Household Search and the Equilibrium Gender Pay Gap

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Abstract

We develop and estimate an equilibrium labor market model to quantify the respective roles of labor supply and demand in generating gender earnings gaps over the life cycle. Households with and without children jointly choose specialization, while firms offer wages anticipating endogenous labor supply responses and incorporating gender-specific preferences, job search and productivity wedges. Using German longitudinal household data, we find that labor supply factors account for approximately 60 percent of the gender earnings gap over the life cycle, primarily reflecting gender differences in preferences for work. Firm-side forces are also quantitatively important: statistical discrimination explains 15 percent of the gap, while gender wedges on the side of firms account for 26 percent. We show that parental leave policies generate a persistent decline in female earnings, driven by sustained reductions in hours worked. Counterfactual reforms reducing leave duration and allowance increase fathers' leave uptake and narrow gender gaps in the short run, but have limited long-run effects.

JEL classification: D13, J16, J31, J64
Keywords: Gender Earnings Gap, Labor Market Equilibrium, Household Search

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1 Introduction

Despite significant convergence over the last decades, women still have substantially lower employment rates and earnings than men in the developed world. Recent literature has identified parenthood as the main driver of the persistence in earnings differentials across genders (Kleven et al., 2019a,b; Adda et al., 2017). The birth of a child impacts the choices of parents in the labor market by permanently increasing both the financial need of the household and the demand for hours spent at home. To meet these needs, parents may decide to specialize in either paid work or childcare activities (Becker, 1985), which may amplify pre-existing earnings differentials: fathers of young children tend to work more hours and earn higher wages, while mothers often leave the labor force or work part-time for a prolonged time. Importantly, firms anticipate the career choices made at the household level and may decide to offer different jobs to men and women, as well as to single or couple workers.[1]

So far, there is limited literature on the role of labor demand and supply forces in shaping labor market outcomes for men and women at different stages of the life cycle, and in particular before and after childbirth. Yet, quantifying these forces is key for identifying effective policies aimed at reducing gender differences in labor market outcomes. Many developed countries enacted family-friendly programs to facilitate the transition of workers into parenthood, such as parental leave legislation or parental allowances. However, these programs appear to have limited or negligible beneficial effects on labor market outcomes (Albanesi et al., 2023; Kleven et al., 2020). Furthermore, recent research indicates that firms adjust their hiring and pay policies in response to family policies (Ginja et al., 2023; Fernández-Kranz and Rodríguez-Planas, 2021; Huebener et al., 2022). Therefore, it is essential to untangle the mechanisms behind both worker and employer decisions to design effective policies.

This paper quantifies the driving forces of gender gaps over the life cycle, taking into account hiring decisions of firms and job acceptance, job quitting, and parental leave take-up decisions of workers in single and couple households. We consider a structural equilibrium model in which firms offer full-time and part-time jobs to workers of either gender. Workers are single or married and undergo several life-cycle stages characterized by the presence and the age of children, fertility, and retirement. Workers also differ in their initial human capital, which is accumulated during employment spells, and depreciates in periods of leave

[1] The idea that firms statistically discriminate in their hiring and pay policies based on perceived differences in working hours across genders also shows up in Albanesi and Olivetti (2009) and Fernández-Kranz and Rodríguez-Planas (2021).

and unemployment. Jobs are created by firms which differ in productivity such that the output of a worker-firm match is increasing in firm productivity, working hours, and in the human capital of the worker. Firms further differ in their preferences of hiring men or women into full-time or part-time jobs, which we model as gender wedges that distort the perceived productivity (cf. Morchio and Moser, 2025)) and that can result from taste-based discrimination on the side of managers or from a different task assignment of men and women within the firm. Firms in our model may also statistically discriminate against women when their skill distribution or their job search and quitting behavior (into parental leave, unemployment, or other jobs) differ from those of men. The matching process between workers and firms is frictional. Both unemployed and employed workers match with firms who offer wages to attract and retain their workers. We build on Burdett and Mortensen (1998), Bontemps et al. (2000) and Fang and Shephard (2019).

We estimate the model using the German Socio-Economic Panel (GSOEP) to match, among others, labor market participation, working hours, wages of single and married men and women at different life-cycle stages. We additionally allow for differences in job search across genders and life-cycle stages by calibrating search intensity to the average number of applications reported in the Panel Labour Market and Social Security (PASS) data. The estimated model replicates gender gaps in wages and hours, as well as the child penalty in the labor market, so that we can use it to quantify the relevance of three factors for the observed gaps: worker skills before entering the labor market, household preferences and job search effort, and firms' gender wedges. Equalizing all these structural parameters between men and women eliminates gender differences in our model, so that we can decompose the existing gaps before and after childbirth into these separate forces. Moreover, gender differences in initial skills, preferences and search effort take an impact on labor market outcomes due to direct supply effects and indirect demand effects arising from statistical discrimination: firms' hiring policies adjust to differences in skills, job acceptance and job quitting between men and women at different life-cycle stages, even in the absence of gender wedges distorting the firms' behavior. We also quantify the magnitudes of these two effects.

We find that labor supply forces account for approximately 60 percent of the total gender earnings gap over the life cycle. This component is driven primarily by gender differences in preferences for market work; heterogeneity in job search intensity and initial skill at labor market entry contributes only modestly. Demand-side forces are nonetheless quantitatively important: statistical discrimination explains 15 percent of the gap, while a gender-specific wage wedge accounts for 26 percent.

A central mechanism operates through equilibrium amplification within the household.

In contrast to models that treat men and women as independent decision-makers, we model joint household choice under a shared budget constraint. This structure generates endogenous specialization and intra-household insurance, which magnify initial gender differences in labor supply into persistent earnings gaps. Because firms anticipate these endogenous supply responses when posting wages, household-level decisions feed back into equilibrium wage schedules. In counterfactual equilibria with individual, rather than joint, decision-making, earnings gaps are substantially smaller, highlighting the role of household insurance and specialization in amplifying gender inequality.

We then use the model to evaluate two counterfactual parental-leave policies. Parental leave regulation permits each parent of a newborn child to leave a job while maintaining the right to return to the job. Parental allowance is a transfer paid to primary caretakers of young children, where the amount is proportional to labor income prior to child births subject to upper and lower caps. Our goal is to understand how these policies may be effective in reducing the gender pay gap while accounting for joint household decisions and employer responses to these policies.

The contribution of the paper is threefold. First, we contribute to the literature on joint household search initiated by Dey and Flinn (2008), Guler et al. (2012) and Flabbi and Mabli (2018) by characterizing the equilibrium wage distribution. Existing work on labor market dynamics with joint household search leaves the labor demand side (job creation and wage setting) exogenous. One notable exception is Fang and Shephard (2019) who structurally estimate an equilibrium joint search model, yet they do not analyze gender gaps and abstract from differences in working hours. Second, we explicitly consider life-cycle labor supply choices of couples as in e.g. Borella et al. (2018) and Guner et al. (2012), while Guner et al. (2020) examine family policies in such a framework. Our paper contributes to this literature by considering hiring and wage offer choices of firms in the presence of labor market frictions. Third, we contribute to a recent literature examining the life-cycle gender earnings gap using structural models. Adda et al. (2017) estimate a dynamic decision model of a household deciding about fertility and women labor supply, taking into account that transitions between inactivity, part-time and full- time work are subject to frictions. Faberman et al. (2026), Morchio and Moser (2025) and Xiao (2024) build equilibrium models in which men and women search for jobs created by firms. These jobs differ in productivity and amenities, while Xiao (2024) also takes childbirth events and parental leave into account. Different from our work, both papers neither consider joint career choices of couples, nor do they allow for the prevalence of part-time work that is key for the child penalty in many countries such as Germany to which our model is calibrated (cf. Kleven et al., 2019a). The

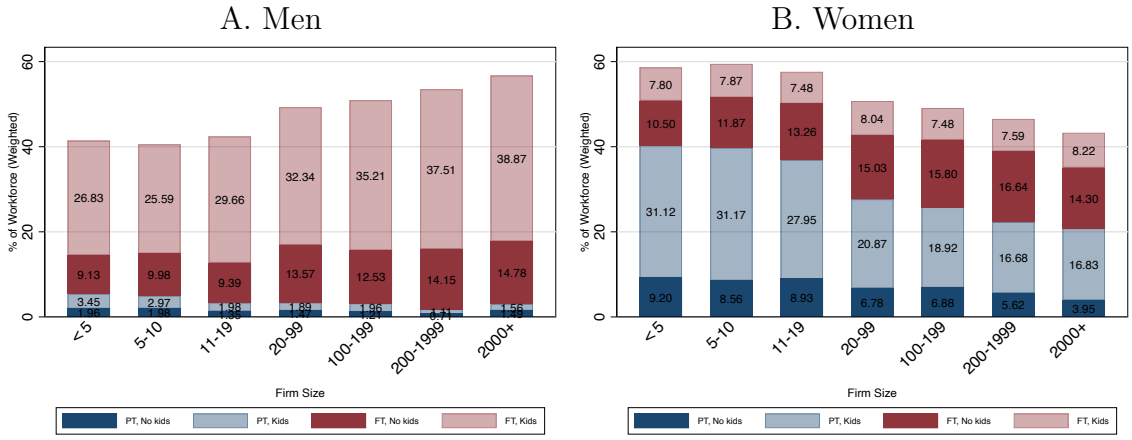
same applies to Amano-Patino et al. (2025) who consider an equilibrium model with on-the-job search of both genders which additionally includes human capital accumulation on the job. The rest of the paper is organized as follows. Section 2 reports some empirical patterns that motivate some of our modeling choices. Section 3 presents the model and section 4 describes the estimation strategy and the model fit. Finally, section 5 presents the quantification of the role of different drivers of gender gaps in earnings, and section 6 reports the estimated effects of reducing parental leave duration and allowance. Section 7 concludes.

2 Empirical Patterns

In this section, we provide empirical evidence that supports our modeling framework by documenting systematic differences in labor market behavior and outcomes across gender and parenthood status. The data used both in this section and in the model estimation are described more extensively in Appendix C.

Differential sorting across firms. In our model, firms choose which combinations of wages and working hours to offer, and workers sort across firms. Firm heterogeneity therefore directly shapes wage outcomes. If firms of different productivity differ systematically in both the contracts they offer and in the composition of their workforce, firm behavior may contribute to the gender pay gap. We test if workers of different gender and demographic status are differentially allocated across different firms. We examine sorting patterns using data from the GSOEP. In the model, productivity is the key dimension of firm heterogeneity; empirically, we proxy productivity using firm-size bins, exploiting the well-established positive relationship between firm size and productivity. For each firm-size bin, we compute the distribution of workers by gender and parenthood status, distinguishing further between full-time and part-time employment. Figure 1 documents systematic differences in workforce composition across firms. Women are disproportionately represented in smaller firms. Mothers are substantially more likely to work part-time, and women overall are more concentrated in part-time employment. These patterns indicate that worker allocation across firms is not neutral with respect to gender and parenthood. Moreover, we observe that both the firm-size wage premium and the gap in hourly wages between full-time and part-time jobs is larger for men than for women (see Figure A.1). Therefore, the overrepresentation of women, especially mothers in part-time positions, in smaller firms contributes to gender wage differentials.

Differences in job search. First, we document differences in job search behavior between genders and across demographic group. We use information from the Panel Study

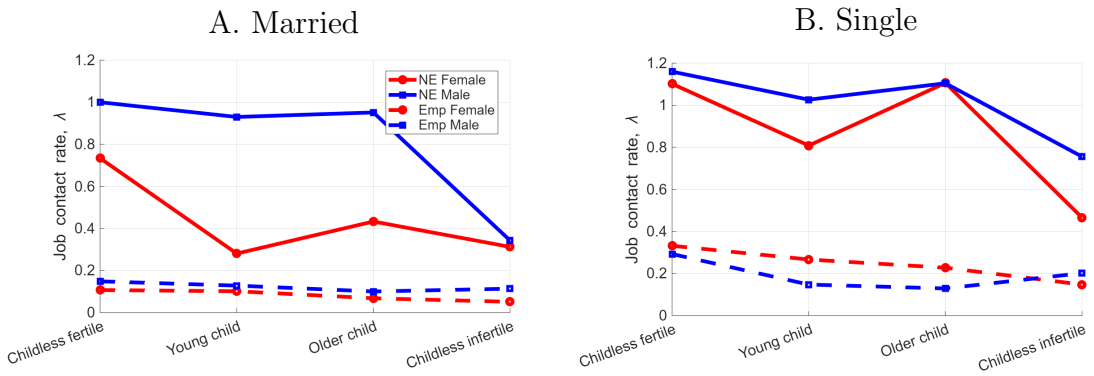


Note: This figure shows the fraction of workers employed by firm-size bin (i.e., number of employees expressed as percentage of workforce), computed using GSOEP data. Panel A reports values for men; Panel B reports values for women. Blue and red bars indicate the fraction of workers in part-time and full-time jobs, respectively. Darker and lighter shades represent workers without children and with children, respectively.

Figure 1: Distribution of men and women in full-time and part-time jobs and across firm-size bins

Labour Market and Social Security (PASS), a longitudinal survey of German households with detailed information about job search activity, for the years 2007-2019. We compute the mean number of applications of employed and non-employed, male and female workers in single and couple households in the four family states (childless fertile, young child, other child, and childless fertile). Figure 2 reports the mean number of applications of each group relatively to the number of applications of non-employed men, which is normalized to 1. The figure reveals that employed workers have similar job search effort across the life stages and marital status. However, there are remarkable differences in the search behavior of married men and women, which become especially large with the arrival of kids: Married fathers' search effort remains flat, while married mothers' search effort drops markedly. Single non-employed parents search with similar effort across genders.

Differences in working hours. Next, to gain insight into how parenthood changes the choice of working hours, we estimate the variation of part-time vs full-time work schedules around the birth of the first child. By looking at the dynamics of the same worker, Figure A.2 shows that after the birth of a child the probability of being employed in a part-time job increases significantly for women, while no significant change is detected for men. When separating the sample of female workers into job switchers and job stayers with the employer at the time of childbirth, we find that the effect is larger for the latter, indicating the presence of frictions to change schedule within the job. We find similar patterns when looking at the differences in desired and actual weekly working hours.



Note: This figure shows the mean number of job applications, normalized by the value of married men in demographic state "childless, fertile" ($k = 1$), computed using PASS data for the years 2007-2019.

Figure 2: Job search effort by gender, demographic group, and marital status

3 The Model

We consider a random search job-posting model with heterogeneous workers and firms which is based on Burdett and Mortensen (1998) and Bontemps et al. (2000). There are men and women workers who live in single and couple households that transit through family stages over the life cycle. Firms offer jobs that differ in working hours and wages. Workers make job acceptance and job quitting decisions, and their skills appreciate (depreciate) while they are employed (non-employed). Under parental leave regulations, parents with young children have the right to leave their job for a limited time after which they are allowed to return to the job. The model is set up in continuous time and we consider a stationary equilibrium.

3.1 The Environment

Workers and Households

We consider men and women workers indexed by $g = m, f$ who are members of either single or couple households without transitions between the two. Single households are indexed by the gender of the household head, while couple households include two working-age members of opposite gender. All households transit through five family states indexed by $k = 1, \ldots, 5$, where $k = 5$ is retirement and $k < 5$ are working-age households: $k = 1$ denotes a childless fertile household, $k = 2$ ($k = 3$) denote a household with young (old) children and $k = 4$ is a childless infertile household. The transition rate from state k to state k' is denoted $\Phi^g_{kk'}$ for a single household of gender g and $\Phi_{kk'}$ for a couple household. Retirement is an absorbing state. To keep the working-age population constant, every retiring single or couple household is replaced by a new single or couple household in family state $k = 1$ with non-employed

workers.

