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Essential work and emergency childcare: identifying gender differences in COVID-19 effects on labour demand and supply

Jordy Meekes[a,b,c,d,*], Wolter H. J. Hassink[e,c], and Guyonne Kalb[b,c,d]

[a]Leiden University, Department of Economics, Steenschuur 25, Leiden, 2311 ES, The Netherlands
[b]The University of Melbourne, Melbourne Institute: Applied Economic & Social Research, Melbourne, level 5 - 111 Barry Street, Carlton, VIC, 3010, Australia
[c]IZA—Institute of Labor Economics, Bonn, Germany
[d]LCC—The ARC Centre of Excellence for Children and Families over the Life Course, Indooroopilly, Australia
[e]Utrecht University, Utrecht University School of Economics, P.O. Box 80125, Utrecht, 3508 TC, The Netherlands

*Corresponding author: j.meekes@law.leidenuniv.nl

Abstract

We examine whether the COVID-19 crisis affects women and men differently in terms of employment, working hours, and hourly wages, and whether the effects are demand or supply driven. COVID-19 impacts are studied using administrative data on all Dutch employees up to December 2020, focussing on the national lockdowns and emergency childcare for essential workers in the Netherlands. First, the impact of COVID-19 is much larger for non-essential workers than for essential workers. Although female non-essential workers are more affected than male non-essential workers, on average, women and men are equally affected, because more women than men are essential workers. Second, the impact for partnered essential workers with young children, both men and women, is not larger than for others. Third, single-parent essential workers respond with relatively large reductions in labour supply, suggesting emergency childcare was insufficient for them. Overall, labour demand effects appear larger than labour supply effects.

JEL classifications: J13, J16, J20, J64

1. Introduction

The extent to which societies have been impacted by COVID-19 is unprecedented in recent times. The COVID-19 economic shock is (partly) so severe due to government-imposed lockdowns, that have shut down specific sectors of the economy leading to a decrease in

labour demand, combined with the compulsory closing of childcare and schools, limiting the labour supply of households. As women and men are employed in different sectors of the economy, thus facing different labour demand shocks in response to COVID-19, and are likely to face different childcare responsibilities, an important question is whether (and how) women and men were affected differently by the COVID-19 crisis with regard to their labour market outcomes.

There are two key mechanisms that could lead to gender differences in the effects from COVID-19. First, the average impact on labour market outcomes caused by the COVID-19 shock can be different for women and men, since the impacts on labour demand vary across economic sectors and gender composition differs across economic sectors (Forsythe *et al.*, 2020). Second, the literature has devoted much attention to gender differences in the impact of the economic effects of COVID-19 because the closing of childcare facilities and schools has put pressure on the ability of households to outsource childcare needs (Alon *et al.*, 2020, 2021; Fuchs-Schündeln *et al.*, 2020). Although, as a result, both men and women increased time spent in home production, women increased hours spent on childcare by more than men (Del Boca *et al.*, 2020; Hupkau and Petrongolo, 2020; Sevilla and Smith, 2020; Oreffice and Quintana-Domeque, 2021), and women in particular were affected by school closure intensity in the USA, reducing their labour supply (Amuedo-Dorantes *et al.*, 2020). As women often take responsibility for the caring roles in the household, they are likely to spend more time on childcare, home schooling, and housework thereby leaving less time for hours in paid employment.

As in other countries, women in the Netherlands tend to have lower employment rates (73.9%) and work fewer hours on average (25.3 h per week) than men (81.6% and 33.5 h per week, respectively), and are thus more likely to take primary responsibility for child-care.[1] The proportion of men and women in employment is relatively high in the Netherlands (especially for women) compared to the average across all OECD countries at 73.7% for men and 59.0% for women. However, the Netherlands also has the largest proportion of part-time workers in Europe and relatively low average working hours. Men in the Netherlands work on average 33.5 h per week compared to 39.5 h per week on average in all OECD countries combined, while Dutch women work on average 25.3 h per week, compared to 34.2 h per week on average in all OECD countries combined.

In light of these differences by gender, this paper aims to determine whether women and men are affected differently by the COVID-19 crisis in terms of labour market outcomes, and whether the mechanisms of the impacts are different (i.e. to what extent the impact appears demand or supply driven). So far, the literature, mostly based on survey data, provides mixed evidence on whether women experienced worse labour market outcomes following the COVID-19 shock than men.

In the USA and UK, women have been affected disproportionately by COVID-19 in terms of job loss, but in Germany there is no evidence of a gender difference in job loss which can be partly explained by the German short-time work scheme which limited the number of people experiencing job loss (Adams-Prassl *et al.*, 2020). For the UK, Hupkau and Petrongolo (2020) show that women and men are equally affected in terms of job loss, but women experience smaller losses in working hours and earnings. Andrew *et al.* (2020) show for parents in the UK that mothers are more likely than fathers to lose their job,

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1 Statistics are from 2020 for men and women aged 15–64. Data were extracted on 28 January 2021 from OECD.stat available on https://www.stats.oecd.org.

spending fewer hours on paid work and more hours on unpaid work such as on childcare activities. A similar conclusion is reached by Farré *et al.* (2022) for Spain. For the Netherlands, Zimpelmann *et al.* (2021) use survey data to show that female workers lose 1 h more in total working hours than men, whereas Hassink *et al.* (2021) use Dutch administrative data to show that gender differences in COVID-19 effects on employment, working hours and hourly wages are close to zero until the end of March 2020. Alon *et al.* (2021) examine cross-country differences in the impact of COVID-19 based on survey data for six countries. They show that the Netherlands experienced relatively small negative impacts on employment and working hours compared to other countries (possibly due to relatively generous furlough schemes, discussed in Section 2.2), and that women are more affected than men in the USA, Germany and Canada but gender differences in the Netherlands (as well as in Spain and the UK) are much smaller.

Using administrative data on the entire population of Dutch employees, we exploit a specific Dutch government policy. At the start of the first lockdown in March 2020, the Dutch government classified economic sectors as essential or non-essential as part of an emergency childcare policy that only allowed essential workers, defined as being employed in critical or crucial sectors, to send their children to childcare or school during the lockdowns. This policy was in effect from March until June 2020 during the first lockdown and from December 2020 until February 2021 during the second lockdown. It was implemented to support two-earner households where both earners were essential workers (and one-earner single-parent households where the single parent was an essential worker).

The two Dutch lockdowns in 2020 with emergency childcare policies in place led to differences between groups of workers. First, there is a difference in labour demand shocks between essential workers (close to zero) and non-essential workers (decreased labour demand), which can be used to isolate labour demand impacts for men and women without children in the non-essential sector. We analyse demand-side driven effects of COVID-19 by comparing essential and non-essential employees, focussing on differences between these two groups resulting from the government's categorization of work into these two groups, and determining to what extent the lockdown affected their employment, working hours, and hourly wages. By examining the differences between essential and non-essential employees by gender, we observe how men and women were differently affected by the labour demand shock caused by COVID-19.

Second, the policy of only providing access to childcare for employees in essential economic sectors allows us to study labour supply responses. Specifically, we study the differences in labour market outcomes across households with different needs for childcare within the groups of essential and non-essential workers. Within the essential worker sector, one would expect (close to) the full labour market impact to be due to labour supply changes, while within the non-essential sector, the full labour market impact is the combined effect of labour supply changes and labour demand changes. Comparing the impact of workers with and without children in the essential sector (and controlling for job characteristics) should isolate the labour supply impact due to the presence of children, while in the non-essential sector this difference represents a lower bound for the labour supply impact due to the presence of children, as some of the labour supply changes may be masked by coinciding decreased labour demand. Furthermore, the gender difference in the labour supply response to COVID-19 is likely to be correlated to differences between essential and non-essential workers in access to (emergency) childcare.

