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ABSTRACT

Intersectional Analysis of the Labour Market Impacts of COVID: The Triple-Whammy of Females, Children, and Lower Skill[1]

We employ a Gender-Based Plus (GBA+) and intersectionality lens to examine the triple whammy of the differential effect of Covid on the trifecta of being female, lower-skilled and facing a motherhood penalty from school-age children. We use a difference-in-difference framework with Canadian Labour Force Survey data to examine the differential effect of two waves of Covid on three outcomes: employment, hours worked, and hourly wages. We find that the trifecta of being female in a lower-skilled occupation and with school-age children is associated with lower employment, hours worked and wages in normal times compared to males in those same situations. As well, such females face the most severe adjustment consequence from major shocks like Covid, with that adjustment concentrated on the extensive margin of employment, and it is restricted to the immediate First Wave and not on a subsequent Omicron wave.

JEL Classification: J13, J16, J64, J71, J78

Keywords: COVID-19, Omicron, labour market impacts, difference-in-Difference, trifecta, woman, lower-skilled jobs, motherhood penalty

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1. INTRODUCTION

As indicated in the subsequent literature review, Covid-19 has had severe adverse effects on the employment, earnings, and physical, emotional and mental health of various groups in Canada, and those groups tend to be disproportionately occupied by women. Women with young school-age children also face a motherhood penalty in the labour market reflecting occupational segregation and their disproportionate burden of household tasks that tie them to their household and restrict their ability to move geographically or advance their careers through upward mobility. Such restrictions have been especially pronounced during the Covid-19 pandemic because of school closings, giving rise to the "Covid motherhood penalty."

Clearly, *each* issue of the effect of Covid on labour market outcomes for women as well as for workers in lower-skilled jobs and the long-standing motherhood penalty for women with children is of policy importance. The intersection of *all three* of these issues – the differential effect of Covid on the trifecta (often termed triple whammy) of (1) being a woman, (2) being in a lower skill job and (3) facing a motherhood penalty from elementary school-age children—compounds that importance. That intersection is the focus of this analysis.

This trifecta is also in the spirit of intersectionality as well as its specific form of Gender-Based Plus (GBA+). Intersectionality basically emphasizes how various interdependent categories combine in an intersecting and synergistic fashion to have an *interactive* effect that is different from the sum of their individual effects. GBA+ is a specific Canadian form of intersectionality that involves the incorporation of gender along with other intersecting factors into the application as well as performance and program evaluation of various programs at the federal level in Canada. In our case, the intersecting factors involve how Covid has a differential effect on the trifecta of being a woman, in a lower-skilled job and with school-age children.

2. LITERATURE AND EXPECTED RELATIONSHIP

The literature clearly establishes that Covid-19 has had disproportionate adverse effects on labour market outcomes for each of our three groups: woman, women in lower-skilled jobs, and women with school-age children.[2] For example, women tend to disproportionately occupy jobs hard-hit by the pandemic. Such jobs are in various inter-related parts if the economy: service jobs in personal and food services, leisure and domestic work, public transit, and nursing and residential care (Dinç 2021, Hou, Picot, and Zhang 2020, Slade 2022); jobs in small businesses (Isabelle, Han and Westerlund (2022), Mo et al, (2020); jobs that are lower-skill, lower-wage and part-time (Fang, Gunderson and Ha 2022, Hou, Picot, and Zhang 2020, Koebel and Pohler 2020, Lemieux et al. 2020, Macdonald 2020, Mo et al. 2020); front-line and service jobs exposed to the virus (Koebel and Pohler 2020; Statistics Canada 2020); and jobs for whom working from home is less feasible (Béland, Brodeur, Mikola and Wright 2022, Gallacher and Hossain 2020 and Messacar, Morissette, and Deng 2020). As indicated in these studies, many of these jobs involve employees who are part-time, temporary, low-tenured, non-union and in small firms. Because women, and especially women in lower-skilled jobs, are often prominent in those inter-related groups, Covid-19 has had a disproportionately adverse effect on a wide range of their outcomes. The common outcomes in these studies include wages, employment, hours worked, earnings, and physical, emotional and mental health (See also, Robson and Tedds (2022) and references cited therein).

The literature also documents that women with young school-age children face a motherhood penalty in the labour market reflecting their disproportionate burden of household

[2] Because we are using Canadian data, the literature cited below refers to Canadian studies. Similar relationships in the U.S. literature are reviewed in Drozd, Moffitt and Zhao (forthcoming).

and child-rearing tasks that impinge on their labour market performance and hence affect outcomes such as employment, hours worked, and wages. Such impingements occur through various theoretical mechanisms[3]: reduced work effort in the labour market as such effort is also shared with household tasks; reduced on-the-job training and interrupted career progression and aspirations that affects their human capital formation; and restrictions on their ability to move geographically or advance their careers through upward mobility and promotions. Also, they may accept lower compensating wages and reduced career advances in return for workplace flexibility to accommodate household responsibilities.

These mechanisms tend to be ones emphasized by economists based on "rational choices" women make where those choices are constrained by household pressures to balance work and family. Other perspectives (e.g., England 2005) emphasize that women tend to be coercively segregated into lower paying jobs. Such occupational segregation emanates from the supply-side based on historical norms and socialization associated with such factors as the role of women as caregivers and men as breadwinners who are expected to earn more than their partners. Such norms can be established early as evidenced by the fields of study entered into by women and men that foster subsequent occupational segregation. Such segregation can also emanate from the demand side through employer discrimination in recruiting, hiring, placement and promotions, as their work tends to be undervalued.

[3] Evidence on the motherhood penalty and the theoretical mechanisms through which it occurs are discussed in Cooke (2014), Drozd, Moffitt and Zhao (forthcoming), Fortin (2019) and Qian and Fuller (2020) as well as earlier studies cited therein. The common outcomes in these studies and the ones they review are wages, employment and earnings where the latter is the product of wages and hours worked.

We interpret our subsequent empirical results through both the economist lens of women making "choices" (although their choices are severely constrained by household pressures to balance work and family) and the sociological lens of occupational segregation emanating from both the supply side and the demand side of the labour market, as shaped by norms and socialization as well as discrimination.

In both perspectives, the disproportionate adverse effect for women with young school-age children has been especially pronounced during the Covid-19 pandemic. This has been termed the "Covid motherhood penalty" because Covid added to the existing burdens (outlined previously) of mothers with children when schools and daycares closed and their children were at home.[4] Even for those fortunate enough to work at home, their time was often divided between work and childcare. The household is not an equal employment opportunity employer, so the motherhood penalty is alive and well and thriving especially during the pandemic.

Each of the issues of the differential effect of Covid on being a woman, in lower-skilled jobs and facing a motherhood penalty from elementary school-age children is important. The intersection of all three of these issues when combined compounds that importance. That intersection is the focus of this analysis.

