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Workplace Amenities and the Gender Pay Gap*

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Abstract

Despite decades of rising female human-capital investment, a sizable gender pay gap remains. We ask how much accounting for the value of job amenities—especially temporal and spatial flexibility—reduces the gender gap in compensation. We merge a new survey that measures on-call duties, evening work, schedule rigidity, and hours with matched employer- employee administrative records. Around childbirth, mothers switch to jobs with set schedules, shorter hours, and no on-call or evening requirements, moving toward lower-pay firms and firms less preferred by men according to revealed-preference firm rankings. Controlling for these amenities explains almost all post-birth firm sorting. To causally estimate the value of amenities to workers, we run an incentivized discrete-choice experiment: around 1,000 workers choose between hypothetical jobs that trade off wages against the same amenities. We find that women demand wage premia twice as large as men for avoiding on-call work and the ability to vary work time for family reasons. Women also place substantially more value on working near home and from home and on avoiding evening work and time pressure. Adding these valuations to monetary earnings shrinks the gender gap in total compensation to 13 percentage points, almost forty percent smaller than the baseline earnings gap.

Keywords: amenities; sorting; gender

JEL Codes: J31, J16, J22

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1 Introduction

Despite decades of gains in women's labor-force participation and education, a stubborn gender wage gap remains. Recent research shows that women place higher value on job amenities such as flexible hours, predictable schedules, and working close to home (Mas and Pallais (2017), Wiswall and Zafar (2017), and Le Barbanchon et al. (2020)). However, we know less about how these amenities are distributed across jobs and how they contribute to gender differences in compensation. In this paper, we link firm-level data on specific amenity offerings with incentive-compatible elicitations of workers' willingness to pay for those amenities. This allows us to decompose gender gaps in total compensation into wage and non-wage components.

This paper first documents gender differences in amenities related to temporal and spacial flexibility using rich survey data from the Labor Force Survey (henceforth, LFS) in Denmark linked with administrative data on job earnings and location. Next, we document the evolution of these differences around parenthood, using administrative data on the date of first childbirth for all survey respondents. As noted by Goldin (2014), the time demands of children may be incompatible with some work arrangements. Compensating differentials may create a wedge between the pay of women and men if women trade off monetary compensation for valuable amenities which increase their non-market productivity, such as a short commute to work or a flexible work schedule (Bütikofer et al. (2023); Le Barbanchon et al. (2020); Borghorst et al. (2024)). We find that in addition to an expansion of the wage gap around parenthood, there is a reduction in women's propensity to work long hours, do evening work and on-call work, to work in jobs with variable schedules, and an expansion in women's propensity to work close to home.[1] For men, changes in these characteristics around parenthood are muted and in some cases, opposite signed.

Next, we turn to understanding how these amenities affect relative wages. As the Rosen (1986) model of compensating differentials would predict, women may seek firms which offer these amenities, but perhaps offer lower pay. We first quantify "low-pay" firms using the Abowd et al. (1999) decomposition (hereafter AKM). This method estimates firm-fixed effects in a regression of wages on firm and individual fixed effects, isolating the relative improvement in wages a person with a given skill set can expect by moving to a particular firm.[2] When controlling for amenities in our survey data, the fall in firm pay premia upon motherhood is reduced almost to zero, suggesting that a substantial part of the decline in average pay at firms where women work after motherhood is explained by the value these firms provide to women on other dimensions. Second, we study the evolution of the Sorkin (2018) revealed preference metric of firm type, called pagerank. When using

[1] We also see that women are *less* likely to work at home after having children, but we note that this data is pre-Covid and the rate of home-work as well as the type of work done at home has changed substantially since 2019, the last year of our survey data on work amenities.

[2] We also include in the regressions select time-varying controls such as age.

a pagerank ranking of firms according to the movements of men, we see that women sort away from highly preferred firms around motherhood. However, this relationship completely disappears when we control for firm-level amenities.

Unobservable factors affect worker flows, meaning that we cannot infer the value of amenities to workers or the role of amenities in total compensation from observed worker movements without additional structural assumptions. To answer the question motivating this paper—what is the role of amenities in explaining the gender wage gap—we conduct an incentivized hypothetical choice preference elicitation survey. Using a nationally representative pool of nearly one thousand participants, we estimate how much individuals are willing to trade-off in earnings in order to access additional amenities. Participants are incentivized to truthfully reveal their preferences because they are told that they will receive links to jobs that fit their preferences based on their responses to 30 hypothetical job comparison vignettes.

Our preference elicitation survey reveals that compared to men, women have strong distaste for jobs requiring on-call or evening work, a strong preference for jobs which allow them to vary work time for family reasons, and a strong preference for working near home. We do not find any evidence that, relative to men, women prefer to choose their working hours, avoid irregular hours, or have variable start and end times. We also do not find significant differences by gender in preferences concerning jobs with long hours. These results suggest that some workplace amenities which appear valuable to women based on workplace flows (for example, avoiding variable start and end times of work), may simply be correlated on the supply side with the requirement for on-call and evening work.[3] When we account for the value of amenities to those workers who have these amenities at their jobs, we find that the gender compensation gap (inclusive of these amenities) is 13%. The gender gap in earnings is 21%. This means that the gender gap in compensation is 38% smaller when we include the value to workers of amenities related to temporal and spacial flexibility, relative to when we only measure monetary earnings.

Our paper contributes to the recently expanding literature on the role of amenities in attracting workers to particular jobs. Much of this literature has taken a structural approach, including Taber and Vejlin (2020), Morchio and Moser (2024), Lavetti and Schmutte (2018), Berger et al. (2023), Bonhomme and Jolivet (2009), Lehmann (2023), Lamadon et al. (2022), Sorkin (2018), among others. Most relevant to our own work is Morchio and Moser (2024), which focuses on job attributes and the gender wage gap in the formal sector in Brazil using administrative data. The administrative data includes the amenities part-time work, whether a worker reports being fired for unjust reasons, parental leave length, and the risk of dying in work accidents. Morchio and Moser (2024) document some sorting around these specific attributes, but most of their focus

[3]Another possible explanation for the difference in WTP and worker flow estimates is that firms which offer certain amenities also discriminate against women in the hiring process. We discuss these possibilities explicitly when describing the methodology and motivation for eliciting worker preferences through a hypothetical choice survey.

is on inferring the role of compensating differentials using the structure of worker sorting and firms pay. Our focus differs both in the types of amenities studied—our data include measures of amenities that are hypothesized to be especially important for women with children—and in how we estimate the value of specific workplace attributes to derive a compensation measure that includes these amenities. In contrast, Morchio and Moser (2024) infer compensating differentials associated with amenities based on worker sorting, finding that these differentials explain about half of the gender pay gap. Our results are consistent with this—for the specific amenities we are able to measure, female workers have substantially higher willingness to pay. Accounting for the value of these amenities leads to a 38% smaller gap in compensation by gender, relative to the gender wage gap.

Contemporaneous and non-structural work on the importance of compensating differentials in the labor market includes Humlum et al. (2025) and Caldwell et al. (2025). These papers use surveys to explicitly estimate the relationship between worker's expectations of amenities and pay at various firms and their preferences for amenities at those firms in Denmark and Germany, respectively. The papers come to different conclusions. Humlum et al. (2025) finds strong evidence of compensating differentials, and that variation in pay across firms for the same worker overstates the variation in utility of that worker by 50%.[4] This is consistent with our results in the same country. In contrast, Caldwell et al. (2025) finds a weak relationship between amenities and pay and finds no evidence of compensating differentials. Finally, Audoly et al. (2024) uses vacancy data from Norway to quantify the pay and non-pay content of job ads and finds that non-pay attributes explain a substantial portion of employer attractiveness to potential applicants. This complements the work of Fluchtmann et al. (2024) who find gender differences in searching for jobs with shorter hours, a short commute, and which are family friendly. Our paper focuses on which specific amenities women value relative to men, and links this to data on the distribution of these amenities in the labor market, which may be driven by the production technology rather than worker preferences.

We also contribute to the literature estimating worker preferences using hypothetical choices (or "vignettes").[5] In a large, US-based study, Maestas et al. (2023) document worker preferences for job amenities using a hypothetical choices study similar to our setting. Maestas et al. (2023) find a small overall role for amenities they measure in explaining the gender gap in compensation. However, the amenities they study do not include those which we find are especially valuable to women (avoiding on-call work and evening work in particular, as well as the ability to vary work time for family reasons).[6] Before this larger work in

[4]In related work, Fredriksson et al. (2025) study how exogenous shocks to outside options affect a worker's mobility and their ability to bargain for a wage increase at their present firm.

[5]Notable alternative approaches include structural methods, discussed below, and the approach by Anelli and Koenig (2021), which uses bunching around thresholds for workplace injury compensation.

[6]Their attributes do include "setting one's schedule" but we find that this attribute does not seem to be differentially important to men and women, despite its apparent correlation with the attributes that we find to be important. One reason for this may be that women do not especially value being able to set their own schedule, beyond being able to adjust work time

the US, Eriksson and Kristensen (2014) use this vignette method in Denmark and provide a summary of its history in the marketing literature. Eriksson and Kristensen (2014) include health insurance, a home pc with internet, job training, and flexible hours in their vignettes, but do not focus on gender differences in the preference for flexibility or on the link between trends in the administrative data in terms of worker-firm sorting and the amenities offered at the firm. While many hypothetical job choice studies are unincentivized, our setting incentivizes truthful reporting of preferences in a methodology similar to Kessler et al. (2019)—participants are giving information about job vacancies aligned with their preferences based on their choices in the study. Our results echo the results of Mas and Pallais (2017), who focus specifically on the preferences of workers for avoiding employer-induced hours irregularity/unpredictability in a field study with workers applying to telemarketing jobs. Using worker flows across jobs in Swedish administrative data linked to the characteristics of jobs measured at the occupation level, Hotz et al. (2017) also emphasize the importance of predictability to women around the time that they become mothers.[7] Finally, our results complement work using vignette studies focused on other important aspects of women's preferences for workplace attributes, including Schuh (2024), Nagler et al. (2023), and Folke and Rickne (2023), who emphasize workplace composition, performance pressure, and avoiding jobs with workplace environments hostile to women. Based on Folke and Rickne (2023), Hampole et al. (2024), and Humlum et al. (2025), the work environment is an important dis-amenity, but unfortunately we do not have data on this job characteristic in the LFS. Based on this literature, incorporating some measure of workplace culture into our calculations would likely further reduce the gender gap in total compensation.

Finally, our results also contribute to the literature on the role of firms in explaining gender differences in pay. Card et al. (2015) document the role of firms in explaining the gender pay gap through the lens of a Oaxaca-Blinder decomposition. Tannenbaum et al. (2025) later does this in the US and with a focus on motherhood. Both papers find that women sort into lower pay firms and that women at a given firm are paid less than men, conditional on their own skill as measured by an AKM wage decomposition. Our results suggest that firm quality is multi-dimensional, and that high pay does not always signal high productivity, desirable firms. Indeed, we see that women and men's preference for firm types begin to differ, especially after childbirth, such that women begin sorting away from high paying firms that have measurably worse amenities on several dimensions. Thus, our results contribute to the pay premium literature by broadening

as needed. Our research highlights the importance of stating amenities in ways that are interpreted similarly by workers/study participants and researchers.

[7]Other notable work on the value of workplace flexibility to employees includes He et al. (2021) and Wiswall and Zafar (2017). Using a field experiment in Chinese job ads, He et al. (2021) find evidence that workers value workplace flexibility. In a hypothetical choice experiment using US college students, Wiswall and Zafar (2017) find that female students have a higher willingness to pay for job stability and flexibility compared to male students. Our setting narrows the jobs attributes most important to workers and we connect these attributes to firms in a matched administrative data setting to understand how these relate to other measures of firm preferences and sorting around motherhood.

the definition of firm quality.

2 Setting and Data

2.1 Institutional setting

The study focuses on the Danish labor market, where female labor force participation is high even among mothers of young children. Over the period of our study from 2008 to 2019, the average labor force participation rate for Danish mothers with children at home was 79%, compared to 84% for fathers in the same situation.[8][9] This matters for our empirical strategy, which uses survey responses on job attributes that are available only for employed individuals. Fortunately, among OECD countries, Denmark stands out for its high employment rate overall and minimal employment decline around motherhood.[10] The high participation rates for both genders in this context suggest that our findings are unlikely to be influenced by selection into the labor force.[11] However, a gender gap remains on the intensive margin: women work approximately four hours fewer per week than men and are more likely to work part-time. Specifically, 27% of women in Denmark work part-time, compared to only 9% of men.[12]

Danish labor markets feature significant gender-based sorting across industries, occupations, and firms. Gallen et al. (2019) report that although the gender pay gap has narrowed over the past 30 years, a considerable gap of approximately 20% remains among recent cohorts, half of which cannot be attributed to hours, occupation, and education/field of study differences. They attribute this remaining disparity in pay to the differing impacts of parenthood on men and women.

Aside from leave schemes, jobs differ according to amenities, some of which are more amenable to combining parenthood and careers. In terms of amenities, Scandinavian workplaces are generally characterized by a high degree of trust and autonomy and flatter organizational structures.[13] Scandinavian workplaces are

[8] See Statistics Denmark, Statistikbanken, `https://www.dst.dk/da/Statistik/emner/arbejde-og-indkomst`.

[9] Note that 2008 marks the beginning of the financial crisis, which led to a rise in the unemployment rate; however, from mid-2011 on, unemployment rates stabilized and began to decline. Thus, the Danish economy was generally in recovery for most of the study period. To account for business cycle fluctuations, we include year fixed effects in our analyses.

[10] Employment around motherhood is plotted in Appendix Figure A1. As discussed by Kleven et al. (2024) there is about a 13 percent employment "motherhood penalty" in Denmark using mothers in slightly earlier cohorts than ours. We find something similar in our data. For comparison, Kleven et al. (2024) measures the employment motherhood penalty as 50% in South Korea, 25% in the US, and almost 40% in Austria.

[11] During the period of our study, there are no reforms to maternity or paternity leave. The most recent reform before our study period took place on March 27, 2002, extending parental leave to 52 weeks. Of this, 4 weeks before birth and 14 weeks after birth are earmarked for the mother, while 2 weeks (within the first 14 weeks after birth) are reserved for the father. The remaining 32 weeks, offered at a reduced benefit rate, can theoretically be shared between parents but are predominantly taken by mothers. Lassen (2023) reports that mothers extended their leave by 5 additional weeks following this reform. For the next two decades, the parental leave scheme remains unchanged until a reform on July 1, 2022, equalizes earmarked leave to 2+9 weeks for each parent.

[12] See Statistics Denmark, AKU, `https://www.dst.dk/da/Statistik/dokumentation/metode/aku-arbejdskraftsundersoegelsen`.

[13] Earlier research has shown, however, that such organizational work practices do not necessarily reduce gender wage gaps (Datta Gupta and Eriksson, 2012; Zimmermann, 2021).

also known to give strong priority to amenities that help to bring about a better work-life balance. In part, such a focus has been a natural demand of a growing female work force. Women in Denmark entered the labor market in large numbers, especially in the 1970's, the decade in which the public sector in Denmark expanded rapidly (Rosen, 1997). Not surprisingly, Denmark ranks high on work-life balance, with its shorter negotiated 37-hour work week, five weeks of paid holiday a year and greater leisure time enjoyed by working individuals.[14] As Danish employed females still do the majority of housework and childcare at home (Bonke and Christensen, 2018), they would arguably place value on these types of amenities. In this paper we observe amenities at the level of the individual worker, enabling us to infer whether women and men in the Danish labor market place different values on family-friendly job amenities and how these valuations are tied to firm quality and longer-term labor market outcomes.

2.2 Matched Employer-Employee Data

The administrative data come from the eIncome Register of Statistics Denmark combined with the Business Register and the Population Register of Statistics Denmark. The eIncome Register is based on information reported to the Ministry of Taxation. It includes monthly contractual hours worked, employment duration, firm id, and establishment id for each worker in Denmark aged 16-65 from 2008-2019, as well as exact start- and end-dates of employment. Using a unique person-id harmonized across all registers available in Statistics Denmark, we link these data to information about the distance between a worker's home and workplace, their age, gender, the date of birth of their first child, their occupation (from union records), and their education. The administrative data further allows us to compute measures of firm ranks based on worker compensation and worker mobility patterns. We outline the computation of these measures in Section 3. Similar administrative data have been used in many recent papers studying trends in the gender pay gap in Denmark (Kleven et al. (2019); Gallen et al. (2019); Gallen (2023); Borghorst et al. (2024), among others). Our paper adds a link using the unique person identifier to that individual's response in the Labor Force Survey of Denmark.

[14] OECD Better Life Index, `https://www.oecdbetterlifeindex.org`.

2.3 Labor Force Survey

We compile a dataset of Danish Labor Force Surveys (LFS) conducted by Statistics Denmark from 2008-2019. Each yearly LFS surveys around 50,000 individual respondents sampled from the Danish working age (15-74 years old) population.[15] Respondents enter the sample throughout the year and are surveyed four times on a quarterly basis. They are asked about their labor market status and a range of detailed information during a specified reference week. Respondents answer additional questions about the number of working hours, usual hours, when working hours are placed (evening, weekends), full time or part time work, shift work, working from home, whether start- and end- times of work are fixed, and whether employers expect workers to be on call. In addition to the recurring basic questionnaire, in some years questions on various topics are surveyed. In these adhoc supplements to the the LFS, respondents have been asked questions about whether they are able to vary work time for family reasons, whether they or their employer decide their work hours, whether they decide the content of their work tasks, and whether they have to work under time pressure. These supplementary questions are unfortunately available only in 1 to 3 years (depending on the variable), and draw from a smaller number of respondents. Given their potential significance in explaining mothers' preferences for workplace amenities, we include these factors in our analysis to the extent possible.