The analyses use unique monthly administrative microdata from Statistics Netherlands that cover the entire Dutch population of employees in the period until 31 December 2020, which allows an assessment of the early impacts of the pandemic. Using a monthly panel of individual employees we study the response of Dutch employees to the COVID-19 outbreak in terms of employment, monthly paid working hours and hourly wages. To study the labour demand and supply effects of COVID-19, a monthly differences-in-differences model is estimated for four subsamples stratified by essential/non-essential status and gender. A triple differences specification is estimated to study the importance of employees' household composition (relationship status, presence and age of children) and spouses' employment situation (essential/non-essential status and non-employment/full-time/part-time status) for labour supply effects. We estimate this model separately for the four samples, controlling for labour demand effects by including a wide range of observables.

The main findings are as follows. On average, non-essential female workers experience a decrease of 1.5 to 3.0 percentage points in employment, of 3% in working hours and of 0.5 to 1% in hourly wages during the two (partial) lockdowns (April to June 2020 and October to December 2020). The impacts for male non-essential workers on hourly wages are similar, but impacts on employment and working hours are smaller by 1 to 1.5 percentage point. In contrast, female and male essential workers experience similar small effects of COVID-19 on employment and working hours. The large difference between essential and non-essential workers highlights the importance of the demand side of the labour market in COVID-19 impacts. Consistent with Lewandowski et al. (2021), we show that, in the Netherlands, women are more likely to be essential workers than men are, attenuating any negative labour demand impacts for women. These findings suggest that, on average, the COVID-19 shock did not result in a widened gender gap in employment in the period until December 2020 due to the relatively large proportion of female essential workers, and labour demand effects appear larger than labour supply effects.

In addition, we show that partnered employees with young children are similarly affected by COVID-19 as partnered employees with older or no children. The only exceptions are partnered female non-essential workers with preschool children who have worse outcomes from June 2020 onwards. Analyses further show that COVID-19 effects on employment, working hours, and hourly wages of partnered individuals with children aged below 12 years do not depend much on the spouse's employment situation.

Data on the entire population of Dutch employees also enable us to focus on the small subpopulation of single parents who often face disadvantage. The results show that the negative effects of COVID-19 on employment and working hours are particularly large for single parents of young children, in particular mothers but also fathers, working in essential jobs. Single mothers of preschool children in essential jobs, relative to other female essential workers, experience a 1.0 percentage point larger loss in employment and a 2 percentage point larger loss in working hours. This effect is also observed for single parents of young children in non-essential jobs.

We extend the literature in three ways. First, we contribute to the literature on the gender difference in the impact of COVID-19 on labour market outcomes by distinguishing between essential and non-essential workers. Previous COVID-19 research argues that female employees are more negatively affected than male employees, as women are more likely to take responsibility for the caring roles in the household, and they are more likely to work in sectors hit hardest by the effects of COVID-19 (Alon et al., 2020, Couch et al., 2021). Other research focuses on the role of essential-worker status in COVID-19 impacts on

labour market outcomes (Blau *et al.*, 2021; Zimpelmann *et al.*, 2021). We combine these two strands of the literature.

Second, we contribute to the aforementioned COVID-19 literature, which is predominantly based on small survey datasets, by using full-population administrative microdata that enable us to study subpopulations that cannot easily be studied with survey data. Specifically, a novel finding of our paper is that the employment and working hours of single mothers with young children are particularly negatively affected during the two lockdowns. This is observed for essential and non-essential workers, suggesting balancing family and paid work is challenging, which results in negative labour supply responses for single parents with young children in these two groups.

Third, we contribute to the literature that relates women's labour market outcomes to household composition, the spouse's employment status, and availability of childcare.[2] The results suggest that the differences between essential and non-essential workers in labour market outcomes are at least partly related to childcare access, since the households in the non-essential sector that have the largest need for childcare are affected the most by the COVID-19 shock. However, the emergency childcare policy was not sufficient to completely avoid negative labour supply effects for single-parent essential workers compared to other essential workers.

2. Background

2.1 COVID-19 and policy timeline

In 2020, three peaks of COVID-19 infections can be distinguished (see Fig. 1). The first wave of Dutch COVID-19 infections occurred during late March and early April 2020; the second wave of infections started in September and had a peak by the end of October; and the third wave peaked in December (National Institute for Public Health and the Environment, 2022). The COVID-19 policies by the Dutch government reflect the development of COVID-19 infections; Fig. 1 also presents a timeline of the main policy events.

In March 2020, preventive measures included a first lockdown, 1.5-m social distancing, cancellations of small and large gatherings, and work from home directives. From March 15 onwards, many non-essential industries were directed to close, including restaurants, schools, and childcare and sport facilities. Importantly, on March 16 it was announced that essential workers, that is, those who are employed in businesses and organizations in critical or crucial sectors (independent of their actual occupation or role in the business), could still send their children to childcare and school as long as the children did not show any sign of colds, coughs or fever.[3] The government defined these crucial sectors for the purpose of determining eligibility for emergency childcare. Although the government advised that emergency childcare is only for households where both parents are essential workers

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2 There is abundant evidence of women's labour market outcomes worsening compared to men's labour market outcomes after becoming a parent (Adda *et al.*, 2017; Kleven *et al.*, 2019; Meekes and Hassink, 2022). The childcare literature shows the effect of the availability of childcare on the labour supply of mothers (Havnes and Mogstad, 2011; Bauernschuster and Schlotter, 2015). Cortés and Pan (2020) provide a comprehensive review of the link between children and gender gaps in labour market outcomes.

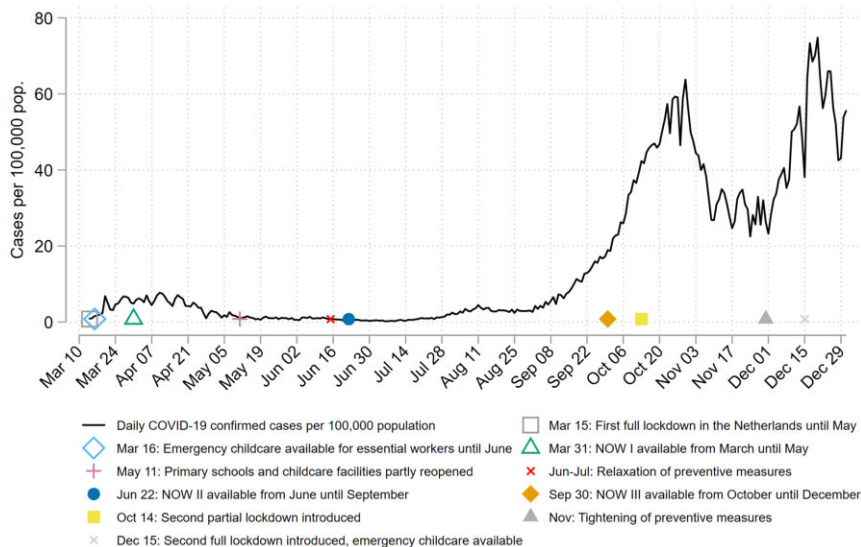3 See Appendix C for the announcement by the Dutch government on emergency childcare for essential workers.

Fig. 1. COVID-19 cases and timeline of policies in the Netherlands in 2020.
Notes: See National Institute for Public Health and the Environment (2022) for the COVID-19 cases data. The Dutch population equals 17,407,585 in 2020 (Statistics Netherlands (CBS), 2022).

(or where the single parent is an essential worker), the government also allowed couple households with just one essential worker to use it. However, based on Dutch survey data, Yerkes *et al.* (2020) find that only 12% of the households indicate that their children were in emergency childcare/school during the first lockdown, while 57% of households contain at least one parent who was an essential worker. They note a lack of clarity around the eligibility rules.