This intersection is also in the spirit of contributing to Gender-Based Plus (GBA+) as well as intersectionality (Cameron and Tedds 2023; Christoffersen and Hankivsky 2021; Findlay 2019; Gunderson in press; Hankivsky and Mussell 2018). Beginning in 1995, the Government of Canada pledged to using (GBA+) to advance gender equality in Canada (Scala and Paterson

[4] The Covid motherhood penalty is discussed in Couch, Fairley and Xu 2022, Heggenes 2020, Schirle 2022, and Zammaro and Prados 2021). The common outcomes in these studies are employment and hours worked.

2017; Treasury Board 2019). GBA+ involves the incorporation of gender along with other intersecting factors into the implementation as well as performance and program evaluation of its various programs. GBA+ is a form of intersectionality – a concept that is growing in importance since its introduction by Crenshaw (1989) and developed further in Crenshaw (2017) with recent contributions in Bauer et al, (2021), Carcia and Zajicek (2022), and Hunting and Hankivsky (2020) and Tedds (2023). The concept basically emphasizes how various interdependent categories combine in an intersecting and synergistic fashion to have an *interactive* effect that is different from the sum of their individual effects.

In our analysis, the intersecting factors (the trifecta of being a woman, in lower-skilled jobs, and with school-age children) reinforce each other to lead to cumulative disadvantage on their own but especially with respect to the impact of Covid. Breaking a link in any component of the trifecta could break the resulting cumulative disadvantage. For example, men (as opposed to women) in lower-skilled jobs would be less likely to be burdened by child-care responsibilities. Women in higher-skilled (as opposed to lower-skilled) jobs would be more likely to continue their employment by working from home and to hire help. Women without school-age children (as opposed to women without school-age children) would not have the disproportionate burden of child-care responsibilities. When the trifecta exists with all three components the cumulative disadvantage from the impact of Covid prevails.

The trifecta of three intersecting factors is generally considered the maximum number of intersectionalities that can be considered given the exponential data requirements to have sufficient observations in the intersecting categories (Gunderson in press; Hancock 2019; Kaushik and Walsh 2018; Schudde 2018). The evolution of the concept of intersectionality and

its application in various fields is outlined in Atewologun (2018), Collins and Bilge (2020), Grzanka (2018), Hankivsky and Jordan-Zachery (2019) and Romero (2017).

To examine any disproportionate adverse effect of Covid on the labour market outcomes of women with elementary school-age children we divide our time period of January 2018 to March 2022 into three sub-periods. The first is a pre-Covid period to provide a normal benchmark from January 2018 to February 2020, just prior to March 2020 when the World Health Organization declared COVID-19 a pandemic on March 11, 2020.

The second period we designate as the First Wave of Covid from April 2020 to June 2020. It reflects the initial Covid Wave that led to severe restrictions in areas such as social distancing, border closings, dining restrictions, and importantly for our purposes, school closings. The third period is designed to reflect an attempt to get back to a new normal involving living with Covid in part because of high vaccination rates, Covid-fatigue and a less deadly virus. We exclude March 2020 between the pre-Covid period and the First Wave since it would only be partially affected by the pandemic (Couch, Fairlie and Xu, 2022). We ended the First Wave as of June 2020 because schools would normally be closed by the end of June in any case.

For the third period, to reflect a return to a new normal involving living with Covid, we use January 2022 to March 2022 and designate it as the Omicron Wave since it was the dominant strain of the virus in that period. Although extremely contagious, it was less deadly.

The theoretical expectation is that in the pre-Covid benchmark period women with elementary school age children would have worse labour market outcomes compared to men with elementary school age children reflecting the *normal* motherhood penalty as documented in the literature discussed previously. In the First Wave of Covid with its severe restrictions and especially the closing of schools that left children at home, the *Covid motherhood penalty* would

be more severe, reflecting the additional impingements on the labour market activity of mothers from their even greater burden of caring for children when the children are at home, Such impingements would be the case especially for women in less-skilled jobs who are often in lower-wage and service jobs such as personal and food services, leisure and domestic work, and nursing homes that are disproportionately hard-hit by the pandemic and where working from home is less feasible. Some may have to quit their job, although some in essential services may not experience any adverse employment effect and even increase their hours of work. This can expose them, however, to Covid risk. To the extent that they were disproportionately adversely affected *on net*, such less-skilled women will still face a trifecta of being a woman, with school-age children and being in less-skilled jobs.

Even if they can work from home, they can still face a Covid motherhood penalty from their disproportionate responsibility of caring for school-age children at home when schools are closed (Heggenes 2020). The motherhood penalty may take the form of reduced employment if they quit their job because of the increased stress of juggling work and child-care. They may even be dismissed if their performance is reduced because of such dual responsibilities. The motherhood penalty can also take the form of reduced hours at work in order to accommodate increased hours on childcare, and it can take the form of reduced wages in return for the flexibility of working from home. If they cannot work from home and lose their job because of that, they are even worse off.

In the Omicron Wave reflecting a return to a new normal, the expectation is that the motherhood penalty would be more severe than in the pre-Covid period but not as severe as the First Wave.

3. DATA AND EMPIRICAL FRAMEWORK

3.1 Data

Our analysis is based on repeated cross-sections of individual data from the monthly files of the Labour Force Survey (LFS) over the period January 2018 to March 2022, divided into the three periods as outlined above. The total sample size is 912,980 (sum of three period sub-samples given subsequently in Table 1B).

We exclude youths under the age of 25 who may be in the school-to-work transition and less likely to have school-age children. We also exclude persons over the age of 54 who may be transitioning from work to retirement and back from retirement, and who are less likely to have young school-age children in need of care. Since our focus is on any differential effect of elementary school closings during the pandemic on mothers and fathers, our treatment group consists of persons who have a child between the elementary school ages of 6-12. Our comparison group consists of those who have no children at home since they are not involved in child-care responsibilities. Hereafter, for simplicity we refer to this group as those without elementary school-age children, or without children. For our hours worked and wage outcomes, we exclude persons who are not employed at work and include only those with positive hours worked and positive earnings. The hourly wage measures are also trimmed so that the top 5% percentiles (earning higher than $55 per hour) are removed,[5] and it is adjusted by the monthly Consumer Price Index. Lastly, we also exclude those missing their National Occupation Classification (NOC) information since we need that information to construct our lower-skilled

[5] The choice of 5% for trimming the data is somewhat arbitrary although it results in excluding those who earn beyond $55 per hour ($110,000 per year based on 8 hours per day for 5 days per week for 50 weeks per year) which seems reasonable for women with school-age children and being in less-skilled jobs. Importantly, subsequent robustness test indicate that are results are not sensitive to such an exclusion.

vs. higher-skilled occupation measure. We conduct and report robustness analysis on some of these exclusions.

As in Fang, Gunderson and Ha (2022) our grouping of occupations into lower-skilled and higher-skilled is based on a mapping of the 40 National Occupation Classification (NOC) codes into those categories. The mapping is based on the educational, training, or preparatory requirements for each occupation. It is given in Appendix A, available on request.