The LFS does not include information linking workers to specific firms, so we rely on a monthly wage register (BFL) for this purpose. To connect a worker to a firm, we identify the workplace from which the worker receives their wage during the month that includes the reference week. If a worker receives wages from multiple employers during that month, we select the employer who paid the highest wage, as the LFS specifies that questions pertain to the worker's main place of employment. If a reference week spans two calendar months, we assign it to the earliest month. In the rare case that a respondent changes firms during the reference week, we assume their response pertains to the firm they were employed at the beginning of the week.

Table 1 presents summary statistics on the key variables in our analysis, combining data from the LFS with variables from the matched employer-employee dataset. Many workplace characteristics captured in the LFS relate to the family-friendliness of the work environment. For example, one variable measured in every wave of the LFS asks whether a worker's start and end times are fixed or flexible. The data shows that 39.2% of women have variable start and end times, compared to nearly 45% of men. Another measure of work irregularity is the absolute difference between usual and actual hours worked, where women also exhibit substantially greater regularity than men. Additionally, women are ten percentage points less likely than men to report being expected to work during their free time. During this period (notably pre-COVID), 30%

[15] The minimum number of responses per survey year is 46,000 and the maximum is 53,000.

of workers report being able to work from home. Another variable of interest is whether a worker exceeds 45 hours per week, which cannot be observed in administrative data due to the contractual cap of 37 hours per week. However, survey data reveal important differences in intensive working hours among full-time workers. We find that seven percent of workers fall into this "long hours" category, and men at almost twice the rate as women. Finally, our data shows a significant difference in distance to work for both genders. On average, men commute 28 km to work, while women travel only 19 km to work.

2.4 Preference Elicitation Survey

In order to estimate the value of amenities to workers, we use random variation generated by a hypothetical choice experiment with a representative sample of Danes available via the European survey firm Bilendi. The exact text of the survey is available in Appendix C.1. Participants were initially screened based on their current employment status, as we condition some of the survey variation on their current wage. Recall from Section 2.1 that employment rates are very high for both Danish men and women, including mothers and fathers. We collected background information about the respondent's current job, including details on the job characteristics that are relevant to the dimensions we examine in the hypothetical choice section of the survey. Summary statistics for the prevalence of these characteristics in the surveyed population are available in Table 2. Consistent with our observations from the LFS (cf. section 2.3), we find in our sample that women are less likely to have control over their working hours, to work long hours, and to work during their free time. In addition, we find that women are less likely to work far away from home. Table 2 provides further details on the sample population, which is representative of Danish workers. The education levels of our respondents are roughly comparable across genders, with women having a higher likelihood of holding a Master's degree and a lower likelihood of having vocational training compared to men. Most of our respondents work in professional roles, with a higher proportion of men in managerial positions and a lower proportion in clerical support and service occupations compared to women. Next, we informed participants that we would provide recommendations for current job vacancies based on their survey responses.[16] Because of this, even though choices are hypothetical, the respondents are incentivized to make choices according to their true preferences.[17] Next, respondents are shown thirty pairs of job profiles and asked to choose which job, a or b, they would most prefer.

[16]Participants are shown thirty contrasts in the survey, such that we are powered to make such recommendations at the individual level. For each individual, we find 3 jobs among current Danish vacancies which are in the same occupation type as the individual and which have all of the job attributes which an individual values at levels statistically significant at the 10% level in the preference elicitation. If there are no statistically significant attributes, we simply find three well paying vacancies in the individual's occupation. We passed these recommendations on to individuals about three months after the completion of the survey.

[17]More than 50% of respondents indicated wanting to receive these job recommendations, despite being currently employed.

In each job, we randomly vary a set of job amenities, defined based on the set of LFS measured amenities. To ensure consistency, we aim to frame our wording as closely as possible to the measures used in the LFS. Specifically, we select the following characteristics: whether the worker chooses working hours, whether the start and end times of work are variable, whether hours vary each week, whether the job has long hours (longer than full-time), full-time, or part-time hours, whether it is possible to vary work time for family reasons, whether the job includes evening work, whether one is expected to be available to work in their free time (on call), whether it is possible to work from home, whether the pace of the job includes working under time pressure, whether work is near ($< 15km$) or far ($> 30km$) from home, whether the worker decides the content of their tasks, and how much the salary is as a percentage of their current wage. All characteristics were randomly chosen for a given profile with equal probability across potential choices, and pay was a random number between 100% and 120% of current pay.

3 Methodology

In this section, we discuss the various data construction exercises undertaken and the regressions used in subsequent analyses.

We begin by describing how we measure average characteristics of firms in section 3.1. We rank firms in three ways. First, we consider the wage premium offered to workers in a given firm j, controlling for the composition of its labor force. This gives us the commonly used AKM—measure of firms' pay premia. Second, we consider which firms are popular according to workers using a method that infers firm ranking from the direction of mobility of workers, denoted *pagerank* in relation to its use in Google's internet page ranking. It was first applied to labor markets by Sorkin (2018). Finally, as a robustness check, we use a transparent measure of firm popularity among workers by simply measuring the rate at which firms hire workers from other firms, relative to hiring them from unemployment. This is called the poaching rate, following Bagger and Lentz (2018). We estimate each firm rank for both genders separately, as well as for the mixed-gender sample.

We then outline the construction of firm-level amenity measures in Section 3.2, computation of event studies in Section 3.3 and the willingness to pay in Section 3.4.

3.1 Firm Rankings

AKM Decomposition We relate the amenities we observe to the pay premium of the firm. To do this we estimate an AKM decomposition of worker pay in the administrative matched employer-employee data according to

$$w_{it} = \alpha_i + \phi_{J(i,t)} + X'_{it}\beta + \varepsilon_{it}$$

where w_{it} is the log earnings of worker i in year t, which are modeled as a function of time-invariant worker characteristics captured in the fixed effects, α_i, time-invariant firm characteristics captured in the firm fixed effects for firm J employing worker i at time t, $\phi_{J(i,t)}$, and covariates X_{it}. We choose as covariates worker age interacted with year and schooling. The fixed effects are estimated relative to an omitted baseline, and the model is identified from wage differences of job movers. The person effect is often interpreted as a worker's ability, rewarded equally across all firms. The firm effect measures the wage premium all workers at the firm receive. AKM firm fixed effects are identified for the connected set of firms, and we focus on the largest connected set.[18] A long literature documents the importance of firm pay premia in explaining the dispersion of wages and worker sorting (Song et al., 2018; Abowd et al., 1999; Goux and Maurin, 1999; Abowd et al., 2002; Bonhomme et al., 2019, 2023a), but less is known about the relationship between these pay premia and other characteristics of the firm, notably inferred or measured amenities.[19]

Pagerank We construct the pagerank following Sorkin (2018). Define with M^0 the matrix of mobility choices of N workers across firms, where rows denote destination firms and columns denote origin firms, ie. M^0_{kj} denotes the number of workers from firm j that choose firm k and M^0_{jk} denotes the number of workers from firm k that choose firm j. Further denote with S^0 a diagonal matrix with the kth entry denoting the sum of mobility choices $S^0_{kk} = \sum_j M^0_{jk}$. Also denote the common value that workers associate with a firm k, composed of monetary as well as non-monetary work aspects, as $\tilde{V}^{EE}_k$. When choosing a firm, workers take into account both the common value that the firm provides $\tilde{V}^{EE}_k$ as well as an idiosyncratic evaluation ι, distributed according the type I extreme value distribution with scale parameter 1. The total utility of a worker at a given firm is hence $\tilde{V}^{EE}_k + \iota$. As a result, the probability of choosing firm k over another firm j is $\frac{\exp \tilde{V}^{EE}_k}{\exp \tilde{V}^{EE}_k + \exp \tilde{V}^{EE}_j}$. Using cross-pair mobility, aggregation and vector notation, we can hence write the equilibrium equation linking worker mobility to firm valuations as

$$S^{0^{-1}} M^0 exp(\tilde{V}^{EE}) = exp(\tilde{V}^{EE})$$

[18] As typical in these settings, the largest connected set covers nearly all workers and firms, see Gallen et al. (2019).
[19] Notable exceptions are Sorkin (2018); Sockin (2022); Morchio and Moser (2024).

We calculate the page rank, $exp(\tilde{V}_k^{EE})$, as the fixed point in the last equation. Note that pagerank measures are identified in the strongly connected set of firms, which requires both inflows as well as outflows of workers at each firm within the set.

Poaching Rate We follow Bagger and Lentz (2018) to construct a poaching rate, defined as the fraction of total new hires who are hired from other firms. Specifically, the poaching rate is computed using the number of poached workers, N_j^{EE}, and the number of hires from unemployment, N_j^{UE}.

$$\pi_j = \frac{N_j^{EE}}{N_j^{UE} + N_j^{EE}} \tag{1}$$

For each firm in our analysis data, we record the share of all hires across all years that come directly from other firms. To do this, we consider a hire as being from unemployment if the worker did not have a job within two weeks of the beginning of the new employment relationship. As in Bagger and Lentz (2018), we recode unemployment of less than 13 weeks followed by return of the worker back to the same employer as part of the original employment spell. Finally, we consider all non-employment spells to reflect unemployment, whether or not the worker actually applied for or obtained unemployment benefits.

3.2 Amenities at the Firm Level

In addition to directly using each worker's own response to survey questions, we also aggregate worker responses at the firm level over time to construct a measure of "average" amenities at the firm. We use these firm-level aggregates as regressors when firm rankings are the dependent variables of interest. For characteristics stemming from LFS questions, we average responses of employees in the LFS across years within the firm to construct a measure of aggregate amenities at the firm-level. For example, if twenty employees of a firm are surveyed in the LFS across all survey years, and five of these workers indicate working from home, then that firm is given a work-from-home value of twenty-five percent for all employees, including the never surveyed employees. We view these aggregates as proxies for the actual firm benefits, which are not observed or measured.

3.3 Event Studies

We measure the evolution of women's and men's outcomes around the time they become parents using the event-study approach popularized by Kleven et al. (2019). For an outcome y_{it} of individual i in calendar

year t, we estimate the effect of year-since-first-birth using the following specification:

$$y_{it} = \sum_{s=-5}^{10} \delta_s \mathbf{1}\{s = t - M_i\} + \sum_a \alpha_a \mathbf{1}\{A_{it} = a\} + \gamma_t + \varepsilon_{it} \tag{2}$$

where M_i is the year in which individual i had their first child, A_{it} is their age, and γ_t represents calendar year fixed effects. The event study coefficients of interest are δ_s, which capture the average difference between individuals whose first child was born s years ago and others who do not yet have children, residual of age and year effects.

3.4 Measuring Willingness to Pay

To quantify the monetary value workers assign to specific amenities, we manipulate job characteristics exogenously and ask workers to make choices over jobs with varying characteristics. To assess the potential magnitude of omitted variable bias in worker flows, we compare our incentivized survey-based estimates of willingness to pay (WTP) with those derived from a regression framework using detailed administrative data. We present each methodology in turn.

Survey Experiment We assume individual i of gender g has preferences over job j, which can be approximated with a linear indirect utility function in job characteristics X in choice pair c:

$$V_{ijc} = \gamma^g + X'_{ijc}\beta^g + \varepsilon_{ijc}$$

The probability that a participant selects job a over job b in choice c is:

$$P^g\left(V_{iac} > V_{ibc}\right) = \alpha^g + \left(X_{iac} - X_{ibc}\right)'\beta^g + \varepsilon_{ic} \tag{3}$$

We estimate the following specification using a linear probability model (LPM):

$$C_{ic} = \alpha^g + \left(X_{iac} - X_{ibc}\right)'\beta^g + \varepsilon_{ic} \tag{4}$$

where the dependent variable C_{ic} is an indicator for whether the individual chose job a over job b in a given job contrast. The independent variables are the differences in the characteristics of job a, X_{iac}, and job b, X_{ibc}, in choice pair c. The characteristics we control for are those observable to the survey participants: whether the worker chooses working hours, whether the start and end times of work are variable, whether hours vary each week, whether the job has long hours (longer than full-time), full-time, or part-time hours,

whether it is possible to vary work time for family reasons, whether the job includes evening work, whether one is expected to be available to work in their free time (on call), whether it is possible to work from home, whether the pace of the job includes working under time pressure, whether work is near or far from home, whether the worker decides the content of their tasks, and how much the salary is as a percentage of their current wage. α^g captures the propensity to select the left job profile (job a) in a way that is unexplained by characteristics. We compute willingness-to-pay in terms of a percentage increase in current wages by taking the ratio of the coefficient on an attribute of interest to the coefficient on job salary, as a percentage of current salary. As discussed in Adams et al. (2025), it may be important to distinguish between "employer-led" flexibility and "employee-led" flexibility. We account for the possibility that hours flexibility is differently valuable to workers when the employer sets a worker's schedule compared to when the worker sets their schedule by including interactions terms in our WTP regression.

Administrative Data We also examine how closely the WTP estimates align when we assume that the administrative data fully capture all relevant amenities and supply-side constraints. To do so, we regress outcomes reflecting worker revealed preferences $y^g_{i(j,t),j,t}$, such as PageRank, poaching rank, and an indicator for firm exit, on job pay and amenity attributes, $\tilde{\Psi}_{ij(j,t),j}$, and X_j, respectively. We further allow for idiosyncratic shocks, captured by ε_{ic}. We capture job pay attributes using coworker average wages together with individual fixed effects. In the presence of individual fixed effects α_i, variation in $w_{-i(j,t),j,t}$ reflects differences in average coworker pay that are orthogonal to individual i's time-invariant characteristics. As such, $w_{-i(j,t),j,t}$ captures firm-specific pay premiums, consistent with the interpretation of wage-setting differences across firms rather than differences in worker composition.[20]

$$\begin{aligned} y^g_{i(j,t),j,t} &= \tilde{\beta}^g_0 + \tilde{\beta}^g_w \tilde{\Psi}_{ij(j,t),j} + X_j \tilde{\beta}^g_a + \varepsilon_{ic} \\ &= \beta^g_0 + \beta^g_w w_{-i(j,t),j,t} + X'_{i(j,t),j,t} \beta^g_a + \alpha_i + \varepsilon_{ic}, \end{aligned}$$

where $y^g_{i(j,t),j,t}$ denotes the outcome of interest for individual i at firm j in time t, $w_{-i(j,t),j,t}$ is the log average wage of coworkers (excluding i), and $X_{i(j,t),j,t}$ is a vector of amenity indicators $I_{x_{i(j,t),j,t}}$ for k distinct amenities. From these estimates, we infer the WTP by equating the value of a job with and without a given amenity:

$$\beta^g_w w_1 + I_{x_{i(j,t),j,t}} \beta^g_a = \beta^g_w w_2,$$

[20]Note that AKM firm pay premia Ψ_j are estimated under different assumptions on worker mobility and hence would be an inconsistent regressor in this setting.

which yields the implied willingness to pay as:

$$WTP^g = \frac{w_2 - w_1}{w_2} = 1 - e^{-\frac{\beta_g^g}{\beta_w^g}}.$$

We compute standard errors using the Delta Method, including for gender-specific differences. The corresponding methodological details are provided in Appendix B.1.

4 Results

In the following, we describe our empirical results. First, in Section 4.1 we analyze how the amenity differences described above vary around the event of parenthood. Next, in Section 4.2, we describe the changes in the types of firms women work in around motherhood, and how our conclusions change when we control for the amenities at those firms. These results are consistent with a role for compensating differentials in explaining some of the gender pay gap, but are ultimately correlations which may arise from other models of worker and firm matching as well. In order to quantify the importance of compensating differentials, Section 4.3 assesses the monetary value of these amenities using our preference elicitation survey, and combines these estimates with the administrative data on worker employment patterns.

4.1 Amenities and Parenthood

Figures 1 and 2 present event studies showing how amenities evolve around the birth of a woman's first child. We will begin by discussing schedule-related variables. While there are no trends in the years leading up to birth in whether start and end-times of work are variable (1b), in the irregularity of hours (1c), in working long hours (1d), and in working in the evening (1f), all of these become substantially less likely upon motherhood. We see smaller effects in the dimension of worker autonomy. Figures 1a, 1e, 2a, and 2e show no trends around motherhood in control over working hours, ability to adjust work-time for family reasons, being on call, and deciding content of tasks, respectively.[21] We also do not see effects on the propensity to work under time-pressure (Figure 2c). Together, these results suggest that new mothers transition to jobs with predictable start and end times, avoid long and irregular hours, and evening work, but do not necessarily do this by getting access to jobs with flexible scheduling, consistent with the interpretation in Hotz et al. (2017).

We corroborate in our data the trends well established in the literature concerning distance to work and earnings impacts of motherhood. We find that women tend to work closer to home after motherhood (Figure

[21] Unfortunately, some of our information on amenities comes from questions which are asked only in one supplement to the LFS in 2019, making it possible to observe women 2 years pre-birth but not more.

2d): in the population overall, the mean distance between work and home is 23,101 meters (see Table 1), by 10 years after motherhood, women work 4,000 meters closer to home than in the year before motherhood. There is evidence of a pre-birth trend in this distance, but the trend is in the opposite direction (so women get increasingly farther from work as they get closer to having children in the pre-period, but this difference is small relative to post-birth). We also corroborate in our sample a large impact of children on women's labor market earnings. Our estimates of the earnings impacts of motherhood are similar to estimates in Kleven et al. (2019): motherhood is associated with a long term reduction in yearly earnings of about 70,000 DKK, about 20% of counterfactual earnings.