The majority of these measures were extended until May 20. However, from May 11 onwards, childcare for children aged 0–4 was again available fully, and primary school students were required to go back to school for about half the time (with regular teaching resuming from June 8). In addition, from June 1 onwards, the hospitality sector was allowed to open their outdoor areas again. Secondary schools and higher education institutions opened again from June 2 and June 15, respectively. Based on the above timeline, we hypothesize that the largest negative labour market impact occurred in April.

On October 13, a second, partial, lockdown was announced by the Dutch government in response to the second wave of COVID-19 cases. The preventive measures were tightened in November and December 2020, with schools and childcare facilities closed from 16 December 2020 until 7 February 2021. Emergency childcare was again available during this period and seems to have been taken up to a larger extent, although lack of clarity regarding which parents may access these services remained an issue during this lockdown period as well.[4]

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4   See https://odissei-data.nl/en/2021/01/what-does-the-first-covid-19-lockdown-teach-us-about-gender-inequality-in-the-netherlands/; viewed on 22 February 2022.

2.2 Dutch government assistance for businesses and employees

The main support for employers and their employees was the Temporary Emergency Measure for the Preservation of Jobs (NOW) allowance,[5] which is a short-time work scheme allowing firms facing reduced labour demand to reduce employees' working hours temporarily. The NOW covers up to 90% of the employer's wage bill for March, April, and May of 2020 covering all employee types including those in flexible jobs. An advance payment for 80% of the requested allowance can be made. Eligible companies are those who (i) expect to lose at least 20% of their revenue, (ii) keep employees' gross pay the same as before the COVID-19 crisis, and (iii) commit to not dismissing employees for economic reasons during the period covered by the allowance from March until 31 May 2020.

Announced on 31 March 2020, the NOW I superseded the Regulation for Reduction in Working Hours to cope with the significant decrease in employers' labour demand. The Regulation for Reduction in Working Hours was a short-time work scheme that had been in place for over 10 years, and was extensively used by employers to cope with the 2008 Global Financial Crisis, which allowed employers to reduce employees' working hours when facing significantly reduced labour demand for a period of 2–24 weeks. The Dutch Public Employment Service covers the salaries of furloughed workers, paying this to the employer who then transfers it to its employees. In June 2020, an extension of the NOW under comparable rules, NOW II, was announced, covering the period from June until September 2020. A third extension for the NOW was announced on 30 September, with NOW III covering the period from October until December 2020.

3. Data

We use administrative data from Statistics Netherlands that cover the entire population of Dutch employees for the analyses. Monthly microdata on labour market outcomes are collected from income statements available in the Job and Wages Register over the period 2019–20 using calendar months January to December. The data are based on employed workers' monthly income statements.

3.1   Key variables

The key outcome variables include individual employment (yes/no), monthly paid working hours, and monthly hourly wage. The indicator variable employment equals one for the employed, even if they currently work 0 h, and zero for the non-employed. The number of paid working hours is unaffected by paid leave, holidays, short-time work covered by the NOW and overtime hours, but it is decreased if employees have reduced paid working hours and/or take unpaid leave. As we use data on paid working hours, reductions in actual working hours paid for through the short-time work scheme do not show up in the data as reduced working hours, and these employees are paid their full wage. Hourly wage is computed by dividing monthly gross wages by monthly working hours. We analyse the natural logarithm of these two outcome variables, only including values larger than zero (i.e. for those who are employed).

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5   In Dutch: 'Tijdelijke Noodmaatregel Overbrugging voor Werkgelegenheid'. Information in English on the various NOW schemes can be found on https://business.gov.nl/subsidy/corona-crisis-temporary-emergency-measure-now/; viewed on 19 June 2022.

All covariates included in the regression models are measured either in the reference month of February of the given calendar year or at the end of the previous year and kept constant over the year, ensuring they are measured before the COVID-19 shock. Demographic and household characteristics are as observed on 31 December of the previous year, including data on the individual's gender, date of birth, country of birth (Netherlands: yes/no), marital status (married or de facto partnership versus single), presence and date of birth of the youngest child, and residential location at the province level (12 distinct provinces). The employee's age category (18–25, 26–35, 36–45, 46–55, 56–60, and 61–64) and youngest child's age category (≤ 4, 4–12, 12–18, and no children or children aged over 18) are determined based on ages in years and months as at February of the calendar year.

Job characteristics are measured in February of the given year, including type of contract (fixed-term contract, permanent contract, and other contract), type of job (regular job, flexible job, payrolling job, sheltered employment, and internship),[6] and full-time/part-time status (≥ 35 weekly hours, $20 \leq$ hours < 35, and < 20 hours).

Firm characteristics are based on annual firm-level data measured in the third quarter of the preceding year, including firm size (0–19, 20–199, 200–499, and 500+ employees) and economic sector (five-digit Standard Industrial Classification (SBI) code).[7] We use the four-digit SBI code of the employer to classify workers as essential or non-essential, since essential worker status is defined based on whether the economic sector of the employer is a critical or crucial sector.[8] A limitation of the data is that we do not observe employees' education if they graduated before 1995. We also do not observe employees' occupations, and thus we are not able to assess the importance of occupation/industry-specific tasks and employees' ability to telecommute (Adams-Prassl *et al.*, 2022).

3.2   Sample selection

We create a monthly panel for individual employees who were employed in February of the year. Confirmed COVID-19 cases started spreading across the Netherlands from March 2020 onwards. The economic impact of COVID-19 is likely to follow a similar timeframe, as the lockdown imposed by the Dutch government also started in March 2020. We, therefore, select two cohorts: all employees in jobs that existed in February 2019 (7,170,270 employees) as well as all employees in jobs that existed in February 2020 (7,283,838 employees), retaining the records for the main job of each employee, defined as the job with

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6   Flexible jobs include temporary and seconded workers. Payrolling jobs include employees who work at a client firm but are formally employed by an intermediary organization. Sheltered employment includes jobs as defined in the Sheltered Employment Act, in Dutch: Wet Sociale Werkvoorziening, which provides work opportunities for people with a severe mental or physical disability.

7   The Dutch SBI, in Dutch: Standaard Bedrijfsindeling, is based on the European Union Nomenclature statistique des activités économiques dans la Communauté Européenne (NACE). The four-digit SBI code is consistent with the four-digit NACE Rev. 2 classification. See https://www.cbs.nl/en-gb/our-services/methods/classifications/activiteiten/standard-industrial-classifications—dutch-sbi-2008-nace-and-isic—for more information.

8   See Table A.1 in Appendix A for an overview of digit codes and essential/non-essential worker status, summary statistics on the proportion of essential workers, proportion of female workers, and sample size by one-digit economic sector.

the highest working hours.[9] Thus we include employees who were employed in February 2019 and/or February 2020 in our empirical analysis. Hence, some employees are observed in 1 year only, while other employees are observed in both years. The 'treated' are individuals who were employed in February 2020. The 'controls' are individuals who were employed in February 2019. The main job of the individual in February is followed over time from January to December of the given year. For a robustness check, we also compared all employees in jobs that existed in February 2018 with all employees in jobs that existed in February 2020.

The economic sector to which the job belongs (a firm-level characteristic) is used to determine essential/non-essential worker status. For this reason, we exclude individual-year observations that have missing firm information from the sample. For employees who exit the main job they had in February, we follow the job with the highest working hours, if there is one. We also exclude individual-year observations of individuals younger than 18 years or older than 64 years in the month of February of the given year.

Summary statistics for the sample of analysis as at February 2020 are presented in Table A.2 in the Online Appendix. These show that women are more likely to be an essential worker: over half fall in this category, while only about a quarter of male employees are categorized as essential workers. Essential workers are more likely to have a permanent contract and be in a regular job. Female essential workers are more likely to work part-time than female non-essential workers, and the same is true for men although the proportion working part time is much smaller. Essential workers are more likely to have been born in the Netherlands, and female essential workers are more likely to be aged 35 or over, and partnered. Women have on average lower wage rates and monthly wages than men across both categories of workers. For men and women the average hourly wage and monthly wage are higher for essential workers than for non-essential workers, more so for women than for men. Both men and women work on average fewer hours if they are essential workers. Overall, essential workers appear to experience better employment conditions, especially women. The patterns observed in 2019 are the same as those observed in 2020, and in addition, in our multivariate analyses, we control for all individual differences.

