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The effects of Covid-19 on couples' job tenures: Mothers have it worse☆

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ABSTRACT

We study the effects of the Covid-19 pandemic on the employment contracts and job tenures of couples, and how these are shaped by gender and the presence of children. Using the Spanish Labour Force Survey, we find that women with children have suffered relatively larger losses of higher-duration, permanent jobs since the pandemic than men or women without children. These losses emerge approximately one year after the onset of the pandemic and persist, even though the aggregate male and female employment rate has recovered. Our results point to potential labour market scars, in particular, for mothers, that hide behind standard aggregate employment measures.

1. Introduction

After dropping steeply at the start of the Covid-19 pandemic, aggregate employment and hours worked have bounced back substantially. However, a still outstanding question is whether all important underlying dimensions and demographics of the labour market have been recovering similarly. In particular, the trajectories of employment and inactivity for men and women in and after the pandemic do not appear to display substantial differences, neither in the US (Goldin, 2022) nor in most European countries (see Bluedorn et al. (2023) for international comparisons, and Fig. 1 in this paper for Spain).

This fact may appear somewhat at odds with the literature on the differential effects of the Covid-19 pandemic on men and women, which typically emphasizes the unequal burden borne by women. While much of the literature focuses on the time that the pandemic most restricted life (2020, with e.g. lockdowns and prolonged school closures), in this paper we are also interested in what happened in 2021 and beyond – after many of the alleviating labour market measures, such as short-time work schemes, were phased out.

The nature of the Covid-19 pandemic has been documented to put severe additional time constraints on households with children, stemming from increased demands of childcare at home and other household production. Within households, these demands typically have not been met equally by both partners. (See e.g. Farré et al. (2022a) and Martinez-Bravo and Sanz (2021) for Spain, Sevilla and Smith (2020), Adams-Prassl et al. (2020) and Andrew et al. (2022) for the UK).[1]

While this may spill over directly into the labour market, with a temporary reduction of working hours, it may have also resulted in job loss, which has the potential for more substantial and long-lasting effects. (See e.g. the aforementioned references, Blázquez et al. (2022), Dolado et al. (2021) and Hupkau and Ruiz-Valenzuela (2022) for Spain, Fiaschi and Tealdi (2022) for Italy, Alon et al. (2020), Hupkau and Petrongolo (2020), Albanesi and Kim (2021), Lim and Zabek (2021), Oreffice and Quintana-Domeque (2021), Cortes and Forsythe (2022), Fairlie et al. (2021), Goldin (2022) and many others – who focus typically on observations early in the pandemic). Female labour market interruptions have been linked, in general (before the pandemic), to a variety of persistent gender gaps, from wages (see Leung et al. (2016),

[1] Caselli et al. (2022) additionally show lockdowns resulted in an uneven reduction of mobility, larger e.g. for women, using mobile phone data during lockdown.

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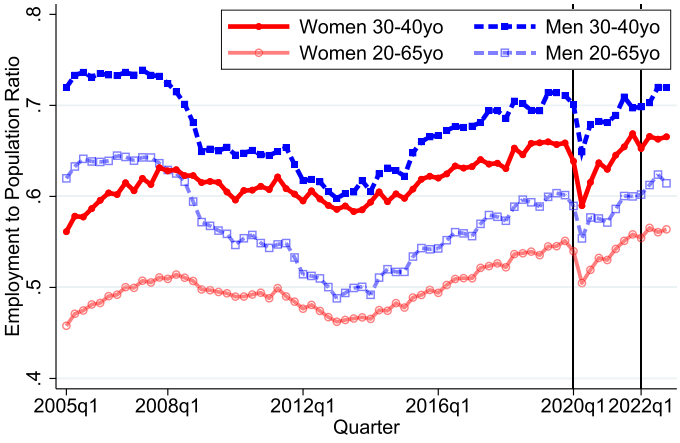


Fig. 1. Employment to Population Ratio (excl. self-employed) of 20-65yo and 30-40yo, by gender. Notes: Employment over population ratio of their respective demographic group, excluding the self-employed from employment in the numerator. Source: Spanish LFS (EPA)..

Kleven et al. (2019) and De Quinto et al. (2020)) to pensions in contributive social security systems (Vara (2013)), and it is no stretch to wonder whether the Covid disruptions would have similarly persistent effects.

Some have taken the temporary nature of the pandemic's drop in employment rates for both women and men as indicative of the absence of any longer-lasting labour market damage done by the pandemic. Looking at these more aggregate outcomes can obscure the different outcomes of prominent subsets, such as mothers, who may already be suspected to be more at risk, for the reasons outlined above. Hence, we study mothers, fathers, and men and women without children separately. A focus on employment alone, however, also leaves aside damage done to the *quality* of employment. Here, we investigate the latter along two dimensions, using Labour Force Survey data from Spain.[2] First, we look at employment by labor contract type; second, we examine changes to the distribution of job tenures, across the four (gender × parental status) groups.

The type of labor contract is an important dimension of employment in the context of a historically dual labour market, such as in Spain. There, employment in open-ended ("permanent") contracts has been typically very desirable (from an individual worker's perspective), with high employment protection and union coverage, but hard to get into. To reach a permanent contract often needed to go through a sequence of temporary contracts before landing a permanent one. In fact, in any given month (up to a reform in 2022) more than 90% of new hires are into temporary contracts. Lafuente et al. (2022) show that the loss of permanent jobs is a major driver of the employment loss during Covid-19 in Spain. In this context, one can ask whether permanent employment has been bouncing back in equal measure for women as for men, for mothers as for fathers.

Indeed, we find that the loss of these 'good' jobs, and the potentially lasting damage that this entails may not be spread evenly across workers, and it is especially mothers who appear to do worse. Relative to the 2016–2019 trend, mothers lose about 3 percentage points of their permanent employment rate in 2021.[3] For comparison, averaged over the entire sample period, their permanent employment rate is about 0.40, so this is quite a nontrivial change. While a 2022 labour market reform increased hiring in permanent contracts in general, the rise of mothers' permanent employment rates (relative to the trend) keeps lagging about 5 percentage points behind women without children, even at the end of 2022 (our most recent data point). In 2021 and 2022, mothers also faced larger negative permanent employment deviations from trend than fathers, with this 'gender gap' declining from about 4 percentage points in 2021 to about economically still rather meaningful 2.5 percentage points. Hence, it appears that mothers face slowly declining scars in terms of quality of employment.

In a similar vein, long-term employment with the same employer tends to be associated, with a revealed preference argument, with a higher quality of employment as well.

We find relatively larger losses of jobs over a wide range of higher tenures (4–12 years) for mothers, when compared to fathers or women without children, over the Covid-19 recession and its aftermath, into 2022. Interestingly, like permanent employment, these relatively higher losses of high and moderate tenure jobs become visible *after* the initial shock of 2020, only in 2021.

These dynamics of the tenure distributions are markedly different from the Great Recession and its aftermath (2008–2013). Here we saw the median and 75h percentile of the job tenure of employed workers move up, while during the Covid pandemic these moved down, most visibly so for mothers. Comparing this behaviour across parents, we see that the median and upper quartile indeed moves down more for mothers than fathers – and this occurs across the vast majority of industries and occupations, and remains visible in 2022.

Overall, the loss of jobs with a permanent contract, after a substantial number of years with the same employer, can constitute a serious economic loss. Recovering from these losses is not necessarily easy or quick, and indeed we see that much of the relative losses of mothers in contracts or tenure persist in 2022. Given this, we argue that –even with the worst of the pandemic in the rearview mirror– attention should be devoted to studying the post-pandemic labour market outcomes of mothers, and the scope of policy to address adverse outcomes. We suggest a few in Section 5.

The rest of the paper is structured as follows: Section 2 examines the institutional background, the timeline of Covid-19 and its response by the Spanish government; Section 3 looks at employment and non-participation probability; Section 4 explores the impact of the pandemic on the tenure distribution; Section 5 considers the potential impact of Covid-related policies in our results and what can we learn from it; Section 6 concludes.

2. Data and the spanish context

In this Section, we discuss our data sources and sample construction. We also contextualize our analysis to the duality of the Spanish labour market and the responses of the Spanish government to the Covid-19 pandemic.

Data and Sample We use quarterly microdata files from the Spanish Labour Force Survey for our analysis. These contain between 130,000 and 160,000 individual observations each quarter between 2005 and 2022.[4] The sample is representative of the Spanish population using the provided population weights. By design, it is a rotating panel where each household stays in the sample for six consecutive quarters. Unfortunately, the panel version of the data—with information on the presence of children in the household—does not provide identifiers that would

[2] That is, the "Encuesta de Población Activa", provided by the Instituto Nacional de Estadística, INE. Given a clear need to make well-informed policy decisions already early on in the pandemic, researchers initially had to collect their own data, for example Farré et al. (2020) and Foremny et al. (2020) for Spain, and e.g. Adams-Prassl et al. (2022a) and Sevilla and Smith (2020) on the UK. In contrast, here, taking advantage of the passage of time since the start of the pandemic, we can now utilize the Spanish LFS to investigate the impact on the labor market for almost three years after the onset of the epidemic.

[3] The permanent employment rate is defined as the proportion of the population that has employment with a permanent contract.

[4] The survey is available since 1976, but we choose to focus on the post 2005 period, as that year the survey underwent significant changes in data collection. See Lafuente (2020) for more details.

Table 1
Sample Description: Couples, EPA Spain 2005-2022.

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Employed	0.652	0.550	0.706	0.721	0.739
Permanent Contract	0.493	0.408	0.545	0.529	0.568
Temporary Contract	0.159	0.142	0.162	0.192	0.171
Self-Employed	0.110	0.077	0.158	0.071	0.131
ERTE	0.003	0.003	0.002	0.003	0.003
Unemployed	0.121	0.141	0.108	0.116	0.099
Inactive	0.118	0.232	0.028	0.092	0.031
Military	0.005	0.001	0.009	0.002	0.011
Managers	0.042	0.028	0.059	0.031	0.051
White collar - Professionals	0.147	0.145	0.102	0.242	0.159
White collar - Tech. support	0.101	0.076	0.102	0.124	0.144
White collar - Other	0.088	0.115	0.043	0.150	0.057
Blue collar - Services	0.167	0.198	0.124	0.217	0.131
Blue collar - Agriculture	0.013	0.005	0.025	0.002	0.018
Blue collar - Artisans	0.116	0.018	0.247	0.014	0.193
Blue collar - Equip.	0.071	0.020	0.137	0.021	0.111
Unsiklled	0.113	0.140	0.104	0.094	0.083
Agriculture	0.034	0.027	0.052	0.014	0.034
Manufactures, prim.	0.041	0.033	0.054	0.035	0.043
Extractive and Energy	0.051	0.022	0.083	0.029	0.078
Manufactures, sec.	0.041	0.017	0.065	0.025	0.070
Construction	0.083	0.013	0.178	0.017	0.130
Hospitality and Sales	0.211	0.223	0.194	0.236	0.191
Transport, Storage and IT	0.068	0.032	0.098	0.052	0.114
Financial and Prof. services	0.115	0.110	0.094	0.157	0.131
Education and Healthcare	0.161	0.189	0.105	0.242	0.128
Other Services	0.059	0.080	0.028	0.091	0.039
Tenure mean (months)	77.805	79.937	85.000	62.995	71.662
Tenure 10th percentile	6.00	5.00	6.00	5.00	6.00
Tenure 25th percentile	22.00	23.00	25.00	19.00	21.00
Tenure 50th percentile	65.00	70.00	72.00	50.00	59.00
Tenure 75th percentile	122.00	127.00	132.00	96.00	110.00
Tenure 90th percentile	170.00	171.00	183.00	139.00	158.00
N	914,289	391,498	299,284	106,344	117,220
Proportion	1.0000	0.3922	0.3125	0.1393	0.1560

Notes: This table gives descriptive statistics on each variable we consider in our analysis for the four groups we look at in the main text, i.e. Mothers and fathers (with children younger than 10yo) in couples and women and men without children in couples. The first column pools all four groups together. The numbers in the represent the share of each subgroup that falls into that category. For example, the first column for 'Employed' shows that 64.9% of our sample (mothers + fathers + women without children + men without children) is employed. The only exception are the statistics on tenure. Those represent the average tenure in number of months for a subgroup or the tenure (in months) at the 10th, 25th, median, 75th and 90th percentile. The table contains data ranging form 2005–2022 (our full sample period). In Appendix we report similar tables for the years 2019–2022 separately.

allow us to track observations over time. For this reason, we focus on the repeated quarterly cross-sections—in which the presence of children is identified—for our analysis.

Throughout the paper, we center our discussion on individuals between 30 and 40 years of age. Most *mothers* in their 30s have a child below 5, and conversely, mothers with children below 5 years most commonly are in their 30s (e.g. pooling our sample, we find that mothers in their30ıs accounts for 53% (40%) of all mothers with children of less than 5 (10) years of age). In this context, we define parenthood to mean the presence of a child below 10 in the household.[5] Further, we label as "no children" the group of households without any dependents under the age 20. For most of the paper, we restrict our focus on couples—with and without children. The main reason for this restriction is to control for the presence of a potential second earner in the household can alter labour market decisions of both men and women. The cross-sectional data provides us with an identifier for the household and a set of individual variables that allows us to identify how individuals are related to each other within households (e.g. who is the father/mother of whom, and who is the partner/spouse of whom). For our purposes, we define couples as households composed of a head (either a female or male) that lives with a spouse or partner. That is, our notion of couples includes both marriages and cohabitations.[6]

Labour market status is derived from standard questions about employment and search behaviour. Tenure is self-reported months in the current firm, and all other demographic variables (age, sex, education, industry and occupation) have their standard definitions as per EUROSTAT requirements. Throughout our analysis we use the population weights given by the Spanish National Institute of Statistics (INE). Key descriptive statistics of our sample are displayed in Table 1.[7]

Duality of the Spanish Labour Market The Spanish labour market, like other European labour markets, has been characterised by a stark duality between fixed-term ("temporary") and open-ended ("permanent") contracts for the last 30 years (see for recent reviews Bentolila et al. (2020) and Dolado et al. (2021)). Temporary contracts with the same firm cannot be renewed beyond 2 years, and have lower firing costs. In contrast, open-ended ('permanent') contracts have higher employment protection, including generous severance payments. This typically translates into longer job tenures for workers in permanent contracts, relative to temporary contracts. That is, the type of contract can serve as (imperfect) proxy for job tenure.

[5] In Appendix Appendix C and Appendix D we do extensive robustness where we change the size of the age groups and the age of children. In Appendix Appendix A we also plot the distribution of household types by age and the distribution of mothers' ages by children's age.

[6] Same-sex couples constitute 0.40% of our couples sample and we exclude them from our main analysis.

[7] Appendix A.1 reports the key descriptive statistics by year for the years 2019, 2020, 2021 and 2022.

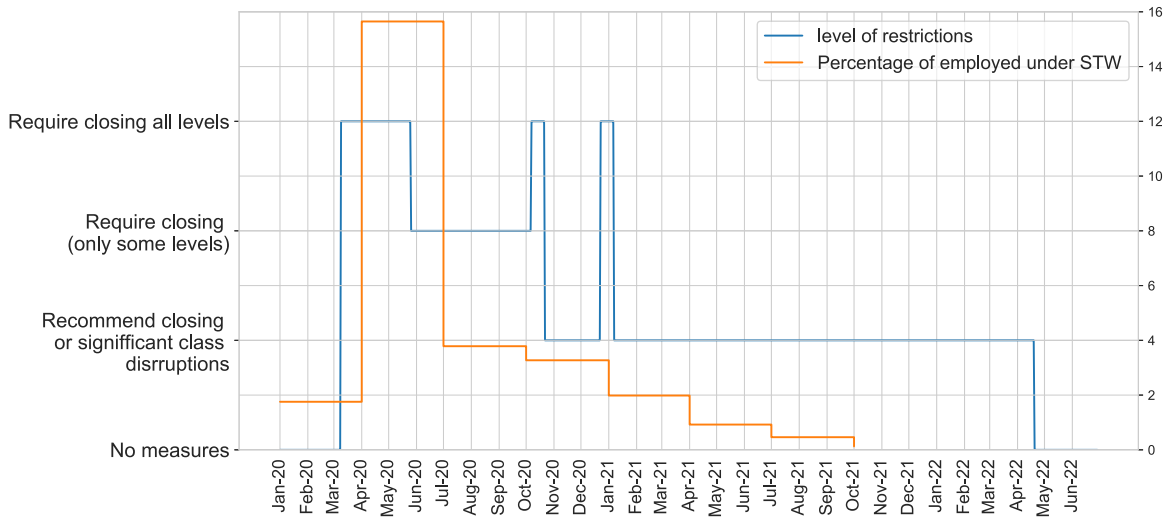


Fig. 2. Restrictions on schools and ERTE incidence, Spain. Notes: Data on restrictions on schools compiled by the Oxford COVID-19 Government Response Tracker (Hale et al. (2021)). ERTE is the Spanish acronym for a Short-Time Work scheme, as defined in BOE (2020). The data for the incidence of ERTEs comes from the Spanish LFS microdata, quarterly frequency, and show the percentage of employed workers between 30 and 35 years of age..

Further, the type of contract is typically associated with differential outcomes. For example, temporary contracts are predictive of future unemployment and associated with lower human capital investment and lower returns to tenure. See e.g. Bentolila et al. (2020) for a recent review, and for wage and skill growth differentials across temporary and permanent jobs, see e.g. Cabrales et al. (2017); Garcia-Cabo (2018); Hospido et al. (2022).[8] Beyond the effects on the labor market, the type of contract is also associated different consumption, investment and choices over the life cycle (e.g Adsera, 2006; Anghel et al., 2023; Guner et al., 2020).

In the context of Spain, we further note that a recent reform (approved by the Parliament in February 2022) has restricted the use of temporary contracts, and has led to an increase in the use of permanent contracts. However, this does not imply that differences between groups of workers cannot persist, e.g. between mothers and fathers, even though new contracts are now more often permanent than before.[9]

The Covid-19 pandemic, Impact and Policy Responses in Spain Covid-19 caused a large fall in employment, visible in Fig. 1. At the start of the pandemic, the government promoted short-time work schemes known by its acronym *ERTEs* in Spanish. These schemes entered with the first batch of emergency measures implemented in April 2020, shortly after the first lockdown was instated in Spain (BOE, 2020). The use of ERTEs extended into 2021, but its use declined substantially, as Fig. 2 shows for our sample. In January 2021 less than 2% of workers where covered by ERTEs, compared to almost 16% at the peak of the pandemic.[10]

Workers on an ERTE would receive up to 80% of their salary covered by their social contributions (without using up unemployment allowances) and remain linked to the firm, even when they could work only reduced hours or not at all. Firms taking up these schemes were forbidden to lay off workers until the scheme expired, facing severe penalties if they would[11]. In this context, it is natural to think that short-time work schemes and lockdowns (mainly the three general ones in late March-June, October and December-January) allowed many parents to stay home with their children during parts of 2020 and the very beginning of 2021. Even when not on an ERTE, working from home was encouraged and has become more common than before the pandemic—yet still only applied to a minority of the working population.[12]

Given our focus on parenthood and labour market outcomes, a relevant dimension for our analysis is schooling disruptions and closures in the pandemic. Fig. 2 shows the timeline of restrictive policies relating to schools in Spain, together with the number of people that were subject to ERTEs in this period. Our data on schooling disruptions come from the "Oxford COVID-19 Government Response Tracker" (Hale et al. (2021)) which summarizes a rich set of policy measures and restrictions during and after the pandemic. It shows the school closures in 2020 during the lockdowns and major schooling disruptions during the summer of that year. However, 2021 also brought disruptions: schooling was characterized by the "bubbles" ("*grupos de convivencia estable*" in its official definition) approach, which had children going to school on alternate days, without mixing with children in other classrooms. Crucially, if there was a confirmed covid-19 case, all members of a bubble group were considered "close contacts" and had to self-isolate. Any child with symptoms was also mandated to self-isolate.[13] [14]

These factors suggest potential severe disruptions in the availability of external childcare, which went beyond the first year of the pandemic, as Fig. 2 shows, while measures like ERTEs were phasing out substan-

[8] Güell et al. (2021) discuss the periods of instability (temporary contracts and unemployment) that can follow the loss of stable, permanent employment.

[9] Another recent reform implemented in 2019 concerns parental leave for men. With this reform, paternity leave was increased from 4 to 16 weeks (see BOE (2019)). People on parental leave are counted as employed, so when considering the effects of the pandemic on non-participation it is worth keeping in mind that parental leave does not affect employment in the accounting sense, but indirect effects may be relevant, in general (Farré and González, 2019), and perhaps more specifically during the pandemic.

[10] Fig. 14 in appendix Appendix A shows more detailed numbers for our sample.

[11] Diaz, Dolado, Janez and Felix (2023) show that the effects of ERTEs firing restrictions lead to increased job retention and lower reallocation in Spain during this period.

[12] This is shown in Fig. 15 in Appendix Appendix A, using results from an annual LFS extension. The share of workers reporting at least occasionally working from home is around 16%.

[13] This guidance included the first stages of school (3 to 5 years old). For the full set of measures, see de Salud Pública (2021c) and de Salud Pública (2021b) for the 2020–2021 and the 2021–2022 school years, respectively.

[14] The roll-out of the vaccine reached children below 12 last, in December 2021 (de Salud Pública, 2021a). While being vaccinated lowered the self-isolation requirements, vaccination coverage was lower for 5-12-year-olds, while those below 5 were typically not vaccinated. At the same time, the rise of the Omicron variant at the end of 2021 caused large numbers of children to become infected. See Fig. 14 in Appendix Appendix A for the numbers of confirmed cases among children.

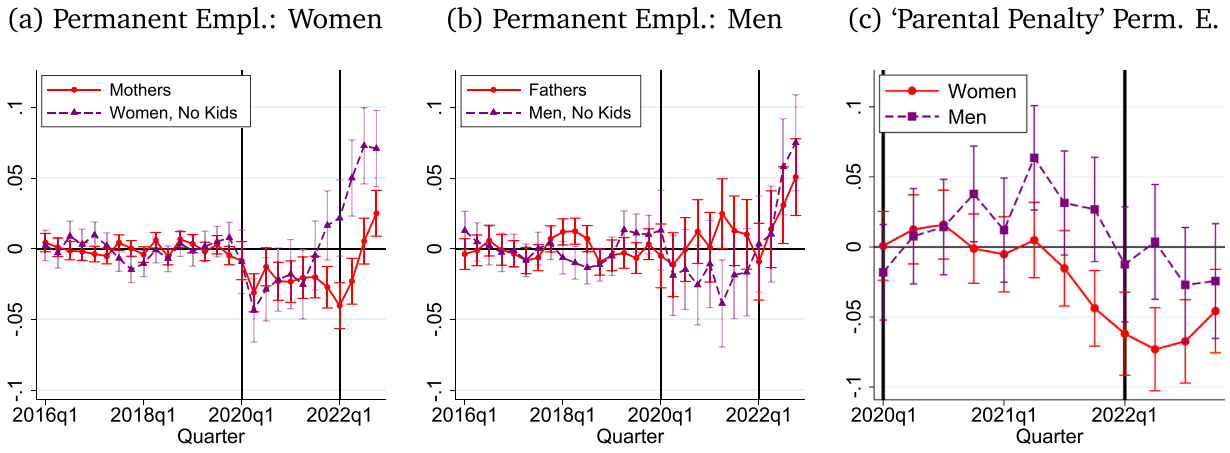


Fig. 3. Effects of Covid-19 on Permanent Employment: Deviations from 2016 to 2019 Trend Notes: Deviations from trend of the share of population on permanent employment, as defined in eq. (1). Units are share of each population group. Vertical lines denote 95% confidence intervals..

tially sooner. This raises the question of whether the demand for domestic provision of childcare was therefore still exceptionally high over this period and influenced labour market outcomes. Fig. 1 shows that both the female and male employment rate of 30-40yo had recovered (beyond) the levels immediately preceding the pandemic by the end of 2022. However, this does not necessarily mean that there are no lingering scars along other, important, dimensions that have hit some harder than others.

Within this context, we now proceed to document the effects of Covid-19 on labour market outcomes by parental status and gender across the job tenure distribution. First, we focus on the type of contract (permanent versus temporary) as an imperfect proxy for job tenure in Section 3. Second, we discuss the effects along the distribution of job tenure (years on the job) in Section 4. In Section 5, we return to these policy changes and discuss how they may have interacted and influenced the timing and magnitude of our results.

3. Gender, parenthood and employment quality in times of Covid: Contracts

In this section we focus on the worker's type of employment contract, under the understanding that open-ended ("permanent") contracts are typically more desirable than fixed-term ("temporary") contracts. In particular, we provide measures of the effects of Covid-19 on employment by contract type, and how this differs across gender and parenthood status.

3.1. Aggregate level analysis: Econometric specification and results

First, we look at the aggregated time series for the total number of employed 30-40-year-olds in Spain in permanent and temporary contracts, split by gender and parenthood status, normalised by the size of the relevant population. For brevity, we will refer to this as the permanent and temporary employment rate of mothers, fathers, "women, no kids" and "men, no kids". Only in this section on aggregate series do we include singles (without children) in the latter two categories, in any subsequent section those without children are cohabiting with a partner.

To assess the effects of Covid on these time series of interest, S_t, we conduct an event study type of exercise, where we use pre-2020 data to forecast a no-Covid baseline scenario, as in Lafuente et al. (2022). In our context, this e.g. helps to account for the different trends that are visible in the data across parental status and gender.[15]

First, we estimate the pre-Covid behavior of each stock (normalised by the total population in each category) assuming a linear trend and seasonal (quarterly) dummies using pre-2020 data:

$$S_t = \beta_0 + \beta_1 t + \delta_{seas}\mathbf{1}_{seas} + e_t, \quad (1)$$

where S_t is the stock in question, β_0 is a constant, β_1 captures the time trend, δ_{seas} is a vector of seasonal dummies and e_t are contemporaneous deviations from predicted values. We focus on the period $2016-2019$, i.e. with 16 quarterly observations for each series, to conduct this estimation.[16]

Second, we use the estimated coefficients from the pre-2019 era to construct a no-Covid baseline scenario as $\widehat{S}_t = \beta_0 + \beta_1 t + \delta_{seas}\mathbf{1}_{seas}$ for the post-2019 period. Thus, under the identifying assumption that had not been for Covid the stocks S_t would have followed $\widehat{S}_t$, we measure the effects of Covid as the deviations of the no-Covid scenario and the actual data after 2019, that is, $e_t = \widehat{S}_t - S_t$ for $t > 2019$. In the plots, we also show the 95% confidence intervals associated with the deviations from (extrapolated) trends.[17] Although the period over which we estimate the trend may be seen as relatively short, we obtain statistically clear and interesting results below.

Fig. 3 shows the deviations of women's permanent employment rate (in percentage points) from the pre-Covid (extrapolated) trend.[18] Early on in the pandemic permanent employment rate fell for both mothers and women without children by around 4 percentage points. However, by 2021 we observe a gap opening up, where women without kids re-

[15] The raw time series of our key variables can be found in Appendix Appendix B.

[16] Including the years preceding this window risks conflating the recovery from the Great Recession with the trend we used extrapolate. Fig. 1 e.g. shows a relatively steep employment recovery for men 30-40yo into 2015. In Appendix Appendix B one can observe similar patterns in the underlying raw data series. In a robustness exercise in this appendix, we have repeated the above exercise based on the linear trend estimated on 2005–2019. Using this trend, the basic 'event study' patterns we discuss here our baseline trend still are present. There we also show that even choosing a shorter trend (estimated in 2018q1-2019q4) we observe a similar pattern. In fact, this short window creates somewhat more pronounced patterns than those documented below for the 2016–2019 trend: e.g. a larger differential in the deviation of the parental penalty of women vs men, statistically significantly different from zero, though (naturally) with somewhat larger confidence bands.

[17] Pre-covid, the confidence intervals of the deviations from trend are calculated directly from the confidence intervals of the predicted trend values relative to the actual observations. Post-covid, we obtain them the regression $S_t = \beta_0 + \beta_1 t + \delta_{seas}\mathbf{1}_{seas} + \delta_q \mathbf{1}_q + e_t$, where $\mathbf{1}_q$ is a vector of dummies for each quarter between 2020q1 and 2022q4.

[18] The permanent employment rate is defined as the number of individuals with employment in permanent contracts divided by the total number of individuals; the temporary employment rate is defined analogously.

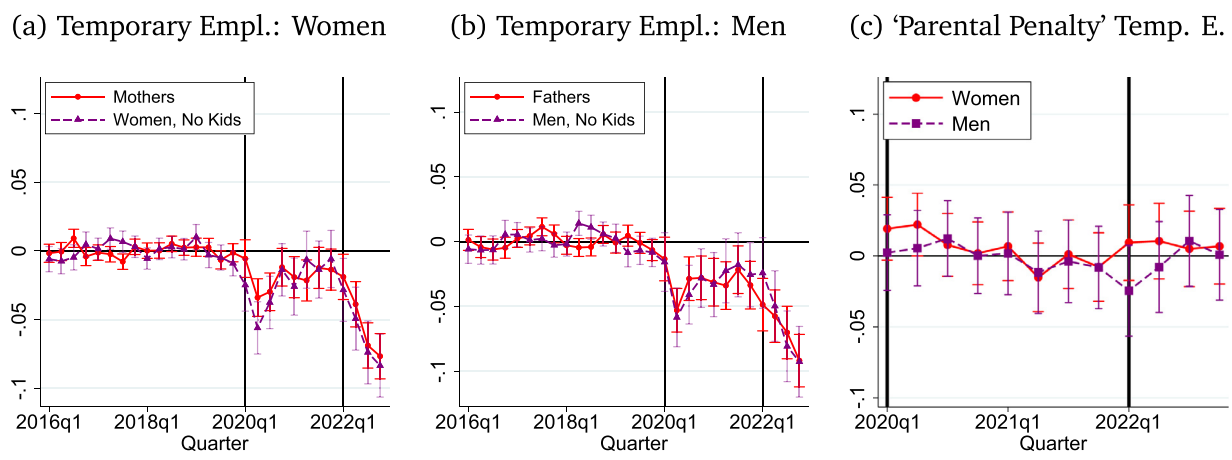


Fig. 4. Effects of Covid-19 on Temporary Employment: Deviations from 2016 to 2019 Trend Notes: Deviations from trend of the share of population on temporary employment, as defined in eq. (1). Units are share of each population group. Vertical lines denote 95% confidence intervals..

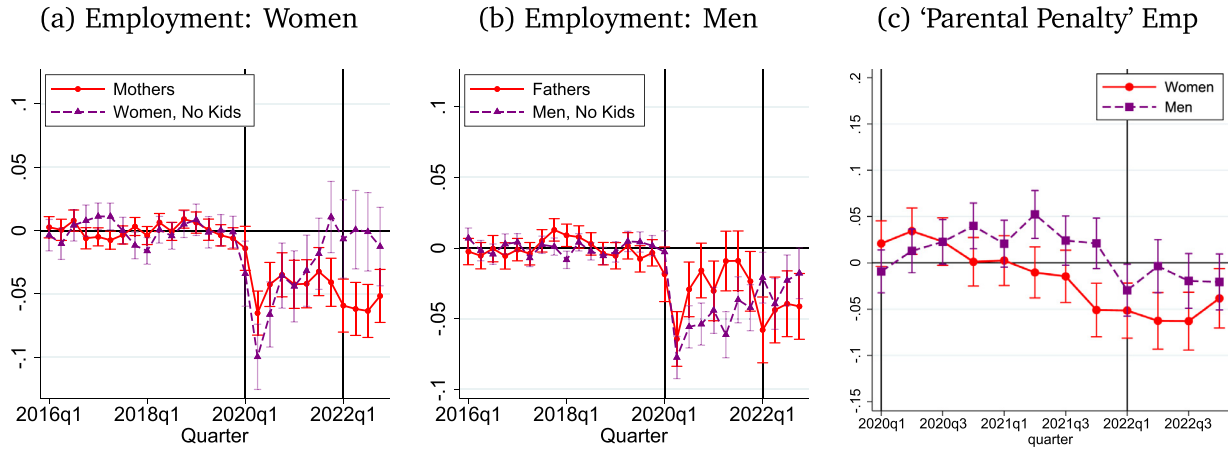


Fig. 5. Effects of Covid-19 on Employment Rate: Deviations from 2016 to 2019 Trend Notes: Deviations from trend of the share of population on employment, temporary or permanent, as defined in eq. (1) Units are share of each population group. Vertical lines denote 95% confidence intervals..

cover their permanent employment but mothers appear stuck at the level of the initial drop. The 2022 labour reform increases permanent employment overall but the gap between both categories persists. The deviations in and after 2020 appear very differently from those pre-2020. Fig. 3 c visualizes the 2020–2022 differences between mothers and women without children explicitly (with the red, solid line), and refers to it as the evolution of the 'parental penalty' in terms of permanent employment.[19] Fig. 3 c confirms that the rise in the parental penalty for women during and after the pandemic, relative to trend, is economically large, at around 5 percentage points, and statistically significant, from the end of 2021 and the entirety of 2022.

The evolution for men is rather different in Fig. 3 b. Early in the pandemic permanent employment of fathers rises relative to trend, while it falls for men without children, i.e. the 'parental penalty' of men initially drops. Towards the end of 2021, permanent employment appears to revert to trend for both categories of men, before both rise in sync with the 2022 labour market reform.

Thus, mothers are the only category that did not return to trend in permanent employment before the 2022 labour market reforms, and continue to display a gap, relative to the permanent employment of men and women without children, even at the end of 2022.

A very different picture emerges when we focus on the temporary employment rate in Fig. 4. As before, the pre-2020 deviations from trend are relatively small compared to the impact of the pandemic and its aftermath, as shown in Figs. 4 a and 4 b. It is perhaps remarkable how much the two series in each Fig. 4 a and 4 b co-move at first sight: initial decline in temporary employment rate, incomplete recovery by the beginning of 2022, then a post-reform decline. A closer comparison between the two figures reveals that the 2021 recovery of male temporary employment is weaker and appears to revert into decline already at the end of 2021, especially for fathers. In terms of the parental temporary employment penalty, we do not see any persistent economically or statistically meaningful gap opening up in Fig. 4 c.

Combining the lessons of Figs. 3 a and 4 we see that parenthood seems to affect women's employment very differently than men's.[20] Women without children are the only group to recover their employ-

[19] The vertical intervals in Fig. 3 c again denote the 95% confidence intervals. To derive this figure, we estimate, for each gender $g = \{men, women\}$, the following regression, involving dummy variable k for the presence of kids below 10yo in the household.

$$S_{t,k,g} = \beta_{0,g} + \beta_{1,g} t + \delta_{seas,g} \mathbf{1}_{seas} + \delta_{q,g} \mathbf{1}_q + k(\beta_{0,k,g} + \beta_{1,k} t + \delta_{seas,k,g} \mathbf{1}_{seas}) + \delta_{q,k,g} \mathbf{1}_q k + e_t \quad (2)$$

where $\delta_{q,k,g}$ captures the difference (in quarterly deviation from the respective trend, post 2020q1) between the time series of parents and those without children (both of the same gender g), which are in Figs. 3 and 3 b.

