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Gender differences in job flexibility: Commutes and working hours after job loss

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This paper studies whether women and men cope with job loss differently. Using 2006-2017 Dutch administrative monthly microdata and a quasi-experimental empirical design involving job displacement because of firm bankruptcy, we find that displaced women are more likely than displaced men to find a flexible job with limited working hours and short commutes. Relative to displaced men, displaced women tend to acquire a job with an 8 percentage points larger loss in working hours and an 8 percentage points smaller increase in commuting. However, displaced women experience longer unemployment durations and comparable hourly wage losses. Job loss thus widens gender gaps in employment, working hours and commuting distance. Further, results point out that displaced expectant mothers experience relatively high losses in employment and working hours, amplifying child penalty effects. The findings show that firm bankruptcy for expectant mothers widens gender gaps in employment and working hours.

1. Introduction

Over the last decades, governments and firms have put in much effort to narrow gender gaps in labour market outcomes. However, as in many other countries, gender gaps in the Netherlands remain pervasive.[1] Many studies have related the gender gaps in employment and wages to preferences from the supply side of the labour market (Goldin, 2014; Blau and Kahn, 2017) and the impacts of children (Adda et al., 2017; Cortés and Pan, 2020). The literature argues that women have a stronger preference for flexible work, as they prefer to be employed in part-time positions (Booth and Van Ours, 2008, 2013) and to work close to home (Crane, 2007; Gutiérrez-i-Puigarnau and Van Ommeren, 2010; Le Barbanchon et al., 2021).[2] Thus, flexibility is a non-wage job attribute, which may come at a price through a compensating wage differential.

One way to study this phenomenon is to look at episodes of exogenous job loss, when displaced workers reconsider their need for flexible work given the constraints of their personal circumstances at home. Theoretically, the costs of women's relatively strong tendency for job flexibility, as measured by working hours and commuting distance, is ambiguous.[3] First, relative to displaced men, displaced women have a

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[1] In 2017, Dutch women relative to men have a 10 percentage points lower labour force participation, a 15 per cent lower wage, a 50 percentage points lower full-time employment and a 20 per cent shorter commute (CBS, 2019).

[2] Note that the underlying mechanisms of a greater tendency for flexibility include household bargaining outcomes and constraints such as women being forced to undertake flexible work due to lack of other options, lack of affordable childcare and cultural and social expectations.

[3] Previous research shows that women's preference for working hours flexibility is strong (Flabbi and Moro, 2012; Wiswall and Zafar, 2018), resulting in a gender wage gap (Bertrand et al., 2010; Cortés and Pan, 2019). Similarly, women tend to have a higher disutility of commuting than men, inducing women to trade off commutes against wages (Van den Berg and Gorter, 1997; Van Ommeren and Fosgerau, 2009; Roberts et al., 2011; Le Barbanchon et al., 2021).

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longer period of unemployment after job loss in search of a flexible job, widening the gender gap in employment. Second, women's greater tendency for job flexibility could widen the gender gap in wages through a compensating wage differential, where non-wage job attributes make up for lower wages. It is thus an empirical question how job loss relates to gender gaps in labour market outcomes.

The need for flexibility may be even stronger for expectant mothers and fathers. However, dismissal of expectant mothers is at odds with the International Labour Organisation's maternity protection convention 2000 (no. 183) which stipulates "it is unlawful for an employer to terminate the employment of a woman during her pregnancy".[4] The strong employment protection of expectant mothers may explain why the consequences of job loss during pregnancy have not been researched to date. We consider the particular setting of job loss due to firm bankruptcy in which pregnant women can be dismissed. As the period around childbirth is a key transition point of flexibility needs and career adjustments, we focus more specifically on women and men expecting a baby upon the incidence of unforeseen job loss.

The rich 2006–2017 monthly administrative data on the entire population from Statistics Netherlands enable us to focus on the disadvantaged subpopulation of individuals who are expecting a baby. We use the setting of exogenous job displacement due to firm bankruptcy as a quasi-experimental design to examine whether women and men cope with job loss differently. We use Coarsened Exact Matching (CEM) on a large set of observables to make displaced and non-displaced workers observationally equivalent (Iacus et al., 2011). We apply a differences-in-differences estimator to compare the outcomes in employment, hourly wages, working hours and commuting distance, respectively, of displaced workers to non-displaced workers. We apply a triple differences estimator to investigate heterogeneity in displacement effects based on individual characteristics. Thereby, any selection into job loss that is common among groups of displaced workers is also cancelled out.

The first key contribution of this paper is to the urban economics literature by showing how the impact of job loss on commuting distance differs by gender. Previous research documents that geographic space is important for gender differences in labour market outcomes. Gutiérrez-i-Puigarnau and Van Ommeren, 2010 show that the importance of commuting for labour supply patterns is slightly stronger for female workers, reducing women's number of workdays per week after an increase in commuting distance. This result can be explained by the growing body of research that suggests the household composition is important for women's labour supply. Consistent with this notion, married women's labour supply is negatively correlated to the metropolitan area commuting time (Black et al., 2014) and positively correlated to the geographical proximity to mothers or mothers-in-law (Compton and Pollak, 2014). Our empirical analysis on gender differences in the effect of job loss on commuting distance, exploiting a quasi-experimental design, extends this evidence base. We find that displaced women experience an eight percentage points smaller increase in commuting. In addition, our results suggest that workers who are longer unemployed experience smaller increases in commutes. These findings have important implications for our understanding of margins of labour adjustment after a negative employment shock and gender gaps in the labour market, as they suggest women are less competitive in the labour market through smaller job search areas.

The second contribution is to the literature on gender differences in the trade-offs between work flexibility and wages. We contribute to this literature by focusing on labour market dynamics after job loss, showing that job loss widens gender gaps in employment, working hours and commuting distance but not in hourly wages. We show that over a three-year post-displacement period, on average, displaced female workers tend to acquire a job with an 8 percentage points larger loss in working hours, an 8 percentage points smaller increase in commuting and a comparable loss in hourly wage, relative to displaced men. However, female workers have on average a longer unemployment duration after job loss. The novel results suggest that the costs of shorter commutes and fewer working hours for displaced female workers come particularly through longer job search.

The third contribution is to the child penalty literature by showing novel results on how the interaction between expecting a baby and the incidence of unforeseen job loss because of firm bankruptcy negatively affects expectant mothers' but not expectant fathers' labour market outcomes, on top of the well-established child penalty effect (Kleven et al., 2019; Cortés and Pan, 2020). We show that expecting a baby at the time of job loss increases unemployment by 10 to 20 percentage points for women but not for men. The effects are long lasting and particularly striking given that we find them for both single and married women in a full-time employed job when job loss occurs. These findings point out that expectant mothers' job loss can be perceived as the start of a large gender gap in employment over the life course.

2. Theoretical background and hypotheses

We use a simple job search framework to guide our empirical analysis on how workers respond to job loss because of firm bankruptcy. Following Le Barbanchon et al. (2021) who argue that gender gaps in wages and commutes are predominantly supply-side driven, we focus on the supply side of the labour market. We use this framework to consider the implications of job loss.

After job loss, the worker's unemployment duration depends on the arrival rate of job offers and the probability of accepting a job. It seems reasonable that a stronger preference for flexibility reduces the set of potential job opportunities. We consider flexibility outcomes in two dimensions — the number of working hours and the distance of commutes. Workers may prefer a part-time job and a short commute as it gives them the opportunity to work according to their own preferences given their personal circumstances at home. However, the set of potential job opportunities is decreasing for workers who are more selective in the number of working hours or geographical scope of search.[5] Thereby, a strong preference for flexibility constrains the exit rate into employment. Alternatively, for workers with high opportunity costs of continued search, the length of job search can be shortened by lowering the reservation wage. Consequently, a stronger preference for flexibility may lead to longer job search and/or higher losses in wages.

We examine the gender difference in coping with job loss. Women set lower reservation wages than men (Krueger and Mueller, 2016; Caliendo et al., 2017). As such, it may be easier for displaced female workers to become re-employed rapidly. However, women tend to have a greater tendency for flexibility, which through a compensating differential may hinder rapid re-employment and/or lead to lower hourly wages. Specifically, the literature shows that female workers have a relatively strong preference for part-time work (Booth and Van Ours, 2008, 2013), limiting the set of potential jobs (Flabbi and Moro, 2012; Goldin, 2014; Wiswall and Zafar, 2018).[6] Another strand of the literature shows that for women the utility loss of commuting is higher than for men, causing a gender difference in labour supply making women less competitive in the labour market through a smaller local labour market (Gutiérrez-i-Puigarnau and Van Ommeren, 2010; Black et al., 2014; Meekes and Hassink, 2019a; Petrongolo and Ronchi, 2020).

[4] See Convention C183 - Maternity Protection Convention, 2000 (No. 183) on https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C183

[5] For literature on the trade-offs among employment, wages and commute, see Van Ommeren and Fosgerau (2009), Mulalic et al. (2014), Meekes and Hassink (2019b), Guglielminetti et al. (2019).

[6] In addition, working part time is costly since there are fewer career opportunities. The literature on part-time employment shows that part-time wage penalties are large for men, but much smaller for women (Hirsch, 2005; Russo and Hassink, 2008; Manning and Petrongolo, 2008). For the Dutch pharmacy sector, Künn-Nelen et al., 2013 show that productivity is higher for firms with a higher female part-time employment share, explained by a more efficient allocation of labour within the firm.

Le Barbanchon et al. (2021) show that the gender difference in the willingness to commute accounts for about 10 per cent of the post-unemployment observed gender wage gap.

This leads to the following three predictions: (i) after job loss, displaced female workers are more likely than their male counterparts to find a job characterised by few working hours and short commutes. Consequently, (ii) displaced women have a relatively long unemployment duration in search of flexible jobs, making job loss more costly. (iii) displaced women's greater tendency for flexibility causes higher wage losses through the compensating wage differential, where non-wage job attributes make up for lower wages.