We use three labour market outcomes as dependent variables: employed vs. not employed as well as hours worked and hourly wages for the employed. For the binary-coded employed vs. not employed dependent variable we use Probit analysis and report marginal effects. These outcomes are common in the previously discussed literature on the motherhood penalty in general (footnote 3) and the Covid motherhood penalty (footnote 4). They are also standard ones in the evaluation of labour market programs highlighting their more general importance for policy purposes (Card, Kluve and Weber 2018 in their meta-analysis of international evidence and ESDC 2023 for Canadian evidence).

The three measures also highlight how Covid and related school closings may have a differential impact on different outcomes for men and women with and without school-age children. For example, the pandemic may disproportionately reduce the probability of being employed for women in lower-skill jobs especially if they have school-age children, but for those who remain employed their individual hours of work may not be as affected especially if they are in higher-skilled jobs who are more likely to be able to work from home. For those who remain employed, their individual wages may actually increase if they receive hazard pay. In essence, the three dependent variables facilitate a more nuanced analysis of the adjustment process.

Our control variables are conventional ones used as determinants of such outcomes. They include gender, education, marital status, age, immigrant status and province. For the subsample of those employed used in the hours and wage equations they also include multiple job holder, private or public sector workers, full- or part-time, permanent or temporary job, tenure, union status and firm size.

Table 1A gives the descriptive statistics for the three outcome dependent variables, separately for the pre-Covid period, the First Wave and the subsequent Omicron Wave. As indicated in Table 1A, the probability of being employed or percent employed is the mean value of the binary dependent variable, coded 1 if employed and 0 if not employed. During the First Wave that probability dropped substantially by 14 percentage points (rounded number) from 0.86 to 0.73 but rebounded to its original level by the subsequent Omicron Wave. Average hours worked decreased slightly by about one-quarter of an hour (-0.28 of an hour) from 38.08 hours to 37.8 hours between the pre-Covid period and the First Wave, increasing slightly by 0.16 of an hour by the Omicron Wave. This relative constancy of the average, however, could mask heterogeneity where some had their hours reduced because of the pandemic or they shifted to working part-time, while others increased their hours in front-line jobs or to replace co-workers who were no longer employed.

Average real hourly wages increased by a substantial $3.10 per hour between the pre-Covid period and the First Wave. This can reflect a compositional effect, as higher wage workers were more likely to lose their job and lower wage workers more likely to lose their job. This is substantiated by the subsequent entry in Table 1C indicating that the individual probability of being employed dropped substantially for workers in lower-skilled jobs and increased for those in higher-skilled jobs. Also, the increase in wages may reflect bonus pay for

individual workers especially in jobs exposed to Covid risk. Such a hazard pay premium for individual workers during Covid was documented for Canada by Lamb, Gomez and Moghaddas (2022). Real hourly wages returned closer to their original pre-Covid levels in the return-to-normal period of the Omicron Wave, albeit they were higher by $1.92 per hour.

The descriptive statistics for the full sample of employed and those not employed portrayed in Table 1B indicate that the proportions for the control variables did not change much over the three time periods. The exception is that the proportion of less educated persons with high-school or below dropped continuously over the three periods, while the proportion with a university degree increased. This polarization of women's work could reflect the structural change of the economy as the result of accelerated automation, remote working, and sector-shift driven by Covid, which tended to favor the highly educated and highly skilled (Beland et al., 2022; Drozd, Moffitt and Zhao forthcoming; Gallacher and Hossain 2020; Lemieux et al., 2020; Messacar, Handler and Frenette 2021; Slade 2022). As well, those with lower education may be more likely to be discouraged workers who were less likely to stay at work or return to work given the reduced job opportunities, giving rise to further polarization.

The descriptive statistics for the subsample of employed in Table 1C used for the hours worked and wage outcomes indicate that there were some notable changes in the composition of the aggregate workforce over the three periods. The employment reduction between the pre-Covid period and the First Wave was especially pronounced for public sector workers, and employees who are part-time, temporary, low-tenured, non-union and in small firms.[6] As

[6] These are gross relationships that do not control for the effect of other factors. For example, the employment decline in the public sector occurs in spite of the fact that it tends not to have the other characteristics that are also associated with employment declines. The common element is that women tend to disproportionately be in those jobs with employment declines.

indicated in the literature review and outlined in more detail subsequently, many of these characteristics apply to the trifecta of being a woman, with elementary school age children and in less-skilled occupations hard-hit by the pandemic, giving rise to further polarization. In all of these cases, except for less-skilled occupations, the employment situation returned towards the normal pre-Covid benchmark by the time of the Omicron Wave with its dropping of restrictions and school openings reflecting living with Covid.

3.2 Difference-in-Difference Framework

In order to drill deeper into any disproportionate adverse effect of the pandemic, and especially school closing, on the intersectionality of the trifecta of being a woman, in a less-skilled occupation and with elementary school-age children, we use a conventional Difference-in-Difference framework. This is done for women compared to men for each of the First Wave and then the Omicron Wave compared to the pre-Covid period, separately for those with and without elementary school-age children and in lower-skilled and higher-skilled jobs.[7] Since the comparison group of males in our analysis is also affected by the pandemic, this is not a conventional Difference-in-Difference analysis where the control group is not affected by the treatment. Rather, we are estimating the *differential* effect of the pandemic on women compared to men by the conventional interaction term of a Difference-in-Difference estimation as outlined below.

[7] Doing the woman x COVID interaction separately for those with and without elementary school-age children and for those in lower-skilled and higher-skilled jobs enables a clear tabular portrayal of the various intersections as illustrated in the various cells of the subsequent tables beginning with Table 2. See Sen, Iyer and Mukherjee (2009) and Gunderson (in press for examples).

$$Y_{i,t} = \beta_0 + \beta_1 Woman_{i,t} + \beta_2 COVID_t + \beta_3 (Woman_{i,t} \times COVID_t) + \beta_4 X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where *i* denotes the demographic group, *t* denotes the time period, $Y_{i,t}$ represents the labour market outcomes for demographic group *i*. The dependent variables $Y_{i,t}$ are employed vs. not employed, hours worked and hourly wages as discussed. The binary variable *Woman* equals 1 if the individual is a woman, and 0 if a man. Its coefficient β_1 is the difference in the outcome between women and men in the pre-Covid period. The binary variable $COVID_t$ is coded 1 for each of the Covid Waves, and 0 for the pre-Covid period. Its coefficient β_2 is the difference in the outcomes for all individuals between the pre- and Covid periods. This is done separately for the First Wave and the subsequent Omicron Wave, each compared to the pre-Covid period.

The $Woman_{i,t}$ x $COVID_t$ interaction term is the key Difference-in-Difference interaction term with its coefficient β_3 giving the *differential* effect of the Covid pandemic on women relative to men. The vector $X_{i,t}$ represents control variables as given in Table 1A for the employed vs. not employed outcome, and the additional controls for the subsample of employed as given in Table 1B. The models also include the seasonal (monthly) fixed effects, year fixed effects, and provincial fixed effects. Standard errors are clustered at the month, year and province level.