[20] Throughout the paper, we consider employment as the sum of permanent and temporary employment, excl. self-employment (while the self-employed are included in the total population, in the denominator). We did not want to mix self-employment and work for an employer indiscriminately. Over the pandemic

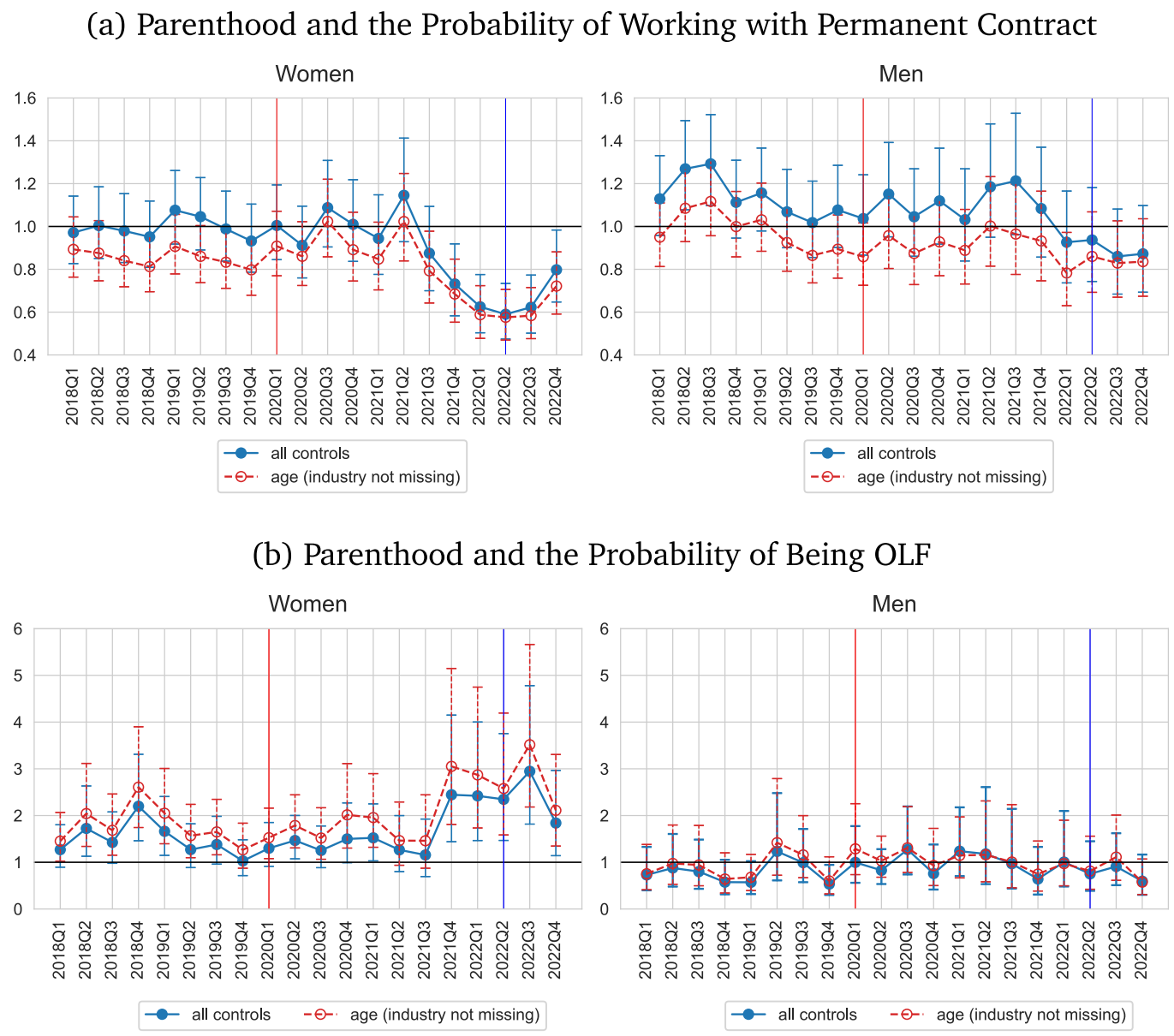


Fig. 6. Effects of Covid-19 on the Marginal Effect of Parenthood, by Gender Notes: Results from logistic regressions; odds-ratio marginal effect of $parent = 1$ dummy variable. That is, $P(state_i, parent)/P(state_i, no\_children)$, where $state_i = \{permanent, inactive\}$; sample comprises all individuals 30–40 years of age. Controls include: education (college, less than high-school), age, part-time indicator (for plot (a)), public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

ment up to their pre-covid trend by 2022. Mothers, on the other hand, appear to have lost employment persistently: the deviation from pre-covid trend, at around 6 p.p., is as large in 2022 as it was in 2020Q2. For men, the outcomes appear in between: a steady recovery for men without children, and an initial recovery for fathers that reverted in 2021. Unlike for mothers, for fathers this originated more from losses in temporary rather than permanent employment. Overall, fathers (at around 1–4 p.p.) have remained persistently closer to their pre-covid employment trend throughout the pandemic aftermath than mothers. During this time then, relative to fathers, mothers have faced persistently larger losses in permanent employment that have only been partially compensated by relatively smaller losses in temporary employment, but which together show up as larger losses in the overall employment rate as well.[21]

3.2. Taking into account heterogeneity in worker characteristics

In the above analysis, we have relied on time series of quarterly employment outcomes aggregated at the level of gender × parenthood status. To investigate whether heterogeneity among these groups in terms of characteristics such as occupations, industries or education plays a role, we now focus our statistical analysis on the individual level. We

they faced different government policies, while the Covid impact on work flexibility (in terms of constraints at home and at work) might also have been different.

[21] Hupkau and Ruiz-Valenzuela (2022) compare the four quarters of the pandemic (2020Q2-2021Q1) with the preceding five quarters (2019Q1-2020Q1), in terms of employment and inactivity. They also find a gender gap in (total) employment for parents late in 2020 that is not present for nonparents.

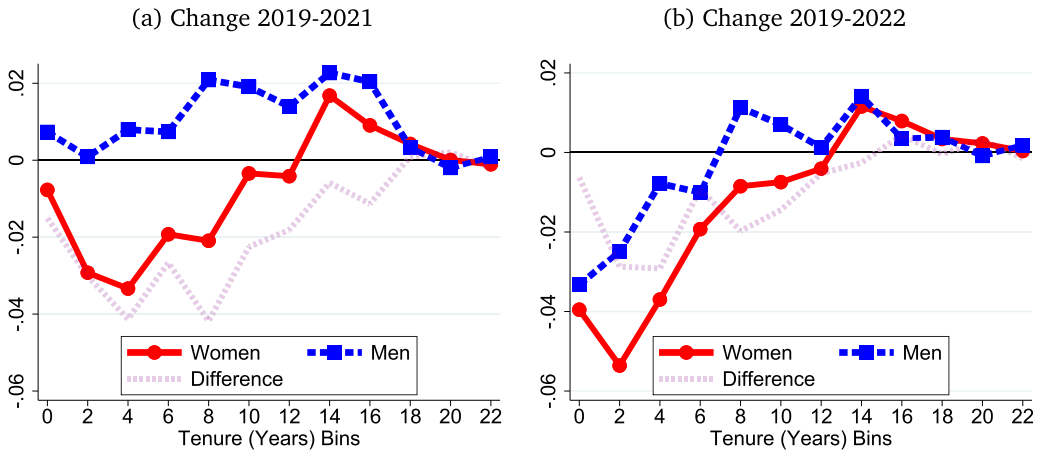


Fig. 7. 'Parental Penalty': Differences in Extended Tenure Distribution Changes, Parents vs Nonparents The sample includes adults age 30–40 and compares parents (cohabiting with children <10) with adults without children (but also cohabiting)..

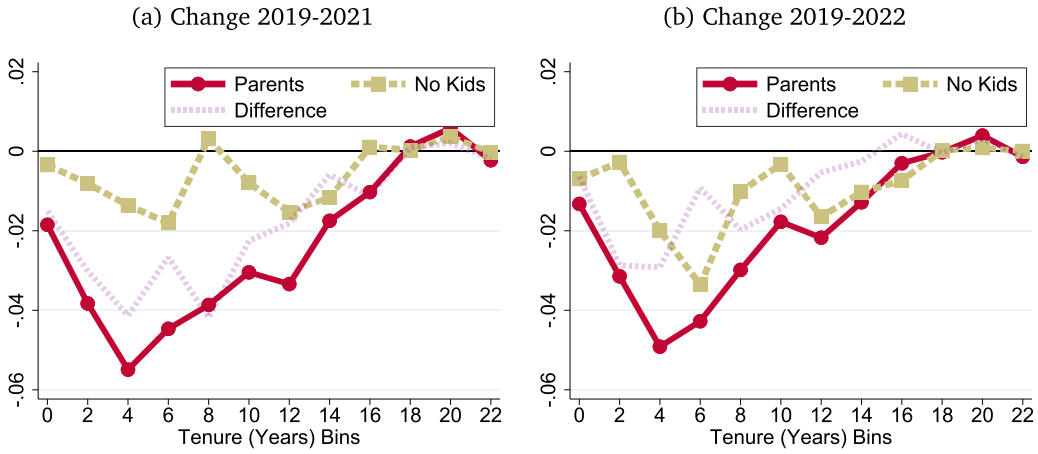


Fig. 8. 'Gender Gap': Difference in Extended Tenure Distribution Changes, Women vs Men The sample includes adults age 30–40 and compares parents (cohabiting with children <10) with adults without children (but also cohabiting). .

consider 30-40-year-olds, with and without children, in cohabiting couples.[22]

Let us first consider how the probability of an individual i working in a permanent contract shifts by their parental status. Denote the probability of working with a permanent contract at time t as $Prob(Perm_{i,t})$. Then, we run separately by quarter t the following logistic model:

$$\frac{Prob(Perm_{i,t})}{1 - Prob(Perm_{i,t})} = exp(\beta_{0,t} + \beta_{1,t}\mathbb{1}parent_{i,t} + \boldsymbol{\delta}_t X_{i,t} + \epsilon_{i,t}), \quad (3)$$

where we use controls X_i for age, part-time worker (for permanent regressions), education (college and less than high school indicator), public sector, industry and occupation (last industry and occupation for non-employed workers). Our main object of interest is the evolution of the marginal effect of parenthood captured by the coefficient associated with the indicator variable $\mathbb{1}parent_i$ which is equal to one if individual i has children (younger than 10) in the household, and zero otherwise.[23] We run (3) separately for women and men. We plot the resulting odds ratio for women and men (with $parent_{it} = 1$) in, respectively, panel (a) and (b) of Fig. 6. The vertical bars around the point estimates again denote 95% confidence intervals.

To highlight one motivation for this exercise: as can be seen in the descriptive statistics, Table 1, the occupation and industry decomposition varies substantially across our four groups. One worry may be that certain industries or occupations (sectors) that are associated with female employment (like hospitality and sales) are affected more profoundly during the pandemic. Employment patterns that originate at the sector level could be interpreted as gender differences when just looking at the gender employment series in the aggregate. A similar worry could apply to parental status. Sectoral differences in the propensity for workers to have permanent contracts could again affect our aggregated series differently. To deal with this, we include occupation and industry in regression (3). Since individuals only are reported with industry and occupation when they are in employment or have been in employment at some point during the previous year, the sample of workers is different when these are included as regressors. We interpret this sample as one of 'attached workers' to the labour force.

Fig. 6 shows the results of regression (3), in panel (a). Note that since we run regression (3) separately for each quarter, we have not removed any time trend. For women in couples in the 'attached worker' sample, before Covid-19, having children was not associated with a lower probability to be in a permanent contract, ceteris paribus; however, a gap opens up in the second half of 2021 that remains until the end of

[22] The only difference with the previous section is that we restrict ourselves to those in couples (thus excluding singles), which is also the sample we consider in the subsequent sections.

[23] Clearly, parenthood is (typically) an endogenous choice (e.g. Jones et al., 2010) and the marginal effects of parenthood pinned down from (3) are reduced form estimates that we do not interpret causally. In this Section, our focus is on the effects of Covid-19 on these reduced form estimates for the parenthood effects.

the time window of the sample. The coefficient on parenthood tells us about the parental penalty, along the same lines Fig. 3 c (but formulated with respect to an odds ratio). With a more restricted sample ('attached workers' who are cohabiting) and controlling for worker characteristics, including industry and occupation, we find essentially the same shape as in Fig. 3 c. At the lowest points, between 2021Q4-2022Q3, women without children are 66% more likely to be in a permanent contract than mothers of children younger than 10. The same applies to men (one could even spot an initial drop in the 'parental penalty' for men early in the pandemic, which then reverts). Again, mothers stand out, and again this becomes visible only later in the pandemic.[24]

To get a sense of the impact of the inclusion of occupation and sector regressors, we investigate a version of regression (3) with age as the only characteristic, on the 'attached worker' sample of cohabiting individuals. The result is the red dashed line in Fig. 6. The difference between the solid line (full set of controls) and the dashed line (only age as control) in Fig. 6a is minimal for women, while there exists a level effect that is present throughout the series. Hence, there appears little evidence for occupational and sectoral shifts during the pandemic and its aftermath driving the increased 'parental penalty' of mothers (or fathers).[25]

In Fig. 6b, we look at the probability of being out of the labour force as a function of parental status, in an analogue of regression (3). We observe that in the second half of 2021, a gap opens up, where mothers now exhibit a relatively higher probability to be outside of the labour force than similarly aged women without kids. The effect is substantial, with women with children being between 2 and 3 times more likely to be out of the labour force than women without children. This is pronounced among the set of 'attached female workers', both because the relative nonparticipation rate of mothers goes up while the nonparticipation rate of 'attached female workers' returns to its pre-covid levels.[26] For men, we observe little changes over the course of the pandemic and its aftermath. Again, the role of composition shifts involving occupations and industries for nonparticipation 'parental penalty' appears limited in the time series dynamics.[27]

Discussion Thus, we see that mothers suffered losses in permanent employment that reached their full extent only over the course of 2021. Relative to women without children in the same age category, and relative to fathers, these losses persist even till the end of our sample (the last quarter of 2022). Similarly, among women who have recent labour market history, mothers faced an increased probability of being out of the labour force compared to their female counterparts without children, from late 2021 till the end of the sample. At the same time, employment of women without children has been the only category that appeared to recover close to the previous trend, in the aftermath of the pandemic. When looking at employment simply by gender, this heterogeneity is obscured: in Fig. 1 both genders have recovered the previous employment levels since the start of the pandemic. However, the conclusion that there are no lasting effects of the pandemic times seems premature: mothers seem to have had it worse, and this difference so far persists.

Of course, permanent employment is only a binary variation of quality, and one that we can expect to become less informative over time after the 2022 labour market reform – though it is interesting that, comparing mothers vs fathers and vs women without kids, differences in the evolution of permanent employment persist for now. Below we look at a further, richer measure: the tenure of the worker on the job.

4. Gender, parenthood and employment quality in times of Covid: Job tenure

In this section, we look at the behaviour of the job tenure distribution in times of Covid. We do so again separately for the four groups: mothers, fathers, and cohabiting women and men without children. In standard matching theory, the longevity of matches is a prime indicator of the quality of the match.[28] Additionally, workers in longer worker-firm matches may have accumulated more firm-specific human capital, which is destroyed when the worker leaves the firm behind. In both cases, regaining employment would not imply a return to the same quality or productivity (or job stability, for that matter). For these reasons, if proportionally more long-tenure jobs are destroyed during the pandemic, this is suggestive that the labour market scars will last longer than measures based on employment alone show. Considering job tenure allows us to go beyond contracts, in a much more 'continuous' way: the range of job tenures that imply a permanent contract is quite broad.[29] Further, the analysis of this section can be applied to other countries, including those that do not have a 'dual' labour market, like Spain.

We proceed in two steps: first we study the evolution of the job tenure distribution, focusing in particular on the change of the tenure distribution over the first two and three years after the start of the pandemic. We choose this window in part because of the mother-specific changes that became visible only in 2021 in the last section. As in the previous section, we first consider the behaviour of individuals aggregated into our four groups, without distinguishing further heterogeneity inside these groups.

Then, we look at it from a longer time series perspective and take along heterogeneity among individual workers. We observe the cyclical patterns in the dynamics of the job tenure distribution in the decade and a half before the pandemic: interestingly the patterns in pandemic times and aftermath appear different from those in the Great Recession. Finally, we look at the role of specific industries and occupations in these patterns.

4.1. Job tenure distribution by gender and parenthood in times of Covid

In this section, we want to study how the job tenure distribution changed over the duration of the pandemic and its aftermath. In particular, we are interested in the loss of high-tenured jobs and how this compares across gender and parental status. Because one would expect a shift in terms of hiring as well as separations during this time and (trend) changes in population, we work with an extended version of the tenure distribution in each period, and normalise the number of workers at each tenure by the entire population of each group, not just by all *employed* workers in a job. Formally, we consider 2-year tenure bins, where the mass of workers in a bin τ (with this normalisation) in a year t is defined as

$$f_{st}(\tau) = \frac{\sum_i (\tau \leq \tau_{it} < \tau + 2)}{\sum_i (i \in s_t)} \text{ for } \tau = 0, 2, 4, \ldots, T, \quad (4)$$

[24] In this regression we used 'children younger than 10' versus the baseline of no children in the household. Results for alternative specifications (children younger than 5 or 16, other parental age groups) are presented in appendix C.2. The main results of this section are robust to these alternatives. We also present the same exercise but with a longer time series in appendix C.4. These last figures highlight how strong the effect of the covid recession period is on mothers' employment, compared to the great recession. Finally, Table 9 in Appendix C.5 displays the coefficients with their standard error presented in Fig. 6.

[25] This is not to say that sectoral shifts during and after Covid do not matter for scores of other economic outcomes. However, it is perhaps suggestive of a role in the labour supply considerations of mothers that are present across occupations and sectors. We discuss this further below.

[26] In the overall sample that includes women that have not worked for more than a year, these trends are weaker.

[27] We provide results to alternative specifications of this regression in section C.3 of the appendix, for ages of children and parents. We find the same patterns as in our main exercise. Appendix C.4 offers also a longer timeline dating back to 2005.

[28] Consider, e.g. seminal on-the-job search model such as Burdett and Mortensen (1998) or Postel-Vinay and Robin (2002).

[29] Having said this, we do not consider contract differences across low tenured jobs in this section.

where τ_{it} is the tenure of person i at time t, and we sum over individuals. Define $\overline{F}_s t(\tau) = \sum_{\sigma=\tau}^{T} f_{st}(\tau)$ as the proportion at time t of *all* individuals in group s that has a tenure equal or greater than τ at time t. Then let $f_{st}(-1)$ equal $1 - \overline{F}_{st}(0)$, i.e. the proportion of workers at time t in group s who do not have a job, while $\overline{F}_{st}(0)$ is simply the employment rate of group s. Along these lines, we also refer to $\overline{F}_{st}(\tau)$ as the employment rate at tenures of τ and higher, and to the implied distribution as the *extended* tenure distribution.

During the pandemic the proportion of individuals in a tenure bin τ changes. We consider $\overline{F}_{s,2021}(\tau) - \overline{F}_{s,2019}(\tau)$ (and $\overline{F}_{s,2022}(\tau) - \overline{F}_{s,2019}(\tau)$), that is by how much the proportion of group s with a tenure of τ and higher, changes between 2019 and 2021 (resp. 2022), and how this varies by group.[30]

With this, we can define tenure distribution analogues to the 'parental penalty' and 'gender gaps' discussed before. For example, the 'parental penalty' $\left(\overline{F}_{w1,2021}(\tau) - \overline{F}_{w1,2019}(\tau)\right) - \left(\overline{F}_{w0,2021}(\tau) - \overline{F}_{w0,2019}(\tau)\right)$, where $w1$ is mothers and $w0$ refers to cohabiting women without children, tells us, when negative, that the proportion of mothers in tenure larger than τ decreased by more than the corresponding proportion changed of women without children, from 2019 to 2021. Thus, in that case, the pandemic affected the higher-than-τ tenures of mothers more negatively than women without children in the same age group. Note that this is an exercise of comparing conditional distributions over time –which has relevance for many questions– but not an exercise of comparing the same set of individuals over time.[31] Hence we use the labels 'parental penalty' and 'gender gaps' for comparisons of the (extended) tenure distribution dynamics in a loose sense here.

Fig. 7 a shows (red solid line) that mothers lost more of their overall employment rate than cohabiting women without children, at tenure $\tau = 0$. Beyond this, however, mothers also lost more of their employment rate at higher tenures than women without children, except for the very highest tenures, larger than 14 years. Hence, the relative loss in the employment rate of mothers is not because women without children experienced a relative rise in low-tenured jobs (i.e. fresh hires). In fact, the opposite happens, we see that at the lowest tenures the 'parental penalty', i.e. the relative losses of mothers, initially increases as tenure rises (i.e. the solid red line initially decreases in Fig. 7 a). This implies that mothers experience relatively lower losses of employment (normalized by group population) in the 0-2yr tenure bin (and slightly so, in the 2-4yr bin) than women without children.

The maximum 'parental penalty' for women is reached at the 4–6 yr tenure bin, in Fig. 7 a. This captures that the employment rate in jobs with tenure of 4 yrs and higher sinks by more than 3 percentage points *more* for mothers than for women without children, between 2019–2021. In context, the average employment rate of mothers in jobs with tenures of 4 or more years is about 30%, so this 3 percentage point difference implies a large relative impact on the employment rate at job tenures of 4 years and higher.

Where the red solid line is steepest upward-sloping, the largest relative losses of employment per tenure bin, i.e. $(f_{w1,2021}(\tau) - f_{w1,2019}(\tau)) - (f_{w0,2021}(\tau) - f_{w0,2019}(\tau))$, occur.[32] Since the steep part covers an interval of 4–12 years of tenure, it is implied that mothers are losing employment relative to women without children at a rather large range of tenures. From the descriptive statistics in Table 1, to get an idea, we know that this tenure in years ranges from less than the median tenure (taken over the entire sample) towards 75th percentile. We'd like to interpret this as the tenures in which workers are typically well-established (and in permanent contracts) without being exceptionally attached.[33]

At tenures beyond 14, the remaining 'parental penalty' (or 'parental bonus', when it is negative) is smaller, also because there is only a small part of the population employed at these tenures.

Interestingly in Fig. 7 a, the 'parental penalty' behaves differently for men (dashed blue line). Fathers lost less (or gained more) than their male counterparts without children in terms of the employment rate at high-tenured jobs, over the period 2019–2021. The 'parental penalty', here really a 'parental bonus', is most pronounced at around 2 percentage points of the population in the tenure range from 8 to 16 years. This 2 percentage points difference makes a large relative impact at higher tenures (about 25% of fathers have a tenure of 10 years or higher).

In broad strokes, these patterns are preserved for women when looking at the evolution of employment up to 2022, in Fig. 7 b, with again the largest 'parental penalty' at the 2 and 4 year tenure bins (up to nearly 6 pp of the population, a large loss relative to employment at those tenures) but a much smaller one at tenures of 8 years and higher. For fathers, compared to men without children, we now see relatively larger employment losses at shorter tenures. Overall this narrows the vertical difference in 'parental penalty' between women and men somewhat (dashed line), but it is still clearly visible and economically significant for an extended range of tenures.

'Gender gaps' in tenure distribution changes We can also look at the 'gender gap' in the dynamics of the extended tenure distributions over the course of the pandemic. Specifically and analogously to the above, define our distributional 'gender gap' for parents as $\left(\overline{F}_{w1,2021}(\tau) - \overline{F}_{w1,2019}(\tau)\right) - \left(\overline{F}_{m1,2021}(\tau) - \overline{F}_{m1,2019}(\tau)\right)$, where $w1$ refers to mothers and $m1$ to fathers; and similarly the gender gap for couples without children. Fig. 8 shows these gaps. A negative gender gap at high tenures implies a more negative (less positive) change in the high-tenure employment rate, over the course of the pandemic, for mothers than fathers.

We observe that the 'gender gap' between parents in terms of the extended tenure distribution remains rather unchanged, whether we take 2021 or 2022 as the endpoint. In both cases, we see that the mothers' (extended) distribution has lost more of their high-tenure employment rate than fathers'. At tenures of 4 years and higher, this difference is maximized at 5 percent of the population. Behind this, in 2021 and 2022 about 2–3 percentage points fewer mothers are employed in jobs with tenure 4 years or higher than in 2019, while 2–3 percentage points more fathers are employed in jobs with these tenures. The relatively linear relation by which the gender gap declines between 4 and 16 years of tenure tells us that these relatively larger losses are built up across almost the whole range of tenures larger than 4 years.

The gender gap between the (extended) tenure distribution changes of cohabiting women and men *without children* is smaller. With endpoint 2021, this holds for almost all tenures, except the very highest. With endpoint 2022, this also holds but the gender gap for nonparents does appear to grow larger for tenures of 6 years and more, coming closer to the parents' gender gap in that interval. Behind this, the mass in the tenure range of 6–10 years in the extended tenure distribution of women without children appears to have decreased more strongly in 2022. Note, however, that a vertical distance of around 0.02 or more is preserved for all tenure bins below 12, except 6, which means that the parental gender gap in tenure distribution is still meaningfully larger at most tenures.[34]

Overall, the employment of mothers with tenures between 2–10 years seems to have suffered over the course of the pandemic, relative

[30] We choose to focus on the complementary cumulative density function $\overline{F}$, rather than f, as the latter (though perhaps easier to understand) is more sensitive to noisy measurement, given the size of our dataset. The strength of the patterns is easier to judge with the complementary cumulative density function, where some of the randomness is averaged out.

[31] This has its roots in the limitations of the data used, where we cannot follow individual workers over time.

[32] This is immediately related the steepest part of the cumulative density function implying the highest densities of the probability density function.

[33] This links to the patterns discussed in Section 3, because these tenures are associated with permanent contracts.

[34] Below, we find other indications that the conditional distribution of women without children shifted down at high tenure tenures, in 2022. Note that the differences in Figs. 7 and 8 are mathematically identical.

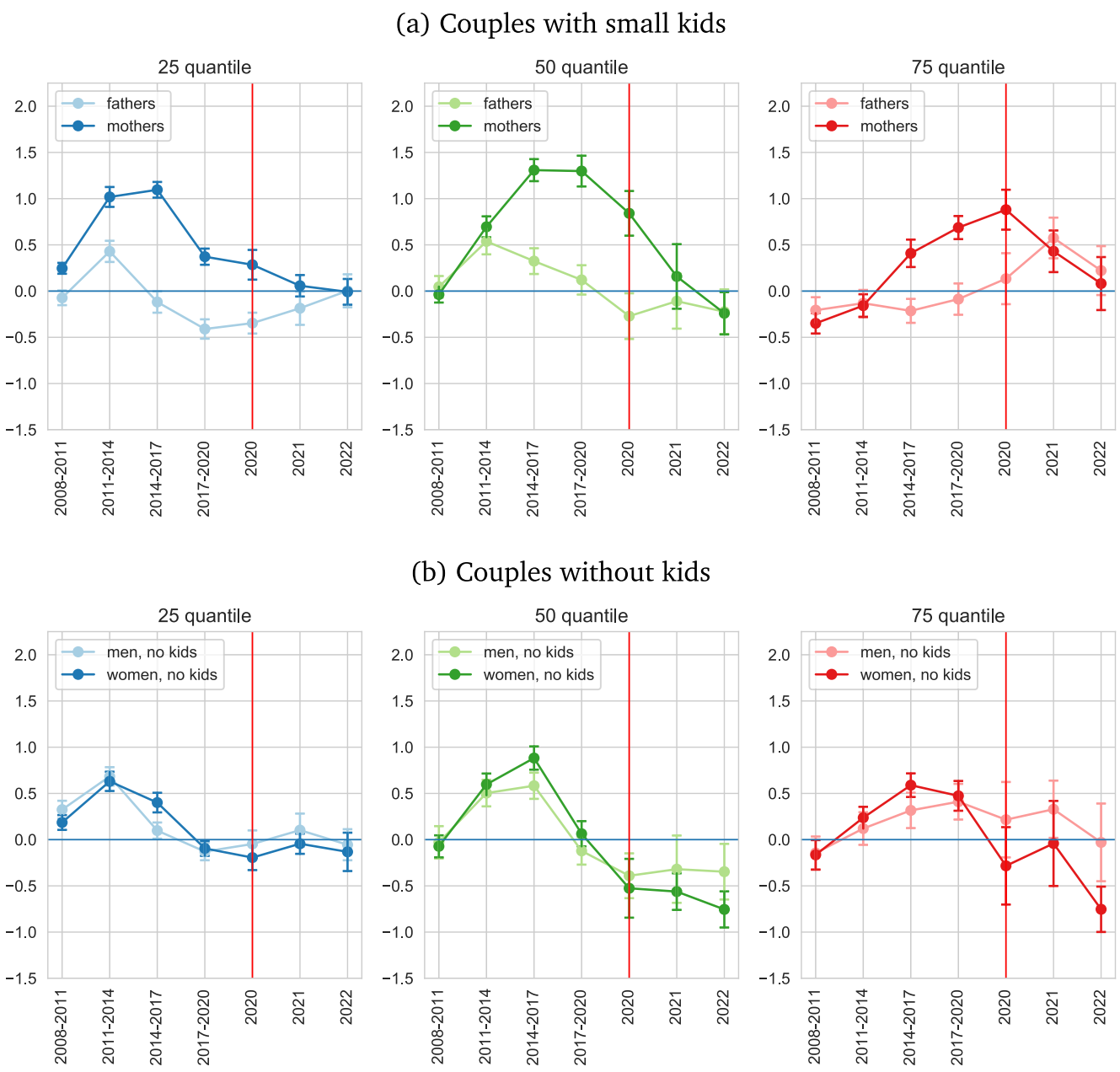


Fig. 9. Coefficients for time dummies, workers 30–40 years of age Notes: Results from regression (5). The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 10. The covariates include: Tenure of the partner, a quadratic term for the tenure of the partner, dummies for: part-time work, college, less than high school, partner college, partner less than high school, a trend for age of the partner, age fixed effects (in 5-year bins due to data limitation)and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022. .

to their partners, and relative to women without children.[35] This fits with the picture of permanent employment in the previous section, but enriches it: the effects are not solely confined to low-tenure permanent contracts but rather can be seen throughout a significant part of the tenure distribution, including at tenures above the median.

While the exercise above is essentially an accounting exercise between aggregate tenure distributions of four aggregate groups, in the next section we apply statistical methods and incorporate further individual-level heterogeneity, to study tenure distribution dynamics during Covid times also in comparison to the decade and a half that preceded it.

4.2. The evolution of the job tenure distribution, 2005–2022

We now look in more detail at the distributional behaviour over a longer period, 2005–2022. It allows us to go back beyond a single pre-Covid baseline year, and in particular allows us to compare the behaviour of the distribution during the pandemic with the Great Recession. Furthermore, we try to control for compositional shifts during this period. Concretely, we run quantile regressions of the form

$$Tenure_{iht}(q) = \alpha_s(q) + \gamma_s(q)\mathbf{X}_{iht} + \delta_{episode}(q)\mathbf{1}_{episode,t} \quad (5)$$

[35] If we split our sample into two, the first part covering individuals of 30–35 years, the second those of 35–40 years, we observe very similar patterns to Figs. 7 and 8 in each of these two samples. If we take (as a placebo type of exercise) 3 or 4 year windows in the years immediately before 2020, we observe very different patterns.

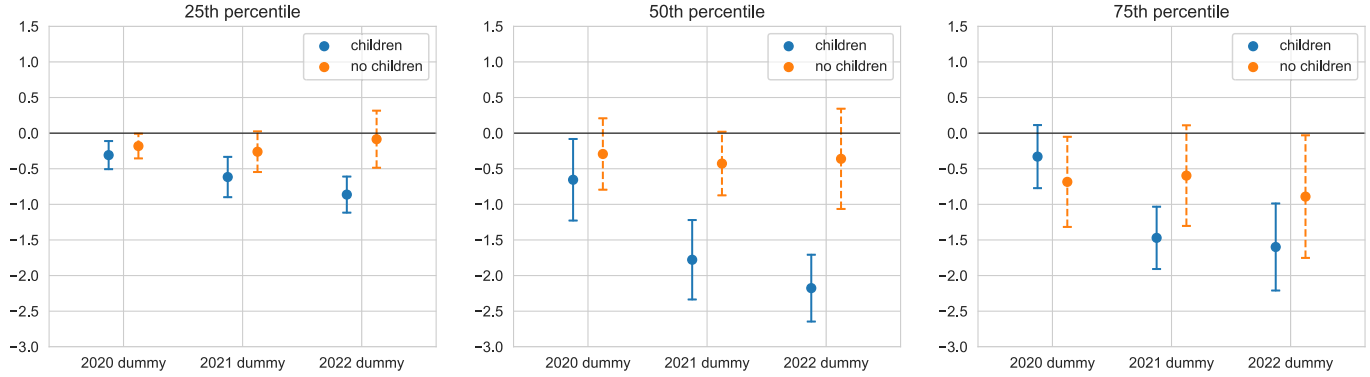


Fig. 10. Values of Covid Year Dummies Interacted with Gender, Regressions Controlling for Worker/Partner Characteristics Notes: Results from regression (6). The sample includes couples age 30–40 and compares couples without children with couples with children younger than 10. The covariates include: Tenure of the partner, a linear time trend, a linear time trend x female, a quadratic component of the time trend (also interacted with a dummy for being a female), yearly Covid dummies, yearly Covid dummies x female, dummies for: part-time, part-time x female, college, college x female, less than high-school, less than high-school x female, partner self-employed, partner self-employed x female, partner college, partner college x female, partner less than high-school, partner less than high-school x female. The dots more the effect of being a woman (with or without kids) on the predicted tenure. .

where s refers to our usual subset of workers (mothers, fathers, cohabiting women without children, cohabiting men without children), $Tenure_{iht}$ refers to the job tenure of person i in household h in time period t; (q) refers to the quantile under consideration in the quantile regression (here we will focus on the 25th, 50th and 75th percentile of the tenure distribution of employed workers, different from the *extended* tenure distribution in the previous section[36]). Vector $\mathbf{X}_{iht}$ refers to the characteristics associated to the person under consideration, namely education, part-time or self-employed status[37]. In this iteration of the regressions, we also include characteristics of the partner also as characteristics in $\mathbf{X}_{iht}$. In Fig. 9 a, we plot the values of the time dummies $\mathbf{1}_{episode,t}$ for distinct time episodes for each of our subsets of workers. The time dummies cover the baseline period is 2005-07, followed by the first and second part of the Great Recession, recovery and the most recent 3-year period before Covid. (These periods are of similar duration). We capture the pandemic recession and its aftermath in separate dummies for 2020, 2021 and 2022.[38] [39]

In Fig. 9 a we plot the values of these dummies where we group individuals by having (or not having) children. Let us first concentrate on pre-Covid outcomes. Here, we observe that cohabiting men and women without kids have remarkably similar movements of the tenure distribution most of the time, as captured by the period dummies in the three quantile regressions. During the Great Recession and its immediate aftermath (2014–2017), the 25th, 50th and 75th percentile of both (conditional) tenure distributions moved up by 6 months to a year.