Household utility in retirement is normalized to zero. During working age, the utility flow of a single household of gender $g = m, f$ is

$$u_g(c, h_g; k) = \ln c + \psi_k^g \frac{(\bar{h} - h_g)^{1-\gamma}}{1-\gamma} + \alpha_k^g \mathbf{1}_{\{h_g > 0\}} \ ,$$

while the utility flow of a couple household is

$$u(c, h_m, h_f; k) = \sum_{g=m,f} u_g(c_g, h_g; k) \ ,$$

where $c_m = c_f = c/2$ and c is household consumption, h_g is working hours of gender $g \in \{m, f\}$. The utility parameters ψ_k^g and α_k^g govern labor supply at the extensive and intensive margin. These parameters are allowed to vary by gender and household type, while the hours endowment $\bar{h}$ and the utility curvature parameter γ are assumed not to vary with demographics. Households do not save so that consumption is equal to household labor income after taxes and transfers. Households discount future utility at rate ρ.

Workers differ in skills $s \in \{s^1, \ldots, s^n\} \subset \mathbb{R}_{++}$ where $s^i < s^{i+1}$. Skills may either appreciate or depreciate, depending on a worker's current employment state and working hours. For an employed worker, the skill goes up to $s^+(s^i) \equiv s^{i+1}$ at transition rate π_x^+ (if $s^i < s^n$). For a non-employed worker, the skill goes down to $s^-(s^i) \equiv s^{i-1}$ with probability π_x^- (if $s^i > s^1$). Here x is the worker's state vector, which is formally defined below, and which includes working hours, so that skill accumulation may differ between full-time or part-time jobs. New households entering family state $k = 1$ draw initial skills with probability $\zeta^g(s)$ for singles of gender g and with probability $\zeta(s_m, s_f)$ for couple households.

Firms

There is a fixed unit mass of firms that differ in productivity y which is distributed with cumulative distribution function $\Gamma(.)$. Firms offer full-time and part-time jobs with hours requirements $h \in \{h^F, h^P\}$. They operate linear production technologies that sum the output of all jobs. If a job in a firm of productivity y is filled with a worker of skill s working h hours, the output is ysh. That is, worker skills and firm productivity are complementary such that ys is the hourly productivity of the match.

To allow for the possibility that firms treat male and female job applicants differently, we introduce a (perceived) productivity gap between male and female workers that may vary with working hours. These gaps may reflect a gendered task assignment of firms or a

productivity misperception (taste-based discrimination) on the side of managers. Specifically, the perceived output of a female worker in a full-time (part-time) job is multiplied with the gender-wedge parameter η^F (η^P). The gender wedge may reflect a productivity discount (when $\eta < 1$) or a productivity premium (when $\eta > 1$) of a female worker.

When a firm aiming to fill a job with hours requirement h meets a male (female) worker, it offers an hourly wage per efficiency unit which is denoted w_m (w_f). Specifically, we allow firms to offer different wages to male or female job applicants at the matching stage.[2] Firms maximize the profit value of its job offers, taking into account workers' labor supply choices as reflected in job acceptance, job quitting, parental leave and hours reductions after parental leave. Therefore, gender differences in wage offers reflect not only the gender wedges introduced above, but also the firms' rational expectations about worker choices regarding quits, parental leave take-up and hours reductions (statistical discrimination). We write Δ^h for the fraction of jobs created with hours requirement h, and $F^{g,h}(w)$ for the distribution of hourly skill adjusted wage offers to workers of gender g in these jobs. These objects are determined in equilibrium.

Parental Leave, Right to Part-Time, Taxes and Transfers

In line with parental leave legislation in many countries, parents of young children have the right to leave their job for a limited time period during which the employer is required to hold the job. In our model, parental leave ends at transition rate τ which is a policy parameter. Parental leave also ends automatically when the children grow older, i.e. when the household leaves family state $k = 2$. In both cases, the worker decides to either return to the previous job or quit the job. We allow the worker to enter parental leave either upon receiving the young child or, in a couple household with young children, when the partner's parental leave spell ends. The latter reflects parental leave legislation that grants this right to both parents.

We also allow parents to request an hours reduction of their full-time job, i.e. a switch from full-time to part-time working hours (at the same hourly wage), which aligns with part-time worker rights in many European countries. To keep the model tractable, we assume those part-time transitions to be permanent, i.e. the employer is not required to provide a full-time job later on. We also restrict such requests to be made upon childbirth (transition

[2] In line with anti-discrimination legislation in modern societies, firms are not allowed to openly discriminate in their pay policies. However, private firms retain discretionary control which worker and which wage to offer. Our model reflects these hiring and pay choices and how they respond to the policy environment. It can also account for within-firm gender pay differences which are still sizable in many countries (e.g. Hennig and Stadler, 2023).

from $k = 1$ to $k = 2$) or at the end of a parental leave spell.[3]

The government maintains a tax-transfer system that determines how disposable household income depends on the labor earnings of the household's workers and on the family composition. Specifically, disposable income in single and couple households is given by $Y^s(x_g, k)$ and $Y^c(x_m, x_f, k)$, where $x_g \equiv (w_g, h_g, s_g, p_g)$ is the state vector of a worker of gender g. The state vector includes the current wage w_g, contractual working hours h_g (which are both zero when the worker is non-employed), worker skill s_g, and the indicator variable $p_g \in \{0, 1, 2\}$ which indicates parental leave or part-time right status. Specifically, we denote $p_g = 0$ if a worker is in regular employment, $p_g = 1$ for workers on parental leave, and $p_g = 2$ for workers who were hired into a full-time job (i.e. contractual hours are $h_g = h^F$) but who requested a permanent part-time reduction. Note that the tax-transfer schedule $Y^s(.)$ and $Y^c(.)$ depends on the family state k and on parental leave status, hence incorporates child allowance and parental allowance as further policy parameters that affect the labor market choices of parents.

Matching and Separations

We allow job-offer rates to vary with gender and with the family state in order to reflect how job search may differ between men and women with or without children. Non-employed workers of gender g in a single or couple household $\chi = s, c$ and family state k meet firms at flow rate $\lambda^n_{g,k,\chi}$, so that a worker is offered a job with hours requirement h at flow rate $\lambda^n_{g,k,\chi}\Delta^h$ with a wage offer w drawn from $F^{g,h}(.)$. The worker then decides whether to accept or reject the offer. Employed workers encounter outside offers at flow rates $\lambda^e_{g,k,\chi}$ whose hours requirements and wages are drawn from the same distribution. The employed worker then decides whether or not to accept the outside offer. Note that workers on parental leave are considered non-employed.

A worker in a job with hours requirement h separates from the job into non-employment at exogenous layoff rate δ_h. Any worker is allowed to voluntarily quit into non-employment when the family status changes, when parental leave ends, or in a couple household, when the partner accepts a new job or returns from parental leave.

[3]Germany introduced right-to-part-time legislation in the year 2001 which granted the right to work part-time to all workers (with or without children) employed in firms with more than 15 employees. Paule-Paludkiewicz (2024) finds that the legislation only had an effect on part-time work of mothers with young children, which justifies our assumption.

3.2 Household Decisions

We denote by $V(x_m, x_f, k)$ the value function of a couple where the state of a worker of gender g is $x_g = (w_g, h_g, s_g, p_g)$, as explained before, and k is the joint family state. With abuse of notation, we also write $V(x_g, x_{-g}, k)$ for generic gender g so that $-g$ is the gender of the partner. We further simplify notation and denote $\xi_g \in \{e, n\}$ the employment status of worker g. The Bellman equation of the couple household is[4]

$$
\begin{aligned}
D(x_m, x_f, k)V(x_m, x_f, k) = u(Y^c(x_m, x_f, k), h_m, h_f) + \sum_{k'} \Phi_{kk'} \bar{V}(x_m, x_f, k') \qquad (1)\\
+ \sum_{g=m,f} \Big\{ \pi^+_{x_g} V(x^+_g, x_{-g}, k) + \pi^-_{x_g} V(x^-_g, x_{-g}, k)\\
+ \sum_{\hat{h}=h_F,h_P} \lambda^{\xi_g}_{g,k,c} \Delta^{\hat{h}} \int \max\left[V(x_g, x_{-g}, k), V(\hat{x}_g, x_{-g}, k), V(\hat{x}_g, x^n_{-g}, k)\right] dF^{g,\hat{h}}(\hat{w})\\
+ \delta_{h_g} V(x^n_g, x_{-g}, k) + \mathbb{I}_{p_g=1} \tau \bar{V}^\tau(x_g, x_{-g}, k) \Big\}
\end{aligned}
$$

where $D(x_m, x_f, k) \equiv \rho + \sum_{k'} \Phi_{kk'} + \sum_g \{\pi^+_{x_g} + \pi^-_{x_g} + \sum_{\hat{h}} \lambda^{\xi_g}_{g,k,c} \Delta^{\hat{h}} + \mathbb{I}_{p_g=0}\tau + \delta_{h_g}\}$. The first line includes the continuation utility after a change of the family state, denoted $\bar{V}$ and further described below. The second line of equation (1) indicates value changes following skill appreciation or depreciation, where we use shortened notation for the worker's continuation states $x^+ = (w, h, s^+(s), p)$ (skill appreciation) and $x^- = (w, h, s^-(s), p)$ (skill depreciation). The third line shows the continuation value if one partner receives a job offer where $\hat{x} = (\hat{w}, \hat{h}, s, 0)$ is the continuation state of the new job $(\hat{w}, \hat{h})$ which also erases any potential parental leave status of the previous job. If the job offer is accepted, the partner may quit to non-employment where we use $x^n = (0, 0, s, 0)$ to denote the continuation state of a newly non-employed worker with skill level s inherited from the previous state x. The fourth line shows the transitions after a job separation and after the end of a parental leave spell of worker g. The latter happens when $p_g = 1$ and at transition rate τ. In this case, continuation utility is denoted $\bar{V}^\tau$ and further described below.

Consider continuation utility after a change of the family state denoted $\bar{V}$. If that transition occurs from $k = 1$ into state $k' = 2$ (young children), either one of the two partners may take parental leave which dominates an outright quit or an hours reduction, as parental leave comes together with parental allowance payments and entails the option of returning to the previous job and while still permitting the search for other jobs. A

[4]The Bellman equation applies to all employment states of the two workers. To simplify notation, we set $\delta_{h=0} = 0$ because non-employed workers cannot separate from a job.

transition to any other family state may induce a quit to non-employment for either of the two workers. Further, a transition from $k = 2$ into $k = 3$ (household with older children) may entail a return from parental leave (current state $x = (w, h, s, 1)$) to the previous job with the same hours, as indicated by the continuation state $x^r = (w, h, s, 0)$, or a return to the same job at lower hours (if the former job was a full time job $h = h_F$) with continuation state $x^l = (w, h, s, 2)$, and in both cases the partner may or may not quit the job. As any partner (potentially) has the option to return to the job (same or lower hours) or to quit the job with continuation state $x^n = (0, 0, s, 0)$, we generically denote the continuation state $x_g^{(r,l,n)}$, and the couple makes an optimal choice about these joint continuation states. Taken together, the continuation utility is

$$\bar{V}(x_g, x_{-g}, k) = \begin{cases} \max\left[V(x_g, x_{-g}, k), V(x_g^p, x_{-g}, k), V(x_g, x_{-g}^p, k)\right] & \text{if } k = 2 \ , \\ \max\left[V(x_g^{(r,l,n)}, x_{-g}^{(r,l,n)}, k)\right] & \text{if } k = 3 \ , \\ \max\left[V(x_g, x_{-g}, k), V(x_g^n, x_{-g}, k), V(x_g, x_{-g}^n, k)\right] & \text{if } k \neq 2, 3, K \ , \\ 0 & \text{if } k = K \ . \end{cases}$$

Finally, consider continuation utility after the end of parental leave of worker g denoted $\bar{V}^\tau(x_g, x_{-g}, k)$. Here worker g may either return to the previous job at the same hours with continuation state $x^r = (w, h, s, 0)$ or, if the previous job was a full-time job, return at lower hours with continuation state $x^l = (w, h, s, 2)$, or quit the job to non-employment with continuation state $x^n = (0, 0, s, 0)$. When the worker returns to the previous job (at same or lower hours), the partner may take parental leave where $x^p = (w, h, s, 1)$ is the state of a worker entering parental leave from state $x = (w, h, s, 0)$. Note that these transitions are all conditional on the household including young children ($k = 2$).[5] Consequently we have

$$\bar{V}^\tau(x_g, x_{-g}, k) = \max\left[V(x_g^r, x_{-g}, k), V(x_g^l, x_{-g}, k), V(x_g^r, x_{-g}^p, k), V(x_g^l, x_{-g}^p, k), V(x_g^n, x_{-g}, k)\right] \ .$$

All decisions about job acceptance, quitting, entering parental leave, or exercising the right to return to the previous job (at the same or reduced hours) involve binary policy functions where we use the notation

$$\Omega\left((x_g^0, x_{-g}^0); (x_g^i, x_{-g}^i)_{i=1}^I; k\right) = \begin{cases} 1 & \text{if } V(x_g^0, x_{-g}^0, k) > V(x_g^i, x_{-g}^i, k) \text{ for all } i = 1, \ldots, I \ , \\ 0 & \text{else} \ , \end{cases}$$

[5] Alternating, repeated spells of parental leave of the same worker are permitted in this model framework. They are also in line with German law as long as children are young and the total duration of parental leave does not exceed three years.

to indicate that (x_g^0, x_{-g}^0) is preferred over any of the alternatives (x_g^i, x_{-g}^i), $i > 0$. In the numerical solution of the model, we smooth out these discrete choices by adding small taste shocks which simply add noise to the household decisions. In this modification, the above function Ω indicates *the proportion of households* that prefer (x_g^0, x_{-g}^0) over the stated alternatives. Our results are not sensitive to the inclusion of these taste shocks. Appendix B contains further details about this extension and it also presents the Bellman equation for single households with value and policy functions V^g, Ω^g.

3.3 Stationary Household Distribution

In a stationary equilibrium, let $G^g(x_g, k)$, $g = m, f$, and $G(x_m, x_f, k)$ denote the measures of single and couple households in the respective states (x_g, k), (x_m, x_f, k). Again with abuse of notation, we also write $G(x_g, x_{-g}, k)$ for couple households with generic gender g. We solve for the stationary measures by equating the inflows and outflows to/from a given household state.

Consider a couple household in state (x_m, x_f, k). The outflow from this state is equal to

$$\mathcal{O}(x_m, x_f, k) \equiv G(x_m, x_f, k) \Bigg[\underbrace{\sum_{k'} \Phi_{kk'}}_{\text{family state change}} + \sum_{g=m,f} \Bigg\{ \underbrace{\pi^+_{x_g} + \pi^-_{x_g}}_{g\text{'s skill adjustment}} + \underbrace{\delta_{h_g}}_{g \text{ is laid off}} + \underbrace{\sum_{\hat{h}} \lambda^{\xi_g}_{g,k,c} \Delta^{\hat{h}} \int \left[1 - \Omega((x_g, x_{-g}); (\hat{x}_g, x_{-g}), (\hat{x}_g, x^n_{-g}); k)\right] dF^{g,\hat{h}}(\hat{w})}_{g \text{ accepts new job}} + \underbrace{\mathbb{I}_{p_g=1}\tau}_{g \text{ exits parental leave}} \Bigg\} \Bigg] .$$

Note that outflows due to voluntary quits to non-employment or entry into parental leave are already included in this expression, either as a consequence of a change of family state, or job acceptance of the partner, or the partner's return from parental leave.

