

CEWP 20-07

COVID-19, Occupation Tasks and Mental Health in Canada

Louis-Philippe
Beland
Carleton University

Abel Brodeur
University of
Ottawa

Derek Mikola
Carleton University

Taylor Wright
University of
Ottawa

May 2020; revised 30 June 2020

Previous title: The Short-Term Economic Consequences of COVID-19: Occupation Tasks and Mental Health in Canada

CARLETON ECONOMICS WORKING PAPERS



Carleton
UNIVERSITY

Department of Economics

1125 Colonel By Drive
Ottawa, Ontario, Canada
K1S 5B6

COVID-19, Occupation Tasks and Mental Health in Canada.*

Louis-Philippe Beland Abel Brodeur Derek Mikola
Taylor Wright

June 30th, 2020

Abstract

In this paper, we study the effect of COVID-19 on the labour market and reported mental health of Canadians. We document that COVID-19 had drastic impact on labour market outcomes in Canada, with the largest effects for younger and less educated workers. To further understand the effect of the pandemic on the labour market, we build indexes for whether (1) workers are relatively more exposed to disease, (2) work in proximity to coworkers, (3) are essential workers, and (4) can easily work remotely. Our estimates suggest that the impact of COVID-19 was significantly more severe for workers more exposed to disease and workers that work in proximity to coworkers, while the effects are less severe for essential workers and workers that can work remotely. Last, using the Canadian Perspective Survey, we find that reported mental health is significantly lower among the most affected workers. We also find that those who were absent from work because of COVID-19 are more concerned with meeting their financial obligations and with losing their job than those who continue working outside their home, while those who transition from working outside the home to their home are not as concerned with job loss. Our analysis points to the individuals the most affected by COVID-19.

KEYWORDS: COVID-19 - unemployment - wages - remote work - essential workers - exposure to disease - mental health

JEL CODES: I14, I18, J21.

*Authors: Beland: Carleton University. Email: louisphilippe.beland@carleton.ca; Brodeur: University of Ottawa and IZA. Email: abrodeur@uottawa.ca; Mikola: Carleton University. Email: derek-mikola@cmail.carleton.ca; Wright: University of Ottawa. Email: taylorjohn.wright@gmail.com. An earlier version of this paper circulated under the title "The Short-term Economic Consequences of COVID-19: Occupation Tasks and Mental Health in Canada"

1 Introduction

COVID-19 is having unprecedented impacts on the Canadian economy and on individuals across the country. The pandemic has led provincial governments to impose social and physical distancing policies and to shutdown non-essential businesses. This has resulted in drastic impact across Canada and radically altered the lives of Canadians.

This paper documents the effect of COVID-19 on labour market outcomes and reported mental health of Canadians.¹ The labour market and mental health of Canadians are serious concerns for policy makers during this pandemic (e.g., Kirkey (2020)). Understanding individuals that are the most affected by the pandemic is important for policymakers aiming to prevent long-term negative impacts. This is especially true if the most affected are also the most vulnerable groups. The pandemic may exacerbate inequalities.

Using the Labour Force Survey (LFS), our results show that COVID-19 had a drastic impact on the labour market with the largest effect on younger and less educated workers, suggesting that COVID-19 may increase inequality in the short run.² To further understand the effect of the pandemic on the Canadian labour market, we build indexes for whether workers (1) are relatively more exposed to disease, (2) work in proximity to coworkers, (3) are essential, and (4) can work remotely.³ We provide evidence that the impact of the pandemic was significantly more severe for workers more exposed to disease and workers that work in proximity to coworkers. We also find that the effects are significantly less severe for essential workers and workers that can work remotely.⁴

We also use the Canadian Perspective Survey Series (CPSS), a new survey from Statistics Canada, to study how mental health may be affected by the pandemic.⁵ This survey allows us to investigate the effect of COVID-19 on reported mental health, ability to meet financial obligations, and concern for loss of employment. Our results suggest that women and less educated workers are more likely to report lower levels of mental health. Our results also show that women are more concerned with losing their jobs than men. Similarly, less educated workers are more concerned with losing their job than more educated workers. Immigrants report a compromised ability to meet financial obligations and are more concerned with losing their jobs than Canadian-born individuals.

¹Our analysis is guided by pre-analysis plans, available here: <https://osf.io/7gujs/>. We are using pre-analysis plans to pre-specify and publicly archive our analysis before the labour data release. Note that we wrote a pre-analysis plan for each of our two main data sets.

²See also Lemieux et al. (2020) for an initial labour market impact of COVID-19. We complement this study by further investigating the impact of COVID-19 using occupation indexes and the impact of COVID-19 on reported mental health across demographics.

³Our indexes are based on occupational survey data from O*NET and we adapt these indexes to the LFS. Our indexes are described in detail in the data section and in the Appendix.

⁴In this paper we refer the term essential and critical interchangeably when describing workers.

⁵The Canadian Perspectives Survey Series is an experimental project covering a variety of social topics related to COVID-19. See Section 4 for more information.

Last, we find that those who were absent from work because of COVID-19 are more concerned with meeting their financial obligations and with losing their job than those who continue working outside of their home, while those who transition from working outside their home to home are not as concerned with job loss. These results highlight important inequities in the effects of COVID-19, and represent an important aspect of how policy makers should efficiently allocate resources to support individuals facing the various impacts of COVID-19.

Our results contribute to the growing literature documenting the effect of COVID-19 on economic outcomes in Canada (e.g., [Beland, Fakorede and Mikola \(2020\)](#); [Lemieux et al. \(2020\)](#)) and other countries (e.g., [Adams-Prassl et al. \(2020\)](#); [Beland, Brodeur and Wright \(2020\)](#); [Coibion et al. \(2020\)](#); [Lewandowski \(2020\)](#); [Rojas et al. \(2020\)](#)).⁶ Our paper also adds to a growing literature on the impacts of COVID-19 on mental health and financial well-being ([Armbruster and Klotzbücher \(2020\)](#); [Brodeur, Clark, Flèche and Powdthavee \(2020\)](#); [Etheridge et al. \(2020\)](#)) and the literature investigating the relationship between health and labour market outcomes ([Currie and Madrian \(1999\)](#); [Strauss and Thomas \(1998\)](#)). Our main contribution is to further the understanding of the effects of the pandemic on the Canadian labour market and to study the link between socioeconomic and occupational characteristics and mental health using the CPSS. The CPSS uniquely allows us to explore plausible mechanisms through which COVID-19 is impacting Canadians beyond labour market outcomes.

The rest of the paper is as follow: Section 2 discusses COVID-19 in Canada, Section 3 discusses the literature and the conceptual framework, Section 4 discusses the data and empirical strategy, Section 5 presents the results, and Section 6 concludes.

2 Brief background on COVID-19 in Canada

COVID-19 is a novel infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease spread globally in early 2020, resulting in a pandemic. The majority of infected individuals have mild symptoms but for some, especially older individuals or those with pre-existing medical conditions, COVID-19 can require hospitalization and may lead to death. The disease has overwhelmed healthcare systems in a number of European countries. Fear of a similar scenario has lead the Canadian federal and provincial governments to promote social and physical distancing, resulting in the indeterminate shut down of non-essential activities and severe job losses. The impetus for shut downs were to “flatten the curve” which would ideally reduce the spread of COVID-19 in Canada sufficiently, so as to not overwhelm the healthcare system ([Perreault et al. 2020](#)).

⁶[Brodeur, Gray, Islam and Bhuiyan \(2020\)](#) present an early literature review on the effect of COVID-19 on economic outcomes.

Figures 1 (linear scale) and A1 (logarithmic scale) present cases and deaths in the largest (and most affected) provinces: Quebec, Ontario, Alberta, and British Columbia. On April 2, Canada surpassed 10,000 confirmed cases of COVID-19. By the end of April, the number of cases and deaths surpassed 50,000 and 3,000, respectively. Figure 1 shows an almost constant increase in cases and deaths from the end of March through the end of May, with cases and deaths significantly greater for Quebec and Ontario than other provinces.

Appendix Table A1 provides a timeline of important events during the COVID-19 pandemic for Canada in their attempts to reduce the spread of COVID-19. The table presents notable information about the first case in Canada (January 25), the first death in Canada (March 8, 2020), when provinces declared state, or public health, emergencies (March 14 - 22), and when closures from schools occurred (March 13 - 23).⁷ As noted in Appendix Table A1, many of the provinces had their spring break scheduled during the emergency declaration. These policies demonstrate the speed with which provinces began to shut down in the middle of March.

By the end of March 2020, provincial governments employed policies that directly impacted the labour market by keeping open only workplaces which were deemed “essential.” Importantly, workers who were not considered essential but able to work from home were allowed to continue working. It is thus likely that workers most affected from these policies are those who could not work from home, did not contribute to essential businesses’ operations, or could not appropriately modify their working conditions. This is critical since many occupations have specific tasks which may not be flexible enough in the short run to meet the restrictions placed upon them. Such policies, while necessarily labour market contracting, differentially impact occupations which are less likely to be essential, more likely to be customer-facing, or unable to work from home.

Figure 1 highlights the effectiveness of all actions taken to flatten the case and death curves. For Quebec and Ontario, the provinces most affected by COVID-19, graphs for cases and deaths are concave by the middle of May. By June, both curves appear to be sufficiently flattened. This flattened curve has been reflected in provinces’ decisions to loosen social gathering restrictions and allow businesses to gradually reopen.

3 Conceptual Framework and Background

COVID-19 may affect labour markets in several ways. In this section, we discuss potential channels focusing first on how the pandemic may affect specific occupations differently. We also include a framework how the pandemic can affect mental health of Canadians.⁸

⁷There are other important dates, such as March 18th when the border was closed to foreign nationals.

⁸Goenka and Liu (2012) present a framework to study the economic impact of infectious diseases. See also Beland, Brodeur and Wright (2020) for a discussion of the potential channels which COVID-19 can affect labour market outcomes.

3.1 Labour market

3.1.1 Occupational Characteristics Occupational characteristics, such as interacting with the public and being in close quarters with other coworkers, may increase the incidence of contracting COVID-19 (e.g. [Baker et al. \(2020\)](#)). On the one hand, certain occupations might receive a wage premium to compensate the increase in risk (e.g. [Smith \(1979\)](#)). On the other hand, the labour supply of some workers might be affected and we may observe a decrease in labour force participation due to the increased risk (e.g. [Garen \(1988\)](#)). These two conditions could lead to a decrease in the likelihood of working and an increase in wages for individuals still employed. Further muddying the waters is the interaction between job loss and the wage distribution. If workers who lose their jobs come from the low end of the wage distribution then we may see an increase in the observed wage rate regardless of whether or not workers remaining in the labour force received a wage premium. To analyse these channels we construct indexes measuring workers' exposure to infection/disease and proximity to others across industries. These indexes are discussed in more details in Section 4 and the Appendix.

Another potentially important aspect is whether or not a worker is deemed “essential.” We build an index of essential workers to investigate the impact of COVID-19 on their labour market outcomes.⁹ Essential workers include the following occupations: medical and healthcare, telecommunications, information technology systems, defense, food and agriculture, transportation and logistics, energy, water and wastewater, law enforcement, and public works industries. There is a clear potential for interaction between these indexes. For example, we think first of healthcare workers when imaging essential workers and those often exposed to infection and disease. Because of the essential nature of these occupations, labour supply may not be as strongly affected (either due to wage premia or exemptions from shutdown policies). As a result, we may expect that workers in occupations that are often exposed to infection/disease and those deemed essential may have relatively stronger labour market outcomes than those in other occupations.

A final occupational characteristic that can affect labour market outcomes is the possibility to work remotely. The COVID-19 pandemic and the government shutdowns are forcing numerous workers to work remotely. Using pre-COVID-19 data, we build an index that measures each occupation's adaptability to remote work. We then investigate the labour market effects for workers in occupations with relatively high and low scores. There is large variation across occupations. For instance, the infrastructure for remote work in high tech firms were already in place, making the adaptation easier. We expect that workers in occupations that can more readily work remotely will have relatively better labour market outcomes than those workers in occupations where remote work is

⁹<https://www.lmiontheweb.org/more-than-half-of-u-s-workers-in-critical-occupations-in-the-fight-against-covid-19/> allows us to build this index.

more challenging or infeasible.

3.1.2 Other Potential Channels Other channels could lead to heterogeneous impacts by occupation and industry. COVID-19 may increase demand for certain goods and services such as packaged goods, grocery stores, drug stores and other delivery companies. These companies may seek to fill numerous positions due to the increased demand. We will study the impact of COVID-19 by industry and document that in certain industries and occupations, there is an improvement in labour market outcomes.

A potential issue for certain workers is the school and day care shutdown across Canada, which may affect labour supply of parents (e.g. [Carta and Rizzica \(2018\)](#) and [Müller and Wrohlich \(2020\)](#)). The pandemic can also affect labour supply through mental health issues (e.g. [Ettner et al. \(1997\)](#)) or via the health conditions of family members (e.g. [Currie and Madrian \(1999\)](#)). Additional considerations are related to potential changes in investment behaviour and the allocation of productive capital across countries. For example, the exportation and production of N95 masks and other medical equipment can lead to labour market opportunities (e.g. [Whalen \(2020\)](#)).

3.2 Mental Health Channels

The pandemic is likely to contribute to changes in mental health through various channels, some direct and others indirect. The concern for contracting COVID-19 may directly decrease the reported mental health of individuals due to the large uncertainty surrounding the disease and what it entails. The highly contagious nature, the potential for transmission from surfaces, or, from those who are asymptomatic, high death rates, and novelty of the virus, are all believed to contribute to changes in mental health. Moreover, the policy actions taken by governments (such as shutdowns) are likely to contribute to mental health changes for indirect reasons. Many policies have left workers in precarious situations such as not knowing about their future income streams, when they might return to, or even find, work. We analyse these potential channels by using data that asks individuals how COVID-19 is affecting their mental health, their financial concerns, and their concern about losing their job in the future. With respect to those who might lose their job in the future, the dataset offers us the unique ability to understand the expectations of individuals since questions were forward-looking. The data and questions available are discussed in further detail in Section 4.¹⁰

¹⁰Our paper will contribute to the literature in other countries on COVID-19 and mental health such as [Armbruster and Klotzbücher \(2020\)](#); [Brodeur, Clark, Flèche and Powdthavee \(2020\)](#); [Etheridge et al. \(2020\)](#).

4 Data and Empirical Strategy

4.1 Labour Force Survey

Statistics Canada uses the Labour Force Survey (LFS) to collect monthly, household-level data and construct aggregate labour market indicators for Canada’s provinces and territories. This publicly available dataset is a cross-section of anonymized household-level economic and sociodemographic information essential in answering our research questions. The LFS is a rotating sample, with the same observations remaining in the sample for six consecutive months before exiting. Each month, interviews are conducted with approximately 56,000 households yielding approximately 100,000 observations.¹¹ The LFS includes respondent-level information on hourly earnings, weekly hours worked, and labour force status, allowing us to answer how COVID-19 has affected individuals and labour markets.

The LFS is structured with a reference week followed by a data collection week. The reference weeks are the week in the month which contains the 15th of the month, while the data collection week immediately follows the reference week. Observations answer questions referencing the reference week during the data collection week.¹²

Individuals are traditionally contacted *via* face-to-face interviews, over the phone (from call centres or from interviewers’ homes), or online, during the ten following the reference week. Due to COVID-19, none of the interviews were conducted face-to-face, or from call centres, in March, April, or May, 2020. In February 2020, by comparison, 19.5% interviews were conducted face-to-face while 46.1% of interviews were conducted from call centre. Most interviews in March (71%) were conducted while the interviewer was their home, up from 5.7% in February 2020. No information is provided based on the medium through which a given interview was conducted in the publicly available data. No information is provided on whether an observation is in the out-going rotation group.

In Table 1, we present summary statistics of our main outcome variables. We use monthly LFS cross-sections starting in January 2016 and ending in May 2020. Differences in counts result from different conditions placed on the data. Unemployed is a binary outcome for anyone who is unemployed but still in the labour force. Labour force participation uses all observations in our sample and is a binary variable. For real hourly wages and hours worked, observations are restricted to those aged 15 to 69 and in the labour force. Those who are unemployed are assigned a value of zero.¹³ All indexes are

¹¹Observations include civilian, non-institutionalized population 15 years and older and excludes those in the Canadian Armed Forces and those living on Aboriginal settlements or reserves.

¹²For example, during March 2020, individuals were contacted between March 23rd and March 27th to answer questions relating to their life between March 16th and March 20th.