The behavior of the 25th, 50th, and 75th percentiles of fathers and mothers have moved somewhat less in lockstep with each other over time than the job tenure distributions at those percentiles of the couples without children. Fathers' and mothers' conditional tenure distributions have generally moved in the same direction over time, in particular shifting up during the Great Recession, but the mothers' distribution has reacted more strongly and more persistently.

Very differently during Covid times, mothers rather experienced a drop at these percentiles, sharply so at the median and 75th percentile with drops of about a year of tenure, unlike the fathers who experienced an initial rise. The behavior of cohabiting men and women without children tracked each other much more, with the exception of the women without children at the 75th percentile, which also experienced a noticeable decline. With this, the Covid behavior in Fig. 9 is consistent with the analysis in the previous section, where we plotted the dynamics of the entire distribution over 2019–2021.

Below, we want to compare outcomes for women vs men, in particular mothers vs fathers, (i.e. the 'gender gaps' in the parlance of the previous section) taking account of workers' heterogeneity, including in terms of occupation and industry employment.

First, let us establish the evolution of the 'gender gaps' during Covid at the 25th, 50th and 75th percentiles. To do so, we pool the data of both genders and consider a regression in the following form for parents and non-parents separately:

$$\begin{aligned} Tenure_{iht}(q) = {} & \alpha_s^0(q) + \gamma_s^0(q)\mathbf{X}_{iht} + \mu_s^0(q,t) \\ & + \alpha_s^1(q) \times \mathbf{1}female_i + \gamma_s^1(q)\mathbf{X}_{iht} \times \mathbf{1}female_i + \mu_s^1(q,t) \times \mathbf{1}female_i \\ & + \sum_{y=2020}^{2022} \delta_{sy}^0(q)\mathbf{1}_{y,t} + \sum_{y=2020}^{2022} \delta_{sy}^1(q)\mathbf{1}_{y,t} \times \mathbf{1}female_i \end{aligned} \tag{6}$$

The function $\mu_s^i(q,t),\ i=0,1$ allows us to incorporate a gender-specific trend or dependence on t only, while the Covid year dummies $\mathbf{1}_{y,t}$ capture the (gender-specific) deviations from this in 2020, 2021 and 2022. For the 'gender gaps' in terms of the change of the tenure distribution, we are especially interested in $\delta^1_{s2020}(q), \delta^1_{s2021}(q), \delta^1_{s2022}(q)$.

In Fig. 10[40] we present the coefficient values of 2020, 2021 and 2022 dummies interacted with gender (i.e. $\delta^1_{s,y},\ y=2020,2021,2022$) from a regression that follows specification (6), with a quadratic trend to capture the 'wave' pattern of Fig. 9 a, controls for the type of job, the education level (worker's and partner's) and the tenure of the partner.[41] Consider the sample of parents, the results show that the tenure distribu-

[36] The previous section suggested changes throughout the distribution of tenures, with perhaps somewhat less of a response towards the very highest tenures. Studying the median, 25th and 75th percentile allows us, relatively parsimoniously, to get a sense of what happens in a range that includes the moderate to high tenures.

[37] The exact control variables of our baseline regression are specified in the description below Fig. 9. For versions with occupation controls see Fig. 38 in Appendix D.2. For other robustness checks, where we vary the age of children see Appendix D.1, or where we adjust the way we control for the age of the partner and tenure of the partner see Figs. 39 and 41 Appendix D.2

[38] The full regression results are reported Table 10 and 11 in appendix D.4.

[39] We also exclude discontinuous workers, because of the effect of the 2022 labour reform on these contracts.

[40] The full regression results are reported Table 12 in appendix D.4.

[41] The 'wave' pattern is more visible if we repeat this exercise but with years instead of periods. We report these results in Fig. 42 in Appendix D.3. The fall followed by an increase after the Great Recession is easier to appreciate there, and the crossings in 2021 for women are also visible. It also highlights that the drastic yearly changes in the 75th percentile are very uncommon for mothers, with only a similar change in 2007 at the start of the Great Recession. We also run a specification with gender-specific linear trends, on data from 2016 onwards (similar in spirit to the first part of Section 3), which gives similar results (see Fig. 44 and 45 in Appendix D.5).

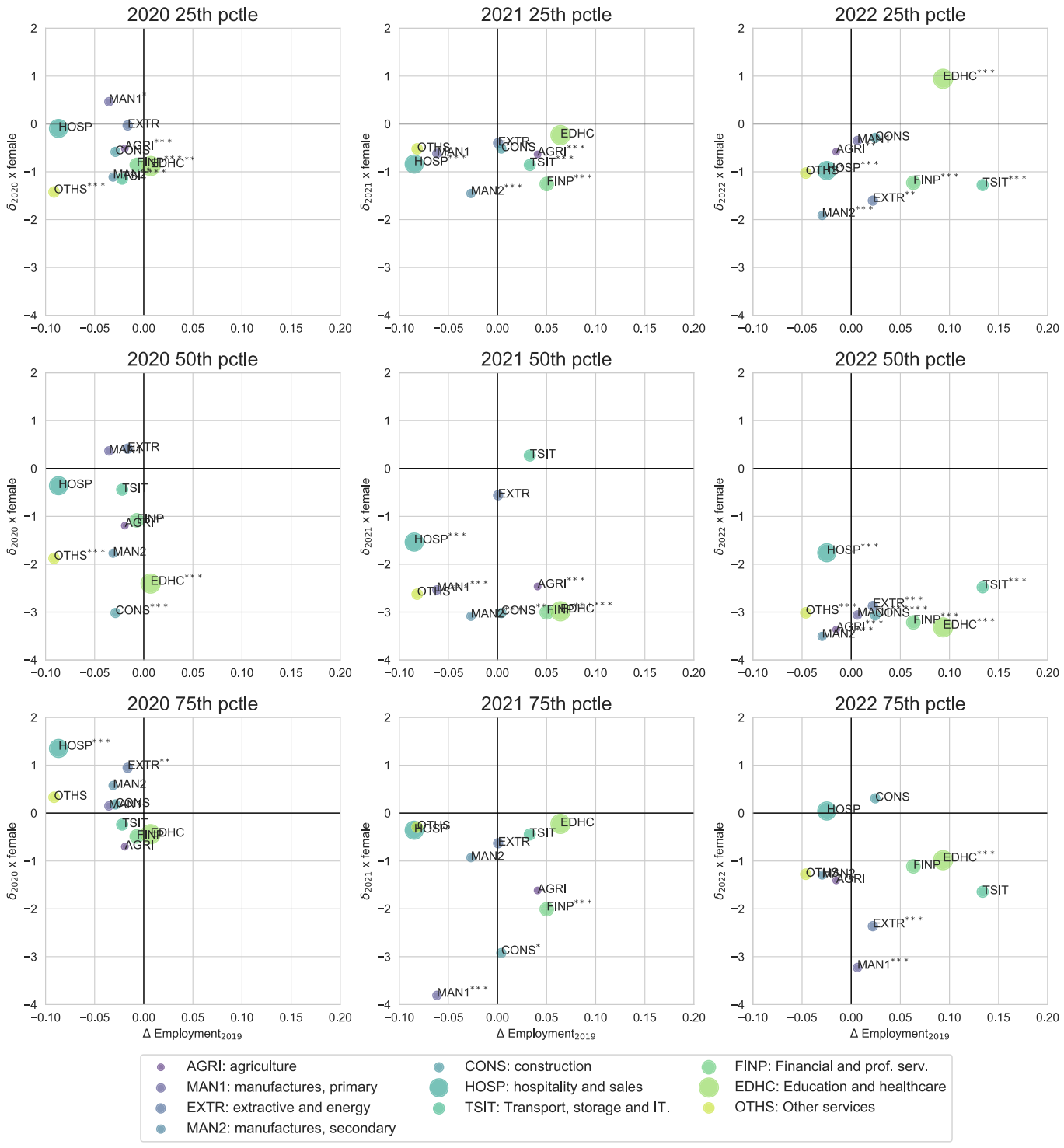


Fig. 11. Interaction variables in quantile regressions, men and women with children Notes: Coefficients from Table 4, where occupation dummies have been replaced by industry. The x-axis represents the loss of total employment in a given year for men, while the y-axis reflects the interaction coefficient for women (interaction $year \times industry \times female$). Scale is years of tenure, employment share of the industry is proportionate with observation size, starts denote significance in the conventional levels..

tion of mothers experiences a statistically meaningful drop at the higher quantiles, relative to the fathers' distribution.' Gender gaps' of parents in Figure 10 are displayed in solid blue. The amount by which the mothers' job tenure distribution shifts down more than the fathers' over course of the pandemic is also large, around 1.5-2 years at the median and 75th percentile. Moreover, these relative shifts persist two years after the start of the pandemic. Without controlling for worker characteristics, the point estimates are rather similar, but somewhat less precisely estimated.[42].

[42] See Fig. 43 in Appendix D.5

Table 2
Tenure Quantile Regressions, with Aggregate Unemployment Rate. Sample of Parents 30–40 yo.

	Parents, 25th pctl	Parents, 50th pctl	Parents, 75th pctl
unemployment rate	0.061***	0.053***	−0.012**
	(0.0030)	(0.0048)	(0.0052)
unemployment rate x female	0.088***	0.035***	−0.025***
	(0.0028)	(0.0038)	(0.0025)
δ_{2020}	0.509***	−0.327*	0.339**
	(0.0782)	(0.1798)	(0.1643)
δ_{2020} x female	−0.623***	−0.897***	−0.238
	(0.1124)	(0.2818)	(0.1966)
δ_{2021}	0.683***	−0.441***	0.685***
	(0.0726)	(0.1409)	(0.0942)
δ_{2021} x female	−0.789***	−1.613***	−0.848***
	(0.1172)	(0.1348)	(0.1030)
δ_{2022}	0.813***	−0.524***	0.054
	(0.0983)	(0.1328)	(0.1561)
δ_{2022} x female	−0.961***	−1.874***	−0.801***
	(0.1287)	(0.2223)	(0.2020)
N	413,371	413,371	413,371
Pseudo R^2	0.0101	0.0238	0.0415

Notes: Coefficients on unemployment, the interaction between unemployment and the female dummy, and $\delta^j_{sy}(q)$, where $y = \{2020, 2021, 2022\}$, and $j = 0, 1$. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. For the full table, see Table 13 in Appendix D.6.

In contrast, when comparing the men and women in couples *without children*, we see smaller rises, if at all, of the 'gender gaps' (dashed orange lines). This shows that the gender gap in changes of the job tenure distributions, to the first order, is a phenomenon that affects parents, rather than couples without children, most. The exception is the higher (75th percentile) tenures again in 2022, where we see evidence that a gender gap is occurring that affects women without children as well (see Section 4.1 above).

Comparing the Labour Markets in Pandemic Times with the Great Recession In the spirit of putting the behavior of the job tenure distributions in Covid times alongside the behavior during the Great Recession, we add the unemployment rate as an indicator of the cyclical economic conditions that further shape the job tenure distribution. That is, we consider regression (6) with a linear trend and two terms that capture a gender-specific dependence on the aggregate unemployment rate.

Table 2 shows the results for the coefficients of interest for men and women in couples with children.[43] Capturing the behaviour documented for the Great Recession, the unemployment variable moves the distribution of job tenures up at all percentiles under consideration when unemployment is higher – and more so for mothers. Taking this into account, the relative drop of the mothers' job tenure distribution in 2021 and, especially, 2022 is noteworthy, and picked up by the large and statistically significant values of the year x female interaction variable at all three quantiles considered here. Unemployment appears to be pushing the 25th and 50th tenure quantiles *up* in the Great Recession when this and the previous results show that Covid pushed tenure quantiles *down*, especially for mothers.[44] This indicates that the pandemic is not behaving like the previous recession.[45] Note that the (δ_{2022} x female) gender gap persists in 2022, even though the post-pandemic unemployment rate by then had returned to its lowest levels in more than a decade.

Occupation Heterogeneity Different occupational groups have been affected differently by the pandemic, and the policy responses to it (furloughs/ERTEs/short-time work (STW), lockdowns, etc.). This has been extensively documented in the literature – see for example Kaplan et al. (2020), Mongey et al. (2021), Houštecká et al. (2021) and Adams-Prassl et al. (2022b). In our case, we are interested to know if this occupational heterogeneity translates into different 'gender gap' outcomes in the behavior of the tenure distribution over the pandemic. One might, for example, hypothesize that women in occupations that could work from home (highly educated white-collar women) or were subject to ERTEs (as in the case of hospitality) were in a better position to manage time constraints during the pandemic than those who had to work at the workplace regardless, and this let to lower losses of high-quality jobs.

We adapt the previous regression to further include occupation fixed effects, occupation dummies interacted with the three Covid-year dummies, and the triple interaction between gender, occupation and Covid-year dummies. The coefficients on the latter tell us the occupation-specific gender gaps (for parents) for each Covid year, after controlling for workers' characteristics, and their partners', the unemployment rate and a linear trend. To be specific, we consider the following quantile regressions

$$Tenure_{iht}(q) = \mathbf{R}(q) + \sum_{y=2020}^{2022} \Omega^0_{sy}(q) Occ_{it} \times \mathbf{1}_{y,t} + \sum_{y=2020}^{2022} \Omega^1_{s,y}(q) Occ_{it} \times \mathbf{1}_{y,t} \times \mathbf{1}female_i \quad (7)$$

where Occ_{it} denotes the vector of indicator variables for different occupational groups, $\Omega^j_{s,y}(q), j = 0, 1;\ y = 2020, 2021, 2022$, the associated coefficients of the interaction of occupations with Covid year dummies and gender. That is, relative to regression (6) we are allowing our Covid shifters to be occupation-specific. The term $\mathbf{R}(q)$ is meant to summarize the constant, worker characteristics and time trend terms on the first two lines of the RHS of regression (6), with gender-specific linear time trends and dependence on aggregate unemployment.

We group the 10 ISCO occupational groups into five: (1) managers; and professionals and highly qualified white-collar workers (2) administrative and other white-collars (3) services blue-collar workers (hospitality, sales) (4) other skilled blue-collar workers (5) unskilled blue collars.

Table 3 shows the results for the occupation interaction coefficients. What is perhaps remarkable is how consistently a gender gap, i.e. $\Omega^1_{s,y}(q) < 0$, has opened up across occupations during Covid: the tenure distribution of mothers, relative to the fathers has shifted down in 2021 and 2022 in almost all occupations, clearest and most significantly for the median, but also at the 75th percentile (most distinctively, in 2022). Moreover, in most occupations, this shift down has occurred in absolute terms as well ($\Omega^0_{s,y}(q) + \Omega^1_{s,y}(q) < 0$), controlling for the other components in $\mathbf{R}(q)$. In contrast, the picture for fathers is much more mixed, in some occupations they also experience declines at the median and 75th percentile of their tenure distribution in 2021 and 2022, but then typically less so than mothers; the conditional tenure distribution in other occupations displays behavior more in line with the tenure distribution in the Great Recession.

Thus overall (controlling for worker characteristics and trends), mothers are losing more mass at the middle-to-high tenures of their tenure distributions over the course of 2020–2022, relative to fathers. This occurs across most occupations and, in 2022, all. In most occu-

[43] The full regression tables are reported in Table 13 of appendix D.6. We also perform the analysis with occupations fixed effects in Fig. 45 and a version with a linear trend using a sample starting in 2016 and occupation fixed effects in Fig. 44 both in Appendix D.5.

[44] To see how labour market flows can shape the dynamics of the tenure distribution, consider e.g. that the job loss of low-tenure workers pushes up the higher quantiles (vice versa for hiring workers into new jobs); the job losses of high-tenure jobs moves the quantiles below these losses down.

[45] While the unemployment rate is very helpful to capture patterns during the Great Recession, this role is more limited during times of Covid: the official unemployment rate changed far less during 2020–2022 than during 2008–2013. It went from 14.4% in the first quarter of 2020, to its pandemic maximum of 16.3% in the third quarter of 2020, to decline slowly to 12.9% in the fourth quarter of 2022.

Table 3
Tenure Quantile Regressions, Coefficients Occupation × Covid Year (× Gender) Interactions, Sample of Parents 30–40 yo.

	25th percentile			50th percentile			75th percentile		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
occ group 1	−0.741***	−0.809***	−0.050	−0.868***	−0.751**	−0.767**	0.028	0.218	0.245
	(0.1535)	(0.1630)	(0.2040)	(0.2214)	(0.3388)	(0.3361)	(0.2326)	(0.3029)	(0.3270)
occ group 2	0.000	0.236	0.424*	−0.176	−0.289	−0.511	0.272	1.622***	0.740*
	(0.1239)	(0.2035)	(0.2321)	(0.4550)	(0.4112)	(0.3230)	(0.2595)	(0.2219)	(0.4059)
occ group 3	0.825***	0.807***	−0.022	1.138***	0.758**	−0.604	−0.200**	−0.195	0.312
	(0.2226)	(0.2196)	(0.2381)	(0.2805)	(0.3738)	(0.4846)	(0.0886)	(0.3380)	(0.2824)
occ group 4	0.436***	0.663***	0.603***	−0.412	−0.027	0.106	1.028***	1.079***	−0.085
	(0.0932)	(0.0943)	(0.1329)	(0.2548)	(0.2032)	(0.1821)	(0.3177)	(0.2646)	(0.3109)
occ group 5	0.472***	0.695***	0.777***	−0.259*	0.949***	1.401***	−0.788**	0.230	0.412
	(0.0780)	(0.0829)	(0.1763)	(0.1386)	(0.2730)	(0.3881)	(0.3897)	(0.2729)	(0.6394)
occ group 1 x female	−0.182	−0.260	−0.935***	−0.058	−0.460	−1.840***	−0.385*	−0.538	−1.037***
	(0.2070)	(0.2759)	(0.1739)	(0.2680)	(0.5678)	(0.3392)	(0.2207)	(0.3903)	(0.2989)
occ group 2 x female	−0.418*	−0.708***	−1.096***	−1.210*	−2.022***	−1.603***	−0.607*	−2.060***	−1.297**
	(0.2360)	(0.2595)	(0.2716)	(0.6850)	(0.5720)	(0.3628)	(0.3534)	(0.3323)	(0.5207)
occ group 3 x female	−0.615***	−0.783***	0.314	−1.065***	−1.963***	−0.559	1.184***	0.552	−0.776**
	(0.2279)	(0.2414)	(0.2723)	(0.3622)	(0.4257)	(0.5217)	(0.2147)	(0.3842)	(0.3361)
occ group 4 x female	−0.151	−0.298	−0.840***	0.069	−2.130***	−2.550***	−0.188	−1.783**	−2.158**
	(0.2250)	(0.2295)	(0.2013)	(0.7790)	(0.3746)	(0.2533)	(0.4514)	(0.7938)	(0.9255)
occ group 5 x female	−0.466***	−0.775***	−0.820***	−0.816***	−2.519***	−2.994***	0.427	−1.110*	−1.869**
	(0.0811)	(0.1025)	(0.1952)	(0.2812)	(0.3174)	(0.3603)	(0.4640)	(0.6149)	(0.7732)
N	409,631	409,631	409,631	409,631	409,631	409,631	409,631	409,631	409,631

Notes: Coefficients of the interaction variables $\Omega_{sy}(q)Occ_{it} \times \mathbf{1}female_i \times \delta_{sy}(q)$ in equation (7), where $y = \{2020, 2021, 2022\}$. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. For the full table, see Table 14in appendix D.6.

Table 4
Tenure Quantile Regressions, Coefficients on Industry × Covid Year × Gender Interactions, Sample of Parents 30–40 yo.

	25th percentile			50th percentile			75th percentile		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
Agriculture x female	−0.513***	−0.636***	−0.582**	−1.193**	−2.466***	−3.366***	−0.701	−1.616	−1.406
	(0.1243)	(0.1250)	(0.2558)	(0.5766)	(0.4719)	(0.7064)	(1.6745)	(1.1277)	(1.7386)
Manufactures prim. x female	0.463*	−0.617	−0.347	0.367	−2.538***	−3.061***	0.149	−3.809***	−3.227***
	(0.2454)	(0.6986)	(0.5169)	(0.6197)	(0.6023)	(0.8712)	(0.4803)	(0.9212)	(1.1970)
Extractive + energy x female	−0.032	−0.400	−1.603**	0.416	−0.558	−2.873***	0.946**	−0.629	−2.363***
	(0.5994)	(0.4926)	(0.6747)	(0.7245)	(1.2659)	(0.6714)	(0.4569)	(0.6045)	(0.6172)
Manufactures sec. x female	−1.110*	−1.453***	−1.913***	−1.770	−3.087***	−3.508***	0.576	−0.929	−1.292
	(0.6186)	(0.4538)	(0.5087)	(1.4632)	(0.8214)	(1.0466)	(0.5354)	(0.8591)	(1.1832)
Construction x female	−0.585	−0.516	−0.292	−3.019***	−3.021**	−3.071***	0.181	−2.924*	0.308
	(0.4391)	(0.3661)	(0.8099)	(0.5859)	(1.2901)	(0.8987)	(0.9787)	(1.5973)	(1.5527)
Hospitality + Sales x female	−0.096	−0.839***	−0.974***	−0.359	−1.537***	−1.759***	1.350***	−0.357	0.044
	(0.2419)	(0.2384)	(0.2157)	(0.3077)	(0.4166)	(0.3440)	(0.4217)	(0.7392)	(0.4017)
Transport, Storage + IT x female	−1.143***	−0.859***	−1.277***	−0.442	0.272	−2.483***	−0.240	−0.445	−1.643
	(0.3975)	(0.2910)	(0.4132)	(0.8094)	(1.3612)	(0.8426)	(0.5182)	(0.3860)	(0.8382)
Financial + porf. serv. x female	−0.857***	−1.255***	−1.230***	−1.083	−3.006***	−3.216***	−0.487	−2.008***	−1.112
	(0.2280)	(0.2491)	(0.2604)	(0.8047)	(0.6990)	(0.6862)	(0.4073)	(0.4267)	(0.7690)
Education + Health x female	−0.880**	−0.234	0.942***	−2.405***	−2.983***	−3.320***	−0.440	−0.225	−0.983***
	(0.4302)	(0.3098)	(0.3263)	(0.3994)	(0.5250)	(0.5312)	(0.2926)	(0.2415)	(0.2920)
Other Services x female	−1.422***	−0.522	−1.027*	−1.875***	−2.627***	−3.015***	0.331	−0.291	−1.276
	(0.3586)	(0.7978)	(0.5620)	(0.6120)	(0.4681)	(0.6399)	(0.5971)	(0.6379)	(1.0818)
N		413,371			413,371			413,371	

Notes: Coefficients of the interaction variables $\Omega^1_{sy}(q)$ in equation (7), where occupation dummies have been replaced by industry dummies and $y = \{2020, 2021, 2022\}$. The magnitude of the coefficients is in years of tenure. Robust standard errors in parenthesis. For the full table, see Tables 19 and 20 in appendix D.6.

pations, mothers' conditional tenure distributions also lose mass in absolute terms at these tenures. Further, this takes place across the skill and education spectrum: it applies e.g. to white-collar and blue-collar occupations alike.

Industry Heterogeneity The pandemic also created large shifts in production and consumption that have affected industries differently. One may wonder whether this has led some industries to shed workers in the middle to high range of tenures more than others, with those industries perhaps employing proportionally more women or mothers (with Table 1 showing clear asymmetries in industries across the four groups). Arguments like these may hint that the particularly pronounced changes in the tenure distribution of mothers may have a relation with the asymmetric nature of the pandemic impact across industries. This is different from looking at occupations because it is not about which activities a worker does, but rather about in which industry he does those.

To investigate this, we first consider an adaption of the quantile regression (7) in which we replace occupations with industries. The coefficients of industries that interacted with the Covid year dummies and gender are displayed in Table 4. Thus, this table shows the behavior of the industry-specific 'gender gaps' of the tenure distribution over the period 2020–2022.

In this table, we observe a general increase in the gender gap at the median, and a similar (but weaker) tendency at the 75th percentile, especially in 2022. This means that across a wide range of industries the tenure distributions of mothers are shifting down at this percentile relative to men. Even more strongly, we observe that in 2021 and 2022, the

mothers' tenure distribution (after controlling for trend and unemployment) shifts down in absolute terms at the 50th (all industries, except transport, storage and IT in 2021) and 75th percentiles (all industries in 2021, and in 2022 all but hospitality and construction). In contrast, for fathers, it shifts up in a majority of industries.[46] It is perhaps interesting that the strongest absolute shift down for mothers at these percentiles is in very male-dominated industries such as the extractive and energy sector and construction.[47]

To investigate whether there is a relation between the 'gender gap' in job tenure dynamics and sectoral employment changes, we plot the employment variation in a given year by industry (on the x-axis), and compare it to the interaction effect $\Omega^1_{sy}(q)$ of the same industry (on the y-axis), by year and percentile, in Fig. 11. If both were correlated, we should be able to see this correlation in the figure. This is not the case for most years and percentiles. Certainly, there does not seem to be a relation that is visible consistently across a large part of the distribution, and persists over time. We can perhaps see in 2022 a weak positive correlation appears in the 25th percentile, which means that sectoral employment losses could be contributing to a larger gender gap below the median tenure, i.e. lower tenure drops more for mothers than fathers when the sector is shrinking. This leaves open a potential role, but a seemingly limited one, for sector-wide factors – that can be investigated more deeply. However, it appears first order that a gender gap opens up in most industries, in 2021 and 2022, whether these industries are growing relatively fast or are shrinking.[48]

5. Discussion

The commonality of the opening of the gender gap at the medium-to-high tenures of the job tenure distribution (i.e. the 50th and 75th percentile in the quantile regressions) across industries and across occupations, suggests an important role for causes that transcend a specific occupation or industry. A natural explanation is that mothers had to adjust their labour supply down, even those that held good and stable jobs, in growing sectors. This might have been a reflection of a larger issue: the incompatibility of the demands of jobs with the demands of care by mothers, which in turn may reflect within-family allocation choices and/or firms' expectations of those choices.

To expand on this argument, during the first year of the Covid-19 pandemic, time-use surveys have shown that women bore a higher share of the caring responsibilities in this period (see Farré et al. (2022a) for Spain, Adams-Prassl et al. (2020) for the UK, Fiaschi and Tealdi (2022) in Italy, including labour market consequences).[49] Caring needs of children were affected by Covid mitigation policies that closed down schools. At the same time, closures of places of employment, working remotely and short-time-work schemes (or ERTEs in Spanish) also created opportunities for parents to share their work and adjust household responsibilities in a more flexible way (even if mothers still bore the brunt of it).

We have shown in sections 3–4.2 that the effects in employment and tenure for mothers start diverging towards the end of 2021. This coincides with the period in which e.g. sanitary measures in schools were still in place, including self-isolation in response to class contacts with Covid cases, but labour market support measures such as ERTEs were phased out. Thus, the timing of our results aligns with the period of the pandemic where it still caused disruptions in childcare but economic production was going back to (more) normal.

This raises the question of whether in 2020 ERTEs (and other measures that favoured flexible working arrangements) helped women with children to retain jobs in the face of higher time constraints at home. In the absence of these measures, unreliable or unavailable childcare could have lowered women's employment further.[50] Interestingly, the Education and Healthcare sector, where a nontrivial part of workers had to continue working, showed effects in 2020 that for other occupations only became visible in 2021.

While we don't want to claim that mothers' labour supply provides the only possible explanation, for the patterns documented in this paper it may be a very natural one, worthwhile to explore further. If indeed the increased demands on mothers led to the destruction of stable, high-quality employment that takes a prolonged time to recover from, policies could be aimed at addressing this. Policies could try to mitigate the effects of episodes in which mothers are constrained by domestic pressures. This includes making it easier and less risky for firms to rehire their previously employed mothers, by providing some insurance or additional flexibility to the firm when they do so. While during the height of the pandemic policies that temporarily suspended in-person work were applied to entire sectors of the economy, the option of more bespoke flexibility, depending on a worker's circumstances (especially child care) could be helpful. In addition, the gender asymmetry we document above in couples with children serves as a reminder that *symmetric* flexibility across genders could help even out the gender gaps and parental penalties in the labour market.[51]

6. Conclusion

The wounds of Covid are fresh, and we are not long enough past it to be able to study the long-term scars in the actual long run. However, we can look, at dimensions of the labour market that are typically associated with a danger of longer-lasting scars. Here, we look at two such dimensions: the loss of permanent jobs, unevenly distributed across gender and parental status, which might imply that women (and in particular mothers) will face a much longer recovery than the aggregate labour market. Similarly, in terms of the distribution of job tenures, we observe a (relative) loss of longer job tenures (above 4 years) by mothers, contrary perhaps to the patterns we might have expected based on the Great Recession. These (relative) losses for mothers are still clearly present in 2022, even though the Spanish economy was also buffeted by shocks, like high energy prices, that are more typically associated with conventional recessions (which would affect men more negatively). This raises the concern that, even as mothers regain employment after the pandemic, they may not regain their previous job quality, at least not for a considerable while. This may be a question that policymakers and academic economists should follow closely over the coming time.

Data availability

All the data is publicly available. The details on how to get the data, as well as the code to generate all tables and figures is available at https://github.com/crisla/TenMoCoS.

[46] See Table 20 in appendix D.6.

[47] See Fig. 46 in appendix D.6. There we relate, by industry, $\Omega^0_{sy}(q)$ to $\Omega^0_{sy}(q) + \Omega^1_{sy}(q)$.

[48] The industries with the smallest gender gaps at the 75th percentile span a range of employment growth rates, from shrinking to growing relatively fast.

[49] Another consideration is that for infants grandparents tend to be secondary caretakers in Spain, but the pandemic also deprived parents of this source of childcare.

[50] This explanation is consistent with the literature on household labour supply, which shows that childcare availability is key for female labour supply (Olivetti and Petrongolo (2017)).

[51] More generally, policies that indirectly target gender norms, like paternity leave, seem to have effects on the implication of fathers in children's future care – as reported among others by Farré et al. (2022b), on a (2007) reform in Spain, and Persson and Rossin-Slater (2019) and Bünning (2015), on Germany and Sweden. The 2019 paternity policy change in Spain goes in this direction, but it will take more time to show effects.

Appendix A. Extended descriptive statistics

In this appendix section we present statistics for our sample in more detail than in Section 2.

Fig. 12 shows that age 30–35 is the group where the three household groups (couples with children, couples without children and single adults) are most balanced among employed workers. We expand this bracket to 30–40 because the presence of small children (at least one child less than 10 years old) is very large in this age bracket too, as Fig. 13 shows. This is also the reason we focus on couples with children less than 10 years old – the 35–40 group has many households that fall in the 10-year category. We carry out robustness analysis with other age groups of parents and children.

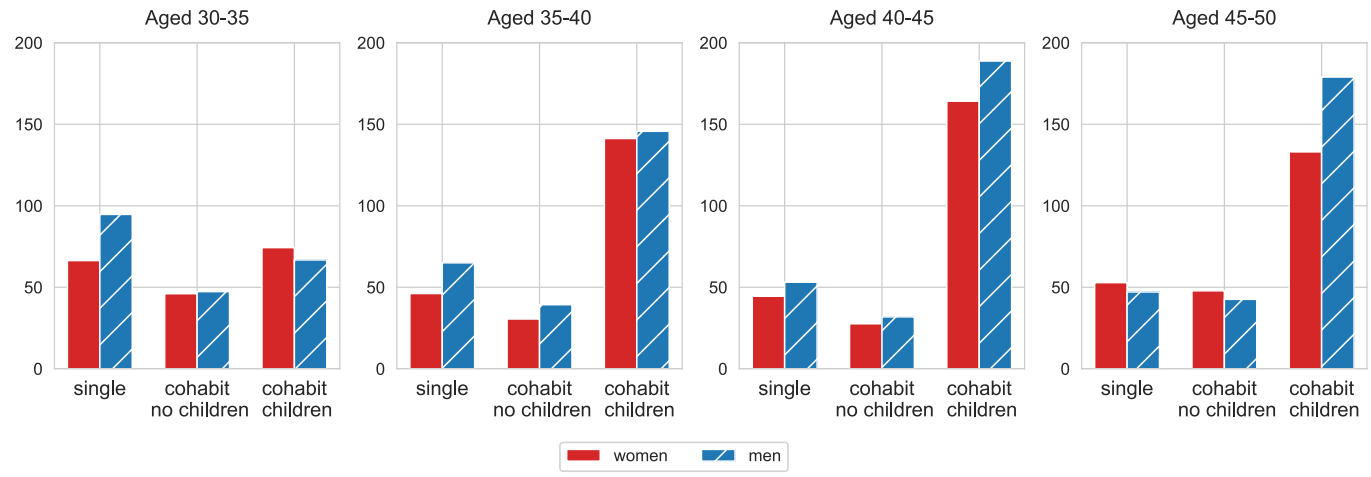


Fig. 12. Household types by age, all employed people Notes: Number of observations in thousands, employed individuals, for all years in the sample (2005–2022). A person is 'cohabiting' if they identify their opposite-sex partner living in the same household in the survey. They are classified as having children if there are also children (younger than 16) present in the household. Source: EPA..

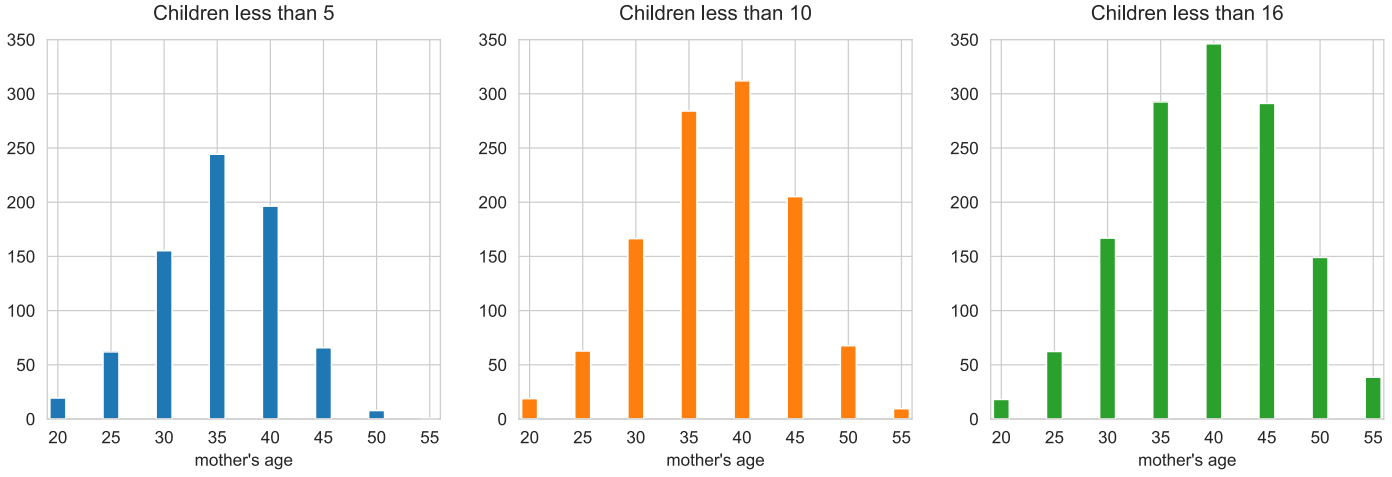


Fig. 13. Observations by age of mothers and their children Notes: Number of observations in thousands, for all years in the sample (2005–2022). A 'mother' is defined as a woman aged between 20 and 60 that is cohabiting with a man and has at least one child in the household. Source: EPA..