Such an approach has been used to estimate the impact of Covid-19 on various demographic groups (Bauer and Weber 2021; Cho et al. 2021; Couch et al. 2022; and Fang, Gunderson and Ha 2022).

4. RESULTS

4.1 Descriptive Statistics

Table 1A gives the descriptive statistics for the three outcome dependent variables, separately for the pre-Covid period, the First Wave and the subsequent Omicron Wave. As indicated in Table 1A, the probability of being employed during the First Wave dropped substantially by 14 percentage points (rounded number) from 0.86 to 0.73 but rebounded to its original level by the subsequent Omicron Wave. Average hours worked decreased slightly by about one-quarter of an hour (-0.28 of an hour) from 38.08 hours to 37.8 hours between the pre-Covid period and the First Wave, increasing slightly by 0.16 of an hour by the Omicron Wave. This relative constancy of the average, however, could mask heterogeneity where some had their hours reduced because of the pandemic or they shifted to working part-time, while others increased their hours in front-line jobs or to replace co-workers who were no longer employed.

Real hourly wages increased by a substantial $3.10 per hour between the pre-Covid period and the First Wave, as higher wage workers were more likely to increase their employment and lower wage workers more likely to reduce their employment. This is substantiated by the subsequent entry in Table 1C indicating that the probability of being employed dropped substantially for workers in lower-skilled jobs and increased for those in higher-skilled jobs. Also, the increase in wages may reflect bonus pay especially in jobs exposed to Covid risk. Such a hazard pay premium during Covid was documented for Canada by Lamb, Gomez and Moghaddas (2022). Real hourly wages returned closer to their original pre-Covid levels in the return-to-normal period of the Omicron Wave, albeit they were higher by $1.92 per hour.

The descriptive statistics for the full sample of employed and those not employed portrayed in Table 1B indicate that the proportions for the control variables did not change much over the three time periods. The exception is that the proportion of less educated persons with

high-school or below dropped continuously over the three periods, while the proportion with a university degree increased. This could reflect structural change in the economy due to accelerated automation, remote working, and sector-shifts driven by Covid, which tended to favor the highly educated and highly skilled (Beland et al., 2022; Gallacher and Hossain 2020; Lemieux et al., 2020; Messacar, Handler and Frenette 2021; Slade 2022). Also, those with lower education may be more likely to be discouraged workers who were less likely to stay at work or return to work given the reduced job opportunities.

The descriptive statistics for the subsample of employed in Table 1C used for the hours and wage outcomes indicate that there were some notable changes in the composition of the workforce over the three periods. The employment reduction between the pre-Covid period and the First Wave was especially pronounced for public sector workers and employees who are part-time, temporary, low-tenured, non-union and in small firms.[8] As indicated in the literature review and outlined in more detail subsequently, many of these characteristics apply to the trifecta of being a woman, with elementary school age children and in less-skilled jobs hard-hit by the pandemic. In all of these cases, except for less-skilled occupations, the employment situation returned towards the normal pre-Covid benchmark by the time of the Omicron Wave with its dropping of restrictions and school openings reflecting living with Covid.

4.2. Difference-in-Difference Employment Results

[8] These are gross relationships that do not control for the effect of other factors. For example, the employment decline in the public sector occurs in spite of the fact that it tends not to have the other characteristics that are also associated with employment declines. The common element is that women tend to disproportionately be in those jobs with employment declines.

Table 2 presents the Difference-in-Difference Probit marginal effects for the probability of being employed based on the coefficient estimates of Equation (1) where the dependent variable is coded 1 if employed and 0 if not employed. The coefficient estimates of β_1, β_2 and β_3 in rows 1-3 respectively apply to the variables *Women* as opposed to Men, a *Covid* period as opposed to pre-Covid, and the key interaction term of *Women* relative to Men in a *Covid* period. Row 4 is calculated as β_2 plus β_3 to indicate the average effect of Covid for all persons plus its disproportionate effect on women.

As indicated in the first row, in the *pre-Covid period* the probability of being employed was always lower for women compared to men, and this was especially the case for women compared to men with elementary school-age children compared to those without such children. However, this employment gap was actually slightly smaller in lower-skilled jobs compared to higher-skilled ones, and this was the case whether school-age children were present or not.

As indicated in the second row of Table 2, the *First Wave of Covid* had a substantial negative impact on the employment of all persons, especially those in lower-skilled jobs.

Our key Difference-in-Difference results are given in row 3 of Table 2 showing the *differential* effect of Covid for women compared to men for each of the intersecting categories. During the First Wave of Covid that differential effect was significantly negative for women in lower-skilled jobs relative to men in such jobs, and especially if they have elementary school-age children (-0.042) but also even if they do not have such children (-0.021). Such women face a triple-disadvantage from the intersection of being a woman, in lower-skilled jobs and with elementary school-age children. Interestingly, women in higher-skilled jobs did not experience that disproportionate adverse effect of Covid. This plausibly reflects that such women are in jobs where remote work is more feasible, and they may have more supports that would enable them to

juggle work and children at home. Also, some may be essential workers (nurses, teachers, doctors) whose demand for their services increased during Covid, fostering their return to the labour market from unemployment, career breaks and retirement.

Row 4 indicates that when these disproportionate adverse effects for women who have the trifecta of being a woman, in lower-skilled jobs and with elementary school-age children are added to the overall negative effect of Covid for all persons, such women experienced the largest reduction of 24.3 percentage points in the probability of being employed (row 4) as a result of the First Wave of Covid. This overall negative effect was larger for this group compared to all other intersectionalities in row 4.

For the subsequent Omicron Wave (right-hand panel) the negative effect of Covid essentially disappeared (row 2) as did its disproportionate adverse effects on women (row 3). The employment situation returned to the normal pre-Covid lower probability of being employed for women compared to men. This rebounding is perhaps surprising, although there is a two-year gap between the Omicron Wave and the pre-Covid period for the adjustment to occur.

Rows 1a to 4a at the bottom of Table 2 calculate the different effects of having elementary school-age children for each of the previous groupings of rows 1-4. For example, the first column of row 1a is calculated as the coefficient from column (1) minus column (2) (i.e., -0.035 minus -0.006 = -.029) with a t-test conducted on the difference. It illustrates the different probability of being employed between men and women in lower skilled jobs with and without children. A negative sign indicates a lower probability of being employed for women compared to men between those with and without children of elementary school age.

This negative effect of elementary school-age children on employment was always greater for women compared to men (1a), and from the effect of Covid (3a) and for the trifecta of

Covid and being in lower-skilled jobs (4a). For the subsequent Omicron Wave these effects were generally muted except for being a woman on its own.

4.3 Difference-in-Difference Hours Worked Results

Table 3 presents results for hours worked for those who were employed. As indicated in the first row, in the pre-Covid period the hours worked were always lower for women relative to men in all of the intersecting categories. Hours worked for women relative to men were also always lower in the lower-skilled categories compared to the higher-skilled ones, and always lower for those who had elementary school-age children compared to those who did not.