The tendency for job flexibility can be amplified in case a disruptive shock involving job loss is combined with expecting a baby. This specific setting might increase mothers' preference for flexibility and fathers' financial incentive to become re-employed rapidly, as traditional gender-role attitudes become more pronounced after becoming a parent (Perales et al., 2018). It leads to two additional predictions. (iv) the gender difference in coping with job loss is amplified when expecting a baby, decreasing women's working hours and commutes and widening gender gaps in employment and hourly wages. Moreover, traditional gender roles are more pronounced when having a partner (Chiappori and Mazzocco, 2017), which increases the value of work flexibilities for women who are married. Thus: (v) relative to single expectant mothers, married expectant mothers experience higher costs of job loss.

3. Institutional setting and data

3.1. Institutional setting in the Netherlands

We first discuss the rules on job displacement and unemployment benefits (UB). Normally, a notification of termination of employment should be provided by the employer to the worker. However, in the case of dismissal due to firm bankruptcy, as it is a very time-sensitive dismissal, a notification from the bankrupt firm to displaced workers is not required. Only if the Public Employment Service agency requests a notification requirement, the firm is obliged to give one. Moreover, as a bankrupt firm is insolvent, severance payments or transition payments are generally not provided to displaced workers.

UB are provided by the Public Employment Service agency for up to 38 months. For each consecutive year of employment that a worker has at least 208 working hours, the worker will receive one more month of UB. For the first two months of UB, the amount of benefits is equal to 75 per cent of the monthly wage received in the displaced job. After two months of UB, the amount equals 70 per cent of the monthly wage. In the regression analysis we aim to take the duration of UB into account by controlling for the worker's age and tenure in the displaced job.

The provision of UB is particularly technical when being displaced and pregnant. Generally, pregnant women cannot experience involuntary job loss, as they have stronger employment protection than other workers. When being pregnant, dismissal can only occur either for reasons involving firm bankruptcy or immediate dismissal for serious cause. A worker who is pregnant is entitled to maternity benefits as stipulated in the Work and Care Act (in Dutch: Wet Arbeid en Zorg (WAZO)). The WAZO is provided for 16 weeks in total: for about one month before and three months after giving birth. For this reason, we analyse whether the displacement effects differ over the number of months since job loss. The WAZO provides 100 per cent of the monthly wage to a pregnant worker. When a displaced worker is no longer receiving WAZO, the worker is entitled to UB. The duration and amount of UB is the same as for other displaced workers and depends on the number of years in previous employment. Workers could also take unpaid parental leave, which would reduce their observed working hours and gross pay.

See Appendix D of the online supplement for further information on childcare, tax system and health insurance.

3.2. Administrative data from Statistics Netherlands

We draw on administrative panel data sets from Statistics Netherlands over the period 2006–2017 to study the gender difference in how workers cope with job loss. The data contain the entire population of Dutch individuals, households and firms. Using the encrypted Randomised Identification Numbers of both individuals and firms, we have precise information on job endings surrounding bankruptcy of a firm. We follow each individual worker for 61 months, two years before until three years after job displacement. For this reason, we include workers who became displaced over the period January 2008 to December 2014. Our sample of analysis contains 60,976 displaced workers and 113,460 non-displaced workers.

The date of bankruptcy is defined as the date on which a Dutch court declares the firm bankrupt. We define displaced workers as workers whose job ended between six months before and one year after the date of bankruptcy. Schwerdt (2011) shows that employees who leave the firm earlier than two quarters before plant closure are indistinguishable from employees engaging in normal labour turnover. For this reason, employees are part of the group of displaced workers if they leave up to six months before bankruptcy. See Table A.1 of Appendix A for the time gap between job loss and firm bankruptcy by gender and full-time/part-time status, which shows most employees leave the firm up to two months before bankruptcy.

For each worker we observe (i) demographic characteristics (gender, age and country of birth), (ii) household characteristics (residential location at the neighbourhood level, marital status, presence of children and birth date of youngest child), (iii) job characteristics (employment, number of working hours, wages and full-time/part-time status[7], job location at the municipality level [set of 388 municipalities that existed in the calendar year 2017 with an average area size of 12 square kilometres], tenure in the job and type of contract); and (iv) firm characteristics (economic sector and size of the firm). The firm characteristics are based on annual firm-level data typically measured in the third quarter of a given calendar year, which we use of the year preceding job loss.

Individuals' educational attainment is used only in robustness checks as it is observed for about half of the sample. We categorise educational attainment by lower, secondary and tertiary education according to the International Standard Classification of Education. The information on education was gradually collected by Statistics Netherlands and only for those graduating since the 1990s and 2000s. In addition, data collection on educational attainment initially started for tertiary education, and later for lower and secondary education as well. Consequently, it is missing disproportionally for older individuals and less educated individuals.

We applied several sample selections. We used individuals with a relatively strong attachment to the labour market by selecting employed workers with a job tenure of at least three years working at least 20 hours a week in the month of job displacement. This group of workers has relatively strong motivation to work, limiting the incidence of labour force withdrawal (non-employment) and entry into self-employment. In addition, part-time jobs with fewer than 20 working hours are excluded from the analysis, because these jobs are often not the stable main job of the displaced worker. We retained the job with the highest wage for workers who have multiple jobs in a given month. Similarly, we removed individuals who are aged below 20 or above 60 years, or do not participate in the labour market such as students and retirees.

We excluded individuals from the pool of displaced workers for several reasons. We excluded employees who work at a bankrupt firm that

[7] The Netherlands is characterised by the highest part-time employment rate of the OECD member countries (OECD, 2019a). Dutch part-time employment as a percentage of total employment equals 76 per cent for women and 27 per cent for men in 2017 (CBS, 2019). Involuntary part-time employment as a percentage of total part-time employment is relatively low, ranging from 4 to 9 per cent for women and 5–12 % for men in the period 2006–2017 (OECD, 2019b).

engaged in a merger or acquisition, approximated by calculating if more than 40 per cent of displaced workers became re-employed at the same employer. This is the case for less than 0.5 per cent of displaced workers. In addition, we excluded individuals who experience more than one job loss because of firm bankruptcy, which holds for less than 0.4 per cent of displaced workers.

3.3. Key variables

The monthly information on employment, wages and working hours is based on monthly income statements provided by the employer to the Dutch tax office. We use data on four outcome variables: employment expressed as an indicator variable that equals one if the individual is employed, the natural logarithm of the gross hourly wage, the natural logarithm of the number of working hours and the natural logarithm of the commuting distance based on the distance in kilometres from neighbourhood of home to municipality of work.

The data on commuting distance are not entirely consistent, resulting in a loss of efficiency, for two reasons. First, the employee's work location is only observed in December of each calendar year, so for workers who have a job that has not been observed in December the work location is missing. Second, Statistics Netherlands uses data on workers' home and work location to link employees to the employer's firm entities. The inconsistency arises from the fact that firms only provide information on the number of firm entities, its locations and the number of employees at each entity, but not on the exact work location of the employee.

The set of key independent variables consists of treatment status, post-displacement status, gender, full-time/part-time status, marital status and the presence and age of children. These variables are all time constant and measured in the month of job displacement, except for the post-displacement status which is time varying. The variables are expressed as zero-one indicator variables. The treatment status, post-displacement status and gender equal one if the worker is displaced, observed after displacement and female, respectively. The full-time/part-time employment status has two categories, consisting of part-time jobs that range from 20 to 35 working hours a week and full-time jobs for jobs with 35 or more working hours a week. Workers' marital status is defined as being married in case of marriage or a registered partnership, and single otherwise. The variable that represents the presence and age of household children has four categories. The categories consist of no child, pregnancy approximated by a birth within 8 to 1 months from the month under observation, youngest child aged 0–18 years; and youngest child over 18 years.

4. Methodology

4.1. Identification challenges and strategy

In this section we discuss the identification challenges and our strategies to overcome these. The key identification challenge is that labour turnover is endogenous to many factors including individuals' gender. For example, relative to men, women are more likely to give up their job for family reasons or to self-select into a part-time job, and the presence of a partner or children amplifies this selection (Blau and Kahn, 2017). In turn, the reason for and incidence of labour turnover is important as through human capital accumulation and signalling it affects workers' long-term labour market outcomes.

In line with the literature on job displacement, our identification strategy exploits a quasi-experimental empirical design involving job loss due to firm bankruptcy as an exogenous shock to the employment status of employees. This strategy ensures that women and men experience unforeseen job loss for an identical reason and controls for unobserved heterogeneity. Also, the design allows us to assess how expectant mothers fare after job loss, as generally companies cannot lay off pregnant women because of strict employment protection legislation. The key identification restriction involves parallel pre-displacement trends for displaced and non-displaced workers as well as for workers who differ in gender, full-time/part-time status and household setting.

Another identification challenge is that it is not random who works at a firm that has been declared bankrupt, as firm bankruptcy can be sensitive to business cycle effects on specific economic sectors. To deal with this identification challenge, we use the CEM procedure to make displaced and non-displaced workers observationally equivalent (Iacus et al., 2011). The CEM procedure is explained in greater detail in Section 4.2.

A final identification challenge is that job stability and fertility are interrelated. For example, the incidence of job loss on average decreases fertility rates for over six years (Del Bono et al., 2015; Huttunen and Kellokumpu, 2016), but may increase fertility rates for young women (Kunze and Troske, 2015). This limits our ability to examine the causal impact of the presence of young children on workers' post-displacement outcomes. To tackle this identification challenge, we exploit a group of workers who are expecting a baby upon the incidence of unforeseen job loss. We use the interaction between job loss because of firm bankruptcy and expecting a baby as an exogenous shock to assess how childbearing affects post-displacement outcomes.