Figure 2 shows the raw data on the proportion in employment and the average monthly working hours for essential and non-essential workers, separately for men and women. As all employees are selected to be in paid work in February 2020, the employment rate is 1 for that month, and lower for the preceding and following months. A sharp decrease in the employment rate and hours worked by non-essential workers is visible in March and April, which is very different from the more steady pattern observed for 2019 (see Fig. B.1 in Online Appendix B). Overall, the 2019 patterns are quite different for the four groups distinguished, indicating the importance of using a difference-in-difference approach to account for these usual non-COVID-related changes in employment and hours worked over the year.

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9   We use all employees in jobs that existed in February of the given year and therefore miss out on new entrants to the labour market. However, Balgova *et al.* (2021) show for the Netherlands that during the COVID-19 pandemic unemployed persons engage less in job search than was observed in previous economic downturns, whereas employed persons search more.
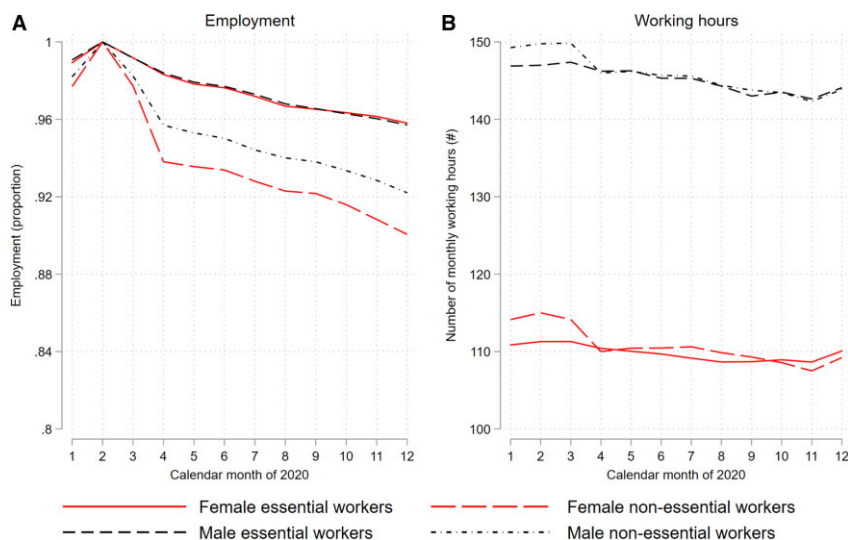
Fig. 2. Mean employment rate and monthly working hours in 2020 for employees who were employed in February 2020.
Notes: Each graph represents a different outcome variable and each line represents a different sample stratified by gender and essential worker status. The analyses are based on 1,838,509 female essential workers, 1,680,077 female non-essential workers, 1,009,733 male essential workers, and 2,755,519 male non-essential workers.

4. Empirical strategy

4.1   Economic framework

The COVID-19 pandemic shock caused negative responses for both labour demand and labour supply. The negative effects on the demand side of the labour market were at least partly driven by the Dutch government's categorization of essential and non-essential work. The lockdowns predominantly affected the demand for employment and working hours of non-essential workers, as these workers are employed in economic sectors that were not defined as critical or crucial (and therefore had to close, with employees only allowed to work from home). However, due to the NOW policy, employment, paid working hours and gross wages were affected much less by the COVID-19 crisis than it otherwise would have been, as businesses that received the NOW were compensated for up to 90% of the wage bill but had to commit to not reducing gross wages or dismissing employees for economic reasons.

The COVID-19 shock may also affect labour supply, as it may cause households to re-evaluate their division of labour between home production and paid work. The employee's household composition is relevant for supply-side effects of COVID-19 in three ways. First, for families with young children, the amount of time spent on home production (through at-home schooling and childcare) increased disproportionally compared to other families. Second, the ability to balance family and paid work is likely to be easier for partnered individuals than single individuals, as couples can share the burden of increased household responsibilities. However, at the same time, although it may be more challenging for single individuals to balance family and paid work, the financial need to remain in paid work is

likely to be stronger. Third, the Dutch government allowed essential workers to send their children to childcare or school during the lockdowns, whereas non-essential workers were not allowed to do so. Consequently, we hypothesize stronger negative labour supply responses for households with young children, for single-parent households, and for households without essential workers. For essential male and female workers without children, we expect zero impact from COVID-19 (neither demand nor supply effects are expected).

Households can use different strategies to deal with these increased household responsibilities. The additional household responsibilities may be shared equally, potentially resulting in lower labour supply for both members of a couple equally. The employee's spousal employment situation is important for supply-side effects of COVID-19 in two ways. First, depending on the spouse's number of paid working hours, the employee may be able to sustain the same paid working hours as before the shock. Second, the ability of the employee's spouse to reduce paid working hours or to vary working times strongly depends on the spouse's essential-worker status. For example, essential workers are less likely to have flexible working hours than non-essential workers.

Furthermore, gender role norms and societal expectations could explain gender differences in who feels (most) responsible for the additional caring and home-schooling tasks. As a result, the burden of increased household responsibilities caused by societal lockdowns and the resulting closing of childcare and schools may be felt disproportionally by women, leading to larger negative labour supply responses for women.

4.2 Model specifications

We compare the outcomes for the universe of employees in jobs that existed in February 2020 to the universe of employees in jobs that existed in February 2019. We follow these individuals for 12 months: 2 months before March and 10 months from March to December. Using monthly information, we assess whether and how the impact of COVID-19 on individuals' labour market outcomes varies over the period after March.

This monthly information allows us to analyse the consequences of the coronavirus waves and two national lockdowns in the Netherlands over 2020. We quantify COVID-19 impacts on employment, working hours, and hourly wages. A monthly differences-in-differences linear regression equation is specified:

$$y_{i\tau c} = \sum_{\substack{\tau = 1 \\ \tau \neq 2}}^{12} \gamma_\tau DY_c \times DM_\tau + \sum_{\substack{\tau = 1 \\ \tau \neq 2}}^{12} \beta_\tau DM_\tau + \delta DY_c + \eta' X_{ic} + \alpha_i + \varepsilon_{i\tau c} \tag{1}$$
$$i \in 1, \dots, N; \tau \in 1, \dots, 12; \ c = 2019, \ 2020$$

where Equation (1) is a generic model for each of the three outcome variables. The subscripts i, τ, and c refer to individual, calendar month, and year, respectively. The vector γ includes the parameters of interest, measuring the impact on the outcome variable by calendar month τ in 2020 relative to February 2020, compared with the outcomes in 2019 relative to February 2019. DY and DM are 0–1 indicator variables for calendar year and calendar month. Reference year is 2019 and reference month is February. The variables in vector X are time constant within a year but may vary between 2019 and 2020; they are included to reduce variation that can be explained by changes in observables between calendar years.[10] X includes dummy variables for individual characteristics (age, presence and

10 Results are robust to excluding the variables in X from the regression equation.

age of children, and residential location at the province level), job characteristics (type of contract, type of job, and full-time/part-time status), and firm characteristics (firm size and economic sector). Individual fixed effects are denoted by α, and ε represents an idiosyncratic error term. Equation (1) is estimated by Ordinary Least Squares with the standard errors clustered by individual, and the samples stratified by gender and essential/non-essential worker status.