As indicated in the second row of Table 3, Covid was associated with reduced hours of work for all persons (both men and women) but only in the lower-skilled occupations in the First Wave. Our key Difference-in-Difference results of row 3 indicate that there was no *differential* effect of Covid on hours worked for women compared to men for any of the intersecting categories.

For the subsequent Omicron Wave (right-hand panel) the negative effect of Covid essentially disappeared (row 2) as did its disproportionate adverse effects on women (row 3). The hours situation returned to the normal pre-Covid lower hours for women compared to men.

As indicated by rows 1a to 4a at the bottom of Table 3 the negative effect on hours of work from having elementary school-age children was greatest for women in lower-skill jobs compared to men in such jobs (row 1a) in both the First Wave and the Omicron Wave. For the other combinations the effects tended to be statistically insignificant or quantitatively small.

Overall, the changes in hours worked for those who remained employed were modest although workers in lower-skilled jobs did experience a reduction in their hours in the First

Wave of Covid. This highlights that most of the adjustment to Covid occurred in the extensive margin of reduced employment (Table 2), rather than the intensive margin of hours worked (Table 3).

4.4 Difference-in-Difference Wage Results

Table 4 presents results for hourly wages for those who are employed. As indicated in the first row, in the pre-Covid period wages were always lower for women relative to men in all of the intersecting categories, even after controlling for the effect of other determinants of wages. This gender wage gap was always greater in the lower-skilled categories compared to the higher-skilled ones, and the motherhood penalty was always greater for those who had elementary school-age children compared to those who did not.

As indicated in the second row of Table 4, The First Wave of Covid was associated with an increase in the wages for all persons (both men and women) in the lower-skilled occupations (row 2). This could reflect compositional effects if those in lower-wage and lower-skilled jobs were less likely to remain employed as documented in Schirle (2021) and as discussed previously in Table 2. And it can also reflect wage bonuses associated with working in jobs with greater exposure to Covid risk. These factors could also explain why the increase in wages of women relative to men in the lower-skilled occupations was especially pronounced for those with vs. without elementary school-age children (3.9% vs. 3.3% in row 4). Such women have higher reservation wages and are likely to remain in the labour force only if those reservation wages are met.

In the higher-skilled occupations, the increase in wages associated with the First Wave of Covid was statistically significant only for those without children and it was a small increase.

These were more likely to involve jobs where remote work is more feasible and could include professionals whose billable hours increased. They could also include essential workers (nurses, teachers, doctors) for which demand for their services increased during Covid and who may receive hazard pay from exposure to the risks of the virus.

Our Difference-in-Difference results of row 3 indicate that the only significant *differential wage* effect of the First Wave of Covid for women compared to men was for women in higher-skilled jobs and with children, and for them the effect was positive but small (1.7%). They appear to require or receive a slight compensating wage for remaining in the labour force compared to their counterpart of men with children.

For the subsequent Omicron wage (right-hand panel) there were few changes relative to the gender gap in the pre-Covid period. The exception was mainly for the small *disproportionate* increase in the wages of women compared to men in lower-skilled occupations (2.6% for those with school-age children, and 1.7% for those without such children). This could reflect wage bonuses associated with disproportionately working in jobs with greater exposure to Covid risk, with such compensating wages being slightly higher for women with elementary school-age children who have higher reservation wages.

Overall, changes in wages for those who remained employed were not common except for an increase in the wages of women relative to men in the lower-skilled occupations. As with the hours of work outcome, most of the adjustment to Covid occurred in the extensive margin of reduced employment (Table 2), rather than the intensive margin of wages (Table 4).

4.5 Robustness Analysis on Exclusions

As indicated previously, we conducted a robustness analysis on some of the exclusions outlined previously. In particular, we altered our exclusion of those above 5% in the wage distribution to those above 1% as well as above 10%. Also, we expanded our restriction from elementary school-age children to also include children under the age of 6 as well as teens and any child in the household.

Appendix B illustrates our key result in line 4 of the effect of Covid (line 2 of Tables 2-4) plus the differential effect of Covid on women relative to men (line 3) for persons in lower-skilled jobs in the First Wave (line 4 Column 1-4). Clearly our results on the effect of Covid and its disproportionate effect on women who are in lower-skilled jobs are substantially unaltered by these alternative exclusions. Full results for all other cells tend to be similar (available on request).

5. CONCLUDING OBSERVATIONS AND POLICY CONSIDERATIONS

In the pre-Covid benchmark period, outcomes for women (employment, hours worked and wages) were always lower than outcomes for men in all of the intersecting categories (higher-skill and lower-skilled jobs, and with and without children of elementary school age) after controlling for other factors that can influence their outcomes.

With respect to the employment outcome, the First Wave of Covid had a more severe negative *differential* effect for women compared to men for each of the intersecting categories, reducing employment probabilities more for women in lower-skilled jobs relative to men in such jobs, and especially if they have elementary school-age children. For the subsequent Omicron Wave the negative effect of Covid on employment disappeared as did its disproportionate

adverse effects on women, although longer-run scarring effects can occur as discussed subsequently.

For the *hours worked* outcome, neither of the Covid Waves were associated with any substantial *differential* effects of Covid for women compared to men in any of the intersecting categories. This highlights that most of the adjustment to Covid occurred in the previously documented extensive margin of reduced employment, rather than the intensive margin of hours worked.

A somewhat similar pattern occurred for the *hourly wage* outcome. The First Wave of Covid was associated with an increase in the wages for all persons in the lower-skilled occupations, and especially for those who had elementary school-age children.

Changes in wages were not common in most of the other intersecting categories in either the First Wave or Omicron Wave. As with the hours of work outcome, most of the adjustment of wages to Covid occurred in the previously documented extensive margin of reduced employment, rather than the intensive margin of wages.

Policy initiatives could focus on the trifecta of women in lower-skilled occupation and with school-age children. They have the lowest employment probabilities in normal times, and they have the most severe adjustment consequence from major shocks like Covid. The negative adjustment consequences tend to occur immediately after the shock, with a return to "normal" employment probabilities soon afterwards. But that normal state still involves a trifecta of women in lower-skilled occupations and with school-age children, and this applies to negative outcomes for employment, hours and wages. In essence, the trifecta merits policy attention in normal times, but especially with respect to short-run employment losses during shocks like Covid.

Our data does not enable analysis of the longer-run employment consequences. Even if the short-run negative employment adjustments do not persist in the longer-run they can still have negative long-run scarring effects not only on subsequent labour market outcomes of individual but also on family formation, marriage and divorce, crime, substance abuse, life satisfaction, mental health and mortality. Furthermore, the negative effects tend to be larger for more disadvantaged groups and they can persist intergenerationally and affect the children of those who are immediately affected.[9] Policy intervention is justified to proactively mitigate both the immediate effects and the longer run scarring effects especially on disadvantaged individuals.

