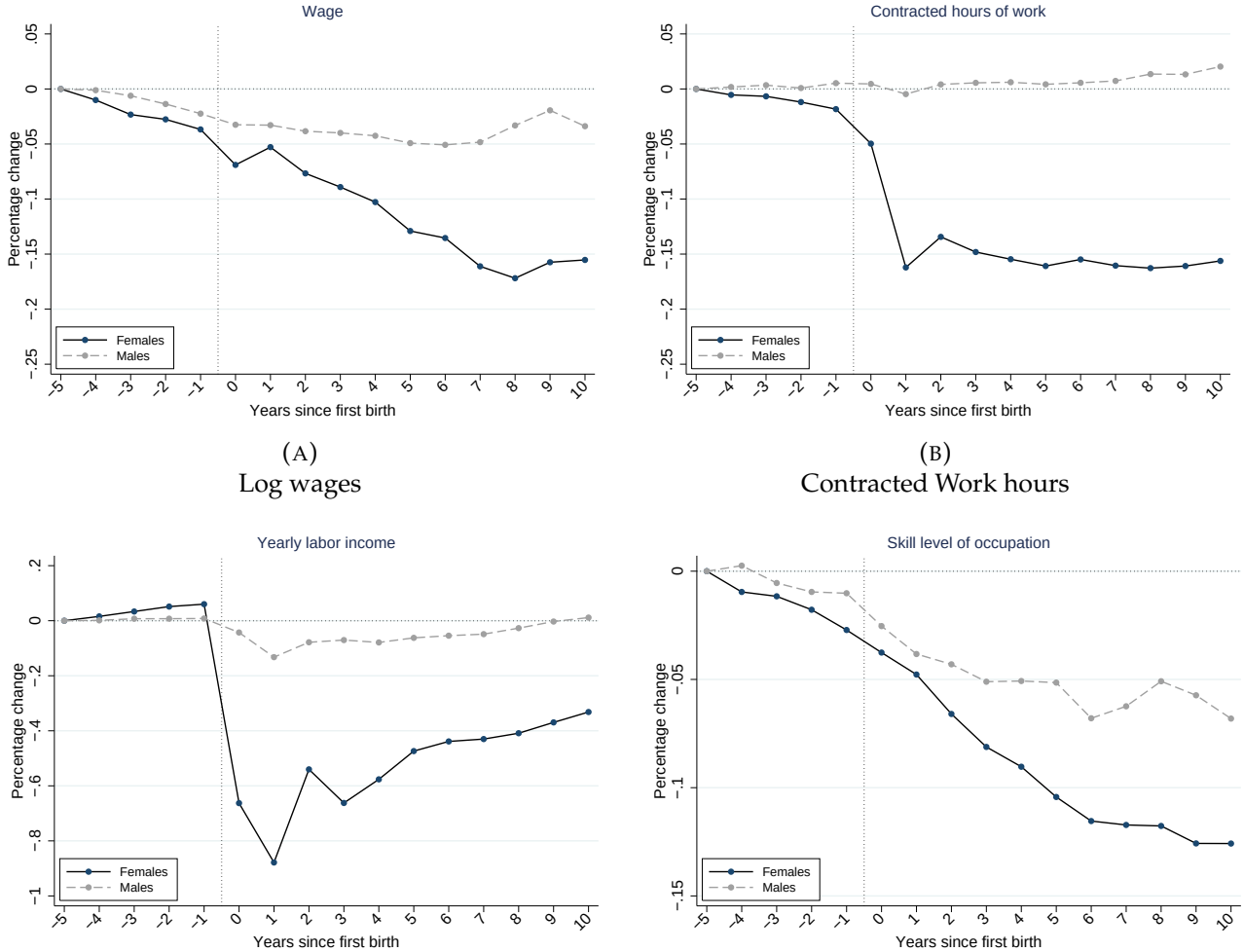
NOTE: The table reports differences in the treatment effect of being assigned to *FF* Q2, Q3, and Q4 relative to *FF* Q1 for mothers and fathers, respectively. p-values for tests of whether the differences from *FF* Q1 are equal to zero are reported in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE 10.
Degree of job flexibility and job autonomy
by *FF* quartile

	FF Quartile:			
	Q1	Q2	Q3	Q4
	(1)	(2)	(3)	(3)
Autonomy	0.714	0.700	0.649	0.571
	(0.0595)	(0.119)	(0.148)	(0.172)
Flexibility	0.427	0.664	0.590	0.503
	(0.272)	(0.185)	(0.175)	(0.183)

NOTE: Means and (standard deviations).

FIGURE 1.
Male and female wages, contracted work hours, labor income, and occupational skill-level by years since first birth.