To determine the extent that labour supply effects, corrected for the labour-demand effects of the shock of COVID-19, vary among employees with different childcare needs and spousal employment, we estimate a monthly triple differences model:

$$
\begin{aligned}
y_{i\tau c} = \alpha_i + \sum_{\substack{\tau=1 \\ \tau \neq 2}}^{12} & [(\lambda_\tau' X_{ic}^*) \times DY_c \times DM_\tau + \gamma_\tau DY_c \times DM_\tau + (\kappa_\tau' X_{ic}^*)DM_\tau + \beta_\tau DM_\tau] + (\mu' X_{ic}^*) \\
& \times DY_c + \delta DY_c + \eta' X_{ic} + \varepsilon_{i\tau c}
\end{aligned}
$$

$$(2)$$

where λ_τ represents the parameters of interest, measuring differences in COVID-19 impacts between specific groups of interest relative to a reference group. Vector X^* now also contains time-constant variables gender and country of birth (Netherlands born versus foreign born) in addition to the time-varying covariates in X outlined in the discussion of Equation (1). Depending on stratification, variables are excluded from X^*. Equation (2) is estimated for samples stratified by gender and essential/non-essential worker status.

4.3   Use of the models to explore demand and supply impacts

The specifications in Section 4.2 provide insights into the differences between women and men with regard to the impact of the COVID-19 shock for each of the three outcome variables. Using Equation (1), we are first interested in the difference $\left(\hat{\gamma}_{female,\,essential} - \hat{\gamma}_{female,\,non-essential}\right)$ as well as $\left(\hat{\gamma}_{male,\,essential} - \hat{\gamma}_{male,\,non-essential}\right)$, where the subscripts on the estimated parameter $\hat{\gamma}$ refer to one of the four stratification combinations male/female and essential/non-essential. These two differences show how women and men were affected differently by the demand shock of COVID-19.

We are also interested in $\left(\hat{\gamma}_{female,\,essential} - \hat{\gamma}_{male,\,essential}\right)$ and $\left(\hat{\gamma}_{female,\,non-essential} - \hat{\gamma}_{male,\,non-essential}\right)$. This can be interpreted as the gender differences in labour supply for essential workers (for whom labour demand has not decreased). For non-essential workers, the gender difference incorporates both labour demand and labour supply effects. By focussing on employees without children, who are expected to have a labour supply response close to zero, the difference can be interpreted as the gender difference in the demand shocks experienced due to COVID-19.

Finally, the estimates of Equation (2) provide further insight into the extent that differences in labour supply responses are larger for households in (greater) need of childcare, due to the presence of young children and/or the lack of a live-in co-parent. The stratification by gender and essential/non-essential worker status provides information on the potential constraints faced which are expected to be larger in the non-essential sector, and on differences by gender in responding to such constraints. The inclusion of spousal employment status allows a comparison by no/part-time/full-time employment status and essential/non-essential worker status of the spouse, which may facilitate different degrees of sharing additional caring and home-schooling tasks.

5. Empirical results

This section provides empirical evidence on COVID-19 effects among Dutch employees. We first examine the effects of COVID-19, showing the impact on labour market outcomes by gender and essential/non-essential worker status. Then, we examine household-driven heterogeneity in the impact of COVID-19, studying the importance of household composition. In the final subsection, we assess, for partnered households with children aged below 12 years, whether the spousal employment status affects the impact of COVID-19.

5.1 Gender differences in COVID-19 effects on employment, working hours, and hourly wages by essential/non-essential worker status

Figures 3 and 4 show COVID-19 effects based on the differences-in-differences specification of Equation (1), estimated separately by gender, and for the four samples stratified by gender and essential/non-essential worker status. COVID-19 effects are identified by comparing employees' outcomes in 2020 to employees' outcomes in 2019. The essential/non-essential worker status is based on the job-spell that existed in February of the given calendar year (see Online Appendix Table A.1). The y-axes in the figures show the impact on employment in percentage points (subgraph A) and on working hours and hourly wages in percentages (subgraphs B and C, respectively). The x-axes represent calendar month, ranging from 1 (January) to 12 (December). The reference year is 2019 and the reference month is 2 (February).

Based on the double-differences specification for samples stratified by gender only, the loss in employment is almost identical for women and men (see Fig. 3A). In April and May 2020, women experienced more negative effects on employment than men, whereas this was reversed in the period October to December 2020. Figure 3 also shows that on average, women experienced a 0.5 percentage point larger loss in working hours than men in April and May 2020, but are doing better on hourly wages, showing around half a percentage point smaller loss in hourly wages across the whole period. Overall, Fig. 3 shows that, relative to male workers, female workers experience a slightly worse impact of the COVID-19 crisis on employment and working hours but a smaller impact on hourly wages.

In Fig. 4, we investigate whether gender differences vary by essential/non-essential worker status. Figure 4A shows that, relative to the three other subgroups, female non-essential workers experience the largest reduction in employment (relative to February in the same year), bottoming in April 2020 at 3.0 percentage points. Male non-essential workers are 1.6–1.9 percentage points less likely to be employed throughout April to May 2020. Non-essential workers also experience worse employment outcomes during the second lockdown that started in October 2020. Conversely, female essential workers and male essential workers experience only a minor reduction in employment of about 0.4 percentage points during April to June 2020, without experiencing negative effects on employment during the second lockdown from October 2020 onwards. The overall impact of COVID-19 by gender in Fig. 3 is thus hiding large differences between men and women in the non-essential sector. Focussing on prime working-age (25–55) essential workers without children, the reduction in employment is only 0.2 percentage points during the first lockdown (see Fig. B.2 in the Online Appendix). The expectation of zero labour demand and labour supply for this group is supported by the data. For 18–64 years old essential workers without children (see Fig. B.3 in the Online Appendix), the results are similar to Fig. 4,

Fig. 3. COVID-19 differences-in-differences effects on employment, log hours worked, and log hourly wages (Equation (1)) stratified by gender (2020 compared to 2019).

Notes: Parameter estimates of the double interaction terms between year and calendar month (γ from Equation (1)). Each graph represents a different outcome variable and each line represents a single regression for a different sample stratified by gender. Reference year is 2019 and reference calendar month is 2 (February). The 95% confidence intervals (the lighter dashed lines of the same colour) are computed based on standard errors clustered by individual. The analyses are based on 3,802,794 female workers and 4,088,300 male workers. For the other two graphs, sample sizes are slightly smaller. Note that, for example, the total number of female workers is lower than the number of female essential workers plus the number of female non-essential workers, as employees could switch essential/non-essential worker status between February 2019 and February 2020 and they would be counted as one individual when counting female workers regardless of their essential/non-essential status.

indicating that the reduced labour supply in Fig. 4 may be mostly for older workers close to retirement.

Although the parallel trends identifying assumption appears to be violated in Fig. 4B, this is due to 2020 being a leap year.[11] Due to the extra day in February 2020, working hours in February 2020 relative to January 2020 have increased compared against the working hours in February 2019 relative to January 2019. For this reason, we interpret the impact on working hours relative to January instead of February.[12]

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11   In January 2020, relative to January 2019, the changes in working hours (compared to February 2020 and February 2019, respectively) are about 1.0–1.75 percentage points lower for each of the four subgroups. This finding can be explained by the facts that 2020 is a leap year and working hours are recorded per month in the administrative data. In the Netherlands, employees' wages are usually paid on a monthly basis so the natural measurement period for hours worked is a month.

12   The 2020 leap year also affects reported COVID-19 effects on hourly wages in graph 4C, but to a much lesser extent than the COVID-19 effects on working hours.

Fig. 4. COVID-19 differences-in-differences effects on employment, log hours worked and log hourly wages (Equation (1)) stratified by gender and essential worker status (2020 compared to 2019).
Notes: See note of Fig. 3. Each line represents a single regression for a different sample stratified by gender and essential worker status. In the employment graph, the analyses are based on 2,010,325 female essential workers, 1,954,822 female non-essential workers, 1,138,069 male essential workers, and 3,082,045 male non-essential workers.