The disproportionate adverse effect for women of being in lower-skilled jobs and with school-age children suggests that policy initiatives could focus on the enhancement of skills that are rewarded in the labour market. This is especially the case since high-skilled women face a smaller pay gap compared to high-skilled men, although a gap still prevails. With respect to skills enhancement at the general education level, providing information that that the monetary returns to education are higher for women than for men could encourage women to acquire such education, albeit this can mean women would now have to balance work, care, and lifelong learning.

This would be enhanced further if women acquire education in fields of study with higher monetary returns such as engineering, business, medicine and science as opposed to humanities and fine arts (evidence reviewed in Gunderson and Oreopoulos 2020). The same would apply to

[9] Scarring effects of the Covid-19 pandemic are documented for Canada in Mahboubi and Higazy (2022) and Messacar, Handler and Frenette (2021) and earlier references cited therein. More general reviews of the international evidence as well as the theoretical mechanisms through which scarring effects occur are given in Von Wachter (2020) and the meta-analysis of 65 international causal studies in Filomena (2023)

apprenticeship programs where women often enter fields that yield low returns such as hairdressing and food services (Gunderson and Krashinsky 2015). Their returns may be low in part due to a large supply influx into those fields due to occupational segregation.

Providing information is of limited use if barriers to acquiring such education and training prevail. Many of these barriers in the education and training area are similar to those that women face in the labour market in general: interruptions due to pregnancy and child raising; dividing time and effort into family responsibilities; stereotyping that leads to segregation into lower paying "caring" fields that involve the primacy of domesticity; harassment and "poisoned" environments especially in male-dominated fields; and lack of peer support, networks and mentors.[10]

Based on the Program for International Student Assessment (PISA) scores, Ferguson (2016, p.9,10) documents that young women have similar scores than young men in literacy and higher scores in reading. However, they have lower scores in mathematics and numeracy, and these are foundation skills for the better paying jobs in science, technology, engineering and mathematics (STEM). Furthermore, even when they have similar scores as young men do they tend not to enter the male-dominated STEM jobs.

Policies are also needed to provide information on the skills that are increasingly rewarded in the labour market through greater employment and promotion opportunities as well as higher wages. Such initiatives are occurring and should be continued. As indicated in Future Skills Centre (2023, p.1). "Success in the workplace is increasingly linked to a set of core skills

[10] In the education area these barriers are discussed in Ferguson (2016), Government of Canada (2023) and Turcott (2011), and in the training and apprenticeship area in Frank and Frenette (2019) and Sweet (2003).

that are remarkably similar across sectors and occupations. These include communication, socio-emotional, digital and basic literacy and numeracy skills…Literacy and numeracy issues are more common for groups that face systemic barriers in the labour market and education systems…Labour market stakeholders are paying closer attention to so-called soft skills, such as those related to interpersonal relationships, leadership, communication, conflict resolution, teamwork and time management."

The Conference Board (2022a) reported on the essential skills required for educational and labour market success as given by leaders in education, skills, and employment from across Canada. Those skills included foundational skills, including digital literacy, social and emotional skills, such as resiliency, self-management, and communication, and job readiness and lifelong learning.

In a subsequent report the Conference Board of Canada (2022b, p.1) indicated that the key "employability skills include communication, problem-solving, positive attitudes and behaviours, adaptability, working with others, and digital skills…social and emotional skills, like active listening and resilience…personal management skills, like demonstrating a positive attitude and being adaptable … and teamwork skills."

An important policy development in this area that is continuously being developed is the O*Net system that links occupations to the specific skills and tasks that are required in each occupation. The procedures use experts to link occupations to the various tasks and skills required as well as work activities, work context, experience required, training and credentials needed, projected growth, and main industries of the work. The skills include content skills, process skills, social skills, complex problem-solving skills, technical skills, systems skills, and

resource management skills. This will clearly help individuals make better informed decisions about occupations and industries to enter and the specific skills required in those jobs.

With respect to policy initiatives to deal with child responsibilities that give rise to the motherhood penalty as well as dual responsibilities in both the labour market and education systems, Qian and Fuller (2020) give a comprehensive set of recommendations and cite related literature. They emphasize the importance of an accessible, well-funded public care sector and implementing flexible leave policies beyond the period of infancy to help working parents manage caregiving demands equitably. They suggest more generous and flexible leave provisions that allow some portion of parental leave to be taken when children are older. They also suggest more caution in the closure of schools and childcare centres in situations like the pandemic.

Qian and Fuller state that more generous leave provisions may exacerbate gender inequality in labour markets since they are used by mothers more than fathers. They suggest that any expansion of leave policies should be accompanied by mechanisms ensuring that they promote men's participation in childcare. They also highlight that the sharing of leave between parents can create greater financial hardships for those with low earnings who do not have the resources to facilitate such sharing. They emphasize that the pandemic simply exacerbated deep-seated labour market inequalities with respect to women and especially those in lower-skilled jobs and with school-age children. Any "return to normal" must recognize these longer run issues, including the scarring effects that may persist after the pandemic.

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Table 1A: Descriptive Statistics (Means, Standard Deviation) for Dependent Variables before and during Covid/Omicron and Mean Difference Test Statistics

	Pre-Covid: Jan 2018 – Feb 2020		First Wave: April – June 2020		Omicron Wave: Jan – Mar 2022		First Wave minus Pre-Covid	Omicron Wave minus Pre-Covid .
Variable	Mean	SD	Mean	SD	Mean	SD	Difference	Difference
% employed	0.86	0.34	0.73	0.45	0.86	0.34	-.0.14***	-0.00
Hours worked	38.08	11.75	37.80	11.18	38.24	11.30	-0.28***	0.16*
Hourly wages	28.79	13.47	31.69	14.34	29.77	13.60	3.10***	1.92***

Significance at: *** p<0.01; ** p<0.05; * p<0.1. The differences in the last two columns are calculated, respectively, as the First Wave and Omicron Wave means minus the Pre-Covid means, with a t-test on the statistical significance of the difference.