Regarding the inflow into state (x_m, x_f, k), consider for example a household without young children ($k \neq 2$) where both members are non-employed ($h_m = h_f = 0$). The inflow into this state can involve skill depreciation, change of the family state with or without job

quitting, layoffs, or the entry of new households into the first family state $k = 1$:

$$\mathcal{I}(x_m, x_f, k) \equiv \underbrace{\sum_{g=m,f} \pi^-_{x_g^+} G(x_g^+, x_{-g}, k)}_{\text{skill depreciation}} + \sum_{k_0} \Phi_{k_0 k} \Bigg\{ \underbrace{G(x_m, x_f, k_0)}_{\substack{\text{family state change} \\ \text{without job quitting}}}$$

$$+ \underbrace{\sum_{\hat{h}} \int G(\hat{x}_m, x_f, k_0)\Omega((x_m, x_f); (\hat{x}_m, x_f); k) + G(x_m, \hat{x}_f, k_0)\Omega((x_m, x_f); (x_m, \hat{x}_f); k) d\hat{w} \Bigg\}}_{\text{family state change where one partner quits job } (\hat{w}, \hat{h})}$$

$$+ \underbrace{\sum_{\hat{h}} \delta_{\hat{h}} \int G(\hat{x}_m, x_f, k) + G(x_m, \hat{x}_f, k) d\hat{w}}_{\text{one partner is laid off from job } (\hat{w}, \hat{h})} + \underbrace{\mathbb{I}_{k=1} N \zeta(s_m, s_f)}_{\text{entry of new couple households}} \quad .$$

In the last line, N is the inflow measure of couple households per unit time of which fraction $\zeta(s_m, s_f)$ enter the labor market with skills (s_m, s_f). The inflow expressions for the other couple households, as well as the inflow and outflow identities for single households are derived similarly. In a stationary equilibrium, inflows are equal to outflows, $\mathcal{I}(x_m, x_f, k) = \mathcal{O}(x_m, x_f, k)$ for all household states (x_m, x_f, k).

3.4 Firm Decisions

Firms choose how many jobs with hours requirements $h = h^F, h^P$ to create and the skill-adjusted wages they offer to workers of gender $g = m, f$ when encountering those workers. Firms anticipate that better paid jobs attract and retain more workers, as in Burdett and Mortensen (1998). In addition, they anticipate how wage policies change parental leave take-up and the option to switch from a full-time to a part-time job for parents of young children when parental leave ends. The firms' wage-offer policies take into account the gender wedges described above as well as the distinct labor supply behavior of the two genders (statistical discrimination).

If a firm with productivity y and a job with hours requirement $h \in \{h^F, h^P\}$ offers wage w_m to male workers and w_f female workers, the perceived profit value of these job offers can be written

$$(y - w_m)\ell(m, h, w_m) + (y\eta^{F/P} - w_f)\ell(f, h, w_f) \ , \tag{2}$$

where $\ell(g, h, w_g)$, $g = m, f$, are the total efficiency units of labor of both genders that the firm expects to employ. To take parental leave (state $p = 1$) and the option of part-time

requests (state $p = 2$) into account, the actual working hours of a worker are

$$H_p(h) \equiv \begin{cases} h & \text{if } p = 0 \ , \\ 0 & \text{if } p = 1 \ , \\ h^P & \text{if } p = 2 \text{ and } h = h^F \ . \end{cases}$$

The efficiency units of labor that workers of gender g provide to a job offer (h, w_g) can be calculated by dividing total efficiency units of labor in those jobs in relation to the total number of offers (h, w_g):

$$\ell(g, h, w_g) = \frac{\sum_{k,s,p} sH_p(h) \left[G^g(w_g, h, s, p, k) + \sum_{h_{-g}, s_{-g}, p_{-g}} \int G((w_g, h, s, p), (w_{-g}, h_{-g}, s_{-g}, p_{-g}), k) dw_{-g} \right]}{\Delta^h f^{h,g}(w_g)} \ , \tag{3}$$

with wage-offer density $f^{h,g}(w_g) \equiv dF^{g,h}(w_g)/dw$.

We break down the firm's decision into two steps. First, the firm chooses how many jobs with hours requirement h to create, and second, the firm chooses the skill-adjusted hourly wages w_g that it offers to both genders in these jobs.

Beginning with the second step, let $w_{g,h}(y)$ denote the optimal wage offer of firm y to a worker of gender g which maximizes the profit value in equation (2), so that the expected perceived profit of a job with hours requirement $h \in \{h^F, h^P\}$ is

$$\pi_h(y) \equiv (y - w_{m,h}(y))\ell(m, h, w_{m,h}(y)) + (y\eta^{F/P} - w_{f,h}(y))\ell(f, h, w_{f,h}(y)) \ . \tag{4}$$

Given these profit values, firm y decides which jobs h to offer. The job creation costs for job with h required hours have two components: a common component $\bar{\varepsilon}_h$ and an idiosyncratic component ε_h which follows a type-I extreme value distribution with parameter σ_ε. A firm with productivity y chooses required hours to maximize

$$\max_h \{\pi_h(y) - \bar{\varepsilon}_h - \varepsilon_h\} \ ,$$

so that the proportion of productivity-y firms choosing $h = h_F, h_P$ is equal to

$$\Delta^h(y) = \frac{\exp[\sigma_\varepsilon(\pi_h(y) - \bar{\varepsilon}_h)]}{\exp[\sigma_\varepsilon(\pi_{h_F}(y) - \bar{\varepsilon}_{h_F})] + \exp[\sigma_\varepsilon(\pi_{h_P}(y) - \bar{\varepsilon}_{h_P})]} \ . \tag{5}$$

The total fraction of job offers with $h = h_F, h_P$ is then calculated as

$$\Delta^h = \int \Delta^h(y)\ d\Gamma(y)\ ,$$

such that $\Delta^{h_F} + \Delta^{h_P} = 1$. We verify in numeric solutions of our model that wage offers $w_{g,h}(y)$ are monotonically increasing in firm productivity y. Therefore, the fraction of wage offers in jobs (g, h) below or equal to $w_{g,h}(y)$ is equal to the fraction of job offers (g, h) in firms with productivity y or less,

$$F^{g,h}(w_{g,h}(y)) = \frac{1}{\Delta^h} \int^{y} \Delta^h(y')\ d\Gamma(y')\ ,$$

which determines the equilibrium wage-offer distributions in jobs (g, h).

3.5 Stationary Equilibrium Definition

A stationary equilibrium is defined by value and policy functions for single and couple households, V^g, V, Ω^g, Ω, stationary distributions of single and couple households over labor market and family states, G^g and G, job creation strategies $\Delta^h(y)$ and wage offers $w_{g,h}(y)$ for all firms such that:

1. Households make optimal job acceptance, job quitting, parental leave and part-time request decisions.
2. Firms make optimal job offer decisions.
3. The household distributions are stationary.

4 Estimation

4.1 Data

We estimate our model using moments obtained from the German Socio-Economic Panel (GSOEP), a longitudinal survey that follows a representative sample of households in Germany throughout their life cycles. This dataset is particularly suitable for our study as it includes information on household composition and the labor market outcomes of adult household members. We use GSOEP data from 2007 to 2019, covering the period following the reform to parental leave and parental allowance policies. Appendix C provides further details on the data analysis.

4.2 External Calibration

We set the annual discount rate ρ to 5%. Demographic transition rates are set exogenously as follows. Transitions from childless infertile to either household with young children (Φ_{12}) and to childless infertile (Φ_{14}) are set to match the average age of the household head at birth of first child and the share of households that never have children. The transition rates Φ_{23} and Φ_{34} are set to match the average age of the household head when the youngest child turns 8 or 20, while Φ_{45} is set to match the retirement age 65. These rates are set separately for couple and single (male/female) households, while all other transition rates are zero. To ensure that the household distribution is stationary, the entry flow for each household type (N for couples and N^g for singles of gender g) equals to the flow into the state of retirement ($k = 5$) of that household type.

We assume that the set of required working hours H_+ includes two levels $\{h_{PT}, h_{FT}\}$, corresponding to part-time and full-time employment. We will use the time use data from GSOEP to calibrate these time endowment parameters. The hours are calibrated to the average working hours of each type of employment in GSOEP. Hours endowment $\bar{h}$ is assumed to be 80 hours per week. We are choosing two levels of skills where the lower skill level is set to reflect the high-to-medium skill premium in the German labor market (see e.g. Figure 1 in Glitz and Wissmann, 2021).

The parental leave exit rate τ is a policy parameter calibrated to the inverse of the median parental leave duration observed in GSOEP. We parametrize the tax-transfer functions Y^c and Y^s with a log-linear specification (Heathcote et al., 2017) plus parental allowance. For singles, we assume that

$$Y^s(x_g, k) = \mathbb{I}_{\{p_g=0\}} \tau_0^s Y_g(x_g)^{1-\tau_1^s} + \mathbb{I}_{\{p_g=1\}} Y_p^s(x_g, k) \ , \tag{6}$$

where $Y_G(x_g) = w_g h_g s_g$ is the gross labor income, and $Y_p^s(x_g, k)$ is the parental allowance for a single parent with demographic type k. For couples, we assume that

$$Y^c(x_m, x_f, k) = \tau_0^c \left[\sum_{g=m,f} \mathbb{I}_{\{p_g=0\}} Y_G(x_g) \right]^{1-\tau_1^c} + \sum_{g=m,f} \mathbb{I}_{\{p_g=1\}} Y_p^c(x_g, k) \ , \tag{7}$$

reflecting joint income taxation at the household level. The parameters of the tax-transfer functions $\tau_0^s, \tau_1^s, \tau_0^c, \tau_1^c$ can be directly estimated from GSOEP by regressing log net income on log gross income, while excluding parental allowance (see Appendix C for further details).

Finally, we calibrate the offer arrival rates of workers in different demographic and labor market states. We assume that job offers are proportional to search effort as measured by

the number of applications in the SOEP data, and we use the $\lambda^{e/n}_{g,k,\chi}$ for $g = m, f$, $k = 1, \ldots, 4$ and $\chi = s, c$ reported in Figure Figure 2. All further externally calibrated parameters are listed in Table 1.

Table 1: External parameters

Parameter	Description	Value	Target/Source
Preference parameters:			
γ	Labor supply elasticity	2	Standard value
$\bar{h}$	Time constraint (hours/week)	80	Standard value
ρ	Discount rate	0.05	Standard value
Skills			:
s_H	High skill	1	Normalization
s_L	Low skill	0.64	Glitz and Wissmann (2021)
Weekly hours:			
h_F	Weekly hours in FT	43.259	Mean weekly hours full time (GSOEP)
h_P	Weekly hours in PT	20.397	Mean weekly hours part time (GSOEP)
Policy parameters:			
b_m	NE benefit, Men	919.02	Median monthly unemployment benefit, Men (GSOEP)
b_f	NE benefit, Women	699.06	Median monthly unemployment benefit, Women (GSOEP)
$\tau_{0,k}$	Tax function, Level	55.72	Tax regression (GSOEP)
$\tau_{1,k}$	Tax function, Curvature	0.37	Tax regression (GSOEP)
	Parental leave expiration rate	0.5	1/median duration of parental leave
	Parental leave benefits	0.67	Replacement rate (GSOEP)
	Minimum PL allowance (per month)	100	Statutory policy
	Maximum parental leave (per month)	6000	Statutory policy
Demography parameters:			
$(\Phi_{12}, \Phi^m_{12}, \Phi^f_{12})$	Transition childless fertile to young children	(0.085,0.040,0.084)	Age at first child (GSOEP)
$(\Phi_{14}, \Phi^m_{14}, \Phi^f_{14})$	Transition childless fertile to childless infertile	(0.010,0.046,0.044)	Share never had children (GSOEP)
$(\Phi_{23}, \Phi^m_{23}, \Phi^f_{23})$	Transition young children to older children	(0.090,0.106,0.098)	Age youngest child turns 8 (GSOEP)
$(\Phi_{34}, \Phi^m_{34}, \Phi^f_{34})$	Transition older children to childless infertile	(0.123,0.095,0.086)	Age youngest child turns 20 (GSOEP)
$(\Phi_{45}, \Phi^m_{45}, \Phi^f_{45})$	Transition childless infertile to retirement	(0.044,0.054,0.053)	Retirement age 65

This table reports the parameters externally computed using GSOEP, 2007-2019. Monetary values are expressed in 2015 euro.

4.3 Two-Step Estimation

The remaining parameters are estimated in a two-step estimation procedure following Bontemps et al. (2000) and Fang and Shephard (2019).

4.3.1 Step 1: Estimation of Supply-Side Parameters

On the labor-supply side, we estimate parameters governing labor supply, including utility function parameters (ψ^g_k, α^g_k), initial skill distribution (ζ^g), skill appreciation/depreciation probabilities (π^+_x, and π^-_x), and matching and separation rates (δ_h).

We also parametrize the offer distribution and estimate its parameters. That is, for each $g \in \{m, f\}$ and $h \in H^+$, the conditional wage distribution $F^{g,h}(w)$ follows a beta distribution with parameters $\left\{\alpha^{g,h}, \beta^{g,h}\right\}$. We estimate these parameters and $\{\Delta^h\}_{h \in H^+}$.

We estimate these parameters using the simulated method of moments where we derive the empirical moments from the GSOEP data unless stated otherwise. Below is a summary

of the identification strategy of supply-side parameters:

- ψ_k^g and α_k^g are identified from the difference in the employment rate and hours distribution by gender and demographic type. We normalize $\psi_{k=1}^{g=m} = 1$.
- The initial distribution over the skill grid (ζ^g) is identified from the gender specific hourly wage distribution conditional on full-time employment at age 25.
- π_x^+ can be identified from the observed year-to-year wage growth by hours type.
- π_x^- can be identified from an estimate of Schmieder et al. (2016) who find that an additional month of non-employment reduces the re-employment wage by 0.8%.
- δ_h can be identified from observed transition probability from each type of employment to non-employment.
- Finally, the wage-offer distribution parameters $\left\{\alpha^{g,h}, \beta^{g,h}\right\}$ can be identified from the observed hourly wage distribution conditional on hours and gender, and Δ^h is identified from the part-time employment share.

After the supply side parameters are estimated, we can compute the labor supply function $\ell(g, h, w)$ using equation (3).

4.3.2 Step 2 - Estimation of Demand-Side Parameters

On the demand side, we need to estimate the gender wedge parameters $\eta^{F/P}$, the common job setup costs $\bar{\varepsilon}_h$ and the Gumbel parameter σ_ε. To estimate these parameters, we follow Fang and Shephard (2019) and construct a theoretical hours choice function $\Delta^h(p)$ and an observed one $\widehat{\Delta}^h(p)$. We look for parameters that minimize the distance between the two. The theoretical function is derived from firms' optimal job-posting decisions given estimated labor supply from step 1, while the observed choice is the one that is consistent with the estimated offer distribution from step 1. In other words, we look for demand-side parameters such that, when firms make optimal job-posting decisions, the resulting offer distribution is the one uncovered in step 1.

We construct the two versions of the hours choice function as follows. Given $\ell(g, h, w)$, we can compute the inverse wage function for male and female workers in jobs with hours requirement h using the first-order conditions of firms' wage-posting problem,

$$y \equiv w_{m,h}^{-1}(w) = \frac{\ell(m,h,w) + w\frac{\partial \ell(m,h,w)}{\partial w}}{\frac{\partial \ell(m,h,w)}{\partial w}} \quad , \quad y \equiv w_{f,h}^{-1}(w) = \frac{1}{\eta^h}\frac{\ell(f,h,w) + w\frac{\partial \ell(f,h,w)}{\partial w}}{\frac{\partial \ell(f,h,w)}{\partial w}} \ . \quad (8)$$

where η^h are the hour-specific gender-wedge parameters. We verify in numerical solutions that the inverse wage function is monotonically increasing. Given the wage function, we can compute the expected profit associated with posting jobs given h using equation (4). Then, we can compute the "theoretical" choice function $\Delta^h(y)$ using equation (5). We refer to this as the theoretical choice because the choice is optimal given the labor supply function $\ell(g, h, w)$ and demand-side parameters.