Our identification strategy involving job loss due to firm bankruptcy is ideal to study gender differences in job flexibility outcomes after job dismissal for various reasons. First, upon the incidence of job loss, workers might exogenously change their reservation wage in relation to their preference for flexibility in working hours and commute. For traditional workers, variation in job flexibility outcomes is low (Flabbi and Moro, 2012). Second, we examine displacement effects by estimating a differences-in-differences specification on a matched sample while limiting demand-side factors such as wage discrimination and a more homogeneous spatial distribution of female jobs (Blau and Kahn, 2017). Specifically, demand-side factors are cancelled out if they affect both the treatment and control group or if they affect displaced workers' pre-displacement and post-displacement outcomes. Third, confounding effects of on-the-job search and firms offering higher wages to reduce labour turnover are limited, because we focus on post-displacement labour market outcomes. Finally, the setting of job displacement limits confounding effects of fertility and home relocation, as job loss reduces the likelihood of having children (Del Bono et al., 2015; Huttunen and Kellokumpu, 2016) as well as the incidence of changing home in the Netherlands (Meekes and Hassink, 2019b).

4.2. Coarsened exact matching

Matching of displaced to non-displaced workers increases the internal validity of our analysis as it limits the potential of selection into job displacement based on observables. An advantage of CEM compared to other matching approaches including propensity score matching is that CEM does not require procedures to assess common support, as the amount of imbalance between treated and controls is controlled by the set of matching variables and thus limited.

The displaced workers are the treatment group. A control group is constructed by matching displaced workers on the month of job loss to identical, non-displaced workers. Thereby, the 'actual' month of job loss of a displaced worker reflects the 'potential' month of job loss of a non-displaced worker. A non-displaced worker is the control of one displaced worker only, and the order of months in which treated were matched to controls is taken randomly. In the years following the actual or potential displacement, the workers in our sample could become unemployed for voluntary reasons as well as for involuntary reasons except for job loss due to firm bankruptcy. This ensures we will not overestimate the displacement effects (Krolikowski, 2018).

The full set of matching variables is as follows: gender, age ($22 \leq$ age ≤ 30 years, $30 <$ age ≤ 35, $35 <$ age ≤ 40, $40 <$ age ≤ 45, $45 <$ age ≤ 50 and $50 <$ age ≤ 57), born in the Netherlands, presence of chil-

Table 1
Individual characteristics of displaced and non-displaced workers using the non-matched sample.

	Non-displaced		Displaced		
	Mean	St. Dev.	Mean	St. Dev	*t*-statistic
Employment (=1)	1	0	1	0	
Working hours (log)	4.9675	0.2084	5.0075	0.2078	-54.15***
Working hours (#)	146.6354	28.2033	152.6126	29.6562	-59.77***
Hourly wage (log)	2.9042	0.3841	2.8099	0.3976	69.26***
Hourly wage (euro)	19.7914	10.4044	18.1860	11.6446	43.50***
Commuting distance (log)	2.1348	1.1628	2.1774	1.1839	-10.35***
Commuting distance (km)	16.0949	22.2872	17.2970	24.3655	-15.21***
Female (=1)	0.4089	0.4916	0.2924	0.4549	66.85***
Age (in years)	42.3971	9.0704	41.6845	9.0030	22.16***
Low-educated (=1)	0.1435	0.3506	0.2356	0.4244	-63.36***
Average-educated (=1)	0.4183	0.4933	0.5526	0.4972	-65.73***
High-educated (=1)	0.4382	0.4962	0.2118	0.4086	110.25***
Born in the Netherlands (=1)	0.9036	0.2952	0.8998	0.3003	3.60***
Partnered (=1)	0.5945	0.4910	0.5806	0.4935	7.99***
Child (=1)	0.7061	0.4555	0.7218	0.4481	-9.70***
Pregnant (=1)	0.0271	0.1625	0.0271	0.1622	0.15
Permanent contract (=1)	0.9368	0.2433	0.9151	0.2787	24.91***
Tenure in the job (in months)	138.7090	91.6126	127.3900	83.7653	34.86***
Manufacturing sector (=1)	0.2531	0.4348	0.4150	0.4927	-105.03***
≥ 35 hours a week (=1)	0.5889	0.4920	0.6644	0.4722	-43.27***
Number of individuals (#)	24,539,699		79,812		

Notes: Individual characteristics are provided for the period January 2008 to December 2014 based on the sample before applying coarsened exact matching. For displaced workers and non-displaced workers, the sample means with standard deviations are provided for the month of actual and potential job loss, respectively. The *t*-statistic shows whether the statistics for the group of displaced workers and group of non-displaced workers are statistically different from each other. ∗∗∗, ∗∗, ∗, correspond to the significance level of 1%, 5%, 10%, respectively. For the statistics on educational attainment, the number of non-displaced individuals and displaced individuals equal 12,439,265 and 58,608, respectively.

dren, type of contract (fixed-term, permanent or other), working hours (≥ 35 h or 20–35 h), tenure in the job (3 ≤ tenure ≤ 6 years, 6 < tenure ≤ 12, 12 < tenure ≤ 18 years or tenure > 18 years), economic sector (21 International Standard Industrial Classification of All Economic Activities (ISIC) industries) and size of the firm (10–49, 50–99, 100–499 or 500 employed workers). All variables are measured in the month of job loss, except for the latter two variables which are based on annual firm-level data and measured in the calendar year preceding job loss.[8]

Before matching, our sample contains 79,812 displaced workers. We applied CEM and matched 71,763 displaced workers to observationally equivalent non-displaced workers in the month of job loss, implying a matching rate of 90 per cent. After matching, we excluded 10,787 displaced workers. Matched pairs were excluded if the individual is not observed for the entire 60-month window around job loss (for example because of immigration or death), or if the individual in the 25-month period until job loss earns an hourly wage below one euro or has missing information on wages, working hours or commuting distance. We assessed the implications of this selection and found similar results using the default matched sample containing 60,976 displaced workers or the full matched sample containing 71,763 displaced workers. For our empirical analysis we use the sample that contains 60,976 displaced workers and 113,460 non-displaced workers, ensuring complete information in the pre-displacement period.

Tables 1 and 2 show the individual summary statistics for the non-matched sample and matched sample, respectively, revealing that CEM is effective in making displaced and non-displaced workers more comparable. Given the large sample sizes, differences in individual characteristics between matched displaced and non-displaced are statistically significant although economically the differences are very small. However, two variables require particular attention. First, the average hourly wage is slightly higher for the matched non-displaced workers (19.12 euro) than for the displaced workers (18.34 euro). Second, the educational attainment of displaced workers is lower than that of non-displaced workers. These two variables may suggest that displaced workers are less productive than non-displaced workers.

However, although the level of hourly wages is different, the changes in hourly wages over time may still be comparable which is important for our identifying strategy. We will investigate the parallel pre-treatment trends in our empirical analysis. Moreover, we will address the concern involving differences in educational attainment between displaced workers and non-displaced workers in a separate robustness check, examining whether our results are robust to including educational attainment as a control. See Tables A.2 and A.3 for summary statistics by gender group. See Table A.4 for firm summary statistics on the firm size and economic sector.

The matched sample contains 523 displaced expectant mothers, 1,126 displaced expectant fathers, 995 non-displaced expectant mothers and 2,074 non-displaced expectant fathers. A potential of concern of endogeneity of fertility could be that those workers who anticipate firm bankruptcy would change their labour turnover decisions. Table A.5, which shows the time gap between birth and job loss, reveals no clear pattern of strategic behaviour in leaving a job over the time gap of one to eight months before birth. This descriptive finding supports that fertility in relation to job loss because of firm bankruptcy is exogenous.

4.3. Empirical models

We use an empirical design that compares pre-displacement outcomes with post-displacement outcomes of displaced and non-displaced workers. The displaced and non-displaced workers will be followed for 24 months before until 36 months after the month of actual and potential job displacement, respectively.

We specify a generic empirical model, shown in (1), to estimate the displacement effect on each of the four outcome variables, Y. Y stands for employment, log hourly wage, log working hours and log commuting distance. Our baseline specification, estimated by OLS, takes the form:

$$Y_{irt} = \delta_Y DISPLACED_i \times POST_{it} + \rho_Y POST_{it} + \beta_Y{}' X_{it} + \alpha_{Y,i} + N_{Y,r} + D_{Y,t} + \varepsilon_{Y,irt}$$
$$i \in 1, \ldots, N; r \in 1, \ldots, 40; t = 1, \ldots, 144 \quad (1)$$

[8] The advantage of matching in the month of job loss is that some variables are more accurately measured, such as the presence of children. However, this could cause a bias if treatment affects any of the matching variables in the month of job loss. To investigate this, we replicate our analysis by matching on variables in the sixth month before job loss in a robustness check which is discussed in Section 5.1.

Table 2
Individual characteristics of displaced and non-displaced workers using the matched sample.