Table 1B: Descriptive Statistics (Means, Standard Deviations) for Independent Variables of Full Sample of Employed and Not Employed

	Pre-Covid: Jan 2018 – Feb 2020		First Wave: April – June 2020		Omicron Wave: Jan – Mar 2022	
Variable	Mean	SD	Mean	SD	Mean	SD
% employed	0.86	0.34	0.73	0.45	0.86	0.34
Immigration status						
Recent immigrants	0.07	0.25	0.07	0.25	0.08	0.27
Established immigrants	0.11	0.31	0.11	0.31	0.14	0.34
Canadian-born	0.83	0.38	0.82	0.38	0.79	0.41
Gender						
Man	0.51	0.50	0.51	0.50	0.51	0.50
Woman	0.49	0.50	0.49	0.50	0.49	0.50
Youngest child						
School-aged children	0.24	0.43	0.24	0.43	0.24	0.43
Without child under 18	0.76	0.43	0.76	0.43	0.76	0.43
Education						
High school and below	0.25	0.43	0.23	0.42	0.21	0.41
College	0.45	0.50	0.45	0.50	0.43	0.49
University degree	0.30	0.46	0.32	0.47	0.36	0.48
Marital status						
Married	0.43	0.50	0.44	0.50	0.43	0.50
Single, never married	0.30	0.46	0.31	0.46	0.32	0.46
Others	0.26	0.44	0.25	0.44	0.25	0.43
Age						
25 to 34	0.32	0.47	0.31	0.46	0.32	0.46
35 to 44	0.30	0.46	0.31	0.46	0.31	0.46
45 to 54	0.38	0.49	0.38	0.49	0.37	0.48
Province						
Nfld. & Labrador	0.03	0.18	0.03	0.17	0.04	0.19
Prince Edward Island	0.03	0.16	0.03	0.16	0.02	0.14
Nova Scotia	0.05	0.22	0.05	0.22	0.05	0.21
New Brunswick	0.05	0.21	0.05	0.22	0.05	0.22
Quebec	0.17	0.38	0.18	0.38	0.18	0.38
Ontario	0.27	0.45	0.28	0.45	0.30	0.46
Manitoba	0.08	0.28	0.08	0.28	0.08	0.28
Saskatchewan	0.07	0.26	0.07	0.26	0.06	0.24
Alberta	0.12	0.32	0.12	0.32	0.09	0.28
British Columbia	0.13	0.33	0.12	0.32	0.13	0.34
Sample size	753,090		74,325		85,565	

Total sample size is 912,580.

Table 1C: Descriptive Statistics (Means, Standard Deviations) for Independent Variables of Sub-Sample of Employed

	Pre-Covid: Jan 2018 – Feb 2020		First Wave: April – June 2020		Omicron Wave: Jan – Mar 2022	
Variable	mean	std dev.	mean	std dev.	mean	std dev.
Skill level						
Lower skilled	0.73	0.44	0.67	0.47	0.67	0.47
Higher skilled	0.27	0.44	0.33	0.47	0.33	0.47
Multiple job holder						
Single job holder	0.94	0.24	0.96	0.19	0.94	0.23
Multiple job holder	0.06	0.24	0.04	0.19	0.06	0.23
Class of worker						
Private sector	0.28	0.45	0.33	0.47	0.30	0.46
Public sector	0.72	0.45	0.67	0.47	0.70	0.46
Full-time or part-time						
Full-time	0.90	0.30	0.92	0.26	0.91	0.29
Part-time	0.10	0.30	0.08	0.26	0.09	0.29
Permanent/temporary job						
Permanent	0.90	0.31	0.92	0.28	0.91	0.28
Temporary	0.10	0.31	0.08	0.28	0.09	0.28
Tenure						
less than 1 year	0.19	0.39	0.15	0.35	0.18	0.39
from 1 to 5 years	0.32	0.47	0.32	0.47	0.33	0.47
more than 5 years	0.48	0.50	0.53	0.50	0.49	0.50
Union member						
Union member	0.32	0.47	0.36	0.48	0.32	0.47
Not union member	0.68	0.47	0.64	0.48	0.68	0.47
Firm size (employees)						
Less than 20	0.18	0.38	0.15	0.36	0.17	0.37
20 to 99	0.17	0.37	0.15	0.36	0.16	0.37
100 to 500	0.15	0.36	0.16	0.36	0.17	0.37
More than 500	0.51	0.50	0.54	0.50	0.51	0.50
Sample size	565,645		48,164		65,254	
Total sample size is 679,063						

Table 2. Difference-in-Differences Results, Probit Marginal Effects on Probability of Employment, Workers with and Without School-aged Child(ren) Separate, and Higher-Skill and Lower-Skill Separate, First Wave and Omicron Wave Separate

	Dependent variable: Probability of employment (coded 1 if employed, 0 if not employed)							
	First Wave				Omicron Wave			
NOC skill level	Lower-skill		Higher-skill		Lower-skill		Higher-skill	
Presence of elementary school-aged child(ren)	With	Without	With	Without	With	Without	With	Without
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample mean	0.86	0.83	0.89	0.88	0.87	0.85	0.90	0.89
1.Woman β_1 *eq. (1)*	-0.035***	-0.006***	-0.041***	-0.032***	-0.033***	-0.005**	-0.037***	-0.030***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
2.Covid β_2 *eq. (1)*	-0.201***	-0.200***	-0.116***	-0.105***	-0.014	0.002	0.002	0.010
	(0.019)	(0.016)	(0.022)	(0.011)	(0.012)	(0.005)	(0.011)	(0.007)
3.Woman x *Covid* β_3 *eq. 1*	-0.042***	-0.021***	0.000	0.012*	-0.008	0.002	-0.011	-0.011
	(0.009)	(0.005)	(0.009)	(0.007)	(0.011)	(0.007)	(0.010)	(0.009)
4.Covid + Woman x *Covid*	-0.243***	-0.221***	-0.116***	-0.093***	-0.022	0.004	-0.009	-0.001
1a. Difference for Women	-0.029**		-0.009***		-0.028***		-0.007***	
2a. Difference for Covid	-0.001		-0.011		-0.016		-0.008*	
3a. Difference for Women x Covid	-0.021***		-0.012**		-0.010***		0.000***	
4a. difference for Covid + Women *x Covid*	-0.022***		-0.023		-0.026		-0.008	
Sample size	132,032	459,610	66,782	168,991	132,734	464,329	68,207	173,385

Significance at: *** p<0.01; ** p<0.05; * p<0.1. Notes: Results based on equation (1). Weighted regression models. Standard errors in parentheses are clustered at province. Controls include individual characteristics (immigrant status, age, education, marital status and province). Row 4 is calculated as row 2 plus row 3. The differences in rows 1a to 4a are the with (children) column minus without (children) columns.

Table 3. Difference-in-Differences Results, Log of Hours Worked, Workers with and without School-aged Child(ren) Separate, and Higher-Skill and Lower-Skill Separate, for the First Wave and Omicron Wave Separate

	Dependent variable: Log of actual hours worked							
	First Wave				Omicron Wave			
NOC skill level	Lower-skill		Higher-skill		Lower-skill		Higher-skill	
Presence of elementary school-aged child(ren)	With	Without	With	Without	With	Without	With	Without
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample mean	37.34	37.98	38.12	38.86	37.35	38.00	38.23	38.96
1.Woman β_1 *eq. (1)*	-0.106***	-0.070***	-0.038***	-0.029***	-0.106***	-0.070***	-0.040***	-0.029***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)
2.Covid β_2 *eq. (1)*	-0.024*	-0.029***	-0.006	0.005	-0.001	0.000	0.008	0.009
	(0.013)	(0.009)	(0.014)	(0.014)	(0.011)	(0.008)	(0.011)	(0.008)
3.Woman x *Covid* β_3 *eq. 1*	0.013	0.005	-0.002	0.005	0.009	0.011	0.012	-0.002
	(0.008)	(0.010)	(0.011)	(0.008)	(0.009)	(0.007)	(0.010)	(0.007)
4.Covid + Woman x *Covid*	-0.011*	-0.024***	-0.008	0.01	0.008	0.011	0.02	0.007
1a. Difference for Women	-0.036***		-0.009***		-0.036***		-0.011***	
2a. Difference for Covid	0.005***		-0.011**		-0.001***		-0.001	
3a. Difference for Women x Covid	0.008**		-0.007		-0.002***		0.014	
4a. Difference for Covid + Woman x Covid	0.013		-0.018		-0.002**		0.013	
Sample size	98,749	348,996	46,908	119,156	100,773	358,638	48,173	123,315