Next, we construct the "observed" choice function $\widehat{\Delta}^h(y)$. To do so, we note that the offer distribution that derives from $\widehat{\Delta}^h(y)$ is

$$F^{g,h}\left(w_{g,h}\left(y\right)\right) = \frac{\int_{\underline{y}}^{y} \widehat{\Delta}^h\left(x\right) d\Gamma\left(x\right)}{\Delta^h} \ . \tag{9}$$

Differentiating equation (9) with respect to y and rearranging, we have

$$\widehat{\Delta}^h\left(y\right) = \frac{\Delta^h f^{g,h}\left(w_{g,h}\left(y\right)\right) w'_{g,h}\left(y\right)}{\gamma\left(y\right)} \ . \tag{10}$$

To obtain $\gamma\left(y\right)$, the probability density of the firm productivity distribution, we sum both sides of equation (10) over h and use the fact that $\sum_{h\in\{PT,FT\}} \widehat{\Delta}^h\left(y\right) = 1$. This gives

$$\gamma\left(y\right) = \sum_{h\in\{PT,FT\}} \Delta^h f^{g,h}\left(w_{g,h}\left(y\right)\right) w'_{g,h}\left(y\right) \ . \tag{11}$$

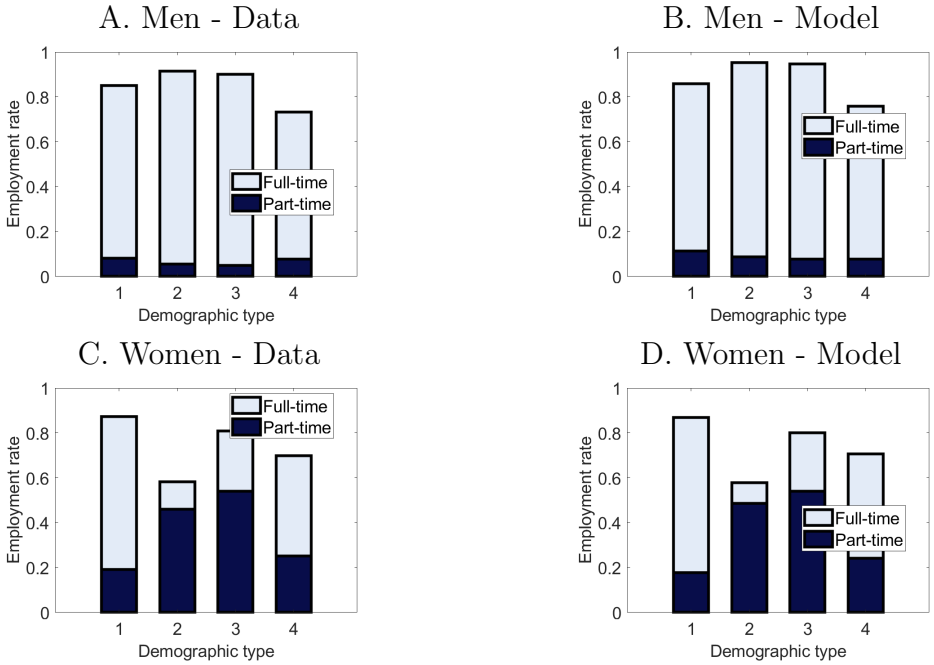
4.4 Model Fit

Table 2 shows the internally estimated parameter values and the calibration targets. Figure 3 shows that our model produces a good fit to the employment and hours distribution of male and female workers in the four demographic states. Figures Figure 4 shows how our model fits the wage distribution of men and women in full-time and part-time jobs, while Figure 5 shows the fit of the wage distribution of men and women at the time of labor market entry. Finally, Table 3 shows the model fit in terms of job separation rates and wage growth in full-time and part-time jobs. Appendix D.1 includes further model statistics: the distribution of workers by types of employment, including parental leave and reduced hours, and the male shares in part-time and full-time employment for all demographic groups.

Table 2: Internal Parameters

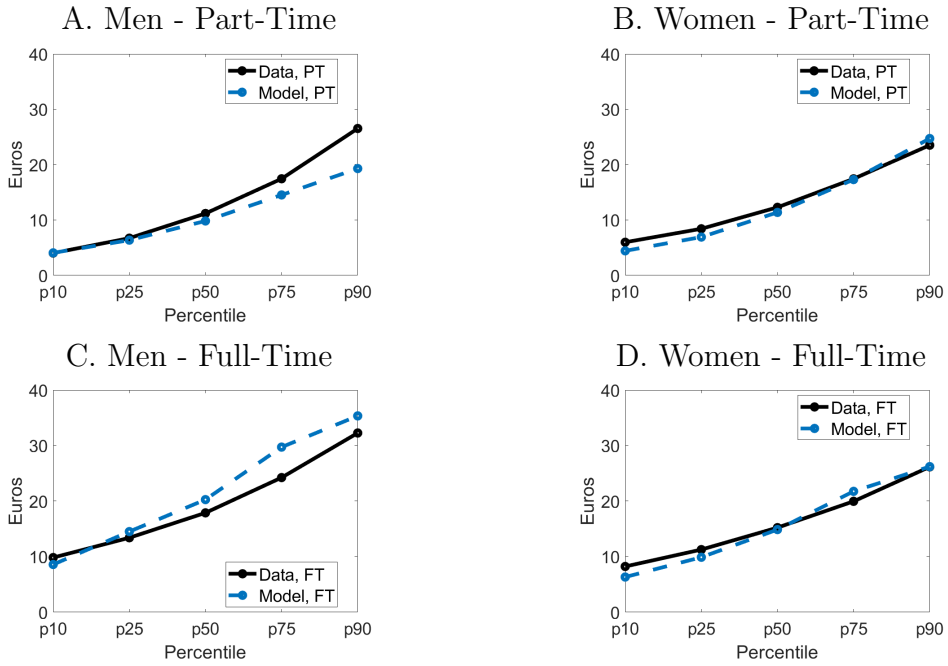
Parameter	Description	Target	Men	Women
Supply-side				
$\delta(P)$	Exog. sep. rate from PT	transition from PT to NE	0.080	
$\delta(F)$	Exog. sep. rate from FT	transition from FT to NE	0.006	
ψ_k^g	Preference for home hours	PT share, variation by (g,k)	$0.3^\dagger$	$6.2^\dagger$
α_k^g	Preference for employment	NE rate by by (g,k)	$3.7^\dagger$	$3.9^\dagger$
$\zeta^g(2)/\zeta^g(1)$	Initial skill ratio (high/low)	Wage distribution of young, FT	0.42	0.59
$\pi^{P,+}$	Skill growth rate in PT	Annual wage growth, PT	0.28	
$\pi^{F,+}$	Skill growth rate in FT	Annual wage growth, FT	0.42	
π^-	Skill depreciation rate in NE	Re-employment wage loss per month of NE	0.08	
Δ^P	Offer distribution, PT	Share of PT in all jobs	0.28	
Demand-side				
$\bar{\epsilon}^P$	Fixed cost of posting PT job $\bar{\epsilon}_F = 0$	Share of PT job offers	0.23	
σ_ε	Stochastic job-posting cost	Share of PT offers by firm	0.21	
η^P	Gender wedge (part-time)	Wage of women rel. to men, PT	1 (norm.)	1.4
η^F	Gender wedge (full-time)	Wage of women rel. to men, FT	1 (norm.)	0.9

This table reports the internally estimated parameter values. † indicates that we are reporting the average across demographic types. NE, PT, and FT refer to non-employment part-time and full-time respectively.



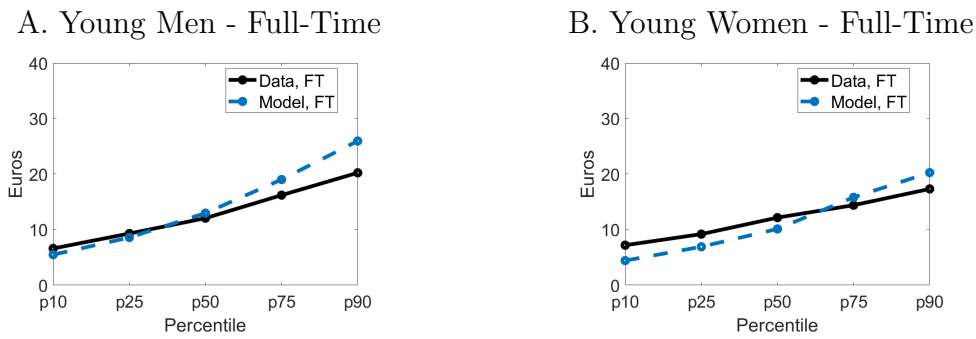
Note: The height of the bars indicate the employment rate. Data moments are computed based on GSOEP 2007-2019.

Figure 3: Model Fit: Employment and hours distribution



Note: Data moments are computed based on GSOEP 2007-2019.

Figure 4: Model Fit: Hourly Wage Distribution by Hours and Gender



Note: Young workers are those age 25. Data moments are computed based on GSOEP 2007-2019.

Figure 5: Model Fit: Hourly Wage Distribution of Young Workers

5 Quantitative Analysis

5.1 Gender Gaps

To better understand the mechanisms underlying gender inequality in earnings, we conduct a series of counterfactual exercises. In each of these exercises, we set supply- or demand-side parameters to gender-neutral values in order to understand how worker and firm behavior contribute to the observed gender gaps. Table 4 lists these counterfactual experiments.

Table 3: Model fit: Additional moments

	Data	Model
Job sep. prob, male PT	0.009	0.008
Job sep. prob, male FT	0.005	0.006
Wage growth, PT	0.0011	0.0009
Wage growth, FT	0.0017	0.0011

Notes: Transition probabilities and wage growth are monthly. Wage growth are in log points.

In the full "Gender Equity" counterfactual, all gender-specific parameters are adjusted to the gender-neutral values, which are defined as the average parameter values of men and women assigned in the benchmark model estimation. Trivially, in this scenario there are no differences between men and women in any outcome variable.

Table 4: Decomposition Counterfactuals

	Gender Equality in				
Economy	Search	Initial Skill	Preference	Gender wedges η	**Offer Dist.**
Benchmark					GE
Gender Equity	x	x	x	x	GE
Gender-Neutral Workers (Demand driven)	x	x	x		GE
No Gender Wedges (Supply driven)				x	GE
Gender-Neutral Firms (Supply only)				x	From Gender Equity CF
Supply-Side Gender Differences:					
Search-Driven		x	x	x	GE
Init. skill driven	x		x	x	GE
Preference driven	x	x		x	GE

Notes: x indicates relevant parameters are set to gender neutral value (average between genders). The absence of x indicates that parameters are set to the the benchmark level. GE indicates that offer distributions are determined in equilibrium.

In the "Gender-Neutral Workers" scenario we set all worker-side parameters (job search, initial skills, household preferences) to gender-neutral values. Therefore, gendered labor market outcomes are demand-driven through the gender wedges on the side of firms.

Conversely, in the "No Gender Wedges" scenario, we equate the gender wedge parameters for men and women. Gender differences are then driven by labor supply (job search, skills, preferences), to which firms react with a gender-specific wage-offer distribution. Therefore, this scenario features statistical discrimination of firms. To shut down this second discrimination channel, the "Gender-Neutral Firms" scenario applies in addition the wage-offer distribution of the "Gender Equity" counterfactual, so that gender differences exclusively emanate from the supply side. Put differently, the difference between the scenarios "No

Gender Wedges" and "Gender-Neutral Firms" is the presence of statistical discrimination in the former scenario, while both scenarios feature gender differences in job search, initial skills and preferences. The final three counterfactuals listed in Table 4 evaluate the contribution of each of these supply channels separately, while the firms' wage-offer distribution adjusts in equilibrium, i.e. statistical discrimination is present.

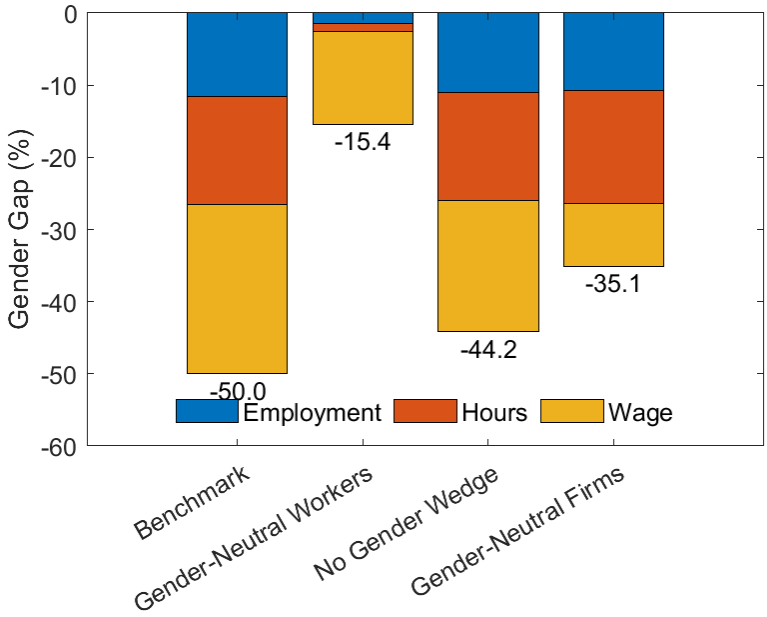


Figure 6: Gender Gap Decomposition

Notes: Height of each bar is gender gap, the percentage difference of female income from male income. Gender gap is decomposed into employment, hours, and wage differences. Horizontal lines show the decomposition in the benchmark economy.

Figure 6 compares the gender earnings gap between the benchmark economy and the three main counterfactuals. Additionally, the respective earnings gap is decomposed into the gaps in employment, hours (conditional on employment) and hourly wages. Any of these gaps is measured as the percentage difference between women and men. In the benchmark calibration, female earnings are almost 50 percent lower than male earnings, of which about 27 percentage points are coming from gaps in employment and hours, while the rest is coming from the gap in hourly wages. In the "Gender-Neutral Workers" (demand driven) scenario, the gap in hourly wages is about half as large while the gaps in employment and hours shrink substantially. Thus gender wedges are responsible for a sizable gender wage gap. Still this wage gap induces only a relatively small response of the extensive and intensive labor supply decisions of men and women.

Conversely, the "No Gender Wedges" (supply driven) scenario has almost the same gaps in employment and hours as the benchmark economy, while the wage gap is about seven percentage points lower. Intuitively, differences in the extensive and intensive hours margins are mostly driven by labor supply. The wage gap in this scenario arises due to three channels. First, female workers accumulate less human capital than male workers. Second, they are employed at lower rungs of the job ladder (i.e. in less productive firms which offer lower wages). Third, firms' wage offers respond to gender differences in labor supply. The contribution of the third channel (statistical discrimination) is sizable, as shown in the comparison with the "Gender-Neutral Firms" (supply only) scenario where this channel is absent. In numbers, statistical discrimination accounts for about ten percentage point gap in hourly wages between men and women.

Complementing Figure 6, Figure D.1 in the Appendix shows how gender inequalities in employment, hours and wages in different demographic types vary in the different counterfactual scenarios. While the wage gap arising from gender wedges is roughly similar for workers with or without (younger) children, it is especially the worker side (gender differences in job search and preferences) that accounts for larger gender gaps in employment and hours in households with younger and older children.

The contributions of demand- and supply-side forces for gender wage gaps across the wage distribution is shown in Figure 7. The wage gap in full-time jobs is particularly pronounced in the middle and at the top of the wage distribution to which the firm side and the worker side contribute in roughly similar magnitudes. The wage gap in part-time jobs is much smaller. This is a result of firms attributing a part-time wage penalty on male workers which is seen in panel B: when only the firms' gender wedges are active, men earn lower wages than women in part-time jobs. However, as can be seen in panel C, when worker differences in preferences, job search and initial skills are taken into account while the firm side is gender-neutral, a substantial wage discount for female workers arises.