Unlike Kleven et al. (2019), we cannot restrict the sample to be balanced. We might be concerned that there is differential selection of women into the labor force around motherhood. Appendix Figure A1 shows that there is an exit of about 10% of women following motherhood from the labor force. Partly this seems to be reflecting differential non-employment of various cohorts of women, since in the balanced panel this effect is reduced to about 7%. To also study whether amenities before child birth correlate with labor force participation after birth, we examine the characteristics of the workplaces of mothers-to-be. Appendix Figure A2b shows that women who do not continue working after birth are on average working at firms with less temporal and spacial flexibility at the job. Conditional on working, there are not composition concerns with the event studies we present: a balanced panel gives the same estimate of the impact on earnings conditional on working as our less-restricted data, as in Appendix Figure A3.

Figures 1 and 2 also present the evolution of amenities around the event of becoming a father for the first time. Where we saw large effects for women—the timing of work, we see muted and shorter-term effects for men. By about five years after becoming fathers, men revert to pre-fatherhood levels of irregular hours, long hours, and evening work, and have only a five percentage point lower probability of working in a job with variable start and end times. There is some evidence that fathers reduce their rate of being on call and their rate of choosing their hours in the short term. In general, there is little impact of parenthood on men's amenities or on their labor market earnings.

4.2 Parenthood and Firms

We next present evidence that controlling for amenities accounts for more than half of the movement of women into lower-pay firms around motherhood, and largely accounts for the sorting upon motherhood away from male-preferred firms.[22] Figures 3 and 4 display the result of estimating equation (2) on pay,

[22]In order to eliminate concerns that differences in firm-quality measures are driven by the sets of firms identifying these measures, we present results only for the largest common set of firms across measures and amenities. In particular, this is the set of firms with at least 10 movers in the largest connected set. Differences in the sets for the measures of firm quality are represented in table 3. Our firm measures correlate positively, in a weighted and unweighted sample as shown in table 4 and 5, respectively.

firm pay premia, and pagerank. The black line in these figures represents estimates without accounting for firm-level amenities, whereas the blue line incorporates controls for the amenities available at the firm level.

There are several econometric challenges we face when implementing these regressions, and we discuss each in turn before turning to the results. First, these regressions are subject to potential omitted variable bias. When we include amenity controls, we do not interpret the coefficients as identifying the causal effect of amenities on pay premia or firm-rank measures. Rather, we view these results as an accounting exercise that compares firms with identical observable amenities - which may also share similar unobservable amenities - and examines how these restricted comparisons differ from unconditional comparisons across all firms. If we observe that including amenity controls attenuates the relationship between outcomes and event time, it is reasonable to expect this attenuation to be even greater under perfect measurement of amenities.[23] Second, amenities are measured with error since we construct firm-level averages from survey responses. These survey responses represent a random sample of the population, leading us to assume that measurement error is classical.[24] Additionally, we employ amenity measures as control variables rather than variables of primary interest, so we do not focus on the estimated coefficients on amenities themselves. Consequently, the standard result that measurement error in independent variables causes attenuation bias is not a concern in our analysis. Third, pagerank and firm pay premia are generated outcome variables, requiring adjustment of standard errors for the event time coefficients.[25] We obtain valid second-stage standard errors through simulation-based variance estimation using firm-level estimates of the variance of firm rank measures. For the latter, we follow Kline et al. (2020)'s leave-one-out approach for firm pay premia. We employ a novel method to construct standard errors for the network statistic pagerank based on MLE estimation techniques. This method exploits the fact that the MLE estimate for pagerank is identical to the solution obtained in Sorkin (2017), enabling derivation of standard errors through classical MLE-based methods. Additional details are provided in Appendix section B.2.

Figure 3 displays the result of an event study using earnings in the top row, and an event study of the average pay premium of the firms where women work in the bottom row. First, the earnings impact of children is attenuated when controlling for the amenities women have access to. Second, the portion of pay associated with the firm in which women work—the firm fixed effects in an AKM decomposition—is largely attenuated when accounting for the amenities women have access to. Accounting for amenities reduces the drop in wage premia around child birth by one-half to two-thirds. The black line presents event

[23] See Bound et al. (2001) for the discussion of the effect of measurement error in covariates.

[24] In our setting, this assumption is particularly plausible for larger firms with more survey respondents.

[25] In our setting, the underestimated standard errors from using generated firm-level dependent variables present greater complexity than typical two-stage regressions. This relates to the well-studied problem of "limited mobility bias" when estimating firm pay premia effects on total wage variation (see, for example, Bonhomme et al. (2023b); Kline et al. (2020); Andrews et al. (2008) and Kline (2024) for a review) and estimation error from finite-sample network statistics with potentially sparse data for pagerank and poaching rank (see, for example, Nowakowicz (2024)).

study regressions including only event-year, age, and year fixed effects. The blue line presents event study regressions in the same sample of women, but adding the average firm-level responses to LFS questions on amenities, as well as own commuting distance.[26] In the left-hand-side, we use all amenities, but only include those firms which are present in each year of the administrative data to avoid changes in the composition of firms around the event, since some survey questions are asked only in 2019 and thus skew the sample toward firms present in the year 2019.[27] In the right-hand-side of Figure 3, we present estimates of the same two event studies, but in the sample of firms for which we have data only on the amenities which are asked about in every survey year. The questions asked in every survey year concern hours, irregularity in hours, work from home, evening work and we also control for commuting distance at the individual level. Table 6 summarizes the differences in the samples across these specifications. The event studies depicted in blue and black lines do not have different samples—both include only firms with information on amenities. We note that the black lines are similar across regressions, meaning that the sample of firms for which we see responses to more amenities is not selected in a way related to motherhood.

We find that accounting for amenities attenuates the motherhood penalty as well as the declining relationship between firm pay premium and years since motherhood. Compared to the year before having the child, a women whose oldest child is five years old works at a firm with a more than two percentage point lower pay premium (Figures 3d and 3c). Controlling for the amenities at her firm, this difference is reduced to less than one percentage point. This suggests that part of the movement to lower pay firms is explained by the fact that these firms have different types of amenities concerning temporal and spacial flexibility, which are particularly important for women around the time they have children.

When considering measures of revealed preference, it is empirically important in our setting to distinguish between firms popular among women and those popular among men. We see in the black lines of Figure 4 that, around motherhood, women shift to firms preferred by women and away from firms preferred by men. Using the preferences of all workers, as in the top row, masks substantial re-sorting around motherhood. We see a similar pattern—motherhood is associated with a shift away from firms preferred by men and towards firms preferred by women—using the poaching measure of preferences, which simply uses the ratio of hires

[26] For each LFS question used in our study: choosing working hours, variability of start and end times, usual vs. actual hours, long hours, possibility of varying work time for family reasons, evening work, on-call duty, working at home, working under time pressure, and choosing the content of tasks, we compute a firm-level average across all years of employee responses. We use these firm-level averages, plus a worker's own commuting distance, as controls in the event study regressions depicted in blue in Figures 3a, 3c, A4a, 4c, and 4e. Some of these amenities are measured only in 2019, so without further adjustments firms would be disproportionately represented if they are in the data in 2019. To avoid composition problems, we restrict to those firms which are present in the administrative data in ever year of the sample. Small firms are less likely to be in this sample, but firm size does not drive the effects we see. This can be seen in Figure 5 where we additionally control for firmsize. In Figures 3b, 3d, A4b, 4d, and 4f we do not require a firm to be present in each year and we use the firm-level average of answers to LFS survey questions on usual vs. actual hours, long hours, working from home, evening work, as well as each individuals' commute distance as controls in the blue event study regressions.

[27] Composition does become a concern if we do not make this adjustment—Appendix Figure A5 presents the results without this restriction. In this sample, the black line which does not include amenity controls follows a different pattern around motherhood than the pattern we see among firms overall.

from other jobs vs. unemployment as a measure of whether the firm is a high-type or low-type. The poaching rate effects are displayed in Appendix Figure A4. For women, the poaching rate may be a more reliable way to measure preferences as an outcome in an event study since firms popular among mothers will be measured as preferred by women overall in pagerank.

When we control for our proxies for amenities in these figures (the blue lines), we see that the negative relationship between years since event and the firms preferred by men completely disappears, suggesting that the reason women avoid these firms is that they do not have the types of amenities women value around motherhood. Controlling for amenities does not significantly impact how workplaces evolve around motherhood according to the ranking inferred by the movements of women across firms. Again, this relationship is somewhat mechanical, since those places that mothers move to are measured exactly as those places preferred by women in the pagerank metric.

4.3 The Monetary Value of Amenities

We next turn to estimating the value of amenities to those who receive them. We see in Table 1 that women are substantially more likely than men to work in jobs with set, predictable schedules, jobs which are near home, and to avoid evening work and long hours. Many of these differences are exacerbated around parenthood, as in Figure 1. These patterns are consistent with sorting by women into jobs and firms which offer predictability and time with children. However, it may also be the case that women would like to work in higher paying, longer hours jobs, but they are not hired for these positions. In addition, amenities may come bundled in jobs due to the technology of production. If we see that women are less likely to work in jobs requiring them to be on call, and also less likely to work in jobs with variable schedules, it may be that women do not object to variability in scheduling so long as it is done with advance notice.

Table 7 presents what we would infer as worker's willingness to pay for amenities if we ignored omitted variable bias and assumed that worker job changes reflected their preferences over amenities. We see valuations of avoiding evening work of 40% for women, 60% for avoiding long hours, and 46% for working from home. We do not take these estimates seriously, but they do highlight the likely magnitude of omitted variable bias in these regressions and why it is important to move beyond observational data to learn about the value of job characteristics to workers.

In order to estimate the value of amenities to women, we implement the incentivized hypothetical choice preference elicitation survey described in section 2.4. By presenting subjects with paired job vignettes, we measure the tradeoff made in wages and job characteristics by respondents. Figure 6 gives an example of the job contrasts that subjects see in our survey.

Table 8 presents the results of the coefficients in regression equation (4) separately for the male and female sample. We observe that men and women generally value job attributes in similar ways. The last column of the table gives the p-value of a test for whether the ratio of the coefficient of interest and the coefficient on wages is significantly different for men and women. We find statistically significant and economically meaningful differences in preferences concerning the ability to vary work time for family reasons, to avoid evening work, to being on call ("Expected to be available for work in free time"), to being able to work from home, avoid time pressure, and to work near home. All other attributes are similarly traded off against wages by men and women.

Turning to average differences in the preferences of mothers compared to women without children, we want the sample of women who are mothers to be similar in other characteristics to the set of non-mothers. We focus on survey respondents who are 27 to 42, in order to obtain a sample similar to what is in event study estimates in Section 4.1.[28]

Table 9 finds significant differences in mothers' WTP for the ability to choose their own working hours, to be able to vary work time for family reasons, to avoid evening work and on-call work, as well as a positive preference for being able to decide the content of their tasks among non-mothers. Among men, in Table 10, we only see significant differences in fathers' preference for (vs non-fathers' aversion to) long hours.[29] Overall, the vignette survey reveals a difference between mothers and non-mothers in measures of control over their work time. These same measures did not evolve around parenthood in the observational data. Consistent with the observational data, we see that mothers prefer to avoid evening work and among men, childless men have similar preferences to fathers. We hesitate to over-interpret these differences between parents and non-parents in our vignette survey. Since our vignette survey is only conducted on one cross-section of Danes in 2024, it is not possible to conduct an event study around the arrival of the first child (we do not know years until children for childless women and men and do not ask about the age of children for mothers and fathers). There are likely some differences between parents and non-parents—beyond whether they have children—driving the patterns we report.

To better understand the gender pay gap, we next ask, how do differences in WTP for various job characteristics affect our interpretation of the gender pay gap? The data reveal heterogeneity in the value of these amenities to workers which is correlated with their job choices. When we survey employed individuals, we also ask about the attributes they have access to in their own current job. For all attributes, we see

[28] The average age at which women give birth is 31.5 in 2023. Similar to event study, we include 5 years before and 10 years after this age. The results are similar with other cutoffs, and Appendix Table A1 gives the results using the full sample. In principle one would be concerned that women over 45 are 35% of the non-mother sample and these women do not identify the effect of motherhood in the event studies presented in the previous section. We do the same cutoff for men.

[29] When we expand to including all ages, we see suggestive differences in the value of variable start and end times to fathers and the ability to vary work time for family reasons.

in Figure 7 that workers with those attributes in their current job are more likely to select jobs with these attributes. These differences are highly significant for the ability to choose working hours, work long hours, vary work time for family reasons, work evenings, and work near home.[30]

In order to compute the gender gap in total compensation, we assign to each attribute the worker's WTP for this attribute among workers with similar characteristics (gender) and with access to this characteristic in their own current job, based on our larger LFS survey sample in the year 2019. For each worker i, we multiply an indicator of whether they report access to amenity a by our estimate of the average worker's WTP for this amenity, according to our survey, sum over amenities, add this to that worker's earnings, as below:

$$Compensation_i = I_i + \sum_{a \in A} WTP_a \mathbf{1}\{a_i\} \tag{5}$$

Our calculations are relative to a "default" job in which workers have set schedules set by their employer, without on-call work, evening work, or time-pressure. Workers are expected to be in the office, and do not work within 15 km of home. We present the gender gap in compensation using two different measures of the WTP for amenities. First, we use the overall average level in the survey population. Next, we calculate the WTP for each amenity separately for workers with access to that amenity and those without. We refer to this as an estimate which incorporates sorting.

We find that incorporating the value of amenities into our estimate of workplace compensation narrows the gender gap. Figure 8 presents compensation by gender using three definitions of compensation: earnings, earnings plus the value of amenities on average by gender, as described in equation (5), and earnings plus the value of amenities on average by gender for those with access to those amenities. The gender earnings gap conditional on working is 21 percentage points. The gender gap in compensation is 18 percentage points when we use average WTP measures from our survey. This modest reduction in the gender gap is due to a relative rise in female compensation when incorporating the value of amenities and a decline in male compensation when incorporating the value of amenities. When accounting for the fact that workers with access to particular amenities (or who work in jobs with what is considered by most to be a disamenity) tend to have higher valuations of those amenities, as modeled in Rosen (1986) and true in our survey (see Figure 7), we estimate a substantial reduction of the total compensation gender gap to 13 percentage points. This 38 percent reduction in the gender gap in compensation is due primarily to a substantial rise in the compensation of women when we incorporate their value of amenities.

[30]Due to constraints on the number of background questions we could ask in the survey, we did not ask about whether a worker experiences time-pressure on the job or whether they decide the content of their tasks.

5 Conclusion

This paper explores the relationship between job amenities and gender differences in pay arising due to childbirth. It also explores how amenities affect firm preferences of women and men. Firm preference is measured either by the AKM firm pay premium or by worker-mobility based measures of firm quality based on revealed preference such as the pagerank or the poaching rate. The motivation is to uncover whether a preference for amenities drives differing firm choices of men and women after birth, and how this preference relates to the motherhood penalty. Do mothers accept lower pay after childbirth in return for more family-friendly amenities which enable them to better balance family life and a career? To answer this question, we merge unique survey data on temporal and spatial job flexibility measures to the matched employer-employee administrative data and explore how amenities evolve around the birth of a woman's first child.

We find that impact of children on mothers' earnings is attenuated when controlling for amenities. Second, we find that amenities attenuates the firm pay premium decline after childbirth. Amenities also explain why women avoid firms that do not have the types of amenities that women value after becoming mothers. While these movements are potentially indicative of compensating differentials, they do not necessarily imply that women value these amenities in particular—amenities may be bundled and various forces, including discrimination, may constrain the ability of women to sort into those jobs that they prefer. In order to estimate the value of amenities to workers, we measure the tradeoff workers are willing to make between job characteristics and wages using an incentivized hypothetical preference elicitation survey. Women are found to prefer jobs in which they do not have to be on call or work evening hours, but there does not seem to be a strong preference for avoiding hours variability *per se*. Accounting for the amenities we measure in the data, the gender gap in compensation is reduced by 38%, to 13 percentage points.