Fig. 14 shows the number of people in our core sample (mothers and fathers of children less than 10, aged 30–40) that report being under an ERTE (shor-term work scheme), as opposed to the aggregate number of Fig. 2. In the same plot and the same scale we depict confirmed covid cases among children as in the official statistics by the Spanish Ministry of Health. The dashed black line depicts children younger than 10 and the green line between 10 and 19. While most of the impact of ERTEs is concentrated in mid-2020 during the first national lockdown, cases among children only start becoming significant in the subsequent covid waves – Winter 2020-21, Autumn 2021 and Winter 2021. Recall that during this period if one child in the school bubble group became infected the whole group needed to stay home and self-isolate. As in Fig. 2, it is clear that the timing of children's need to stay home does not coincide with the availability of employment protection measures that would allow adults to stay at home with them.

Fig. 15 a depicts the share of each population group that reports working from home at least occasionally in the annual Survey of Working Conditions carry out by the Spanish National Statistical Institute. The share increases by 6 percentage points from men aged 35–44 with respect to

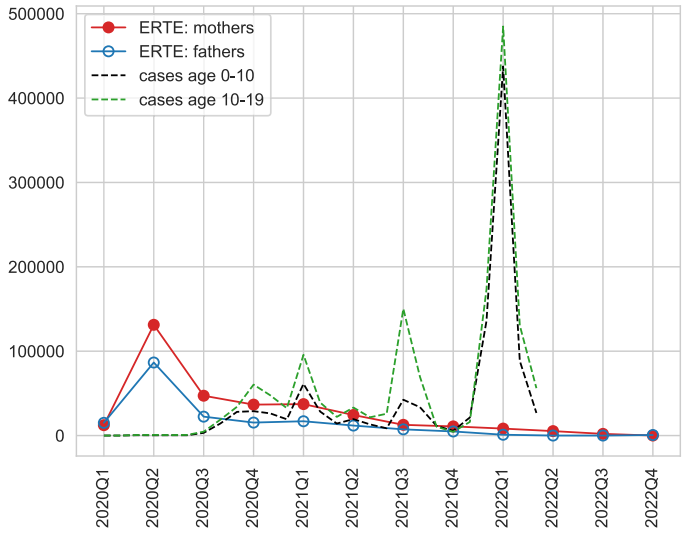


Fig. 14. Share of part-time employment, couples 30–40 years of age Notes: Number of people affected by a full-time ERTE (shot-term work scheme), individuals that cohabit with a partner of the opposite sex, aged 30–40. 'Mothers' refers to mothers of children less than 10 years of age. Source: Spanish LFS (EPA). Covid cases are confirmed covid cases from official records. Source: Spanish LFS (EPA) and Ministry of Health (https://cnecovid.isciii.es/covid19/#documentaci%C3%B3n-y-datos).

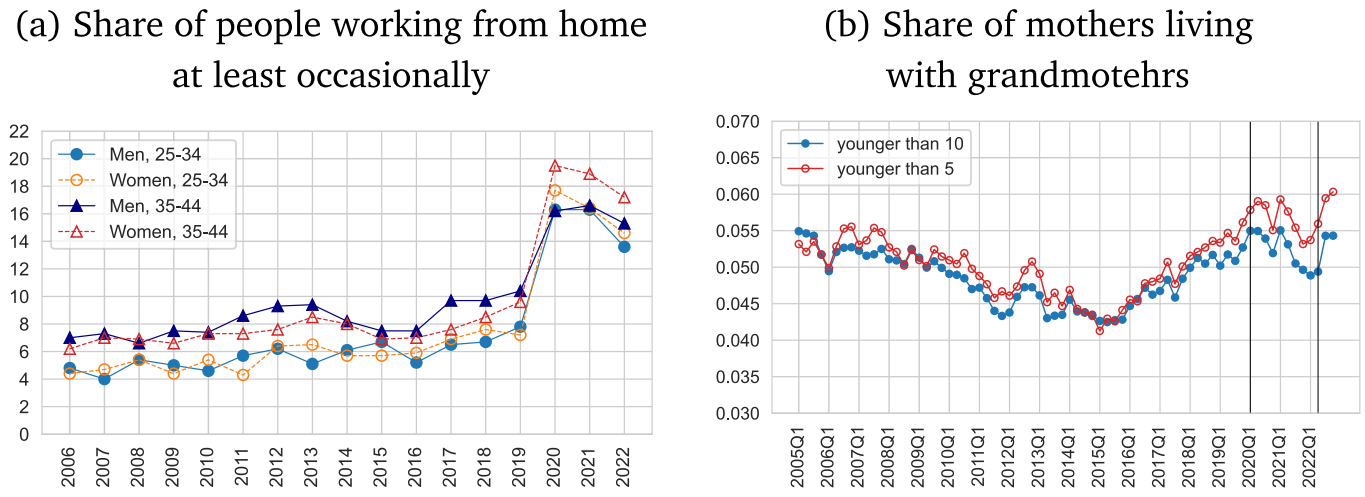


Fig. 15. Remote work and cohabiting grandmothers Notes: On the left, percentage of people of each demographic group that report working from home at least 'Occasionally' in the yearly survey of working conditions (INE). On the right, share of mothers in our sample that report living with their own mother in the same household. .

2019, which seems small but it is a 60% increase. The number for women is even higher, 12 percentage points – close to 100% increase – for both ages 25–34 and 35–44. it is worth noting that the decrease in subsequent years is only between 2 and 4 percentage points, and remains highest among women aged 35–44, which was never the case before. The ability to work from home can help parents deal with increase childcare needs and reduce the 'parenthood penalty'. Unfortunately, the survey does not give more details at the household level, so we can only point out that remote work was more prevalent in this period, which is a particular change of this pandemic with respect to previous recessions.

Fig. 15 b reports the share of the mothers in our sample that have their own mothers co-residing with them in the same household. The availability of grand-parental care can help couples with the childcare duties, and it is traditionally the case in Southern Europe. Yet, the share of living-in grandmothers remains low in our sample, between 5 and 6%. Our data does not allow us to say if grandparents living outside the household also provide care, but social distancing measures make this less likely. That being said, we note two things: the share of cohabiting grandmothers has increased steadily since 2015 and (b) we see a fall in 2021 in Fig. 15b, which coincides with the spike in cases among children we have just discussed.

Fig. 16 shows the share of workers that work part-time. In the paper we do not make a distinction beween part and full time, although we include an indicator variable for part-time job in our regressions. One concern is that the fall in the upper parts of the tenure distribution for mothers could be driven by women switching full-time to part-time jobs, particularly after the reform. In this is the case we should observe an increase in the share of employed workers working part-time. This is not the case in Fig. 16: although mothers have a very high share of part-time employment (over 30%) this is stable trough the covid-19 period, and even after an modest increase in 2022 part-time employment is still lower than at the beginning of 2020. This is similar for fathers and women in couples without children.

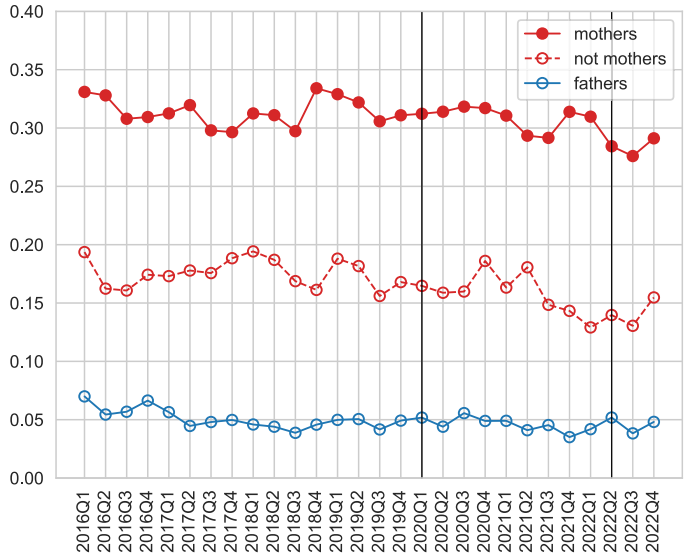


Fig. 16. Share of part-time employment, couples 30–40 years of age Notes: Share of employment that is declared to be part-time, for individuals that cohabit with a partner of the opposite sex, aged 30–40. 'Mothers' refers to mothers of children less than 10 years of age. Source: Spanish LFS (EPA). .

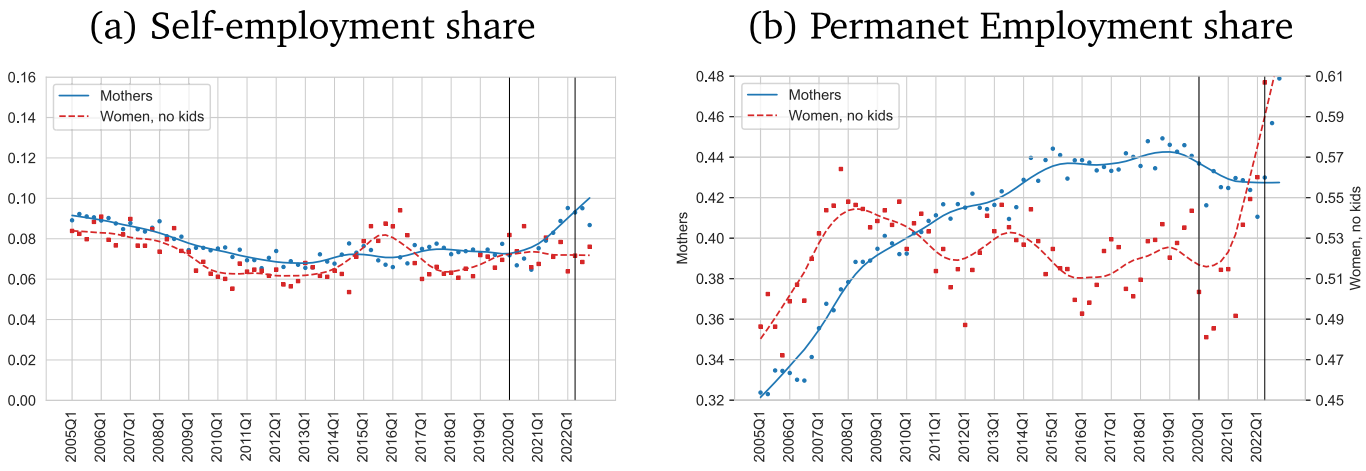


Fig. 17. Raw share of labour market shares, women aged 30–40. Notes: share of the population in each state, for woman that cohabit with a partner of the opposite sex, where mothers have at least one child less than 10 years of age. Lowess smoothed series with 1/5 softness. .

Another question that arises when we consider the losses of employment of mothers is if they are moving to self-employment. We excluded from the analysis self-employment as it is marginal and rather stable among women, around 7 to 9 percent, as Fig. 17 shows. This figure is analogous to the ones displayed in appendix Appendix B, but zooms in for mothers and includes self-employment. We have both figures on the same scale, which means for self-employment the y-axis is between 0 and 16 percentage points and for permanent employment it is between 32 and 48 for mothers and 45 to 61 for women without children. We can see an increase in self-employment during the pandemic among mothers and this increase is a bit larger than the fall in permanent employment since 2022. Therefore it is possible that some of the mothers that lost permanent employment have gone to self-employment, particularly high-tenured women, since they may the means and experience to transition to self-employment. Without data on flows, however, we cannot say if this is indeed the case.

The next section expands Table 1 by focusing in years 2019–2022.

A1. Descriptive statistics by year

2019

2020

2021

Table 5
Descriptive statistics for 2019.

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Employed	0.696	0.608	0.747	0.749	0.772
Permanent Contract	0.520	0.444	0.575	0.535	0.591
Temporary Contract	0.177	0.164	0.172	0.213	0.181
Self-Employed	0.107	0.074	0.157	0.070	0.130
ERTE	0.000	0.000	0.000	0.000	0.000
Unemployed	0.092	0.120	0.070	0.092	0.061
Inactive	0.105	0.198	0.026	0.088	0.036
Military	0.008	0.003	0.015	0.002	0.016
Managers	0.027	0.019	0.037	0.021	0.034
White collar - Professionals	0.182	0.179	0.121	0.302	0.187
White collar - Tech. support	0.095	0.057	0.102	0.116	0.156
White collar - Other	0.088	0.114	0.042	0.136	0.063
Blue collar - Services	0.199	0.242	0.151	0.229	0.150
Blue collar - Agriculture	0.015	0.005	0.030	0.002	0.025
Blue collar - Artisans	0.102	0.016	0.228	0.012	0.167
Blue collar - Equip.	0.063	0.022	0.127	0.014	0.091
Unskilled	0.117	0.144	0.114	0.083	0.085
Agriculture	0.042	0.029	0.067	0.019	0.050
Manufactures, prim.	0.039	0.034	0.050	0.032	0.037
Extractive and Energy	0.052	0.022	0.089	0.037	0.074
Manufactures, sec.	0.039	0.017	0.064	0.022	0.065
Construction	0.057	0.010	0.127	0.011	0.087
Hospitality and Sales	0.236	0.255	0.220	0.247	0.207
Transport, Storage and IT	0.074	0.030	0.107	0.055	0.144
Financial and Prof. services	0.114	0.108	0.092	0.156	0.133
Education and Healthcare	0.180	0.218	0.115	0.252	0.136
Other Services	0.062	0.078	0.038	0.088	0.041
Tenure mean (months)	77.982	83.558	83.131	62.221	71.444
Tenure 10th percentile	5.00	5.00	6.00	5.00	5.00
Tenure 25th percentile	21.00	23.00	24.00	16.00	18.00
Tenure 50th percentile	60.00	72.00	65.00	45.00	54.00
Tenure 75th percentile	131.00	136.00	135.00	100.00	118.00
Tenure 90th percentile	170.00	174.00	180.00	144.00	164.00
N	42,046	17,703	13,006	5699	5638
Proportion	1.0000	0.3941	0.2988	0.1537	0.1534

Table 6
Descriptive statistics for 2020.

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Employed	0.668	0.580	0.729	0.682	0.759
Permanent Contract	0.511	0.428	0.582	0.495	0.601
Temporary Contract	0.157	0.152	0.146	0.187	0.158
Self-Employed	0.097	0.069	0.141	0.077	0.106
ERTE	0.038	0.040	0.033	0.038	0.041
Unemployed	0.111	0.132	0.085	0.131	0.089
Inactive	0.124	0.219	0.046	0.111	0.046
Military	0.009	0.002	0.015	0.002	0.019
Managers	0.027	0.021	0.036	0.024	0.027
White collar - Professionals	0.178	0.177	0.117	0.291	0.186
White collar - Tech. support	0.096	0.066	0.105	0.095	0.154
White collar - Other	0.092	0.118	0.040	0.147	0.068
Blue collar - Services	0.197	0.226	0.160	0.229	0.165
Blue collar - Agriculture	0.011	0.004	0.024	0.002	0.014
Blue collar - Artisans	0.101	0.017	0.226	0.015	0.161
Blue collar - Equip.	0.062	0.022	0.122	0.011	0.101
Unskilled	0.113	0.136	0.117	0.085	0.074
Agriculture	0.037	0.027	0.062	0.013	0.041
Manufactures, prim.	0.043	0.036	0.056	0.037	0.042
Extractive and Energy	0.049	0.026	0.084	0.030	0.061
Manufactures, sec.	0.038	0.014	0.064	0.016	0.075
Construction	0.055	0.008	0.129	0.008	0.078
Hospitality and Sales	0.230	0.245	0.219	0.234	0.207
Transport, Storage and IT	0.078	0.038	0.104	0.053	0.150

(*continued on next page*)

Table 6 (*continued*)

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Financial and Prof. services	0.118	0.107	0.101	0.164	0.132
Education and Healthcare	0.177	0.209	0.111	0.258	0.140
Other Services	0.061	0.079	0.032	0.088	0.044
Tenure mean (months)	78.244	84.813	85.370	60.530	67.724
Tenure 10th percentile	7.00	6.00	9.00	5.00	6.00
Tenure 25th percentile	22.00	24.00	27.00	17.00	18.00
Tenure 50th percentile	60.00	72.00	69.00	44.00	48.00
Tenure 75th percentile	130.00	144.00	137.00	96.00	108.00
Tenure 90th percentile	173.00	179.00	181.00	144.00	162.00
N	35,626	15,180	10,796	4831	4821
Proportion	1.0000	0.3960	0.2921	0.1527	0.1593

Table 7
Descriptive statistics for 2021.

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Employed	0.687	0.590	0.751	0.738	0.762
Permanent Contract	0.522	0.427	0.601	0.525	0.613
Temporary Contract	0.165	0.163	0.150	0.213	0.150
Self-Employed	0.101	0.081	0.127	0.074	0.130
ERTE	0.014	0.016	0.011	0.013	0.014
Unemployed	0.101	0.130	0.082	0.100	0.066
Inactive	0.111	0.198	0.040	0.088	0.042
Military	0.009	0.002	0.016	0.003	0.018
Managers	0.030	0.024	0.041	0.021	0.031
White collar - Professionals	0.185	0.184	0.119	0.307	0.187
White collar - Tech. support	0.102	0.071	0.109	0.102	0.163
White collar - Other	0.088	0.109	0.043	0.138	0.066
Blue collar - Services	0.186	0.222	0.141	0.213	0.152
Blue collar - Agriculture	0.012	0.006	0.026	0.002	0.011
Blue collar - Artisans	0.096	0.014	0.223	0.009	0.160
Blue collar - Equip.	0.064	0.020	0.126	0.019	0.102
Unskilled	0.107	0.126	0.109	0.092	0.075
Agriculture	0.035	0.028	0.061	0.011	0.031
Manufactures, prim.	0.033	0.025	0.050	0.025	0.031
Extractive and Energy	0.050	0.024	0.088	0.031	0.066
Manufactures, sec.	0.039	0.016	0.062	0.027	0.069
Construction	0.059	0.009	0.129	0.019	0.097
Hospitality and Sales	0.214	0.228	0.207	0.198	0.206
Transport, Storage and IT	0.077	0.036	0.106	0.058	0.147
Financial and Prof. services	0.122	0.114	0.104	0.167	0.133
Education and Healthcare	0.189	0.225	0.118	0.284	0.134
Other Services	0.059	0.074	0.028	0.087	0.050
Tenure mean (months)	78.618	81.351	88.066	61.266	72.481
Tenure 10th percentile	6.00	5.00	7.00	6.00	6.00
Tenure 25th percentile	23.00	22.00	28.00	18.00	22.00
Tenure 50th percentile	60.00	65.00	71.00	46.00	57.00
Tenure 75th percentile	130.00	132.00	144.00	93.00	110.00
Tenure 90th percentile	178.00	180.00	192.00	144.00	167.00
N	29,313	12,844	8877	3865	3734
Proportion	1.0000	0.3982	0.2829	0.1561	0.1629

2022

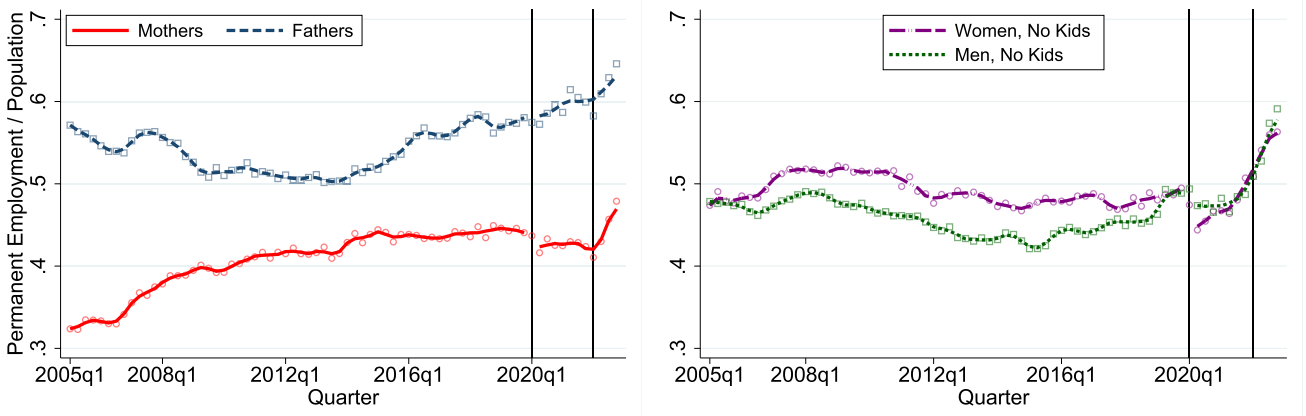
Table 8
Descriptive statistics for 2022.

	All	Mothers	Fathers	Women, No Kids	Men, No Kids
Employed	0.693	0.581	0.734	0.761	0.798
Permanent Contract	0.561	0.444	0.616	0.605	0.679
Temporary Contract	0.132	0.137	0.118	0.156	0.119
Self-Employed	0.104	0.093	0.145	0.068	0.099
ERTE	0.002	0.003	0.000	0.001	0.000
Unemployed	0.090	0.117	0.076	0.090	0.054
Inactive	0.114	0.209	0.045	0.081	0.049
Military	0.008	0.001	0.014	0.002	0.018
Managers	0.030	0.022	0.040	0.027	0.036
White collar - Professionals	0.189	0.191	0.106	0.297	0.203
White collar - Tech. support	0.097	0.059	0.105	0.104	0.159
White collar - Other	0.086	0.108	0.040	0.137	0.060
Blue collar - Services	0.194	0.233	0.152	0.227	0.142
Blue collar - Agriculture	0.012	0.004	0.028	0.002	0.015
Blue collar - Artisans	0.093	0.019	0.219	0.014	0.141
Blue collar - Equip.	0.067	0.022	0.132	0.015	0.115
Unskilled	0.107	0.128	0.110	0.086	0.082
Agriculture	0.030	0.024	0.052	0.008	0.032
Manufactures, prim.	0.040	0.033	0.060	0.029	0.038
Extractive and Energy	0.048	0.023	0.077	0.027	0.075
Manufactures, sec.	0.037	0.014	0.061	0.026	0.060
Construction	0.057	0.011	0.128	0.019	0.083
Hospitality and Sales	0.223	0.236	0.214	0.240	0.192
Transport, Storage and IT	0.085	0.037	0.116	0.064	0.159
Financial and Prof. services	0.115	0.106	0.094	0.149	0.132
Education and Healthcare	0.196	0.237	0.114	0.278	0.152
Other Services	0.054	0.068	0.029	0.068	0.045
Tenure mean (months)	74.745	79.112	84.095	58.025	69.419
Tenure 10th percentile	5.00	5.00	6.00	5.00	6.00
Tenure 25th percentile	20.00	20.00	26.00	17.00	19.00
Tenure 50th percentile	59.00	62.00	66.00	45.00	55.00
Tenure 75th percentile	120.00	130.00	132.00	82.00	98.00
Tenure 90th percentile	176.00	180.00	189.00	141.00	166.00
N	27,834	11,989	8316	3889	3644
Proportion	1.0000	0.3760	0.2687	0.1783	0.1770

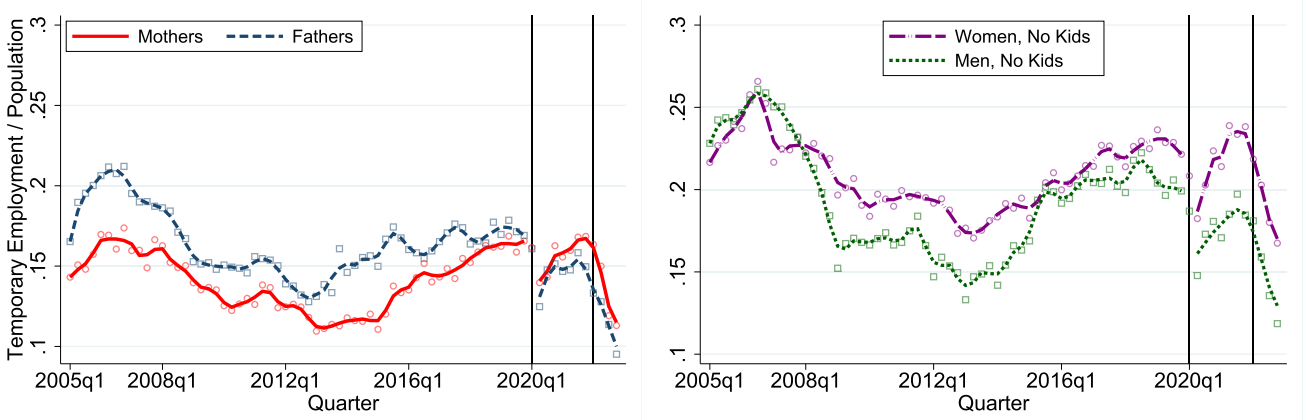
Appendix B. Time Series of Labour Market Aggregates

B1. Detrended series, parenthood penalties, gender gaps

(a) Permanent Empl./Population Parents 30-40yo (b) Perm. Empl./Population Nonparents 30-40yo



(c) Temporary Empl./Population Parents 30-40yo (d) Temp. Empl./Population Nonparents 30-40yo



(e) Employment/Population Parents 30-40yo (f) Employment/Population Nonparents 30-40yo

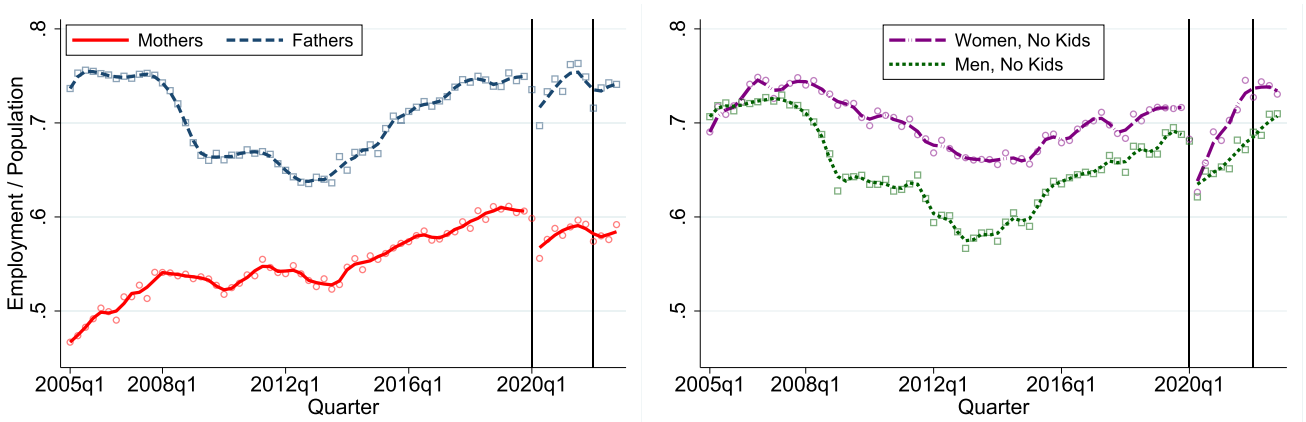
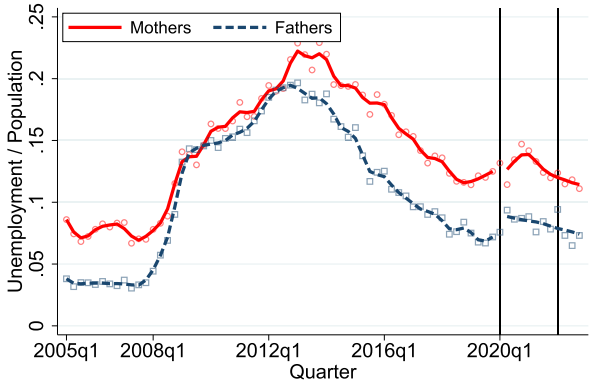
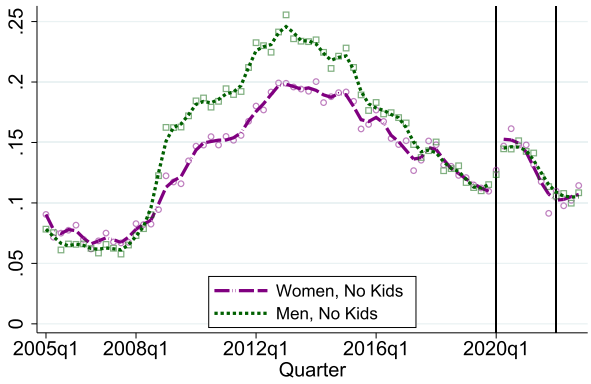


Fig. 18. Time Series Labour Market Aggregates by Gender and Parental Status (I).

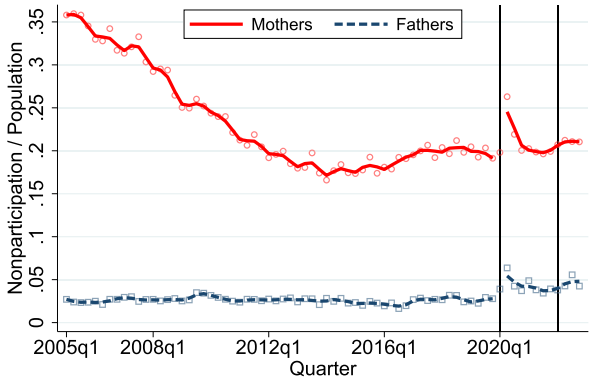
(a) Unemployment/Population Parents 30-40yo



(b) Unempl./Population Nonparents 30-40yo



(c) Out of Labour Force/Population Parents 30-40yo



(d) Out of Labour Force/Population Nonparents 30-40yo

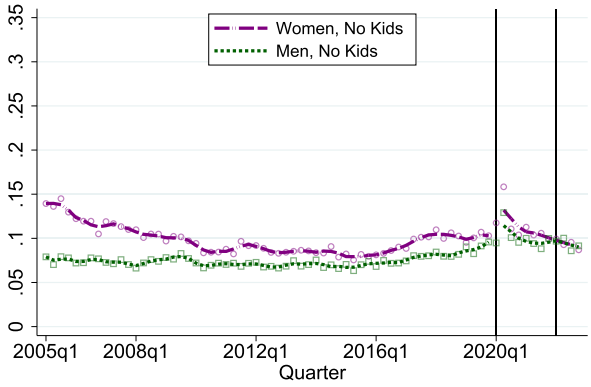
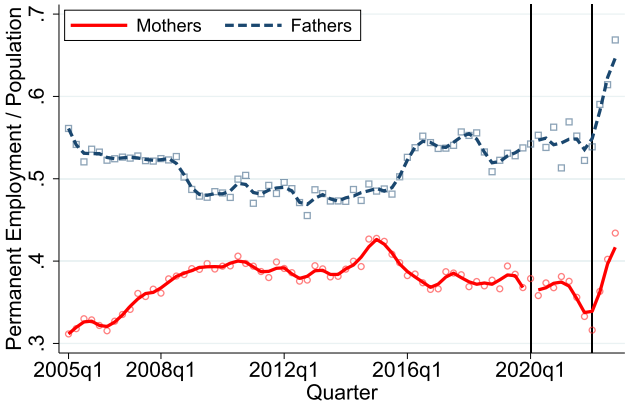


Fig. 19. Time Series Labour Market Aggregates by Gender and Parental Status (II).

(a) Perm. Empl./Population Parents 30-35yo



(b) Perm. Empl./Population Parents 35-40yo

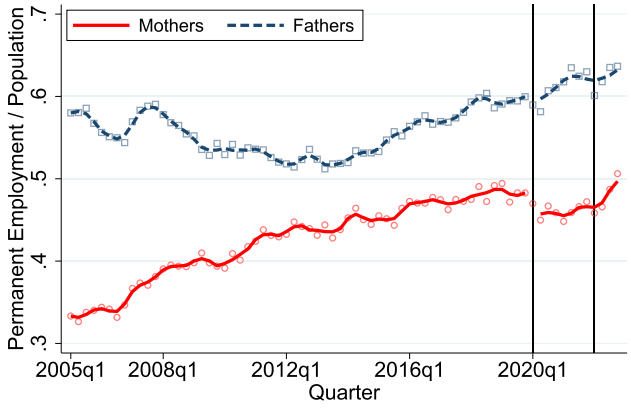


Fig. 20. Permanent Employment / Population of Parents 30–35 and 35–40 yo. Notes: Stocks measured using population weights. Lines show smoothed trend using lowess filter..

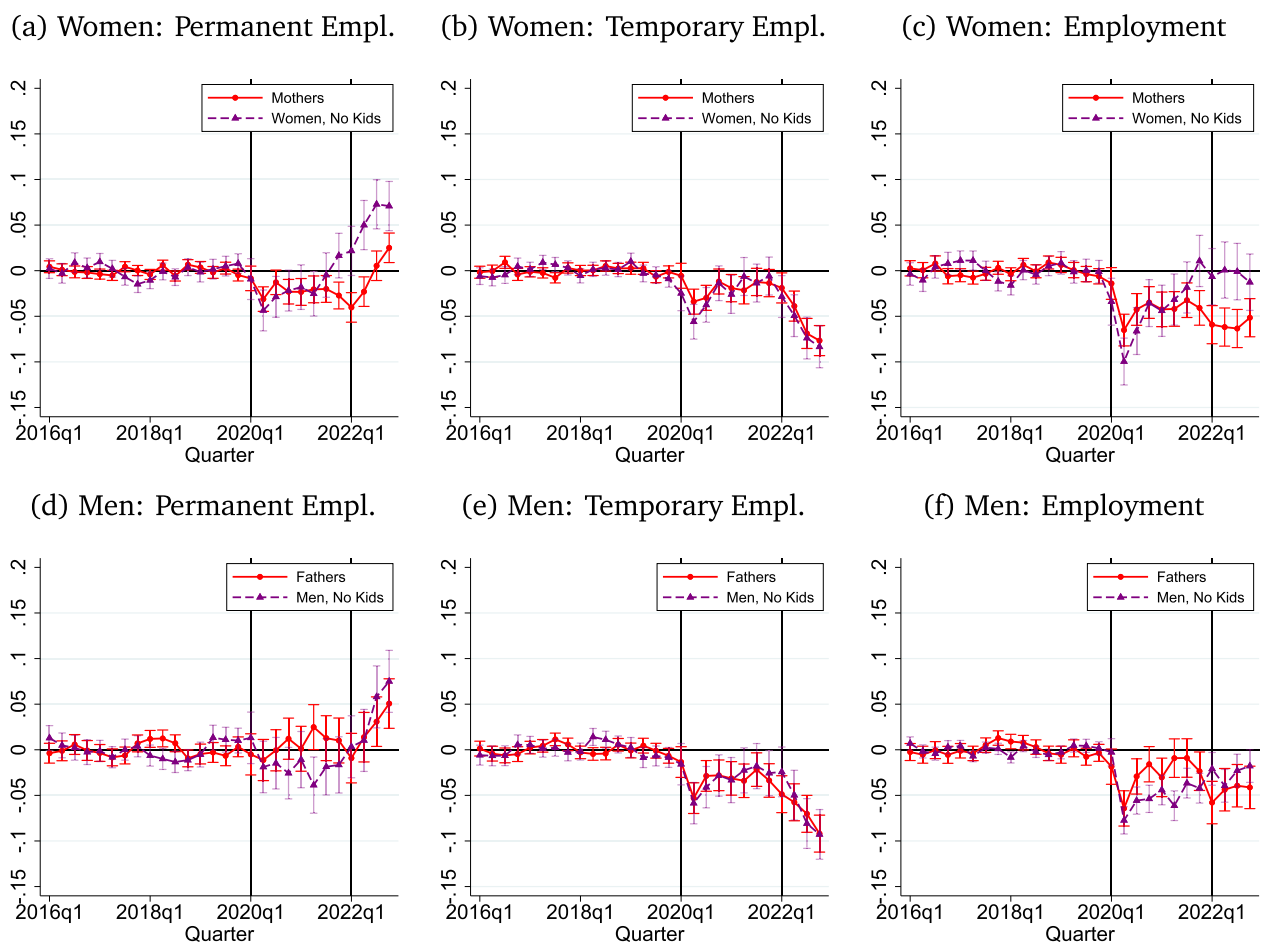


Fig. 21. Detrended series of labour market stocks, by parental status and gender.