	Non-displaced		Displaced		
	Mean	St. Dev.	Mean	St. Dev	*t*-statistic
Employment (=1)	1	0	1	0	
Working hours (log)	5.0106	0.2056	5.0168	0.2059	-5.94***
Working hours (#)	151.9897	28.7510	152.9819	29.7680	-6.79***
Hourly wage (log)	2.8662	0.3874	2.8206	0.3935	23.31***
Hourly wage (euro)	19.1204	10.4694	18.3448	11.5539	14.22***
Commuting distance (log)	2.3363	0.9992	2.3587	1.0119	-4.43***
Commuting distance (km)	16.6422	23.3424	17.3278	24.4084	-5.76***
Female (=1)	0.2848	0.4513	0.2866	0.4522	-0.82
Age (in years)	41.9641	9.0850	41.9243	8.8907	0.88
Low-educated (=1)	0.1833	0.3869	0.2290	0.4202	-18.00***
Average-educated (=1)	0.4831	0.4997	0.5511	0.4974	-21.58***
High-educated (=1)	0.3337	0.4715	0.2198	0.4141	40.28***
Born in the Netherlands (=1)	0.9284	0.2578	0.9201	0.2711	6.25***
Partnered (=1)	0.5954	0.4908	0.5930	0.4913	0.97
Child (=1)	0.7340	0.4419	0.7286	0.4447	2.41**
Pregnant (=1)	0.0270	0.1622	0.0270	0.1622	0.01
Permanent contract (=1)	0.9495	0.2190	0.9411	0.2354	7.36***
Tenure in the job (in months)	128.1786	85.0000	129.1490	84.2032	-2.28**
Manufacturing sector (=1)	0.3959	0.4891	0.4014	0.4902	-2.23**
≥ 35 hours a week (=1)	0.6715	0.4697	0.6696	0.4704	0.78
Number of individuals (#)	113,460		60,976		

Notes: Individual characteristics are provided for the period January 2008 to December 2014 based on the sample after applying coarsened exact matching. For displaced workers and non-displaced workers, the sample means with standard deviations are provided for the month of actual and potential job loss, respectively. The *t*-statistic shows whether the statistics for the group of displaced workers and group of non-displaced workers are statistically different from each other. ∗∗∗, ∗∗, ∗, correspond to the significance level of 1%, 5%, 10%, respectively. For the statistics on educational attainment, the number of non-displaced individuals and displaced individuals equal 56,003 and 45,097, respectively.

where subscripts *i, r* and *t* denote the worker, residential location and month, respectively. The parameters of interest of interest are denoted by δ_Y, which capture the displacement effects on each of the dependent variables Y. The displacement effect is identified based on a two-way interaction term between the scalar indicator variables *DISPLACED* and *POST*. *DISPLACED* is time-constant and equals one for displaced workers and zero for non-displaced workers. *POST* equals one for the period of 36 months after job loss, and zero for the month of job loss and the 24 months before job loss. The worker's time-varying covariates are represented by vector X. Individual-specific fixed effects are denoted by α, which control for time-constant unobservables such as the worker's ability. In the differences-in-differences specification, X contains only four time-varying worker's age categories ($20 < \text{age} \leq 30$ years, $30 < \text{age} \leq 40$, $40 < \text{age} \leq 50$ and $50 < \text{age} \leq 60$). N_Y represents indicators for the residential location based on the European Nomenclature des Unite´s Territoriales Statistiques (NUTS) 3 classification, which controls for local labour market conditions. Parameter D_Y denotes the monthly time indicators and ε_Y denotes the idiosyncratic error term.

Eq. (2) extends (1) by allowing the displacement effects to depend on the number of months since job loss. We examine how the displacement effects change over the post-displacement period and assess whether the parallel pre-displacement trends hold. The specification is

$$Y_{irt} = \sum_{\substack{\tau=-24 \\ \tau \neq -12}}^{36} \left(\delta_Y^\tau DISPLACED_i \times G_{it}^\tau + \rho_Y^\tau G_{it}^\tau\right) + \beta_Y{}' X_{it} + \alpha_{Y,i} + N_{Y,r} + D_{Y,t} + \varepsilon_{Y,irt} \quad (2)$$

where the time-dependent displacement effects, δ_Y^τ, denote the parameters of interest.

The parameters δ_Y^τ are identified using interaction terms between *DISPLACED* and the scalar indicator variables G^τ. Parameter τ is defined as the time gap between the month under observation and the month of job loss, ranging from minus twenty-four to plus thirty-six in increments of one. At $\tau = 0$, displaced workers have their actual month of job displacement and matched non-displaced workers have their potential month of displacement. Hence, G^τ, $\tau = -24, \ldots, 36$, denotes the τ-th time gap between the month of observation and month of job loss. We used the twelfth month before job loss as the base category, $G^{\tau=-12}$.

We specify a model in (3), which complements (1), to assess whether the displacement effects differ by worker characteristics. Specifically, we include interaction terms among the vector of worker characteristics *X, DISPLACED* and *POST*.

$$\begin{aligned} Y_{irt} = {} & \left(\kappa_Y{}' X_{it}\right) \times DISPLACED_i \times POST_{it} + \left(\gamma_Y{}' X_{it}\right) \times DISPLACED_i \\ & + \left(\eta_Y{}' X_{it}\right) \times POST_{it} + \delta_Y DISPLACED_i \times POST_{it} + \rho_Y POST_{it} \\ & + \beta_Y{}' X_{it} + \alpha_{Y,i} + N_{Y,r} + D_{Y,t} + \varepsilon_{Y,irt} \end{aligned} \quad (3)$$

where vector κ_Y denotes the parameters of interest. In the triple differences specification, the vector X contains the time-varying covariate age, the time-constant covariates gender and born in the Netherlands, the time-constant covariates measured in the month of job loss including the four categories of job tenure, type of contract (fixed-term, permanent or other), year of job displacement, full-time/part-time status (≥ 35 h or 20–35 h), marital status (single or married) and presence and age of children (no child, expecting a baby, youngest child aged 0 to 4 years, aged 4 to 12 years, aged 12 to 18 years or older than 18 years), and the time-constant covariates measured in the calendar year preceding job loss including firm size (10–49, 50–99, 100–499 or ≥ 500 employed workers) and economic sector (manufacturing or servicing).[9]

We specify a model in (4), which complements that of (2), to assess whether the importance of worker characteristics for the displacement effects changes over time since job loss.

$$\begin{aligned} Y_{irt} = \sum_{\substack{\tau=-24 \\ \tau \neq -12}}^{36} & \left(\left(\kappa_Y^{\tau}{}' X_{it}\right) \times DISPLACED_i \times G_{it}^\tau + \delta_Y^\tau DISPLACED_i \times G_{it}^\tau \right. \\ & \left. + \left(\eta_Y^{\tau}{}' X_{it}\right) \times G_{it}^\tau + \rho_Y^\tau G_{it}^\tau\right) \\ & + \left(\gamma_Y{}' X_{it}\right) \times DISPLACED_i + \beta_Y{}' X_{it} + \alpha_{Y,i} + N_{Y,r} + D_{Y,t} + \varepsilon_{Y,irt} \end{aligned} \quad (4)$$

[9] Note that the full-time/part-time status is not incorporated in the model on displacement effects by full-time/part-time status and neither in the model on effects by household setting. The worker's marital status and presence and age of children are not included in the model on effects by household setting.

where vector κ^{τ} denotes the parameters of main interest. Again, we use G^{τ} instead of *POST*, including three-way interaction terms among the indicator variables *X, DISPLACED* and G^{τ}.

5. Empirical analysis

5.1. Displacement effects for all workers

We first present empirical evidence on the average displacement effect on the four outcome variables. Panel A of Fig. 1 shows the displacement effects (Eq. (2)) for the full sample, identified by comparing the changes in outcomes of displaced workers and non-displaced workers over the time since job loss. The *y*-axis registers the impact on the outcome variable, which is in percentage points for employment (Fig. 1A) and in percentages for hourly wages (Fig. 1B), working hours (Fig. 1C) and commuting distance (Fig. 1D). The *x*-axis registers the number of months between the month under observation and the month of job loss, and equals zero for the month of actual and potential displacement for the treated and controls, respectively. The reference category of the displaced contains the non-displaced workers and the reference month is the twelfth month before job loss. Importantly, observe in Fig. 1 the parallel pre-displacement trends for displaced and non-displaced workers.

We are interested in how the displacement effects change over the period after job loss, estimated for the full sample (black solid line in panel A). Fig. 1A shows that six months after job loss, displaced workers are 33 percentage points less employed than non-displaced workers. After 18 and 36 months, the loss in employment equals 20 and 14 percentage points, respectively. Fig. 1B shows that the loss in hourly wages becomes smaller over the period soon after job loss, ranging from 6.5 per cent the first month after job loss to 4.5 per cent four months after job loss. After 18 months, the negative displacement effect on wages is more pronounced and remains relatively stable at about 7 per cent. Fig. 1C shows that the displacement effect on working hours is most severe up to six months after displacement, which suggests that workers who become re-employed relatively soon after job loss do so by finding a job with fewer working hours. After six months, the loss in hours work equals 14 per cent and diminishes further to 8 per cent over the post-displacement period of 36 months. Fig. 1D shows that the displacement effect on commutes increases to 26 per cent over the first three months since job loss, and thereafter decreases to 11 per cent over the post-displacement period of three years. The displacement effects on hourly wages, working hours and commuting distance are identified conditional on employment. The results suggest that workers who stay unemployed for a longer period experience a higher loss in hourly wage but smaller changes in working hours and commute.

Overall, panel A of Table 3, based on Eq. (1), shows that compared to the non-displaced workers, over the post-displacement period of 36 months, displaced workers experience on average a loss of 25 percentage points in employment (Column (1)) and, conditional on employment, a loss of 6 per cent in hourly wages (Column (2)), a loss of 11 per cent in working hours (Column (3)) and an increase of 16 per cent in the commuting distance (Column (4)).[10]

The displacement effects in Table 3 on employment and wages are consistent with those reported in the literature.[11] While studies on the US traditionally focus on displacement effects on wages and earnings (Jacobson et al., 1993; Couch and Placzek, 2010; Davis et al., 2011; Krolikowski, 2018), studies on European countries tend to assess the displacement effects on employment and wages (Eliason and Storrie, 2006; Huttunen et al., 2011; Ichino et al., 2017; Huttunen et al., 2018; Halla et al., 2020). In Europe, employment is arguably a more important margin of adjustment because of the more centralised wage system characterised by higher wage floors (Kuhn, 2002; Blau and Kahn, 2003). For the UK, Hijzen et al. (2010) show displaced workers experience income losses ranging between 18 to 35 per cent. Supporting the results by Meekes and Hassink (2019b) on the Netherlands, Table 3 shows that workers experience a substantial increase in the commuting distance following job loss.