¹³The LFS does not collect wage information for self-employed. To simplify, we restrict our analysis of hours and wages to those who work in the public and private sectors. Thus, we exclude those who are self-employed.

given to observations who have assigned to them a National Occupation Classification (NOC) major group number. The average person between January 2016 and May 2020 reports being unemployed about 6.7 percent of the time and has a labour force participation rate of nearly 64 percent. Average real wages of workers in the LFS is approximately \$20.89 Canadian dollars per hour and they work on average 34.5 hours a week.

4.2 Occupational Measures of Exposure, Proximity, Critical Workers and Remote Work

To gauge the impact of COVID-19 on various occupations in Canada, we build four indexes: workers relatively more exposed to disease, workers that work in close proximity to coworkers, essential workers and workers who can easily work remotely. Employment Social Development Canada’s classifications of essential skills does not contain the information required to construct these measures and as such we use the Occupational Information Network (O*NET) survey data to build these measures. O*NET is sponsored by the U.S. Department of Labor and aims to gather occupational data and develop applications to help create and maintain a skilled labour force. O*NET is gathering and providing detailed information on occupation task and description, which can be accessed and used by researchers.

Our exposure to disease index is defined as how often an occupation is exposed to infection or disease with responses ranging from “Never” to “Everyday”. Our index of proximity to coworkers is defined as the extent to which an occupation performs tasks in close proximity to other people with answers ranging from “more than 100 feet away” to “Nearly touching”. Our index for working remotely is defined as how frequently an occupation works from home. Essential workers are based on the LMI Institute index.¹⁴ It provides a list of essential occupations in several fields: medical and healthcare, telecommunications, information technology systems, defense, food and agriculture, transportation and logistics, energy, water and wastewater, law enforcement, and public works industries.

In sum, we built indexes on exposure and proximity similarly to [Beland, Brodeur and Wright \(2020\)](#), a work from home index adapted from [Dingel and Neiman \(2020\)](#), and a critical workers index adapted from the LMI Institute to the Canadian Labour Force Survey. There are two difficulties we overcome to use these measures. First, we convert O*NET and SOC codes to Canada’s National Occupation Classification (NOC) system.¹⁵ Second, we aggregate up to a level which we can merge with observations in the LFS. The former is done with a crosswalk between O*NET and NOC codes, while the latter is done by successively aggregating indexes based on their employment share. For a more

¹⁴See this link for more details: <https://www.lmiontheweb.org/more-than-half-of-u-s-workers-in-critical-occupations-in-the-fight-against-covid-19/>.

¹⁵O*NET has been used in previous research in Canada such as [Frenette and Frank \(2018\)](#). They use O*Net to investigate the differences between the skill level of Canadians and Americans.

detailed discussion of this procedure see Appendix A1. All indexes are standardized with a mean of zero and standard deviation of one.

Additional summaries of our indexes are offered in Appendix Figure A2. Each NOC major group is displayed as a circle and the area of the circle is proportional to the number of employees in that occupation according to Canada’s 2016 census. In both graphs we use our exposure to infection or disease measure as our y-axis and physical proximity to coworkers on the x-axis. The two panels vary in how they colour the circles. In the top panel of Appendix Figure A2, orange denotes the highest ability to work from home while blue denotes the lowest ability to work from home. The NOC major group for finance, insurance and related business has a high ability to work from home (orange) while having relatively low exposure to infection and disease and relatively limited physical proximity to fellow workers. This is in contrast to professional occupations in nursing which displays low ability to work from home and relatively high exposure to disease and high physical proximity to coworkers. The bottom panel of Appendix Figure A2 shows the same placement of bubbles, but varying the colour by quartile of critical worker index. In keeping with finance and nursing, we see the level of importance of these two major groups has changed: finance is relatively non-critical while nursing is considered critical.

4.3 Canadian Perspective Survey Series

To better understand how the pandemic is affecting the mental health of individuals we use the Canadian Perspective Survey Series 1 - Impacts of COVID-19 (CPSS). The survey series is being used to understand how Canadians view contemporaneous and emerging issues that are simultaneously important to policy makers. The cross-section is constructed by inviting randomly sampled units from the Labour Force Survey who were in the outgoing rotation group for any of the months between April 2019 and July 2019. Initially, there were 31,896 individuals who signed-up for the new survey. For those who agreed to participate in the CPSS, 7,242 had a valid email address through which Statistics Canada could email observations information to participate online. The CPSS was issued between March 29, 2020 and April 3, 2020 and collected information about the observation during the reference (previous) week. The CPSS gathered information regarding observations’ basic demographic characteristics, labour market outcomes, health variables, and changes in consumption habits and attitudes related to the COVID-19 pandemic.

In Appendix Table A2, we provide weighted percentages for variables of interest to this study. Columns are used to denote the various ways observations are categorized into their employment status and panels represent variables that have various scale outcomes. Those who are considered employed (columns 1, 2 or 3) include all those who worked or were absent for any reason, including temporary lay-offs. Columns 2 and 3 show those who were absent for reasons not relating to COVID-19 and those absent due to COVID-

19, respectively. Column 4 defines those who are unemployed – excluding temporary layoffs. The final column shows all those who had their employment status unstated. We see that about 40% of the sample is unemployed while just under half the sample were recorded being employed at work for at least part of the reference week.

The variable being used for mental health derives from the online questionnaire which asked individuals: “In general, how is your mental health?” where they could reply with either Excellent, Very Good, Good, Fair, Poor, or Don’t Know. We see that just over 80% of individuals regard their mental health as being Good, Very Good, or Excellent. When comparing the column 1 (At Work) to column 4 (unemployed) of Appendix Table A2, we see a similar distribution of perceived mental health.

The middle panel of Appendix Table A2 displays how COVID has impacted individuals’ ability to “meet their financial obligations or essential needs”. Nearly half (44.7%) of individuals report COVID-19 as having above a minor impact and about a quarter (23.8%) report that the impact is “Too Soon to Tell”.

The bottom panel of Appendix Table A2 reports how COVID–19 affects their earnings and job security. We use one variable which asks: “To what extent do you agree or disagree with the following statement? I might lose my main job or main self-employment income source in the next four weeks.” Observations can answer on a scale from Strongly Agree to Strongly Disagree and Don’t Know. This question is only valid to those who are considered employed or Not Stated.

4.4 Empirical Strategy

We rely on a simple pre/post analysis at the national level. The model is:

$$y_{i,p,t} = \alpha + \beta PostCOVID_t + x'_{i,p,t} \gamma + \theta_p + \delta_t + \varepsilon_{i,p,t}, \quad (1)$$

where $y_{i,p,t}$ is an economic outcome for individual i in province p and month t . Our four main outcomes variables characterize individuals’: (1) Unemployment status; (2) labour force participation; (3) actual hours of work; and (4) real hourly wages.

An individual’s unemployment status is a binary outcome which is one if an individual is unemployed and zero if they are employed. The LFS defines someone as unemployed during the reference week who “were without work, were available for work and were either on temporary layoff, had looked for work in the past four weeks or had a job to start within the next four weeks.” Individuals in the labour force are all those individuals who were employed or unemployed (as per the previous definition) during the reference period.

Actual hours of work are computed for civilians aged 16–69 who are considered employed, and counts the actual number of hours worked in the reference week, excluding overtime. For hours of work, we include only those working in the public or private sector

(exclude self-employed). The hourly wages (constant dollars relative to the individual's given province in January 2018) is computed for civilians aged 16–69 currently employed in the public or private sector and paid hourly. Those who are unemployed have their wage set to 0 while our analysis excludes the self-employed and unpaid workers.

$Post\ COVID_t$ is an indicator equals to one for March, April and May 2020 and zero for all preceding months. The time ranges between January 2016 to May 2020. $x_{i,p,t}$ is a vector of other regressors including categorical variables for an individual's age group, gender, marital status, and education level. Finally, θ_p and δ_t represent province and time fixed effects, respectively.

Only year, month and province fixed effects are included in the basic model. We enrich the basic model by controlling for demographic characteristics, and the educational level of the respondent. Moreover, to allow for common regional shocks to a given economic outcome, we estimate specifications that include interactions between year fixed effects and province fixed effects. We report standard errors clustered at the province level.¹⁶

5 Results

In this section, we present the impact of COVID-19 on labour market outcomes in Canada, using the LFS. We also investigate the potential heterogeneity of the effect of COVID-19 by worker characteristics such as age, education, marital status, and gender. We examine the role of occupations using our four indexes: workers that work with proximity to coworkers, workers relatively more exposed to disease, essential workers, and workers who can easily work remotely. Last, we analyse the effect of the pandemic on mental health.

5.1 Labour market Consequences of COVID-19

We first present a graphical representation of the impact of COVID-19 on labour market outcomes. Figure 2 presents the unemployment rate (Panel 2a), labour force participation (Panel 2b), hours of work (Panel 2c) and hourly wages (Panel 2d) over the period between January 2016 to May 2020. Figure 2 shows that the unemployment rate increased drastically in April 2020, while labour force participation, hours worked and hourly wages all decreased. More precisely, the unemployment rate increased by 8 percentage points from 6% to approximately 14%, hours of worked decreased from 32 hours to less than 28 hours, and labour force participation decreased from about 65% to less than 62%, from January 2020 to May 2020. Labour force participation and hours of work rebounded

¹⁶We also present for our main Table 2, bootstrapped p-values clustering on province and P-values that are multiway clustered on province and month. Results are qualitatively the same. For brevity, we present this exercise for Table 2 only but results are consistent to all main tables.

slightly in May 2020, while unemployment remained stable.¹⁷ Interestingly, real hourly wages decreased by slightly more than \$0.50, but remains at a higher level than throughout most of the time period January 2016 to April 2020. Of note, the composition of workers changed drastically, which could explain part of the decrease on real wages if low-income earners are more likely to have been laid off. We probe this further later in the analysis.

We present in Figure 3 the labour market outcomes across the different provinces and regions in Canada (Ontario, Quebec, Alberta, British Columbia and Atlantic Canada and Manitoba-Saskatchewan). Figure 3 shows similar drastic impact across Canada, and captures the worsening labour market outcomes throughout March and April, and slight recovery in May.

Table 2 presents our baseline results, which contains estimates of equation (1) for our four outcome variables. The time period is January 2016 to May 2020. The dependent variables are respectively the unemployment rate (Panel (a), columns 1–3), labour force participation (Panel (a), columns 4–6), hours of work (Panel (b), columns 1–3) and hourly wages (Panel (b), columns 4–6). Columns 1 and 4 control for province, year and months fixed effects. Columns (2) and (5) add individual characteristics controls such as gender, age, and marital status. Columns (3) and (6) add education category and province \times year fixed effects.¹⁸ Table 2 confirms that the unemployment rate increased since the beginning of the pandemic, while labour force participation, hours of work and wages all decreased. Recall that our variable of interest, *Post COVID* equals one for March, April and May 2020, and zero otherwise. Our estimates suggest that the unemployment rate jumped by about 6.38 percentage points, while labour force participation decreased by 3.96 percentage points. Total actual hours worked decreased by about 4.82 (in levels) on average. Controlling for individuals’ characteristics and education has no effect on the size and magnitude of our estimates. We also find a significant decrease in real hourly wage.¹⁹

Appendix Table A3 investigates COVID-19 related layoffs and absences from work in more details. In the top panel, the dependent variable is a binary variable which equals one if an unemployed individual said their reason for leaving work was due to: (a) own illness or disability, or (b) being laid off. In the middle panel, the dependent variable is a binary variable which equals one if an employed individual reported a full week of absence during the reference week due to: (a) other reasons, or (b) own illness or disability. In the

¹⁷As discussed in the empirical strategy section, hours and wage are set to 0 for unemployed and in labour force individuals in all our analysis.

¹⁸Following Roodman et al. (2019), we also present bootstrapped p-values clustering on province in brackets. P-values that are multiway clustered on province and month are displayed in braces. Results are robust to bootstrap p-value and multiway p-value. For space concern, we present this exercise for Table 2 only but results are consistent to all main tables.

¹⁹The coefficients for real hourly wage is significant at conventional level in most specifications, but the effect is less precise.

bottom panel, the dependent variable is a binary variable which equals one if an employed individual reported a part week of absence during the reference week due to: (a) other reasons, or (b) own illness or disability. Our estimates provide suggestive evidence that there is a statistically significant increase in COVID-19 related layoffs and absences from work as we find a significant increase in our three measures, including full week and part week absences.

5.2 Heterogeneity by Characteristics

We now investigate with graphical representations the short-term effects of COVID-19 on labour market outcomes for different subgroups of respondents. Appendix Figures A3, A4, A5, A6, A7, A8, A9 and A10 illustrate our outcome variables by gender, women with kids versus no kids, age groups, marital status, weekly earnings quartile, education groups, immigrants, and years since immigration, respectively. We conclude our heterogeneity analysis with related regressions analysis in Appendix Tables A4 - A7.

Appendix Figure A3 illustrates the evolution of our four outcome variables by gender. We find that COVID-19 has negative labour market outcomes for both male and female, with no discernible large differential effects. This suggest that COVID-19 did not increase gender inequalities in labour market outcomes. We further investigate the effects by gender by examining the impact of COVID-19 on labour market outcomes of women with kids versus women with no kids in Appendix Figure A4. It shows a decrease in labour market outcomes for both women with kids and women without kids, with a larger negative impact on labour outcomes for women without kids. This suggest that daycare and schools being close due to government shut down is not leading to a larger negative effect for women with kids versus women without kids.

We next present the effect of COVID-19 by age groups (15 to 34; 35 to 54; and 55+). This is important as COVID-19 has larger (less) negative health effects on older (younger) workers. This could potentially affect their labour market outcomes and in particular, their labour supply. In contrast, younger workers might be more vulnerable and less likely to have job security. Appendix Figure A5 shows that COVID-19 had an impact on all age groups, with the largest effect for younger workers, perhaps indicating less job security.

We next document the impact of the pandemic by marital status. Appendix Figure A6 shows that there was a large increase in unemployment and a decrease in labour force participation for both married and non married individuals, but the effect is larger for non married individuals.

Appendix Figure A7 shows how real hourly wages and total actual hours of work vary by income quartile. Individuals included in these graphs are employed, leading to the omission of unemployment and labour force participation. We observe those in the upper three quartiles of the income distribution seeing reduced hours of work while the lowest

quartile sees a slight increase in the hours of work. For hourly wages however, we see virtually no difference between groups.

In Appendix Figure A8, we present results by educational attainment. Individuals are classified into three educational categories: less than high school, high school degree and some college, and postsecondary degree. Appendix Figure A8 shows that the negative impact of COVID-19 is present in all education categories, but the effect appears more pronounced for less educated workers (less than high school, and high school and some college versus postsecondary accreditation).

Appendix Figure A9 illustrates the results separately for immigrants and native born. It suggests that both native born and immigrants see a decrease in labour market outcomes due to COVID-19 and that the effect is similar. We study immigrants in more details in Appendix Figure A10 by splitting the sample by years since immigration. More precisely, we separate immigrants into two categories: less than 10 years and more than 10 years ago. We find that the negative impact is quite similar for recent or long-established immigrants.

So far, we find that younger, unmarried and less educated individuals seem to be the most affected by COVID-19 and government response. In contrast, there does not seem to be differential effects by gender or immigration status. We turn to our regression analysis to check whether the differential effects are statistically significant or explained by our set of controls and fixed effects. We investigate heterogeneous effects of COVID-19 by demographic characteristics in Appendix Tables A4 - A7. To investigate the potential heterogeneity of the effects, we interact our variable of interest, *Post Covid*, with a dummy for female (column 1), age categories (16–34 and 35–54) (column 2), a dummy for being married (column 3) and our educational attainment (column 4). We confirm the results from the graphical representations: younger, unmarried and less educated individuals are more negatively affected. Women are slightly more negatively affected than men but the effect is economically small.

5.3 Characteristics of Occupations and Jobs

We first show graphically how the labour market outcomes fluctuate over time by our occupational indexes. Figures 4, 5, 6, and 7 show the labour market outcomes when assigning individuals to a dummy variable that represents an individual being above or below the median index value for physical proximity, exposure to disease, critical worker, and ability to work from home, respectively.

Figures 4 and 5 illustrate our physical proximity and exposure to disease indexes, respectively. These figures show that workers interacting closely with other and those who are more likely to be exposed to diseases have worse labour market outcomes (higher unemployment and lower labour force participation) following COVID-19 than those below

the median. Interestingly, all labour market outcomes for our physical proximity index seem to show comparable rebounds across individuals above and below the median in May.