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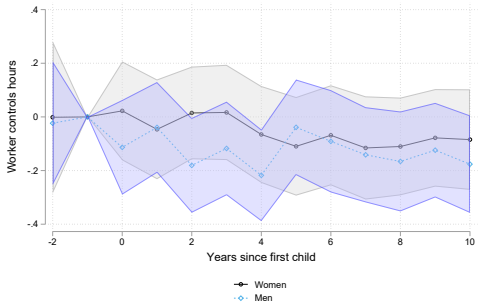
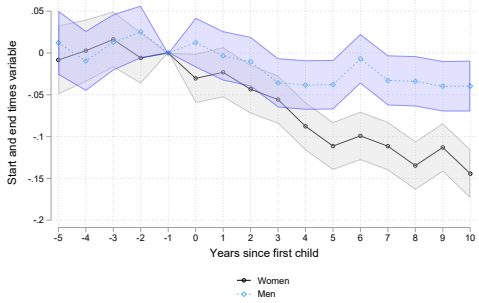
Figures

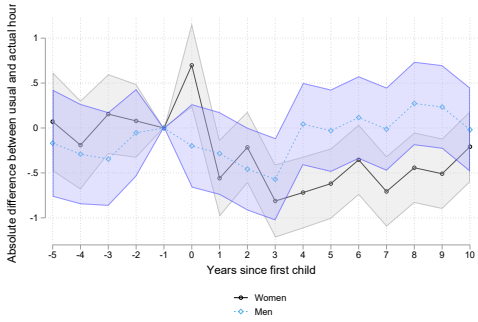
Figure 1: Parenthood and Amenities



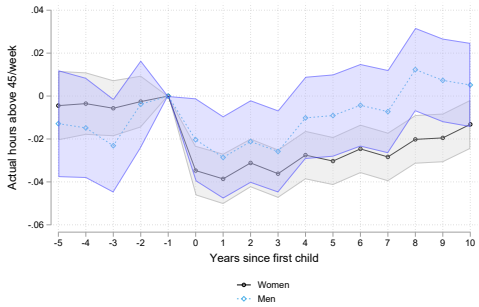
(a) Worker chooses working hours



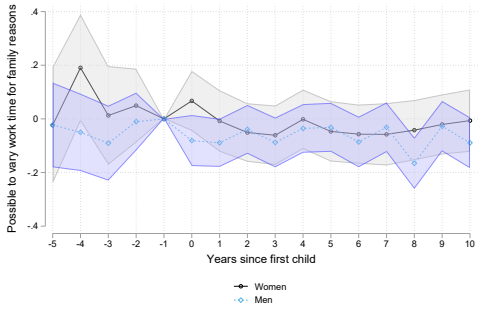
(b) Start and end times variable



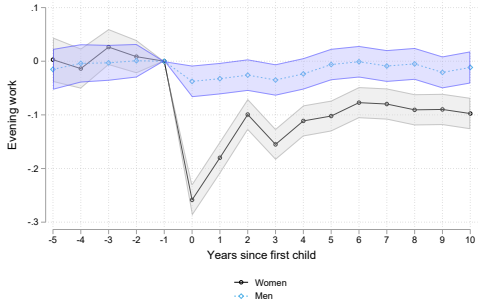
(c) Absolute difference between usual and actual hours



(d) Actual hours above 45/week



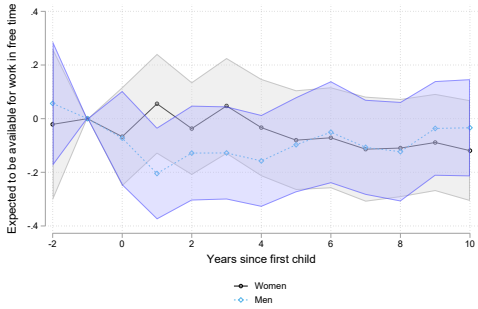
(e) Possible to vary work time for family reasons



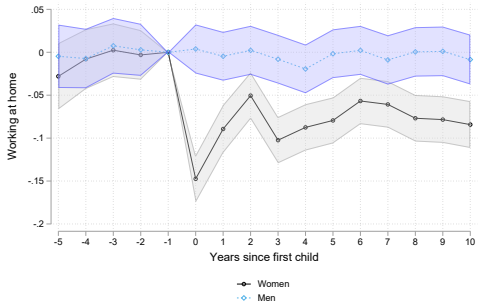
(f) Evening work

Note: This figure shows the relationship between years since first birth and various workplace amenities, as reported in survey data. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These regressions additionally include fixed effects for individual age and fixed effects for the calendar year.

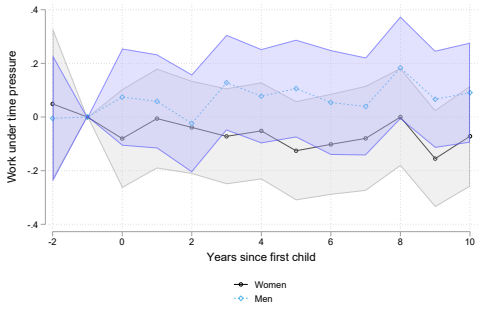
Figure 2: Parenthood and Amenities (cont)



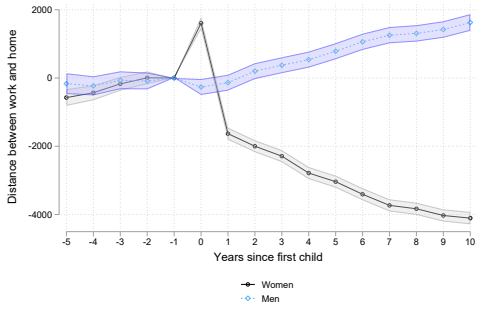
(a) Expected to be available for work in free time



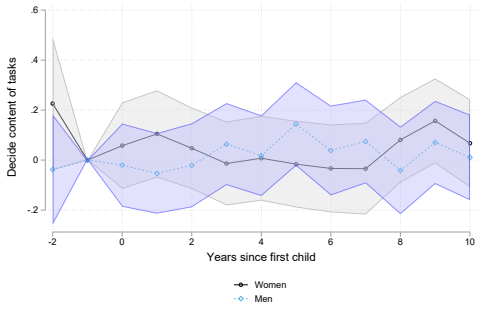
(b) Working at home



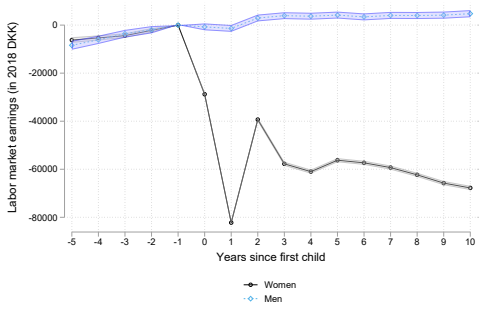
(c) Work under time pressure



(d) Distance between work and home



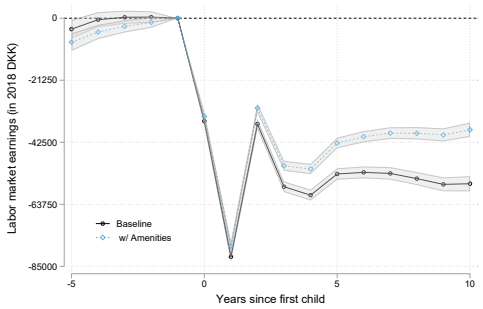
(e) Worker decides content of tasks



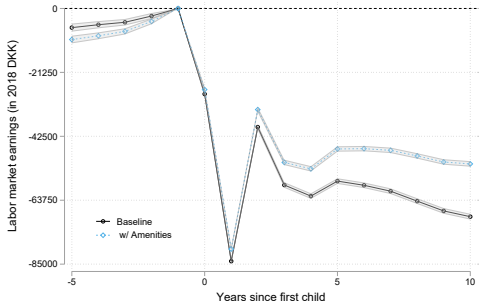
(f) Labor market earnings (in 2018 DKK)

Note: This figure shows the relationship between years since first birth and various workplace amenities, as reported in survey data. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These regressions additionally include fixed effects for individual age and fixed effects for the calendar year.

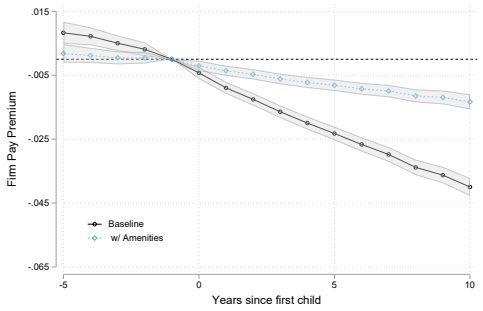
Figure 3: Accounting for Firm-Level Amenities—Pay Premia



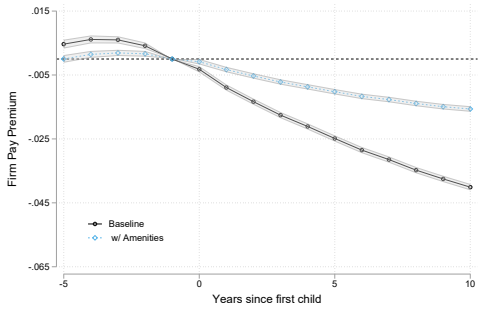
(a) All amenity data, total labor market earnings



(b) Including only amenities available in all years, total labor market earnings



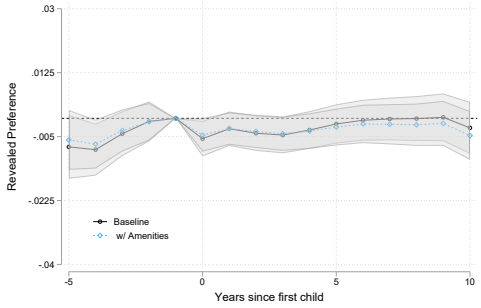
(c) All amenity data, firm pay premium



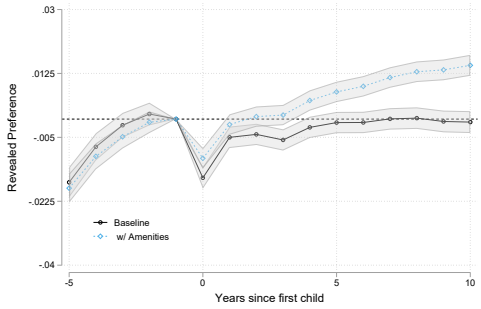
(d) Including only amenities available in all years, firm pay premium

Note: This figure shows the relationship between years since first birth and measures of pay (first row) and the firm-level pay premium (second row). The solid black line is the result of a regression including only event-year, age, and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and trends may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm premia as constants.

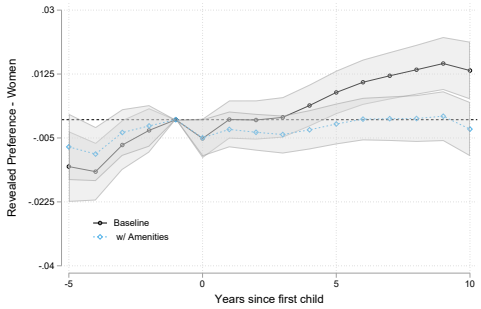
Figure 4: Accounting for Firm-Level Amenities–Revealed Preference Ranking (Pagerank)



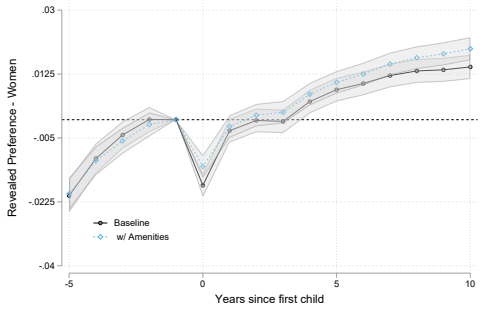
(a) All amenity data, preferences of all workers



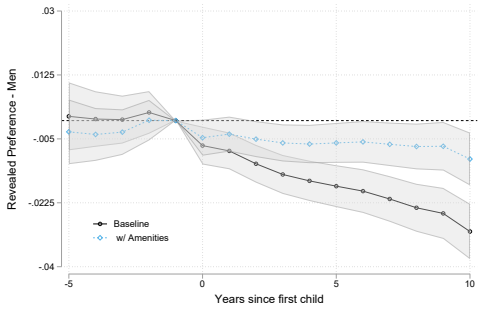
(b) Including only amenities available in all years, preferences of all workers



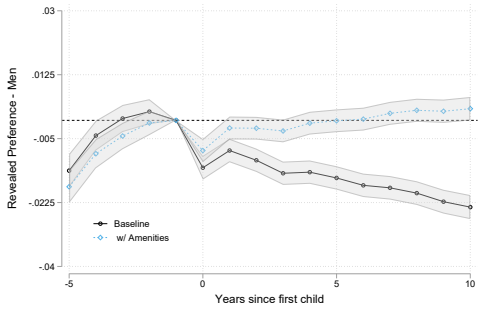
(c) All amenity data, preferences of female workers



(d) Including only amenities available in all years, preferences of female workers



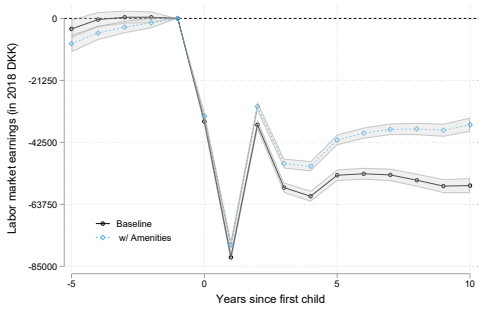
(e) All amenity data, preferences of male workers



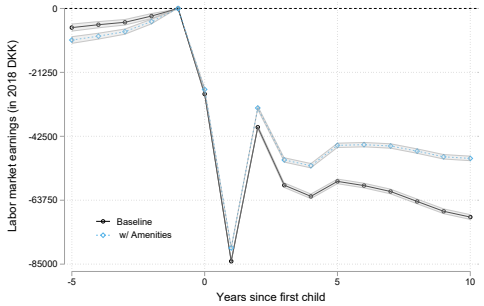
(f) Including only amenities available in all years, preferences of male workers

Note: This figure shows the relationship between years since first birth and measures of which firms are preferred by workers. The first row has pagerank computed overall, among all workers. The second row has pagerank when measured on the subset of female workers, and the last row has pagerank when measured on the subset of male workers. The solid black line is the result of a regression including only event-year, age, and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and trends may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm rankings as constants.

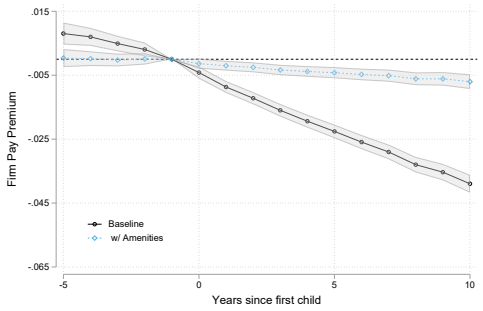
Figure 5: Accounting for Firm-Level Amenities—Pay Premia accounting for firm size



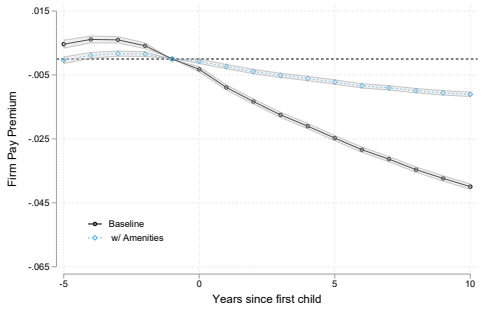
(a) All amenity data, total labor market earnings



(b) Including only amenities available in all years, total labor market earnings



(c) All amenity data, firm pay premium



(d) Including only amenities available in all years, firm pay premium

Note: This figure shows the relationship between years since first birth and measures of pay (first row) and the firm-level pay premium (second row). The solid black line is the result of a regression including only event-year, age, firmsize and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and trends may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm premia as constants.

Figure 6: Sample Survey Contrasts

	Job A	Job B
Timetal	Deltid - 20 timer om ugen	Fuldtid - 37 timer om ugen
Kontrol over timer	Fastsætter din egen tidsplan	Din arbejdsgiver fastsætter din tidsplan
Arbejde hjemmefra	Ja, medarbejdere kan arbejde hjemme fra nogle dage	Ingen
Mødetid på arbejde	Dine start- / sluttider for arbejdet er variable	Du skal arbejde på bestemte, fastsatte tidspunkter
Brug for at arbejde om aftenen	Aldrig	Ja, ofte
Timetal er regelmæssige	Timerne varierer fra uge til uge	Timerne varierer fra uge til uge
Tempo	Tidspres	Afslappet
Uafhængighed	Dine arbejdsopgaver og arbejdsgange er defineret af din arbejdsgiver	Du vælger selv, hvordan du udfører dit arbejde
Familietid	Det er vanskeligt at tilpasse arbejdstiden af personlige/familiemæssige årsager	Det er vanskeligt at tilpasse arbejdstiden af personlige/familiemæssige årsager
Tilkaldevagt	Du kan blive kontaktet når du har fri for at blive kaldt på arbejde næste dag	Du er ikke på vagt
Afstand	Arbejdspladsen ligger mere end 30 km væk fra din bopæl	Arbejdspladsen ligger inden for 15 km fra din bopæl
Løn	16 % mere end din nuværende månedsløn	14 % mere end din nuværende månedsløn

Hvilket job foretrækker du?