5.2. Gender differences in displacement effects

Next, we consider differences between men and women in the patterns of displacement effects. The parameter estimates provided in Fig. 2 are based on Eq. (4), which again are relative to the changes in outcomes of non-displaced workers but also identify and control for differences in displacement effects among workers with different individual characteristics.[12] Importantly, the identifying restriction involving parallel pre-treatment trends holds for the role of gender in displacement effects (Fig. 2).

Fig. 2A shows that the gender difference in the displacement effect on employment is largest four months after job loss and equals 9 percentage points, and remains about 2 percentage points from about two years since job loss. Fig. 2B and 2C show that the gender difference in the loss in wages and working hours is relatively persistent over the post-displacement period at 2 percentage points and 7.5 percentage points, respectively. Fig. 2D shows that displaced women experience a 7.5 percentage points smaller increase in the commuting distance than do displaced men. The results provided in panels B, C and D of Table 3 and the results based on regressions stratified by gender in panel B of Fig. 1 are consistent with those provided in Fig. 2.

The estimates have three important implications. First, a novel outcome is that because of job loss the gender difference in both hours of work and commuting distance become larger. It seems displaced women have a greater tendency for flexibility after job loss, putting more emphasis on reduced working hours and shorter commutes than do displaced men. Second, relative to men, women have a longer period of search on average and remain unemployed for a longer period. This is consistent with Kunze and Troske (2012, 2015) and Farber (2017). Specifically, the employment loss for women is 9 percentage points higher than for men four months after job loss, whereas this difference is only 2 percentage points 24 months since job loss. Third, there is no widening of the gender hourly wage gap. On the contrary, on average the wage gap reduces over the entire post-displacement period.[13] The finding of smaller wage losses for displaced women is consistent with Davis et al. (2011) who document that after job loss the drop in earnings is slightly smaller for women than men. One interpretation of these results is that displaced female workers' tendency for flexibility is greater and increases job search duration without widening the gender pay gap.

[10] We replicated our analysis by matching on variables in the sixth month before job loss instead of the month of jobs loss. Note that this only affects the variables "presence of children", "type of contract" and "working hours", as all other matching variables are time constant or measured in the calendar year before job loss. In the results provided in Table C.1 we find that our results are robust.

[11] In our empirical analysis on working hours and commutes, we use the logarithm of a transformed version of the outcome variable computed by taking the logarithm of the value plus one. To assess the sensitivity of our results to the operationalization of hourly wages, working hours and commuting distance, in a separate robustness check we provide results based on models specified in levels. Furthermore, results are robust to models specified in logs by taking the Inverse Hyperbolic Sine Transformation, which are available upon request. Finally, we ran a robustness check by using a selective sample of workers with complete information on hourly wages, working hours and work location (see Table C.2), and our conclusions are robust.

[12] See Figure B.1 for results based on a model where we excluded the interaction terms among full-time/part-time status, *DISPLACED* and *G*. See figures B.2-B.8 of Appendix B for the role of other observables in displacement effects based on the model of Fig. 2. See Tables A.6, A.7 and A.8, respectively, for the displaced workers' within changes in hourly wages, working hours and the commuting distance by full-time/part-time status. See Tables A.9, A.10 and A.11, respectively, for the displaced workers' distribution of hourly wages, working hours and the commuting distance.

[13] We also assess the gender difference in the displacement effect on wages by comparing high-wage to low-wage workers (see Table C.3 and Fig. C.1). Relative to displaced high-wage men, displaced high-wage women experience a 0.7 percentage points smaller loss in wages, consistent with Panel D of Table 3. This suggests women's smaller displacement effect on wages is not caused by their wages being very close to the minimum wage level.

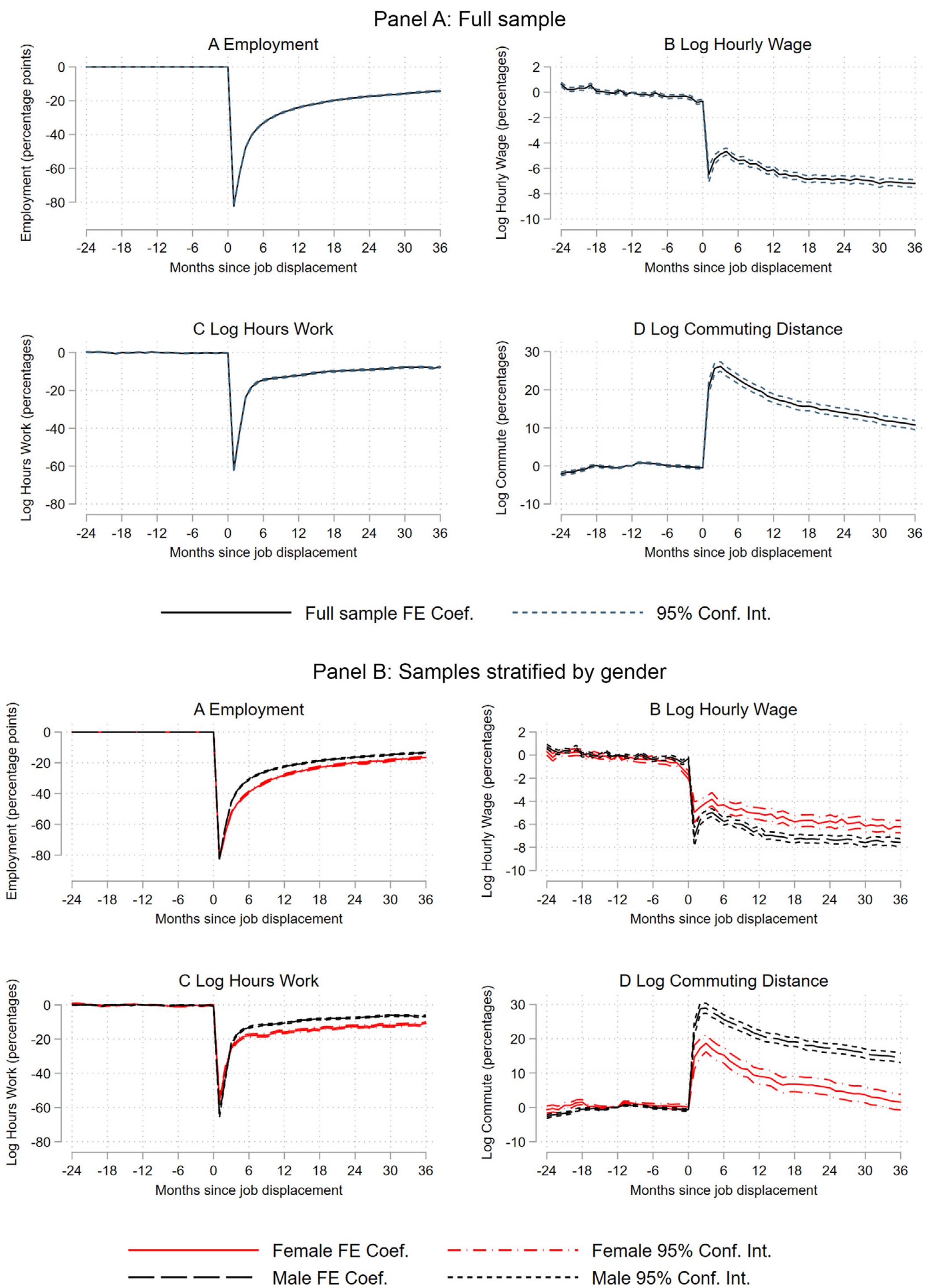

Fig. 1. Time-dependent displacement effects on employment (A), hourly wages (B), hours work (C) and commuting distance (D) (Eq. (2)).
Notes: Each line gives the parameter estimates of the interaction term *DISPLACED* x G^{τ} of a different regression. Three sets of coefficients are provided, estimated separately for the full sample (Panel A), for female employees and for male employees (Panel B). Reference category of the displaced workers, *DISPLACED*, contains the non-displaced workers. Reference month is $G^{\tau=-12}$, the twelfth month before job loss. The 95% confidence intervals are computed using clustered standard errors on the individual level. Each fixed effects regression model includes 304 parameters. The number of individuals equals 174,436, including 49,788 women and 124,648 men.

5.1.1. *Robustness checks*

We present six robustness checks to assess the validity of our results and analyse the importance of workers' full-time/part-time status. First, in Fig. C.2 of Appendix C we overcome a positive selection into employment for female workers by including unemployed individuals and keeping zeros in the data on wages, working hours and commuting distance for the unemployed. The parameter estimates provided in Fig. C.2 are based on model (4) specified in levels instead of in logs. Fig. C.2 shows that the impact on hourly wages in levels is slightly smaller for women than men. Importantly, the gender difference in displacement effects on the three outcome variables is very similar using models in levels including zeros for the unemployed compared to models in lev-

Table 3
Impact of job loss on employment, hourly wages, working hours and commuting distance.

	Employment (=1) (1)	Hourly wage (log) (2)	Working hours (log) (3)	Commute (log) (4)
Panel A: Full sample (Eq. (1))				
DISPLACED × *POST*	-0.2478***	-0.0642***	-0.1133***	0.1635***
	(0.0015)	(0.0010)	(0.0014)	(0.0051)
Panel B: Sample of women (Eq. (1))				
DISPLACED × *POST* × *Female*	-0.2817***	-0.0518***	-0.1497***	0.0704***
	(0.0028)	(0.0018)	(0.0031)	(0.0097)
Panel C: Sample of men (Eq. (1))				
DISPLACED × *POST* × *Female*	-0.2343***	-0.0688***	-0.0995***	0.1996***
	(0.0017)	(0.0012)	(0.0015)	(0.0059)
Panel D: Full sample (Eq. (3))				
Base category: Men				
DISPLACED × *POST* × *Female*	-0.0373***	0.0167***	-0.0827***	-0.0812***
	(0.0039)	(0.0027)	(0.0041)	(0.0137)

Notes: Each column gives the dependent variable and each row gives the parameter estimate of the two-way interaction term *DISPLACED* x *POST* (Panels A, B and C) or of the three-way interaction term *DISPLACED* x *POST* x *Female* (Panel D). Each parameter estimate is based on a different regression. Standard errors clustered on the individual level are in parentheses. ***, **, *, corresponds to the significance level of 1%, 5%, 10%, respectively. Reference category of *DISPLACED, POST* and *Female* contains the non-displaced workers, pre-displacement period and men, respectively. Main, two-way interaction and three-way interaction effects of the covariates are not reported. The displaced and non-displaced workers are followed for 24 months before until 36 months after the month of actual (treated) and potential (controls) job loss. The number of observations included in the full sample for employment, hourly wage, working hours and commuting distance equals 10,640,596, 9,760,553, 9,763,522, and 9,639,113, respectively. The number of individuals equals 174,436, including 49,788 women and 124,648 men.