(A)
Log wages

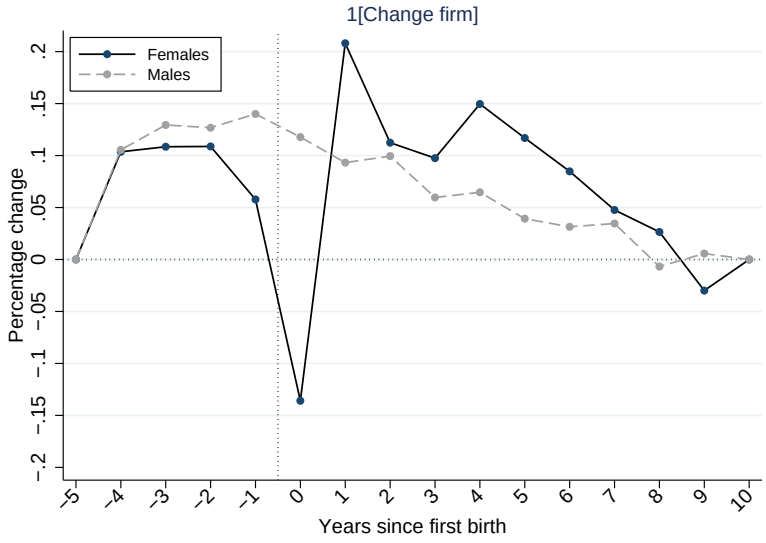
(B)
Contracted Work hours

(C)
Labor income

(D)
Skill level of occupation

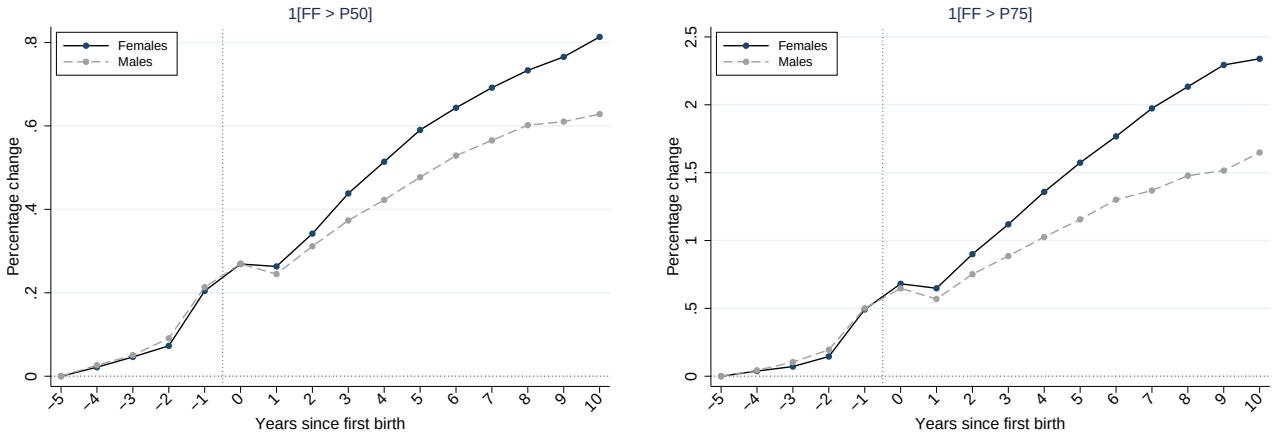
NOTE: Each dot pertains to the estimated coefficients on the $\mathbb{1}\{t = \kappa + j\}$ indicators in specification (1).

FIGURE 2.
Probability of switching workplace by years since first birth



NOTE: Changes in the probability of firm switching by years since first birth

FIGURE 3.
Changes in average family friendliness of workers' firm (FF) and in probabilities of working at a firm from different parts of FF distribution by years since first birth.

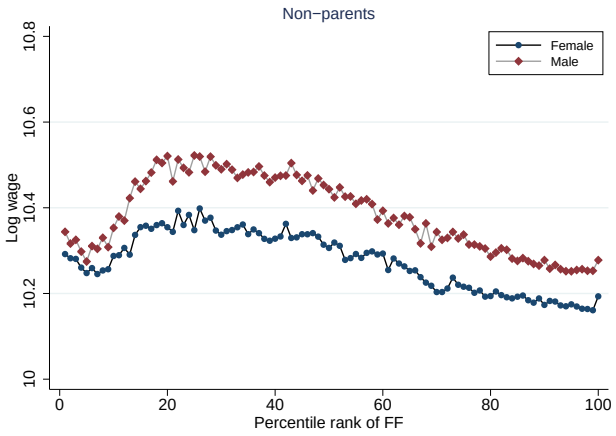


(A)
$1[FF \geq P50]$

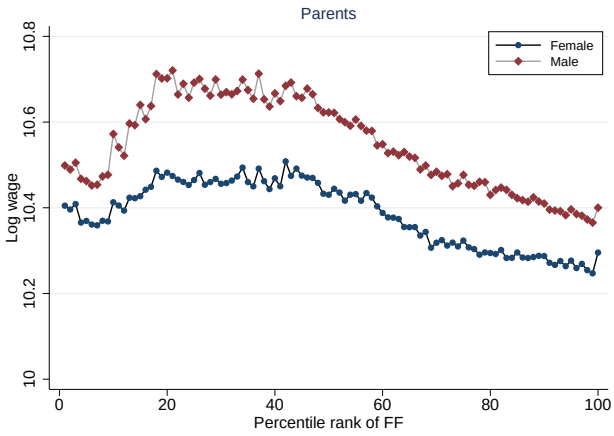
(B)
$1[FF \geq P75]$

NOTE: Each dot pertains to the estimated coefficients on the $\mathbb{1}\{t = \kappa + j\}$ indicators in specification (1).

FIGURE 4.
Ave. ***Log monthly wages*** over firm family friendliness (*FF*) distribution
by gender & after parenthood status

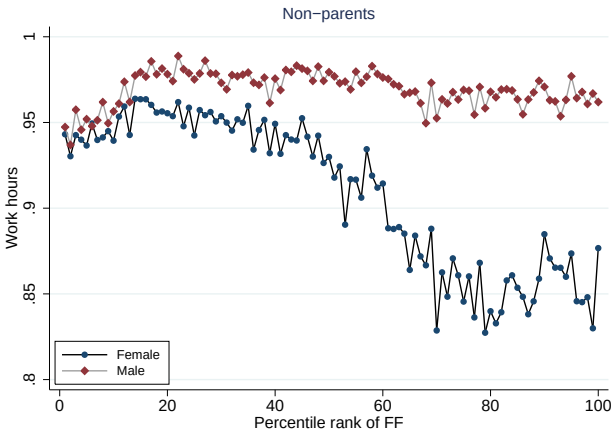


(A)
Log wages over *FF* distn. for *non-parents*

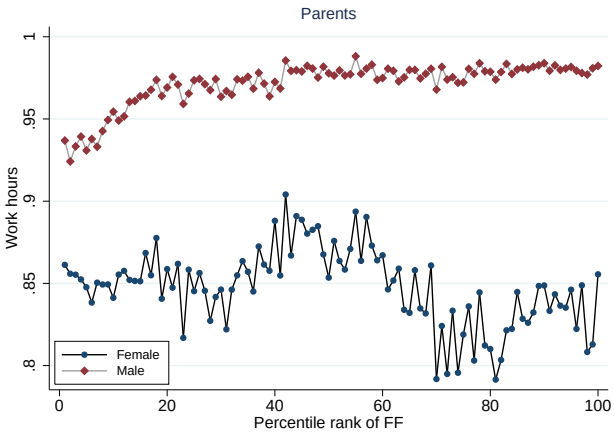


(B)
Log wages over *FF* distn. for *parents*

FIGURE 5.
Ave. ***Contracted work hours*** over firm family friendliness (*FF*) distribution
by gender & after parenthood status