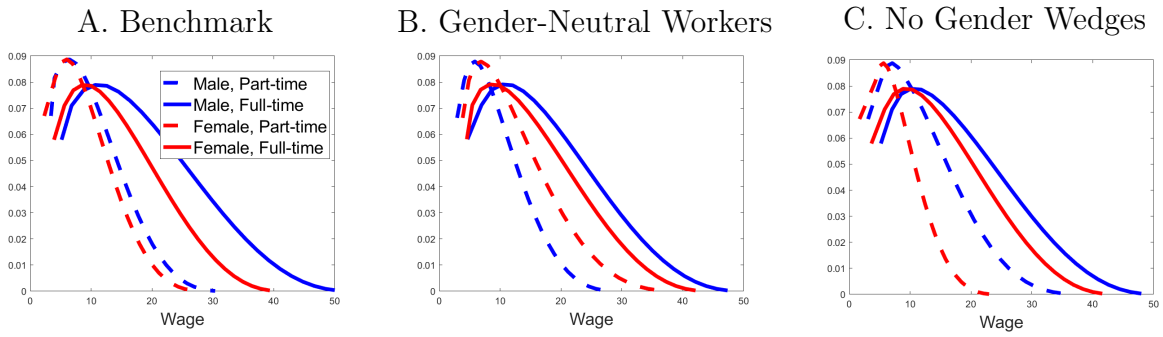
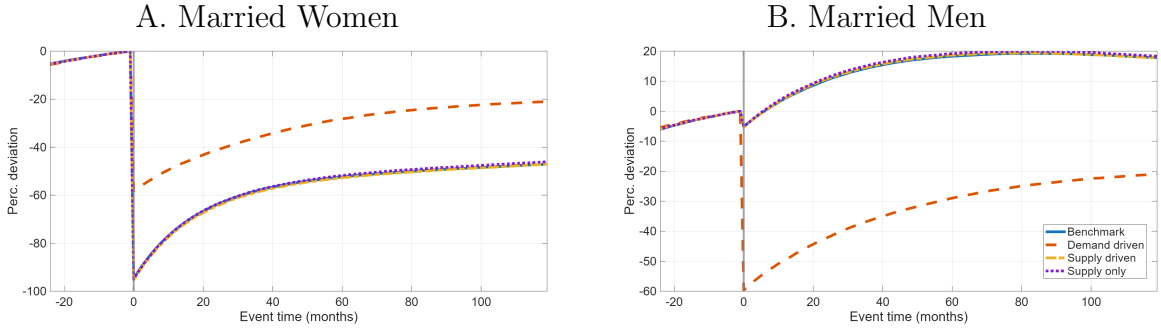


Figure 7: Offer Distribution: Skill-Adjusted Wage

5.2 Child Penalty

Figure 8 shows how earnings before and after childbirth evolve for men and women in our model. While average male earnings dip only briefly, mainly due to parental leave spells of few men in our model, they recover quickly and even grow faster than in the year prior childbirth. In contrast, female earnings drop by over 80 percent in the year after childbirth. Even five to ten years later, their earnings remain 45 to 60 percent below their pre-childbirth levels.

The comparison with counterfactual scenarios reveals that it is the supply-side differences that account for these child-related gender gaps. When only gender wedges and statistical discrimination are active (the "demand-driven scenario"), earnings losses between men and women are about the same. This is consistent with our previous finding that the demand side contributes to gender wage gaps that are almost the same for workers with and without young children. In contrast, both the "supply-driven" and the "supply-only" scenario, where gender differences in labor supply are taken into account, generate earnings dynamics around childbirth which are almost identical to the benchmark economy. We conclude that gender differences in labor supply (with or without statistical discrimination) are responsible for the child penalty in our model.

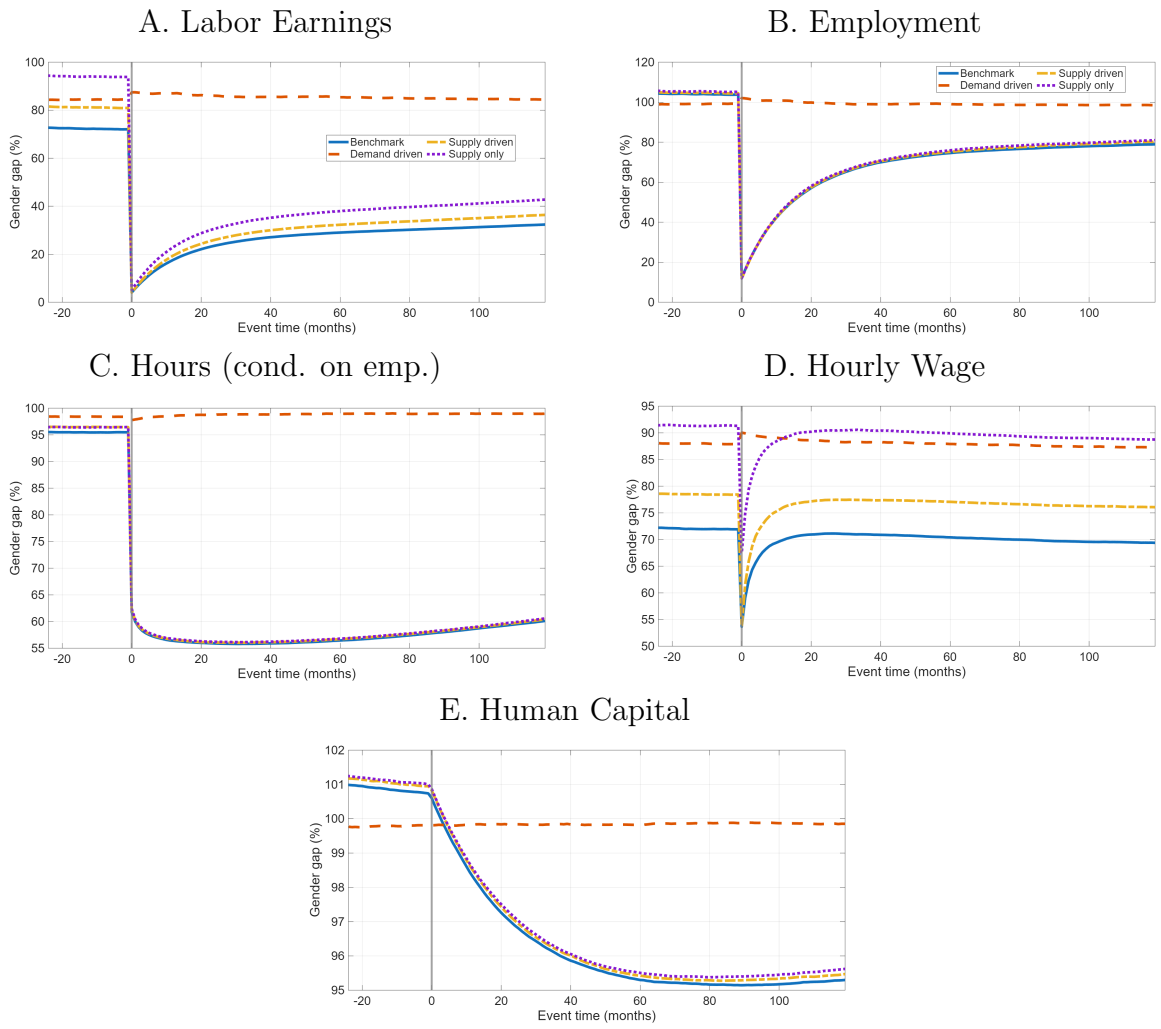


Note: The figures shows change in labor earnings after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure 8: Earnings before and after child birth

We confirm this result when we break down earnings into the extensive and intensive employment margins and into hourly wages (see Figures D.2 to D.4 in the Appendix). Figure 9 summarizes gender gaps before and after childbirth in earnings (panel A), employment, hours and hourly wages (panels B-D) and in human capital (panel E) which contributes to the hourly wage gap. The blue lines show gender gaps in our benchmark economy. Before childbirth, women's earnings are 25 percent below male earnings, which is predominately due to lower hourly wages and a moderately higher share of part-time employment, despite

women's higher human capital (as they enter with slightly higher initial skills in our estimated model). Upon childbirth, a large and persistent earnings gap emerges. Even five to ten years after childbirth, the intensive hours margin is forty percent lower, while the extensive hours margin (employment) is 20 percent lower for mothers compared to fathers. Also the gap in hourly wages widens, especially in the short term and even several years after childbirth. This is because fathers gain human capital by about three percent while mothers lose about two percent (see D.5), due to substantially longer spells in parental leave, non-employment and part-time work. As a result, the human capital component in wages is about five percent lower for mothers compared to fathers ten years after childbirth.



Note: The figures show change in gender inequality after a child birth event. Y-axis represent gender ratio (married female to married male, in %).

Figure 9: Gender inequality before and after child birth

The other lines in Figure 9 show gender gaps before and after childbirth in our counter-

factual scenarios. While the demand side (gender wedges) accounts for a twelve percent gap in hourly wages that is roughly the same for individual before and after childbirth, the supply side is responsible for the widening of the extensive and intensive hours margins (panels B and C). Regarding hourly wages, however, the supply side alone ("supply only" scenario) accounts for only a small gap (and a short-term drop after childbirth). When coupled with statistical discrimination ("supply driven" scenario), the gap in hourly wages becomes much larger, yet it does not widen persistently.

We further investigate the prominent role of the supply side for the child penalty by breaking down the gender gaps in Figure 9 into the counterfactual gaps driven by gender differences in initial skills, job search and preferences. As Figure D.6 shows, differences in initial skills hardly matter. As mentioned above, women even enter the labor market with slightly higher skills, and thus have higher human capital before childbirth, so that there are no gaps in employment or working hours. Instead, the majority of the supply-driven gender gaps of both childless individuals and of parents with young children are driven by gender differences in preferences. Additionally the drop of job search effort of mothers accounts for the widening gap in employment and working hours. Moreover, lower job search effort of women compared to men is reflected in lower hourly wages even prior to child birth.

5.3 Sorting

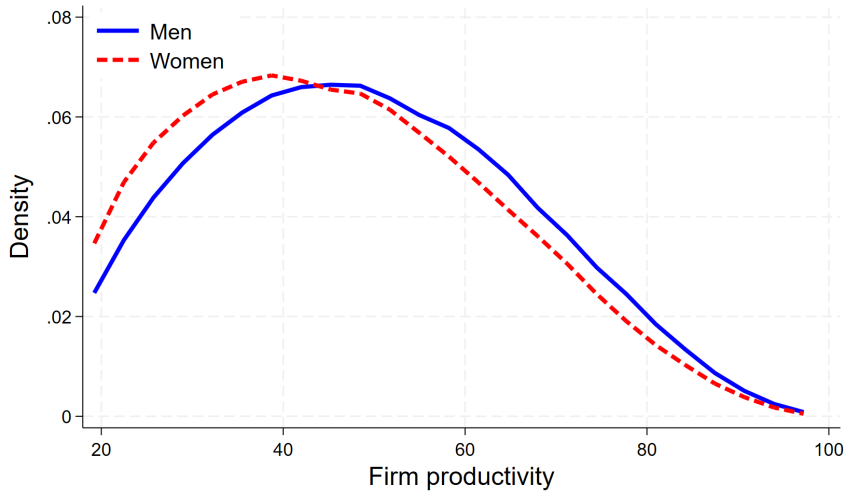


Figure 10: Distribution of male and female workers across firms

Notes: Based on simulated data from the benchmark economy.

Both in the data and in our model, women earn lower wages, especially in full-time jobs

at the middle and top of the wage distribution. Moreover, mothers compared to fathers are more frequently employed in part-time jobs which also pay lower hourly wages. Here we investigate how the sorting of men and women into firms of different productivity contributes to these gaps.

Indeed, women are on average employed in less productive firms in our model, which can be seen in Figure 10 showing the density distributions of men and women across firms with different productivity. Since costs of creating full-time and part-time jobs are the same for all firms while the benefits of full-time jobs are larger for more productive firms, firms at the bottom of the productivity distribution have a larger share of part-time jobs (25%) compared to firms at the top of the productivity distribution (10%), see Figure D.7. However, when we counterfactually impose the same share of part-time jobs in all firms, we still find that women end up more frequently employed in low-productivity firms and less frequently in high-productivity firms, where the change compared to the benchmark model is relatively small (see Figure D.8).

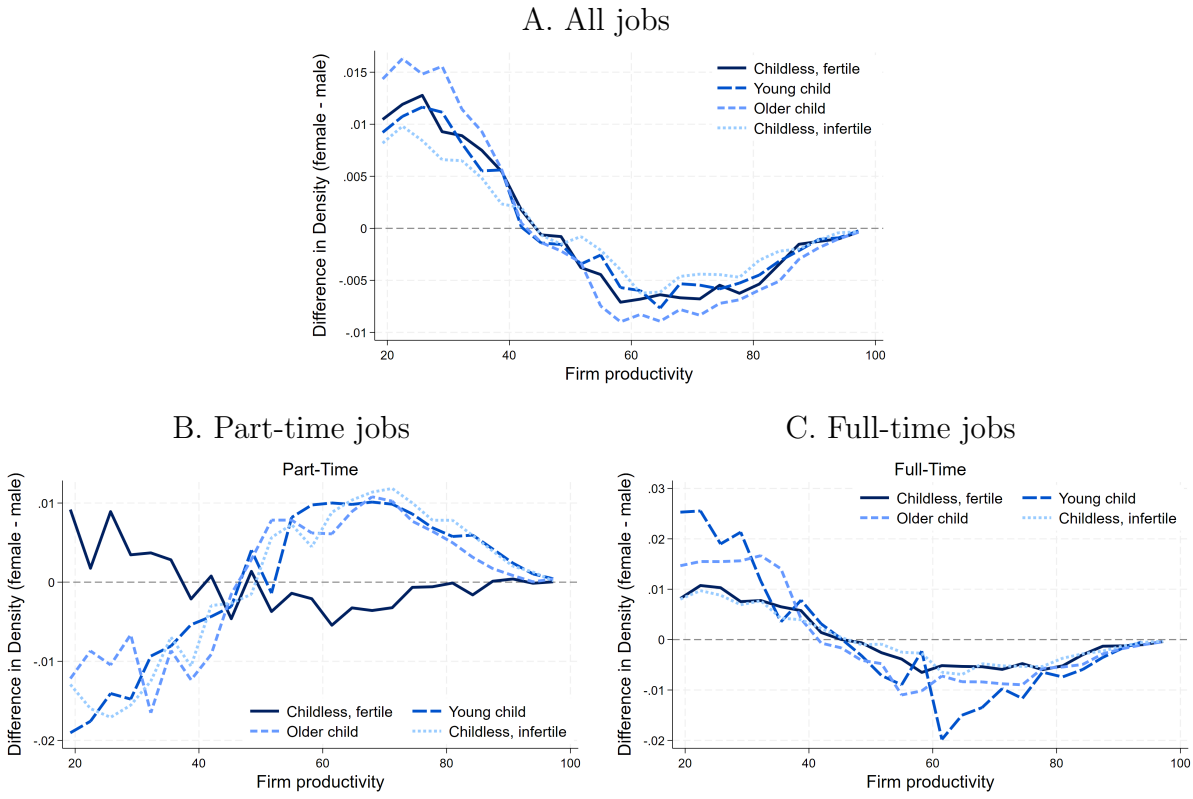
Instead, the gendered sorting pattern is mainly observed in full-time jobs, and it is substantially larger for mothers and fathers compared to childless men and women. Panel A of Figure 11 shows that in all demographic states, women are more often (less often) employed in low (high) productivity firms, where sorting is the strongest for those in the older child state ($k = 3$) and weakest for childless fertile men and women ($k = 1$). Panels B and C of Figure 11 show that these sorting patterns are driven by the gender composition in full-time jobs which is again stronger for men and women with children. In part-time jobs, however, women sort more into more productive firms compared to men, with the exception of childless fertile men and women. The explanation is that mothers have generally longer spells of part-time employment than men so that the also climb the part-time job ladder faster in comparison to fathers who rarely decide to accept part-time jobs.

6 Parental Leave Policy

6.1 Parental Leave: Take Up and Follow Up

In our benchmark model, 77 percent of mothers with young children take up parental leave, while this share of fathers is only 16 percent. Note that both these shares include a potential follow-up parental leave spell in a couple when the parental leave spell of their spouse ends.