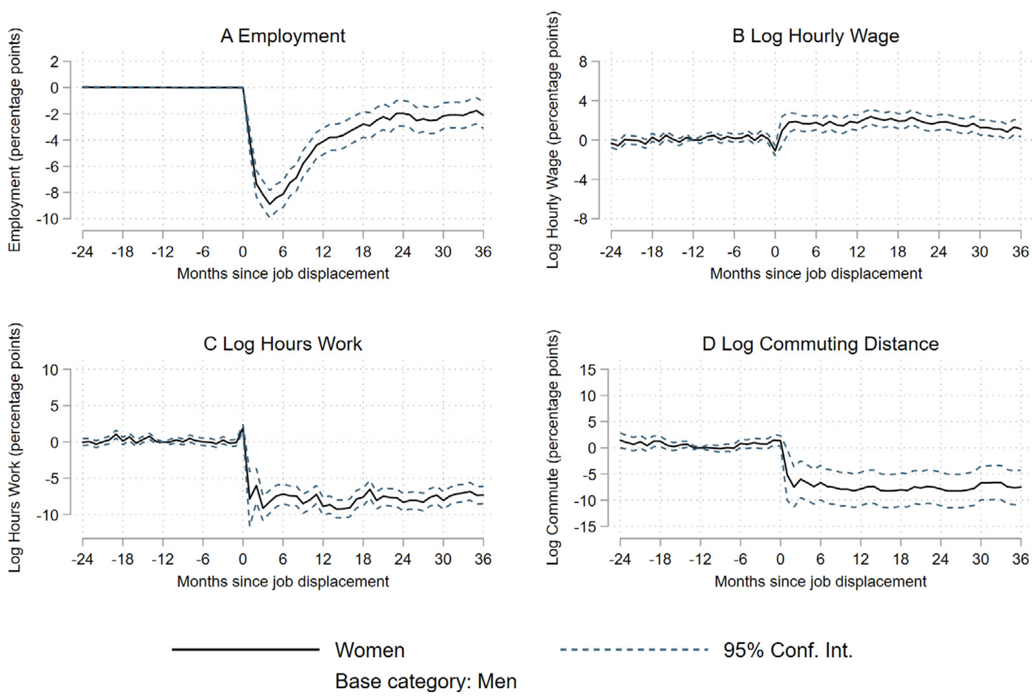

Fig. 2. Gender difference in the time-dependent displacement effects on employment (A), hourly wages (B), hours work (C) and log commuting distance (D) (Eq. (4)). *Notes:* Each line gives the parameter estimates of the three-way interaction term *Female* x *DISPLACED* x G^{τ} of a different regression. Reference category of *Female* contains men. Reference category of the displaced workers, *DISPLACED*, contains the non-displaced workers. Reference month is G^{-12}, the twelfth month before job loss. The regression analyses include three-way interaction terms, two-way interaction terms and main effects of *DISPLACED* and G^{τ} interacted with the time-varying variable age (3) and with the time-constant variables born in the Netherlands, marital status, presence and age of children (5), job tenure (3), type of contract (2), fulltime/part-time status, firm size (3), manufacturing sector and the year of job displacement (6), respectively. All time-constant variables are measured in the month of job loss, except for firm size and sector which are measured in the year preceding job loss. The 95% confidence intervals are computed using clustered standard errors on the individual level. Each fixed effects regression model includes 3547 parameters.

els excluding zeros, especially from about three to six months after job loss which can be explained by the fact that most displaced workers are re-employed at that time. This shows that the potential issue of positive selection into employment for the estimation of the specification on hourly wages, working hours and commutes, respectively, does not affect our conclusions.

Second, we show that our results on wages and working hours are robust to excluding post-displacement job-to-job turnover (see Figs. C.3 and C.4 for results based on Eqs. (2) and (4), respectively). This finding suggests the patterns in post-displacement labour market outcomes over time since job loss are caused by individuals entering employment instead of by job-to-job transitions.

Third, we apply placebo treatment tests on parallel pre-treatment trends, matching displaced to non-displaced workers in the twelfth month before actual displacement (see Figs. C.5 and C.6 for models (2) and (4), respectively). These results show no effects in the twelve months leading up to the month of job loss, which further supports our parallel trends identification assumption.

Fourth, we show in Table C.4 that controlling for the worker's educational attainment does not affect the gender difference in displacement effects. Specifically, including educational attainment in the triple differences specification, controlling for any imbalance in education by explicitly including the relevant three-way, two-way and main terms, leads to comparable estimates of the gender difference in displacement effects as those reported without controlling for educational attainment. The results are also robust to excluding the individuals without information available about their educational attainment. One reason for the limited importance of controlling for educational attainment could be that the baseline specification includes individual fixed effects, capturing time-constant unobserved ability. Overall, these results suggest the imbalance between displaced and non-displaced workers in educational attainment does not affect the estimated gender differences in displacement effects.

Fifth, we assess whether the gender difference in displacement effects is driven by a difference in full-time/part-time status as measured before job loss (see Table C.5 and Fig. C.7 for the results based on models (3) and (4), respectively). The results show that both part-time employed women and full-time employed women have a relatively low number of working hours and short commute after job loss. Moreover, results indicate that displaced full-time employed men experience the smallest loss in employment. Further, we show that displaced women who were in a part-time or full-time job experience a loss in hourly wages comparable to displaced full-time employed men. Importantly, the evidence indicates that the smaller loss in hourly wages for displaced women compared to displaced men as observed in Fig. 2B is caused by the large loss in wages for displaced part-time employed men.

Sixth, an alternative identification strategy can be applied, focusing on displaced workers only by matching women to observationally equivalent men experiencing job loss from the same firm. A limitation of this strategy is that it does not control for possible gender differences in labour market outcomes that are controlled for when including non-displaced workers, and sample sizes are much smaller making it impossible to study impacts for expectant mothers. However, an advantage of this strategy is that displaced women and displaced men are made observationally equivalent, by matching on the set of variables discussed in Section 4.2 as well as on the firm identifier. Based on a sample of 5,867 individuals, Table C.6 shows that our key findings on gender differences in displacement effects based on this more restrictive identification strategy are comparable to those reported in Table 3 (panel D, based on Eq. (3)). Specifically, displaced women compared with displaced men experience larger losses in employment and working hours, smaller losses in hourly wages and smaller increases in the commuting distance.

5.2. Displacement effects on expectant mothers and expectant fathers

We focus on the displacement effects for expectant mothers (Table 4 and Fig. 3) and expectant fathers (Table 5 and Fig. C.9), based on the triple differences model. The reference category of the displacement group contains non-displaced workers, the reference month is the twelfth month before job loss and the reference category of household setting contains singles without children. More specifically, the pregnancy effect of displaced expectant mothers, for example, equals the difference between the change in outcome after job loss of displaced pregnant women and the change in outcome of displaced women in the reference household setting, relative to the changes in outcome between the non-displaced counterparts.

The evidence in Table 4, based on Eq. (3), shows that displaced full-time employed female workers who are pregnant at the time of job loss become re-employed by finding a job with 8–12 percentage points fewer working hours, and experience a 13 to 19 percentage points larger loss in employment, compared to the other groups of displaced women (Panel A of Table 4). Displaced expectant mothers appear relatively selective in commuting distance, however, the difference in the displacement effect on commute is statistically insignificant. The results on heterogeneity effects by household setting based on the sample of part-time employed women are less pronounced (Panel B), providing evidence that pregnancy at the time of job loss leads to a 7 to 11 percentage points higher loss in women's employment. We do not observe significant differences in wage losses.

The effects on employment and working hours are long lasting and particularly striking given that they should be interpreted on top of the 'standard' child penalty effect.[14] In the triple differences model, the standard child penalty effect is captured by including non-displaced expectant workers. That is, changes in outcome of non-displaced expectant workers relative to non-displaced workers in the reference household setting act as the reference point for our estimates on changes in outcome of displaced expectant workers compared to displaced workers in the reference household setting.

Moreover, the results suggest that single expectant mothers and married expectant mothers experience comparable displacement effects. Part of the pregnancy effect on employment may be attributed to the demand side of the labour market through discrimination, and the small difference between single and married women does not allow us to infer that having a spouse affects post-displacement labour supply of pregnant women. Notably, except for pregnant mothers and single mothers with children aged 18 years or under, the role of the worker's household setting in displacement effects is relatively small and thus of limited importance. This result does not imply that women's household setting does not affect their labour market outcomes, but only that this factor is similar for displaced women and non-displaced women. Overall, the findings show that the interaction between job loss and pregnancy results in particularly worse labour market outcomes for displaced women, on top of the well-established child penalties that women experience.