(•) A
( ) B

(a) Example of job contrast from survey

	Job A	Job B
Hourly figures	Part-time - 20 hours per week	Full time - 37 hours per week
Control over hours	Set your own schedule	Your employer sets your schedule
Work from home	Yes, employees can work from home from some days	No
Meeting time at work	Your start/end times for work are variable	You must work at specific, fixed times
Need to work on the evening	Never	Yes, often
Hours are regular	Hours vary from week to week	Hours vary from week to week
Pace	Time pressure	Relaxed
Independence	Your work tasks and workflows are defined by your employer	You choose how you do your work
Family time	It is difficult to adjust working hours personal/family reasons You can be	It is difficult to adjust working hours for personal/family reasons
On-call duty	contacted when you are free to be called at work the next day	You are not on duty
Distance	The workplace is more than 30 km away from yours residence	The workplace is within 15 km of your place of residence
Pay	16% more than your current monthly salary	14% more than your current monthly salary

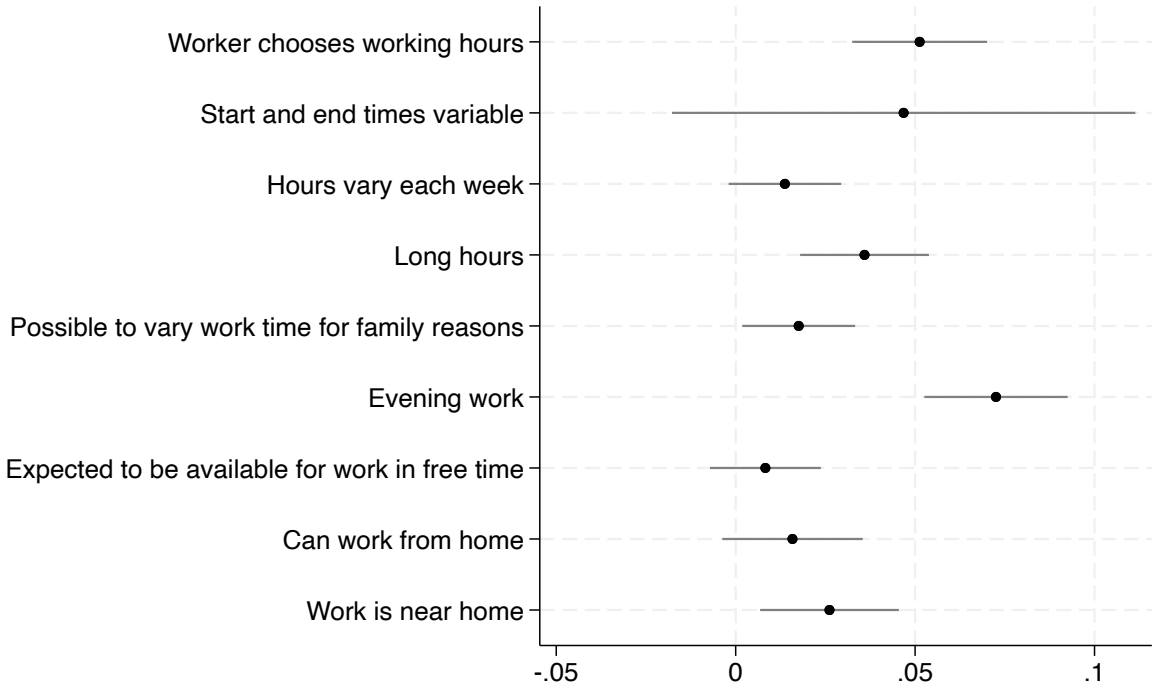
Which job do you prefer?

(•) A
( ) B

(b) Example of job contrast from survey: English translation

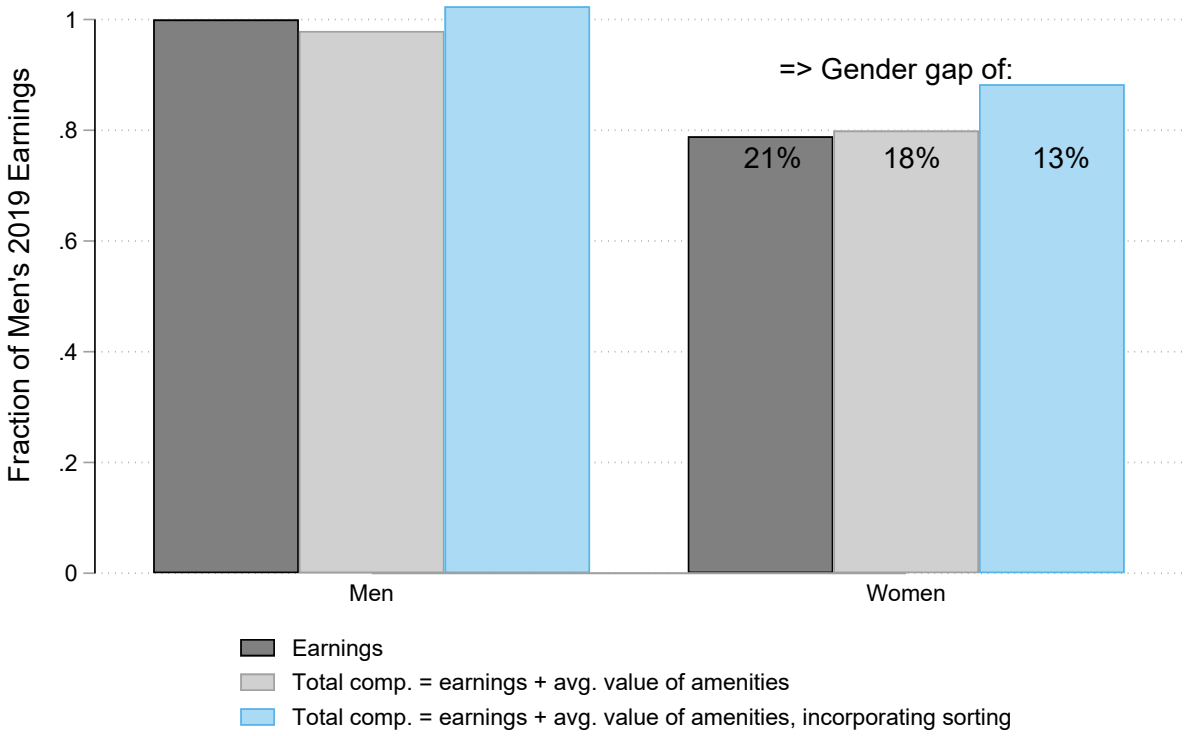
Note: This figure shows an example job contrast in the original Danish (top panel) and translation from google translate to English (bottom panel).

Figure 7: Coefficient on Interaction between Own Job Characteristic and Valuation of the Characteristic in Survey



Note: This figure displays coefficient on the interaction between whether an individual has the characteristic listed in the figure in their current job (all surveyed individuals are employed) and the willingness to choose a job profile with this characteristic in the hypothetical choice scenarios, as equation 4. All are jointly estimated, and standard errors clustered at the individual respondent level are displayed in the gray bars.

Figure 8: Gender Pay Gap Accounting for Value of Amenities



Note: This figure presents men's and women's average earnings (dark gray), and men's and women's average compensation under two different calculations which add to baseline earnings the value of amenities in terms of earnings. First, we use average WTP for amenities from our survey, allowing heterogeneity in the value of amenities by gender only (light gray bars). Next, we estimate the value using only responses of individuals who have a job with that amenity, by gender (the blue bars). The labels at the top of the bars for women give the gender gap in the relevant compensation: 1 minus the ratio of the bar for women to the bar for men, in percentage terms. We use administrative data on the earnings gap in 2019 linked to the labor force survey (including an ad hoc module) in 2019. These data includes all of the amenities for which we have WTP measures in our preference elicitation survey.

Tables

Table 1: Summary Statistics

	All	Women	Men
Age	43.989	44.128	43.837
Worker chooses working hours	0.496	0.448	0.552
Expected to be available for work in free time	0.527	0.483	0.580
Work under time pressure	0.411	0.422	0.398
Possible to vary work time for family reasons	0.624	0.575	0.682
Decide order of tasks	0.808	0.811	0.806
Decide content of tasks	0.652	0.637	0.670
Distance between work and home	23,101	18,920	27,684
Actual hours above 45/week	0.070	0.049	0.094
Absolute difference between usual and actual hours	3.920	3.807	4.048
Working at home	0.302	0.288	0.318
Start and end times variable	0.418	0.392	0.449
Evening work	0.421	0.400	0.445
Labor market earnings (in 2018 DKK)	427,674	375,909	484,152
N	1,793,846	935,977	857,869

Note: This table displays summary statistics for variables used in later analysis. All observations are at the person level. Observation counts differ primarily because not all questions were asked in all years (see Table 11 below), but also because respondents may choose not to respond to particular questions, or may not be eligible to be asked particular questions based on past responses. The sample is individuals represented in the LFS in at least one year between 2008 and 2019.

Table 2: Summary Statistics: Vignette Survey

	All	Women	Men
Demographics			
Age	40.461	39.794	41.433
No schooling	0.006	0.005	0.007
Elementary schooling	0.032	0.027	0.039
High school	0.066	0.062	0.071
Vocational training	0.256	0.243	0.273
Short-term higher education degree	0.102	0.100	0.106
Bachelor's degree	0.332	0.333	0.330
Master's degree	0.196	0.220	0.163
PhD	0.010	0.010	0.010
Occupation			
Managers	0.075	0.057	0.101
Professionals	0.370	0.399	0.328
Technicians and Associate Professionals	0.126	0.106	0.155
Clerical Support Workers	0.154	0.184	0.111
Services and Sales Workers	0.137	0.162	0.101
Skilled Agricultural, Forestry and Fishery Workers	0.009	0.010	0.007
Craft and Related Trades Workers	0.039	0.014	0.076
Plant and Machine Operators, and Assemblers	0.023	0.012	0.039
Elementary Occupations	0.061	0.052	0.074
Armed Forces Occupations	0.005	0.003	0.007
Work Characteristics			
Worker chooses working hours	0.409	0.378	0.453
Start and end times variable	0.557	0.554	0.562
Hours vary each week	0.358	0.321	0.411
Full-time	0.786	0.726	0.872
Part-time	0.175	0.240	0.081
Long hours	0.039	0.034	0.047
Possible to vary work time for family reasons	0.717	0.679	0.773
Evening work	0.323	0.304	0.350
Expected to be available for work in free time	0.230	0.186	0.296
Can work from home	0.467	0.446	0.498
Work is near home	0.612	0.655	0.549
Monthly labor market earnings (in 2018 DKK)	42,648	35,423	52,187
N	998	592	406

Note: This table presents summary statistics from the Vignette Survey. Sample sizes for the income variable are 703, 400, and 303 for the full sample, women, and men, respectively. Income is winsorized at the 1st and 99th percentiles.

Table 3: Observations per Firm Measures

	Firm Observations
Pay-Premiums	232111
Pay-Premiums Men	184701
Pay-Premiums Women	139456
Pagerank	129085
Pagerank Men	95831
Pagerank Women	70290
Poaching Rank	220306
Poaching Rank Men	178092
Poaching Rank Women	134510

Note: This table displays the number of firm rankings per measure.

Table 4: Correlations across Firm Measures

	$\tilde{V}^{EE}$	ϕ	π	$\log(L)$	$\log(Y/L)$
$\tilde{V}^{EE}$	1.00				
ϕ	0.43	1.00			
π	0.11	0.16	1.00		
$\log(L)$	0.05	0.19	-0.02	1.00	
$\log(Y/L)$	0.09	0.26	0.03	0.16	1.00

Note: This table displays the correlations across different firm measures. $\tilde{V}^{EE}$ denotes the pagerank, ϕ denotes the firm wage premia, π denotes the poaching rate, $\log(L)$ denotes log firm size and $\log(Y/L)$ denotes revenue per worker. We weight observations by firm size.

Table 5: Correlations across Firm Measures - unweighted

	$\tilde{V}^{EE}$	ϕ	π	$\log(L)$	$\log(Y/L)$
$\tilde{V}^{EE}$	1.00				
ϕ	0.38	1.00			
π	0.02	0.07	1.00		
$\log(L)$	0.10	0.33	-0.13	1.00	
$\log(Y/L)$	0.14	0.18	0.04	0.09	1.00

Note: This table displays the correlations across different firm measures. $\tilde{V}^{EE}$ denotes the pagerank, ϕ denotes the firm wage premia, π denotes the poaching rate, $\log(L)$ denotes log firm size and $\log(Y/L)$ denotes revenue per worker.

Table 6: Observations Included in Firm Event-Study Regressions

	Person-Year Obs.	Unique Workers	Unique Firms
Including only amenities available in all years	2394796	474424	5870
Including all amenities	2063334	424309	1859
Including all amenities, firms present all years	535763	49754	1158

Note: This table displays the person-year observations, unique workers, and unique firms included in three specifications used to understand the evolution of firm types around motherhood. First, the broadest sample which includes all firms (workers) which had workers (coworkers) surveyed in the LFS in any year. Next, in order to include a wider range of amenities, we restrict to firms who have workers responding to the ad hoc supplements of the LFS and for which we have some measure of all the available amenities discussed in this paper. Finally, because some questions were asked only in one year, we further restrict to firms present in the data in every year to avoid effects being driven by changes in the composition of firms in the sample over the sample period.

Table 7: Willigness-to-pay estimates - Large amenity set

Amenity	Result	SE	Result	SE	Diff. p-value
Regression on Stayer					
	Women		Men		
Worker chooses working hours	0.11	0.01	0.06	0.00	0.00
No expected flexibility in working times	0.00	0.01	0.03	0.00	0.01
Expected to be available for work in free time	-0.03	0.01	0.01	0.00	0.00
No work under time pressure	-0.04	0.01	0.02	0.00	0.00
Possible to vary work hours for family reasons	-0.30	0.01	-0.12	0.01	0.00
Decide order of tasks	0.11	0.01	0.07	0.01	0.00
Decide content of tasks	0.08	0.01	-0.07	0.01	0.00
Low Distance between work/home	0.09	0.01	0.05	0.00	0.00
Actual hours below 45/week	0.64	0.01	0.60	0.01	0.01
Low absolute difference between usual and actual hours	-0.01	0.01	0.10	0.00	0.00
Working at home	0.46	0.01	-0.05	0.01	0.00
Start and end times not variable	0.40	0.01	0.14	0.01	0.00
No evening work	0.34	0.01	-0.12	0.01	0.00

Note: The table shows the willingness to pay estimates obtained with the register data. The regression relates the rate at which workers exit a firm to the average amenities at that firm, as well as average coworker wages. Standard errors and p-values are derived using the delta method, as described in the Appendix. The last column shows the p-value of the difference in the willingness to pay estimates across genders. In this table, the largest set of amenities has been retained. Appendix Tables A3 and A4 present alternative measures using different a smaller set of amenities and using alternative measures of worker preference across firms.

Table 8: Vignette Survey: Women vs. Men

	(1) Female	(2) Male	(3) P-value female = WTP_{male}
Worker chooses working hours	0.016	0.013	0.344
	(0.005)	(0.006)	
Start and end times variable	0.004	0.013	0.400
	(0.005)	(0.006)	
Hours vary each week	-0.006	-0.005	0.739
	(0.005)	(0.006)	
Long hours	0.064	0.034	0.335
	(0.030)	(0.037)	
Possible to vary work time for family reasons	0.062	0.028	0.000
	(0.006)	(0.007)	
Evening work	-0.099	-0.081	0.000
	(0.007)	(0.008)	
Expected to be available for work in free time	-0.068	-0.040	0.000
	(0.005)	(0.007)	
Can work from home	0.054	0.043	0.007
	(0.006)	(0.008)	
Work under time pressure	-0.074	-0.069	0.011
	(0.006)	(0.008)	
Work is near home	0.104	0.063	0.000
	(0.007)	(0.007)	
Worker decides content of tasks	0.010	0.017	0.777
	(0.005)	(0.006)	
Percentage increase in wage	0.012	0.017	
	(0.001)	(0.001)	
Observations	17760	12180	29940
Number of participants	592	406	998

Note: This table displays the coefficients from a regression of the propensity to pick the left hand side job vignette on the difference (left hand side minus right hand side) in the job characteristics described in the vignette, fully interacted with female (coefficients in column 1) and male (coefficients in column 2) indicators. The third column reports the p-value from a test of whether the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for women equals the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for men. Each individual in the study evaluates thirty job contrasts, and standard errors in parentheses are clustered at the participant level.

Table 9: Vignette Survey: Mothers vs. Nonmothers

	(1) Mother	(2) Nonmother	(3) P-value $WTP_{mother} = WTP_{nonmother}$
Worker chooses working hours	0.027	0.006	0.053
	(0.009)	(0.009)	
Start and end times variable	0.005	0.018	0.487
	(0.009)	(0.010)	
Hours vary each week	-0.001	0.005	0.653
	(0.009)	(0.009)	
Long hours	0.039	0.127	0.483
	(0.056)	(0.060)	
Possible to vary work time for family reasons	0.070	0.058	0.060
	(0.011)	(0.011)	
Evening work	-0.117	-0.063	0.000
	(0.012)	(0.012)	
Expected to be available for work in free time	-0.065	-0.052	0.043
	(0.010)	(0.010)	
Can work from home	0.049	0.053	0.383
	(0.011)	(0.011)	
Work under time pressure	-0.065	-0.072	0.352
	(0.011)	(0.011)	
Work is near home	0.095	0.102	0.198
	(0.013)	(0.013)	
Worker decides content of tasks	-0.007	0.037	0.004
	(0.009)	(0.009)	
Percentage increase in wage	0.012	0.017	
	(0.001)	(0.001)	
Observations	5190	4590	9780
Number of participants	173	153	326

Note: This table displays the coefficients from a regression of the propensity to pick the left hand side job vignette on the difference (left hand side minus right hand side) in the job characteristics described in the vignette, for the sample of women, fully interacted with mother (coefficients in column 1) and non-mother (coefficients in column 2) indicators. The third column reports the p-value from a test of whether the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for mothers equals the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for non-mothers. We restrict to women age 27-42, in order to keep a sample more similar to that of event studies. All women are included in Appendix Table A1. Each individual in the study evaluates thirty job contrasts, and standard errors in parentheses are clustered at the participant level.

Table 10: Vignette Survey: Fathers vs. Nonfathers

	(1) Father	(2) Nonfather	(3) P-value $WTP_{father} = WTP_{nonfather}$
Worker chooses working hours	0.013	0.021	0.883
	(0.011)	(0.017)	
Start and end times variable	-0.000	0.029	0.127
	(0.010)	(0.014)	
Hours vary each week	-0.007	0.005	0.516
	(0.009)	(0.017)	
Long hours	0.125	-0.078	0.056
	(0.070)	(0.086)	
Possible to vary work time for family reasons	0.036	0.012	0.136
	(0.013)	(0.016)	
Evening work	-0.053	-0.058	0.637
	(0.012)	(0.016)	
Expected to be available for work in free time	-0.024	-0.043	0.587
	(0.011)	(0.014)	
Can work from home	0.051	0.036	0.233
	(0.013)	(0.017)	
Work under time pressure	-0.046	-0.077	0.546
	(0.012)	(0.019)	
Work is near home	0.046	0.069	0.753
	(0.012)	(0.018)	
Worker decides content of tasks	0.016	0.025	0.871
	(0.010)	(0.015)	
Percentage increase in wage	0.016	0.021	
	(0.002)	(0.002)	
Observations	4200	2040	6240
Number of participants	140	68	208

Note: This table displays the coefficients from a regression of the propensity to pick the left hand side job vignette on the difference (left hand side minus right hand side) in the job characteristics described in the vignette, for the sample of men, fully interacted with father (coefficients in column 1) and non-father (coefficients in column 2) indicators. The third column reports the p-value from a test of whether the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for fathers equals the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for non-fathers. We restrict to men age 27-42, in order to keep a sample more similar to that of event studies. All men are included in Appendix Table A2. Each individual in the study evaluates thirty job contrasts, and standard errors in parentheses are clustered at the participant level.