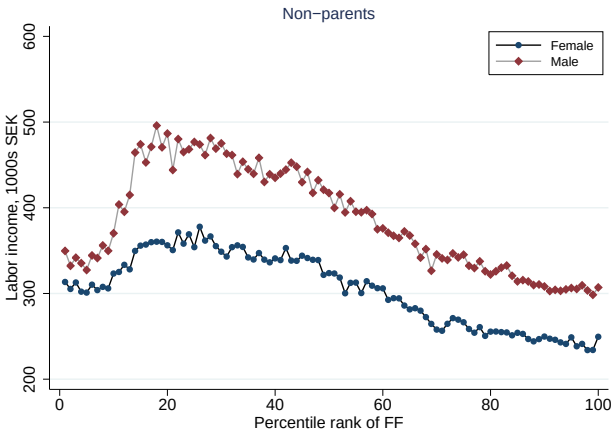


(A)
Contracted Work hours over *FF* distn. for *non-parents*

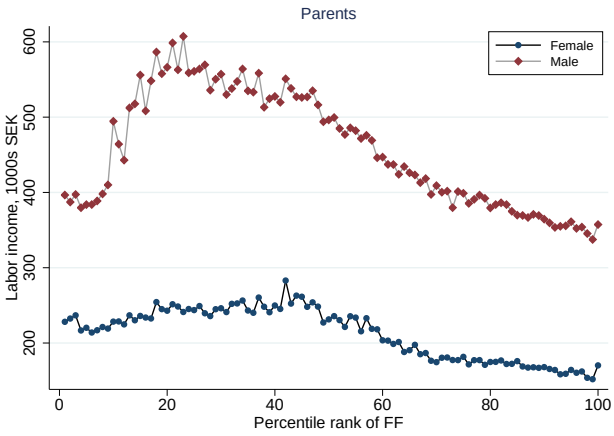


(B)
Contracted Work hours over *FF* distn. for *parents*

FIGURE 6.
Ave. ***Labor income*** over firm family friendliness (*FF*) distribution
by gender & after parenthood status

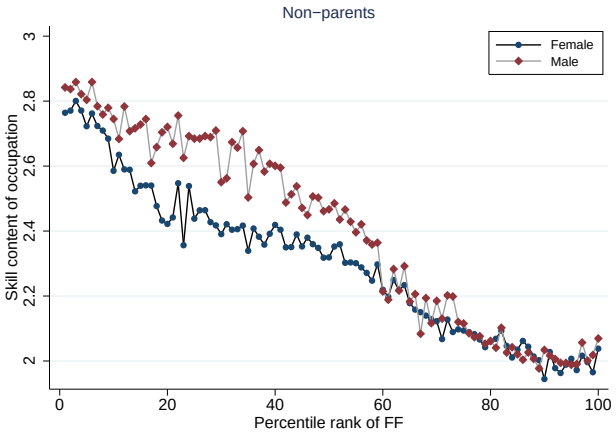


(A)
Labor income over *FF* distn. for *non-parents*

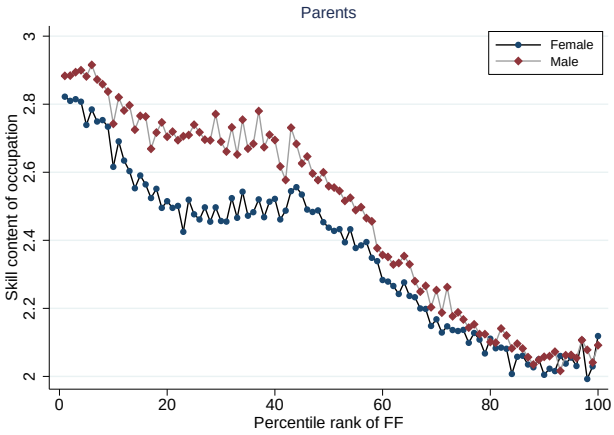


(B)
Labor income over *FF* distn. for *parents*

FIGURE 7.
Ave. ***Skill-level of workers' occupation*** over firm family friendliness (*FF*) distribution
by gender & after parenthood status

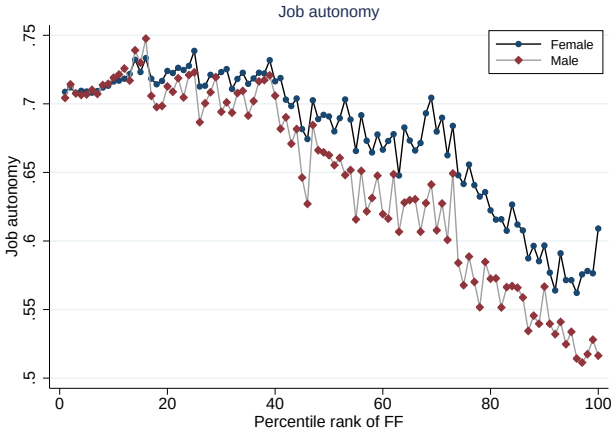


(A)
Skill-level of Occupation over *FF* distn. for *non-parents*

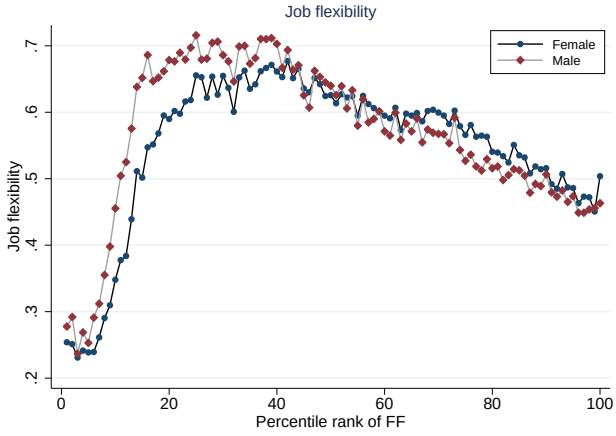


(B)
Skill-level of Occupation over *FF* distn. for *parents*

FIGURE 8.
Job Flexibility and Job Autonomy by Percentile Rank of FF



(A)
Degree of job autonomy by percentile rank of FF



(B)
Degree of job flexibility by percentile rank of FF

Appendix A Data Appendix

Wage Data

We use multiple population-wide Swedish administrative registers to create a linked employer-employee data set. The analysis is based on individual longitudinal information on demographic and background characteristics from the LOUISE register, which contains annual labor income for each individual, with zero-income reported for periods of non-work. We link this information to a matched employer-employee register (RAMS) that contains all employed and self-employed individuals in Sweden, with plant identifiers. Wages are drawn from the Wage Structure Statistics, which report full-time equivalent monthly wage rates (measured in November each year). We match wages to each person-plant-year pair, so that - in the case of multiple employments in one year - wages correspond to the wages earned at the main employer as derived from RAMS.