Fig. 3, based on Eq. (4), shows that for displaced full-time employed women the negative pregnancy effect on post-displacement employment peaks at 40 percentage points four months since job loss.[15] This effect becomes smaller six months since job loss but remains about 10 percentage points after 18 months since job loss, and holds for both single women (panel A) and married women (panel B). The 10 percentage points lower employment of displaced expectant mothers three years since job loss is an important result, as it suggests that the job loss and pregnancy effect lasts until after the additional three-month maternity benefits run out. Importantly, for part-time employed women the negative pregnancy effect on employment almost fully disappears two years since job loss (see Fig. C.8).

Table 5 and Fig. C.9 show results on the role of the household setting in male workers' post-displacement outcomes. Compared to displaced full-time employed men who are single and have no children, displaced full-time employed expectant fathers who are single or married at the time of job loss experience smaller losses in employment. Panel A of Table 5 also shows that displaced full-time expectant fathers have relatively high working hours in the post-displacement period. We do not find clear effects for expectant fathers who were in a part-time job when job loss occurred.

In general, displaced full-time employed expectant mothers who become re-employed after job loss are more likely to find a job with limited working hours. Moreover, displaced expectant mothers tend to experience a relatively high loss in employment, whereas displaced expectant fathers experience a relatively low loss in employment. These results are relative to the changes in labour market outcomes of the non-displaced counterparts, implying that expectant mothers' job loss amplifies the child penalty effect on employment and working hours.

[14] The existence of child penalties on employment and earnings for women but not for men is well established in the literature on children and gender gaps in labour market outcomes (Kleven et al., 2019; Cortés and Pan, 2020).

[15] See Fig. C.8 of Appendix C for the effects on part-time employed women.

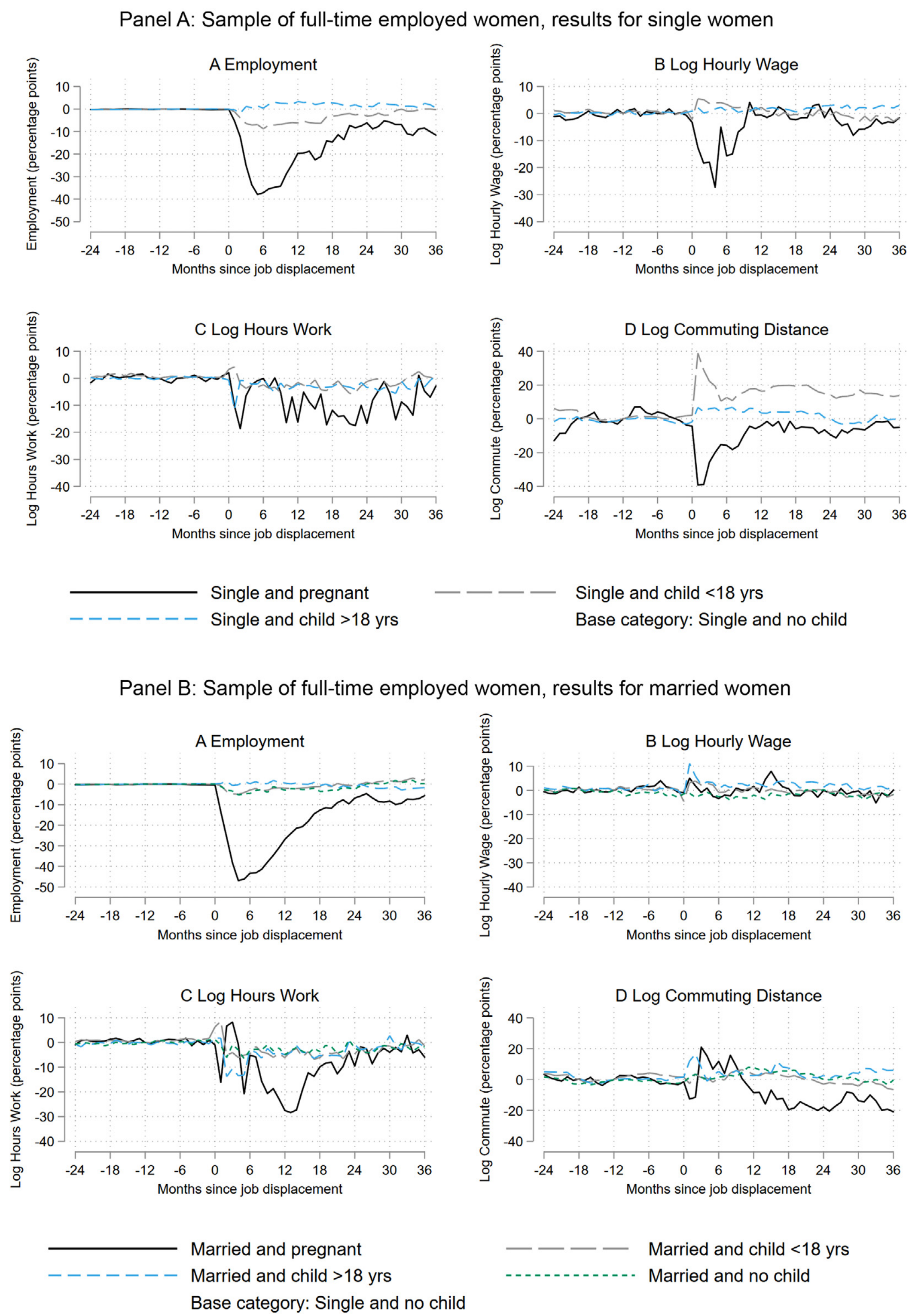

Fig. 3. Time-dependent displacement effects for displaced female workers by household setting on employment (A), hourly wages (B), hours work (C) and commuting distance (D) (Eq. (4)).
Notes: Each outcome variable gives the parameter estimates of a single regression. For example, sub-graphs A of panels A and B are based on a single regression. The regression analyses include a three-way interaction term *Household Setting* x *DISPLACED* x G^{τ}. Reference category of household setting, *DISPLACED* and month, contains workers who are single and have no kids before actual or potential job loss, the non-displaced workers and the twelfth month before job loss, respectively. For clarity reasons, we have excluded confidence intervals. See Table 4 for additional notes.

Table 4
The role of female workers' household setting in the effects of job displacement (Eq. (3)).

	Employment (=1) (1)	Hourly wage (log) (2)	Working hours (log) (3)	Commute (log) (4)
Panel A: Sample of full-time employed women				
DISPLACED × *POST* × *Household Setting:*				
Base category: Single and no child				
Single and pregnant	-0.1655***	-0.0326	-0.1148***	-0.0783
	(0.0375)	(0.0232)	(0.0408)	(0.1377)
Single and child ≤ 18 yrs	-0.0354**	-0.0014	-0.0290	0.1464**
	(0.0163)	(0.0126)	(0.0185)	(0.0623)
Single and child > 18 yrs	0.0207	0.0182**	-0.0259*	0.0301
	(0.0133)	(0.0085)	(0.0142)	(0.0538)
Married and pregnant	-0.1871***	-0.0090	-0.1192***	-0.1445
	(0.0322)	(0.0204)	(0.0405)	(0.1171)
Married and child ≤ 18 yrs	-0.0104	-0.0044	-0.0469***	-0.0139
	(0.0149)	(0.0123)	(0.0171)	(0.0546)
Married and child > 18 yrs	-0.0189	0.0193	-0.0416*	0.0451
	(0.0218)	(0.0154)	(0.0236)	(0.0731)
Married and no child	-0.0193	-0.0116	-0.0299*	0.0364
	(0.0147)	(0.0107)	(0.0163)	(0.0555)
Panel B: Sample of part-time employed women				
DISPLACED × *POST* × *Household Setting:*				
Base category: Single and no child				
Single and pregnant	-0.1149***	0.0041	-0.0437	-0.0233
	(0.0330)	(0.0170)	(0.0376)	(0.1147)
Single and child ≤ 18 yrs	0.0069	-0.0027	0.0007	-0.0079
	(0.0135)	(0.0076)	(0.0156)	(0.0475)
Single and child > 18 yrs	0.0279	0.0085	-0.0424*	0.0442
	(0.0177)	(0.0101)	(0.0227)	(0.0602)
Married and pregnant	-0.1009***	-0.0333	-0.0341	0.0011
	(0.0289)	(0.0212)	(0.0356)	(0.1116)
Married and child ≤ 18 yrs	0.0349***	-0.0071	0.0239*	0.0050
	(0.0123)	(0.0069)	(0.0143)	(0.0432)
Married and child > 18 yrs	0.0332**	0.0113	-0.0258	0.0790
	(0.0160)	(0.0090)	(0.0191)	(0.0538)
Married and no child	-0.0201	-0.0043	-0.0311	0.0091
	(0.0169)	(0.0097)	(0.0193)	(0.0565)

Notes: Parameter estimates of the three-way interaction terms among *Household Setting* x *DISPLACED* x *POST* are provided. Standard errors clustered on the individual level are in parentheses. ***, **, *, corresponds to the significance level of 1%, 5%, 10%, respectively. Reference category of household setting contains workers who are single and have no kids before actual (treated) or potential (controls) job loss. Reference category of *DISPLACED* contains the non-displaced workers. Reference category of *POST* contains the pre-displacement period. The regression analyses include three-way interaction terms, two-way interaction terms and main effects of *DISPLACED* and *POST* interacted with the variables age (3), born in the Netherlands, job tenure (3), type of contract (2), firm size (3), manufacturing sector and the year of job displacement (6), respectively. Results are provided separately for a sample of 16,610 full-time employed women (including 285 single expectant mothers and 316 married expectant mothers) and a sample of 33,178 part-time employed women (including 377 single expectant mothers and 540 married expectant mothers).

5.3. Discussion on the role of geography in gender gaps in the labour market

In this sub-section, we position our estimates in the literature and provide some possible avenues for further research. Our estimates have pointed at the role of geography in the development of gender gaps in the labour market. We find that women are less likely than men to increase commutes after experiencing job loss. Furthermore, displaced women experience larger losses in employment and working hours than displaced men. This gender difference in displacement effects is amplified for those expecting a baby at the time of job loss.