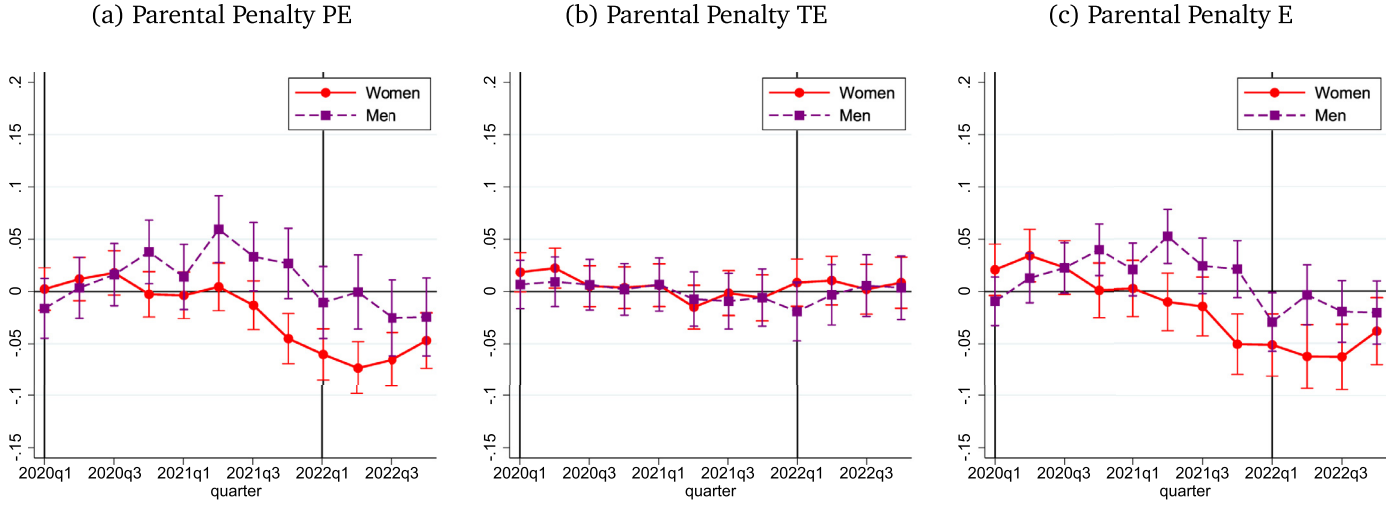


Fig. 22. 'Parenthood Penalty' – parent indicator coefficient.

Appendix C. Yearly regressions, parenthood effect on permanent employment

Fig. 26 shows the estimated coefficient on parental status in Eq. 3 after running the regression on pooled data by year. The left panel shows the results for the regression on the probability of having a permanent contract; the right panel shows the results for inactivity (non-participation).

For the permanent regression, the gap in the estimated coefficients between men and women opens during 2020 and widens in 2021. For inactivity, the coefficients increase and the differences remain largely significant.

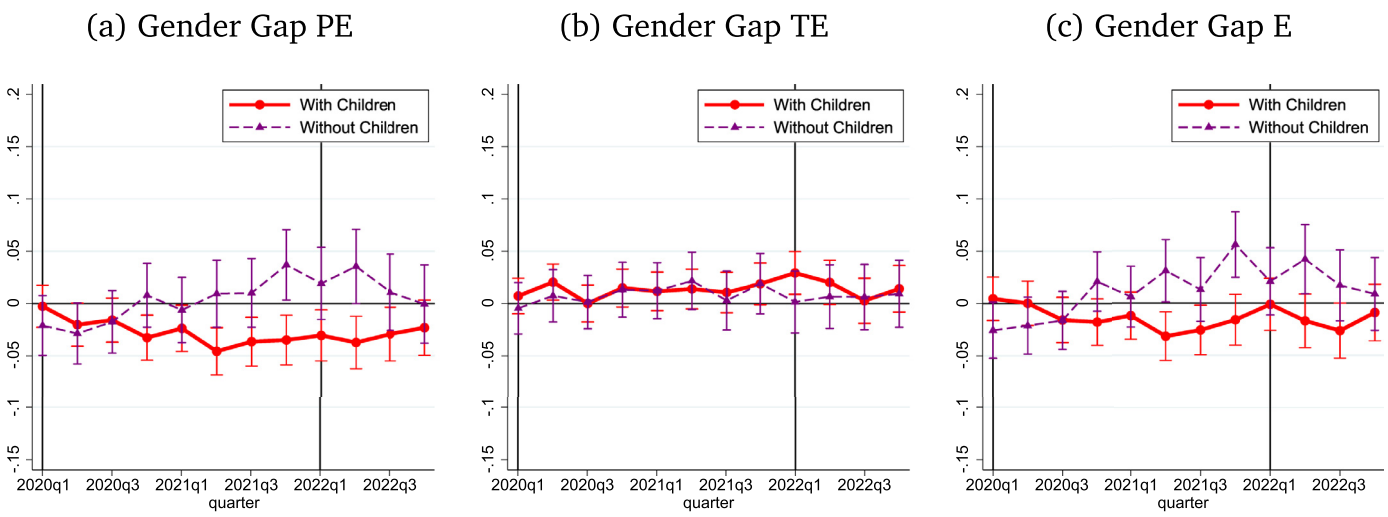


Fig. 23. 'Gender Gap' – female coefficient.

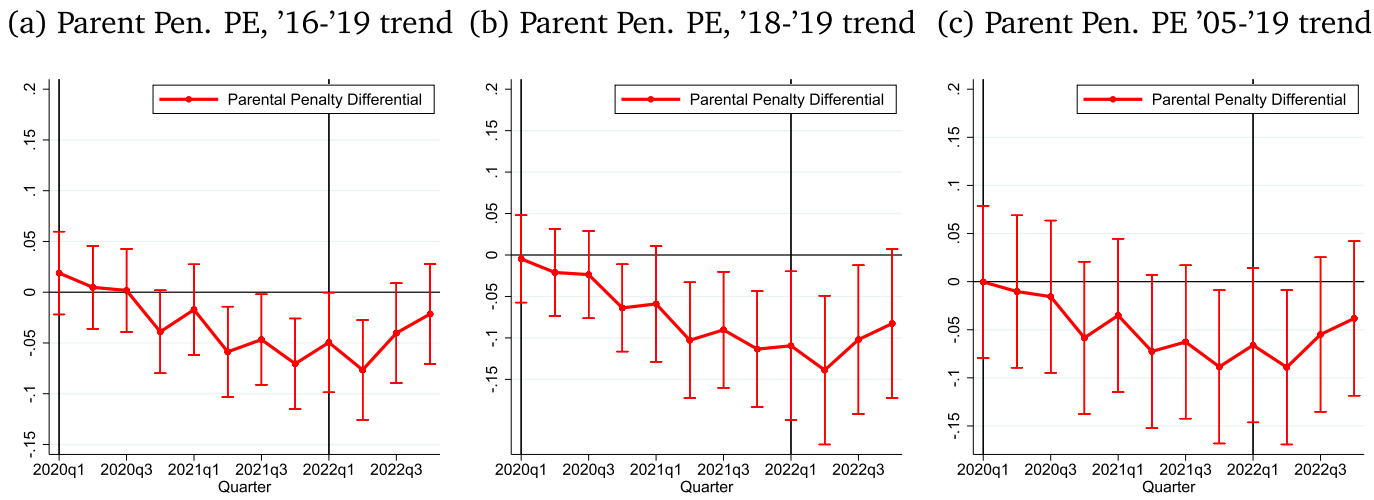


Fig. 24. Parenthood penalty, alternative time trend.

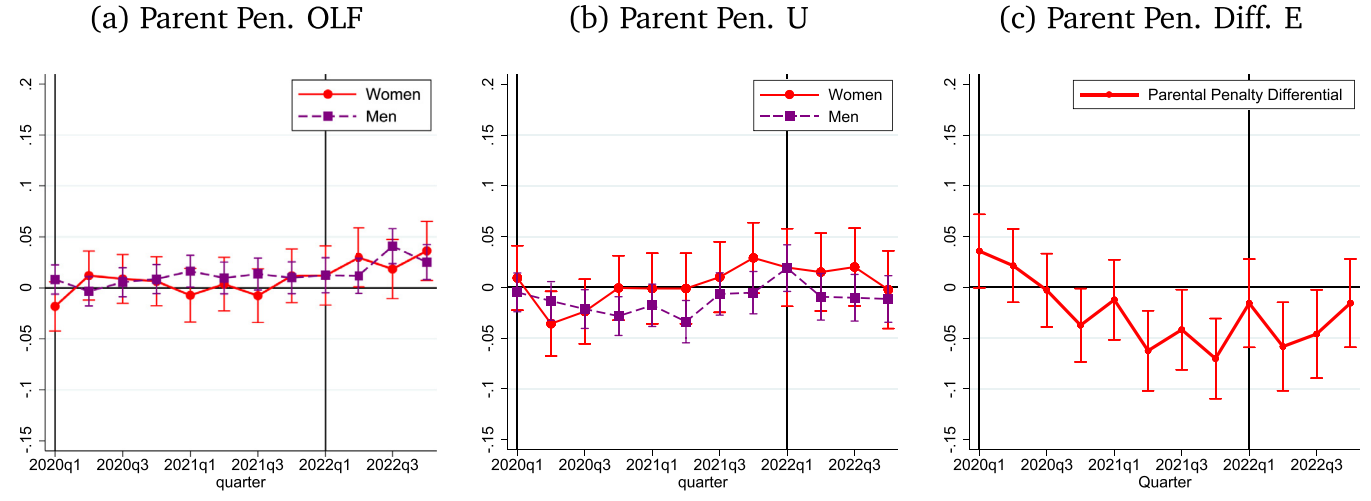


Fig. 25. Parenthood penalty, other labour market states.

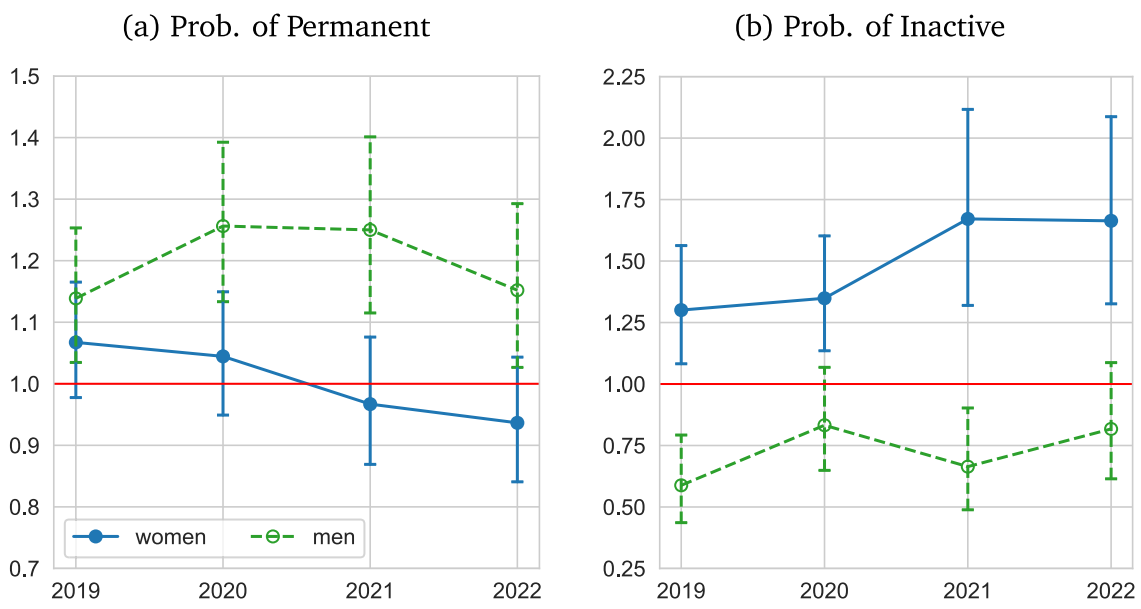


Fig. 26. Odds-ratio of being a parent of children younger than 10, data pooled by year Notes: Results from logistic regressions; odds-ratio marginal effect of $parent = 1$ dummy variable. That is, $P(state_i, parent)/P(state_i, no\_children)$, where $state_i = \{permanent, inactive\}$; sample comprises all individuals 30–40 years of age. Controls include: education (college, less than high-school), age, part-time indicator (for plot (a)), public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

C1. Effects of parenthood employment, sample selection

The following plots illustrate alternative specifications of Eq. 3, where the controls in the right hand side include (i) age only, (ii) age but restricting the sample to those observations with non-missing industry information (iii) all controls, including age, industry and other personal characteristics.

This exercise illustrates that controlling for industry composition effects results in an additional restriction on the data: this variable needs to be reported. For those non-employed individuals, if they have been out of a job for more than one year the industry (and occupation) of the last job is not recorded. Fig. 27 below shows that this restriction is important for mothers, particularly when measuring the impact of parenthood in the probability of being OLF (inactive). As a result, the estimates reported in Fig. 6 should be interpreted as the effect in the most attached individuals.

C2. Probability of working with permanent contract for different age groups

This section replicates the coefficients on parenthood indicator in a series of repeated cross-section regressions, following equation (3), on different samples and time frames. More plots and the code to generate these is available on our Github repository online.

C3. Probability of being out of the labour force (inactive) for different age groups

C4. Longer time frame

C5. Table for Fig. 3

Table 9 below reports the coefficients, standard deviations and number of observations from the coefficient on parenthood indicator in Eq. (3). These are depicted in Fig. 3 a. We have omitted the rest of the coefficients from the table for brevity but there are available in our Github repository online.

Appendix D. Extended results, quantile regression

D1. Quantile regressions for different age groups of children

This section replicates the time dummy coefficients in (5), estimated on different samples and time frames. All the code to generate these is available on our Github repository online.

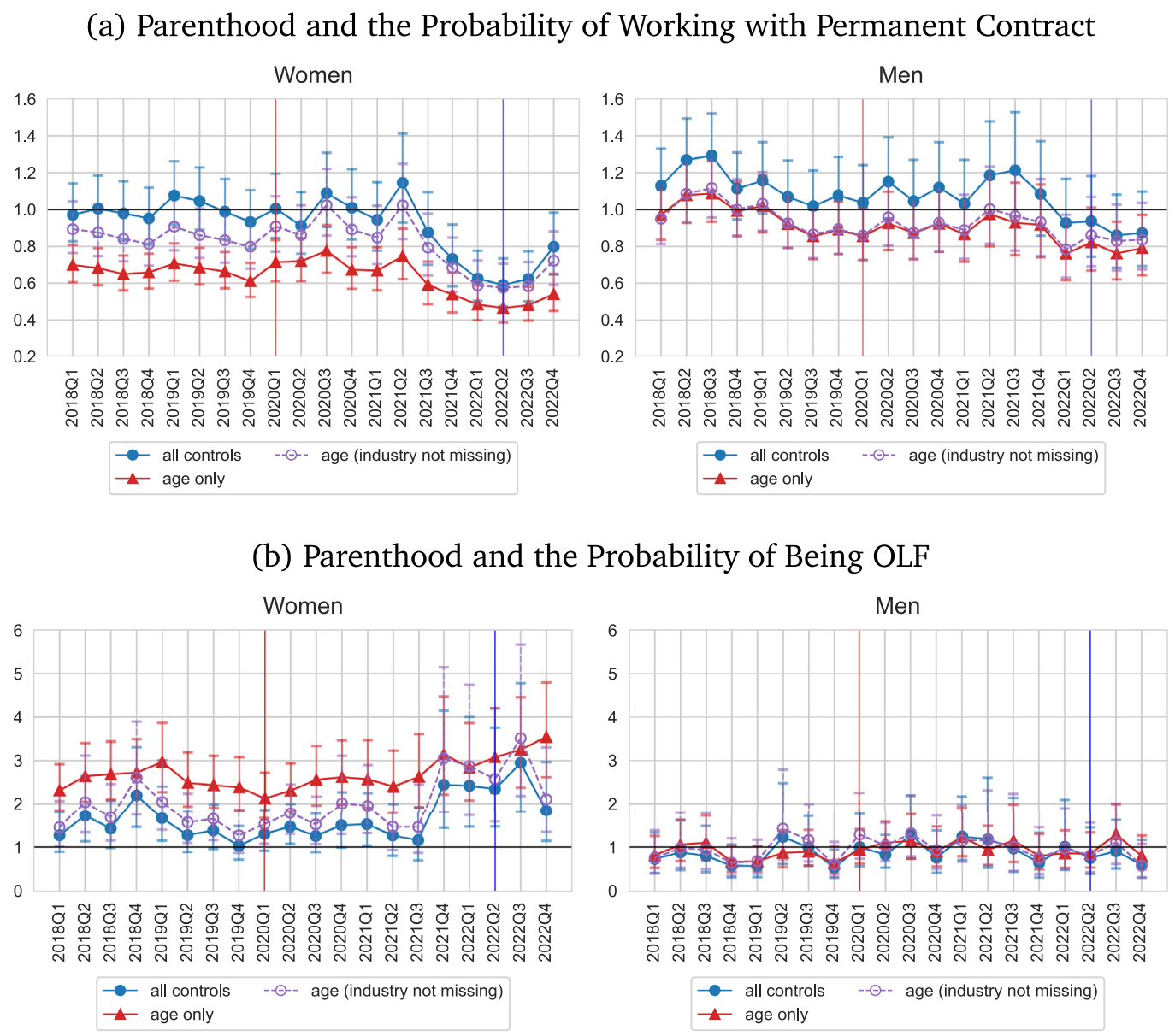


Fig. 27. Effects of Covid-19 on the Marginal Effect of Parenthood, by Gender and controls Notes: Results from logistic regressions; odds-ratio marginal effect of $parent = 1$ dummy variable. That is, $P(state_i, parent)/P(state_i, no\_children)$, where $state_i = \{permanent, inactive\}$; sample comprises all individuals 30–40 years of age. Controls include: education (college, less than high-school), age, part-time indicator (for plot (a)), public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

D1.1. Parents age 30–40, children age <5
D1.2. Parents age 30–40, children age <10
D1.3. Parents age 30–40, children age <15
D2. Different fixed effects

D2.1. Parents age 30–40, children age <10, with age fixed effects and occupation fixed effects
D2.2. Parents age 30–40, children age <10, with age fixed effects incl. age fixed effects for partner
D2.3. Parents age 30–40, children age <10, with age fixed effects and tenure bins
D2.4. Parents age 30–40, children age <10, with age fixed effects and precise tenure bins
D3. Quantile regressions, by year

D4. Regression tables, baseline quantile regressions

Main text results Fig. 9 a

Fig. 28. Odd ratios of being a parent on the probability of being employed with a permanent contract, children younger than 10 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 with 95% confidence intervals. That is, $P(permanent, parent)/P(permanent, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, part-time indicator, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

Main text results Fig. 10

D5. Robustness checks

D5.1. No controls, age fixed effects
D5.2. Occupation fixed effects, linear trend, sample from 2016 onward
D5.3. Occupation fixed effects, quadratic trend, full sample
D6. Full regression tables

Quantile regressions, unemployment as trend

Quantile regressions, occupation controls

Quantile regressions, occupation controls, by age

Tenure with industry controls

Fig. 29. Odd ratios of being a parent on the probability of being employed with a permanent contract, children younger than 5 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 with 95% confidence intervals. That is, $P(permanent, parent)/P(permanent, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, part-time indicator, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

Fig. 30. Odd ratios of being a parent on the probability of being employed with a permanent contract, children younger than 16 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 with 95% confidence intervals. That is, $P(permanent, parent)/P(permanent, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, part-time indicator, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

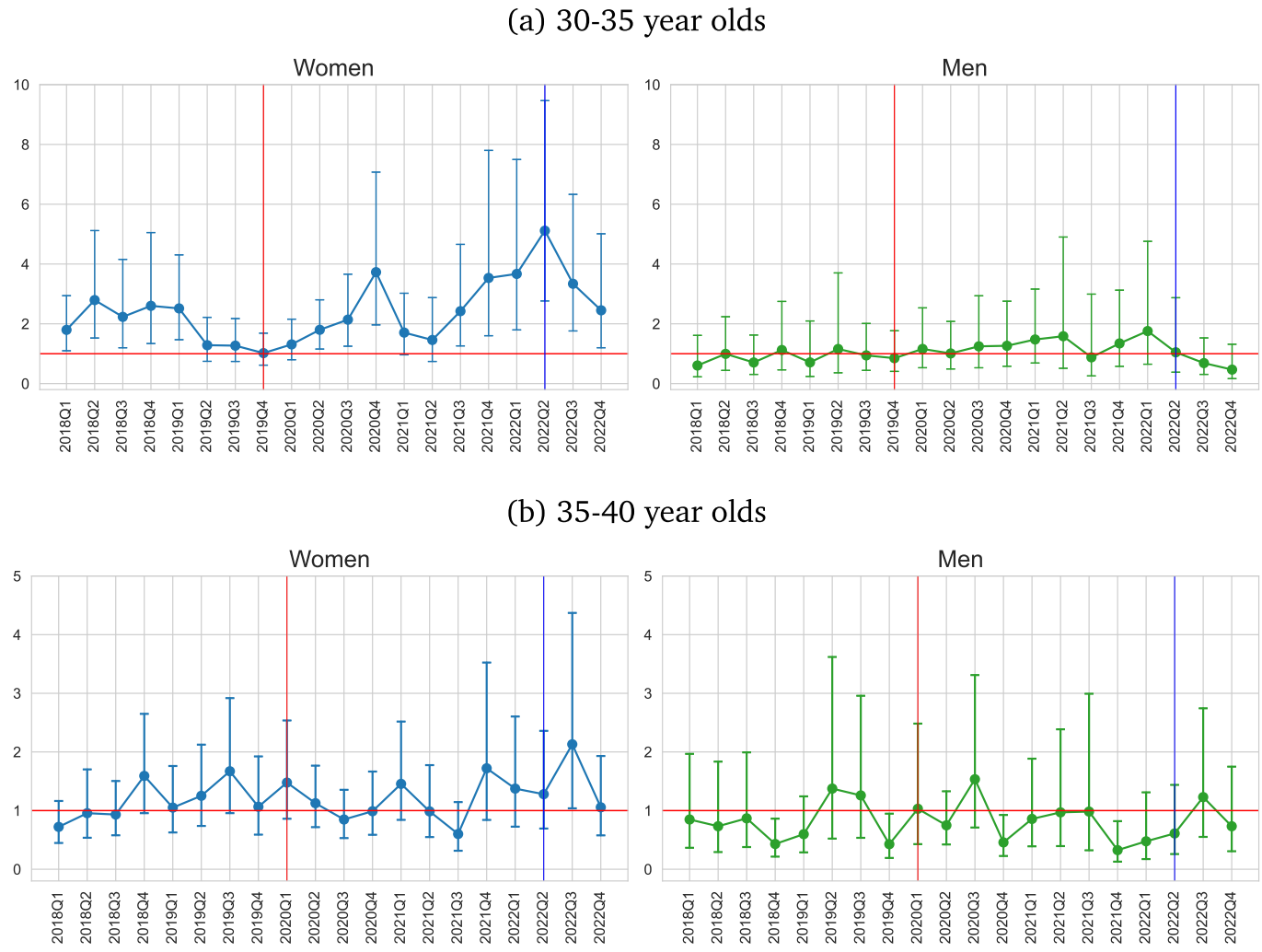


Fig. 31. Odd ratios of being a parent on the probability of being OLF with a permanent contract, of children younger than 10 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 (with inactivity as dependent variable) with 95% confidence intervals. That is, $P(OLF, parent)/P(OLF, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates.

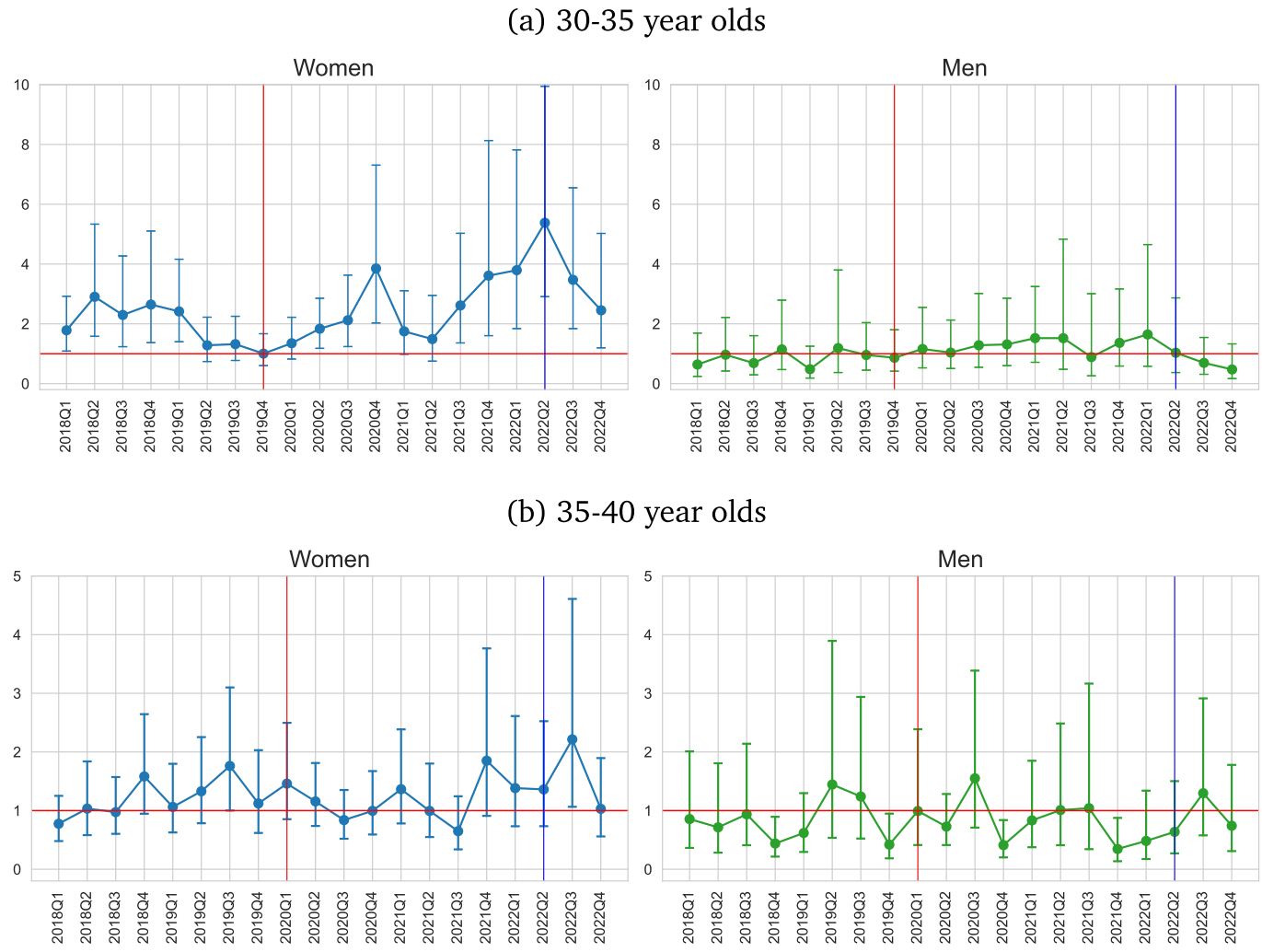


Fig. 32. Odd ratios of being a parent on the probability of being OLF with a permanent contract, children younger than 5 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 (with inactivity as dependent variable) with 95% confidence intervals. That is, $P(OLF, parent)/P(OLF, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

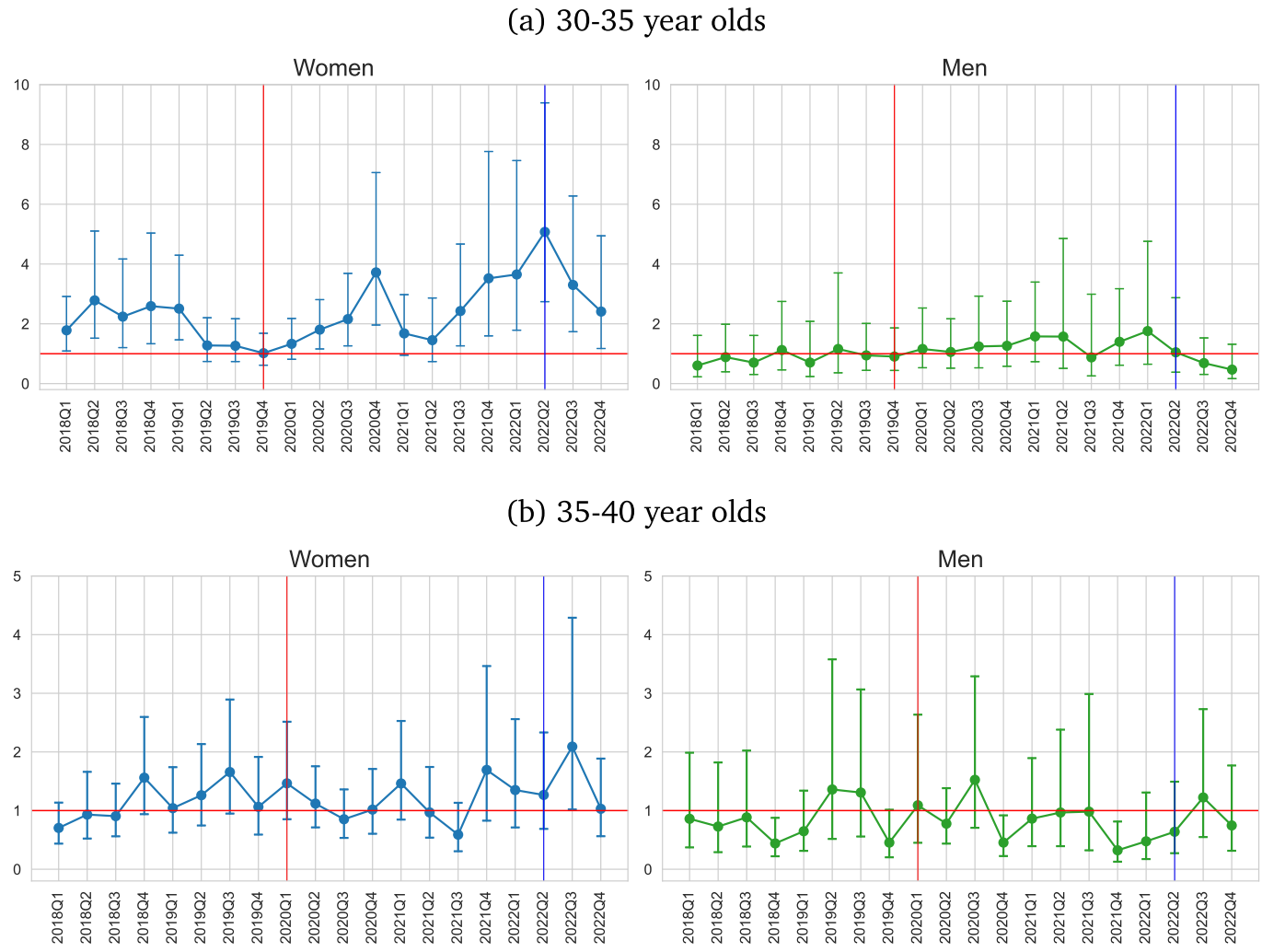


Fig. 33. Odd ratios of being a parent on the probability of being OLF with a permanent contract, children younger than 16 Notes: Odds-ratios of the dummy variable *parent* = 1 of Eq. 3 (with inactivity as dependent variable) with 95% confidence intervals. That is, $P(OLF, parent)/P(OLF, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Controls include: education (college, less than high-school), age, public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

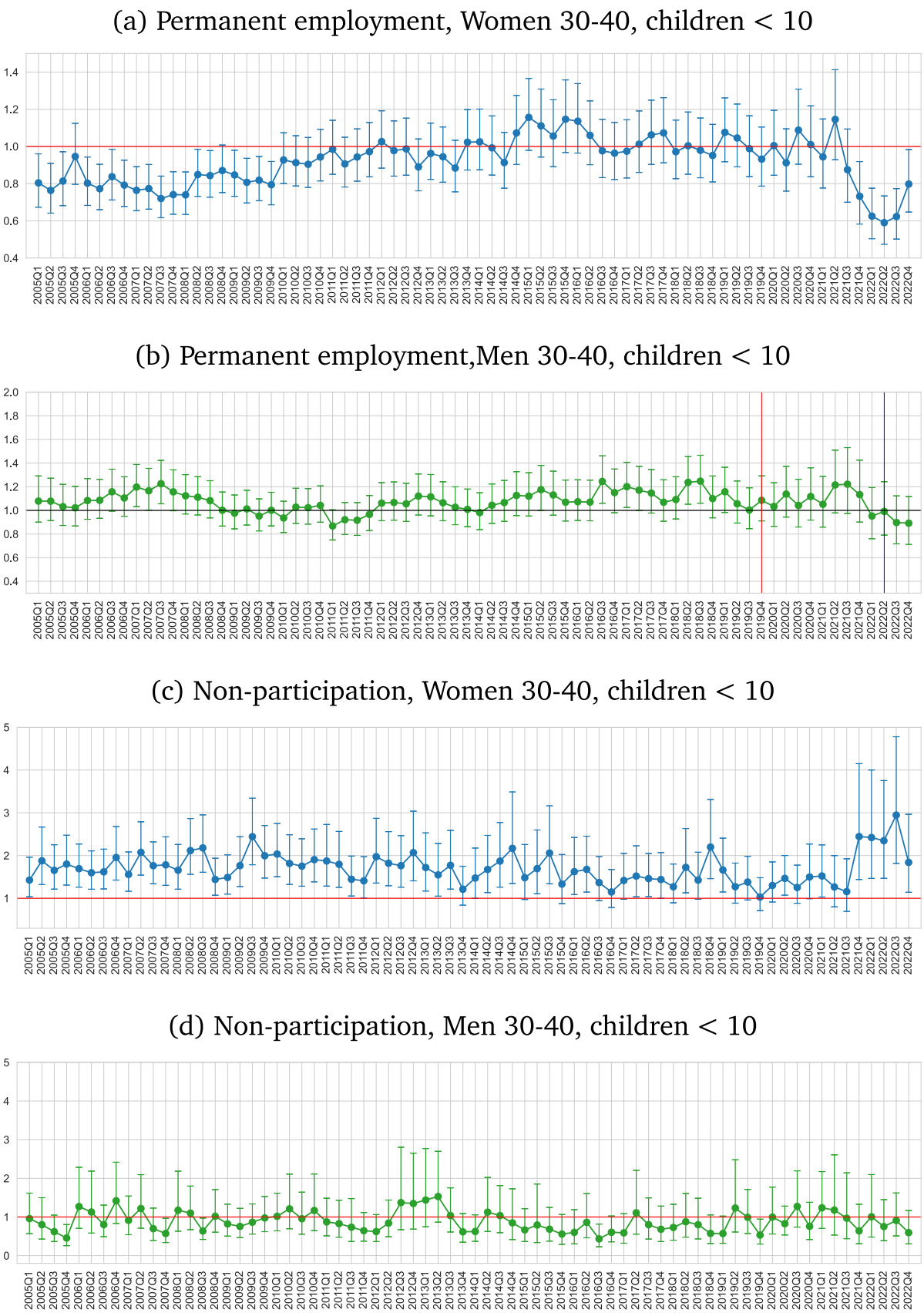


Fig. 34. Marginal effect of parenthood on the odds of state S_i Notes: Results from logistic regressions; odds-ratio marginal effect of $parent = 1$ dummy variable. That is, $P(state_i, parent)/P(state_i, no\_children)$, where $state_i = \{permanent, inactive\}$; sample comprises all individuals 30–40 years of age. Controls include: education (college, less than high-school), age, part-time indicator (for plot (a) and (b)), public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Robust sandwich standard errors reported as 95% confidence interval around point estimates..