Table 11: Observations Per Variable

	Person-Year Observations	Years in Data
Worker chooses working hours	14698	2
Expected to be available for work in free time	7203	1
Work under time pressure	7220	1
Possible to vary work time for family reasons	17264	3
Decide order of tasks	7200	1
Decide content of tasks	7200	1
Distance between work and home	20910950	12
Actual hours above 45/week	233140	12
Absolute difference between usual and actual hours	217951	12
Working at home	233170	12
Start and end times variable	231198	12
Evening work	233170	12
Labor market earnings (in 2018 DKK)	21020839	12

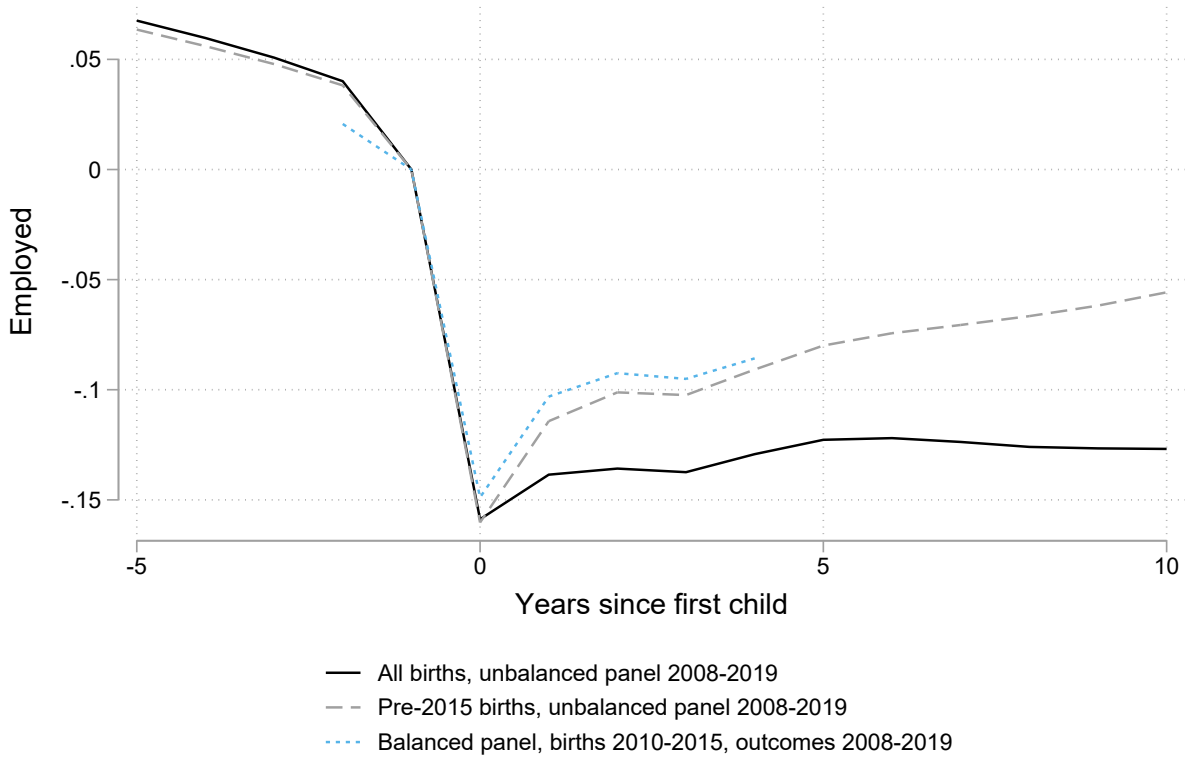
Note: This table displays the person-year observations (unique responses) to the questions we use to measure amenities, as well as the number of unique surveys these questions appear in. There are 12 potential years of survey data (2008-2019), but some questions are asked only in an ad hoc supplement. There are up to 3 ad hoc supplements we draw from, with some questions only asked in one of these supplements.

Appendix for:

Gender Differences in Amenities, Wages, and Firms

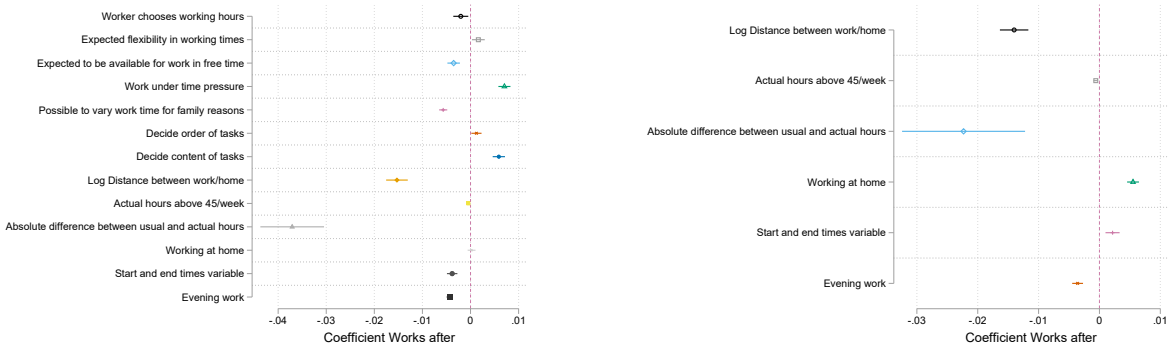
A Appendix Figures and Tables

Figure A1: Employment and Motherhood



Note: This Figure plots the event study coefficients around motherhood for our sample overall, as well as for a balanced panel on a restricted number of years-since-event, by necessity. The outcome is having any earnings in the calendar year, restricted to women age 16-65 between 2008 and 2019.

Figure A2: Workplace Characteristics before Child Birth

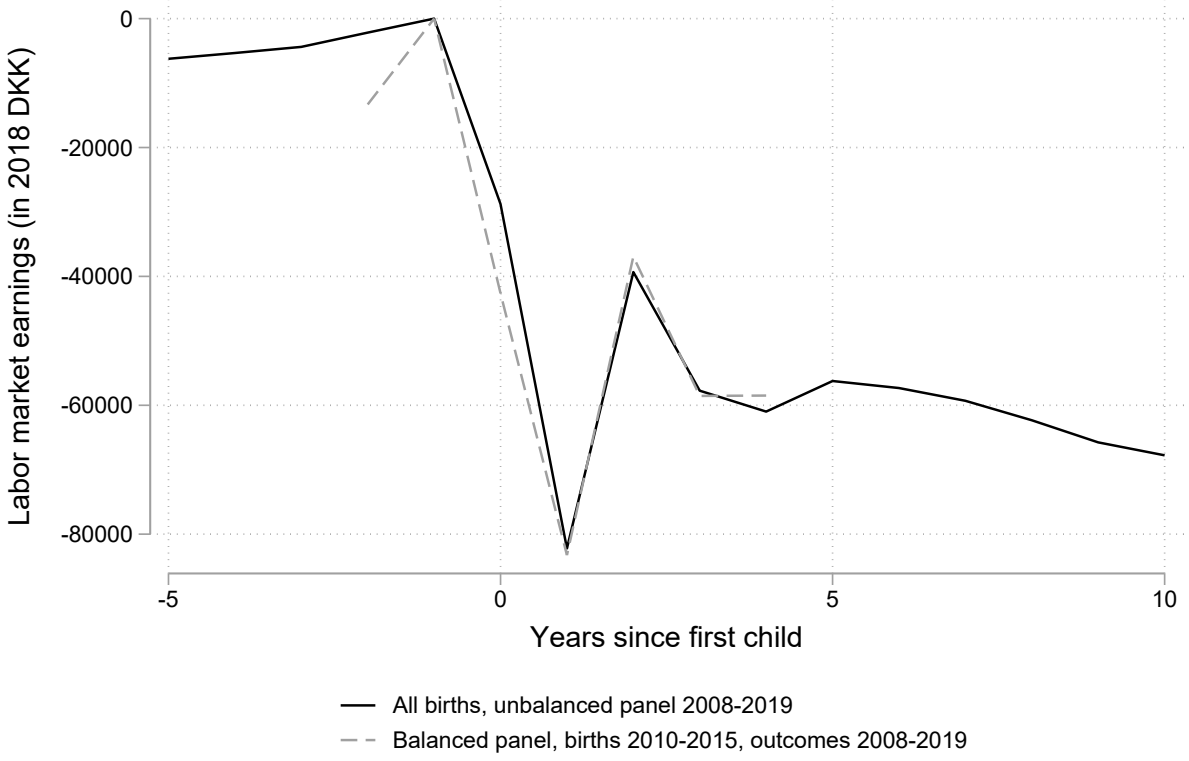


(a) All amenity data

(b) Including only amenities available in all years

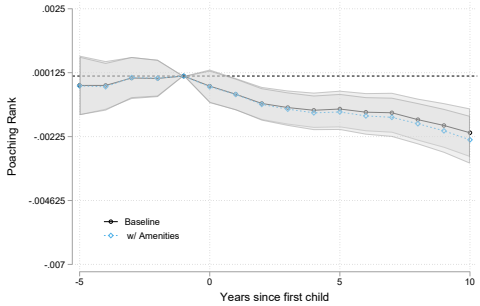
Note: This figure shows the correlation between workplace amenities in the year before child birth and the selection into work in the year after child birth. The depicted coefficients are the result of a regression including age, occupation, education, firm size and year fixed effects, for one amenity at a time. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and coefficients may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions.

Figure A3: Earnings and Motherhood

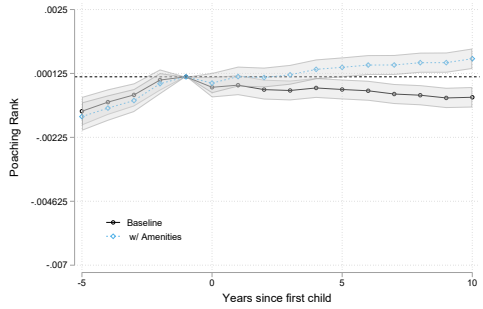


Note: This Figure plots the event study coefficients around motherhood for our sample overall, as well as for a balanced panel on a restricted number of years-since-event, by necessity. The outcome is earnings conditional on working, restricted to women age 16-65 between 2008 and 2019.

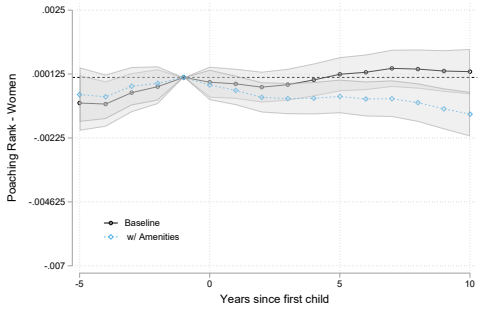
Figure A4: Accounting for Firm-Level Amenities–Revealed Preference Ranking (Poaching Rate)



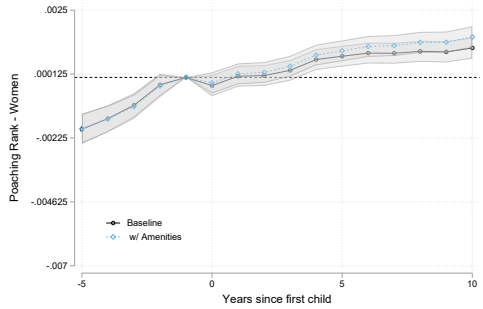
(a) All amenity data, preferences of all workers



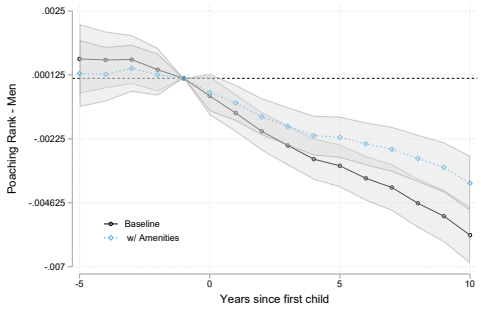
(b) Including only amenities available in all years, preferences of all workers



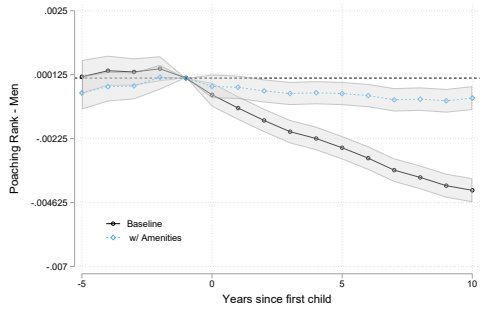
(c) All amenity data, preferences of female workers



(d) Including only amenities available in all years, preferences of female workers



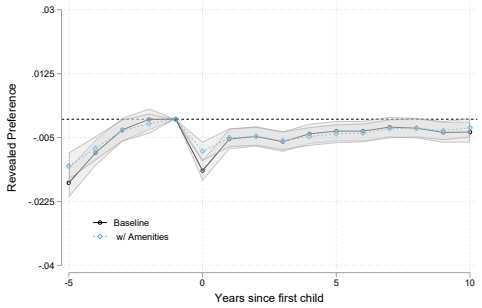
(e) All amenity data, preferences of male workers



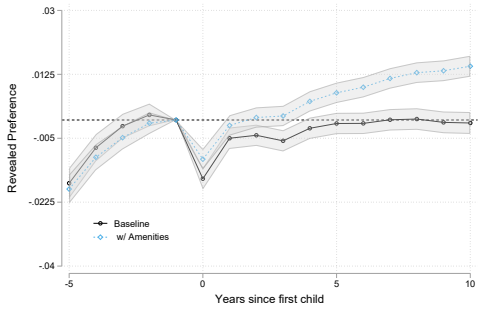
(f) Including only amenities available in all years, preferences of male workers

Note: This figure shows the relationship between years since first birth and measures of which firms are preferred by workers. The first row has poaching rate computed overall, among all workers. The second row has poaching rate when measured on the subset of female workers, and the last row has poaching rate when measured on the subset of male workers. The solid black line is the result of a regression including only event-year, age, and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and trends may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm rankings as constants.

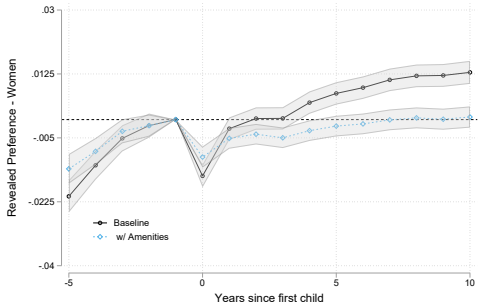
Figure A5: Accounting for Firm-Level Amenities–Revealed Preference Ranking (Pagerank)



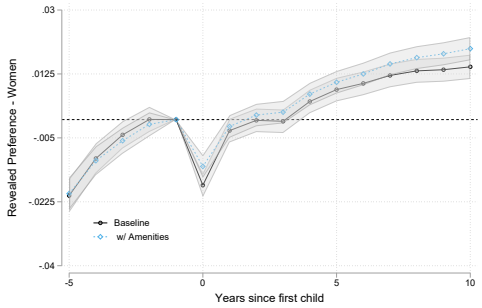
(a) All amenity data, preferences of all workers



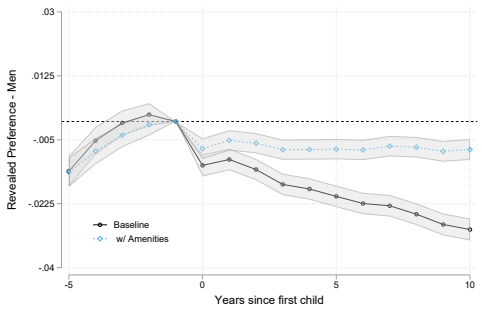
(b) Including only amenities available in all years, preferences of all workers



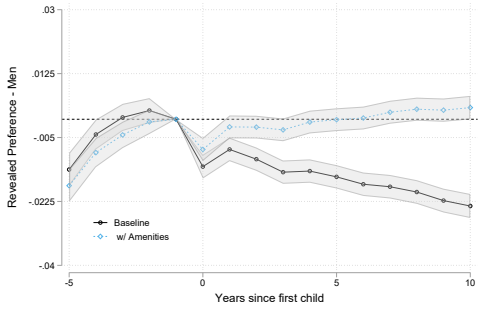
(c) All amenity data, preferences of female workers



(d) Including only amenities available in all years, preferences of female workers



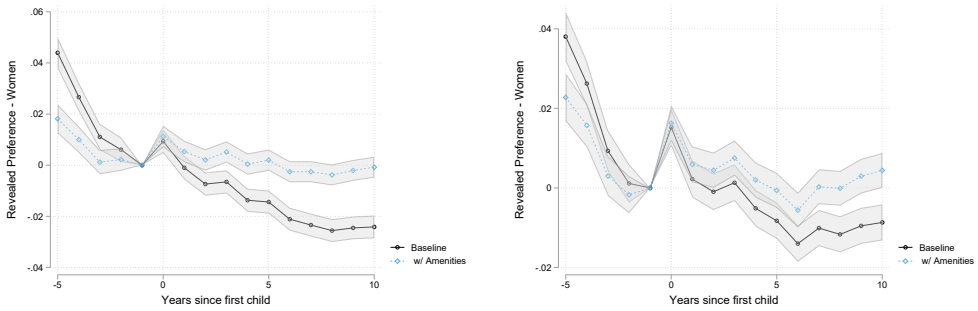
(e) All amenity data, preferences of male workers



(f) Including only amenities available in all years, preferences of male workers

Note: This figure shows the relationship between years since first birth and measures of which firms are preferred by workers. The first row has pagerank computed overall, among all workers. The second row has pagerank when measured on the subset of female workers, and the last row has pagerank when measured on the subset of male workers. The solid black line is the result of a regression including only event-year, age, and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. We do not restrict to a balanced set of firms, as in the main Figures. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm rankings as constants.