While the institutional framework allows parents to return to their previous job (at the same or reduced working hours) upon parental leave termination, the ultimate decision whether or not to return to the previous job or whether to request reduced hours varies across



Note: Based on simulated data from the benchmark model.

Figure 11: Density Difference (Female minus Male) Across Firm Productivity

genders and also depends on the spousal labor market state. Table 5 shows the follow-up labor market status after parental leave termination for mothers (panel A) and fathers (panel B). Each row is a probability distribution of the subsequent employment choice (return to full-time job, return to part-time job, request part-time from previous full-time job, or quit to non-employment), and it is reported separately by the spouse's labor market status (non-employment, part-time and full-time employment). It can be seen that mothers return much less frequently to previous full-time jobs and request much more frequently part-time employment compared to fathers. Mothers even do so when their spouse is non-employed. Fathers, in contrast, often decide to quit their job in those case where their spouse is full-time employed.

6.2 Policy Counterfactuals

Current parental leave regulation in Germany stipulates the right to return to the previous job (possibly at reduced hours) and it pays a transfer (parental allowance) which is linked

Table 5: Decision upon PL termination by spousal employment state

A. Female PL termination

	FT	PT	PT(reduced)	NE
NE spouse	0.063	0.160	0.746	0.031
PT spouse	0.007	0.131	0.754	0.107
FT spouse	0.004	0.148	0.742	0.106

B. Male PL termination

	FT	PT	PT(reduced)	NE
NE spouse	0.628	0.147	0.198	0.027
PT spouse	0.664	0.143	0.126	0.068
FT spouse	0.174	0.072	0.145	0.609

Note: Based on simulated data. Each row represents the probability distribution across four possible decisions when one's PL terminates. NE, PT, and FT refer to non-employment part-time and full-time respectively. PT (reduced) refers to part-time employment as a result of hours reduction from a full-time job.

to the previous wage subject to a cap. To evaluate the separate effects of both features, we consider the following economies with counterfactual policies:

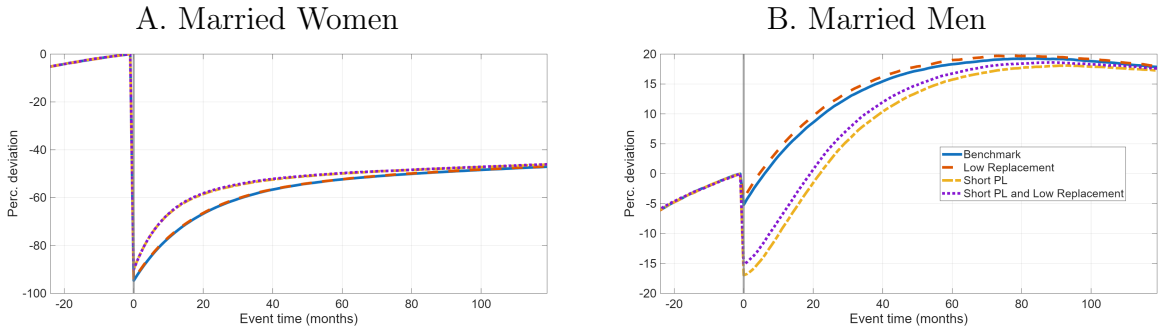
- Low replacement rate: the parental leave allowance replacement rate is half of the benchmark level, while the cap remains the same.
- Short parental leave: the parental-leave expiration rate (parameter φ) is twice as high as in the benchmark economy.

We also consider a combined scenario, and in all counterfactuals we calculate the stationary equilibrium of the economy in general equilibrium.

When the replacement rate of parental leave is cut by half, the responses in parental leave take up are rather small: Mothers' and fathers' take-up rates decline by one and two percentage points respectively, see Table D.3. The relatively larger decline of fathers can be explained by the observation that they earn higher wages prior to childbirth so that the opportunity costs of parental leave are larger under the lower replacement rate. By contrast, when the parental leave duration becomes half as large, the share of fathers in parental leave increases substantially (from 16 to 41 percent) while the share of mothers remains high and virtually unchanged. The intuition is that many more men find it attractive to choose a short parental leave spell when this option becomes available.

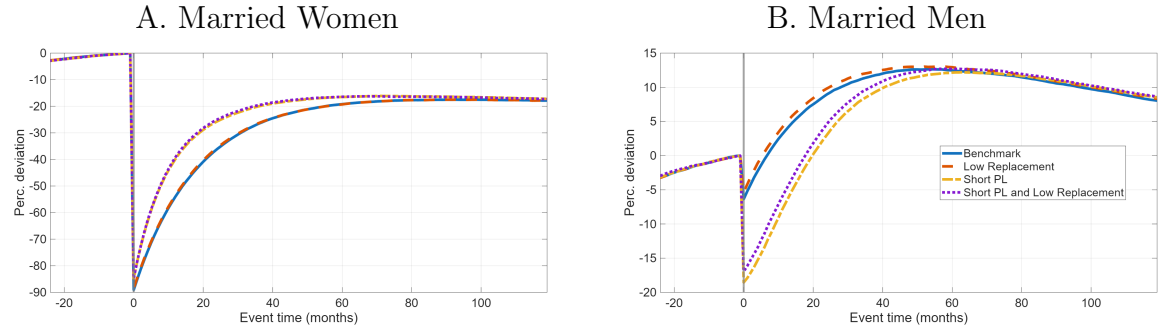
Figures 12 to 16 show the changes in earnings, employment, hours, hourly wage and human capital of married mothers and fathers in the ten years after childbirth, where we

compare the benchmark model with the policy counterfactuals. Again, in line with the rather small changes in take-up rates, the counterfactual with a lower replacement rate has only a very small (positive) effect on male hours and earnings, as fewer men choose to take up parental leave.



Note: The figures shows change in labor earnings after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure 12: Earnings before and after child birth: PL Policies

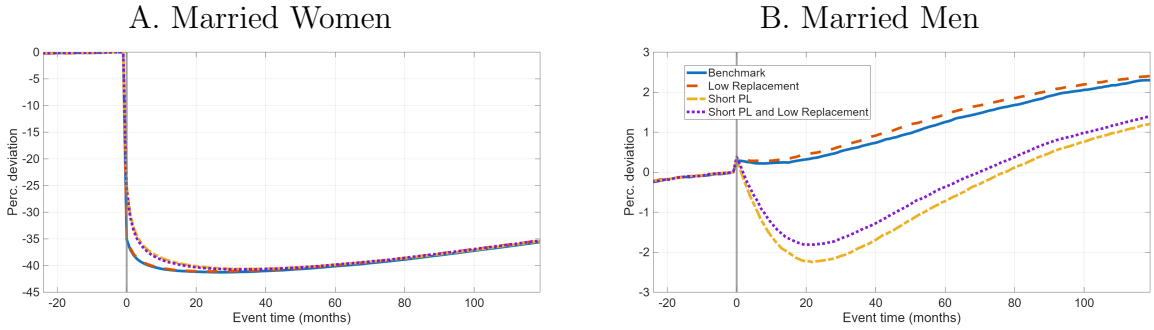


Note: The figures shows change in employment after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

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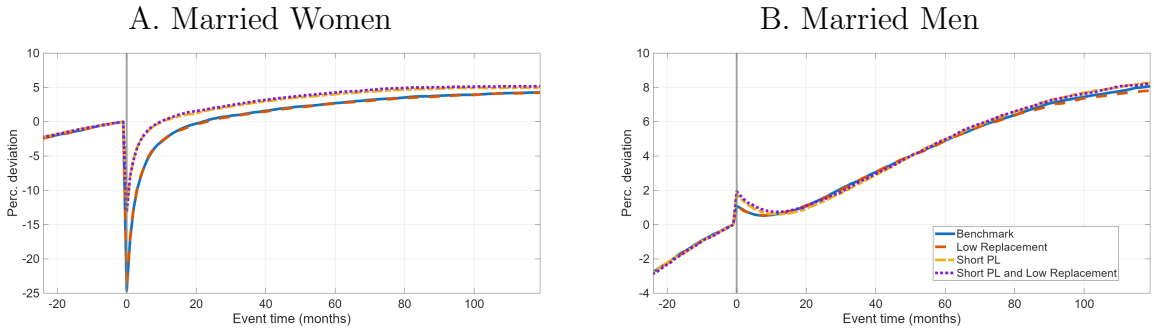
Figure 13: Employment before and after child birth: PL Policies

Shortening the duration of parental leave has a stronger (and negative) effect on the earnings of fathers who now choose much more frequently to take up parental leave. This response of fathers is also reflected in a somewhat faster recovery of mothers' earnings and working hours. Although mothers take up parental leave in the same proportions as in the benchmark economy, they decide to return faster to employment and decide less often to cut working hours. As a result of higher employment and working hours, human capital losses of mothers are lower which is reflected in a faster recovery of hourly wages. On the other hand, the human capital losses of fathers are relatively small, as they leave the job only for



Note: The figures shows change in hours (conditional on employment) after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure 14: Hours before and after child birth: PL Policies



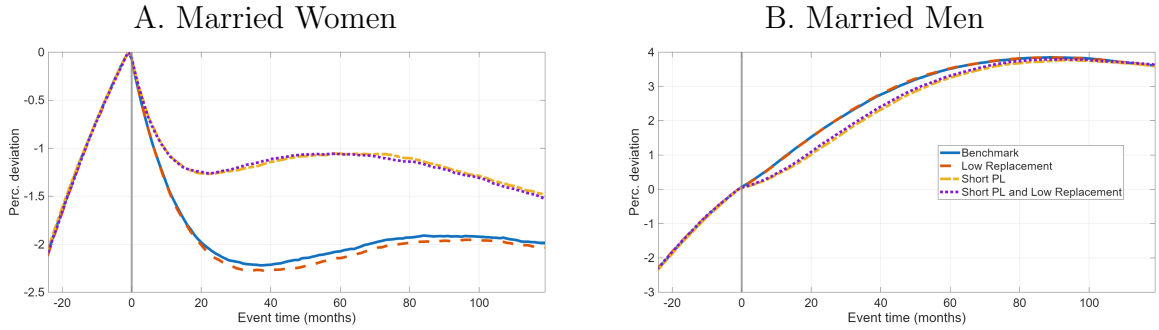
Note: The figures shows change in hourly wage (conditional on employment) after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure 15: Hourly wage before and after child birth: PL Policies

a relatively short time. Hence, their hourly wages are nearly the same as in the benchmark economy.

7 Conclusions

This paper develops an equilibrium household-search model of the labor market that explicitly incorporates firms' endogenous decisions over job offers, including wage and hours configurations, in response to workers' life-cycle labor supply patterns. By allowing the distribution of part-time and full-time job offers to emerge from the interaction between workers' evolving preferences and constraints and firms' strategic posting decisions, our framework provides new insights into the mechanisms underlying child-related gender gaps in labor market outcomes.



Note: The figures shows change in human capital after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure 16: Human capital before and after child birth: PL Policies

Our decomposition reveals that approximately two-thirds of the observed gender earnings gap can be attributed to labor supply factors, with the remaining one-third driven by labor demand considerations. This finding highlights the primacy of constraints and choices on the worker side (including caregiving responsibilities and preferences over working hours) while underscoring that demand-side factors remain economically meaningful contributors to gender disparities. We find that worker-related factors account entirely for gender gaps in employment rates and hours worked, while both gender wedges and statistical discrimination contribute to the gender wage gap. Importantly, these discriminatory components remain stable over the life cycle.

A central mechanism in our model is the systematic sorting of men into more productive firms, a pattern that intensifies after childbirth. This sorting emerges from the interaction between two key features of the labor market: more productive firms disproportionately post full-time positions, and men exhibit substantially higher propensity to work full-time. Consequently, the joint distribution of workers and jobs generates persistent gender gaps even in the absence of time-varying discrimination. This finding emphasizes the role of the employment structure itself (specifically, the bundling of higher productivity with full-time schedules) in perpetuating gender inequality.

Our counterfactual analysis of parental leave policies yields important policy insights. Extended parental leave generates a sharp and persistent decline in female earnings, driven primarily by sustained reductions in hours worked rather than changes in wages conditional on employment. This persistence suggests that parental leave may inadvertently reinforce rather than ameliorate gender gaps by further differentiating mothers' and fathers' labor market trajectories. Conversely, we find that shorter, more gender-neutral leave policies increase fathers' uptake and help narrow gender gaps immediately following childbirth. This

result points to the potential for family leave design to reshape household specialization patterns during the critical early childhood period.

More broadly, our results suggest that understanding gender gaps requires careful attention to the equilibrium structure of the labor market. Policies that affect workers' labor supply decisions will induce responses in firms' job posting strategies, which in turn feed back into workers' opportunities and choices. Future research might extend our framework to consider additional dimensions of job flexibility, the role of workplace culture and norms, and the potential for policies that directly target firms' employment practices. As labor markets continue to evolve and policy debates around work-family balance intensify, equilibrium models that take seriously both sides of the market will remain essential tools for rigorous policy evaluation.

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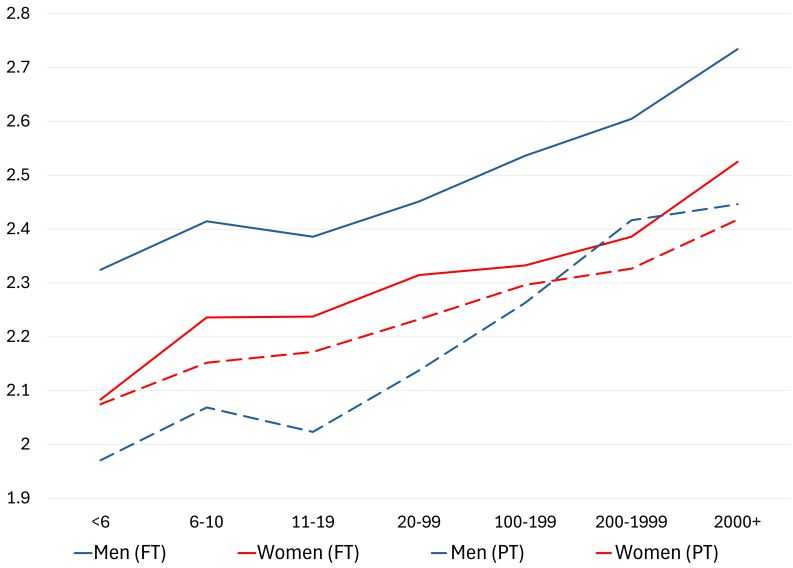
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Appendix

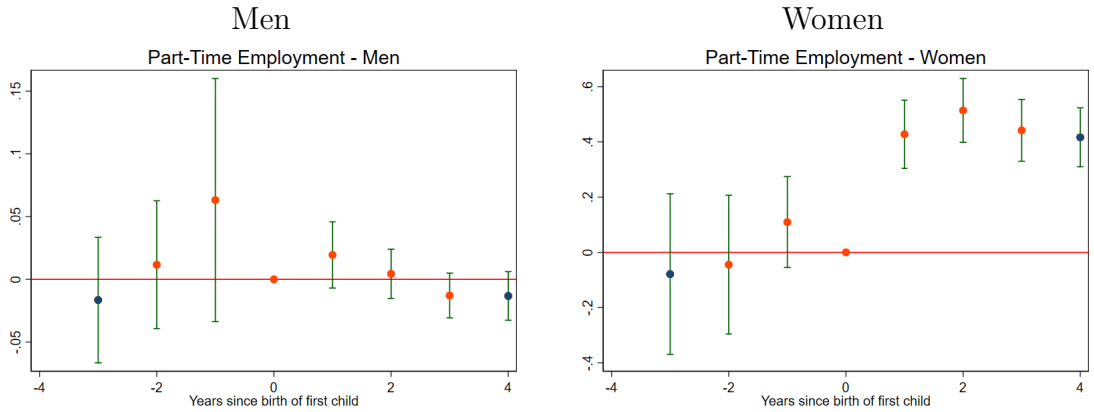
A Additional Empirical Patterns



Note: Raw log hourly wages from GSOEP data.