Table 9
Odds-ratio of being in state S_t conditional on being a parent, ages 30–40 .

	Permanent						Non-participant					
	women			men			women			men		
	β_1	std	N	β_1	std	N	β_1	std	N	β_1	std	N
2018Q1	0.9715	(0.08)	4959	1.1289	(0.0946)	4615	1.2699	(0.227)	4922	0.7293	(0.2231)	4429
2018Q2	1.0039	(0.085)	4900	1.2691	(0.1057)	4599	1.724	(0.3724)	4804	0.8774	(0.2706)	4599
2018Q3	0.9793	(0.0816)	4874	1.2925	(0.1079)	4543	1.4256	(0.2741)	4771	0.8012	(0.2523)	4412
2018Q4	0.9514	(0.0786)	5042	1.1127	(0.0923)	4591	2.1991	(0.459)	5042	0.5748	(0.1776)	4592
2019Q1	1.0758	(0.0872)	5074	1.1564	(0.0983)	4589	1.6624	(0.3139)	5074	0.5717	(0.1699)	4363
2019Q2	1.0457	(0.0858)	5028	1.0682	(0.0929)	4552	1.2714	(0.2339)	5028	1.2318	(0.4398)	4386
2019Q3	0.9882	(0.083)	4869	1.0179	(0.0905)	4355	1.3803	(0.2551)	4869	0.9911	(0.2766)	4355
2019Q4	0.9321	(0.0807)	4767	1.0768	(0.0973)	4253	1.0291	(0.1914)	4767	0.5327	(0.1557)	4254
2020Q1	1.0045	(0.0886)	4553	1.0368	(0.0952)	4056	1.3004	(0.2342)	4505	0.9975	(0.293)	4056
2020Q2	0.912	(0.085)	4194	1.151	(0.1117)	3689	1.4664	(0.2328)	4194	0.8277	(0.1845)	3689
2020Q3	1.0877	(0.1025)	4013	1.0454	(0.1035)	3581	1.2532	(0.2229)	4044	1.2733	(0.3535)	3468
2020Q4	1.0098	(0.0967)	3985	1.1194	(0.1135)	3486	1.4995	(0.3171)	3985	0.7582	(0.2316)	3486
2021Q1	0.9439	(0.0942)	3740	1.0317	(0.109)	3215	1.5227	(0.3032)	3706	1.2377	(0.3561)	3215
2021Q2	1.1454	(0.1225)	3471	1.1851	(0.1339)	2993	1.2655	(0.2952)	3438	1.1791	(0.4777)	2612
2021Q3	0.8749	(0.0996)	3278	1.2127	(0.1432)	2805	1.1561	(0.3006)	3278	0.9691	(0.3923)	2474
2021Q4	0.7317	(0.0849)	3320	1.0836	(0.1297)	2807	2.4447	(0.6599)	3320	0.6415	(0.2384)	2807
2022Q1	0.6249	(0.0688)	3327	0.9264	(0.1085)	2797	2.4211	(0.6206)	3327	1.005	(0.3774)	2797
2022Q2	0.59	(0.0657)	3375	0.9369	(0.1108)	2859	2.347	(0.5624)	3353	0.7513	(0.252)	2860
2022Q3	0.6229	(0.0687)	3297	0.8601	(0.1004)	2801	2.9468	(0.727)	3270	0.9095	(0.2682)	2801
2022Q4	0.7977	(0.0851)	3250	0.8723	(0.1023)	2738	1.8396	(0.4482)	3250	0.5954	(0.204)	2739

Notes: Odds-ratios of the dummy variable $parent = 1$ of equation (3) with 95% confidence intervals. That is, $P(S_t, parent)/P(S_t, not\_parent)$. Sample is all women (men) of the given age range, cohabiting with a partner of the opposite sex. Reference group is women (men) cohabiting without children. Rest of the coefficients have been omitted for brevity. These are coefficients on: education (college, less than high-school), age, part-time indicator (for regressions on permanent employment), public sector indicator, occupation and industry indicators. 'Age' refers to regressions where the only control is age. Standard errors in parenthesis and observations in columns denoted N.

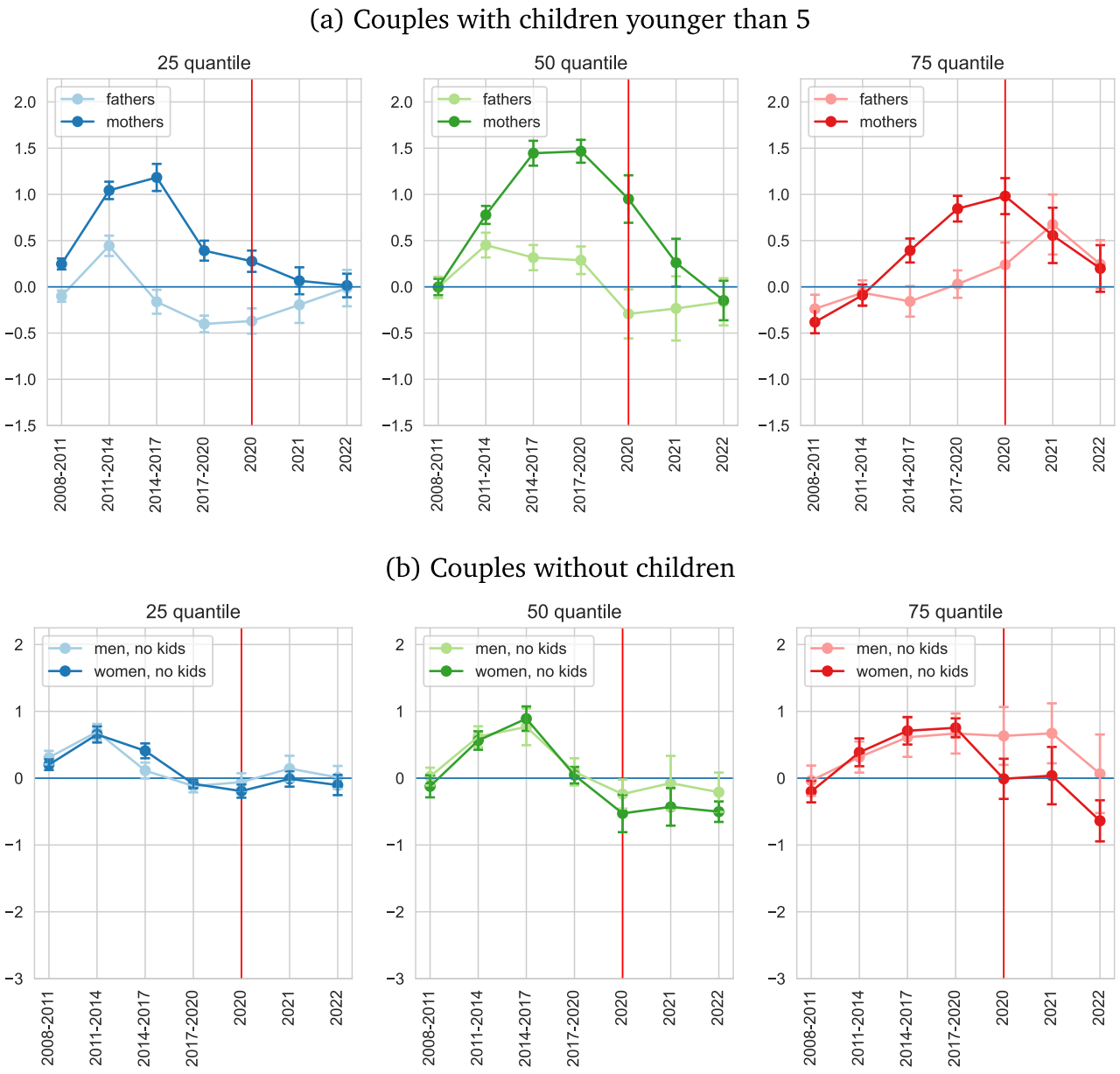


Fig. 35. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 5. The covariates include: Tenure of the partner, quadratic term for tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

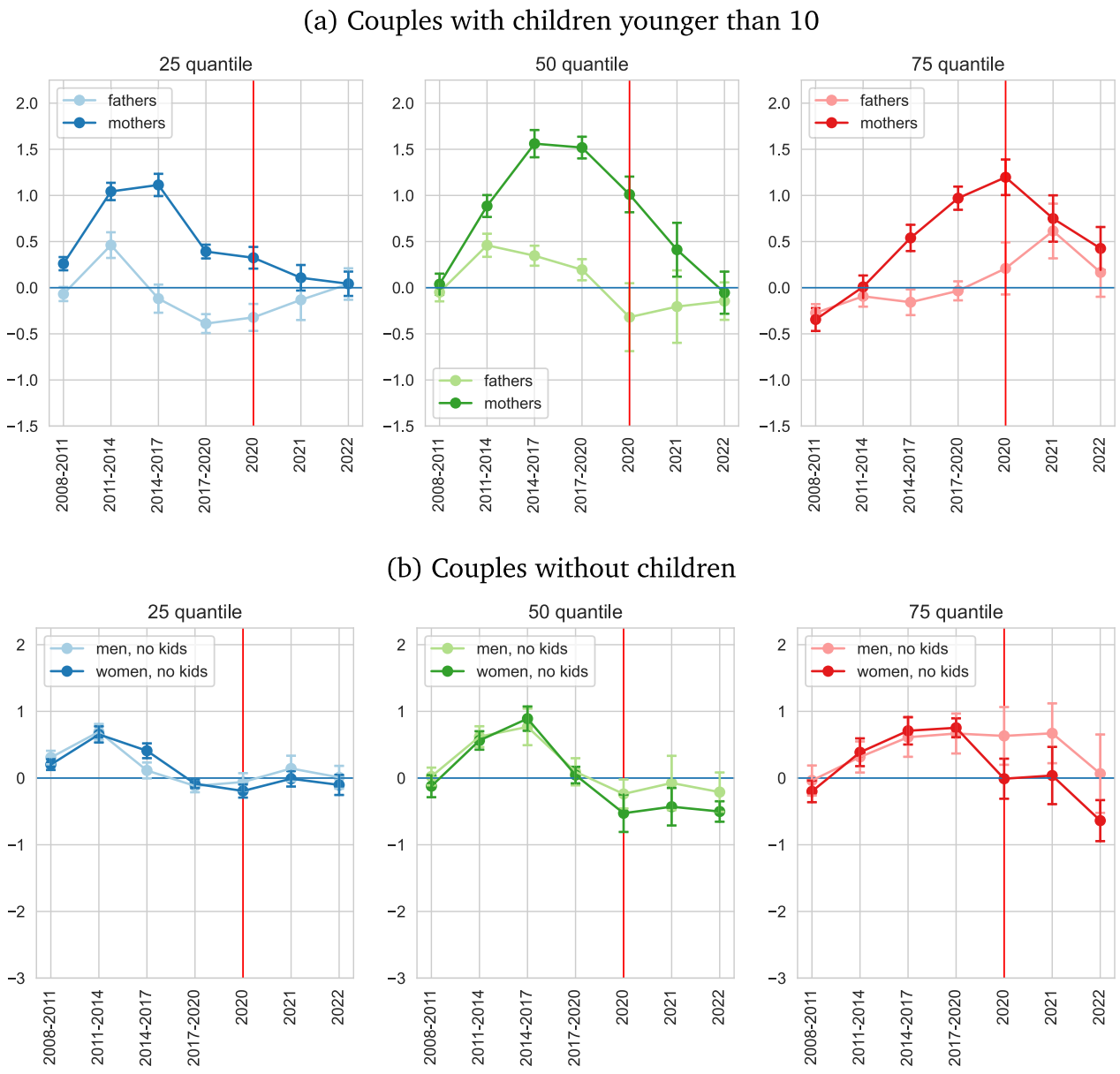


Fig. 36. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 10. The covariates include: Tenure of the partner, quadratic term for tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

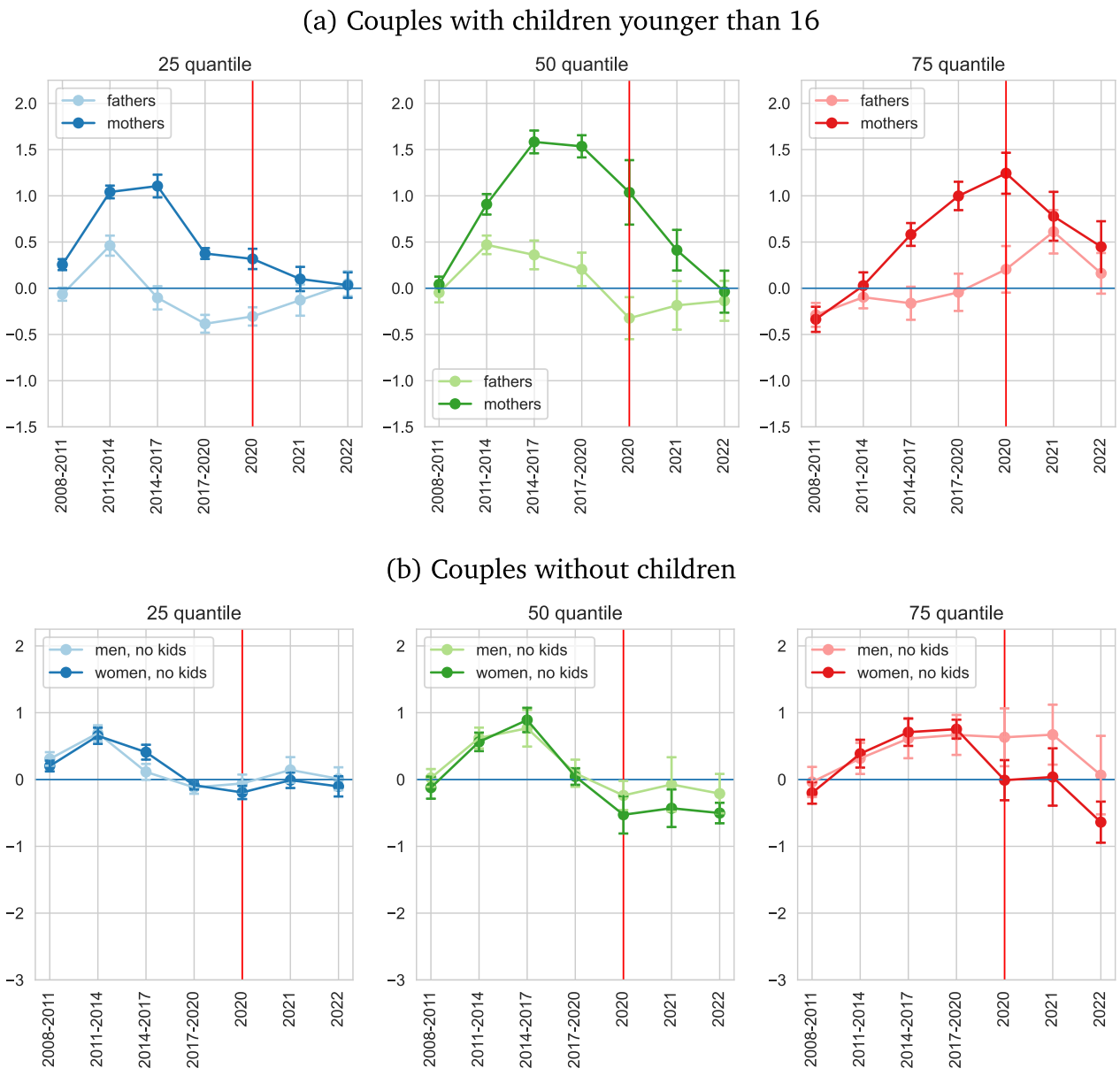


Fig. 37. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 15. The covariates include: Tenure of the partner, quadratic term for tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

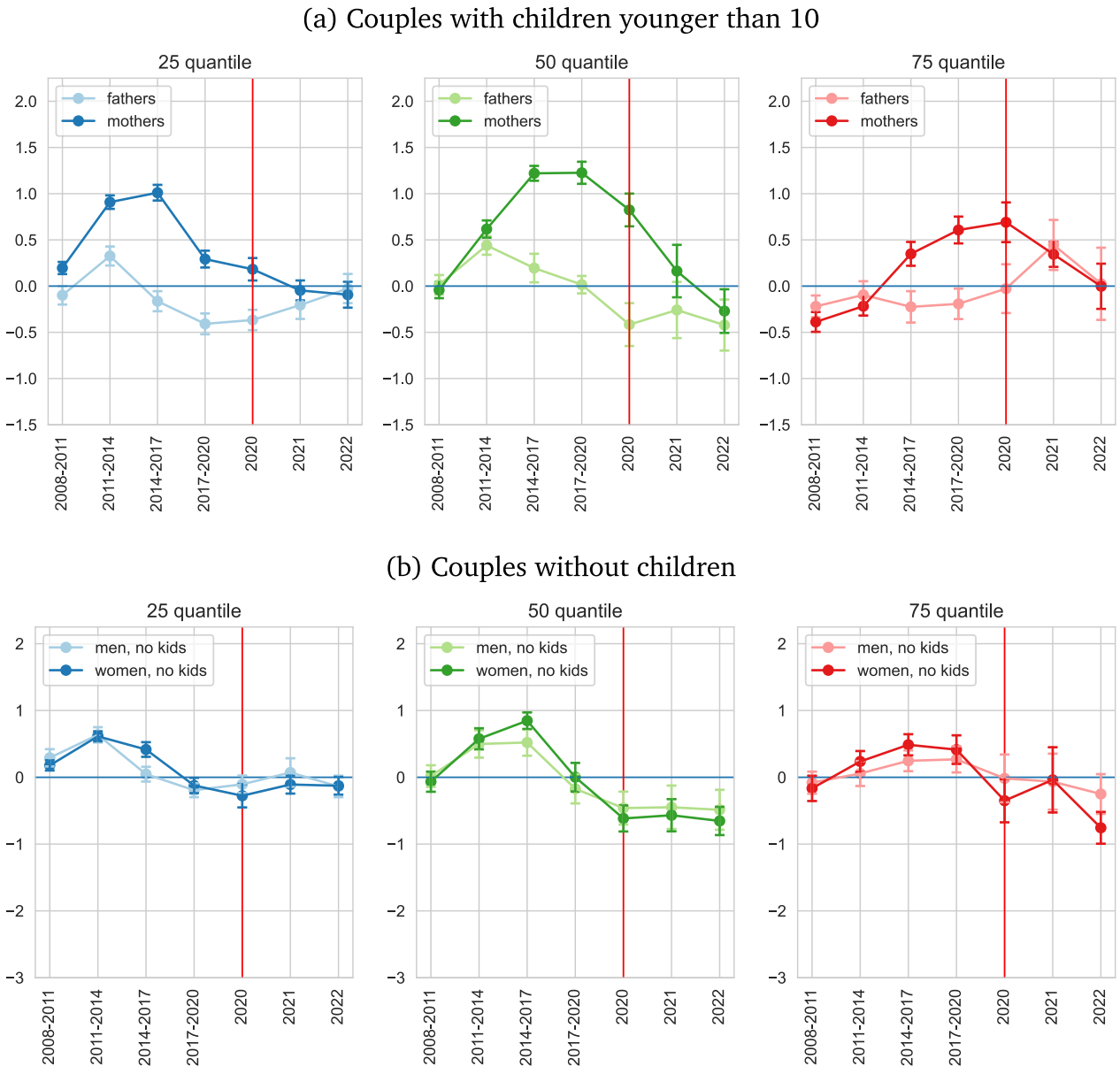


Fig. 38. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 10. The covariates include: Tenure of the partner, quadratic term for tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner, age fixed effects (in 5-year bins due to data limitation), occupation fixed effects where we classify five groups: (1) managers; and professionals and highly qualified white collar workers (2) administrative and other white collar (3) services blue collar workers (hospitality, sales), (4) other skilled blue collar workers (5) unskilled blue collars. We also include period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

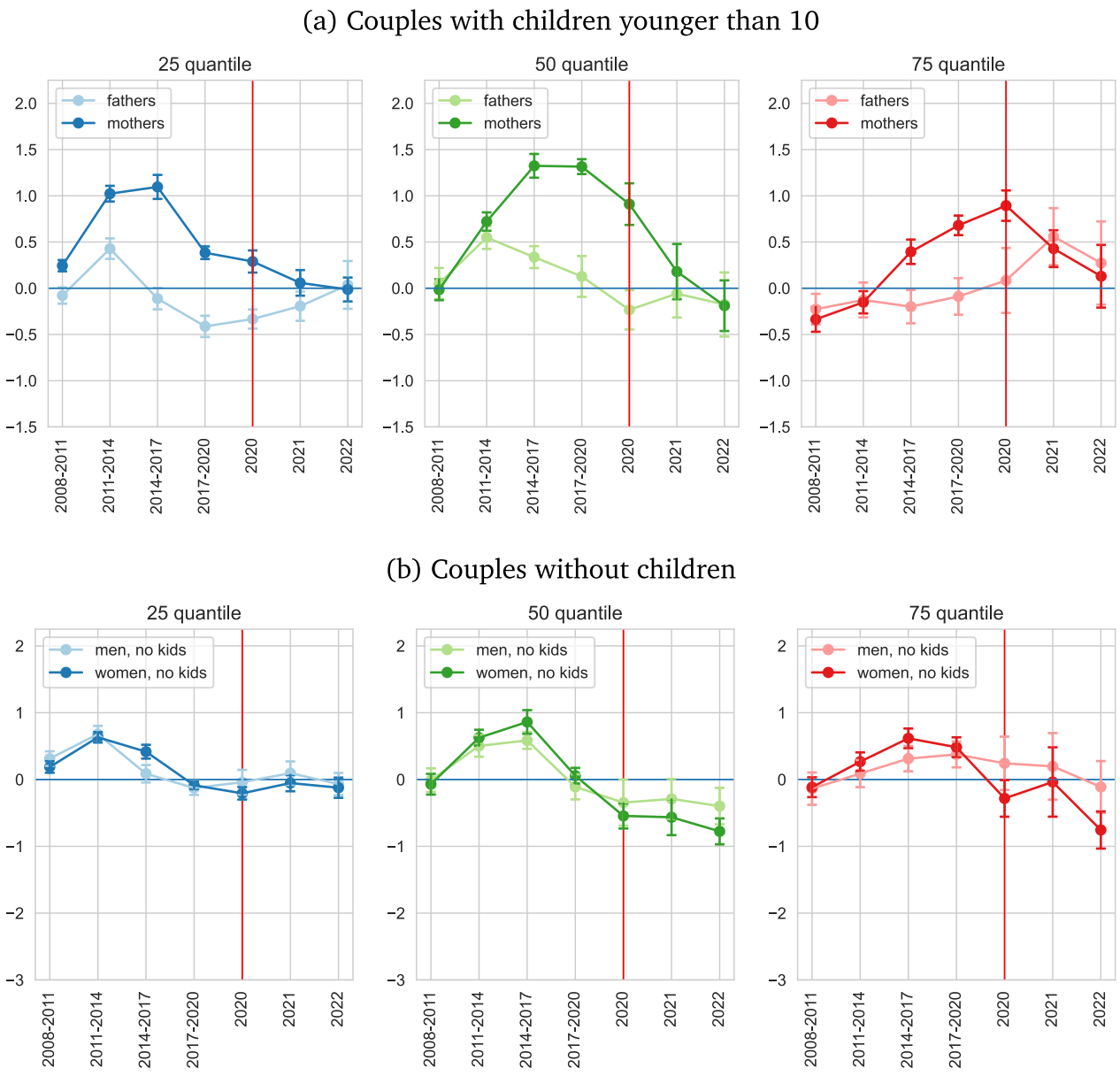


Fig. 39. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 10. The covariates include: Tenure of the partner, quadratic term for tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, age fixed effects of the partner, age fixed effects (in 5-year bins due to data limitation)and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

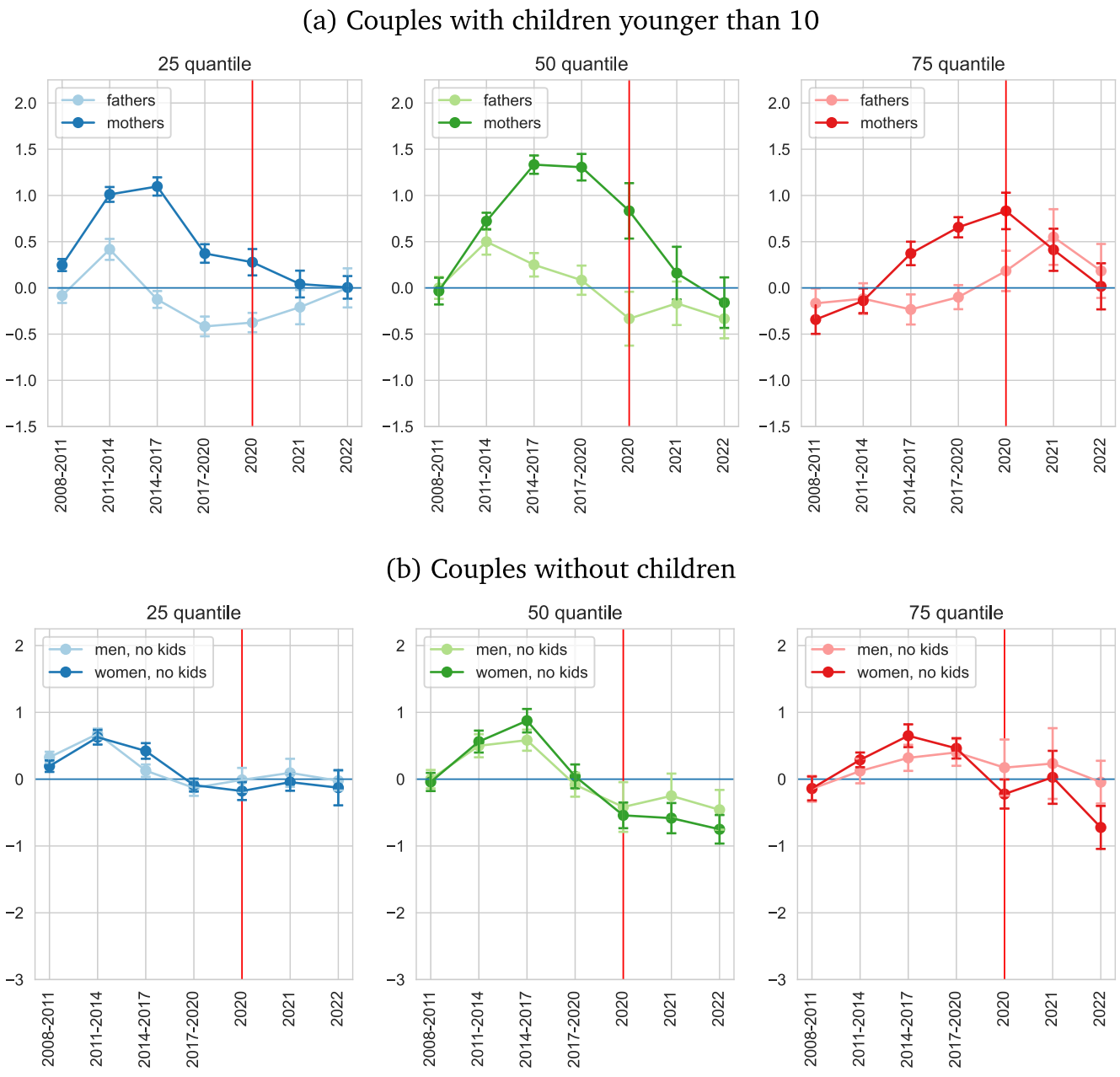


Fig. 40. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 15. The covariates include: tenure fixed effects of the partner (we use tenure bins, which are as follows: 0 – 2 years, 2 – 5 years, 5 – 10 years, 10 – 15 years and more than 15 years), dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. The dots mark the period fixed effect on the predicted tenure. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

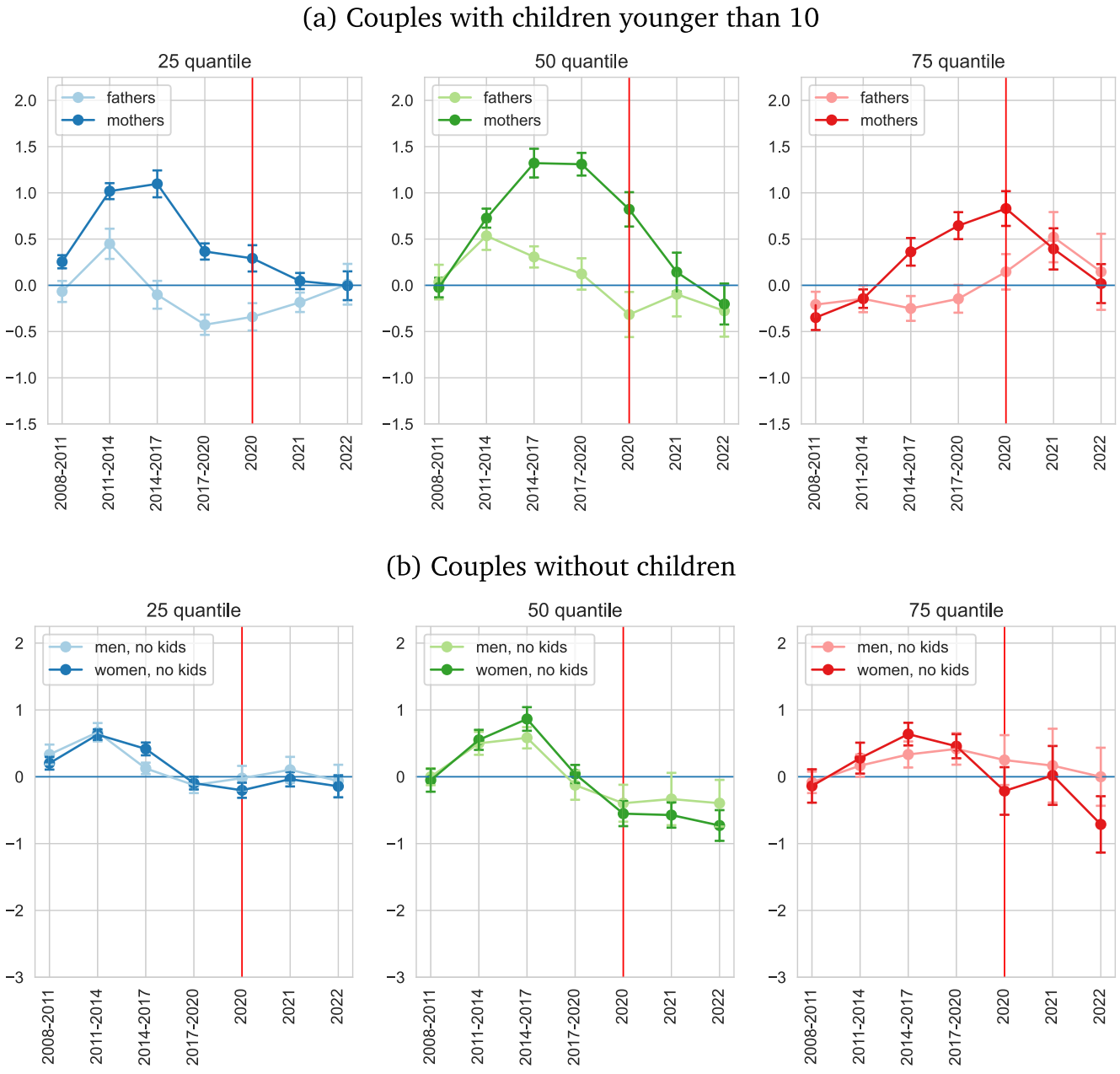


Fig. 41. Coefficients for time dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 15. The covariates include: tenure fixed effects of the partner (we use tenure bins, which are as follows: 0 – 0.5 years, 0.5 – 1 years, 1 – 3 years, 3 – 5 years, 5 – 10 years, 10 – 15 years and 15 years.), dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The dots mark the period fixed effect on the predicted tenure. The baseline period is defined as 2005–2007, the other periods are: 2008–2013, 2014–2016, 2017–2019, 2020, 2021, 2022.