Figure A6: Correlation Male and Female Firm Rankings



(a) All amenity data

(b) Including only amenities available in all years

Note: This figure shows the relationship between years since first birth and the correlation of male nand female pagerank measures. The solid black line is the result of a regression including only event-year, age, and year fixed effects. The dashed blue line adds to the regression firm averages of the amenities available in the LFS and administrative data. The left-hand-side includes all amenities in these regressions, including those only asked about in one ad-hoc survey. Since some of these questions are asked only in one year, firms present in that year would be differentially selected into the sample and trends may reflect changes in the composition of firms. To alleviate this concern, we restrict to a balanced set of firms which appear in the BFL data in every year in the sample period. The right-hand-side includes a much larger set of firms and a smaller subset of amenities—those measured in every year—in the regressions. The gray shaded region is the 95% confidence interval around the point estimate for year since birth. These standard errors are computed taking the measured firm rankings as constants.

Table A1: Vignette Survey: Mothers vs. Nonmothers (All Ages)

	(1) Mother	(2) Nonmother	(3) P-value $WTP_{(1)} = WTP_{(2)}$
Worker chooses working hours	0.023	0.008	0.069
	(0.007)	(0.007)	
Start and end times variable	-0.001	0.009	0.394
	(0.007)	(0.008)	
Hours vary each week	-0.006	-0.005	0.824
	(0.006)	(0.007)	
Long hours	0.049	0.079	0.800
	(0.039)	(0.047)	
Possible to vary work time for family reasons	0.065	0.059	0.150
	(0.008)	(0.009)	
Evening work	-0.109	-0.085	0.009
	(0.009)	(0.010)	
Expected to be available for work in free time	-0.073	-0.062	0.049
	(0.007)	(0.008)	
Can work from home	0.055	0.052	0.234
	(0.008)	(0.009)	
Work under time pressure	-0.071	-0.078	0.490
	(0.008)	(0.009)	
Work is near home	0.101	0.108	0.353
	(0.009)	(0.011)	
Worker decides content of tasks	-0.001	0.025	0.018
	(0.007)	(0.007)	
Percentage increase in wage	0.011	0.014	
	(0.001)	(0.001)	
Observations	10140	7620	17760
Number of participants	338	254	592

Note: This table displays the coefficients from a regression of the propensity to pick the left hand side job vignette on the difference (left hand side minus right hand side) in the job characteristics described in the vignette, for the sample of women, fully interacted with mother (coefficients in column 1) and non-mother (coefficients in column 2) indicators. The third column reports the p-value from a test of whether the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for mothers equals the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for non-mothers. Each individual in the study evaluates thirty job contrasts, and standard errors in parentheses are clustered at the participant level.

Table A2: Vignette Survey: Fathers vs. Nonfathers (All Ages)

	(1) Father	(2) Nonfather	(3) P-value $WTP_{(1)} = WTP_{(2)}$
Worker chooses working hours	0.019	0.005	0.214
	(0.008)	(0.011)	
Start and end times variable	0.005	0.029	0.089
	(0.008)	(0.010)	
Hours vary each week	-0.011	0.006	0.179
	(0.007)	(0.011)	
Long hours	0.060	-0.013	0.303
	(0.049)	(0.059)	
Possible to vary work time for family reasons	0.040	0.008	0.007
	(0.009)	(0.010)	
Evening work	-0.085	-0.074	0.200
	(0.010)	(0.013)	
Expected to be available for work in free time	-0.041	-0.038	0.502
	(0.009)	(0.010)	
Can work from home	0.051	0.030	0.080
	(0.010)	(0.011)	
Work under time pressure	-0.058	-0.087	0.356
	(0.009)	(0.014)	
Work is near home	0.057	0.073	0.774
	(0.009)	(0.012)	
Worker decides content of tasks	0.019	0.013	0.458
	(0.007)	(0.010)	
Percentage increase in wage	0.016	0.019	
	(0.001)	(0.001)	
Observations	7740	4440	12180
Number of participants	258	148	406

Note: This table displays the coefficients from a regression of the propensity to pick the left hand side job vignette on the difference (left hand side minus right hand side) in the job characteristics described in the vignette, for the sample of men, fully interacted with father (coefficients in column 1) and non-father (coefficients in column 2) indicators. The third column reports the p-value from a test of whether the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for fathers equals the ratio of the amenity coefficient to the coefficient on the percentage increase in wages for non-fathers. Each individual in the study evaluates thirty job contrasts, and standard errors in parentheses are clustered at the participant level.

Table A3: Willigness-to-pay estimates - Small amenity set

Amenity	Result	SE	Result	SE	Diff. p-value
Regression on Revealed Preference					
	Women		Men		
Low Distance between work/home	0.14	0.00	0.08	0.00	0.00
Actual hours below 45/week	0.45	0.00	0.19	0.00	0.00
Low absolute difference between usual and actual hours	0.02	0.00	-0.01	0.00	0.00
Working at home	0.40	0.00	0.03	0.00	0.00
Start and end times not variable	0.12	0.00	-0.10	0.00	0.00
No evening work	0.10	0.00	0.05	0.00	0.00
Regression on Poaching Rank					
	Women		Men		
Low Distance between work/home	0.07	0.00	0.02	0.00	0.00
Actual hours below 45/week	0.22	0.00	0.40	0.00	0.00
Low absolute difference between usual and actual hours	0.05	0.00	0.05	0.00	0.28
Working at home	0.05	0.00	-0.07	0.00	0.00
Start and end times not variable	-0.04	0.00	-0.29	0.00	0.00
No evening work	0.08	0.00	-0.09	0.00	0.00
Regression on Stayer					
	Women		Men		
Low Distance between work/home	0.10	0.00	0.03	0.00	0.00
Actual hours below 45/week	0.34	0.00	0.24	0.00	0.00
Low absolute difference between usual and actual hours	-0.12	0.00	-0.05	0.00	0.00
Working at home	0.23	0.00	-0.05	0.00	0.00
Start and end times not variable	0.15	0.00	-0.01	0.00	0.00
No evening work	0.17	0.00	0.00	0.00	0.00

Note: The table shows the willigness to pay estimates obtained with the register data. The respective gender-rankings have been used, that is pagerank for women for the female sample and pagerank for men for the male sample. The last column shows the p-value of the difference in the willigness to pay estimates across genders. In this table, a small set of amenities has been retained which is consistently observed across time.

Table A4: Willigness-to-pay estimates - Large amenity set - 1

Amenity	Result	SE	Result	SE	Diff. p-value
Regression on Revealed Preference					
	Women		Men		
Worker chooses working hours	0.30	0.00	0.17	0.00	0.00
No expected flexibility in working times	0.27	0.00	0.27	0.00	0.97
Expected to be available for work in free time	0.16	0.00	0.22	0.00	0.00
No work under time pressure	0.26	0.00	0.19	0.00	0.00
Possible to vary work hours for family reasons	-0.33	0.00	-0.12	0.00	0.00
Decide order of tasks	0.02	0.00	-0.07	0.00	0.00
Decide content of tasks	-0.25	0.00	-0.29	0.00	0.00
Low Distance between work/home	0.25	0.00	0.19	0.00	0.00
Actual hours below 45/week	0.40	0.00	0.43	0.00	0.00
Low absolute difference between usual and actual hours	0.14	0.00	0.22	0.00	0.00
Working at home	0.80	0.00	0.05	0.00	0.00
Start and end times not variable	0.43	0.00	-0.15	0.00	0.00
No evening work	0.47	0.00	0.32	0.00	0.00
Regression on Poaching Rank					
	Women		Men		
Worker chooses working hours	0.14	0.00	0.20	0.00	0.00
No expected flexibility in working times	-0.04	0.00	-0.13	0.00	0.00
Expected to be available for work in free time	0.19	0.00	0.18	0.00	0.00
No work under time pressure	0.03	0.00	0.20	0.00	0.00
Possible to vary work hours for family reasons	-0.68	0.00	-0.19	0.01	0.00
Decide order of tasks	0.09	0.00	-0.30	0.00	0.00
Decide content of tasks	-0.00	0.00	0.03	0.00	0.00
Low Distance between work/home	0.11	0.00	0.04	0.00	0.00
Actual hours below 45/week	0.11	0.00	0.71	0.01	0.00
Low absolute difference between usual and actual hours	0.16	0.00	0.19	0.00	0.00
Working at home	0.07	0.00	-0.12	0.01	0.00
Start and end times not variable	0.03	0.00	-0.19	0.00	0.00
No evening work	0.24	0.00	0.13	0.00	0.00

Note: The table shows the willigness to pay estimates obtained with the register data. The respective gender-rankings have been used, that is pagerank for women for the female sample and pagerank for men for the male sample. The last column shows the p-value of the difference in the willigness to pay estimates across genders. In this table, the largest set of amenities has been retained.

B Details for Computation of Standard Errors

B.1 Standard Errors for Willingness to Pay Estimates using Administrative Data

Let $T = g(\theta_1, \theta_2)$, where θ_1 and θ_2 denote estimators. The variance of the transformation T is approximated via the delta method as:

$$\text{Var}(T) \approx \nabla g(\hat{\theta}_1, \hat{\theta}_2)^T \cdot \text{Cov}(\hat{\theta}_1, \hat{\theta}_2) \cdot \nabla g(\hat{\theta}_1, \hat{\theta}_2)$$

where $\nabla g(\hat{\theta}_1, \hat{\theta}_2)$ denotes the gradient of the transformation, and $\text{Cov}(\hat{\theta}_1, \hat{\theta}_2)$ is the covariance matrix of the estimators. In the application considered here, the transformation is given by:

$$T = g(\hat{\beta}_{\text{amenity}}, \hat{\beta}_{\text{wage}}) = 1 - \exp\left(-\frac{\hat{\beta}_{\text{amenity}}}{\hat{\beta}_{\text{wage}}}\right)$$

The gradient with respect to $\hat{\beta}_{\text{amenity}}$ and $\hat{\beta}_{\text{wage}}$ is:

$$\frac{\partial T}{\partial \hat{\beta}_{\text{amenity}}} = \frac{1}{\hat{\beta}_{\text{wage}}} e^{-\frac{\hat{\beta}_{\text{amenity}}}{\hat{\beta}_{\text{wage}}}}$$

$$\frac{\partial T}{\partial \hat{\beta}_{\text{wage}}} = \frac{\hat{\beta}_{\text{amenity}}}{\hat{\beta}_{\text{wage}}^2} e^{-\frac{\hat{\beta}_{\text{amenity}}}{\hat{\beta}_{\text{wage}}}}$$

Accordingly, the variance of the transformed coefficient is:

$$\begin{aligned}\text{Var}(T) \approx &\left(\frac{\partial T}{\partial \hat{\beta}_{\text{amenity}}}\right)^2 \cdot \text{Var}(\hat{\beta}_{\text{amenity}}) + \\ &\left(\frac{\partial T}{\partial \hat{\beta}_{\text{wage}}}\right)^2 \cdot \text{Var}(\hat{\beta}_{\text{wage}}) + \\ &2 \cdot \frac{\partial T}{\partial \hat{\beta}_{\text{amenity}}} \cdot \frac{\partial T}{\partial \hat{\beta}_{\text{wage}}} \cdot \text{Cov}(\hat{\beta}_{\text{amenity}}, \hat{\beta}_{\text{wage}})\end{aligned}$$

To compare transformed estimates across genders T_1 and T_2 obtained from independent regressions, the standard error of the difference is:

$$\text{SE}(T_1 - T_2) = \sqrt{\text{SE}(T_1)^2 + \text{SE}(T_2)^2}$$

B.2 Standard Errors for Two-Stage Regression Using Firm Rank Variables

Overview

We consider a two-step estimation procedure:

1. Estimate firm characteristics Z_j in a first stage;
2. Regress estimated firm characteristics $\hat{Z}_j$ on covariates X_j:

$$\hat{Z}_j = X_j\beta + \omega_j,$$

where the regression residual $\omega_j = \varepsilon_j + \nu_j$ combines structural noise ε_j and estimation error ν_j from the first stage.

We consider three firm-level measures Z_j: firm fixed effects $\hat{\psi}_{j(i,t)}$, PageRank $\exp(\tilde{V}^{EE})$, and poaching rates π_j. Each is subject to estimation error due to limited mobility, finite-sample network statistics, or sparse data. These errors induce bias in the variance estimate of the second-stage coefficient estimates $\hat{\beta}$. We focus here on how heteroskedasticity in the measurement error ν_j affects the variance of $\hat{\beta}$. From the moment condition:

$$\hat{\beta}^{\text{naive}} = (X'X)^{-1}X'\hat{Z} = \beta + (X'X)^{-1}X'\nu,$$

the variance of $\hat{\beta}$ is:

$$\text{Var}(\hat{\beta}) = (X'X)^{-1}X'(\Sigma_\varepsilon + \Sigma_\nu)X(X'X)^{-1}.$$

which highlights that heteroskedasticity in ν_j leads to error in the naive variance estimate of $\hat{\beta}$. Consider an example. Suppose that measurement error ν_j is heteroskedastic across firms - for instance, assume that larger firms yield more precise first-stage estimates, so that $\text{Var}(\nu_j \mid \text{firm size})$ is decreasing in firm size. This has two consequences. First, standard errors computed under homoskedasticity assumptions will be biased downward, understating uncertainty. Second, even robust (e.g., Eicker-Huber-White) standard errors may misrepresent sampling variability if they fail to account for the fact that ν_j originates from a prior estimation step and varies systematically. Finally, note that standard bootstrap methods are neither a possible solution given the type of firm characteristics we are interested in. By definition, bootstrap estimators are smooth functions of resampled data. However, for estimated firm-level quantities - such as $\hat{\psi}_j$, π_j, and PageRank - the bootstrap perturbs not just noise but the underlying network structure or labor mobility paths. This invalidates bootstrap resampling assumptions, since the structure used to define ν_j is not held fixed. As a result, bootstrapped variance estimates for $\hat{\beta}$ could be severely biased, especially when heteroskedasticity in ν_j is driven by network sparsity or unbalanced sample coverage.

Simulation-Based Bias Correction To address this bias, we adopt a simulation-based attenuation correction approach, conditional on an estimate of $\widehat{\text{Var}}(\nu_j)_j$. Specifically, we assume:

$$\hat{Z}_j = Z_j + \nu_j, \quad \nu_j \sim \mathcal{N}(0, \widehat{\text{Var}}(\nu_j)_j),$$

and implement the following steps:

1. Simulate $\nu_j^{(s)} \sim \mathcal{N}(0, \widehat{\text{Var}}(\nu_j)_j)$, for $s = 1, \ldots, S$
2. Construct $Z_j^{(s)} = \hat{Z}_j - \nu_j^{(s)}$

3. Estimate $\hat{\beta}^{(s)}$ from $Z_j^{(s)} = X_j\beta + \varepsilon_j$

4. Average: $\hat{\beta}^{\text{corrected}} = \frac{1}{S}\sum_{s=1}^{S}\hat{\beta}^{(s)}$

We now describe how $\widehat{\text{Var}}(\nu_j)_j$ is estimated for each type of firm characteristic.

Variance Estimators for Firm Fixed Effects $\hat{\psi}_{j(i,t)}$

Let $\hat{\psi} = Aw$, where A is the projection matrix from the first-stage AKM estimation. Kline et al. (2020) show that the variance of the estimation error can be approximated as:

$$\text{Var}(\nu) \approx \sigma^2 AA',$$

where σ^2 is estimated using leave-one-out methods.

Variance Estimators for the Poaching Rate π_j

The poaching rate is defined as:

$$\pi_j = \frac{N_j^{EE}}{N_j^{EE} + N_j^{UE}},$$

where N_j^{EE} is the number of hires from other firms, and N_j^{UE} is the number of hires from unemployment. Assuming hires are independent Bernoulli draws, we estimate:

$$\text{Var}(\pi_j)_j = \frac{\pi_j(1-\pi_j)}{N_j^{EE} + N_j^{UE}}.$$

Variance Estimators for PageRank $\exp(\tilde{V}^{EE})$

In the following, we show how we can use the MLE formulation of Pagerank to derive the variance of Pagerank estimates.