In Figure 6, we present labour market outcomes using our critical worker index. The labour market responses of workers above and below the median appear to have similar trends but workers above the median for this index are slightly less affected by COVID-19 for all labour market outcomes.

Figure 7 presents results for workers above and below the median for the work from home index. Our four subfigures show that those who can more easily work from home have fared better since the onset of the pandemic with respect to all labour market outcomes. Those who have an above median work from home index have lower unemployment rates (in levels and in changes) as seen in Figure 7a, smaller reductions in actual hours worked (Figure 7c), and no relative change in wages (Figure 7d) when compared to those who cannot more easily work from home. It should be noted that those who are less able to work from home showed comparatively larger improvements (less unemployed, more labour force participation, more actual hours worked, higher wages) between April 2020 and May 2020 compared to those more able to work from home, suggesting that the reopening of the economy is crucial for these workers.

We next investigate the impact of COVID-19 on different occupations, using our four indexes and regression analysis. Tables 3 and 4 provide estimates for the differential effects of COVID-19 on workers across our exposure, proximity, essential workers, and remote work indexes and are structured similarly. We include *Post COVID*, *Index* and the interaction of these two variables. *Index* corresponds to one of our indexes, which have been standardized. As such, the point estimates should be interpreted as the effect of a one standard deviation increase in the index value (i.e. moving to an occupation that is one standard deviation more exposed to disease or infection). In Appendix Tables A8 and A9 we conduct a similar analysis replacing *Index* by *Index Dummy*, which is a dummy variable representing whether the individual is in an occupation above the median for our four indexes.

Table 3 focuses on unemployment and labour force participation for all of our indexes and Table 4 focus on hourly wages and hours of work for those indexes. The top panel of Table 3 shows that workers in occupations working more closely with others are significantly more likely to be unemployed while workers who are more exposed and workers able to work remotely are significantly less likely to be unemployed. The coefficient for critical workers is not statistically significant. The bottom panel suggests workers who are in occupations working more closely are significantly less likely to be in the labour force while those in critical care and more able to work remotely are more likely to be in the labour force. Our estimates for more exposed workers are negative but not statistically significant at conventional levels. The results from the top panel in Appendix Table A8

also suggest that those who work more closely and are more exposed are more likely to be unemployed, while critical care workers and those more able to work from home are less likely to be unemployed. The results presented in the bottom panel of Appendix Table A8 reinforce the above findings: those working more closely with others are less likely to be in the labour force while critical care workers and those more able to work from home are more likely. These results also find that more exposed workers are less likely to be in the labour force.

Table 4 presents results for actual hours and wages. In the top panel in Table 4, we find that workers working in proximity to coworkers are more likely to have a decrease in real hourly wage while workers able to work remotely are less likely to have a decrease in hourly wage. The bottom panel indicates hours worked fell more for those working more closely but increased for those more able to work from home or most exposed. The analogous results from Appendix Table A9 reports that workers working in close proximity and those most exposed are more likely to see a decrease in hourly wage while workers able to work remotely are more likely to have an increase.

We provide additional figures illustrating the impact of the pandemic for different subgroups of workers. Appendix Figure A11 presents results for full-time and part-time workers for hours and hourly wages. It suggests a larger decline in hours and wages for full-time workers. This can potentially be explained by the fact that several part-time jobs are related to restaurants and grocery which are less affected by the pandemic. Appendix Figure A12 presents results for part-time students, full-time students and non-student. It shows that COVID-19 had an impact on all three groups. Appendix Figure A13 presents results by union status for hours and hourly wages. It suggests that the COVID-19 impact is significantly less important for union workers. This is potentially due to the fact that union workers are more likely to have some protections from lay-offs in their collective bargaining agreements. Appendix Figure A14 presents the impact of COVID-19 on self-employed individuals. It separates between incorporated and unincorporated. Self-employed are separated in two categories: incorporated (working for themselves in corporate entities) and unincorporated (working for themselves in other entities). The literature argues that incorporated entities is a good proxy for entrepreneurship (e.g., Levine and Rubinstein (2017)). Appendix Figure A14 shows that the negative impacts of COVID-19 on labour market outcomes is present for both incorporated and unincorporated entities and the effect is important for unemployment and labour force participation. Appendix Figure A14 suggests that COVID-19 had important negative impacts on entrepreneurship activities.²⁰

²⁰See Beland, Fakorede and Mikola (2020) for a detailed study of the effect of COVID-19 on self-employed business owners in Canada by characteristics of owners.

5.4 Mental Health and COVID-19

Even prior to COVID-19 there has been an increasing scholarly and media interest in causes and consequences of social isolation and loneliness, in particular their effects on mental health and adjacent health outcomes. Social isolation has been linked to an array of health complications including higher mortality rates (Alcaraz et al. (2019)) and depression (Hawkley and Capitanio (2015)) while deteriorating mental health is one facet of the increasing mid-life “deaths of despair” seen in some parts of the developed world (Case and Deaton (2015)). COVID-19’s effects directly related to social isolation and financial concerns may hint at lasting health problems that in addition to being a human crisis, also bleed into the labour market (lost productivity, deterioration of human capital, etc.).

We analyse the effects of COVID-19 on an individual’s mental health, and financial and work concerns using the following ordered probit regression equation:

$$y_i = \alpha + x_i' \gamma + z_i' \beta + \varepsilon_i, \quad (1)$$

where y_i is an outcome for individual i . Our three main outcomes variables characterize individuals’: (1) mental health; (2) financial concerns; and (3) employment concerns. Mental health is a variable which takes on values ranging from 1 (Poor) to 5 (Excellent). Financial Concerns measures an individual’s estimation of COVID-19’s impact on their ability to meet financial obligations or essential needs and takes on values ranging from 1 (Major Impact) to 5 (Too Soon to Tell). Employment concerns is a variable measuring an individual’s agreement with the notion that they might lose their main job or self-employment income and ranges in values from 1 (Strongly Agree) to 5 (Strongly Disagree).

x_i' is a vector of individual demographic covariates which include sex, age, marital status, and immigration status. z_i' includes economic context covariates which we consider important in predicting the outcomes. These include the employment status of the individual, whether the workplace of an individual has changed during the reference week, whether or not COVID-19 has had an impact on observations’ ability to meet financial obligations or essential needs, and whether the individual fears losing their job in the upcoming four weeks.

As per Appendix Table A2, we use an ordered probit to maintain the structure of the scales for these outcomes and omit any individuals who report “Not Stated.”

Table 5 shows the results of our ordered probit regressions when having observations’ perceived mental health as the outcome variable.²¹ Column (1) includes unemployed

²¹Appendix Table A10 relies on the dependent variable “Perceived Health” instead of “Mental Health.” It shows that those who were employed with absence unrelated to COVID-19 or those who were unemployed reported lower perceived health. This contrasts with those who missed work due to COVID-19, who, on average, have no difference in perceived health. Last, those who have financial concerns are

individuals while columns (2) and (3) use only those who are reported as employed by the CPSS.

We first describe the relationship between our socioeconomic variables and mental health. We see that females and young people report lower mental health scores. Older individuals also report lower mental health status. Turning to immigration status, when including unemployed individuals our results indicate that immigrants report higher mental health status than Canadian born. When restricting to employed individuals only, we are unable to detect a difference between the two groups. Last, we find that employed individuals who have less than a high school education report lower mental health status while we find no difference compared to more educated workers when including unemployed individuals.

We now turn to our main results for the CPSS. Column (1) of Table 5 shows that only those who missed work during the reference week for reasons unrelated to COVID-19 demonstrated lower perceived mental health when compared to those who were at work for at least a part of the reference week. Those who missed work due to COVID-19 or were unemployed showed no difference in perceived mental health. This result is surprising and suggest that workers absent from work because of COVID-19, those unemployed and those working may all, on average, suffer equally from the pandemic.

Column (2) indicates that compared to those who continued to work outside of home, mental health is unaffected for those who transition to working from home. Moreover, those whose work was previously done from home report no differences in mental health status compared to those who continued to work outside of home. Column (3) shows that those who agreed that COVID-19 had major, moderate, or minor impacts on their ability to meet financial responsibilities or essential needs have slightly lower perceived mental health.

Table 6 examines the effects of COVID-19 on the ability of individuals to meet their financial responsibilities, as in columns (1) – (3), or how they fear losing their job, as in columns (4) – (6). Females do not seem to differ from males in how COVID impacts their financial concerns but do express less fear of losing their job. Immigrants, across all models, show that COVID-19 is impacting their ability to meet financial responsibilities and essential needs and are more likely than Canadian-born to fear losing their job in the next four weeks. Individuals with less than high school are not as impacted in meeting their financial obligations but are more concerned with losing their job compared to those with more than high school education.

Estimates in column (2) suggest that those who are employed but absent due to COVID-19 report being concerned for meeting their financial obligations in comparison to individuals working outside the home. Similarly, estimates in column (5) show that this group is significantly more likely to answer that they fear losing their job than individuals likely to report lower health.

working.

Column (3) indicates that those who previously worked from home and those who were absent from work are more concerned with meeting their financial obligations than those who remain working outside of home. The estimated effect is particularly large for those absent from work. Column (6) shows that those who are absent from work are more likely to be concerned with losing their job while those who transition from working outside the home to from home are not as concerned with job loss.

To sum up, we find that individuals who felt that COVID-19 impacted their ability to meet financial needs had worse mental health; those who were unemployed, absent from work because of COVID-19, and those who continued working had similar mental health; and those who transition to work from home do not report worse mental health than those who continued to work outside of home.

6 Conclusion

In this paper, we document the short-term consequences of COVID-19 on labour market and mental health outcomes in Canada. Our results show that COVID-19 had a drastic impact on the labour market, with the largest effect on younger and less educated workers, suggesting that COVID-19 may increase inequality in the short run. We investigate whether the economic consequences of this pandemic were larger for certain occupations. To do so, we build four indexes: workers relatively more exposed to disease, workers that work in proximity to coworkers, essential workers, and workers who can easily work remotely. Our estimates suggest that the labour market impacts of the pandemic were more severe for workers more exposed to disease and workers that work in proximity to coworkers, while the effects are significantly less severe for essential workers and workers that can more easily work remotely.

We also use the Canadian Perspective Survey to investigate the effect of COVID-19 on reported mental health and financial concerns in Canada. The CPSS allows us to understand some of the channels through which the COVID-19 pandemic might affect individuals and its differential impacts across subgroups. Our results suggest that those who indicate being absent from work due to COVID-19 are more likely to express fear over meeting financial obligations and losing their job. Additionally, we find that women, workers with less than high school education, and immigrants are particularly adversely affected.

It is important for policy makers to understand the trade-offs between disease prevention, employment and health. As many governments look to help displaced and affected workers, these findings highlight some of those most in need of assistance. It is more than just traditional labour market outcomes which should be the target of future policies. Our results suggest that policies should continue to address the present concerns about wors-

ening mental health, precarious expectations about work, and inability to meet financial obligations and essential needs some individuals currently face. This paper attempts to get at these effects and describe the heterogeneity which exists in Canada.

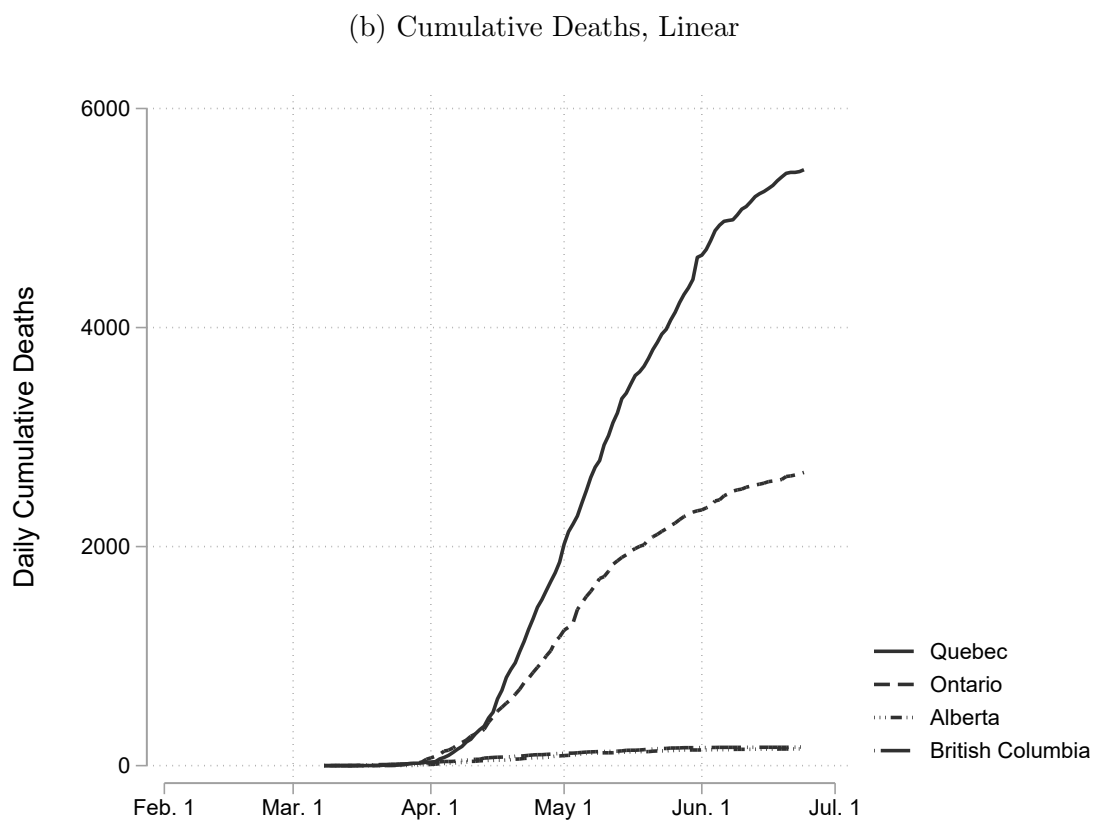
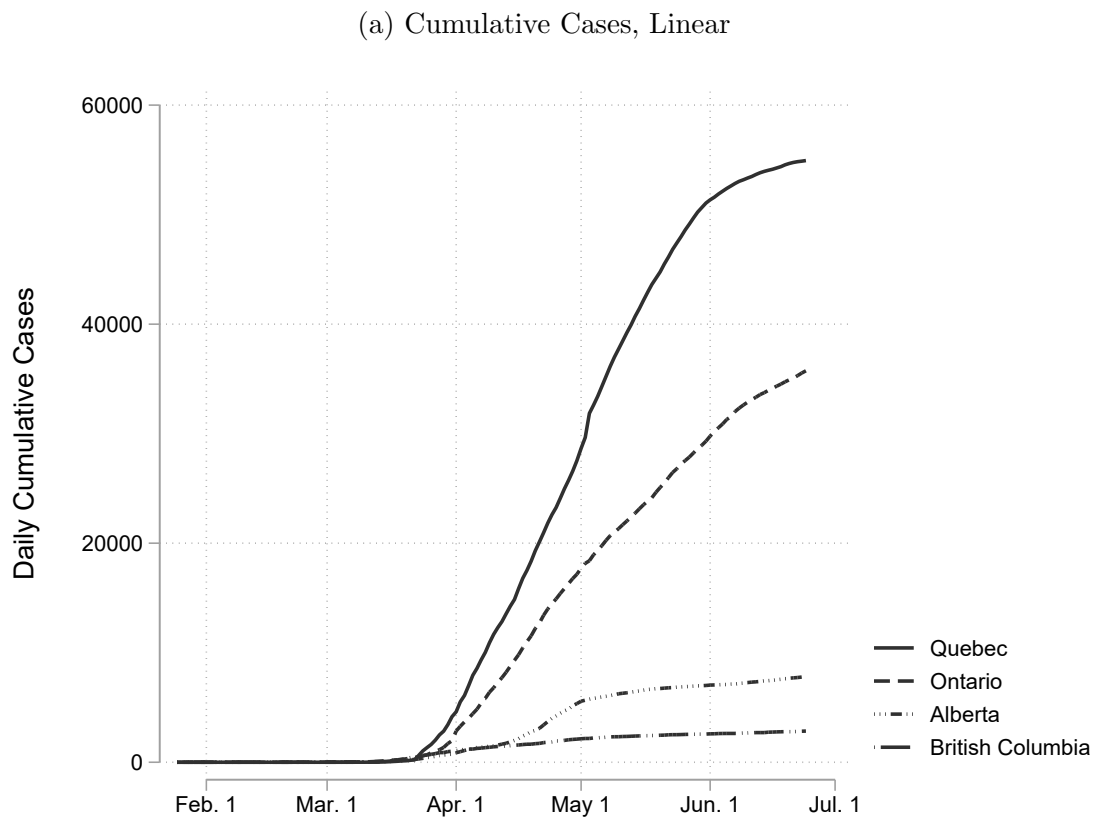
References