Wages are available for all individuals employed in the public sector, and for a sample of individuals in the private sector. The sampling is stratified by firm size and industry affiliation and the register includes sample weights that can be used to calculate aggregated statistics that are nationally representative. However, to get a balanced panel of individual wages, we use an imputed measure for the private sector, and for workers who due to e.g., temporary illness is absent from the workplace during the measuring month of the Wage Statistics, but for whom we observe an employment in RAMS.[33]

We obtain predicted wages from a log wage regression that controls for individual characteristics (sex, educational attainment, an indicator for public sector employment, age, and age squared). In addition, we include the worker's approximated monthly wage, which we derive from their annual earnings from the same employer, adjusted for the approximated number of months worked. The estimated regression equation is the following:

$$log(w_{it}) = \alpha_0 + \beta_1 log(w_{it}^{approx}) + \beta_2' \boldsymbol{x}_{it} + \lambda_t + \xi_{it} \tag{25}$$

where $\boldsymbol{x}_{it}$ is a vector of personal characteristics, λ_t are calendar year dummies, and w_{it}^{approx} is the approximated monthly wage. We retrieve $\hat{w}_{it}$, and let this be the wage observation for workers who are non-sampled or absent from work during the measuring month of the Wage Statistics in a given year, and thus were we lack information on (true) monthly wage rates.

The annual earnings data - RAMS - has information about the first and last calendar months of an

[33] We use a strategy for imputation similar to the one used by Hensvik (2012) on the same data sources.

employment spell in each year, but the register does not include hours worked. Using the start- and end-dates of an employment spell to calculate months worked will not predict monthly wage rates perfectly. In particular, monthly wage rates are likely to be underestimated for part-time workers with long employment spells. To address this issue, we restrict the sample in (25) to workers with an approximated wage within the 1st and 99th percentile of the true (nationally representative) wage distribution.

Table A.1 compares the true (nationally representative) log wage distribution to the predicted and imputed log wage distributions. The imputed wages look fairly similar to the true wage distribution. Nevertheless, we perform sensitivity checks by estimating our main wage regressions using the true wages with the sample weights.

TABLE A.1.
Comparison between True and Imputed Wages

	(1) True	(2) Predicted	(3) Imputed
Mean	10.331	10.294	10.273
St.dev	0.304	0.276	0.310
10th percentile	9.966	9.925	9.884
50th percentile	10.308	10.298	10.263
90th percentile	10.736	10.655	10.671
Observations	1 169 801	2 487 748	2 795 663

NOTE: The table compares the true wage distribution with the distribution of predicted wages retrieved from estimating Equation 25, and in column (3) the distribution of the new wage measure which imputes missing (true) wage observations with the predicted wages.

Occupational Classification

Part of our analysis focuses on the occupational skill upgrading of workers over their careers. The information on occupational skill content is derived from the occupational classification, SSYK. The classification standard divides occupations into one of four levels of skill content, which are defined in terms of the international educational classification standard ISCD 1976. The educational classification is used as a guideline for determining the qualification level of each occupation in SSYK, but the qualification and skill needed to perform the occupation need not be obtained through formal education, but can also be obtained through experience. The skill content index thus measures the qualifications that the *occupation* requires, and not necessarily the level of education that the *worker* must have. Table A.2 describes in detail the education level that corresponds to the skills required in level 1- through level 4-occupations. Table A.3 illustrates the skill level of the major occupation groups in the classification standard. For example, the most skilled jobs refer to senior officials, managers, and legislators, while the second most

skilled jobs refer to specialists and professionals.

TABLE A.2.
Description of occupational skill level

Skill level	Description
1:st	No educational or skill requirements
2:nd	Occupations requiring secondary schooling or equivalent skills obtained elsewhere
3:rd	Occupations requiring shorter post-secondary schooling (maximum 3 years) or equivalent skills obtained elsewhere
4:th	Occupations requiring longer post-secondary schooling (3-4 years or more) and an academic degree

NOTE: The table describes the skill level requirements in terms of the training required.

TABLE A.3.
Required skill level for different occupation groups

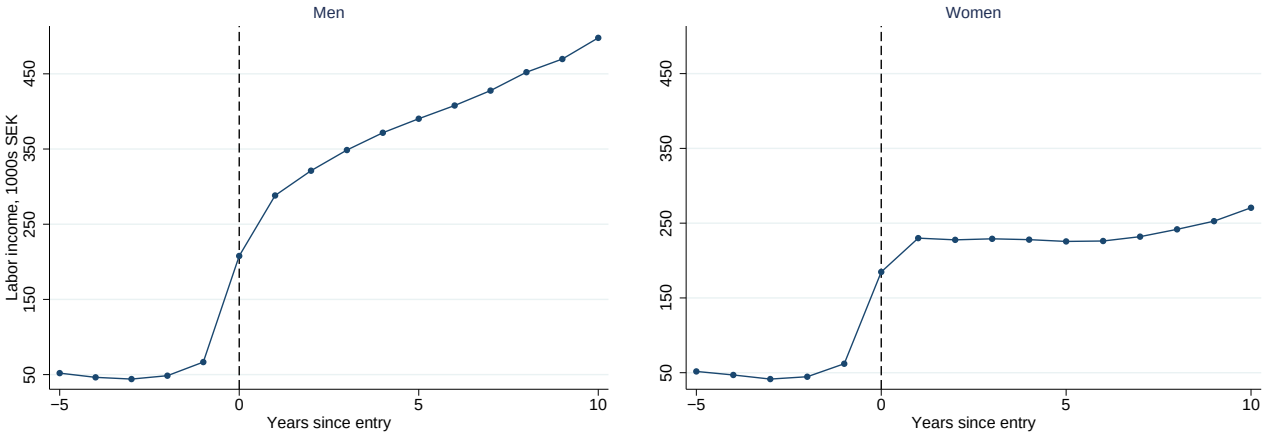
Occupation group	Skill level
Legislators, senior officials and managers	4:th
Work requiring theoretical specialist skills	3:rd
Work requiring shorter post-secondary schooling	2:nd
Clerical work	2:nd
Service-, nursing-, and sales occupations	2:nd
Agricultural, gardening, forestry, and fishing occupations	2:nd
Crafts occupations in construction and manufacturing	2:nd
Machine operators and assemblers, transportation services, etc.	2:nd
Elementary occupations	1:st

NOTE: The table describes the skill level requirements for occupation groups in SSYK.

Sampling Strategy

We focus on individuals whom we observe the year of labor market entry, entry wages, and first occupation. We follow Kramarz and Skans (2014) and define labor market entry as the first job after completing the highest attained level of education that lasted at least four months, and yielded annual earnings exceeding three times the 10th percentile of the full wage distribution. Because the occupational classification standard in the Wage Statistics is available only from 1996, we restrict attention to individuals

FIGURE A.1.
Labor income by time since labor market entry



who entered the labor market in 1996 or later. We further restrict the sample to individuals whose first child is born *after* entering the labor market.

To check that our definition of labor market entry is reasonable, Figure A.1 plots the average annual labor earnings five years before labor market entry to ten years after labor market entry. For both men and women there is a discontinuous jump in earnings in the year of our defined labor market entry, with very low earnings before that year. Table A.4 reports cumulative proportions of the sample securing a first stable job by years since graduation from highest attained education (compulsory schooling, high school, or college). Individuals with higher levels of education manage to find a first job sooner than individuals with low education.