These empirical outcomes add to other studies that have demonstrated a gender difference in commutes (Crane, 2007; McQuaid and Chen, 2012; Haley-Lock et al., 2013; Le Barbanchon et al., 2021) and hours of work (Goldin, 2014).[16] In comparison to these studies, our setting of episodes of job loss because of firm bankruptcy is novel. In addition, there have been no studies on the importance of pregnancy in such a setting, although some studies find relatively strong labour market effects for single mothers in general (Francesconi and Van der Klaauw, 2007). All of the outcomes point in the direction of a female tendency for flexibility.

Women's stronger need for flexibility can be explained by traditional gender roles and intra-household decision making, where traditionally women invest more time in home production (Blau and Kahn, 2017; Chiappori and Mazzocco, 2017; Ngai and Petrongolo, 2017). The tendency for flexibility and decisions on female labour supply are explained, among others, by gender identity considerations and social norms (Cortés and Pan, 2020; Cavapozzi et al., 2021), access to child care (Guest and Parr, 2013), the geographical proximity to mothers or mothers-in-law (Compton and Pollak, 2014) and a larger negative impact of commuting on well-being (Roberts et al., 2011; Jacob et al., 2019). There are also substantial differences in time spent on household activities between partnered and non-partnered mothers (Hamermesh, 2021).

The importance of flexibility, in terms of a short commute, for gender gaps, can be explained by several mechanisms on how space differentially shapes careers of women and men. First, it may fit into a broad literature – stemming from Rosen (1986) to Sorkin (2018) – that demonstrates the relevance of city and job amenities as important determinants of the variance of pay across employees. Flexibility is part of the utility function, so that it leads to a framework of compensating wage differ-

16 We abstract from the consequences of commute on effort. Zenou (2002) demonstrates that employers may use commuting distance as a screening device. For example, Van Ommeren and Gutiérrez-i-Puigarnau (2011) and Hassink and Fernandez (2018) demonstrate that longer commutes cause higher workplace absenteeism. However, Van Ommeren and Gutiérrez-i-Puigarnau (2011) find no gender specific commuting effect and the other two studies do not analyse gender differences.

Table 5
The role of male workers' household setting in the effects of job displacement (Eq. (3)).

	Employment (=1) (1)	Hourly wage (log) (2)	Working hours (log) (3)	Commute (log) (4)
Panel A: Sample of full-time men				
DISPLACED × POST × Household Setting:				
Base category: Single and no child				
Single and expecting a baby	0.0526***	0.0068	0.0289**	-0.0975
	(0.0150)	(0.0102)	(0.0134)	(0.0654)
Single and child ≤ 18 yrs	0.0246***	-0.0095**	0.0153**	-0.0307
	(0.0071)	(0.0047)	(0.0060)	(0.0253)
Single and child > 18 yrs	0.0013	0.0005	-0.0110*	0.0159
	(0.0076)	(0.0049)	(0.0066)	(0.0271)
Married and expecting a baby	0.0483***	0.0025	0.0250**	0.0015
	(0.0134)	(0.0094)	(0.0109)	(0.0531)
Married and child ≤ 18 yrs	0.0566***	-0.0080**	0.0305***	-0.0292
	(0.0056)	(0.0037)	(0.0049)	(0.0201)
Married and child > 18 yrs	0.0423***	-0.0186***	0.0227***	-0.0476*
	(0.0085)	(0.0055)	(0.0078)	(0.0283)
Married and no child	0.0291***	-0.0073	0.0034	-0.0217
	(0.0082)	(0.0055)	(0.0071)	(0.0281)
Panel B: Sample of part-time employed men				
DISPLACED × POST × Household Setting:				
Base category: Single and no child				
Single and expecting a baby	0.0681	0.0444	0.0422	0.1563
	(0.0425)	(0.0280)	(0.0467)	(0.1269)
Single and child ≤ 18 yrs	0.0397**	0.0019	0.0143	0.0188
	(0.0161)	(0.0105)	(0.0157)	(0.0555)
Single and child > 18 yrs	0.0103	-0.0084	0.0025	0.0171
	(0.0173)	(0.0117)	(0.0176)	(0.0579)
Married and expecting a baby	0.0387	0.0113	0.0106	0.0337
	(0.0334)	(0.0292)	(0.0322)	(0.1084)
Married and child ≤ 18 yrs	0.0817***	-0.0021	0.0398***	0.0255
	(0.0132)	(0.0088)	(0.0133)	(0.0456)
Married and child > 18 yrs	0.0511***	-0.0098	0.0407**	0.0331
	(0.0178)	(0.0120)	(0.0183)	(0.0577)
Married and no child	0.0297	0.0093	0.0169	-0.0548
	(0.0196)	(0.0132)	(0.0190)	(0.0642)

Notes: Parameter estimates of the three-way interaction terms among *Household Setting* x *DISPLACED* x *POST* are provided. Standard errors clustered on the individual level are in parentheses. ***, **, *, corresponds to the significance level of 1%, 5%, 10%, respectively. Reference category of household setting contains workers who are single and have no kids before actual (treated) or potential (controls) job loss. Reference category of *DISPLACED* contains the non-displaced workers. Reference category of *POST* contains the pre-displacement period. Results are provided separately for a sample of 100,406 full-time employed men (including 1032 single expectant fathers and 1602 married expectant fathers) and a sample of 24,242 part-time employed men (including 194 single expectant fathers and 372 married expectant fathers). See Table 4 for additional notes.

entials. In the spirit of Sorkin (2018), our study suggests that the spatial and gendered dimension of sorting of workers across high-paying and low-paying firms could be important for gender differences in pay and compensating differentials.

Second, it is important to note that the tendency for flexibility includes mechanisms related to constraints on women because of gendered roles in home production. For example, women being forced to undertake flexible work because of lack of other options, lack of affordable childcare in close geographical proximity, and cultural and social expectations. Indeed, studies have emphasised that flexibility takes the role of a constraint on labour supply that might be related to gendered roles and caregiving (Altonji and Paxson, 1992; Bertrand, 2020; Cagliesi and Hawkes, 2021).

Third, pursuing more flexibility by finding jobs nearby may induce a longer spell of unemployment for female job seekers after, for example, a career interruption because of family reasons. A career break may cause occupational gender segregation and affect the rate of human capital deterioration (Görlich and De Grip, 2009; Biewen et al., 2018; Laun and Wallenius, 2021). In turn, the deterioration of human capital may also affect the employer's hiring decisions (Fernandez and Fernandez-Mateo, 2006). For mothers, minimizing the distance between the residential location, job location and children's school or childcare centre location, is likely to be important for labour market attachment.

Fourth, women's shorter commuting distance suggests that they are more likely to rely on a smaller network of peers that could make it more difficult for them to find a job. It may lengthen the unemployment duration and limit job match quality. The literature demonstrates the importance of a spatial network of local neighbourhood-level interactions for job search and referrals (Hellerstein et al., 2011; Schmutte, 2015). Moreover, Hellerstein et al. (2014) provide evidence of spatial labour market networks, showing these networks affect turnover and earnings. In a different context, Rosenthal and Strange (2012) show that female entrepreneurs make firm location decisions such that they are more segregated and located farther away from dense areas and benefit less from agglomeration economies. These decisions are explained by women's higher cost of commuting because of a higher time allocation in the household.

6. Conclusion

Our results imply that displaced women have a relatively strong tendency for job flexibility, characterised by more limited working hours and short commutes when they find a new job. Relative to displaced men, displaced women tend to acquire a job with an 8 percentage points larger loss in working hours and an 8 percentage points smaller increase in commuting. Furthermore, displaced women have a relatively long period of job search, which is costly. Specifically, four months after job loss, the gender difference in post-displacement employment equals 9 percentage points, which becomes 4 and 2 percentage points after 12 and 36 months since job loss, respectively.

It seems plausible that job loss does not widen the gender hourly wage gap, as we show for displaced women that their loss in hourly wages is slightly smaller than that of displaced employed men. Importantly, women's longer job search duration may be due to flexibility concerns but also wage concerns. Specifically, women find a job with a shorter commuting distance and a better hourly pay, so it seems like the additional job search has at least some positive effect on wages, but not large enough to compensate for the negative effect on women's monthly earnings caused by reduced working hours. Overall, the results show that job loss widens gender gaps in working hours and commuting distance and suggest that women's greater tendency for job flexibility increases their job search duration but does not widen the gender hourly wage gap in the three-year period after job loss.

We find that women who were pregnant and in a full-time job upon dismissal are on average about 10–20 percentage points less employed than displaced women who were not pregnant, irrespective of the marital status at the time of job loss. This finding indicates that job loss due to firm bankruptcy amplifies motherhood employment penalties, as our results on displaced expectant mothers are relative to the changes in outcomes of non-displaced expectant mothers. In contrast, displaced expectant fathers have a relatively high employment rate after experiencing job loss. In addition, we show that displaced full-time employed expectant women experienced reduced working hours. We do not find any significant differences in commuting distance and hourly wages. Our analysis shows that firm bankruptcy for expectant mothers widens gender gaps in employment and working hours.

Taken together, as in other countries, in the Netherlands there is no employment protection for expectant mothers against dismissal because of firm bankruptcy. We show that expectant mothers are more likely to remain disconnected from the labour market for a longer period after job loss relative to other groups of displaced workers. Thus, for expectant mothers, job loss widens the gender employment gap and possibly the gender pay gap through reduced long-term earnings potential over the life course. A policy recommendation is to protect expectant mothers against the consequences of employment discontinuity.

More generally, policies to narrow gender gaps may involve providing more affordable childcare in close geographical proximity, encouraging men to share childcare responsibilities and raising awareness within households of the consequences of job loss at the time of pregnancy.

CRediT authorship contribution statement

Jordy Meekes: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Wolter H.J. Hassink:** Conceptualization, Methodology, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing.

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Supplementary materials

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