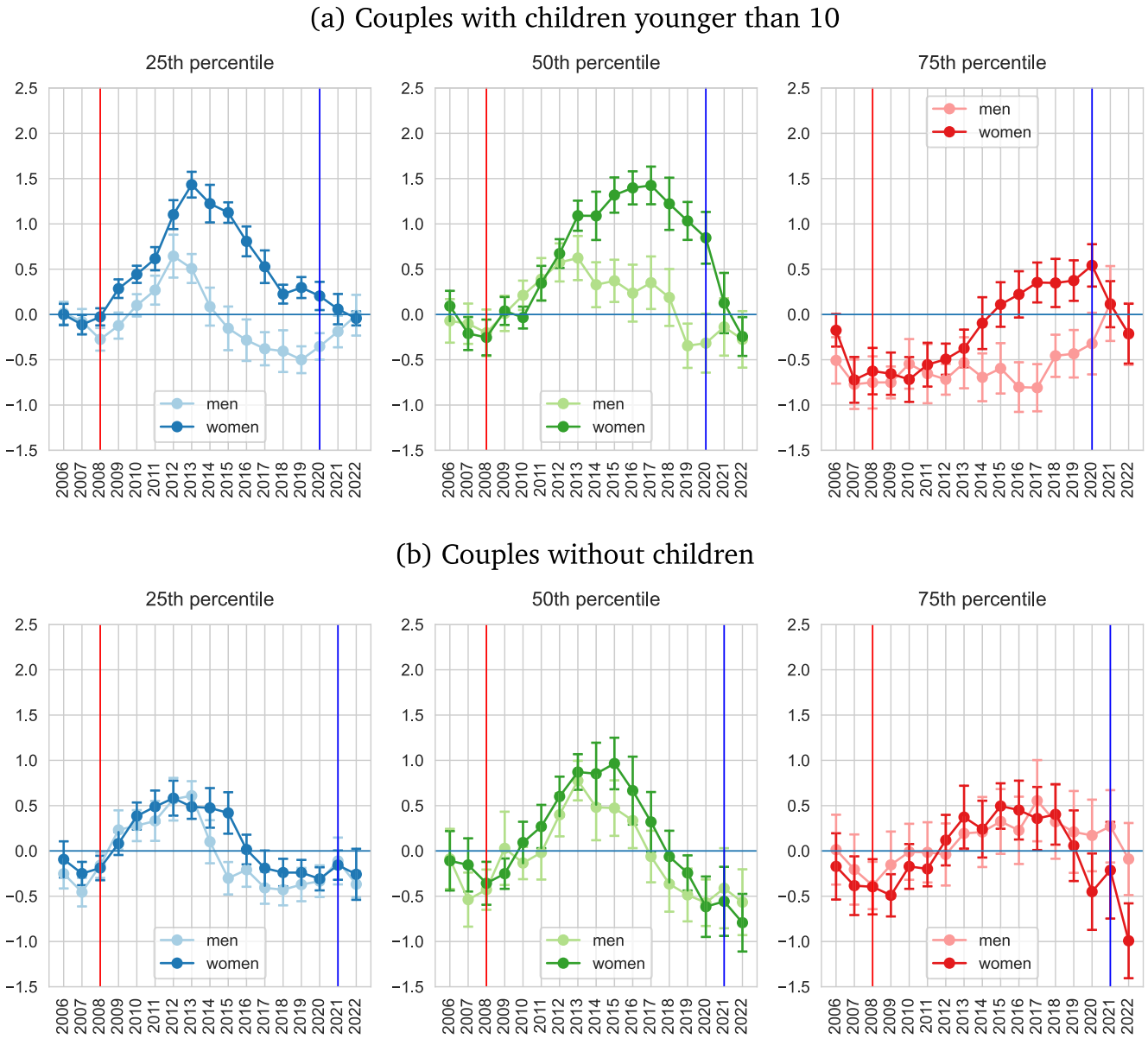


Fig. 42. Coefficients for year dummies, workers 30–40 years of age, Spain Note: The sample includes couples age 30–40 and compares men and women within couples, with and without children younger than 10. The covariates include: Tenure of the partner, dummies for: part-time work, college, less than high-school, partner college, partner less than high-school, a trend for age of the partner and period fixed effects. 95% confidence intervals in vertical bars. Y-axis units in years of tenure. The dots mark the period fixed effect on the predicted tenure. The baseline year is 2005.

Table 10
Women 30–40 years of age, children younger than 10 .

	Mothers			Women without children		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
Tenure Partner	0.191***	0.319***	0.196***	0.144***	0.270***	0.240***
	(0.0038)	(0.0092)	(0.0087)	(0.0084)	(0.0163)	(0.0174)
Tenure Partner^2	−0.006***	−0.007***	−0.002***	−0.005***	−0.008***	−0.006***
	(0.0002)	(0.0004)	(0.0004)	(0.0004)	(0.0009)	(0.0009)
Part Time	−0.920***	−1.393***	−1.056***	−1.231***	−2.440***	−2.911***
	(0.0236)	(0.0403)	(0.0499)	(0.0227)	(0.0510)	(0.1049)
College	1.374***	1.732***	0.078*	0.425***	0.480***	−0.496***
	(0.0275)	(0.0417)	(0.0429)	(0.0333)	(0.0434)	(0.0551)
Less than High-school	−0.405***	−1.365***	−2.976***	−0.581***	−0.863***	−2.204***
	(0.0551)	(0.0703)	(0.1068)	(0.1087)	(0.1879)	(0.3006)
Partner age	−0.012***	−0.020***	0.041***	−0.001	−0.001	0.032***
	(0.0036)	(0.0042)	(0.0048)	(0.0029)	(0.0047)	(0.0063)
Partner self-employed	0.029	0.228***	0.194***	0.002	−0.122**	−0.052
	(0.0339)	(0.0411)	(0.0313)	(0.0470)	(0.0620)	(0.1027)
Partner College	0.531***	0.370***	−0.072*	−0.065**	−0.241***	−0.548***
	(0.0252)	(0.0400)	(0.0425)	(0.0311)	(0.0226)	(0.0481)
Partner less than High-school	−0.358***	−0.974***	−1.802***	−0.343***	−0.189	0.051
	(0.0309)	(0.0621)	(0.1085)	(0.0881)	(0.1733)	(0.3100)
$\delta_{2008-2011}$	0.246***	−0.038	−0.349***	0.186***	−0.072	−0.165**
	(0.0300)	(0.0441)	(0.0562)	(0.0408)	(0.0607)	(0.0816)
$\delta_{2011-2014}$	1.018***	0.695***	−0.158**	0.631***	0.597***	0.237***
	(0.0549)	(0.0577)	(0.0629)	(0.0532)	(0.0600)	(0.0601)
$\delta_{2014-2017}$	1.096***	1.308***	0.409***	0.401***	0.883***	0.589***
	(0.0433)	(0.0608)	(0.0757)	(0.0541)	(0.0643)	(0.0651)
$\delta_{2017-2020}$	0.372***	1.298***	0.687***	−0.095**	0.064	0.474***
	(0.0446)	(0.0849)	(0.0637)	(0.0412)	(0.0697)	(0.0822)
δ_{2020}	0.285***	0.841***	0.880***	−0.194***	−0.526***	−0.284
	(0.0820)	(0.1232)	(0.1101)	(0.0690)	(0.1623)	(0.2136)
δ_{2021}	0.057	0.158	0.431***	−0.044	−0.562***	−0.041
	(0.0591)	(0.1784)	(0.1149)	(0.0557)	(0.1010)	(0.2348)
δ_{2022}	−0.008	−0.240**	0.081	−0.132	−0.755***	−0.753***
	(0.0710)	(0.1166)	(0.1462)	(0.1059)	(0.0998)	(0.1251)
Age > 35	0.762***	1.963***	3.009***	0.615***	1.837***	2.848***
	(0.0330)	(0.0419)	(0.0373)	(0.0361)	(0.0520)	(0.0699)
β_0	0.651***	3.026***	6.448***	0.928***	2.951***	5.871***
	(0.1279)	(0.1393)	(0.1524)	(0.1018)	(0.1765)	(0.2248)
N	183,470	183,470	183,470	64,713	64,713	64,713
Pseudo R^2	0.0539	0.0327	0.0777	0.0601	0.0752	0.0867

Notes: Results from simultaneous quantile regression (5), as depicted in Fig. 9 a. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis.

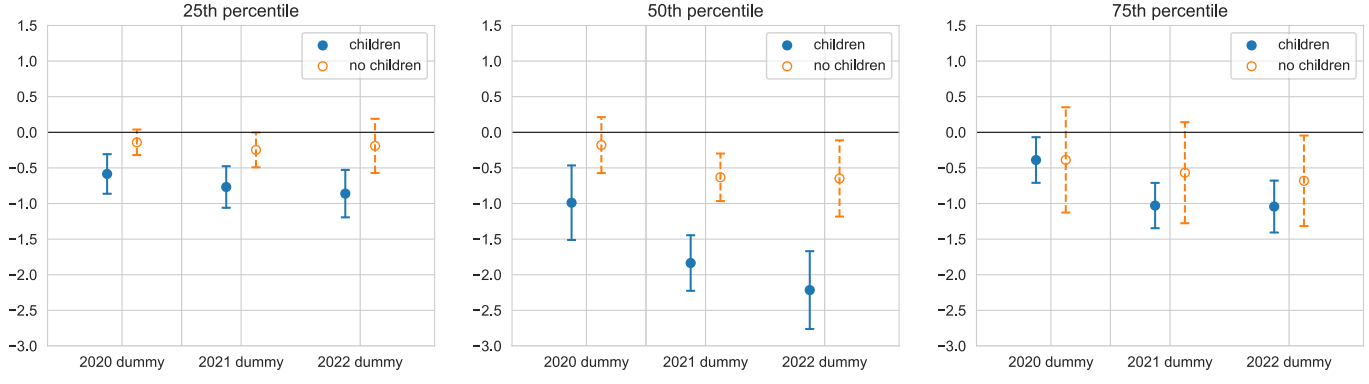


Fig. 43. Covid-dummies interacted with gender, controlling for partner's tenure only Note: The sample includes couples age 30–40 and compares couples without children with couples with children younger than 10. The covariates include: a linear time trend, a linear time trend x female, a quadratic component of the time trend (also interacted with a dummy for being a female), yearly Covid dummies, yearly Covid dummies x female and age fixed effects. The dots more the effect of being a woman (with or without kids) on the predicted tenure.

Table 11
Men 30–40 years of age, children younger than 10 .

	Fathers			Men without children		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
Tenure Partner	0.244***	0.318***	0.117***	0.233***	0.367***	0.223***
	(0.0087)	(0.0133)	(0.0153)	(0.0107)	(0.0174)	(0.0178)
Tenure Partner^2	−0.007***	−0.005***	0.004***	−0.008***	−0.009***	−0.001
	(0.0008)	(0.0008)	(0.0010)	(0.0005)	(0.0012)	(0.0009)
Part Time	−1.881***	−3.814***	−4.287***	−1.488***	−3.284***	−4.515***
	(0.0380)	(0.0685)	(0.1676)	(0.0261)	(0.0846)	(0.0994)
College	0.965***	0.453***	−1.227***	0.370***	−0.128**	−1.570***
	(0.0373)	(0.0497)	(0.0474)	(0.0389)	(0.0573)	(0.0515)
Less than High-school	−0.676***	−1.729***	−2.598***	−0.446***	−1.263***	−1.475***
	(0.0711)	(0.1321)	(0.1571)	(0.0864)	(0.2473)	(0.2763)
Partner age	0.032***	0.062***	0.097***	−0.020***	−0.036***	−0.017*
	(0.0040)	(0.0052)	(0.0057)	(0.0038)	(0.0083)	(0.0096)
Partner self-employed	−0.024	−0.029	0.295***	−0.092	0.055	0.350**
	(0.0545)	(0.0941)	(0.0621)	(0.0564)	(0.0913)	(0.1469)
Partner College	0.579***	0.722***	0.207***	0.386***	0.567***	0.223
	(0.0407)	(0.0564)	(0.0733)	(0.0351)	(0.0696)	(0.0864)
Partner less than High-school	−0.163**	−0.785***	−1.793***	−0.271***	−0.624***	−1.925***
	(0.0642)	(0.1505)	(0.1838)	(0.1024)	(0.2349)	(0.2688)
$\delta_{2008-2011}$	−0.073*	0.046	−0.207***	0.325***	−0.029	−0.144
	(0.0405)	(0.0597)	(0.0717)	(0.0489)	(0.0892)	(0.0910)
$\delta_{2011-2014}$	0.430***	0.538***	−0.131*	0.684***	0.504***	0.120
	(0.0584)	(0.0714)	(0.0730)	(0.0508)	(0.0733)	(0.0901)
$\delta_{2014-2017}$	−0.118**	0.324***	−0.214***	0.098**	0.583***	0.316***
	(0.0591)	(0.0711)	(0.0661)	(0.0447)	(0.0723)	(0.0975)
$\delta_{2017-2020}$	−0.410***	0.121	−0.087	−0.129***	−0.122	0.410***
	(0.0534)	(0.0809)	(0.0864)	(0.0480)	(0.0758)	(0.0985)
δ_{2020}	−0.347***	−0.271**	0.134	−0.047	−0.391***	0.216
	(0.0575)	(0.1261)	(0.1406)	(0.0749)	(0.1237)	(0.2081)
δ_{2021}	−0.186**	−0.109	0.575***	0.103	−0.319*	0.329**
	(0.0918)	(0.1517)	(0.1122)	(0.0914)	(0.1858)	(0.1580)
δ_{2022}	0.003	−0.223*	0.222	−0.055	−0.347**	−0.030
	(0.0910)	(0.1230)	(0.1351)	(0.0857)	(0.1536)	(0.2143)
Age > 35	0.591***	1.770***	2.703***	0.469***	1.848***	3.082***
	(0.0349)	(0.0537)	(0.0550)	(0.0401)	(0.0669)	(0.0780)
β_0	−0.208*	1.491***	6.285***	1.205***	4.125***	8.486***
	(0.1227)	(0.1472)	(0.1541)	(0.1056)	(0.2283)	(0.2682)
N	131,703	131,703	131,703	67,347	67,347	67,347
Pseudo R^2	0.0427	0.0288	0.0617	0.0491	0.0626	0.0774

Notes: Results from simultaneous quantile regression (5), as depicted in Fig. 9 a. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis.

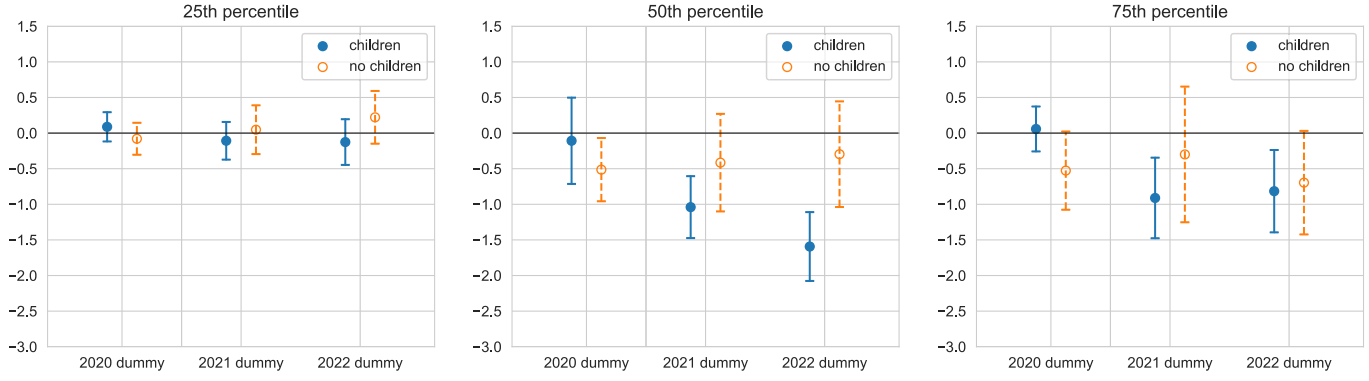


Fig. 44. Covid-dummies interacted with gender, controlling for worker/partner characteristics Note: The sample includes couples age 30–40 and compares couples without children with couples with children younger than 10. The sample is restricted to only include observations from 2016 onward. The covariates include: Tenure of the partner, a linear time trend, a linear time trend x female, yearly covid dummies, yearly covid dummies x female, age fixed effects, age fixed effects x female, occupation fixed effects (where we distinguish between 5 groups: (1) managers; and professionals and highly qualified white collar workers (2) administrative and other white collar (3) services blue collar workers (hospitality, sales) (4) other skilled blue collar workers and (5) unskilled blue collars). The dots more the effect of being a woman (with or without kids) on the predicted tenure. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Table 12
Full set of controls, mothers 30–40 years of age, children younger than 10 .

	Parents			Couples without Children		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
Tenure Partner	0.097***	0.191***	0.173***	0.072***	0.151***	0.162***
	(0.0020)	(0.0030)	(0.0023)	(0.0039)	(0.0039)	(0.0045)
t	0.034***	0.047***	−0.026***	0.047***	0.049***	0.001
	(0.0024)	(0.0057)	(0.0055)	(0.0037)	(0.0054)	(0.0053)
t^2	−0.001***	−0.001***	0.000***	−0.001***	−0.001***	0.000*
	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
t x female	0.039***	−0.011	−0.002	0.006	0.012*	0.008
	(0.0041)	(0.0081)	(0.0064)	(0.0056)	(0.0065)	(0.0077)
t^2 x female	−0.000***	0.001***	0.000***	−0.000	−0.000	−0.000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
δ_{2020}	0.369***	−0.165	−0.006	0.419***	−0.241	−0.310
	(0.0820)	(0.1995)	(0.1748)	(0.0735)	(0.2043)	(0.2379)
δ_{2021}	0.725***	0.155	0.361**	0.865***	0.115	−0.296
	(0.1376)	(0.2021)	(0.1699)	(0.1194)	(0.2041)	(0.2118)
δ_{2022}	1.125***	0.118	−0.121	0.887***	0.097	−0.852***
	(0.0667)	(0.1741)	(0.2342)	(0.1244)	(0.2849)	(0.2931)
female	−0.864***	−1.178***	−1.345***	−0.118*	−0.844***	−1.574***
	(0.0444)	(0.1115)	(0.1126)	(0.0693)	(0.1042)	(0.1649)
δ_{2020} x female	−0.309***	−0.655**	−0.330	−0.181**	−0.293	−0.684**
	(0.1007)	(0.2921)	(0.2260)	(0.0886)	(0.2556)	(0.3229)
δ_{2021} x female	−0.616***	−1.778***	−1.471***	−0.261*	−0.427*	−0.597*
	(0.1445)	(0.2845)	(0.2232)	(0.1456)	(0.2279)	(0.3603)
δ_{2022} x female	−0.863***	−2.176***	−1.599***	−0.085	−0.361	−0.891**
	(0.1292)	(0.2394)	(0.3118)	(0.2045)	(0.3591)	(0.4391)
Part time x male	−1.822***	−3.993***	−4.372***	−1.538***	−3.543***	−4.568***
	(0.0399)	(0.0857)	(0.1805)	(0.0382)	(0.0737)	(0.1424)
Part time x female	−0.915***	−1.392***	−1.061***	−1.174***	−2.390***	−2.977***
	(0.0230)	(0.0363)	(0.0365)	(0.0282)	(0.0436)	(0.0911)
College x male	1.065***	0.556***	−1.187***	0.374***	−0.099	−1.595***
	(0.0285)	(0.0497)	(0.0416)	(0.0328)	(0.0603)	(0.0663)
College x female	1.421***	1.737***	0.048	0.440***	0.537***	−0.369***
	(0.0375)	(0.0381)	(0.0468)	(0.0383)	(0.0681)	(0.0923)
Less than High-school x male	−0.779***	−1.948***	−2.566***	−0.625***	−1.383***	−1.527***
	(0.0596)	(0.0927)	(0.1896)	(0.0689)	(0.1543)	(0.2236)
Less than High-school x female	−0.428***	−1.468***	−2.929***	−0.587***	−0.737***	−1.806***
	(0.0424)	(0.0877)	(0.1544)	(0.0860)	(0.1498)	(0.1418)
Partner self-employed x male	0.001	−0.031	0.302***	−0.076	0.070	0.290***
	(0.0671)	(0.0879)	(0.0908)	(0.0479)	(0.1157)	(0.1101)
Partner self-employed x female	−0.012	0.179***	0.205***	0.010	−0.106	−0.026
	(0.0385)	(0.0466)	(0.0334)	(0.0371)	(0.0678)	(0.0766)
Partner college x male	0.695***	0.869***	0.277***	0.450***	0.622***	0.210**
	(0.0335)	(0.0431)	(0.0680)	(0.0378)	(0.0589)	(0.0867)
Partner college x female	0.600***	0.495***	−0.045	−0.004	−0.121**	−0.441***
	(0.0346)	(0.0467)	(0.0336)	(0.0278)	(0.0513)	(0.0673)
Partner less than High-school x male	−0.240***	−0.814***	−1.828***	−0.329***	−0.764***	−1.913***
	(0.0557)	(0.1041)	(0.1278)	(0.0922)	(0.1721)	(0.2425)
Partner less than High-school x female	−0.390***	−1.046***	−1.803***	−0.323***	−0.357***	−0.209
	(0.0293)	(0.0773)	(0.1249)	(0.0687)	(0.1303)	(0.1516)
Age > 35	0.703***	1.897***	3.104***	0.456***	1.677***	2.926***
	(0.0186)	(0.0277)	(0.0307)	(0.0145)	(0.0407)	(0.0417)
β_0	0.805***	3.451***	9.186***	0.779***	3.328***	8.255***
	(0.0245)	(0.0752)	(0.0839)	(0.0497)	(0.0767)	(0.0907)
N	315,173	315,173	315,173	134,841	134,841	134,841
Pseudo R^2	0.0466	0.0267	0.0688	0.0502	0.0695	0.0840

Results from simultaneous quantile regression (5), as depicted in Fig. 10. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis.

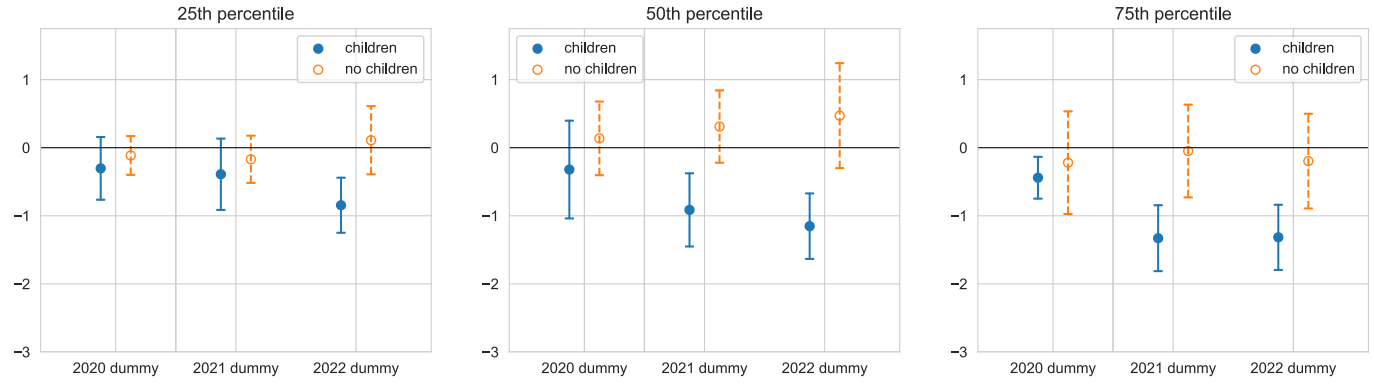


Fig. 45. Covid-dummies interacted with gender, controlling for worker/partner characteristics Note: The sample includes couples age 30–40 and compares couples without children with couples with children younger than 10. The covariates include: Tenure of the partner, a linear time trend, a linear time trend x female, a quadratic component of the time trend (also interacted with a dummy for being a female), yearly Covid dummies, yearly Covid dummies x female, dummies for: part-time, part-time x female, college, college x female, less than high-school, less than high-school x female, partner self-employed, partner self-employed x female, partner college, partner college x female, partner less than high-school, partner less than high-school x female, age fixed effects and occupation fixed effects where we classify three groups: (1) managers; and professionals and highly qualified white collar workers (2) administrative and other white collar (3) services blue collar workers (hospitality, sales) and exclude (4) other skilled blue collar workers (5) unskilled blue collars. The dots more the effect of being a woman (with or without kids) on the predicted tenure. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Table 13
Pooled tenure regressions, unemployment as trend .

	Parents, 25th pctl	Parents, 50th pctl	Parents, 75th pctl
β_0	0.943***	4.243***	9.473***
	(0.0444)	(0.0598)	(0.0662)
female	−0.930***	−1.087***	−1.038***
	(0.0551)	(0.0890)	(0.0780)
t	−0.013***	−0.000	0.001
	(0.0007)	(0.0022)	(0.0017)
t x female	0.018***	0.045***	0.023***
	(0.0013)	(0.0025)	(0.0020)
unemployment rate	0.061***	0.053***	−0.012**
	(0.0030)	(0.0048)	(0.0052)
unemployment rate x female	0.088***	0.035***	−0.025***
	(0.0028)	(0.0038)	(0.0025)
Age 35–40	1.133***	2.650***	3.615***
	(0.0305)	(0.0561)	(0.0583)
Age 35–40 x female	−0.216***	−0.221***	−0.078
	(0.0446)	(0.0675)	(0.0741)
δ_{2020}	0.509***	−0.327*	0.339**
	(0.0782)	(0.1798)	(0.1643)
δ_{2020} x female	−0.623***	−0.897***	−0.238
	(0.1124)	(0.2818)	(0.1966)
δ_{2021}	0.683***	−0.441***	0.685***
	(0.0726)	(0.1409)	(0.0942)
δ_{2021} x female	−0.789***	−1.613***	−0.848***
	(0.1172)	(0.1348)	(0.1030)
δ_{2022}	0.813***	−0.524***	0.054
	(0.0983)	(0.1328)	(0.1561)
δ_{2022} x female	−0.961***	−1.874***	−0.801***
	(0.1287)	(0.2223)	(0.2020)
N	413,371	413,371	413,371
Pseudo R^2	0.0101	0.0238	0.0415

Notes: Coefficients from simulatanous quantile regression (6), with a linear trend and controls variables on unemployment. The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis.

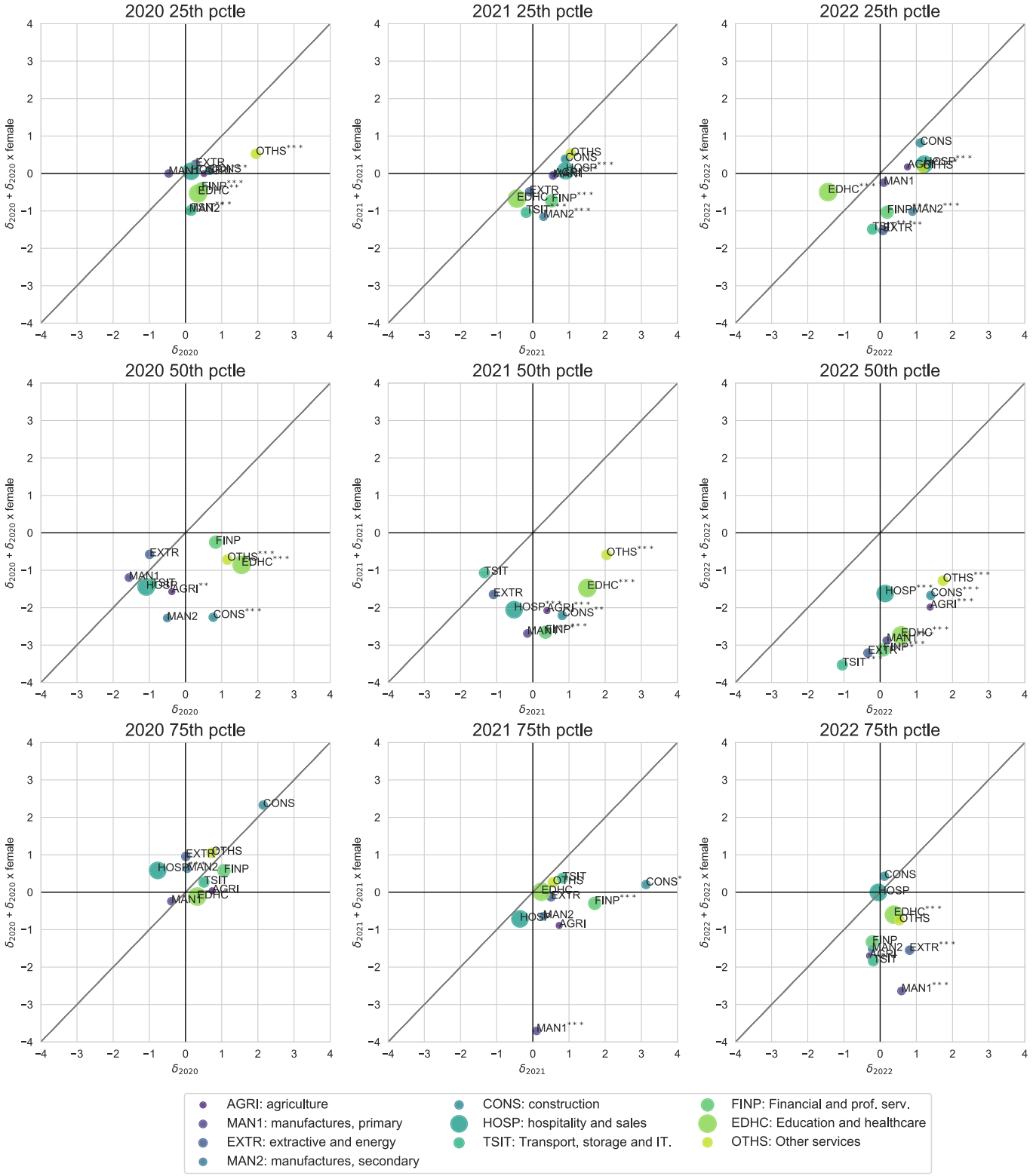


Fig. 46. Interaction variables in quantile regressions, men and women with children Notes: Coefficients from Tables 4 and 19, from regression (7), where occupation dummies have been replaced by industry. x-axis represents the industry-effect for men (interaction $year \times industry$) while y-axis reflects the total industry-effect for women (interaction $year \times industry$ + interaction $year \times industry \times female$). Scale is years of tenure.

Table 14
Pooled tenure regressions, occupation interactions, all other coefficients .

	Parents, 25th pctl	Parents, 50th pctl	Parents, 75th pctl
t	−0.011***	−0.007***	−0.004**
	(0.0007)	(0.0014)	(0.0019)
t x female	0.012***	0.038***	0.026***
	(0.0009)	(0.0019)	(0.0023)
unemployment rate x male	0.034***	0.046***	0.004
	(0.0029)	(0.0040)	(0.0038)
unemployment rate x female	0.055***	0.019***	−0.028***
	(0.0020)	(0.0034)	(0.0030)
female	−0.063	0.191**	0.538***
	(0.0884)	(0.0829)	(0.0763)
age 35–40	0.781***	2.353***	3.481***
	(0.0306)	(0.0405)	(0.0526)
age 35–40 x female	−0.087**	−0.209***	−0.086
	(0.0377)	(0.0593)	(0.0692)
occ group 2	−0.474***	0.330***	1.506***
	(0.0585)	(0.0577)	(0.0589)
occ group 3	−0.664***	0.781***	2.399***
	(0.0780)	(0.0885)	(0.0769)
occ group 4	−2.150***	−1.787***	0.648***
	(0.0534)	(0.0708)	(0.0592)
occ group 5	−3.265***	−4.557***	−2.769***
	(0.0451)	(0.0748)	(0.1101)
occ group 2 x female	−0.846***	−0.897***	−1.194***
	(0.0690)	(0.0815)	(0.0763)
occ group 3 x female	−2.216***	−3.523***	−2.909***
	(0.0990)	(0.0944)	(0.0871)
occ group 4 x female	−0.923***	−0.797***	−0.681***
	(0.0814)	(0.1594)	(0.1275)
occ group 5 x female	−0.530***	−0.939***	−1.748***
	(0.0594)	(0.0888)	(0.1364)
β_0	3.163***	5.565***	8.520***
	(0.0556)	(0.0447)	(0.0565)
N	409,631	409,631	409,631
Pseudo R^2	0.0453	0.0644	0.0640

Notes: Coefficients of Eq. (7). The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. The occupation interactions are presented in Table3 in the main text.

Table 15
Adults age 30–35, quantile tenure regressions, occupation interactions with Covid years (I) .

	Children younger than 5			Children younger than 10			Children younger than 15		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
t	−0.008***	−0.009***	0.018***	−0.008***	−0.009***	0.019***	−0.008***	−0.009***	0.019***
	(0.0012)	(0.0024)	(0.0026)	(0.0006)	(0.0018)	(0.0012)	(0.0009)	(0.0023)	(0.0017)
t x female	0.005***	0.027***	0.017***	0.005***	0.029***	0.017***	0.005***	0.029***	0.017***
	(0.0018)	(0.0038)	(0.0034)	(0.0010)	(0.0025)	(0.0020)	(0.0009)	(0.0038)	(0.0023)
unemployment rate x male	0.034***	0.074***	0.022***	0.034***	0.075***	0.018***	0.034***	0.075***	0.018**
	(0.0031)	(0.0049)	(0.0068)	(0.0025)	(0.0045)	(0.0058)	(0.0036)	(0.0048)	(0.0079)
unemployment rate x female	0.062***	0.061***	0.015**	0.061***	0.065***	0.020***	0.061***	0.064***	0.019***
	(0.0037)	(0.0074)	(0.0061)	(0.0036)	(0.0058)	(0.0042)	(0.0035)	(0.0063)	(0.0050)
female	−0.228**	0.579***	1.467***	−0.214***	0.580***	1.495***	−0.213**	0.579***	1.494***
	(0.1094)	(0.0741)	(0.0771)	(0.0826)	(0.1161)	(0.0867)	(0.0936)	(0.1065)	(0.0982)
occ group 2	−0.665***	0.478***	1.793***	−0.684***	0.447***	1.810***	−0.656***	0.418***	1.802***
	(0.0744)	(0.1065)	(0.0790)	(0.0934)	(0.0838)	(0.0723)	(0.1166)	(0.1297)	(0.0568)
occ group 3	−1.401***	−0.921***	1.177***	−1.427***	−1.015***	1.118***	−1.421***	−1.013***	1.118***
	(0.0521)	(0.0721)	(0.0603)	(0.0427)	(0.0712)	(0.0702)	(0.0721)	(0.0772)	(0.0930)
occ group 4	−2.317***	−3.351***	−2.054***	−2.329***	−3.361***	−2.069***	−2.323***	−3.352***	−2.055***
	(0.0590)	(0.1021)	(0.1183)	(0.0355)	(0.0856)	(0.1501)	(0.0644)	(0.0717)	(0.1390)
occ group 5	−0.336	−0.360	−1.953***	−0.327	−0.322*	−1.739**	−0.321*	−0.320	−1.739***
	(0.2493)	(0.2672)	(0.7096)	(0.2414)	(0.1853)	(0.8213)	(0.1896)	(0.2176)	(0.6193)
occ group 2 x female	−0.727***	−0.753***	−0.977***	−0.774***	−0.870***	−1.177***	−0.777***	−0.877***	−1.165***
	(0.0978)	(0.1084)	(0.1482)	(0.1065)	(0.1629)	(0.1266)	(0.1045)	(0.1574)	(0.1291)
occ group 3 x female	−1.354***	−1.982***	−1.472***	−1.382***	−2.191***	−1.796***	−1.407***	−2.150***	−1.786***
	(0.0962)	(0.0766)	(0.1307)	(0.0853)	(0.0987)	(0.1291)	(0.1118)	(0.1633)	(0.1520)
occ group 4 x female	−0.702***	0.040	−0.221	−0.739***	−0.423**	−0.713***	−0.743***	−0.449**	−0.730***
	(0.0774)	(0.1983)	(0.1644)	(0.0860)	(0.1986)	(0.2125)	(0.0664)	(0.2234)	(0.2385)
occ group 5 x female	−0.528***	−0.757***	−0.996***	−0.477***	−0.784***	−1.176***	−0.481***	−0.798***	−1.198***
	(0.0586)	(0.0849)	(0.1733)	(0.0468)	(0.0748)	(0.1610)	(0.0553)	(0.1029)	(0.2594)
β_0	2.438***	4.625***	7.495***	2.433***	4.607***	7.535***	2.432***	4.613***	7.537***
	(0.0597)	(0.0799)	(0.1046)	(0.0526)	(0.0814)	(0.0959)	(0.0781)	(0.0887)	(0.1130)
N	136,361	136,361	136,361	136,361	136,361	136,361	136,361	136,361	136,361
Pseudo R^2	0.0354	0.0443	0.0306	0.0354	0.0443	0.0306	0.0354	0.0443	0.0306

Notes: Coefficients of Eq. (6). The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. The occupation interactions are presented in the next table.