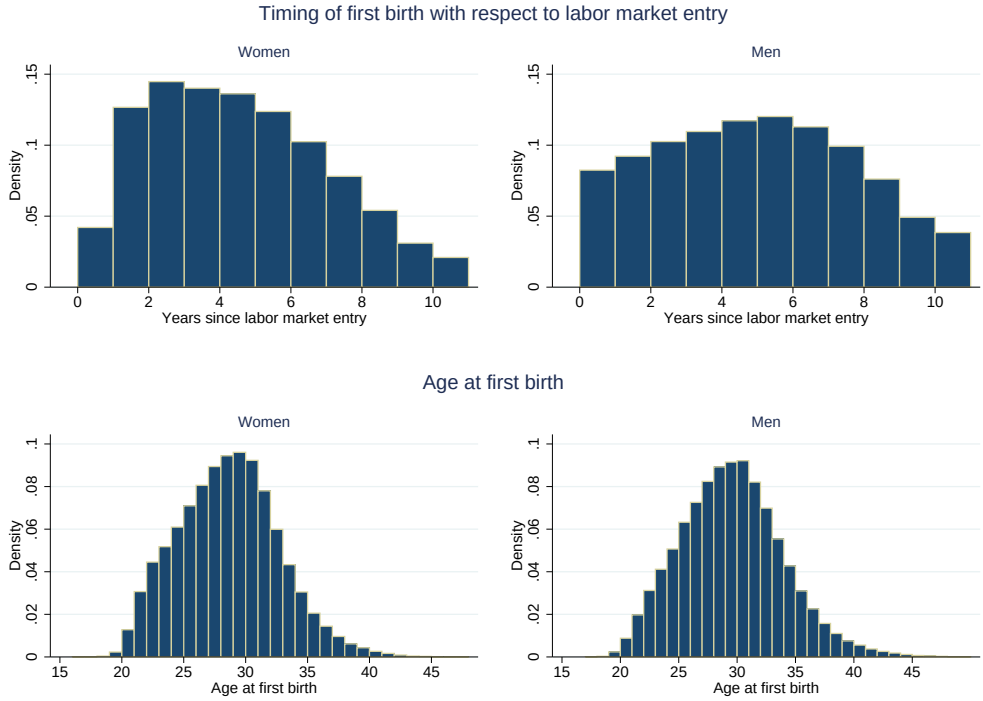
TABLE A.4.
Years elapsed between graduation and labor market entry: cumulative proportions

Years since graduation:	(1) Compulsory school	(2) High school	(3) College
0	0.0033	0.2579	0.5895
1	0.0305	0.5455	0.8002
2	0.1127	0.7190	0.8936
3	0.3311	0.8223	0.9431
4	0.5709	0.8876	0.9699
5	0.7443	0.9274	0.9828

NOTE: The table reports the cumulative proportions of individuals in our sample who find a first stable job by years since graduation, separately for persons with at most compulsory schooling, high school, and college education.

Appendix B Additional Tables and Figures

FIGURE B.1.
Timing of first birth with respect to labor market entry & age



NOTE: The figure shows men's and women's timing of first birth with respect to years since labor market entry (upper panel), and their age at first birth (lower panel).

TABLE B.1.
Treatment Effects on Career Outcomes of being Assigned to Family Friendly Firms: Controlling for Occupation

	Log monthly wage (1)	Annual Work hours (2)	Annual labor income (3)
Parent	0.0525***	0.0000	44.6024***
	(0.0024)	(0.0020)	(2.4545)
Female × Parent	-0.0279***	-0.1387***	-164.7279***
	(0.0031)	(0.0043)	(3.3264)
FF Q2	-0.0156***	-0.0024**	-24.7149***
	(0.0013)	(0.0011)	(2.3407)
FF Q3	-0.0147***	-0.0067***	-22.1002***
	(0.0015)	(0.0013)	(1.7866)
FF Q4	0.0153***	-0.0137***	-7.3400***
	(0.0017)	(0.0015)	(1.7739)
FF Q2 × Female	0.0161***	0.0051***	28.5093***
	(0.0016)	(0.0016)	(2.4301)
FF Q3 × Female	0.0152***	-0.0029	19.4788***
	(0.0018)	(0.0020)	(1.9342)
FF Q4 × Female	0.0034	-0.0202***	6.0838***
	(0.0021)	(0.0025)	(1.9713)
FF Q2 × Parent	0.0156***	0.0063***	10.1549***
	(0.0015)	(0.0012)	(2.2412)
FF Q3 × Parent	-0.0060***	0.0140***	-4.4640**
	(0.0016)	(0.0013)	(1.8595)
FF Q4 × Parent	-0.0357***	0.0212***	-14.1899***
	(0.0017)	(0.0013)	(1.8078)
FF Q2 × Parent × Female	-0.0020	0.0034*	-14.8047***
	(0.0018)	(0.0021)	(2.4688)
FF Q3 × Parent × Female	0.0061***	0.0210***	3.4244
	(0.0020)	(0.0024)	(2.1636)
FF Q4 × Parent × Female	0.0204***	0.0347***	17.2743***
	(0.0022)	(0.0027)	(2.1586)
Observations	847 683	847 683	847 683