Consistent with the leap year explanation, the parallel trends restriction holds for employment in graph 4A. Further supporting the parallel trends assumption is Fig. B.4 in Online Appendix B, showing that COVID-19 effects are robust to using data of year 2018 instead of 2019, indicating similar labour market dynamics in 2018 and 2019. Estimated employment impacts are the same across all months, while the impact on hours worked is the same during the first four calendar months. From May onwards, COVID-19 impacts on hours worked diverge slightly when comparing 2020 with 2018 instead of 2020 with 2019, with the 2019 results being more conservative implying a slightly smaller impact from COVID-19 than when using 2018 data. This robustness check indicates that using 2018 instead of 2019 as the counterfactual year would lead to similar conclusions regarding the impact of COVID-19 on the Dutch labour force in 2020.

Figure 4B shows reduced working hours consistent with the lower employment over the period March to December 2020. On average, relative to January 2020, female non-essential workers experience a reduction of 3% in working hours in the months of April, May, October, and November. Male non-essential workers experience a reduction of 1.5% in working hours. In contrast, both female and male essential workers experience hardly any reduction in working hours in the period from March 2020 onwards (further supporting the zero labour supply and demand expectation for this group, even for workers with children).

Figure 4C shows that the hourly wages of female essential workers increase by 0.5–1% over the period April to December 2020, whereas female and male non-essential workers experience a decrease of about 0.5 to 1% in hourly wages. This finding suggests a relatively

rapid response to the COVID-19 pandemic from the demand side of the labour market, reducing wages for non-essential workers and increasing wages for essential workers. Wages increased especially for those sectors in which there are relatively many female essential workers, explained by a small decrease in working hours and a small increase in gross pay.[13]

In the log specification, working hours and wages are estimated conditional on being employed (and observations on non-employed workers are excluded). Figure B.5 in Online Appendix B provides results for the models on working hours and hourly wages, based on a specification in levels instead of using a logarithmic transformation in a similar vein as Kleven *et al.* (2019). The specification in levels (using the non-transformed hours and wages as observed) is unconditional. This approach has the benefit of limiting the impact of selection into employment on the results (for example based on skill) by including non-employed individuals in the sample. Following Kleven *et al.* (2019), non-employed individuals' working hours and hourly wages are set to zero. The results in Online Appendix Fig. B.5(A and B) are consistent with those provided in Fig. 4(B and C), respectively, suggesting selection into employment does not affect our conclusions.

Two key conclusions can be drawn. First, the results show that there is heterogeneity in COVID-19 effects on labour market outcomes by the employee's essential/non-essential worker status. The large difference between essential workers and non-essential workers highlights the importance of the demand side of the labour market, as the lockdown is limiting the economic activities of specific non-essential economic sectors, particularly accommodation and food service activities, culture, sports and recreation, the renting and leasing of tangible goods, and other business support services (see Online Appendix Table A.3).

Second, female essential workers and male essential workers have been affected similarly by the COVID-19 shock in terms of employment and working hours, whereas there are notable differences between female non-essential workers and male non-essential workers.[14] Relative to male non-essential workers, female non-essential workers faced larger reductions in employment and working hours. Results based on a triple differences specification, as provided in Online Appendix Table A.5, show that the employee's contract, type of job, full-time/part-time status and to a lesser extent age are important in explaining differences in COVID-19 effects within the group of non-essential workers. In this regard, as female non-essential workers are more likely to be in non-standard jobs than male non-

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13   The impact is not just due to the decrease in working hours: results that show a small increase in female essential workers' monthly gross wage from June to November 2020, using log monthly gross wage as the outcome variable, are available upon request. The patterns in working hours and hourly wages could be due to changes in outcomes of individuals who remain in the same job or due to labour turnover. We find that the trends are driven by employees who remain in the same job over the twelve months of each year. These results are also available upon request.

14   See Table A.2 for sample means for individual characteristics in February 2020 by gender and essential/non-essential worker status. Although male and female essential workers are similarly affected, impacts by age differ. Table A.4 reports results based on the triple differences specification for essential workers, which shows relatively large impacts on labour supply by age. In the period from March 2020 onwards, essential workers aged between 18 and 25 had relatively high employment and working hours, whereas essential workers aged between 60 and 65 had relatively low employment (consistent with the difference between Figs. B.2 and B.3). This may indicate a supply side impact from older workers withdrawing from the labour market as they are more at risk from the virus, which may have increased the demand for younger workers.

essential workers (see sample means on, for example, type of contract and type of job by gender and essential worker status in Online Appendix Table A.2), we observe more negative COVID-19 effects for female non-essential workers in Fig. 4, suggesting labour demand effects are important. However, in February 2020, 52% of female employees are essential workers (see Online Appendix Table A.2), who are much less negatively affected by the COVID-19 shock in terms of labour market outcomes. In contrast, 73% of male jobs are non-essential thus experiencing relatively poor outcomes. As a result, overall, women and men experienced similar COVID-19 effects on employment on average.

5.2 Role of household composition in the labour supply effects of the COVID-19 shock

To establish the role of household composition in the impact of the COVID-19 shock on labour market outcomes by gender and essential/non-essential worker status, Figs 5–8 provide estimates of the impact of the employee's household composition for each of these four groups separately. We estimate a triple-differences model, as outlined in Equation (2), which includes triple and double interaction terms between calendar year, calendar month, and all observables, ensuring we capture labour supply effects. This model is estimated separately for the four samples stratified by gender and essential/non-essential worker status controlling for labour demand effects by including interaction terms between year, month and economic sector.[15] The employee's household composition is defined based on the individual's marital status (single versus partnered) and the presence and age of the youngest child (four categories) in February of the relevant year. The reference category contains employees who are single without children aged below 18 years. For readability, we have excluded the confidence intervals from the graphs.

If the emergency childcare policy is completely successful, essential workers with young children should experience similar COVID-19 effects on outcomes as essential workers who have no young children, assuming that, conditional on observables such as the employee's age and employment contract, these groups only differ in their need for childcare. In contrast, if the emergency childcare is relatively ineffective in facilitating parents' labour market participation during the Dutch national lockdown of mid-March until May 2020 and during the second full lockdown that started in December 2020, we should see that households with young children experience worse outcomes during these periods, both for essential and non-essential workers.

We show that the role of the presence and age of children in the COVID-19 impact is very small for partnered essential workers, conditional on the employee's gender (see Figs 5 and 7). This evidence suggests that couples with young children have coped relatively well with the lockdown.[16] This is consistent with the similar impacts observed for all essential

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15 To provide an overview of the role of individual characteristics in COVID-19 effects over the period March to December 2020, we use a pre versus post triple-differences specification (aggregating the months before and after COVID-19 started) for samples stratified by essential/non-essential worker status and controlling for economic sector (see Tables A.4 and A.5 for essential workers and non-essential workers, respectively).

16 Although in the data we do not observe how household tasks are divided within couple families, Yerkes et al. (2020) analyse the COVID-19 impact in the Netherlands using cross-sectional survey data for April 2020. They show that work pressure increased and the probability of doing household tasks decreased for essential workers. They also suggest that during the COVID-19 outbreak
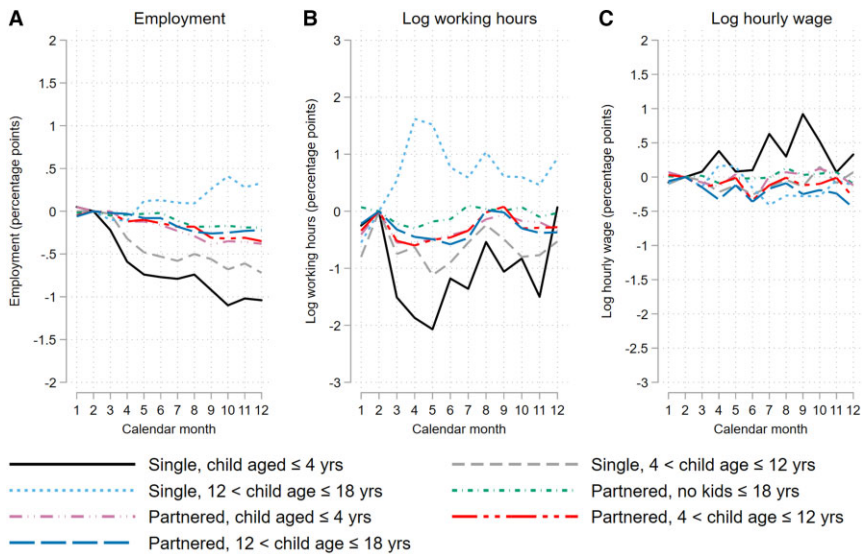
Fig. 5. COVID-19 triple differences effects on employment, log hours worked, and log hourly wages based on the triple interaction term between household composition, year, and month (Equation (2)) for female essential workers.