Figure A.1: Log hourly wage by gender, working hours and firm-size bin

Diverging career paths across genders after childbirth. We compare labor market outcomes of parents of children below 3 years old using the German Socio-Economic Panel (GSOEP). Specifically, we estimate OLS regressions of labor market outcomes on binary indicators with value one if the respondent is the mother (father) of a child younger than three years old, while controlling for gender, age, tenure, number of children and fixed effects for education, state of residence, and survey year. This allows us to distinguish how the labor market outcomes of mothers of young children differ with respect to those of the fathers of young children, or to those of other women and other men (the baseline category). As reported in Table A.1, earnings differentials between men and women are larger when considering parents of young children: mothers of young children have systematically lower earnings than other women, while fathers of young children have higher earnings than other men. The earnings differentials are mostly driven by the differentials in real hourly wages, but mothers of young children work on average 4.6 hours less than men, while there is no difference in working hours between fathers of young children and other men. Mothers of young children have a lower probability to be employed. Parents of young children work



Note: This table reports event-study estimates of the impact of the first childbirth on the probability of moving to a part-time schedule for fathers (left panel) and mothers (right panel). The sample includes all employed parents. Controls for age, tenure and state of residence are included. Confidence intervals at 95 percent level are obtained from worker-level cluster-robust standard errors.

Figure A.2: Childbirth and Part-Time Jobs: Event Study Coefficients

less days in a week, but only mothers dedicate more time to childcare and housework, while fathers of young children spend on average less time than other men (including fathers of older children) on these activities. Finally, we find that the job search of women which is already on average lower than that of men is reduced even more when her children are young.

Transition between working hours after childbirth. We have used the GSOEP data to examine transitions in working hours schedules following childbirth. Specifically, we computed the share of workers in full-time jobs who had a child in a given year and analyzed their employment status, working hours, and whether they were employed at the same firm in the subsequent year. The estimates in Table Table A.2 indicate that 81.3% of workers remain in full-time employment with the same employer, while 7.5% transition to full-time positions with a new employer. Additionally, 8% shift to part-time schedules within their old firm, whereas 6% move to part-time positions with a new employer. A smaller fraction, 2.6%, exits employment altogether. These figures highlight that a substantial portion of working hours adjustments occur within the same employer, possibly reflecting the German legal framework supporting the right to part-time work after childbirth. Our model explicitly accounts for these transitions across working hours schedules.

Table A.1: Labor market differences for men and women with or without young children

Dependent variable	(1) Earnings	(2) Log real hourly wage	(3) Hours	(4) Employment	(5) Days worked per week	(6) Child care hours per week	(7) Housework hours	(8) Job search
Mother of a child ≤3 y.o.	-274.3***	-0.0759***	-4.594***	-0.029***	-0.187***	3.071***	0.372***	-0.127***
	(52.15)	(0.0277)	(0.554)	(0.007)	(0.024)	(0.167)	(0.0669)	(0.036)
Father of a child ≤3 y.o.	129.6**	0.0654***	0.507	-0.005	-0.037**	-0.824***	-0.215***	0.005
	(51.81)	(0.0243)	(0.482)	(0.006)	(0.015)	(0.129)	(0.0578)	(0.036)
Woman	-731.2***	-0.154***	-10.09***	0.002	-0.453***	0.978***	1.412***	-0.140***
	(28.52)	(0.0164)	(0.364)	(0.003)	(0.011)	(0.0837)	(0.0393)	(0.016)
Age	-7.369***	0.00149*	-0.241***	0.001***	-0.008***	-0.115***	0.0152***	-0.003***
	(1.134)	(0.000859)	(0.0185)	(0.000)	(0.001)	(0.00456)	(0.00221)	(0.001)
Household Size	-9.025	0.0170***	-1.373***	0.025***	-0.052***	0.456***	0.251***	-0.065***
	(8.096)	(0.00611)	(0.129)	(0.001)	(0.005)	(0.0381)	(0.0162)	(0.005)
Observations	15,983	15,306	13,006	12,3947	68,792	14,981	15,561	20,443
R-squared	0.316	0.166	0.262	0.064	.078	0.327	0.334	0.135

Note: Linear probability models with robust standard errors in parentheses. Controls include age, tenure, current household size, number of children and fixed effects for schooling level categories, state, survey year. *,**,*** denote statistical significance at the 10, 5 and 1 percent level.

Table A.2: Transition across Working Hours

	Transition rate
Full time old firm to full time old firm	0.813
Full time old firm to full time new firm	0.075
Full time old firm to part time old firm	0.080
Full time old firm to part time new firm	0.060
Full time old firm to non-employment	0.026

Note: Share of workers in full time jobs having a child at t, by employment, working hours, and employer the next year $t+1$. Own computation using GSOEP data using respondents observed in the year before and after child-birth. The estimates are robust when using a three years lag but the sample is reduced.

B Model: Further Details

B.1 Single Households

We denote by $V^g(x,k)$ the value function of a single household with gender g where $x = (w,h,s,p)$ is the worker state vector and k is the family state. The Bellman equation of the household is

$$\begin{aligned} D^g(x,k)V^g(x,k) = u(Y^s(x,k),h) + \sum_{k'} \Phi_{kk'}\bar{V}^g(x,k') + \pi_x^+ V^g(x^+,k) + \pi_x^- V^g(x^-,k) \quad \text{(B.1)} \\ + \sum_{\hat{h}\in H_+} \kappa_{h,p}\lambda^{g,\hat{h}} \int \max\left[V^g(x,k), V^g(\hat{x},k)\right] dF^{g,\hat{h}}(\hat{w}) \\ + \mathbb{I}_{p=1}\tau \max\left[V^g(x^r,k), V^g(x^n,k), V^g(x^l,k)\right] + \delta_h V^g(x^n,k) \end{aligned}$$

where $D^g(x,k) \equiv \rho + \sum_{k'}\Phi_{kk'} + \pi_x^+ + \pi_x^- + \sum_{\hat{h}}\kappa_{h,p}\lambda^{g,\hat{h}} + \mathbb{I}_{p=0}\tau + \delta_h$. We use the same shortened notation for the continuation states of the worker as defined in the main text: $x^+ = (w,h,s^+(s),p)$ and $x^- = (w,h,s^-(s),p)$ denote skill adjustment, $\hat{x} = (\hat{w},\hat{h},s,0)$ is the continuation state after accepting a new job $(\hat{w},\hat{h})$, $x^n = (0,0,s,0)$ is non-employment, $x^r = (w,h,s,0)$ is return from parental leave at required hours, and $x^l(w,h,s,2)$ is the return from parental leave at reduced hours.

The first line of Bellman equation (B.1) includes the continuation utility after a change of the family state. As explained for couple households in the main text, the worker may quit the job (when $k \neq 2$), enter parental leave which dominates quitting when $k = 2$, may return from parental leave (at required or reduced hours) or quit the job when children grow older ($k = 3$), or enter retirement when $k = K$. Therefore,

$$\bar{V}^g(x,k) = \begin{cases} \max\left[V^g(x,k), V^g(x^p,k)\right] & \text{if } k = 2\ , \\ \max\left[V^g(x^r,k), V^g(x^l,k), V^g(x^n,k)\right] & \text{if } k = 3\ , \\ \max\left[V^g(x,k), V^g(x^n,k)\right] & \text{if } k \neq 2,3,K\ , \\ 0 & \text{if } k = K\ . \end{cases}$$

Decisions about job acceptance, quitting, or entering parental leave involve binary policy functions where we use the notation

$$\Omega^g\left(x^0;(x^i)_{i=1}^I;k\right) = \begin{cases} 1 & \text{if } V^g(x^0,k) > V^g(x^i,k) \text{ for all } i = 1,\ldots,I\ , \\ 0 & \text{else}\ , \end{cases}$$

to indicate that x^0 is preferred over any of the alternatives (x^i), $i > 0$.

B.2 Taste Shocks

In our Bellman equations, we use household discrete choices over alternatives $\boldsymbol{z} = (z^i)_{i=0}^I$ where $z^i = (x_g^i, x_{-g}^i)$ for couple households and $z^i = x^i$ for single households, with continuation utilities

$$\tilde{V}(\boldsymbol{z}, k) = \max\left(V(z^0, k), V(z^1, k), \ldots, V(z^I, k)\right) \ .$$

We also define the binary policy function indicating the choice of z^0 over the alternatives $(z^i)_{i=1}^I$:

$$\Omega\left(z^0; (z^i)_{i=1}^I; k\right) = \begin{cases} 1 & \text{if } V(z^0, k) > V(z^i, k) \text{ for all } i = 1, \ldots, I \ , \\ 0 & \text{else} \ . \end{cases}$$

In the numerical implementation of the model, we smooth out these discrete choices by adding idiosyncratic taste shocks α^i to continuation utilities where α^i is type-I extreme-value distributed with parameter σ_α. Given a realization of taste shocks $\boldsymbol{\alpha} = (\alpha^i)_{i=0}^I$, the household's continuation utility is

$$\tilde{V}_{\boldsymbol{\alpha}}(\boldsymbol{z}, k) = \max\left(V(z^0, k) + \alpha^0, V(z^1, k) + \alpha^1, \ldots, V(z^I, k) + \alpha^I\right) \ ,$$

so that the ex-ante continuation utility is

$$\tilde{V}(\boldsymbol{z}, k) = \mathbb{E}_{\boldsymbol{\alpha}} \tilde{V}_{\boldsymbol{\alpha}}(\boldsymbol{z}, k) = \frac{1}{\sigma_\alpha} \ln\left\{\sum_{i=0}^I \exp\left[\sigma_\alpha V(z^i, k)\right]\right\} \ .$$

The proportion of households choosing z^0 becomes

$$\Omega\left(z^0; (z^i)_{i=1}^I; k\right) = \frac{\exp\left[\sigma_\alpha V(z^0, k)\right]}{\sum_{i=0}^I \exp\left[\sigma_\alpha V(z^i, k)\right]} \ .$$

We choose a large value of parameter σ_α such that the modified model approximates the original model without taste shocks well and such that alternative (large) values of parameter σ_α do not alter our model estimation and results.

C Estimation of Moments

We obtain all statistics for model estimation from the German Socio-Economic Panel (GSOEP), a representative household survey conducted by DIW Berlin since 1984. Each year, around 30,000 individuals from 15,000 households are surveyed, providing information on household composition, labor market status, employment history, working hours, earnings, transfers, and other income sources, along with various personal and household characteristics. We use GSOEP wave 37 and data from the survey years 2007 to 2019. We do not include earlier years, as the parental leave reforms central to our benchmark model took effect in January 2007. Later years are excluded because the COVID-19 pandemic has impacted the labor market behavior of workers in unprecedented ways.

Sample and definitions. We define working-age individuals as those who are 20 years or older. We limit our analysis to households where the head is between 20 and 65 years old, categorizing them into the following household types:

- *Single household - Man*: The household head is a man, with no other working-age individuals present.
- *Single household - Woman*: The household head is a woman, with no other working-age individuals present.
- *Couple household*: A married couple (a man and a woman) is present, both aged 20-65, with no other working-age individuals in the household.

We exclude all households that do not satisfy these definitions, including cohabiting or same-sex couples, singles or couples with working-age children, and households with one spouse over 66 and the other below 65.[6] For all three household types, we define the following demographic groups:

- *Childless fertile*: In single households, the head is under 40. In couple households, the woman is under 40.
- *Young kids*: The household has children, with the youngest being at most 7 years old.
- *Old kids*: The household has children, with the youngest being 8 years or older.

[6] If one individual identifies as married and cohabiting, but other members aged 20-65 have missing marital status, we impute the closest-aged individual as the spouse. We exclude households with missing age or gender for any member, as this would prevent accurate identification of household heads, children, and demographic groups.

- *Childless infertile*: The household has no co-habitating children (if there were, they must have moved out). In single households, the head is 40 or older. In couple households, the woman is 40 or older.

The final sample includes 570,799 observations, corresponding to 110,243 unique workers and 40,655 unique households.

Employment and wages. Workers are classified as full-time employed if their weekly working hours (*pgtatzeit*) exceed 30, part-time employed if their weekly working hours are between 8 and 30, or non-employed otherwise. On average, full-time employees work 43 hours each week, while part-time employees work about 20 hours per week (Table 1).

We calculate the hourly wage of employed workers as current gross labor income (*pglabgro*) divided by monthly hours (4.3 times the weekly working hours). We deflate all wages using the OECD Consumer Price Index for Germany with a base year of 2015 as reported in the FRED database. We compute the distribution of log weekly wages based on gender and work schedule. On average, women earn 92% of men's hourly wages when working full time (2.65 vs 2.87 log euro per hour). However, average hourly wages are nearly the same between genders in part-time roles. Men working part-time men earn about 91% of those working full-time, while part-time women earn approximately 98% of full-time women's wages. Additionally, we examine wage distribution by gender at the start of a worker's career, focusing on employees under 28 years old in full-time positions. The average log wage during the first job spell, compared to the average log wage over the course of a working life, is 85% for men and 92% for women.

Taxes and Transfers. We estimate the parameters of the tax functions for single and couple households (equations (6) and (7), respectively), following the approach of Kaas et al. (2021). Specifically, we use CPI-adjusted income data from the GSOEP's *pequiv* module. We log-transform each equation and estimate it using Ordinary Least Squares for the combined data set, with separate estimations for each household type and demographic group. We define net annual household income as gross annual income minus taxes plus transfers (including child allowances). We then regress net log income on gross log income separately for single and couple households (pooling genders), while controlling for year fixed effects. The estimated constant and slope are used as parameters for the tax functions of the two household types. The parameter τ_0, calculated as 1 minus the constant, reflects the net tax revenue and represents the average level of taxation. The parameter τ_1, derived as the exponential of the slope parameter, determines the progressivity of the tax and transfer system. When $\tau_1 > 0$, marginal tax rates exceed average tax rates, indicating a progressive tax system. In contrast, negative values of τ_1 indicate a regressive system, while a value of

zero implies a flat tax rate.

The estimated coefficients are reported in Table C.1, and the implied parameters of the tax function parameters are presented in Table 1. The large positive estimate of τ_1 suggests that the German tax and transfer system is highly redistributive.

Table C.1: Tax function by household type and demographic group

	Dependent variable: Log net income			
Sample:	Couple Households			
Demographic group:	1	2	3	4
Log gross income	0.766***	0.436***	0.565***	0.612***
	(0.020)	(0.012)	(0.016)	(0.049)
Constant	2.467***	6.169***	4.754***	4.157***
	(0.223)	(0.134)	(0.180)	(0.540)
R-squared	0.949	0.718	0.825	0.793
N. observations	963	27,127	15,669	1,792
Sample:	Single Households			
Demographic group:	1	2	3	4
Log gross income	0.539***	0.506***	0.512***	0.576***
	(0.013)	(0.013)	(0.013)	(0.012)
Constant	4.687***	5.070***	5.004***	4.254***
	(0.139)	(0.134)	(0.132)	(0.121)
R-squared	0.686	0.647	0.656	0.693
N. observations	17,971	20,453	24,400	22,395

This table reports the estimates of the logarithm of the gross income on the net income, both computed excluding the child and parental allowance. The first and the second column report the estimates for the sample of couple and single households, respectively. Standard errors are reported in parentheses. *, **,*** denote statistical significance at the 10, 5, 1 percent level.

D Additional Model Results

D.1 Further Model Statistics

Table D.1 shows the distribution of workers by types of employment, including parental leave and reduced hours. Table D.2 shows the male share in part-time and full-time employment.