Table 16
Adults age 30–35, quantile tenure regressions, occupation interactions with Covid years (II) .

	Children younger than 5			Children younger than 10			Children younger than 15		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
δ_{2020} x occ group 1	0.297	−0.382	−0.791	0.090	−0.403	−0.853*	0.093	−0.399	−0.852*
	(0.3415)	(0.3899)	(0.7011)	(0.2896)	(0.4145)	(0.4876)	(0.3257)	(0.3649)	(0.4616)
δ_{2020} x occ group 2	0.651***	0.271	−0.042	0.702***	0.297	0.034	0.680***	0.329	0.042
	(0.2077)	(0.2647)	(0.4678)	(0.2337)	(0.4420)	(0.3559)	(0.2194)	(0.4846)	(0.4250)
δ_{2020} x occ group 3	0.565***	0.618***	0.832***	0.589***	0.692***	0.844**	0.589***	0.651***	0.844**
	(0.1602)	(0.2204)	(0.2992)	(0.1331)	(0.2541)	(0.3902)	(0.1440)	(0.2083)	(0.3338)
δ_{2020} x occ group 4	0.231**	0.018	−1.603***	0.264***	0.022	−1.753***	0.264***	0.016	−1.767**
	(0.1092)	(0.2736)	(0.4552)	(0.0907)	(0.4100)	(0.4967)	(0.0769)	(0.3645)	(0.7668)
δ_{2020} x occ group 5	−0.125	0.182	−1.021**	−0.114	0.178	−1.059***	−0.109	0.180	−1.059**
	(0.2082)	(0.5095)	(0.4876)	(0.3941)	(0.4768)	(0.4016)	(0.3862)	(0.4003)	(0.5130)
δ_{2021} x occ group 1	−0.314	−0.128	0.508	−0.317	−0.133	0.434	−0.313	−0.130	0.436
	(0.4545)	(0.3826)	(0.6587)	(0.4890)	(0.3820)	(0.5830)	(0.4784)	(0.3516)	(0.8468)
δ_{2021} x occ group 2	0.757*	0.431	1.186*	0.786	0.459	1.124*	0.764**	0.490	1.133*
	(0.4254)	(0.9315)	(0.7192)	(0.3048)	(0.5799)	(0.6706)	(0.3627)	(0.7638)	(0.6755)
δ_{2021} x occ group 3	0.857***	1.186***	0.628*	0.779***	1.276***	0.644	0.780***	1.277***	0.645**
	(0.2189)	(0.3263)	(0.3477)	(0.2193)	(0.4217)	(0.4244)	(0.2107)	(0.3730)	(0.3247)
δ_{2021} x occ group 4	0.410***	1.116***	−1.805***	0.463***	1.141***	−1.580***	0.462***	1.135***	−1.593***
	(0.0821)	(0.2671)	(0.5603)	(0.1646)	(0.2401)	(0.4752)	(0.1477)	(0.2498)	(0.4581)
δ_{2021} x occ group 5	0.667**	0.842**	−0.336	0.680**	0.842**	−0.390	0.685**	0.842*	−0.390
	(0.2679)	(0.3399)	(0.4547)	(0.2842)	(0.3655)	(0.3367)	(0.2791)	(0.4696)	(0.4922)
δ_{2022} x occ group 1	−0.355	−0.496	−2.506***	−0.356	−0.497**	−2.589***	−0.352	−0.495	−2.587***
	(0.3600)	(0.3325)	(0.6260)	(0.4356)	(0.2163)	(0.6242)	(0.5270)	(0.3097)	(0.6248)
δ_{2022} x occ group 2	0.082	−0.387	0.121	0.197	−0.355	−0.118	0.174	−0.326	−0.108
	(0.3076)	(0.5142)	(0.1735)	(0.3886)	(0.2815)	(0.2577)	(0.4003)	(0.5942)	(0.2617)
δ_{2022} x occ group 3	0.235*	0.164	−1.640***	0.190	0.181	−1.962***	0.190	0.181	−1.962***
	(0.1357)	(0.3111)	(0.5508)	(0.1374)	(0.3096)	(0.4453)	(0.1767)	(0.2740)	(0.5644)
δ_{2022} x occ group 4	0.436***	1.262***	−1.992***	0.509***	1.436***	−2.026***	0.508***	1.429***	−2.040***
	(0.1226)	(0.4338)	(0.2430)	(0.0915)	(0.5089)	(0.1936)	(0.1167)	(0.3761)	(0.1929)
δ_{2022} x occ group 5	−0.118	0.234*	0.221*	−0.088	0.128	0.090	−0.087	0.121	0.091
	(0.1091)	(0.1315)	(0.1182)	(0.0929)	(0.1269)	(0.1187)	(0.1106)	(0.1440)	(0.1104)
δ_{2020} x occ group 1 x female	−0.921***	−1.531***	1.187	−0.894***	−1.511***	1.002	−0.898***	−1.516***	1.005
	(0.2859)	(0.3372)	(0.8108)	(0.2560)	(0.2224)	(0.9301)	(0.2797)	(0.3591)	(0.7141)
δ_{2020} x occ group 2 x female	−0.498	−1.614***	0.423	−0.234	−1.596***	0.500	−0.234	−1.601***	0.493
	(0.3540)	(0.4604)	(0.8771)	(0.2417)	(0.4324)	(0.7159)	(0.3550)	(0.3653)	(0.5452)
δ_{2020} x occ group 3 x female	−0.468*	−0.509	0.675	−0.477**	−0.423	0.554	−0.455	−0.476	0.495
	(0.2531)	(0.5885)	(0.5962)	(0.2042)	(0.6142)	(0.3707)	(0.2770)	(0.6942)	(0.6041)
δ_{2020} x occ group 4 x female	−0.618*	−2.062***	−2.916**	−0.545*	−1.958**	−2.538*	−0.545*	−1.902***	−2.516**
	(0.3246)	(0.6685)	(1.3062)	(0.3165)	(0.8040)	(1.3353)	(0.3132)	(0.6909)	(1.1646)
δ_{2020} x occ group 5 x female	−0.095	−0.317	0.309	−0.131	−0.413	0.298	−0.131	−0.412	0.324
	(0.1110)	(0.4388)	(0.6805)	(0.1361)	(0.5769)	(0.6272)	(0.1005)	(0.4264)	(0.8148)
δ_{2021} x occ group 1 x female	−0.654**	−1.429***	0.738	−0.663	−1.439**	0.758	−0.667	−1.443***	0.760
	(0.3078)	(0.5325)	(0.5501)	(0.4303)	(0.6742)	(0.4718)	(0.4093)	(0.4790)	(0.5541)
δ_{2021} x occ group 2 x female	−0.139	−1.912***	−1.933***	−0.139	−1.959***	−1.825***	−0.139	−1.965***	−1.832**
	(0.5187)	(0.6013)	(0.7342)	(0.5402)	(0.4229)	(0.6030)	(0.5501)	(0.6028)	(0.8229)
δ_{2021} x occ group 3 x female	−0.563	−1.224	−2.152***	−0.508	−1.293*	−1.961**	−0.486	−1.346	−1.966**
	(0.4773)	(1.0896)	(0.7519)	(0.3920)	(0.7051)	(0.8149)	(0.3859)	(0.8503)	(0.8188)
δ_{2021} x occ group 4 x female	−1.162***	−4.129***	−5.578***	−1.020**	−3.773***	−5.205***	−1.020***	−3.759***	−5.183***
	(0.3257)	(0.4613)	(0.5306)	(0.4755)	(0.5832)	(1.0282)	(0.3247)	(0.4508)	(0.8027)
δ_{2021} x occ group 5 x female	−0.473***	−2.522***	−0.457	−0.445**	−2.491***	−0.330	−0.444***	−2.490***	−0.099
	(0.1086)	(0.4364)	(0.8236)	(0.1799)	(0.2849)	(0.5511)	(0.1537)	(0.4174)	(0.8237)
δ_{2022} x occ group 1 x female	−0.903***	−2.748***	−1.915***	−0.982**	−2.756***	−1.883***	−0.985***	−2.760***	−1.882***
	(0.3416)	(0.3774)	(0.5307)	(0.4302)	(0.3610)	(0.3911)	(0.3104)	(0.4720)	(0.5580)
δ_{2022} x occ group 2 x female	−0.615	−1.503***	−0.103	−0.566	−1.615***	0.004	−0.566	−1.620***	−0.006
	(0.4019)	(0.5583)	(0.7820)	(0.4366)	(0.4407)	(0.7629)	(0.5172)	(0.4610)	(0.6442)
δ_{2022} x occ group 3 x female	0.167	−0.783	−3.311***	−0.021	−0.718	−3.078***	0.002	−0.771	−3.129***
	(0.2626)	(0.5622)	(0.4208)	(0.4186)	(0.4851)	(0.5154)	(0.3968)	(0.6399)	(0.4407)
δ_{2022} x occ group 4 x female	−0.474	−2.896***	−3.268***	−0.414	−2.469***	−2.543***	−0.413	−2.455***	−2.524**
	(0.3058)	(0.6518)	(0.6597)	(0.2708)	(0.5837)	(0.6951)	(0.2856)	(0.8142)	(1.1501)
δ_{2022} x occ group 5 x female	−0.278**	−2.682***	−1.827***	−0.342***	−2.851***	−1.075**	−0.341**	−2.742***	−0.971
	(0.1341)	(0.4917)	(0.6936)	(0.1062)	(0.5136)	(0.5438)	(0.1431)	(0.5009)	(0.7087)
N	136,361	136,361	136,361	136,361	136,361	136,361	136,361	136,361	136,361
Pseudo R^2	0.0354	0.0443	0.0306	0.0354	0.0443	0.0306	0.0354	0.0443	0.0306

Notes: Interaction coefficients of equation (7). The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. Remaining coefficients are in the previous table.

Table 17
Adults age 35–40, quantile tenure regressions, occupation interactions with Covid years (I) .

	Children younger than 5			Children younger than 10			Children younger than 15		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
t	−0.013***	−0.006**	−0.013***	−0.013***	−0.009***	−0.016***	−0.013***	−0.009***	−0.016***
	(0.0013)	(0.0027)	(0.0021)	(0.0008)	(0.0020)	(0.0014)	(0.0010)	(0.0020)	(0.0014)
t x female	0.019***	0.043***	0.023***	0.017***	0.046***	0.029***	0.016***	0.045***	0.030***
	(0.0019)	(0.0034)	(0.0029)	(0.0018)	(0.0017)	(0.0019)	(0.0016)	(0.0029)	(0.0023)
unemployment rate x male	0.035***	0.025***	−0.017***	0.033***	0.030***	−0.014***	0.033***	0.028***	−0.016***
	(0.0037)	(0.0073)	(0.0062)	(0.0031)	(0.0053)	(0.0050)	(0.0034)	(0.0044)	(0.0033)
unemployment rate x female	0.046***	−0.022***	−0.077***	0.049***	−0.008	−0.069***	0.048***	−0.006	−0.068***
	(0.0039)	(0.0037)	(0.0042)	(0.0041)	(0.0063)	(0.0058)	(0.0039)	(0.0043)	(0.0043)
female	−0.622***	0.248**	1.535***	−0.652***	0.216***	1.538***	−0.644***	0.226***	1.537***
	(0.1248)	(0.1000)	(0.0713)	(0.0618)	(0.0575)	(0.0802)	(0.1073)	(0.0811)	(0.0668)
occ group 2	−0.336***	1.237***	2.563***	−0.537***	1.176***	2.650***	−0.563***	1.173***	2.643***
	(0.1017)	(0.0609)	(0.0551)	(0.1087)	(0.0686)	(0.0870)	(0.1056)	(0.0654)	(0.0730)
occ group 3	−2.467***	−2.035***	0.525***	−2.581***	−2.252***	0.395***	−2.570***	−2.257***	0.398***
	(0.0758)	(0.0885)	(0.0592)	(0.0764)	(0.0723)	(0.0576)	(0.0782)	(0.0699)	(0.0497)
occ group 4	−3.950***	−5.331***	−3.007***	−3.997***	−5.456***	−3.224***	−3.983***	−5.453***	−3.213***
	(0.0717)	(0.1148)	(0.1209)	(0.0762)	(0.0981)	(0.1203)	(0.0815)	(0.0904)	(0.1359)
occ group 5	−0.995***	−1.149***	0.358**	−0.936***	−0.999***	0.474***	−0.922***	−1.004**	0.438
	(0.1794)	(0.3441)	(0.1511)	(0.1491)	(0.2600)	(0.1653)	(0.2288)	(0.3938)	(0.3038)
occ group 2 x female	−0.765***	−0.448***	0.058	−0.938***	−0.789***	−0.234	−0.935***	−0.895***	−0.366**
	(0.1099)	(0.1282)	(0.1173)	(0.0994)	(0.1587)	(0.1884)	(0.1193)	(0.1219)	(0.1471)
occ group 3 x female	−2.986***	−3.725***	−1.759***	−3.016***	−4.551***	−2.609***	−2.979***	−4.720***	−2.845***
	(0.1304)	(0.2004)	(0.1501)	(0.1065)	(0.1925)	(0.2002)	(0.0991)	(0.1390)	(0.1376)
occ group 4 x female	−1.290***	−0.232	0.893***	−1.274***	−1.061***	0.213	−1.326***	−1.242***	−0.087
	(0.1227)	(0.1951)	(0.1699)	(0.0960)	(0.2356)	(0.1762)	(0.0722)	(0.1791)	(0.1799)
occ group 5 x female	−0.666***	−0.996***	−0.828***	−0.647***	−1.117***	−1.324***	−0.601***	−1.105***	−1.434***
	(0.0688)	(0.1038)	(0.1818)	(0.0638)	(0.1768)	(0.2353)	(0.0558)	(0.0824)	(0.1386)
β_0	4.353***	8.505***	12.647***	4.388***	8.522***	12.698***	4.378***	8.531***	12.735***
	(0.1064)	(0.1099)	(0.0828)	(0.0908)	(0.1067)	(0.1175)	(0.0920)	(0.0699)	(0.0739)
N	277,632	277,632	277,632	277,632	277,632	277,632	277,632	277,632	277,632
Pseudo R^2	0.0451	0.0522	0.0295	0.0451	0.0522	0.0295	0.0451	0.0522	0.0295

Notes: Coefficients of equation (7). The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis. The occupation interactions are presented in the next table.

Table 18
Adults age 35–40, quantile tenure regressions, occupation interactions with Covid years (II) .

	Children younger than 5			Children younger than 10			Children younger than 15		
	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl	25th pctl	50th pctl	75th pctl
δ_{2020} x occ group 1	−0.041	0.154	0.601**	−0.068	0.136	0.687***	−0.062	0.125	0.710***
	(0.1872)	(0.6254)	(0.2622)	(0.1136)	(0.4650)	(0.2567)	(0.1759)	(0.2997)	(0.2163)
δ_{2020} x occ group 2	1.193***	1.165***	−0.138	1.102***	1.158***	−0.147	1.123***	1.161***	−0.146
	(0.4437)	(0.3076)	(0.1222)	(0.3115)	(0.3428)	(0.1040)	(0.3532)	(0.3092)	(0.1298)
δ_{2020} x occ group 3	0.408***	−0.864***	1.067***	0.460***	−0.752**	1.163***	0.464***	−0.747**	1.123***
	(0.0805)	(0.2920)	(0.2254)	(0.0932)	(0.3648)	(0.3090)	(0.1051)	(0.3084)	(0.2596)
δ_{2020} x occ group 4	0.640***	−0.349	−1.608*	0.644***	−0.108	−1.302	0.645***	−0.113	−1.349
	(0.1710)	(0.3303)	(0.9544)	(0.0986)	(0.1723)	(0.8583)	(0.0877)	(0.1663)	(0.8761)
δ_{2020} x occ group 5	−1.067***	−1.329***	0.676	−1.104***	−1.097***	0.792**	−1.089***	−1.099***	0.781**
	(0.1587)	(0.4789)	(0.4521)	(0.1580)	(0.3324)	(0.3730)	(0.1858)	(0.4004)	(0.3848)
δ_{2021} x occ group 1	0.434*	0.006	1.891***	0.371**	−0.040	1.993***	0.378*	−0.050	1.988***
	(0.2265)	(0.6713)	(0.2184)	(0.1593)	(0.3845)	(0.1679)	(0.2015)	(0.7462)	(0.1840)
δ_{2021} x occ group 2	0.602**	0.435	−0.378	0.554	0.477	−0.442	0.594*	0.478	−0.446
	(0.2845)	(0.5577)	(0.2638)	(0.2151)	(0.3712)	(0.3025)	(0.3069)	(0.5770)	(0.3062)
δ_{2021} x occ group 3	0.656***	−0.913***	1.160***	0.727***	−0.595*	1.147***	0.731***	−0.632**	1.133***
	(0.1398)	(0.3286)	(0.4201)	(0.1057)	(0.3290)	(0.4024)	(0.1329)	(0.3066)	(0.3850)
δ_{2021} x occ group 4	0.889***	0.800**	1.525**	0.893***	0.905***	1.515***	0.894***	0.853**	1.494***
	(0.1886)	(0.3458)	(0.6721)	(0.1454)	(0.3242)	(0.5793)	(0.1866)	(0.4121)	(0.5583)
δ_{2021} x occ group 5	−0.508**	−1.376***	0.453	−0.500*	−1.255***	0.580	−0.486**	−1.261***	0.569
	(0.2583)	(0.3061)	(0.2812)	(0.2808)	(0.3021)	(0.4418)	(0.2246)	(0.2098)	(0.3758)
δ_{2022} x occ group 1	0.753***	−0.458	1.826***	0.574***	−0.468	1.728***	0.581**	−0.483	1.717***
	(0.2802)	(0.4802)	(0.3271)	(0.2018)	(0.3621)	(0.2967)	(0.2572)	(0.3363)	(0.3523)
δ_{2022} x occ group 2	−0.272	−0.650	0.573	−0.290	−0.478	0.578	−0.178	−0.479	0.575
	(0.3820)	(0.6458)	(0.3721)	(0.4393)	(0.6363)	(0.4048)	(0.6215)	(0.6945)	(0.4663)
δ_{2022} x occ group 3	0.937***	−0.259	0.670*	0.914***	0.001	0.750*	0.912***	−0.000	0.690*
	(0.1567)	(0.3094)	(0.3615)	(0.1961)	(0.2979)	(0.4014)	(0.1951)	(0.2310)	(0.3552)
δ_{2022} x occ group 4	1.253***	1.835***	1.776**	1.022***	1.785***	2.035**	1.075***	1.695***	1.967***
	(0.3538)	(0.4716)	(0.8952)	(0.3342)	(0.6044)	(0.9508)	(0.2732)	(0.4053)	(0.4546)
δ_{2022} x occ group 5	0.017	0.245	1.137***	−0.061	−0.021	0.914***	−0.015	−0.068	0.802***
	(0.1275)	(0.1514)	(0.1128)	(0.1176)	(0.1664)	(0.1825)	(0.1469)	(0.0933)	(0.1101)
δ_{2020} x occ group 1 x female	−0.225	0.504	−0.550***	−0.258	0.410	−0.778***	−0.262	0.424	−0.782**
	(0.2884)	(0.3568)	(0.1586)	(0.3014)	(0.2878)	(0.2261)	(0.3241)	(0.4015)	(0.3213)
δ_{2020} x occ group 2 x female	−0.596	−1.077	−0.873**	−0.645***	−1.118**	−1.144***	−0.641***	−1.072	−1.183***
	(0.3930)	(0.8482)	(0.3549)	(0.1698)	(0.4878)	(0.3675)	(0.2444)	(0.6630)	(0.3062)
δ_{2020} x occ group 3 x female	−0.811*	−0.060	1.278***	−0.851**	−0.448	1.369***	−0.780**	−0.262	1.426***
	(0.4426)	(0.5364)	(0.1950)	(0.4118)	(0.5902)	(0.2693)	(0.3912)	(0.6339)	(0.2976)
δ_{2020} x occ group 4 x female	0.278	2.731*	0.311	0.057	2.484	0.208	−0.109	2.598	0.264
	(0.3729)	(1.4543)	(0.6339)	(0.3753)	(1.8005)	(0.4575)	(0.3149)	(1.9756)	(0.4394)
δ_{2020} x occ group 5 x female	−0.882***	−1.223**	1.071	−0.803***	−1.011***	1.412	−0.806***	−1.045***	1.704
	(0.1783)	(0.5035)	(1.2007)	(0.1329)	(0.3138)	(1.0537)	(0.1604)	(0.2582)	(1.1089)
δ_{2021} x occ group 1 x female	−0.347	0.235	−0.889*	−0.147	0.029	−1.137***	−0.148	0.042	−1.170***
	(0.2907)	(0.4973)	(0.4615)	(0.2983)	(0.5439)	(0.3946)	(0.3015)	(0.5119)	(0.3972)
δ_{2021} x occ group 2 x female	−1.277***	−2.354***	−2.046***	−1.046***	−2.142***	−2.228***	−1.004***	−2.073**	−2.289***
	(0.2893)	(0.7134)	(0.2478)	(0.2446)	(0.6858)	(0.3210)	(0.2336)	(0.8118)	(0.2600)
δ_{2021} x occ group 3 x female	−0.565	−1.609***	0.998***	−0.562**	−1.697***	1.428***	−0.590*	−1.639**	1.434***
	(0.3476)	(0.6167)	(0.3657)	(0.2581)	(0.5555)	(0.3483)	(0.3377)	(0.7322)	(0.4170)
δ_{2021} x occ group 4 x female	−0.130	−1.316**	−0.654	−0.074	−0.848*	−0.103	−0.144	−0.744*	−0.032
	(0.3559)	(0.5346)	(0.6644)	(0.3274)	(0.4716)	(0.7929)	(0.2751)	(0.4485)	(0.7006)
δ_{2021} x occ group 5 x female	−1.202***	−2.134***	−1.003	−1.118***	−2.296***	−2.212**	−1.098***	−2.215***	−2.325**
	(0.2587)	(0.4653)	(1.4100)	(0.2089)	(0.4736)	(1.0386)	(0.1835)	(0.5114)	(0.9613)
δ_{2022} x occ group 1 x female	−0.926**	−1.655***	−0.981***	−0.882***	−1.683***	−1.232**	−0.854***	−1.658***	−1.269***
	(0.4017)	(0.3686)	(0.3058)	(0.3328)	(0.3066)	(0.4891)	(0.2707)	(0.2822)	(0.4055)
δ_{2022} x occ group 2 x female	−1.450***	−1.930***	−1.818***	−1.261***	−1.786***	−1.769***	−1.234***	−1.786**	−1.788***
	(0.3808)	(0.7202)	(0.3653)	(0.3698)	(0.4861)	(0.3344)	(0.3515)	(0.7212)	(0.5850)
δ_{2022} x occ group 3 x female	0.760*	−0.616	0.070	0.802*	−0.439	0.235	0.642	−0.343	0.061
	(0.3919)	(0.6620)	(0.4649)	(0.4324)	(0.6644)	(0.5968)	(0.5826)	(0.6557)	(0.6357)
δ_{2022} x occ group 4 x female	−0.547	−2.230***	0.521	−1.086***	−2.362***	−0.265	−1.039**	−2.273***	−0.138
	(0.4531)	(0.7598)	(1.0426)	(0.3810)	(0.7594)	(1.5209)	(0.4319)	(0.6976)	(1.1778)
δ_{2022} x occ group 5 x female	−1.471***	−3.199***	−1.572	−1.170***	−3.171***	−2.132**	−1.223***	−3.125***	−2.218*
	(0.3412)	(0.5641)	(1.4452)	(0.3410)	(0.7119)	(1.0086)	(0.3132)	(0.5114)	(1.1880)
N	277,632	277,632	277,632	277,632	277,632	277,632	277,632	277,632	277,632
Pseudo R^2	0.0451	0.0522	0.0295	0.0451	0.0522	0.0295	0.0451	0.0522	0.0295

Notes: Interaction coefficients of equation (7). The magnitude of the coefficients is are years of tenure. Robust standard errors in parenthesis.
Remaining coefficients are in the previous table.

Table 19
Pooled tenure regressions, industry interactions, full table (I) .

	25th pctl	50th pctl	75th pctl
t	−0.009***	−0.004***	0.002
	(0.0009)	(0.0013)	(0.0014)
t x female	0.014***	0.050***	0.033***
	(0.0012)	(0.0018)	(0.0014)
unemployment rate x male	0.027***	0.038***	−0.003
	(0.0024)	(0.0035)	(0.0033)
unemployment rate x female	0.073***	0.020***	−0.024***
	(0.0024)	(0.0046)	(0.0041)
Manufactures prim.	2.320***	4.488***	4.129***
	(0.0834)	(0.1446)	(0.2204)
Extractive + energy	2.681***	4.758***	3.897***
	(0.0442)	(0.0913)	(0.1873)
Manufactures sec.	3.073***	5.463***	4.684***
	(0.0563)	(0.1170)	(0.2327)
Construction	0.440***	0.524***	0.591***
	(0.0237)	(0.1060)	(0.1935)
Hospitality + Sales	1.789***	3.490***	3.757***
	(0.0445)	(0.1162)	(0.1945)
Transport, Storage + IT	1.551***	2.675***	1.897***
	(0.0478)	(0.1154)	(0.1962)
Financial + porf. serv.	2.567***	4.206***	2.925***
	(0.0553)	(0.1228)	(0.1874)
Education + Health	5.113***	6.966***	5.662***
	(0.0644)	(0.1132)	(0.2122)
Other Services	1.499***	2.684***	2.180***
	(0.0675)	(0.1566)	(0.2644)
Agriculture x female	−1.401***	−2.591***	−3.288***
	(0.0797)	(0.1182)	(0.3432)
Manufactures prim. x female	−1.888***	−1.915***	−1.183***
	(0.1249)	(0.2451)	(0.1972)
Extractive + energy x female	−0.887***	−1.260***	−1.146***
	(0.1234)	(0.1495)	(0.1047)
Manufactures sec. x female	−1.362***	−1.699***	−1.498***
	(0.1635)	(0.1048)	(0.1791)
Construction x female	0.101	1.735***	1.080***
	(0.0931)	(0.1893)	(0.1528)
Hospitality + Sales x female	−1.643***	−1.750***	−1.884***
	(0.0600)	(0.1149)	(0.1094)
Transport, Storage + IT x female	−0.206*	0.192	0.219*
	(0.1193)	(0.1558)	(0.1218)
Financial + porf. serv. x female	−1.532***	−1.303***	−0.666***
	(0.0623)	(0.1065)	(0.1253)
Education + Health x female	−3.552***	−3.522***	−2.963***
	(0.0928)	(0.0738)	(0.1047)
Other Services x female	−2.066***	−3.545***	−3.234***
	(0.0688)	(0.1575)	(0.2057)
β_0	0.168***	2.354***	8.170***
	(0.0233)	(0.1016)	(0.2033)
N	413,371	413,371	413,371
Pseudo R^2	0.0354	0.0466	0.0279

Notes: Coefficients of the interaction variables $\Omega^1_{sy}(q)$ in equation (7), where occupation dummies have been replaced by industry dummies and $y = \{2020, 2021, 2022\}$. The magnitude of the coefficients is in years of tenure. Robust standard errors in parenthesis.

Table 20
Pooled tenure regressions, industry interactions, full table (II) .

	25th percentile			50th percentile			75th percentile		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
Agriculture	0.511***	0.590***	0.756***	−0.378*	0.389*	1.380***	0.739	0.729	−0.292
	(0.1160)	(0.1290)	(0.1861)	(0.2278)	(0.2164)	(0.3900)	(0.5868)	(1.0101)	(0.9355)
Manufactures prim.	−0.465***	0.562	0.102	−1.563***	−0.151	0.182	−0.390	0.105	0.589
	(0.1610)	(0.4036)	(0.5193)	(0.3156)	(0.5138)	(0.3890)	(0.3704)	(0.5994)	(0.7128)
Extractive + energy	0.278**	−0.090	0.081	−0.992**	−1.087***	−0.337	0.008	0.504	0.813
	(0.1303)	(0.2784)	(0.4521)	(0.4478)	(0.3418)	(0.4764)	(0.3939)	(0.5226)	(0.5387)
Manufactures sec.	0.105	0.295	0.892***	−0.507	−1.074**	−0.833*	0.052	0.284	−0.223
	(0.1954)	(0.3760)	(0.2566)	(0.5439)	(0.5269)	(0.5055)	(0.2513)	(0.4835)	(0.6435)
Construction	0.666***	0.900***	1.108***	0.765***	0.813**	1.400***	2.147***	3.127***	0.118
	(0.1084)	(0.1632)	(0.1352)	(0.2458)	(0.3476)	(0.2774)	(0.6424)	(1.0183)	(0.8331)
Hospitality + Sales	0.154	0.912***	1.222***	−1.087***	−0.517**	0.139	−0.768**	−0.356	−0.049
	(0.1435)	(0.1999)	(0.2003)	(0.1798)	(0.2425)	(0.2500)	(0.3884)	(0.5466)	(0.3667)
Transport, Storage + IT	0.158	−0.183	−0.212	−0.939***	−1.338***	−1.046**	0.509	0.822**	−0.189
	(0.1535)	(0.1645)	(0.1559)	(0.3527)	(0.2000)	(0.4557)	(0.4021)	(0.3948)	(0.6514)
Financial + porf. serv.	0.444***	0.523***	0.194	0.833*	0.351	0.090	1.061***	1.710***	−0.216
	(0.1402)	(0.1931)	(0.1937)	(0.4998)	(0.6117)	(0.4887)	(0.2938)	(0.1399)	(0.5579)
Education + Health	0.347	−0.439	−1.440***	1.550***	1.507***	0.580	0.324*	0.238	0.382*
	(0.4131)	(0.3031)	(0.2615)	(0.2651)	(0.3489)	(0.5197)	(0.1959)	(0.1816)	(0.2302)
Other Services	1.945***	1.050	1.176**	1.157*	2.039***	1.736***	0.723	0.554	0.531
	(0.3324)	(0.8087)	(0.5361)	(0.5937)	(0.4656)	(0.5610)	(0.5860)	(0.4877)	(0.7525)
Agriculture x female	−0.513***	−0.636***	−0.582**	−1.193**	−2.466***	−3.366***	−0.701	−1.616	−1.406
	(0.1243)	(0.1250)	(0.2558)	(0.5766)	(0.4719)	(0.7064)	(1.6745)	(1.1277)	(1.7386)
Manufactures prim. x female	0.463*	−0.617	−0.347	0.367	−2.538***	−3.061***	0.149	−3.809***	−3.227***
	(0.2454)	(0.6986)	(0.5169)	(0.6197)	(0.6023)	(0.8712)	(0.4803)	(0.9212)	(1.1970)
Extractive + energy x female	−0.032	−0.400	−1.603**	0.416	−0.558	−2.873***	0.946**	−0.629	−2.363***
	(0.5994)	(0.4926)	(0.6747)	(0.7245)	(1.2659)	(0.6714)	(0.4569)	(0.6045)	(0.6172)
Manufactures sec. x female	−1.110*	−1.453***	−1.913***	−1.770	−3.087***	−3.508***	0.576	−0.929	−1.292
	(0.6186)	(0.4538)	(0.5087)	(1.4632)	(0.8214)	(1.0466)	(0.5354)	(0.8591)	(1.1832)
Construction x female	−0.585	−0.516	−0.292	−3.019***	−3.021**	−3.071***	0.181	−2.924*	0.308
	(0.4391)	(0.3661)	(0.8099)	(0.5859)	(1.2901)	(0.8987)	(0.9787)	(1.5973)	(1.5527)
Hospitality + Sales x female	−0.096	−0.839***	−0.974***	−0.359	−1.537***	−1.759***	1.350***	−0.357	0.044
	(0.2419)	(0.2384)	(0.2157)	(0.3077)	(0.4166)	(0.3440)	(0.4217)	(0.7392)	(0.4017)
Transport, Storage + IT x female	−1.143***	−0.859***	−1.277***	−0.442	0.272	−2.483***	−0.240	−0.445	−1.643
	(0.3975)	(0.2910)	(0.4132)	(0.8094)	(1.3612)	(0.8426)	(0.5182)	(0.3860)	(0.8382)
Financial + porf. serv. x female	−0.857***	−1.255***	−1.230***	−1.083	−3.006***	−3.216***	−0.487	−2.008***	−1.112
	(0.2280)	(0.2491)	(0.2604)	(0.8047)	(0.6990)	(0.6862)	(0.4073)	(0.4267)	(0.7690)
Education + Health x female	−0.880**	−0.234	0.942***	−2.405***	−2.983***	−3.320***	−0.440	−0.225	−0.983***
	(0.4302)	(0.3098)	(0.3263)	(0.3994)	(0.5250)	(0.5312)	(0.2926)	(0.2415)	(0.2920)
Other Services x female	−1.422***	−0.522	−1.027*	−1.875***	−2.627***	−3.015***	0.331	−0.291	−1.276
	(0.3586)	(0.7978)	(0.5620)	(0.6120)	(0.4681)	(0.6399)	(0.5971)	(0.6379)	(1.0818)
N		413,371			413,371			413,371	

Notes: Coefficients of the interaction variables $\Omega^1_{sy}(q)$ in equation (7), where occupation dummies have been replaced by industry dummies and $y = \{2020, 2021, 2022\}$. The magnitude of the coefficients is in years of tenure. Robust standard errors in parenthesis.

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