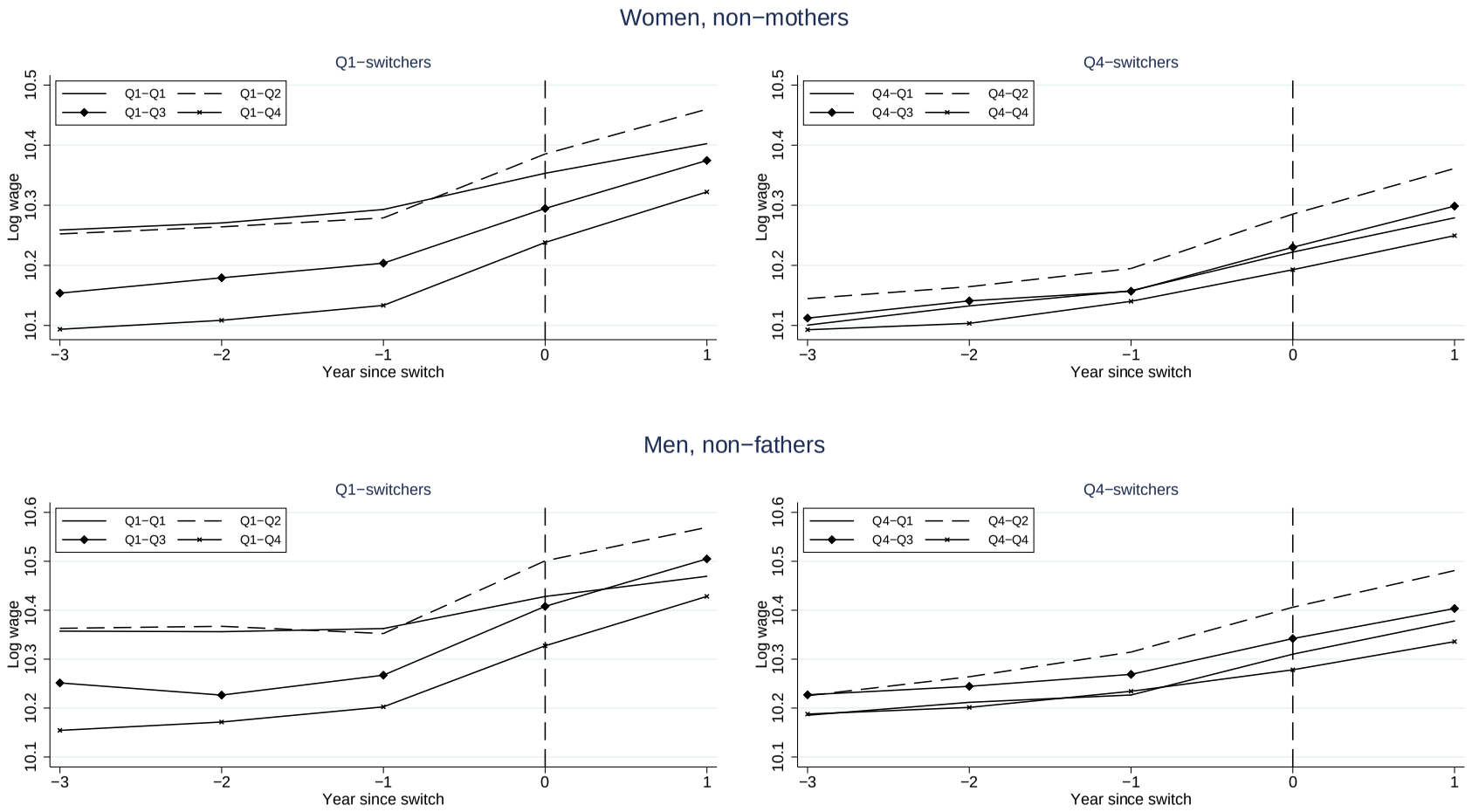
NOTE: Additional controls (not reported in the table) include polynomials in experience, experience interacted with parenthood status, with gender, and interacted with gender × parenthood indicators, and 29 dummy variables indicating 2-digit occupational group. Standard errors are clustered at the individual level (reported in parentheses). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

TABLE B.2.
Treatment Effects on Career Outcomes of being Assigned to Family Friendly Firms: Controlling for Industry and Sector

	Log monthly wage (1)	Annual Work hours (2)	Annual labor income (3)	Occup. Skill Content (4)
Parent	0.0443***	0.0013	40956.7320***	0.0026
	(0.0019)	(0.0019)	(2137.0069)	(0.0063)
Female × Parent	-0.0807***	-0.1314***	-140858.9208***	-0.0022
	(0.0026)	(0.0042)	(2597.3685)	(0.0084)
FF Q2	-0.0171***	-0.0032***	-24951.3863***	-0.0142***
	(0.0011)	(0.0010)	(1646.0469)	(0.0034)
FF Q3	-0.0206***	-0.0071***	-28170.9382***	-0.0371***
	(0.0012)	(0.0012)	(1389.3928)	(0.0042)
FF Q4	-0.0061***	-0.0168***	-19489.6037***	-0.0312***
	(0.0013)	(0.0015)	(1388.4891)	(0.0049)
FF Q2 × Female	0.0205***	0.0060***	28865.8278***	-0.0152***
	(0.0013)	(0.0016)	(1724.8379)	(0.0042)
FF Q3 × Female	0.0210***	0.0020	23541.3740***	0.0041
	(0.0015)	(0.0019)	(1516.1483)	(0.0053)
FF Q4 × Female	0.0110***	-0.0155***	10321.4652***	0.0074
	(0.0017)	(0.0025)	(1561.4411)	(0.0062)
FF Q2 × Parent	0.0101***	0.0062***	10007.6290***	0.0263***
	(0.0012)	(0.0012)	(1648.5240)	(0.0040)
FF Q3 × Parent	-0.0061***	0.0121***	463.5223	0.0362***
	(0.0013)	(0.0012)	(1444.7491)	(0.0047)
FF Q4 × Parent	-0.0244***	0.0205***	-8275.4716***	0.0079*
	(0.0013)	(0.0013)	(1407.8893)	(0.0044)
FF Q2 × Parent × Female	-0.0100***	0.0055***	-15323.4631***	0.0001
	(0.0016)	(0.0020)	(1851.4878)	(0.0051)
FF Q3 × Parent × Female	0.0017	0.0223***	2537.2785	-0.0182***
	(0.0017)	(0.0023)	(1693.0374)	(0.0060)
FF Q4 × Parent × Female	0.0177***	0.0367***	20886.6876***	-0.0077
	(0.0018)	(0.0026)	(1669.1403)	(0.0062)
Observations	1 272 462	819 875	1 272 462	801 498