- Adams-Prassl, A., Boneva, T., Golin, M. and Rauh, C.: 2020, Inequality in the impact of the coronavirus shock: Evidence from real time surveys. CEPR Discussion Paper 14665.
- Alcaraz, K. I., Eddens, K. S., Blase, J. L., Diver, W. R., Patel, A. V., Teras, L. R., Stevens, V. L., Jacobs, E. J. and Gapstur, S. M.: 2019, Social isolation and mortality in US black and white men and women, *American Journal of Epidemiology* **188**(1), 102–109.
- Armbruster, S. and Klotzbücher, V.: 2020, Lost in lockdown? COVID-19, social distancing, and mental health in Germany. Diskussionsbeiträge 2020-04.
- Baker, M. G., Peckham, T. K. and Seixas, N. S.: 2020, Estimating the burden of United States workers exposed to infection or disease: A key factor in containing risk of COVID-19 infection, *medRxiv Preprint*.
- Beland, L.-P., Brodeur, A. and Wright, T.: 2020, COVID-19, stay-at-home orders and employment: Evidence from CPS data. IZA Discussion Paper 13282.
- Beland, L.-P., Fakorede, O. and Mikola, D.: 2020, The short-term effect of COVID-19 on self-employed in Canada, *Canadian Public Policy*.
- Berry, I., Soucy, J.-P. R., Tuite, A. and Fisman, D.: 2020, Open access epidemiologic data and an interactive dashboard to monitor the covid-19 outbreak in canada, *CMAJ* **192**(15), E420–E420.
- Brodeur, A., Clark, A. E., Flèche, S. and Powdthavee, N.: 2020, COVID-19, lockdowns and well-being: Evidence from Google Trends. IZA Discussion Paper 13204.
- Brodeur, A., Gray, D., Islam, A. and Bhuiyan, J.: 2020, A literature review of the economics of COVID-19. IZA Discussion Paper 13411.
- Carta, F. and Rizzica, L.: 2018, Early kindergarten, maternal labor supply and children’s outcomes: Evidence from Italy, *Journal of Public Economics* **158**(C), 79–102.
- Case, A. and Deaton, A.: 2015, Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century, *Proceedings of the National Academy of Sciences* **112**(49), 15078–15083.
- Coibion, O., Gorodnichenko, Y. and Weber, M.: 2020, The cost of the COVID-19 crisis: Lockdowns, macroeconomic expectations, and consumer spending. NBER Working Paper 27141.
- Currie, J. and Madrian, B. C.: 1999, Health, health insurance and the labor market, *Handbook of Labor Economics* **3**, 3309–3416.

- Dingel, J. I. and Neiman, B.: 2020, How many jobs can be done at home?
- Etheridge, B., Spantig, L. et al.: 2020, The gender gap in mental well-being during the COVID-19 outbreak: Evidence from the UK. Institute for Social and Economic Research 2020-08.
- Ettner, S. L., Frank, R. G. and Kessler, R. C.: 1997, The impact of psychiatric disorders on labor market outcomes, *ILR Review* **51**(1), 64–81.
- Frenette, M. and Frank, K.: 2018, Are Canadian jobs more or less skilled than American jobs? Statistics Canada, Analytical Studies Branch Research Paper Series, no. 406. catalogue no. 11F0019M. Ottawa.
- Garen, J.: 1988, Compensating wage differentials and the endogeneity of job riskiness, *Review of Economics and Statistics* **70**(1), 9–16.
- Goenka, A. and Liu, L.: 2012, Infectious diseases and endogenous fluctuations, *Economic Theory* **50**(1), 125–149.
- Hawkey, L. C. and Capitanio, J. P.: 2015, Perceived social isolation, evolutionary fitness and health outcomes: A lifespan approach, *Philosophical Transactions of the Royal Society B: Biological Sciences* **370**(1669), 20140114.
- Kirkey, S.: 2020, Coming undone: What COVID-19 pandemic policies have done to our psyche. National Post.
- Lemieux, T., Milligan, K., Schirle, T. and Skuterud, M.: 2020, Initial impacts of the COVID-19 pandemic on the Canadian labour market, *Canadian Public Policy*.
- Levine, R. and Rubinstein, Y.: 2017, Smart and illicit: Who becomes an entrepreneur and do they earn more?, *Quarterly Journal of Economics* **132**(2), 963–1018.
- Lewandowski, P.: 2020, Occupational exposure to contagion and the spread of COVID-19 in Europe. IZA Discussion Paper 13227.
- Müller, K.-U. and Wrohlich, K.: 2020, Does subsidized care for toddlers increase maternal labor supply? Evidence from a large-scale expansion of early childcare, *Labour Economics* **62**, 101776.
- Office of the Premier: 2020a, List of essential workplaces. Government of Ontario.
- Office of the Premier: 2020b, Ontario orders the mandatory closure of all non-essential workplaces to fight spread of COVID-19. Government of Ontario.
- Perreault, L., MacDonald, N. and Walsh, M.: 2020, Canada’s Chief Medical Officer Dr. Theresa Tam says government needs to ‘act now’ to contain coronavirus epidemic. The Globe and Mail.
- Rojas, F. L., Jiang, X., Montenegro, L., Simon, K. I., Weinberg, B. A. and Wing, C.: 2020, Is the cure worse than the problem itself? Immediate labor market effects of COVID-19 case rates and school closures in the US. NBER Working Paper 27127.
- Roodman, D., Nielsen, M. O., MacKinnon, J. G. and Webb, M. D.: 2019, Fast and wild: Bootstrap inference in Stata using boottest, *Stata Journal* **19**(1), 4–60.

- Smith, R. S.: 1979, Compensating wage differentials and public policy: A Review, *ILR Review* **32**(3), 339–352.
- Strauss, J. and Thomas, D.: 1998, Health, nutrition, and economic development, *Journal of Economic Literature* **36**(2), 766–817.
- Whalen, J.: 2020, 3M will import masks from China for U.S. to resolve dispute with Trump administration. Washington Post.

Figure 1: Cases and Deaths in Largest Four Provinces, Linear Scale.



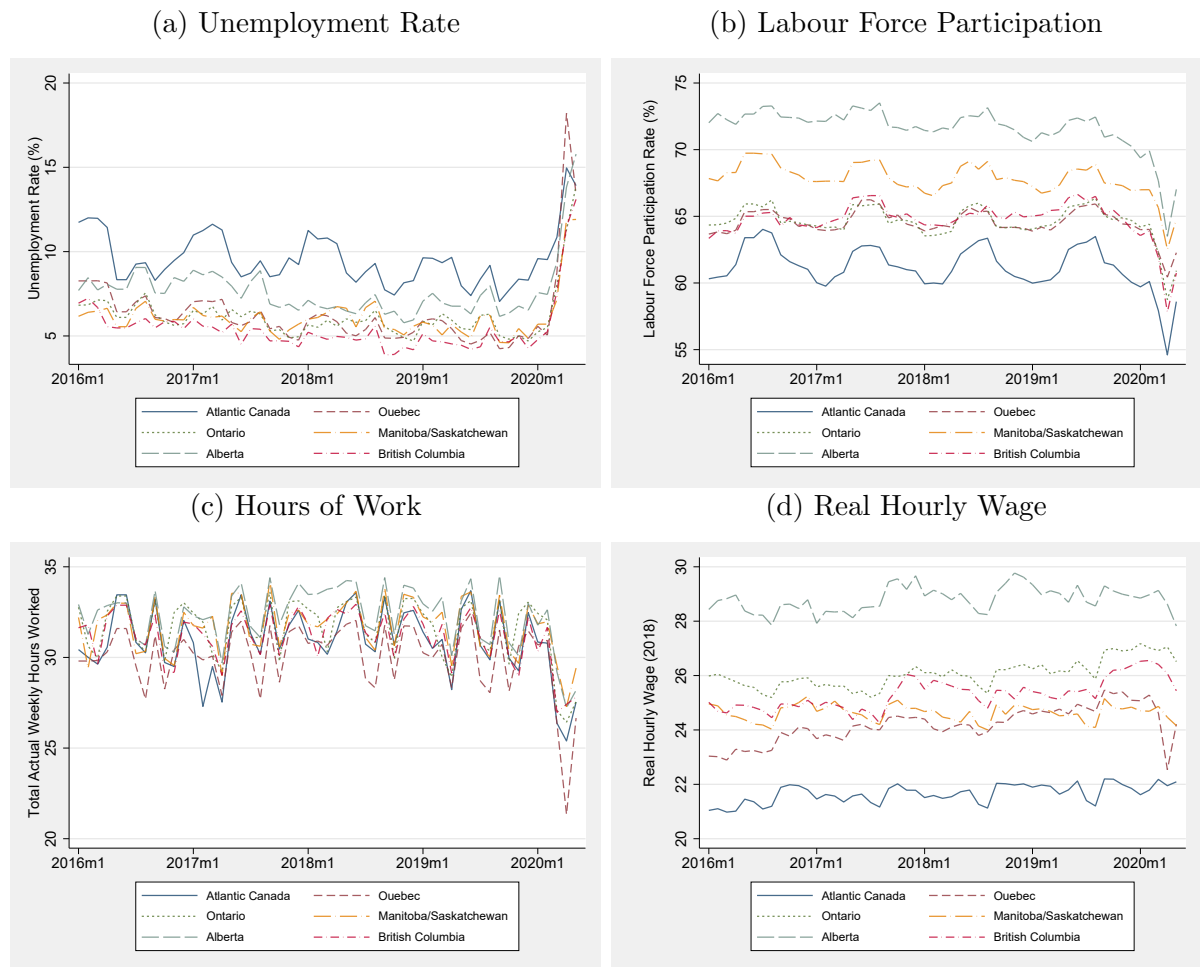
Authors' Calculations. Data from [Berry et al. \(2020\)](#).

Figure 2: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Canada.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate for Canada. Panel B plots the labour force participation for Canada. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for Canada. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for Canada. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Figure 3: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Canada by Provinces and Regions.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Atlantic Canada includes Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and New Brunswick. Panel A plots the unemployment rate for Canada's provinces and regions. Panel B plots the labour force participation for Canada's provinces and regions. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for Canada's provinces and regions. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for Canada's provinces and regions. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Figure 4: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Physical Proximity Index, by above or below median.



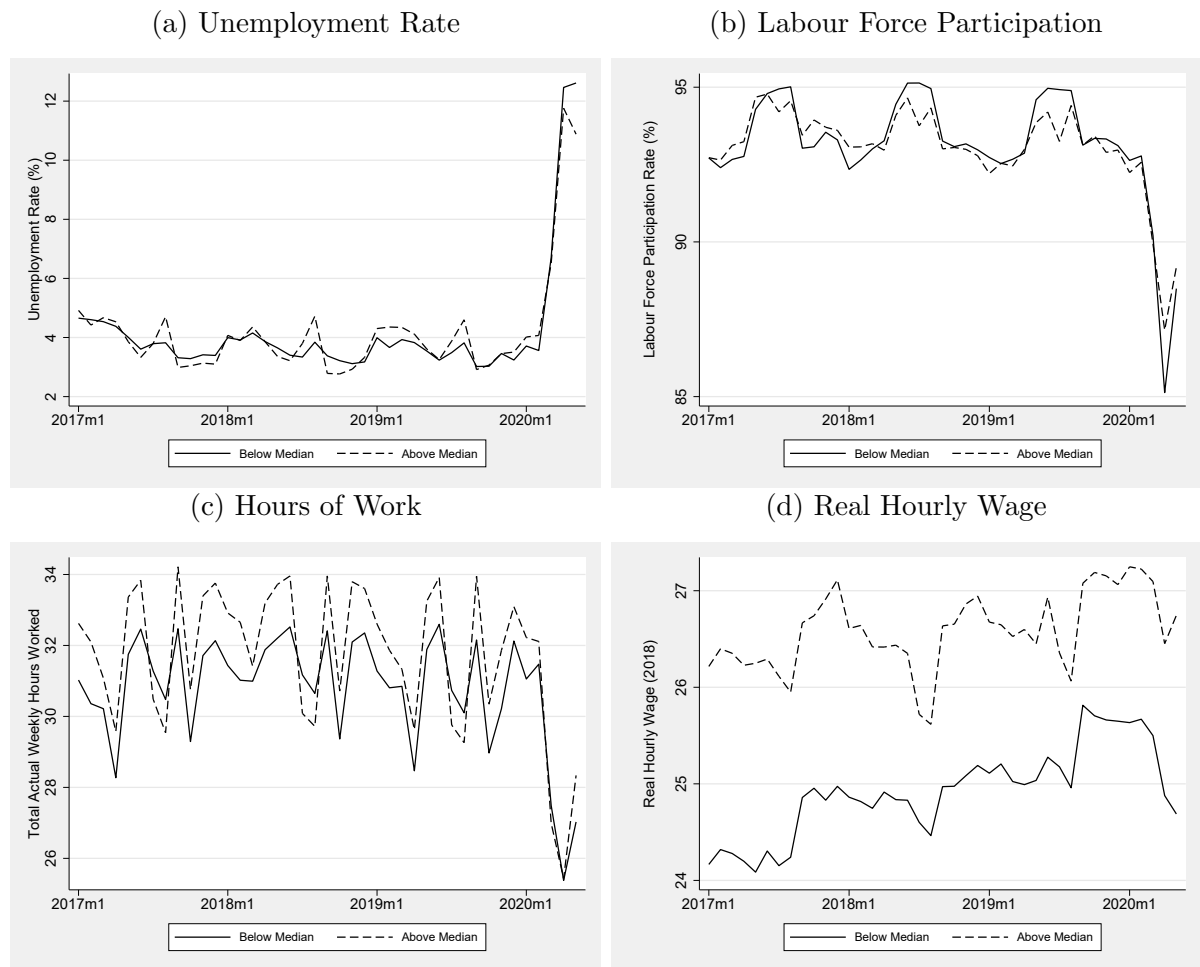
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate for those above and below the median index value for the physical proximity index. Panel B plots the labour force participation for those above and below the median index value for the physical proximity index. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for those above and below the median index value for the physical proximity index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for those above and below the median index value for the physical proximity index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Figure 5: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Exposure to Disease Index, by above or below median.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate for those above and below the median index value for the exposure to disease index. Panel B plots the labour force participation for those above and below the median index value for the exposure to disease index.. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for those above and below the median index value for the exposure to disease index.. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for those above and below the median index value for the exposure to disease index.. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Figure 6: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Critical Workers Index, by above or below median.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate for those above and below the median index value for the critical workers index. Panel B plots the labour force participation for those above and below the median index value for the critical workers index. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for those above and below the median index value for the critical workers index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for those above and below the median index value for the critical workers index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Figure 7: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Work from Home Index, by above or below median.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate for those above and below the median index value for the work from home index. Panel B plots the labour force participation for those above and below the median index value for the work from home index. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for those above and below the median index value for the work from home index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for those above and below the median index value for the work from home index. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero.

Table 1: Summary Statistics for Labour Market Outcomes

	Mean	Std. Dev.	Max.	Min.	Count
Unemployed	0.07	0.25	1.00	0.00	3417278
Labour Force Participation	0.64	0.48	1.00	0.00	5371251
Real Hourly Wage	24.82	14.30	193.62	0.00	2823336
Total Actual Weekly Hours Worked	31.20	17.26	99.00	0.00	2823336

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. Unemployed is a binary variable which equals one if an individual is unemployed and zero otherwise. Labour force participation is a binary variable which equals one if an individual is in the labour force and zero otherwise. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Real hourly wage (January 2018, provincial) includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Total actual hours worked across all jobs includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a wage value of zero.