Maximum Likelihood Estimate of PageRank The probability of a worker choosing firm k is given by:

$$\pi_k = \frac{\exp(\tilde{V}_k^{EE})}{\sum_l \exp(\tilde{V}_l^{EE})}.$$

Now suppose we observe aggregate mobility data in the form of a matrix $M^0 \in \mathbb{R}^{F\times F}$, where M_{kj}^0 denotes the number of workers moving from firm j to firm k. Assuming that all transitions are independent, the likelihood of observing the entire set of transitions is:

$$\prod_{j=1}^{F}\prod_{k=1}^{F}(\pi_k)^{M_{kj}^0}.$$

Taking logs, the log-likelihood becomes:

$$\mathcal{L}(\tilde{V}^{EE}) = \sum_{j=1}^{F}\sum_{k=1}^{F} M_{kj}^0 \log(\pi_k).$$

Substituting in the expression for π_k, we get:

$$\log(\pi_k) = \tilde{V}_k^{EE} - \log\left(\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})\right).$$

Thus, the log-likelihood simplifies to:

$$\mathcal{L}(\tilde{V}^{EE}) = \sum_{j=1}^{F}\sum_{k=1}^{F} M_{kj}^0 \left[\tilde{V}_k^{EE} - \log\left(\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})\right)\right].$$

We can advance further using

$$\begin{aligned}
\mathcal{L}(\tilde{V}^{EE}) &= \sum_{j=1}^{F}\sum_{k=1}^{F} M_{kj}^0 \left[\tilde{V}_k^{EE} - \log\left(\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})\right)\right] \\
&= \sum_{k=1}^{F}\left(\sum_{j=1}^{F} M_{kj}^0\right)\tilde{V}_k^{EE} - \sum_{j=1}^{F}\left(\sum_{k=1}^{F} M_{kj}^0\right)\log\left(\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})\right) \\
&= \sum_{k=1}^{F} T_k \cdot \tilde{V}_k^{EE} - \left(\sum_{j=1}^{F} S_{jj}^0\right)\log\left(\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})\right),
\end{aligned}$$

where $T_k = \sum_{j=1}^{F} M_{kj}^0$ is the total number of workers flowing into firm k, and $S_{jj}^0 = \sum_k M_{kj}^0$ is the total number of workers leaving firm j. Taking the derivative of $\mathcal{L}$ with respect to $\tilde{V}_m^{EE}$, we obtain:

$$\begin{aligned}
\frac{\partial \mathcal{L}}{\partial \tilde{V}_m^{EE}} &= T_m - \left(\sum_{j=1}^{F} S_{jj}^0\right) \cdot \frac{\exp(\tilde{V}_m^{EE})}{\sum_{l=1}^{F} \exp(\tilde{V}_l^{EE})} \\
&= T_m - N \cdot \pi_m,
\end{aligned}$$

where $N = \sum_j S_{jj}^0$ is the total number of observed transitions. Setting the gradient to zero yields:

$$T_m = N \cdot \pi_m, \quad \text{for all } m.$$

This is equivalent to:

$$\frac{T_m}{N} = \pi_m,$$

meaning the empirical inflow share equals the predicted probability in equilibrium.

Equivalence to PageRank Solution We now show that the maximum likelihood estimator $\tilde{V}^{EE}$ from the multinomial logit model is equivalent to the PageRank solution as described in Sorkin (2018). Recall from above that the MLE satisfies:

$$\pi_k = \frac{T_k}{N}, \quad \text{where } T_k = \sum_j M_{kj}^0, \quad N = \sum_{k,j} M_{kj}^0.$$

Since $\pi_k = \frac{\exp(\tilde{V}_k^{EE})}{\sum_l \exp(\tilde{V}_l^{EE})}$, this implies:

$$\frac{\exp(\tilde{V}_k^{EE})}{\sum_l \exp(\tilde{V}_l^{EE})} = \frac{T_k}{N}.$$

Multiplying both sides by $\sum_l \exp(\tilde{V}_l^{EE})$, we get:

$$\exp(\tilde{V}_k^{EE}) = \frac{T_k}{N} \cdot \sum_l \exp(\tilde{V}_l^{EE}),$$

which shows that $\exp(\tilde{V}_k^{EE})$ is proportional to T_k, the total number of workers arriving at firm k. Now consider the PageRank equation:

$$S^{0^{-1}} M^0 \exp(\tilde{V}^{EE}) = \exp(\tilde{V}^{EE}),$$

where S^0 is the diagonal matrix of column sums of M^0, i.e., $S^0_{kk} = \sum_j M^0_{jk}$, the total number of workers leaving firm k. This formulation assumes that a worker at origin firm j chooses destination firm k with probability:

$$\frac{M^0_{kj}}{\sum_l M^0_{lj}} = \frac{M^0_{kj}}{S^0_{jj}}.$$

Let $P = S^{0^{-1}} M^0$ denote the transition matrix. Then, the PageRank vector $\exp(\tilde{V}^{EE})$ is the stationary distribution of this Markov chain:

$$P \exp(\tilde{V}^{EE}) = \exp(\tilde{V}^{EE}).$$

This implies that $\exp(\tilde{V}^{EE})$ is a right eigenvector of P associated with eigenvalue 1. In equilibrium, the inflow to each firm (the left-hand side) equals the value of the firm (right-hand side), which aligns with the MLE first-order condition where inflow shares match predicted choice probabilities. Hence, solving the MLE via the multinomial logit model yields the same fixed-point solution as computing the PageRank from the normalized mobility matrix. Note that this equivalence holds up to scale, since both models are only identified up to a location shift in $\tilde{V}^{EE}$.

Variance PageRank We can use this insight to derive the MLE-based variance of the estimate. The observed information (negative Hessian) matrix is:

$$\frac{\partial^2 \mathcal{L}}{\partial \tilde{V}_m^{EE} \partial \tilde{V}_n^{EE}} = -N \left[\pi_m (\delta_{mn} - \pi_n) \right],$$

where δ_{mn} is the Kronecker delta. In matrix form:

$$\nabla^2 \mathcal{L} = -N \left(\text{diag}(\pi) - \pi\pi^\top \right).$$

Thus, the asymptotic variance of $\tilde{V}^{EE}$ is:

$$\text{Var}(\tilde{V}^{EE}) = \frac{1}{N} \left(\text{diag}(\pi) - \pi\pi^\top \right)^+,$$

where $(\cdot)^+$ denotes the Moore-Penrose pseudoinverse.

C Online Appendix: Survey Materials

C.1 Original Survey

Informed Consent

INFORMATIONSARK OM AARHUS UNIVERSITET

Professor Nabanita Datta Gupta, Institut for Økonomi, Aarhus Universitet, er i gang med et forskningsstudie finansieret af ROCKWOOL fonden omkring vurderinger af jobkarakteristika.

Rekruttering af deltagere udføres af Bilendi.co, en survey virksomhed med over 20 års erfaring i at hjælpe forskere med markedsundersøgelser i over 13 europæiske lande, herunder Danmark.

Din deltagelse i denne forskningsundersøgelse er frivillig.

Hvorfor udføres denne undersøgelse?

Formålet med denne undersøgelse er at kortlægge, hvordan enkeltpersoner beslutter, hvilken type job de foretrækker. Ved hjælp af en række hypotetiske jobkontraster bliver du bedt om at vælge, hvilket job du

foretrækker at have. Ud fra disse kontraster vil forskerne være i stand til at forstå individers præferencer for jobkarakteristika.

Hvad sker der, hvis jeg deltager i denne forskningsundersøgelse?
Det er frivilligt at deltage i denne undersøgelse. Ved deltagelse vil forskeren bede dig om følgende:
At deltage i undersøgelsen vedrørende dine jobpræferencer. Undersøgelsen vil også omfatte grundlæggende demografiske oplysninger.

Hvor længe vil jeg være i forskningsundersøgelsen?
Deltagelse tager i alt ca. 20 minutter.

Er der nogen potentielle risici eller ubehag, som jeg kan forvente af denne undersøgelse?
Der er ingen forventede risici eller ubehag.

Er der nogen potentielle fordele ved at deltage?
Du kan drage fordel af undersøgelsen ved at modtage vejledning om potentielle jobmuligheder, når studiet er slut.

Vil jeg blive betalt for at deltage?

Du vil modtage 200 Bilendi point for at deltage.

Vil oplysninger om mig og min deltagelse blive behandlet fortroligt?

Alle oplysninger, der indhentes i forbindelse med denne undersøgelse, og som kan identificere dig, forbliver fortrolige. De vil kun blive videregivet med din tilladelse eller som krævet ved lov. Den forskningsansvarlige vil ikke have adgang til identificerbare data. Identificerbare oplysninger vil kun blive brugt til betaling og til at sende personlige forslag om jobmuligheder. Data vil blive afidentificeret og anonymiseret inden analysen.

Hvordan vil resultater videregives?

Resultater vil kun blive videregivet i aggregeret form, hvilket betyder, at ingen individuelle deltageres svar kan identificeres. De aggregerede resultater vil blive publiceret i videnskabelige tidsskrifter efter at have gennemgået peer review. Deltagerne er velkomne til at anmode om at se de publikationer, der kommer ud af undersøgelsen.

Hvilke rettigheder har jeg, hvis jeg deltager i denne undersøgelse?

• Du kan vælge, om du vil være med i denne undersøgelse eller ej, og du kan til enhver tid trække dit samtykke tilbage ved at afbryde deltagelsen.
• Uanset hvilken beslutning du træffer, vil der ikke være nogen straf for dig og intet tab af ydelser, som du ellers var berettiget til.
• Du kan nægte at besvare spørgsmål, som du ikke ønsker at besvare, og stadig deltage i undersøgelsen.
• Efter at have deltaget, kan du ikke længere trække dit tilsagn om samtykke om deltagelse tilbage.

Hvem kan jeg kontakte, hvis jeg har spørgsmål til denne undersøgelse?

• ***Forskerholdet:***
Hvis du har spørgsmål, kommentarer eller bekymringer om forskningen, kontakt venligst forskeren ansvarlig for undersøgelsen: Professor Nabanita Datta Gupta, ndg@econ.au.dk

• ***Databeskyttelse ved Aarhus Universitet***
Hvis du har spørgsmål til dine rettigheder som deltager i

undersøgelsen, eller hvis du har bekymringer eller forslag, og du ønsker at tale med andre end forskerne, kan du kontakte Databeskyttelsesrådgiveren tilknyttet Aarhus Universitet på mail: dpo@au.dk

Samtykke

Jeg har læst denne formular, og forskningsundersøgelsen er blevet forklaret for mig. Jeg har fået mulighed for at stille spørgsmål, og mine spørgsmål er blevet besvaret. Hvis jeg har yderligere spørgsmål, har jeg fået at vide, hvem jeg skal kontakte. Jeg accepterer at deltage i den ovenfor beskrevne forskningsundersøgelse.

Du modtager betaling og rådgivning inden for to uger.

Hvis du accepterer at deltage, skal du klikke på "ja". ${e://Field/p} ${e://Field/m}

- ○ Ja
- ○ Nej

Elegibility

Tak fordi du deltog i denne undersøgelse. Det tager ca. 20 minutter at gennemføre denne undersøgelse. Denne undersøgelse spørger om dine jobpræferencer. Først vil vi spørge om dit nuværende job.

Er du ansat i øjeblikket?

- ○ Ja
- ○ Nej

Sociodemographic Questions

Hvad er din alder?

Hvilket køn er du?

- ○ Kvinde
- ○ Mand
- ○ Andet

Hvad er din højeste fuldførte uddannelse?

- ○ Ingen uddannelse
- ○ Grundskole
- ○ Gymnasiale uddannelser
- ○ Erhvervsfaglige uddannelser
- ○ Kortere videregående uddannelser
- ○ Mellemlange videregående uddannelser
- ○ Lange videregående uddannelser
- ○ Phd og forskeruddannelser

Har du hjemmeboende børn?

- ○ Ja
- ○ Nej

Hvad er din nuværende branche?

- ○ **Ledelsesarbejde**, fx øverste ledelse i myndigheder, virksomheder og organisationer, inden for administration, produktions- og servicevirksomhed, hotel og restauration og andre serviceområder

- **Arbejde, der forudsætter viden på højeste niveau indenfor pågældende område**, fx ingeniør, læge, sygeplejerske, underviser, pædagog, økonomi-, administration- og salgsmedarbejder, revisor, finans- og forsikringsarbejde, IT, journalist, præst, bibliotekar, forfatter, kunstner m.fl.
- **Arbejde, der forudsætter viden på mellemniveau**, fx tekniker, arbejde indenfor forretningsservice, agent- og mæglerarbejde, salg og køb, speditør, told og grænsearbejde, forvaltning og udøvelse af lovgivning, sportsudøver og træner, fotograf, køkkenchef, driftsteknikarbejde m.fl.
- **Almindeligt kontor- og kundeservice arbejde**, fx sekretærarbejde, kasserer og kundeinformationsarbejde, beregnings- og registreringsarbejde, lagerekspeditionsarbejde m.fl.
- **Service- og salgsarbejde**, fx service under transport, kokkearbejde, tjener, frisør, inspektørarbejde indenfor rengøring, salgsarbejde, omsorgsarbejde for børn og indenfor pleje og sundhed, redning og overvågningsarbejde
- **Arbejde indenfor landbrug, skovbrug og fiskeri ekskl. medhjælp**, fx arbejde indenfor landbrug og gartneri, plantevækst, dyreopdræt, skovbrug, fiskeri og jagt
- **Håndværkspræget arbejde**, fx indenfor byggeri, metal- og maskinarbejde, præcisionshåndværk og grafik, elektriske og elektroniske område, fødevarefremstilling, snedkeriarbejde m.fl.
- **Operatør- samt monteringsarbejde og transportarbejde**, fx operatørarbejder ved stationære anlæg og maskiner, monteringsarbejde af mekanisk, elektrisk og elektronisk arbejde, chaufførarbejde og førere af køretøj m.fl.

- ○ **Andet manuelt arbejde**, fx rengøringsarbejde, manuelt arbejde indenfor landbrug, skovbrug og fiskeri, råstofudvinding, bygge og anlæg, produktions-, transport- og lagerarbejde, tilberedning af mad m.fl.
- ○ **Militært arbejde**, fx på officersniveau, befalingsmandsniveau og øvrige rangordener

Hvad er din nuværende månedsløn før skat (i DKK. Hvis du ikke ønsker at svare, kan du lade feltet stå blankt)?

I din nuværende stilling, har du:

- ○ Deltid
- ○ Fuldtid
- ○ Mange timer (over 37 timer)

I din nuværende stilling:

- ○ Bestemmer du selv din tidsplan
- ○ Er din tidsplan besluttet af din arbejdsgiver

I din nuværende stilling, har du mulighed for at arbejde hjemme?

- Ja
- Nej

I din nuværende stilling:

- varierer dit start-/sluttidspunkt på arbejdet
- start-/sluttidspunkt på arbejdet er faste

Har du aftenarbejde i din nuværende stilling?

- Ja
- Nej

I din nuværende stilling:

- dit timetal om ugen varierer hver uge
- dit timetal er omtrent det samme hver uge

Er det nemt at justere din tid på arbejdet af

familiemæssige / personlige årsager i din nuværende stilling?

- Ja
- Nej

Er du nogensinde tilkaldevagt i din nuværende stilling?

- Ja
- Nej

Ligger din arbejdsplads inden for 15km fra din bopæl?

- Ja
- Nej

Ligger din arbejdsplads mere end 30km fra din bopæl?

- Ja
- Nej

Job Selection Instructions

I den næste del af undersøgelsen får du vist 30 profiler af hypotetiske job. Disse job kan variere på følgende måder: timetal, kontrol over timer, mulighed for at arbejde hjemme, start-/-sluttidspunkter, omfanget af aftenarbejde, om arbejdstiden kan justeres, om man er tilkaldevagt, transporttid og lønvilkår.

Vi bruger dine svar i dette afsnit til at give dig personlige forslag til typer af jobs, der i øjeblikket er tilgængelige, og som kan passe til dine præferencer. Hvis du beslutter dig for at modtage disse forslag, vil du modtage dem via Bilendi. Vi kontakter ikke arbejdspladser eller virksomheder på dine vegne. Vi giver dig kun anbefalinger, der er i overensstemmelse med de valg, du foretager i den næste del af dette spørgeskema, hvis du siger, at du er interesseret i disse forslag.

Job Selection Exercise

	Job A	Job B
Timetal	${e://Field/jobA_hours_01}	${e://Field/jobB_hours_01}
Kontrol over timer	${e://Field/jobA_control_hours_01}	${e://Field/jobB_control_hours_01}
Arbejde hjemmefra	${e://Field/jobA_remote_work_01}	${e://Field/jobB_remote_work_01}
Mødetid på arbejde	${e://Field/jobA_time_flexibility_01}	${e://Field/jobB_time_flexibility_01}
Brug for at arbejde om aftenen	${e://Field/jobA_evenings_01}	${e://Field/jobB_evenings_01}
Timetal er regelmæssige	${e://Field/jobA_regular_hours_01}	${e://Field/jobB_regular_hours_01}
Tempo	${e://Field/jobA_pace_01}	${e://Field/jobB_pace_01}
Uafhængighed	${e://Field/jobA_independence_01}	${e://Field/jobB_independence_01}
Familietid	${e://Field/jobA_family_time_01}	${e://Field/jobB_family_time_01}
Tilkaldevagt	${e://Field/jobA_oncall_01}	${e://Field/jobB_oncall_01}
Afstand	${e://Field/jobA_distance_01}	${e://Field/jobB_distance_01}
Løn	${e://Field/jobA_salary_increase_01} % mere end din nuværende månedsløn	${e://Field/jobB_salary_increase_01} % mere end din nuværende månedsløn

Hvilket job foretrækker du?

○ A

○ B

Author note: This is repeated 29 additional times, but we do not print these additional contrasts to save pages.

	Job A	Job B
Timetal	${e://Field/jobA_hours_02}	${e://Field/jobB_hours_02}
Kontrol over timer	${e://Field/jobA_control_hours_02}	${e://Field/jobB_control_hours_02}