Notes: Parameter estimates of the triple interaction terms between household composition, year, and calendar month based on 2,010,325 female essential workers. Each graph represents a different outcome variable based on one single regression. The reference household is a single person without children, reference year is 2019 and reference calendar month is February. For clarity of the graphs, confidence intervals are excluded (but available upon request). Parameter estimates of the main variables, and the double interaction and triple interaction terms between year, calendar month, and other observables are also estimated.

workers in Fig. 4 versus essential workers without children in Online Appendix Fig. B.2. For non-essential workers, however, we find that couples with young children are less likely to remain employed, compared to non-essential workers without children under 18 years or with children between 12 and 18 years (see Figs 6 and 8). This impact is stronger for women than men, indicating that they take on more of the childcare/home-schooling responsibilities, especially in the longer term, while in the first few months partnered men and women with young children both decreased their employment to the same, small extent. The larger (negative) impact for workers with younger children appears nearly completely counteracted by the smaller (more positive) impact for workers with older children, as Fig. 4 and Online Appendix Fig. B.2 (for all workers and workers without children, respectively) show similarly sized impacts.

Furthermore, we observe that essential workers who are single and have a child aged below 4 years (dark solid line) or between 4 and 12 years (grey dashed line) are particularly negatively affected by COVID-19 in terms of employment and working hours. Figure 5

the gender gap in the division of childcare and household work narrowed, as men increased their relative share of care tasks compared to before the lockdown. However, this did not persist (André *et al.*, 2021).
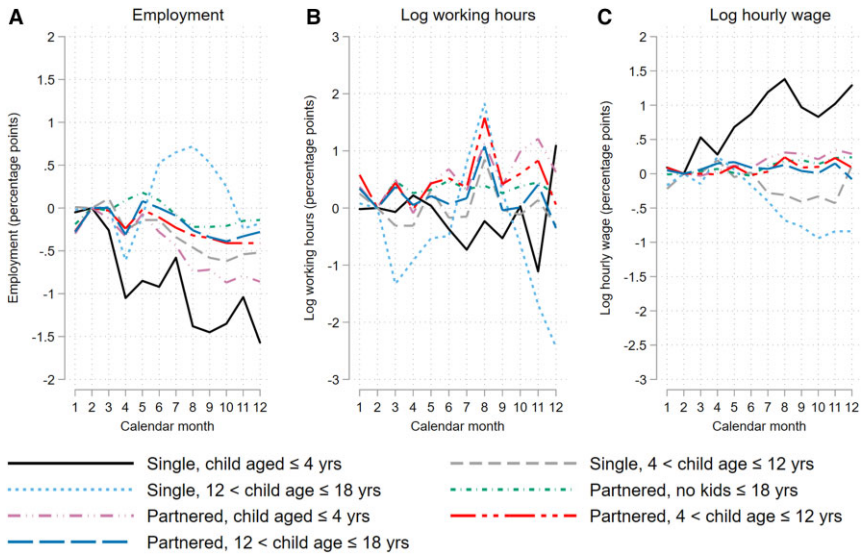
Fig. 6. COVID-19 triple differences effects on employment, log hours worked, and log hourly wages based on the triple interaction term between household composition, year, and month (Equation (2)) for female non-essential workers.

Notes: Parameter estimates of the triple interaction terms between household composition, year, and calendar month based on 1,954,822 female non-essential workers. For other notes, see Fig. 5.
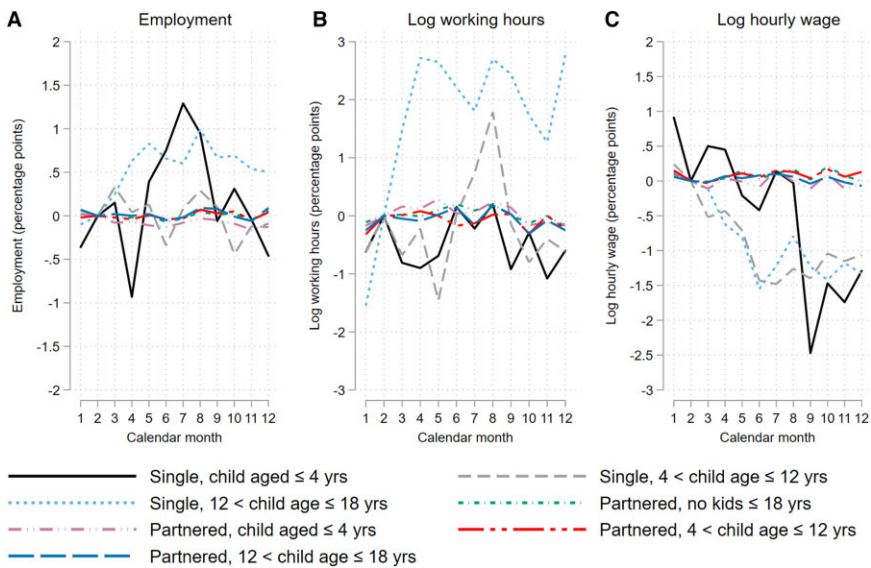

Fig. 7. COVID-19 triple differences effects on employment, log hours worked, and log hourly wages based on the triple interaction term between household composition, year, and month (Equation (2)) for male essential workers.

Notes: Parameter estimates of the triple interaction terms between household composition, year, and calendar month based on 1,138,069 male essential workers. For other notes, see Fig. 5.
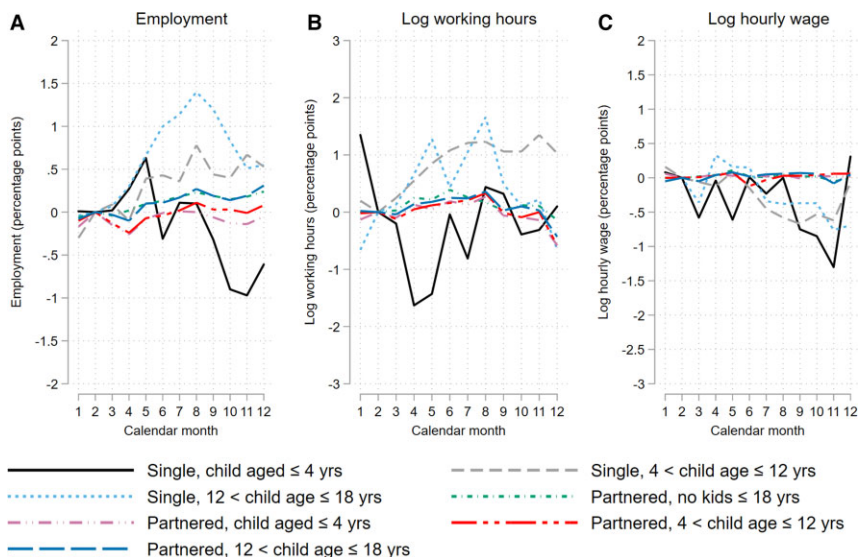
Fig. 8. COVID-19 triple differences effects on employment, log hours worked, and log hourly wages based on the triple interaction term between household composition, year, and month (Equation (2)) for male non-essential workers.
Notes: Parameter estimates of the triple interaction terms between household composition, year, and calendar month based on 3,082,045 male non-essential workers. For other notes, see Fig. 5.

shows that female essential workers, who are single and have children under 4 years, have a 1 percentage point larger loss in employment and a 1 to 2 percentage point larger loss in working hours, relative to single female essential workers. Similarly, Fig. 7 suggests that single male essential workers with young children also have worse outcomes relative to other groups of male essential workers, although this was the case only during the first lockdown of April and May 2020, and this group of men seems to compensate for low employment in April to May with increased employment during July to August. One interpretation of these results is that for single women with young children the balancing act of family and paid work led to reduced employment and working hours, whereas for single men with young children the financial incentive to remain employed and retain the level of paid working hours is relatively strong.