Table 2: COVID-19 and Labour Market Outcomes, Canadian, National-Level

	Unemployment			Labour Force Participation		
	(1)	(2)	(3)	(4)	(5)	(6)
Post COVID	0.0627 (0.0064)	0.0636 (0.0062)	0.0638 (0.0062)	-0.0388 (0.0033)	-0.0395 (0.0034)	-0.0396 (0.0034)
<i>Bootstrapped p-value</i>	[.009]	[.009]	[.009]	[.003]	[.003]	[.003]
<i>Multiway p-value</i>	{.003}	{.002}	{.002}	{.001}	{.000}	{.001}
Observations	3417278	3417278	3417278	5371251	5371251	5371251
	Real Hourly Wage			Total Actual Weekly Hours Worked		
	(1)	(2)	(3)	(4)	(5)	(6)
Post COVID	-0.454 (0.2771)	-0.645 (0.2373)	-0.695 (0.2482)	-4.688 (0.4454)	-4.793 (0.4280)	-4.817 (0.4292)
<i>Bootstrapped p-value</i>	[.080]	[.060]	[.051]	[.007]	[.006]	[.006]
<i>Multiway p-value</i>	{.073}	{.010}	{.027}	{.000}	{.000}	{.000}
Observations	2823336	2823336	2823336	2823336	2823336	2823336
Indv. Char.		✓	✓		✓	✓
Educ.			✓			✓
Prov. FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓
Prov. X Year FE			✓			✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors clustered by province are in parentheses. Bootstrapped p-values are in brackets and are calculated clustering on province using 999 repetitions. Multiway p-values are reported in braces, clustering on province and month. In the top panel, columns 1–3, the dependent variable is a binary variable which equals one if an individual is unemployed and zero otherwise. In the top panel, columns 4–6, the dependent variable is a binary variable which equals one if an individual is in the labour force and zero otherwise. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. In the bottom panel, columns 1–3, the dependent variable is the real hourly wage (January 2018, provincial). This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. In the bottom panel, columns 4–6, the dependent variable is the total actual hours worked across all jobs. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a wage value of zero. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns contain fixed effects for Province, Year and Month, and are controlled for in all columns. Columns (2) and (5) augment fixed effects with individual characteristics which include categorical variables for sex, marital status and ages. Columns (3) and (6) augments fixed effects and individual characteristics with a categorical variable for highest educational attainment.

Table 3: The Impacts of COVID-19: Proximity, Exposure, Critical Workers and Work from Home Indexes, Unemployed and Labour Force Participation

	Proximity	Exposure	Unemployed Critical Worker	Work from Home
Post COVID	0.0675 (0.0071)	0.0664 (0.0070)	0.0664 (0.0070)	0.0694 (0.0070)
Index	0.000673 (0.0003)	-0.00383 (0.0005)	0.000855 (0.0005)	-0.00599 (0.0012)
Post COVID \times Index	0.0125 (0.0013)	-0.00377 (0.0011)	-0.00233 (0.0023)	-0.0219 (0.0013)
Observations	2572973	2572973	2572973	2572973
Labour Force Participation				
Post COVID	-0.0516 (0.0050)	-0.0509 (0.0048)	-0.0506 (0.0047)	-0.0523 (0.0050)
Index	-0.00333 (0.0007)	-0.000107 (0.0006)	0.000694 (0.0004)	0.00269 (0.0009)
Post COVID \times Index	-0.0137 (0.0025)	-0.00112 (0.0013)	0.00408 (0.0017)	0.0149 (0.0013)
Observations	2774924	2774924	2774924	2774924
Indv. Char.	✓	✓	✓	✓
Educ.	✓	✓	✓	✓
Prov. FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Month FE	✓	✓	✓	✓
Prov. \times Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors are clustered by province. Panels vary by outcome measure used while columns vary by index measure used. In the top panel, the dependent variable is a binary variable which equals one if an individual is unemployed and zero otherwise. In the bottom panel, the dependent variable is a binary variable which equals one if an individual is in the labour force and zero otherwise. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. Columns 1–4 vary based on the index used. All indexes are standardized. In columns 1 and 2, the “physical proximity to others” and “exposure to infection and disease” indexes are used, respectively. In columns 3 – 4, the “critical worker” and “work from home” indexes are used, respectively. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province \times year, year and month.

Table 4: The Impacts of COVID-19: Proximity, Exposure, Critical Workers and Work from Home Indexes, Real Hourly Wage and Hours of Work

	Real Hourly Wage			
	Proximity	Exposure	Critical Worker	Work from Home
Post COVID	-0.744 (0.2196)	-0.678 (0.2302)	-0.680 (0.2280)	-0.843 (0.2169)
Index	-1.965 (0.1867)	-0.102 (0.1031)	-0.216 (0.0602)	3.544 (0.2359)
Post COVID \times Index	-0.411 (0.0765)	0.0449 (0.1255)	-0.0878 (0.1803)	0.721 (0.1135)
Observations	2173327	2173327	2173327	2173327
Total Actual Weekly Hours Worked				
Post COVID	-4.687 (0.4339)	-4.585 (0.4394)	-4.599 (0.4400)	-4.772 (0.4268)
Index	-1.212 (0.0381)	-0.895 (0.0542)	0.0936 (0.0503)	0.304 (0.0659)
Post COVID \times Index	-1.264 (0.1260)	-0.0517 (0.1658)	-0.505 (0.2391)	1.649 (0.2185)
Observations	2173327	2173327	2173327	2173327
Indv. Char.	✓	✓	✓	✓
Educ.	✓	✓	✓	✓
Prov. FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Month FE	✓	✓	✓	✓
Prov. \times Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors are clustered by province. Panels vary by outcome measure used while columns vary by index measure used. In the top panel the dependent variable is the real hourly wage (January 2018, provincial). This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. In the bottom panel, the dependent variable is the total actual hours worked across all jobs. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. Columns 1–4 vary based on the index used. All indexes are standardized. In columns 1 and 2, the “physical proximity to others” and “exposure to infection and disease” indexes are used, respectively. In columns 3 – 4, the “critical worker” and “work from home” indexes are used, respectively. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province \times year, year and month.

Table 5: Perceived Mental Health, Employment, Work from home, and Stressors, Ordered Probit, Canadian, National-Level

	Perceived Mental Health		
	(1)	(2)	(3)
Female	-0.220 (0.060)	-0.187 (0.067)	-0.202 (0.067)
Married or common-law	0.218 (0.058)	0.207 (0.072)	0.194 (0.071)
15 to 34	-0.506 (0.082)	-0.429 (0.090)	-0.492 (0.089)
45 to 55	-0.437 (0.066)	-0.358 (0.076)	-0.410 (0.077)
Less than high school	0.0669 (0.124)	-0.380 (0.186)	-0.365 (0.178)
High school diploma or equivalent	-0.171 (0.066)	-0.0607 (0.086)	-0.0863 (0.088)
Immigrant	0.167 (0.073)	0.114 (0.090)	0.118 (0.087)
Employed but absent, not COVID	-0.338 (0.131)		
Employed but absent due to COVID	-0.00276 (0.085)		
Unemployed	-0.0987 (0.075)		
Changed from outside home to home		-0.0497 (0.076)	
Work remains at home		0.129 (0.118)	
Absent from work		-0.114 (0.089)	
Impact on financial obligations			-0.112 (0.065)
Might lose job			-0.0686 (0.070)
Observations	4509	2691	2741

Notes: Authors' calculations. Data from the Canadian Perspectives Survey Series. All regressions are estimated using an ordered probit, with weights applied and robust standard errors. The dependent variable in columns 1–3 is a ranking of perceived mental health, ranging from 5 (Excellent), 4 (Very Good), 3 (Good), 2 (Fair), 1 (Poor). All explanatory variables are dummy variables. The base category across all columns is male, single or widowed or separated or divorced, over 55 years old, has above a high school education, and was born in Canada. We omit any observations who respond “Not Stated” to the dependent variable. Observations decrease in columns (2), (3), because our subsample are only those observations which are employed. Columns (1) has explanatory variables that are demographic variables and indicators for labour force status. The omitted category in columns (1) from employment status is “Employed and at work, at least part of the week”. Columns (2) has explanatory variables that are demographic variables with indicators for where observations are working. The omitted category in columns (2) is if someone continues to working outside the home. Columns (3) has explanatory variables that are demographic variables with two indicator variables. The first, Impact on financial obligations, equals one if respondent’s answered “Major Impact” or “Impact” when asked if COVID-19 will impact their ability to meet financial obligations or essential needs. The second is variable, Might lose job, equals one if respondent’s answered “Strongly Agree” or “Agree” to if they felt they would lose their job in the next 4 weeks.

Table 6: Financial Responsibilities, Work Concerns, Employment Status and Work from Home, Ordered Probit, National

	Financial Concerns			Might Lose Job		
	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.0495 (0.054)	0.0877 (0.056)	0.0934 (0.064)	0.216 (0.058)	0.122 (0.064)	0.140 (0.064)
Married or common-law	0.0871 (0.058)	0.0884 (0.059)	0.0873 (0.072)	0.0106 (0.063)	0.176 (0.070)	0.170 (0.070)
15 to 34	-0.264 (0.067)	-0.277 (0.075)	-0.00941 (0.082)	-0.680 (0.075)	0.0642 (0.084)	0.0804 (0.083)
45 to 55	-0.306 (0.063)	-0.324 (0.071)	-0.0805 (0.081)	-0.957 (0.062)	-0.0417 (0.072)	-0.00676 (0.069)
Less than high school	0.234 (0.110)	0.266 (0.113)	0.208 (0.186)	0.573 (0.138)	-0.397 (0.173)	-0.378 (0.172)
High school diploma or equivalent	0.00686 (0.063)	0.00639 (0.063)	-0.115 (0.083)	0.201 (0.071)	-0.261 (0.085)	-0.193 (0.086)
Immigrant	-0.204 (0.069)	-0.168 (0.070)	-0.245 (0.091)	-0.0298 (0.071)	-0.238 (0.073)	-0.222 (0.074)
Employed but absent, not due to COVID		0.00228 (0.138)			0.0230 (0.138)	
Employed but absent due to COVID		-0.666 (0.124)			-0.849 (0.093)	
Unemployed		-0.0531 (0.067)				
Work changed from outside home to home			0.00828 (0.073)			0.190 (0.078)
Work remains at home			-0.281 (0.102)			-0.0452 (0.092)
Absent from work			-0.508 (0.102)			-0.554 (0.092)
Observations	4618	4574	2713	4605	2749	2711

Notes: Authors' calculations. Data from the Canadian Perspectives Survey Series. All regressions are estimated using an ordered probit, with weights applied and robust standard errors. The dependent variable in columns 1–3 is a ranking of the respondent's ability to meet financial obligations or essential needs. Values range from 1 (Major Impact), 2 (Moderate Impact), 3 (Minor Impact), 4 (No impact), 5 (Too soon to tell). The dependent variable in columns 4–6 is the response of the observation when asked to agree or disagree that they might lose their main job or self-employment income in the next four weeks. Values range from 1 (Strongly Agree), 2 (Agree), 3 (Neither Agree nor Disagree), 4 (Disagree), 5 (Strongly Disagree). All explanatory variables are indicator variables. The base category across all columns is male, single or widowed or separated or divorced, Over 55 years old, has above a high school education, and was born in Canada. We omit any observations who respond "Not Stated" to the dependent variable. Column (1) and (3) uses only basic demographic characteristics from the regression. Columns (2) and (5) augment the demographic variables with indicators where observations are working. The omitted category in columns (2) and (5) is if someone continues to working outside the home. Columns (3) and (6) augment the demographic variables with indicators where observations are working. The omitted category in columns (3) and (6) is if someone continues to working outside the home.

A1 Index Adaptations for the Labour Force Survey

The Canadian Labour Force Survey (LFS) tracks information for an individual’s occupation across the 40 major groups of Canada’s National Occupation Classification (NOC) system. This paper makes use of four different indexes and adapts them for the LFS, utilizing a cross-walk between the 2016 Canadian National Occupation Classification (NOC) with O*NET-SOC codes. After merging various datasets using our cross-walk, we aggregate the NOC’s 500 unit groups to NOC 40 major groups, weighting at successive aggregations by employment shares from Canada’s 2016 census. This aggregation allows us to merge the index measures with the LFS. At the end of the process, each observation in the LFS that has assigned to them an NOC 40 major groups, is given the weighted index value.

The challenge is to adapt indexes to the LFS. The cross-walk developed by Brookfield Institute for Innovation and Entrepreneurship makes matching Canadian NOC with American O*NET data feasible.²² The cross-walk is constructed such that at least one of every 500 unit groups (the smallest level of aggregation that the NOC system contains) is matched to at least one of the O*NET-SOC codes. This allows use to adapt indexes to the Canadian data, such as the physical proximity to other workers and disease exposure measures as in [Beland, Brodeur and Wright \(2020\)](#), the work from home index from O*NET used in [Dingel and Neiman \(2020\)](#), and the critical worker index from the LMI Institute.²³ For all four indexes, we merge the dataset based on the NOC-O*NET cross-walk. The physical proximity and exposure indexes from [Beland, Brodeur and Wright \(2020\)](#), and the work from home index from [Dingel and Neiman \(2020\)](#), match to 484 of 500 NOC unit groups. The critical worker index from LMI Institute matches to 446 NOC unit groups. The LMI match less well because they are using 7-digit SOC codes which are not as fine as O*NET-SOC codes. We will return to these missing values when we aggregate our 500 NOC unit groups.

For each NOC unit group, we take the (unweighted) average index score across all matched O*NET-SOC codes. This is because there may be multiple O*NET-SOC codes which map to a single NOC unit group. This leaves us with an average measure for each matched NOC unit groups. For example, since we had 484 successful matches from [Dingel and Neiman \(2020\)](#)’s work from home index, we will now have an unweighted average unit group for 484 NOC unit groups. In this case, that leaves 16 NOCs without an index measure.

We solve the missing value problem using the structure of the NOC and how it aggregates into coarser classifications. The NOC maps their 500 unit groups into 140 minor groups, and maps their 140 minor groups to 40 major groups. To solve the missing value problem,, we assign each unmatched unit group the *unweighted* average of their associated *minor* group. This unweighed average is the average of all other unit group members with known index values that belong to the same (more aggregate) minor group. We then construct the minor groups’ *weighted* average using each unit groups’ 2016 employment shares from Statistics Canada Table 98 – 400 – X2016271. This yields a complete list of weighted averages indexes for the 140 minor groups.²⁴ Doing this across all minor groups yields the weighted index for a minor group. From here, we construct an employment share weighted index average for the 40 major groups. We are able to merge our weighted

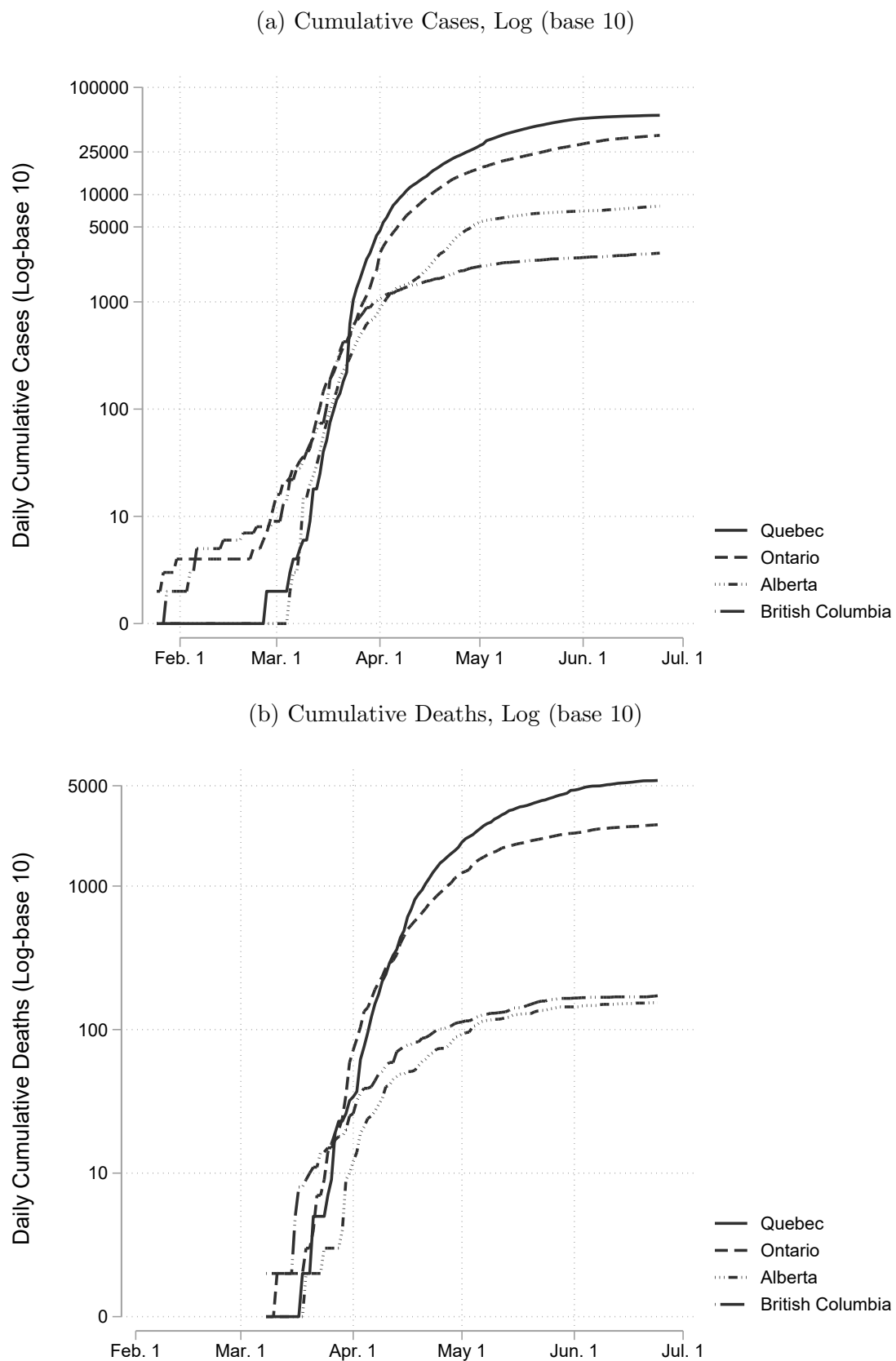
²²See https://github.com/BrookfieldIIE/NOC_ONet_Crosswalk.