Significance at: *** p<0.01; ** p<0.05; * p<0.1. Notes: Results based on equation (1). Weighted regressions. Standard errors in parentheses are clustered at province and month-year level. Controls include individual characteristics (age, education, marital status, child status, and province) as well as job characteristics (multiple-job holder status, temporary employment status, part time employment status, firm size, union membership status, tenure, and categories of industry and occupation). Row 4 is calculated as row 2 plus row 3. The differences in rows 1a to 4a are the with (children) column minus without (children) columns.

Table 4. Difference-in-Differences Results, Log of Hourly Wage, Workers with and without School-aged Child(ren) Separate, and Higher-Skill and Lower-Skill Separate, for the First Wave and Omicron Wave Separate

	Dependent variable: Log of hourly wage							
	First Wave				Omicron Wave			
NOC skill level	Lower-skill		Higher-skill		Lower-skill		Higher-skill	
Presence of elementary school-aged child(ren)	With	Without	With	Without	With	Without	With	Without
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample mean	25.80	24.12	37.66	34.43	25.68	24.02	37.55	34.35
1.Woman β_1 *eq. (1)*	-0.198***	-0.145***	-0.088***	-0.059***	-0.198***	-0.144***	-0.086***	-0.058***
	(0.004)	(0.003)	(0.005)	(0.003)	(0.004)	(0.003)	(0.005)	(0.003)
2.Covid β_2 *eq. (1)*	0.050***	0.026***	0.018	0.018**	-0.011	-0.010*	-0.001	0.011
	(0.011)	(0.007)	(0.011)	(0.009)	(0.007)	(0.005)	(0.009)	(0.008)
3.Woman x *Covid* β_3 *eq. 1*	-0.011	0.007	0.017*	0.011	0.026***	0.017***	-0.004	0.004
	(0.010)	(0.007)	(0.010)	(0.008)	(0.009)	(0.006)	(0.010)	(0.009)
4.Covid + Woman x *Covid*	0.039***	0.033***	0.035*	0.029**	0.015***	0.007***	-0.005	0.015
1a. Difference for Woman	-0.053***		-0.029***		-0.054***		-0.028***	
2a. Difference for Covid	0.024***		0.000		-0.001***		-0.012***	
3a. Difference for Woman x Covid	-0.018***		0.006***		0.009***		-0.008***	
4a. Difference for Covid + Woman x Covid	0.009***		0.006***		0.008***		-0.020**	
Sample size	96,668	344,348	38,297	104,670	98,740	354,079	39,466	108,646

Significance at: *** p<0.01; ** p<0.05; * p<0.1. Notes: Results based on equation (1). Weighted regressions. Standard errors in parentheses are clustered at province and month-year level. Controls include individual characteristics (age, education, marital status, child status, and province) as well as job characteristics (multiple-job holder status, temporary employment status, part time employment status, firm size, union membership status, tenure, and categories of industry and occupation).Row 4 is calculated as row 2 plus row 3. The differences in rows 1a to 4a are the with (children) column minus without (children) columns.

Appendix A: Mapping of 40 major NOC groups into five skill level occupational categories (Available on request)

NOC_40	Description	NOC_5	Skill level
1	Senior management occupations	00	high
2	Specialized middle management occupations	00	high
3	Middle management occupations in retail and wholesale trade and customer services	00	high
4	Middle management occupations in trades, transportation, production and utilities	00	high
5	Professional occupations in business and finance	A	high
6	Administrative and financial supervisors and administrative occupations	B	low
7	Finance, insurance and related business administrative occupations	B	low
8	Office support occupations	C	low
9	Distribution, tracking and scheduling coordination occupations	C	low
10	Professional occupations in natural and applied sciences	A	high
11	Technical occupations related to natural and applied sciences	B	low
12	Professional occupations in nursing	A	high
13	Professional occupations in health (except nursing)	A	high
14	Technical occupations in health	B	low
15	Assisting occupations in support of health services	C	low
16	Professional occupations in education services	A	high
17	Professional occupations in law and social, community and government services	A	high
18	Paraprofessional occupations in legal, social, community and education services	B	low
19	Occupations in frontline public protection services	B	low
20	Care providers and educational, legal and public protection support occupations	C	low
21	Professional occupations in art and culture	A	high
22	Technical occupations in art, culture, recreation and sport	B	low
23	Retail sales supervisors and specialized sales occupations	B	low
24	Service supervisors and specialized service occupations	B	low
25	Sales representatives and salespersons wholesale and retail trade	C	low

Appendix A: Mapping of 40 major NOC groups into five skill level occupational categories (continued)

NOC_40	Description	NOC_5	Skill level
26	Service representatives and other customer and personal services occupations	C	low
27	Sales support occupations	D	low
28	Service support and other service occupations, n.e.c	D	low
29	Industrial, electrical and construction trades	B	low
30	Maintenance and equipment operation trades	B	low
31	Other installers, repairers and servicers and material handlers	C	low
32	Transport and heavy equipment operation and related maintenance occupations	C	low
33	Trades helpers, construction labourers and related occupations	D	low
34	Supervisors and technical occupations in natural resources, agriculture and related production	B	low
35	Workers in natural resources, agriculture and related production	C	low
36	Harvesting, landscaping and natural resources labourers	D	low
37	Processing, manufacturing and utilities supervisors and central control operators	B	low
38	Processing and manufacturing machine operators and related production workers	C	low
39	Assemblers in manufacturing	C	low
40	Labourers in processing, manufacturing and utilities	D	low

Appendix B. Robustness Checks, Alternative Coefficients for Key Result of the Effect of Covid Plus the Differential Effect of Covid on Women Relative to Men for Lower-skilled Persons in the First Wave (Available on Request)

Alternative Exclusions	Prob of Employment	Hours Worked	Ln Wages
Original restriction to elementary school age children 6-12 and excluding hourly wages in top 5%	-0.243***	-0.011*	0.039***
Also including children under 6	-0.235***	-0.022***	0.037***
Also including teens 13-18	-0.229***	-0.023***	0.030***
Including all children	-0.224***	-0.020***	0.039***
New restriction to exclude hourly wage in top 1%	-0.244***	-0.012*	0.040***
New restriction to exclude hourly wage in top 10%	-0.252***	-0.002	0.036***