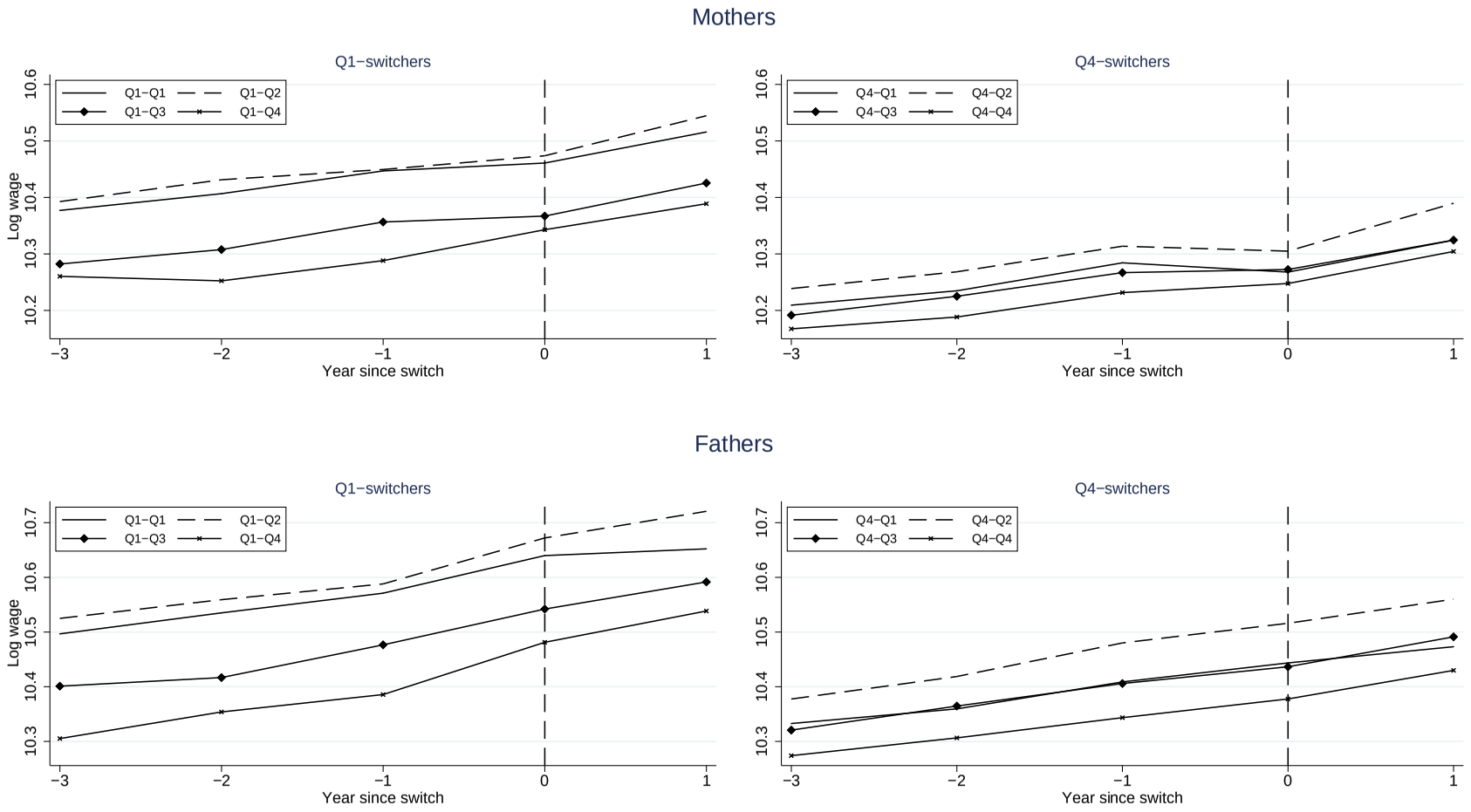
NOTE: Additional controls (not reported in the table) include polynomials in experience, experience interacted with parenthood status, with gender, and interacted with gender × parenthood indicators, and 20 dummy variables indicating 2-digit industry classification and three dummy variables for sector (government, public, private). Standard errors are clustered at the individual level (reported in parentheses). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

FIGURE B.2.
Wage-trends Before Job Changes: Non-parents



NOTE: The figures show the wage trends 3 years before and 1 year after a job change, defined as changing employer, for women who are not yet mothers (upper panel), and men who are not yet fathers (lower panel). The left-hand graphs depict the wage trends before and after job switches in which workers move from a firm in the lowest quartile of the *FF* distribution to a firm in the upper quartiles of the distribution, and the right-hand graphs depict job switches from the uppermost quartile of the *FF* distribution to a firm in the lower parts of the *FF* distribution.

FIGURE B.3.
Wage-trends Before Job Changes: Parents



NOTE: The figures show the wage trends 3 years before and 1 year after a job change, defined as changing employer, for mothers (upper panel), and fathers (lower panel). The left-hand graphs depict the wage trends before and after job switches in which workers move from a firm in the lowest quartile of the *FF* distribution to a firm in the upper quartiles of the distribution, and the right-hand graphs depict job switches from the uppermost quartile of the *FF* distribution to a firm in the lower parts of the *FF* distribution.

TABLE B.3.
Job characteristics from ULF/SILC by *FF* quartile

FF Quartile	(1) Q1	(2) Q2	(3) Q3	(3) Q4
Freedom to decide				
Start- and end-time of workday	4.901	5.993	5.733	5.160
	(1.295)	(1.207)	(1.359)	(1.419)
Location of work	0.405	0.355	0.286	0.226
	(0.0629)	(0.0970)	(0.111)	(0.122)
When to take breaks	0.687	0.805	0.779	0.747
	(0.141)	(0.0989)	(0.112)	(0.135)
When to take vacation	0.627	0.846	0.835	0.826
	(0.237)	(0.128)	(0.110)	(0.110)
How to plan your work tasks	0.952	0.923	0.909	0.889
	(0.0275)	(0.0412)	(0.0528)	(0.0739)
How to structure one's work	7.467	7.289	7.083	6.660
	(0.434)	(0.809)	(0.964)	(1.080)
How to allocate your time across tasks	0.687	0.713	0.657	0.651
	(0.103)	(0.142)	(0.186)	(0.181)
The general direction of work	5.490	5.560	5.558	5.133
	(0.509)	(0.870)	(1.200)	(1.177)
Working hours and time pressure of job				
Stressful job	0.765	0.735	0.715	0.651
	(0.130)	(0.152)	(0.212)	(0.250)
Fulltime	0.595	0.607	0.553	0.576
	(0.314)	(0.318)	(0.334)	(0.323)
Part-time	0.240	0.159	0.222	0.281
	(0.427)	(0.366)	(0.416)	(0.450)
Mostly daytime work	0.929	0.858	0.796	0.751
	(0.0824)	(0.115)	(0.145)	(0.156)
Evenings/nights	0.0110	0.0235	0.0403	0.0519
	(0.0176)	(0.0342)	(0.0457)	(0.0590)
Shifts/irregular working hours	0.0605	0.118	0.164	0.198
	(0.0724)	(0.0964)	(0.123)	(0.125)

NOTE: Means and (standard deviations).