²³See this link for more details: <https://www.lmiontheweb.org/more-than-half-of-u-s-workers-in-critical-occupations-in-the-fight-against-covid-19/>.

²⁴For example, suppose we have two unit groups (A and B) who make up minor group (AB), where A has an index value of 1, B has a missing value, and they both have 0.5 employment shares of AB. We do as follows: assign B a value of 1 as its index (the unweighted average from the known unit groups, A). Then we weight both A and B by their employment shares to construct the minor group index: in this case AB has an index value of 1 ($= 0.5 + 0.5$).

average index value to observations in the LFS that contain information on individuals' NOC major group.

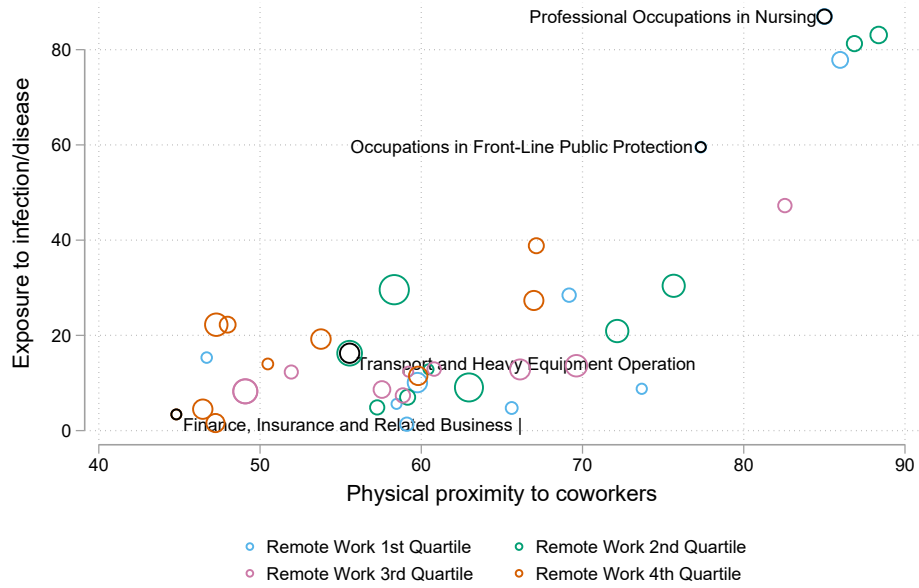
Figure A1: Cases and Deaths in Largest Four Provinces, Logarithmic Scale.



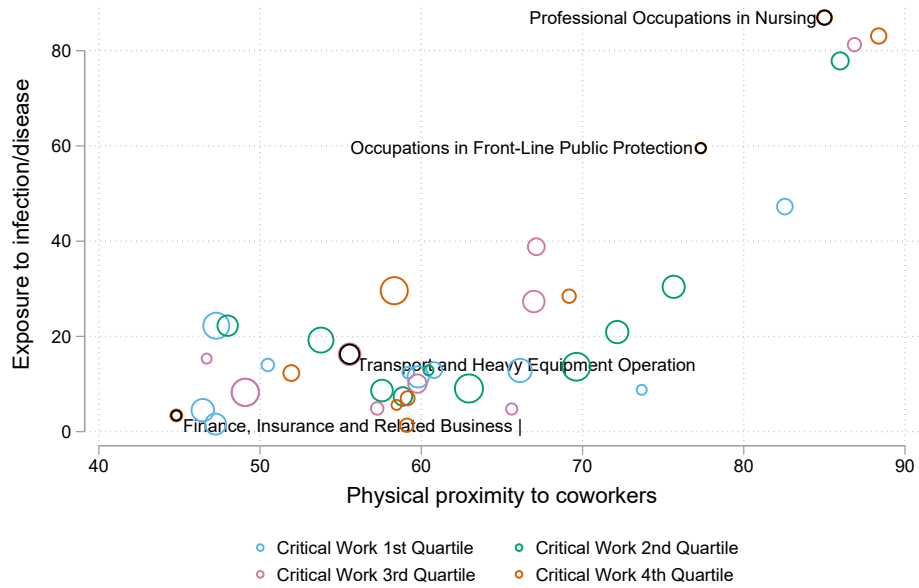
Authors' Calculations. Data from [Berry et al. \(2020\)](#).

Figure A2: Physical Proximity and Exposure to Disease Indexes by NOC Occupations.

(a) Physical Proximity, Exposure to Disease and Work from Home Indexes by Occupation

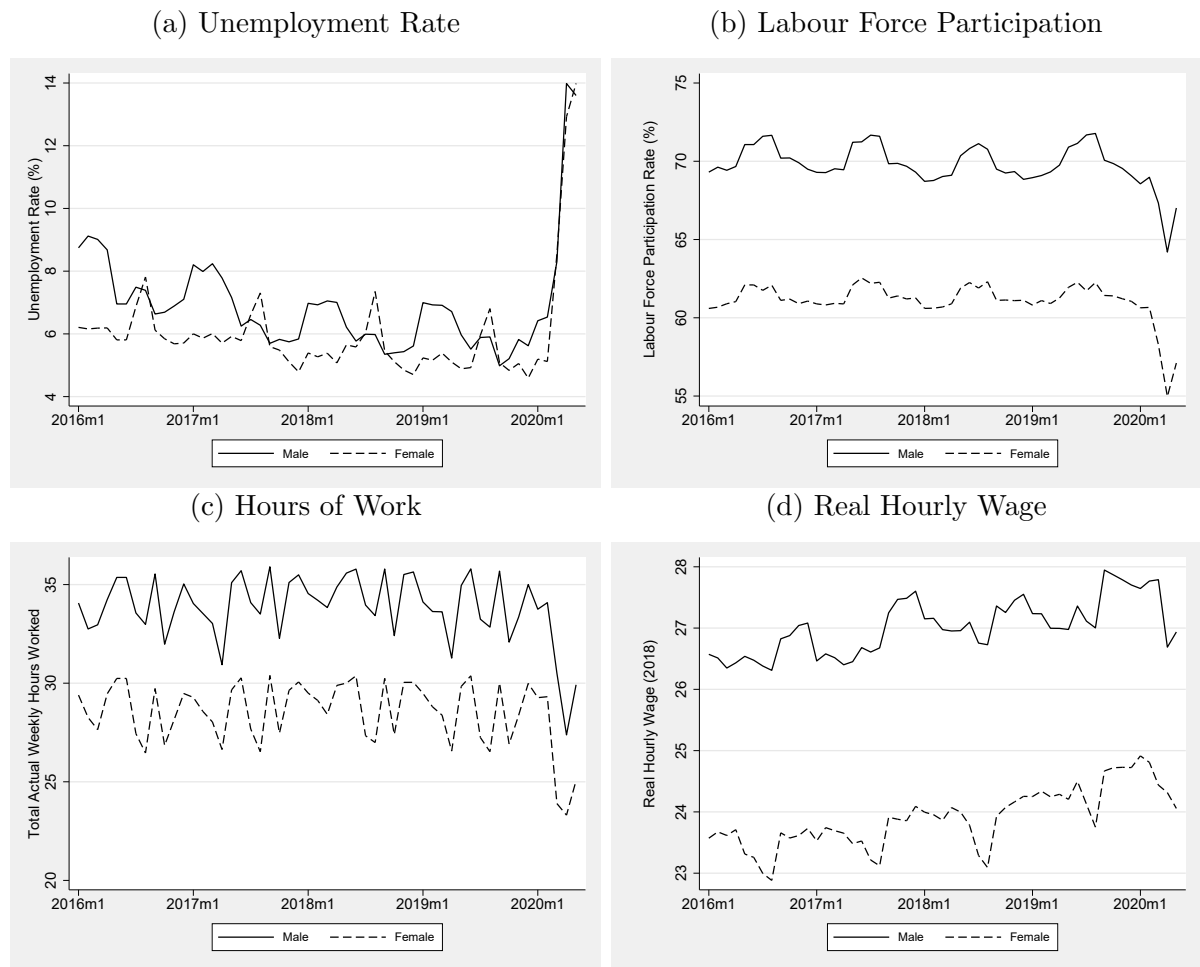


(b) Physical Proximity, Exposure to Disease and Critical Worker Indexes by Occupation



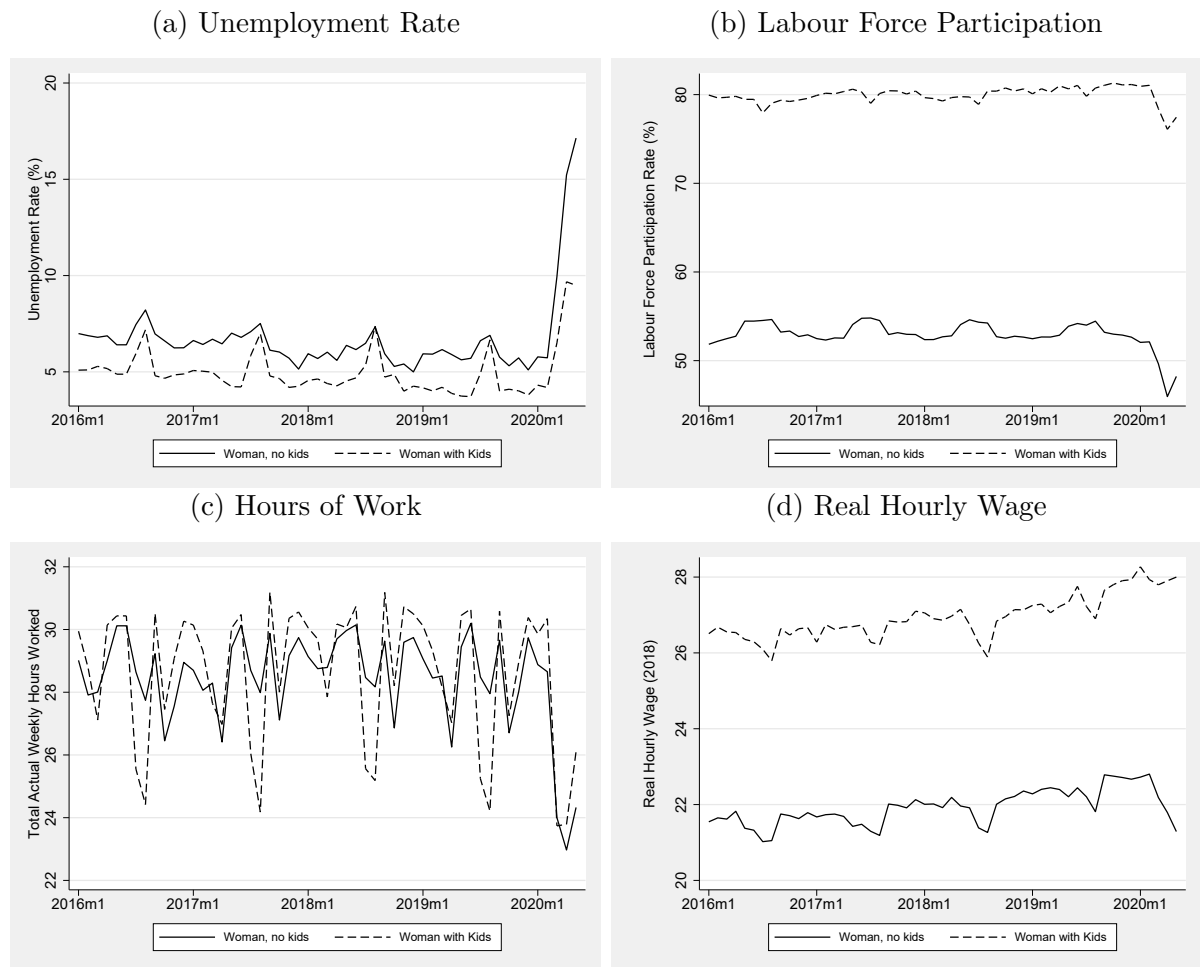
Each circle represents an occupation from the National Occupation Codes (2016). The size of each circle represents the number of LFS respondents employed in that occupation. The larger the circle, the greater the number of people employed in that occupation. Panels vary by index regarding the colour of the circle. In the top panel, the work from home index adopted from (Dingel and Neiman 2020) and applied to the LFS. The bottom panel adopts the critical worker index described by LMI Institute Index to the LFS. A detailed explanation can be found in our appendix on indexes. The x-axis plots each occupation's physical proximity to coworkers, measured by O*NET's index. The further to the right, the closer in proximity employees in that occupation work with their coworkers. The y-axis plots each occupation's exposure to infection and disease, also measured by O*NET's index. The further up, the more frequently employees in that occupation are exposed to infection and disease. The color of the circles corresponds to the quartile of each occupation in the remote work index we constructed. Occupations in the first quartile are more commonly done from home while those in the fourth quartile are not commonly done from home.

Figure A3: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Sex.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate by sex. Panel B plots the labour force participation by sex. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by sex. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual hourly wages (January 2018, provincial) by sex. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A4: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages for Women with and without Children.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate for women with and without children. Panel B plots the labour force participation for women with and without children. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked for women with and without children. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) for women with and without children. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A5: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Age Group.



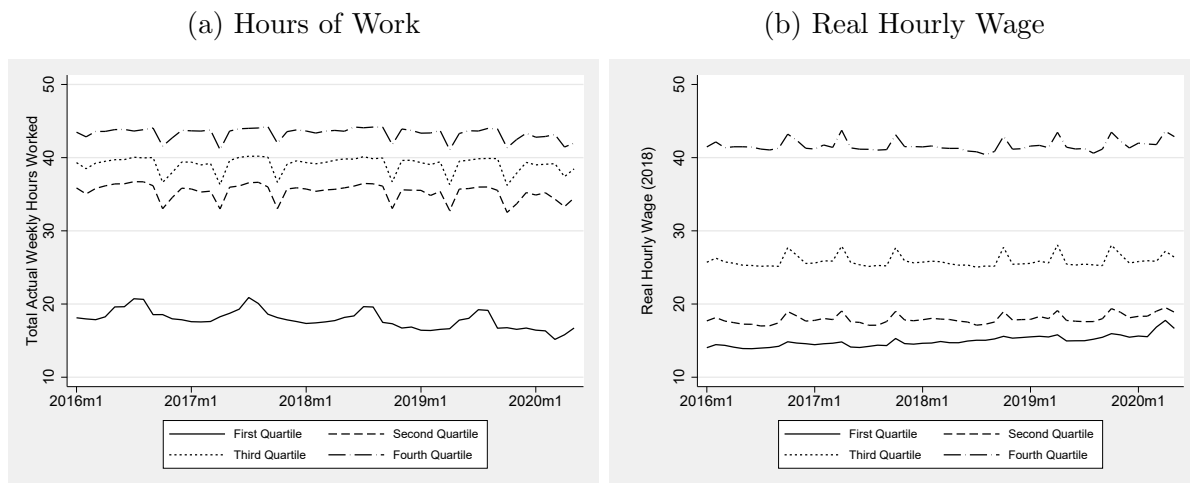
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate by age group. Panel B plots the labour force participation by age group. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by age group. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by age group. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A6: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Marital Status.