Table D.1: Detailed Employment Distribution

Gender	k	NE	PL	PT	FT reduced	FT
Male	1	0.139	0.000	0.113	0.000	0.748
Male	2	0.034	0.014	0.077	0.010	0.865
Male	3	0.053	0.000	0.073	0.006	0.869
Male	4	0.240	0.000	0.077	0.001	0.682
Female	1	0.131	0.000	0.177	0.000	0.691
Female	2	0.328	0.094	0.189	0.297	0.093
Female	3	0.198	0.000	0.245	0.294	0.263
Female	4	0.292	0.000	0.147	0.094	0.467

Notes: Columns share in each of the five detailed employment states, conditional on gender and k. NE is non-employment (excluding those on parental leave); PL is parental leave; PT is part-time contract (not on parental leave, not on full-time contract with reduced hours); FT reduced is full-time contracts with reduced hours; and FT is full-time contracts without reduced hours.

Table D.2: Share of Men in Part-time and Full-time Employment

	Part-time	Full-time
All	0.175	0.696
Childless, fertile	0.361	0.516
Young child	0.132	0.982
Older child	0.101	0.846
Childless, infertile	0.208	0.621

Notes: The table shows the share of men in each type of employment.

D.2 Counterfactual Experiments

D.3 Further Policy Results

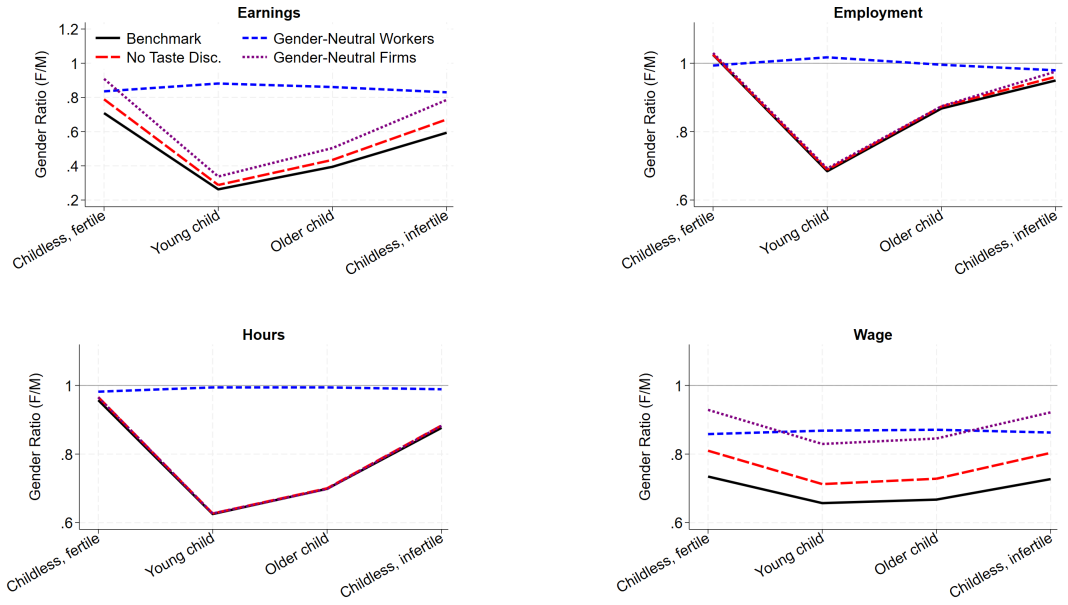
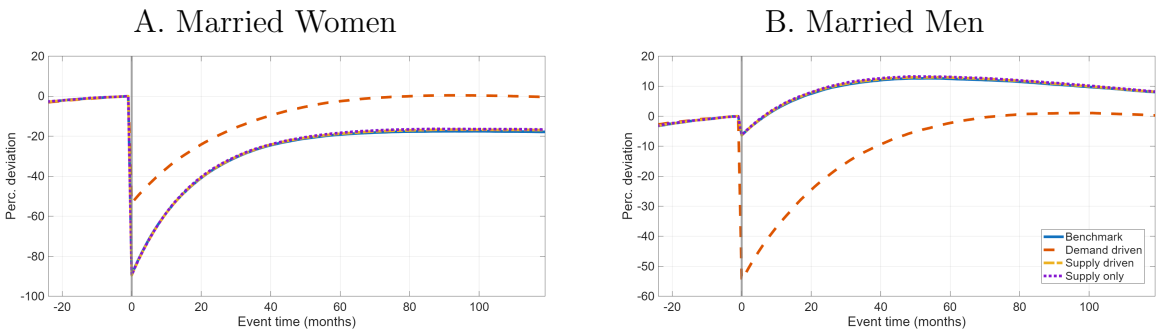


Figure D.1: Gender gap across life stages

Table D.3: Parental Leave Take-Up Rates

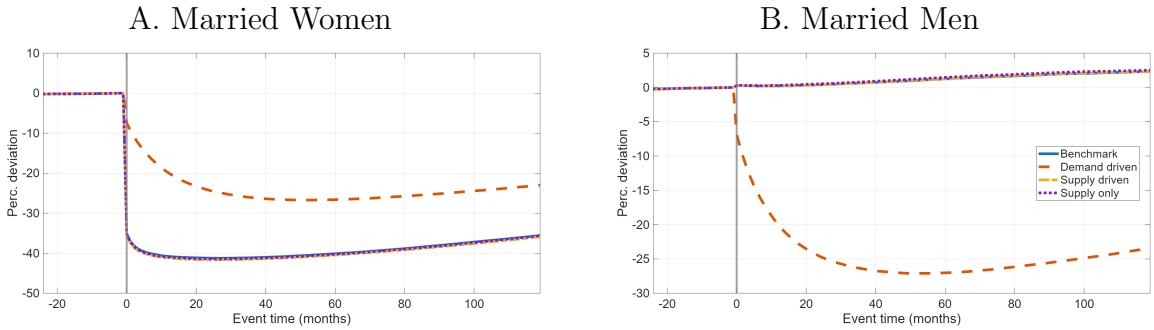
Gender	**Benchmark**	**Low Allowance**	**Short PL**
Married Mothers	77%	76%	77%
Married Fathers	16%	14%	41%

Notes: Based on simulated data. Take-up probability is computed as the share of parents who have ever taken up parental leave; it is not conditional on being eligible (i.e. employed). Low Allowance and Short PL refer to economies with counterfactual parental leave policies.



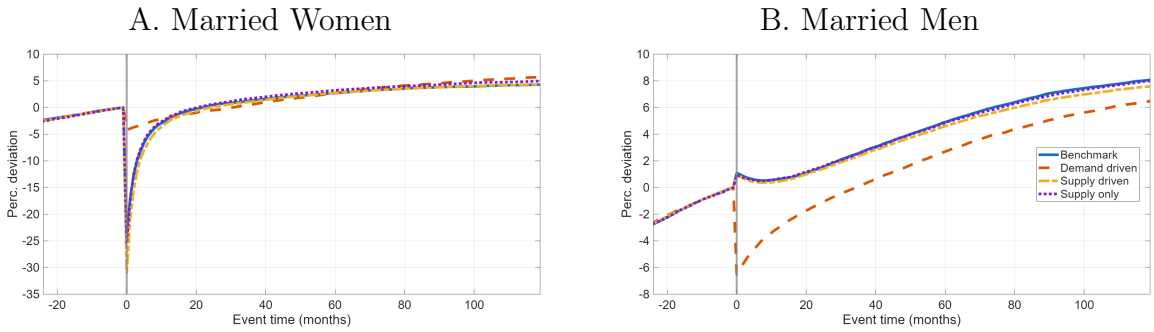
Note: The figures shows change in employment after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure D.2: Employment before and after child birth



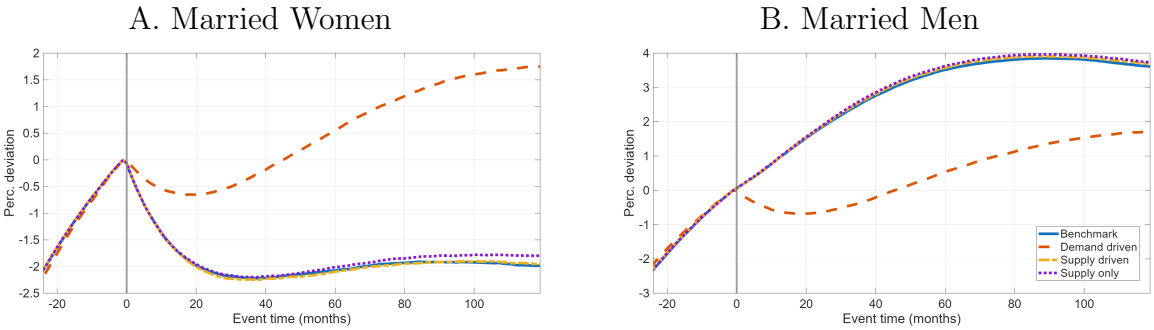
Note: The figures shows change in hours (conditional on employment) after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure D.3: Hours before and after child birth



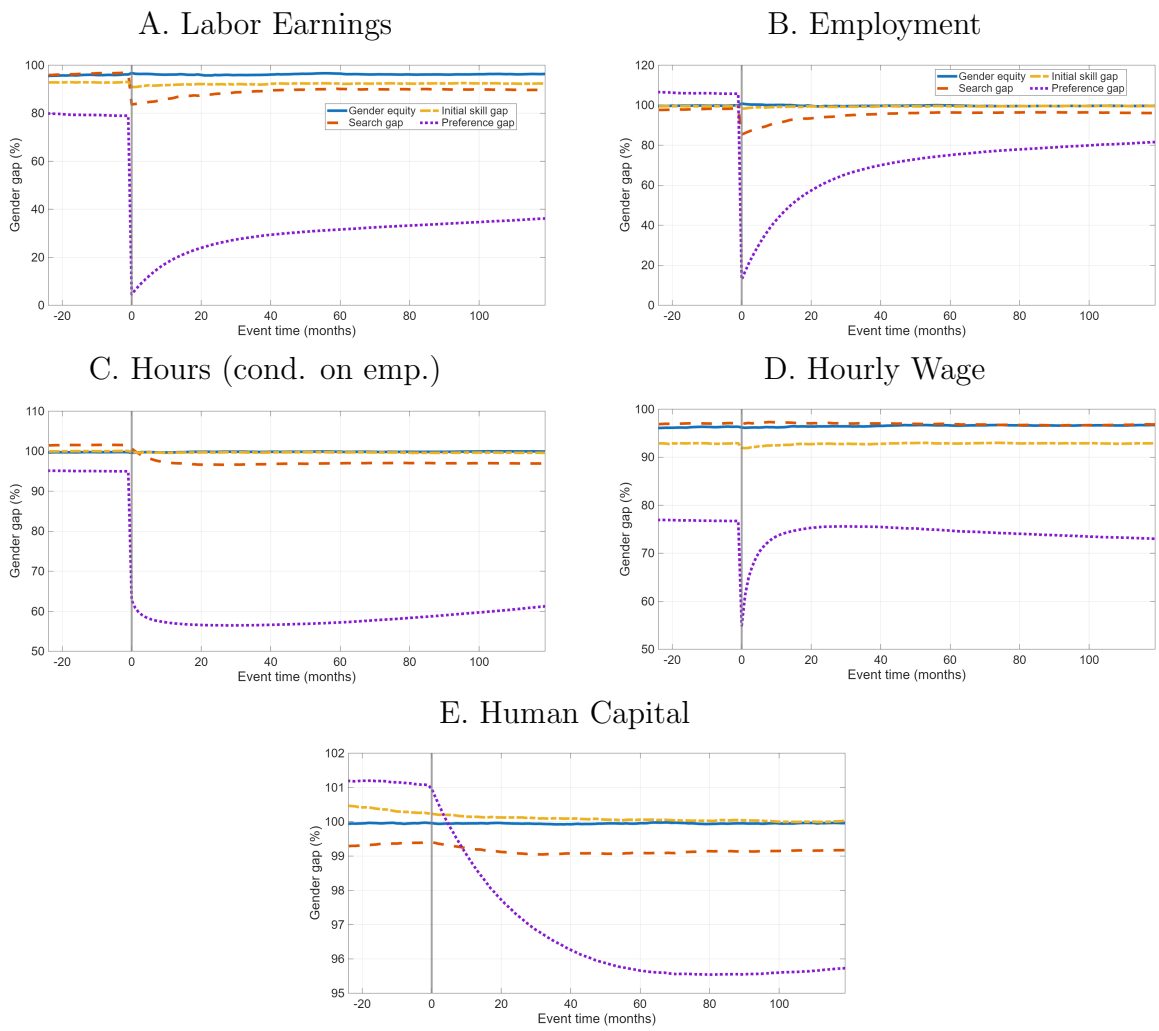
Note: The figures shows change in hourly wage (conditional on employment) after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure D.4: Hourly wage before and after child birth



Note: The figures shows change in human capital after a child birth event, for married women and men. The values on the y axis represent percentage deviations (%) with respect to the month prior to child birth (i.e., transition into $k = 2$).

Figure D.5: Human capital before and after child birth



Note: The figures shows change in gender inequality after a child birth event. Y-axis represent gender ratio (married female to married male, in %). "Gender equity" refers to the gender equity counterfactual. The other lines represent search-driven, initial-skill-driven and preference-driven counterfactuals (see Table 4).

Figure D.6: Gender inequality before and after child birth: Supply-side drivers

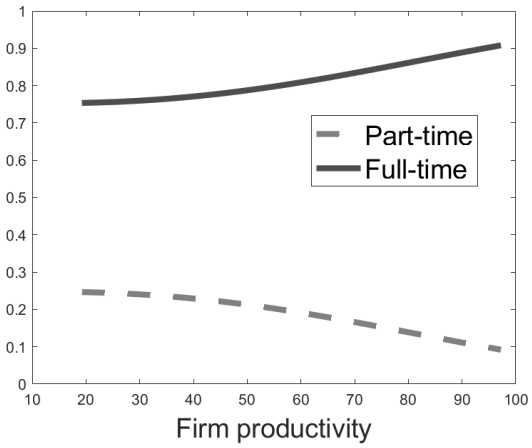


Figure D.7: Probability of Posting PT and FT Jobs by Firm Productivity

Notes: Based on the policy function of firms, $Delta(h;p)$, from the benchmark economy.

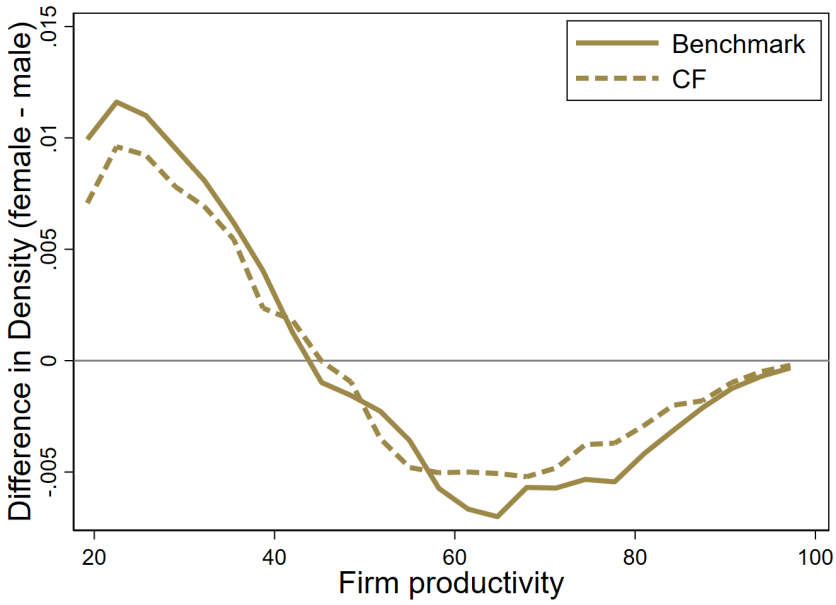


Figure D.8: Density Difference (Female minus Male) Across Firm Productivity: Benchmark and Uniform-Δ Counterfactual

Notes: Based on simulated data from the benchmark and counterfactual uniform-*Delta* economy. In the counterfactual economy, we set $Delta(h;p)$ at the average value across firms.