TABLE B.4.
Principal components analysis for job flexibility index

	Factor Loadings			
	(1)	(2)	(3)	(4)
Start & end workday	0.5489	0.1050	-0.8285	0.0347
Work location	0.1869	0.8887	0.2505	0.3353
When to take breaks	0.6109	0.0267	0.3791	-0.6945
When to take vacation	0.5390	-0.4454	0.3273	0.6356
Eigenvalues	2.467	1.121	0.356	0.055
Percent of variance	0.617	0.280	0.090	0.014

TABLE B.5.
Principal components analysis for job autonomy index

	Factor Loadings			
	(1)	(2)	(3)	(4)
How to plan one's tasks	0.4784	0.4657	-0.6886	0.2830
How to structure one's work and tasks	0.5707	-0.2327	-0.0827	-0.7831
How to allocate working time across tasks	0.4618	0.5155	0.7137	0.1079
Affect the general direction of one's work	0.4819	-0.6806	0.0976	0.5431
Eigenvalues	2.808	0.696	0.423	0.073
Percent of variance	0.702	0.174	0.106	0.018

TABLE B.6.
Degree of job flexibility and job autonomy by occupational category

Occupational group:	(1) Job Autonomy	(2) Job Flexibility
Legislators, senior officials and manager	0.881	0.820
	(0.092)	(0.116)
Professionals	0.836	0.748
	(0.103)	(0.179)
Associate professionals and technicians	0.783	0.648
	(0.130)	(0.124)
Clerks	0.692	0.545
	(0.119)	(0.123)
Service workers and shop and market sales workers	0.583	0.411
	(0.180)	(0.163)
Skilled agricultural workers	0.638	0.351
	(0.176)	(0.268)
Craft and related trades workers	0.661	0.523
	(0.103)	(0.124)
Plant and machine operators and assemblers	0.558	0.418
	(0.149)	(0.135)
Elementary occupations	0.590	0.444
	(0.170)	(0.186)
Overall mean	0.705	0.574
	(0.169)	(0.197)

NOTE: Means and (standard deviations).

Appendix C Decision Rule for Entering Parenthood

Now consider the decision-rule for choosing to *enter the state of parenthood at age t*, where $p_{i,k} = 0$ for $k = t_0, ..., t-1$. Following notation in Hotz and Miller (1993) and Arcidiacono and Miller (2011), let d_{ikt} denote indicator variables for each of the four possible outcomes for the choices of $(p_{it}, \Delta J_{it})$, i.e., $d_{i1t} = 1$ if $(p_{it} = 0, \Delta J_{it} = 0)$ and 0 otherwise; $d_{i2t} = 1$ if $(p_{it} = 0, \Delta J_{it} = 1)$ and 0 otherwise; $d_{i3t} = 1$ if $(p_{it} = 1, \Delta J_{it} = 0)$ and 0 otherwise, and $d_{i4t} = 1$ if $(p_{it} = 1, \Delta J_{it} = 1)$ and 0 otherwise. And let V_{it} denote the (unconditional) valuation of individual i at the beginning of age t, which is defined to be:

$$V_{it}(w_{i,t-1}, \mathbf{z}_{i,t-1}, p_{i,t-1}, \phi_i, \zeta_{i,t-1}^{p_{i,t-1}}) \equiv E_t\big[\sum_{j=t}^{T}\sum_{k=1}^{4} \delta^{j-t} d_{ikj}^o U^{p_{ikj}^o}(w_{ij}, \mathbf{z}_{ij}, \phi_i, \zeta_{ij}^{p_{ikj}^o})\big], \tag{C.1}$$

where $\zeta_{i,t-1}^{p_{i,t-1}}$ is i's idiosyncratic preference shock at age $t-1$ which depends on the value of $p_{i,t-1}$, d_{ikj}^o denotes the optimal choices of d_{ikj} in all future periods, conditional on i's information set at t, $(w_{i,t-1}, \mathbf{z}_{i,t-1}, \phi_i)$; the $\zeta_{ij}^{p_{ikj}^o}$s differ with the optimally chosen future parenthood status; δ is the discount factor; and the expectation in (C.2) is taken over the future draws of ζs, the birth process, and the future draws on the jobs, $(w_{ifj}, \mathbf{z}_{ifj})$, that parents realize in (future) periods when they choose to enter the job lottery.

Let V_{it}^1 denote individual i's valuation, *conditional on entering parenthood at age t*, which is given by:

$$V_{it}^1(w_{it}, \mathbf{z}_{it}, \phi_i) \equiv \big[\sum_{k=3}^{4} d_{ikt}^o U^1(w_{it}, \mathbf{z}_{it}, \phi_i, \zeta_{it}^1)\big] E_t\big[\sum_{j=t+1}^{T}\sum_{k=3}^{4} \delta^{j-t+1} d_{ikj}^o U^1(w_{ij}, \mathbf{z}_{ij}, \phi_i, \zeta_{ij}^1)\big], \tag{C.2}$$

where the first term in the product on the righthand side of (C.2) characterizes the utility payoff in age t from the job/firm choice at that age. The second term in this product characterizes the expected payoff over the remaining periods of one's life, conditional on individual i's age-t information set. Let V_{it}^0 denote individual i's valuation, *conditional on not having entered parenthood prior to age t*, which is given by:

$$V_{it}^0(w_{it}, \mathbf{z}_{it}, \phi_i) \equiv \big[\sum_{k=1}^{2} d_{ikt}^o U^0(w_{it}, \mathbf{z}_{it}, \phi_i, \zeta_{it}^0)\big] E_t\big[\sum_{j=t+1}^{T}\sum_{k=1}^{4} \delta^{j-t+1} d_{ikj}^o U^{p_{ikj}^o}(w_{ij}, \mathbf{z}_{ij}, \phi_i, \zeta_{ij}^{p_{ikj}^o})\big], \tag{C.3}$$

It follows that the decision rule for individual i to enter into parenthood at age t if and only if:

$$V_{it}^1(w_{it}, \mathbf{z}_{it}, \phi_i) > V_{it}^0(w_{it}, \mathbf{z}_{it}, \phi_i^0). \tag{C.4}$$

Even under the assumption that the per-period payoff functions, $U^p(w_{it}, \mathbf{z}_{it}, \phi_i, \zeta_{it}^p)$ are, themselves, lin-

ear in its arguments (see (4)), the conditional valuation functions, V_{it}^1 and V_{it}^0, are not. This fact has several implications for estimation.

First, the decision rule for entering parenthood at age t is not linear in the parameters. In particular, it is not linear in the ϕ_is. As a result, $V_{it}^1 - V_{it}^0$, i.e., the difference of the conditional valuation functions in (C.3) and (C.2), does eliminate ϕ_is from the decision rule in (C.4).

Second, the decision rules for the onset of parenthood require one to evaluate the expectations taken over the future payoffs imply that one must take account of the conditional expectation of the future idiosyncratic shocks, condition on making optimal decisions in the future i.e., $E(\zeta_{it} \mid d_{ikj}^o), j = t+1, ..., T$, which, in general are not equal to 0. These conditional expectations also do not difference out of V_{it}^1 and V_{it}^0, they require one to take a stand on the distribution of ζ_{it}s, and are the resulting conditional expectation functions will, in general, depend on the parameters of U^p in (4) in a non-linear way.

In contrast, as we show in 4.2, none of these issues arise when one uses the variation of job changes within parenthood to estimate (identify) the parameters of U^p using the decision rule in (7).