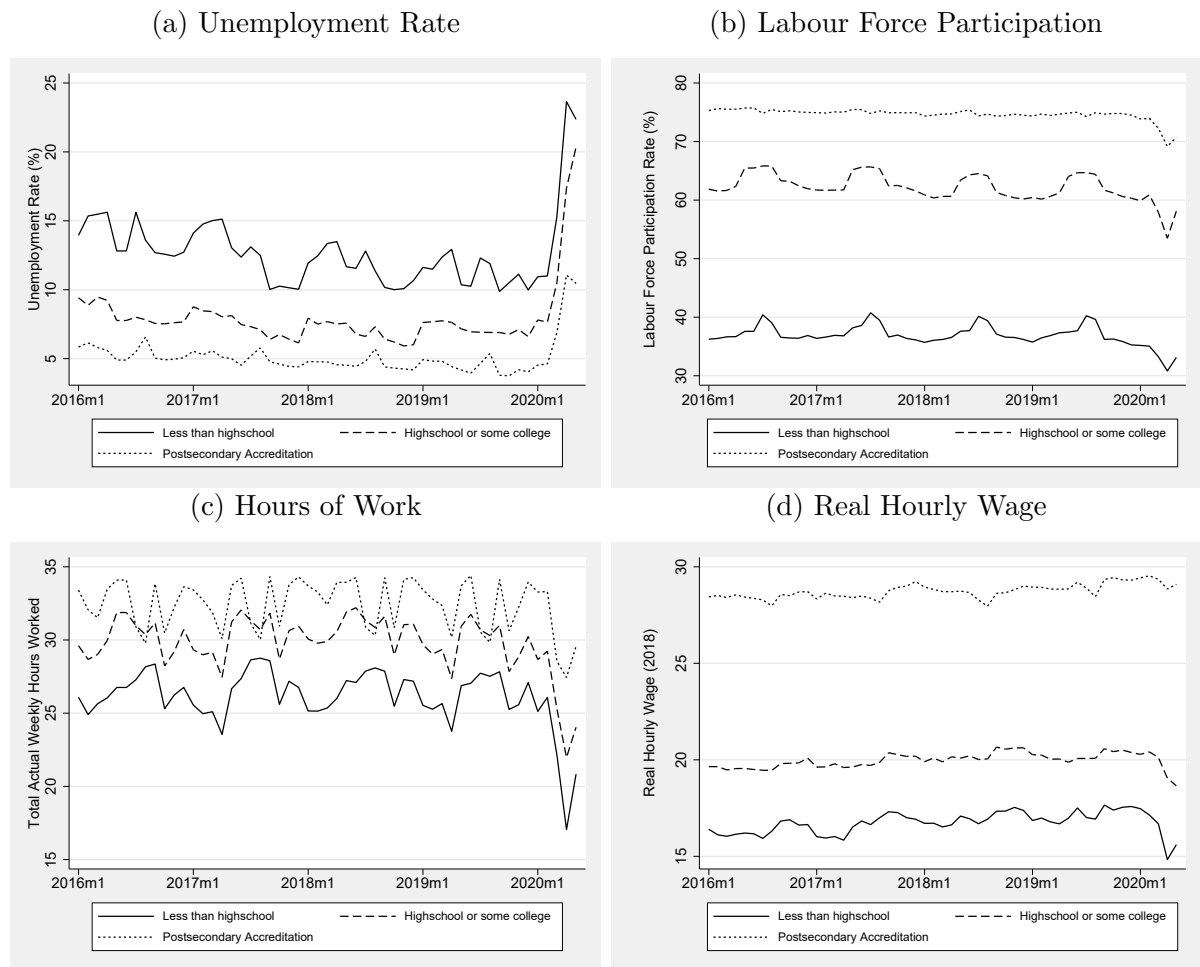
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate by marital status. Panel B plots the labour force participation by marital status. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by marital status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by sex. This includes individuals who were: civilian; 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A7: Hours of Work and Hourly Wages by Weekly Earnings Quartile.



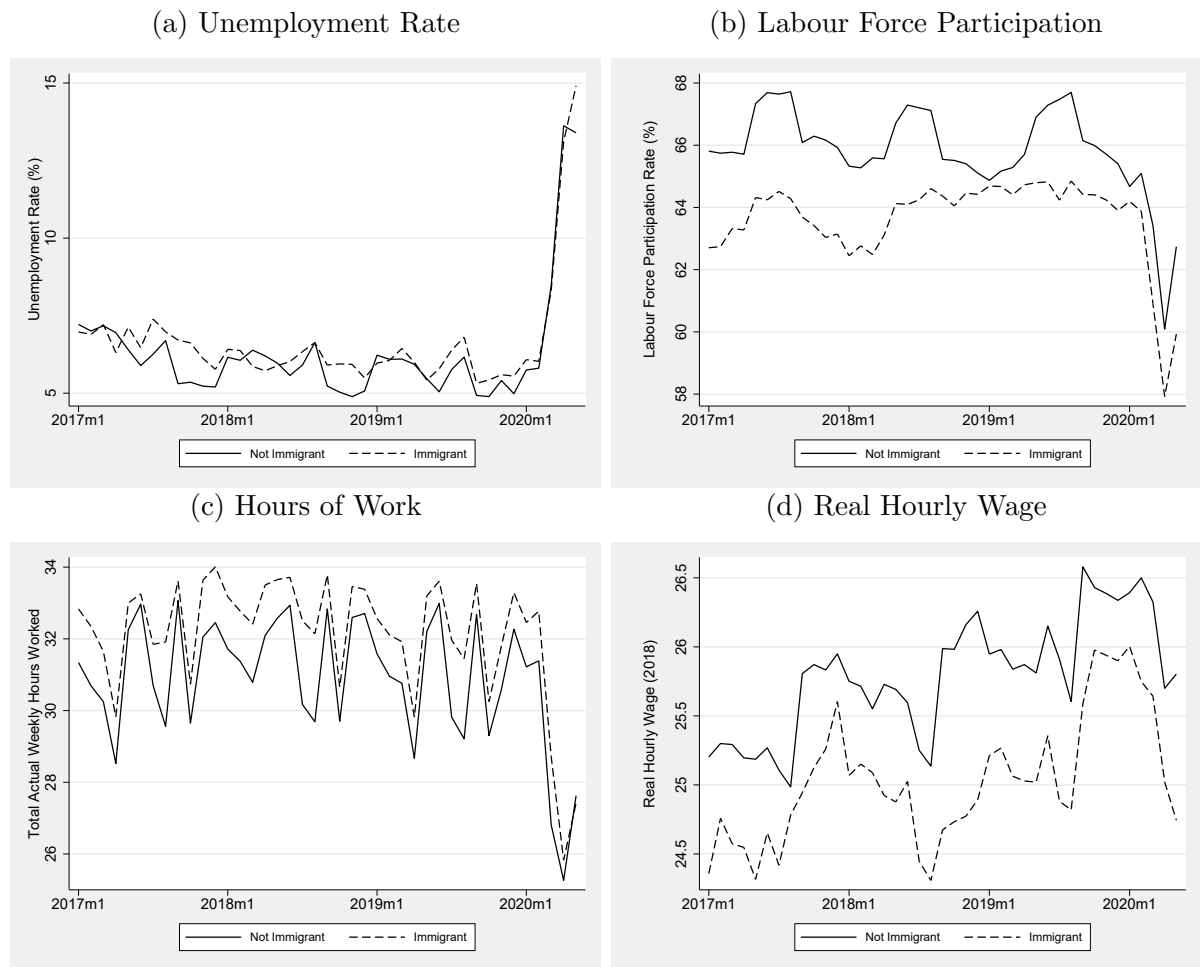
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the total actual hours worked by weekly earnings quartile. Weekly earnings is calculated as the real hourly wage (January 2018, provincial) multiplied by the total usual hours of worked in a week. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed earned zero income and were omitted. Panel B plots the usual hourly wages (January 2018, provincial) by weekly earnings quartile. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed earned zero income and were omitted.

Figure A8: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Education Status.



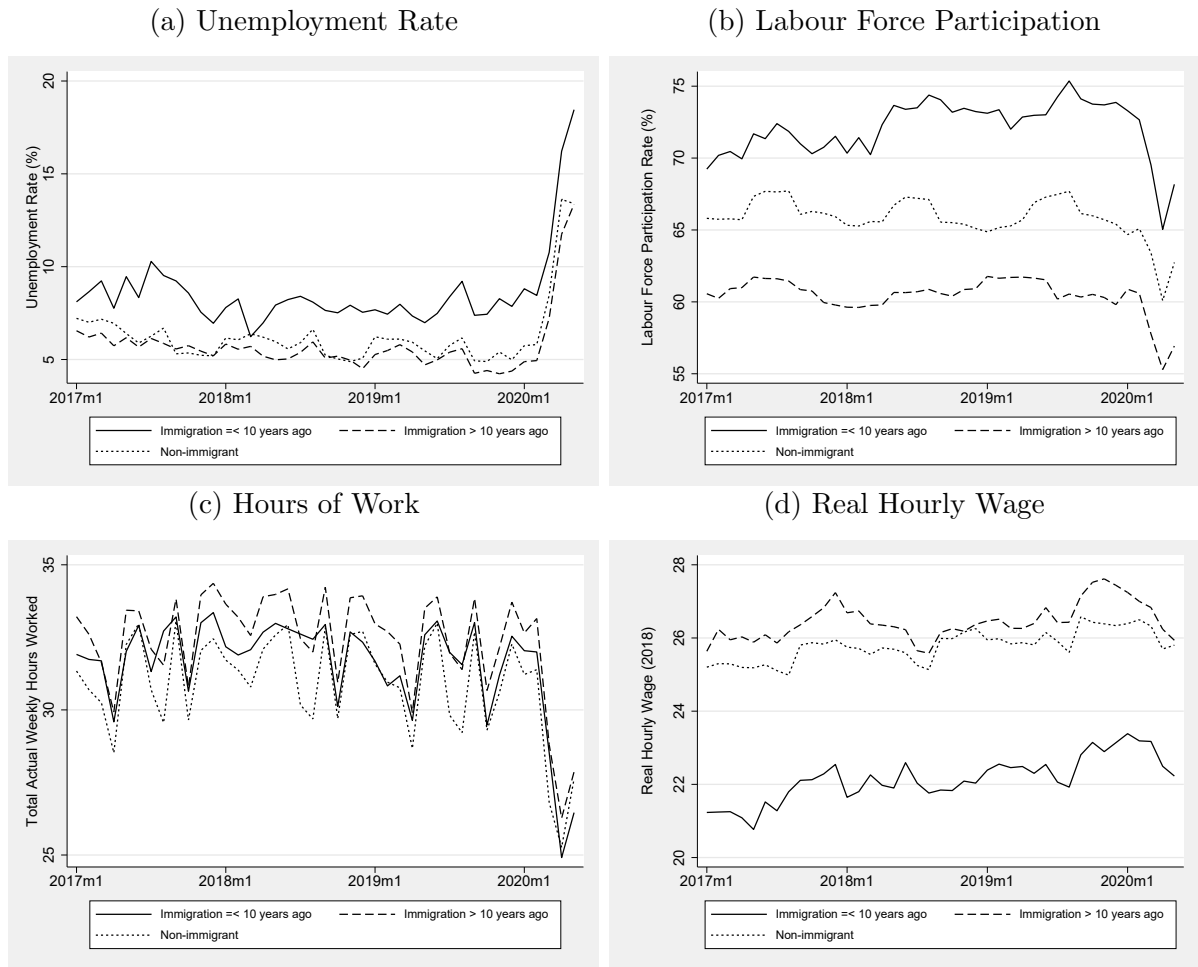
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate by education status. Panel B plots the labour force participation by education status. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by education status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by education status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A9: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Immigration Status.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate by immigrant status. Panel B plots the labour force participation by immigrant status. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by immigrant status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by immigrant status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A10: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Years Since Immigration.



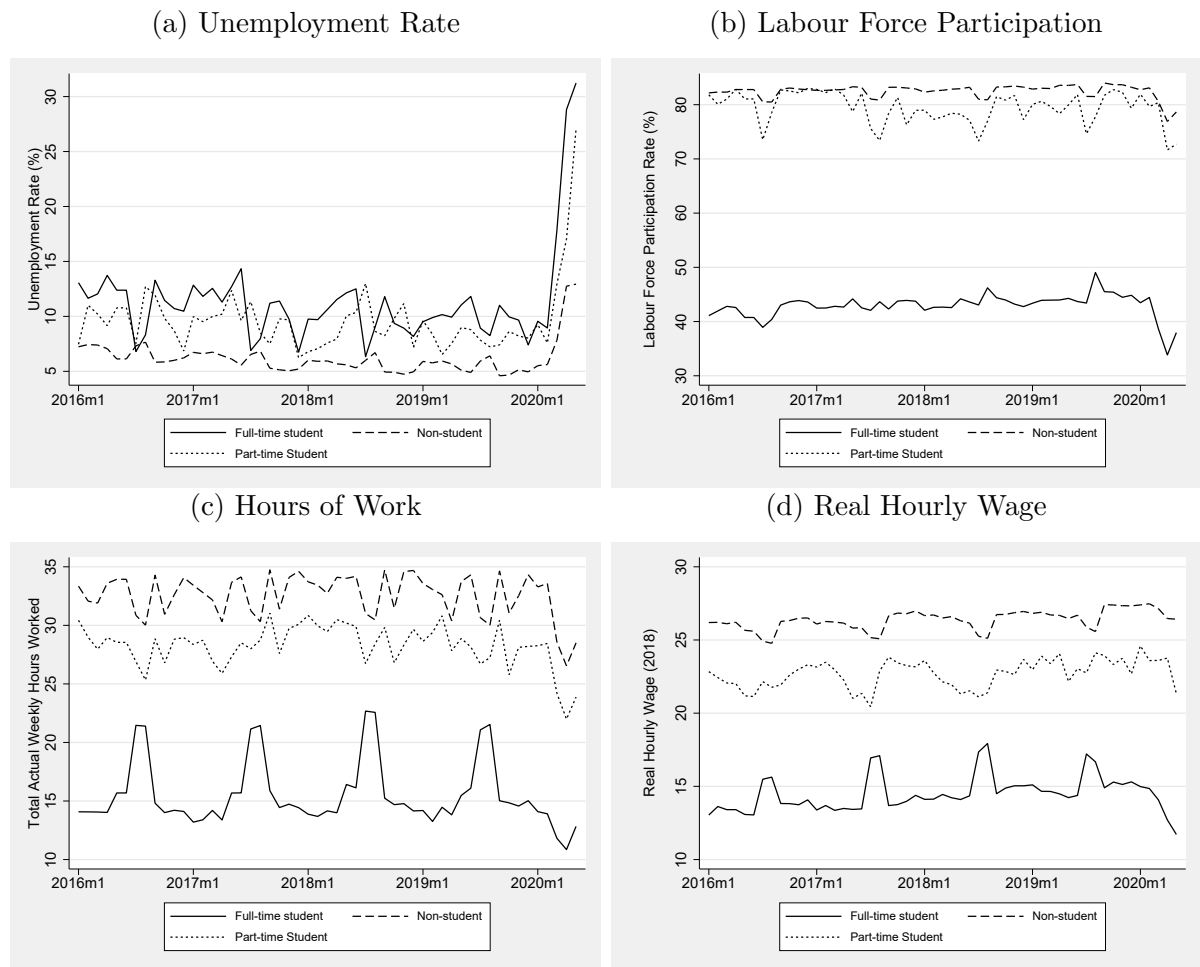
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2017 to May 2020. Panel A plots the unemployment rate by years since immigration. Panel B plots the labour force participation by years since immigration. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by years since immigration. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by years since immigration. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A11: Hours of Work and Hourly Wages by Full-Time or Part-Time Worker Status.