For men fewer triple interaction effects are statistically significant than for women. However, non-essential workers who are single and have a child aged between 0 and 12 years also do much worse than the other groups of non-essential workers in terms of employment and working hours (see Figs 6 and 8). These findings suggest that being single places an extra-large burden on parents during school and childcare closures regardless of access to emergency childcare; that is, the emergency childcare for essential workers is not sufficient to ensure they are not worse affected than the other groups of essential workers.

Overall, for single parent workers with children aged below 12, the negative impacts on employment and working hours start in March 2020 and are largest in October and November 2020. This evidence suggests that caring responsibilities at the time of a lockdown affects the labour supply decisions of single persons, who cannot share household responsibilities with a spouse, and the emergency childcare for essential workers does not

fully mitigate this problem. Single parents of children aged 12–18, on the other hand, are more likely to be employed and work more hours (especially from April to May onwards) than single workers, regardless of gender and essential worker status, suggesting the importance of financial considerations for this group. Although a small subpopulation, single parents are a substantial part of the Dutch labour force. Among essential workers, 3.6% of women are single mothers of children aged below 12 years and 1.2% of men are single fathers of children aged below 12 years (see Online Appendix Table A.2). Conversely, there is little heterogeneity in COVID-19 effects for partnered essential employees, both women and men appear able to overcome the issue of balancing housework and paid work together. Non-essential partnered workers with young children have slightly larger negative impacts on employment than workers without children (and women more so than men), but these impacts are much smaller than for single parents. One interpretation of these findings is that couples, relative to single parents, may be more able to deal with the societal lockdown by sharing the burden of increased household responsibilities. This is perhaps particularly true in the Netherlands where both men and women have relatively low working hours in employment.

5.3 Importance of the spousal employment status for the impact of COVID-19

We study the importance of spousal employment for the impact of COVID-19 on labour market outcomes for couples with children. We define the spousal employment situation based on the non-employment/full-time/part-time status and essential/non-essential worker status in February of the relevant year. We estimate the triple differences model of Equation (2) for a selective sample of full-time employees; that is, partnered employees with children aged below 12 years. We use this sample to assess whether there is a gender difference in the importance of spousal employment status for the impact of COVID-19. That is, do partnered female employees who work full time have similar relative changes in labour market outcomes in response to COVID-19 depending on their spouse's employment as male employees who work full-time. Triple interaction effects are estimated for the four samples stratified by gender and essential/non-essential worker status (Figs B.6–B.9 in Online Appendix B). The reference category consists of employees whose partners are full-time employed essential workers.

Figure B.6 in the Online Appendix shows the results for full-time employed female essential workers. Relative to women whose spouses are full-time essential workers, women who have spouses in different employment situations experience similar employment outcomes (see Graph B.6A). Full-time employed female workers whose spouse is a part-time employed essential worker, appear to have slightly lower employment, while having a non-essential worker or non-employed spouse leads to slightly higher employment for the employee. The evidence suggests little heterogeneity in the impact on hours worked and hourly wages based on the spouse's employment situation (graphs B.6B and B.6C). Figure B.8 in the Online Appendix suggests that male essential full-time employees' labour market outcomes are hardly affected by spousal employment status.

Figure B.7 in the Online Appendix shows that female non-essential full-time employees, whose spouse is an essential full-time employee, experience worse employment outcomes in December 2020 and slightly reduced hours during the first and second lockdown. In contrast, Fig. B.9 in the Online Appendix shows that male non-essential full-time employees whose spouse is an essential full-time employee experience better employment outcomes

and slightly higher hours. Together, these results indicate that among non-essential workers, women tend to have worse labour market outcomes if their partner is an essential full-time employee but this is not the case for men.

Overall, the heterogeneity in effects observed in Figs. B.6–B.9 is small, compared to the baseline COVID-19 impacts shown in Fig. 4. The results suggest that the labour supply response is relatively unaffected by the spouse's paid working hours and the spouse's essential-worker status for couple families with children under 12, except for female non-essential full-time employees.

6. Discussion and conclusion

Two national lockdowns in the Netherlands in 2020 led to big challenges for households balancing home and work life. The compulsory closures of childcare and schools were likely to be a major disruption to the amount of time that could be dedicated to paid work, especially for mothers who often take primary responsibility for most of the unpaid work in the household. Using administrative microdata covering the Dutch population of employees for the period until December 2020, we provide causal evidence on the gender differences in COVID-19 effects on employment, paid working hours and hourly wages by essential/non-essential worker status and household composition.

Our conclusions are fourfold. First, the larger impact on non-essential workers shows that the demand side of the labour market is particularly important in the COVID-19 effects on employees' labour market outcomes. Non-essential workers experienced negative COVID-19 effects on employment of 1.5–3 percentage points, on working hours of 1.5–3% and on hourly wages of 1%, between April and December 2020. In general, essential workers experienced only minor negative effects.

Second, the COVID-19 shock affected women unevenly. Female non-essential workers had considerably worse employment and working hours outcomes than male non-essential workers. However, 52% of female employees are essential workers whereas for male employees this is only 27%, and essential workers (independent of gender) were less affected by the COVID-19 shock in terms of labour market outcomes. This explains why, on average, women and men experienced similar COVID-19 effects on employment, and why gender gaps in employment, working hours or hourly wages did not seem to widen to a large extent during 2020.

Third, we observe that the no/part-time/full-time employment and essential/non-essential worker status of the spouse did not lead to different labour supply responses for full-time male and female essential workers with children aged below 12. However, single parents (mothers and fathers) with young children showed relatively strong COVID-19 effects on labour market outcomes, including single parents who are essential workers and are thus eligible for emergency childcare. One interpretation of this finding is that the emergency childcare was not a very effective mechanism to deal with the COVID-19 shock in terms of balancing home and work life. It suggests that the Dutch emergency childcare policy was not sufficient for single parent essential workers to balance family and paid work during the societal lockdown.

Fourth, for female non-essential workers, labour market outcomes were more negative if young children were present in the household or if they were full-time employed and have a spouse who is a full-time employed essential worker. Keeping other factors constant, the observed negative effect on female non-essential workers is stronger for households that are

likely to have a larger need for childcare—especially single mothers. These stronger negative effects can be interpreted as reduced labour supply by this specific group due to competing work and family responsibilities which were not resolved by the policies available to them.

The impacts of COVID-19 on labour demand in the Netherlands are likely to be smaller than these impacts in countries which did not provide support similar to the NOW. Although, like in many other countries, female workers are affected more than male workers when (young) children are present, the impacts on labour supply in the Netherlands are likely to be smaller than in countries with higher average hours worked, especially since in the Netherlands both male and female working hours are substantially lower than the average for all OECD countries combined. As a result combining family and work, even in the challenging circumstances of the pandemic, may be easier in the Netherlands than in many other countries, at least for two-parent families.

Supplementary material

Supplementary material is available on the OUP website. These are the replication files and the Online Appendix. The non-public microdata from Statistics Netherlands used in this paper are available under certain conditions for statistical and scientific research. For further information contact Statistics Netherlands at microdata@cbs.nl.

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