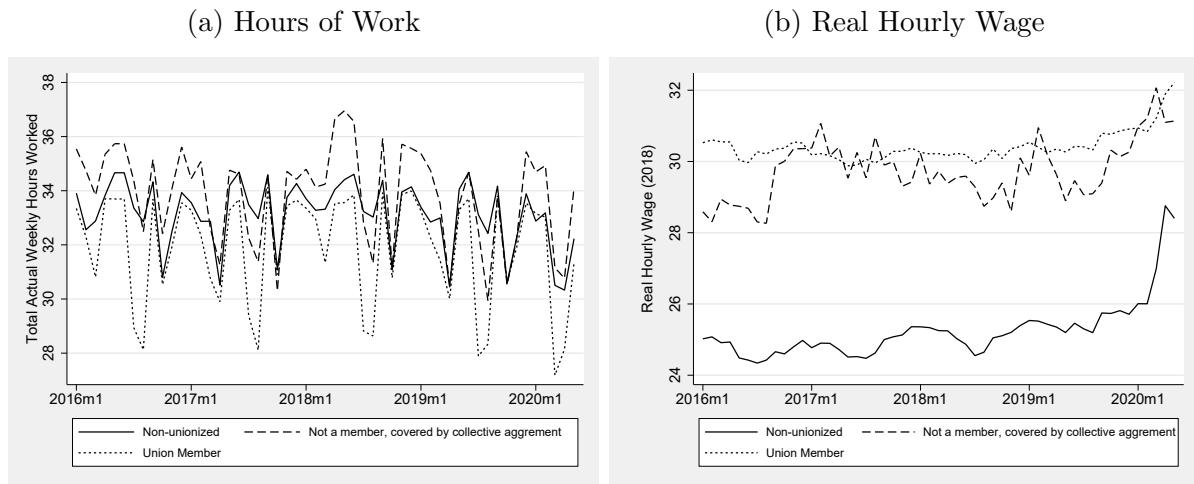
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the total actual hours worked by full-time or part-time worker status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel B plots the usual real hourly wages (January 2018, provincial) by full-time or part-time worker status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A12: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Full-Time or Part-Time Student Status.



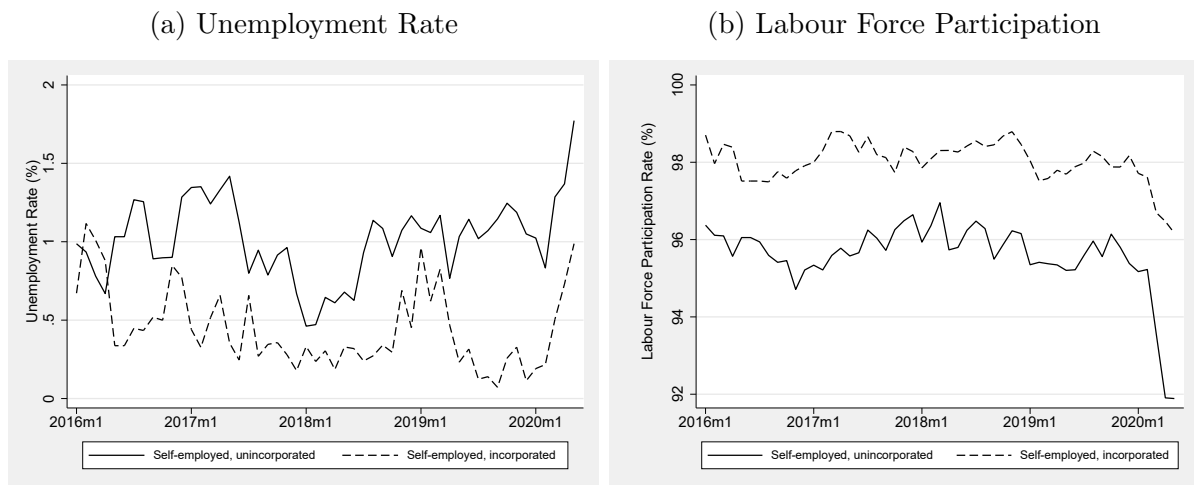
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate by full-time or part-time student status. Panel B plots the labour force participation by full-time or part-time student status. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by full-time or part-time student status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel D plots the usual real hourly wages (January 2018, provincial) by full-time or part-time student status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

Figure A13: Hours of Work and Hourly Wages by Union Status.



Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the total actual hours worked by full-time or part-time union status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero. Panel B plots the usual real hourly wages (January 2018, provincial) by union status. This includes individuals who were: civilian; aged 15–69 and in the labour force. Those who were unemployed were assigned a value of zero.

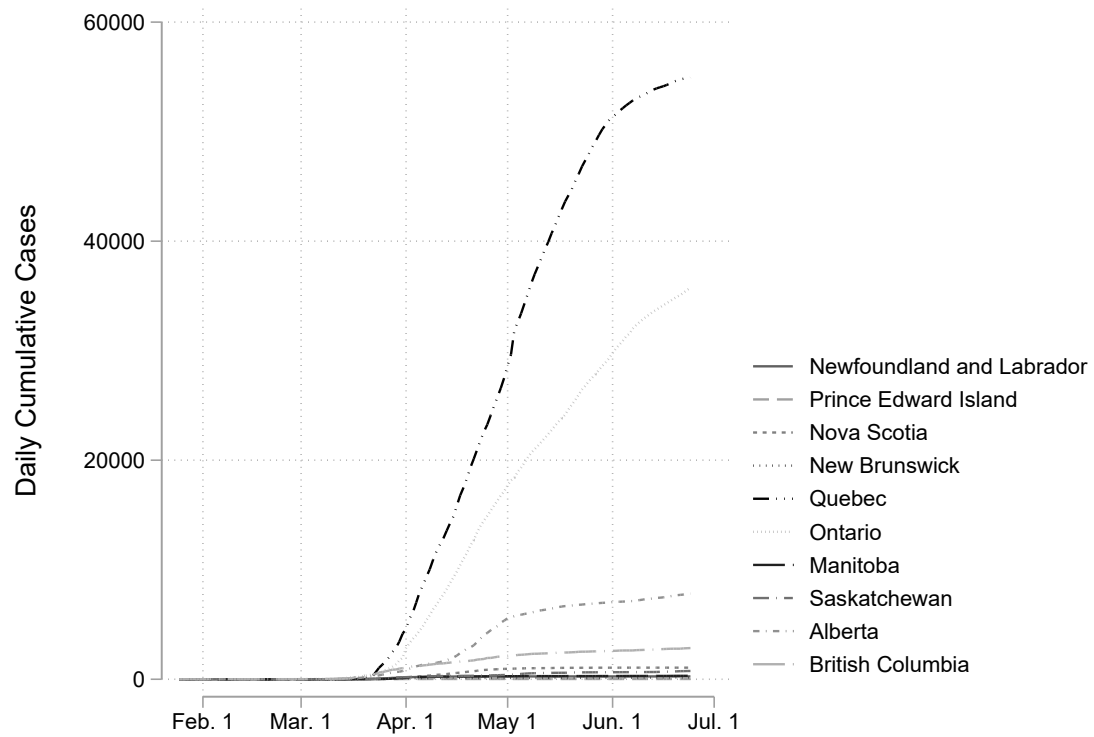
Figure A14: Unemployment Rate, Labour Force Participation, Hours of Work and Hourly Wages by Self-Employment Incorporated and Unincorporated.



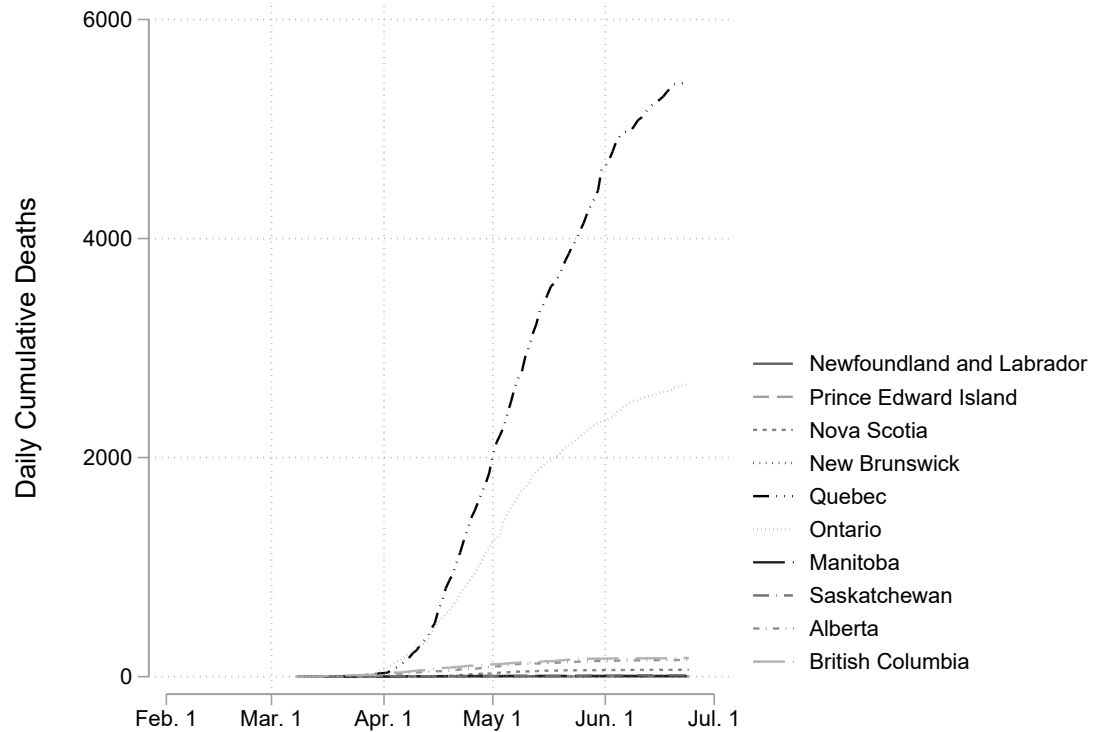
Notes: Authors' calculations. Data from the Canadian Labour Force Survey with final weights applied to all subgraphs. The time period is January 2016 to May 2020. Panel A plots the unemployment rate incorporated or unincorporated self-employment. Panel B plots the labour force participation by incorporated or unincorporated self-employment. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Panel C plots the total actual hours worked by incorporated or unincorporated self-employment. This includes individuals who were: civilian; aged 15–69; employed either at work and/or absent from work during the survey week; includes only those who were self-employed; were not self-employed; all jobs.

Figure A15: Cases and Deaths in All Provinces, Linear Scale.

(a) Cumulative Cases, Linear



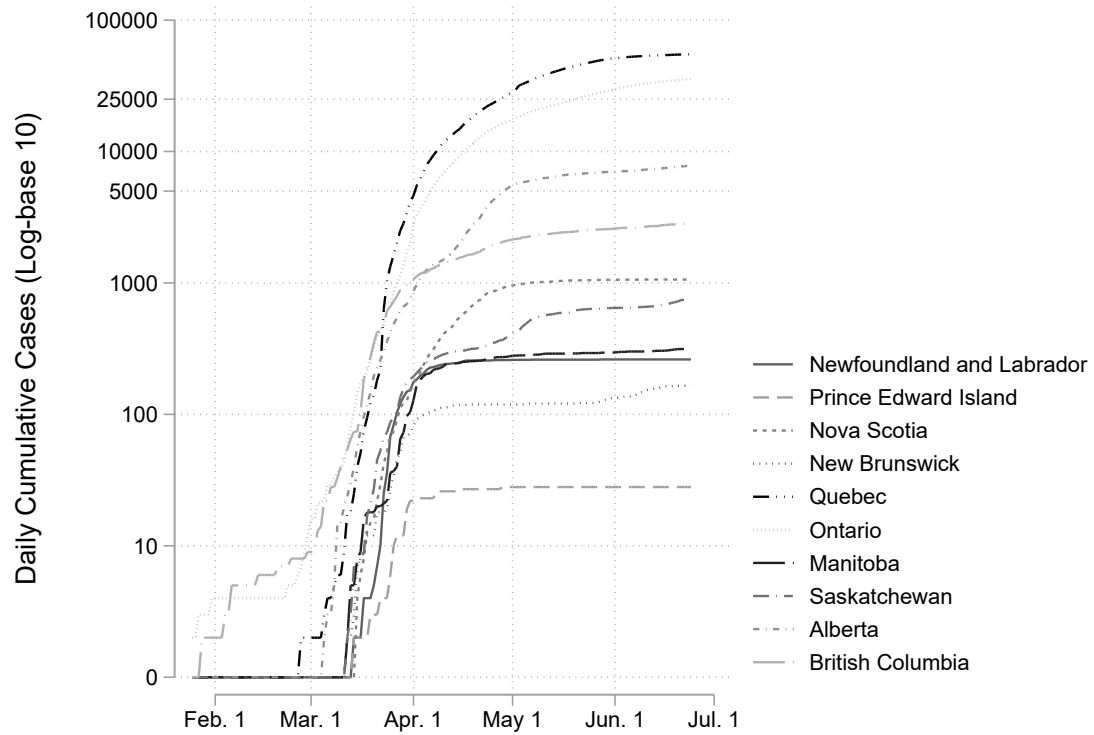
(b) Cumulative Deaths, Linear



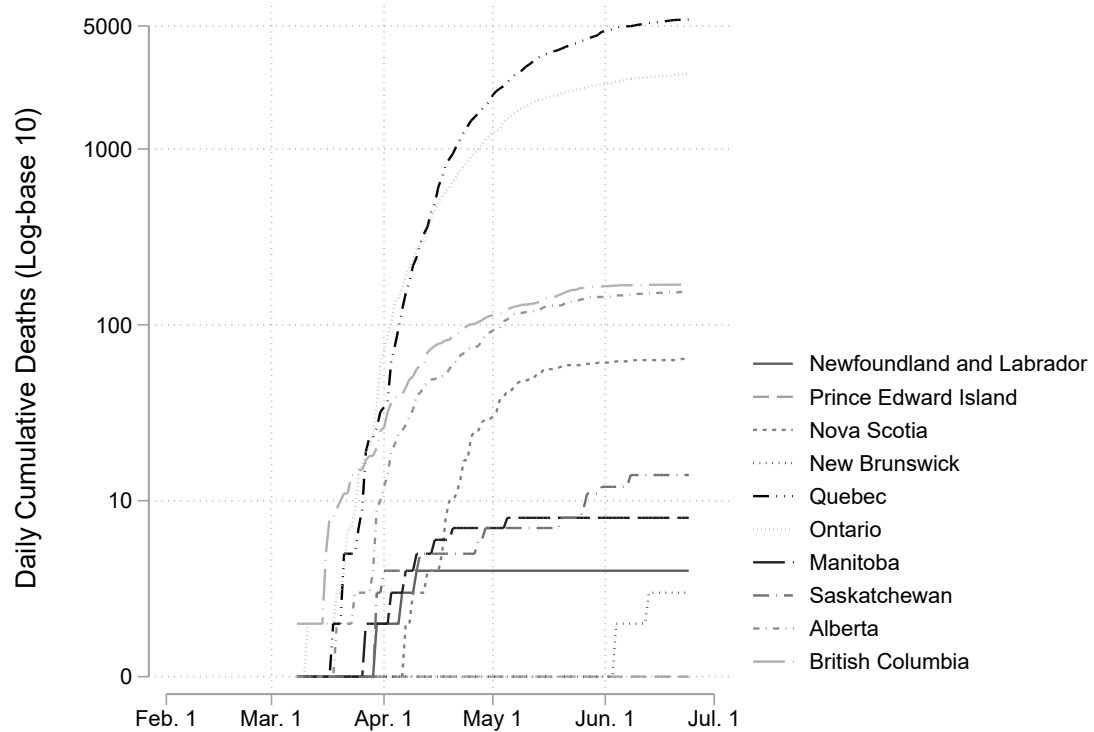
Authors' Calculations. Data from [Berry et al. \(2020\)](#).

Figure A16: Cases and Deaths in All Provinces, Logarithmic Scale.

(a) Cumulative Cases, Log (base 10)



(b) Cumulative Deaths, Log (base 10)



Authors' Calculations. Data from [Berry et al. \(2020\)](#).

Table A1: Major Dates for Policy Responses in Canada

Province	First Reported Case	First Death	Emergency Declared	School Closures
Newfoundland and Labrador	March 14, 2020	March 30, 2020	March 18, 2020	March 16, 2020 (Public)
Nova Scotia	March 15, 2020	April 7, 2020	March 22, 2020	March 23, 2020 (Public)*
Prince Edward Island	March 14, 2020	NONE	March 16, 2020	March 23, 2020 (Public)*
New Brunswick	March 12, 2020	NONE	March 19, 2020	March 16, 2020 (Public)
Quebec	February 27, 2020	March 18, 2020	March 14, 2020	March 13, 2020 (Public and Private)
Ontario	January 25, 2020	March 11, 2020	March 17, 2020	March 16, 2020 (Public)**
Manitoba	March 12, 2020	March 27, 2020	March 20, 2020	March 23, 2020 (Public)*
Saskatchewan	March 11, 2020	March 30, 2020	March 18, 2020	March 20, 2020 (Public)
Alberta	March 5, 2020	March 19, 2020	March 17, 2020	March 15, 2020 (All)
British Columbia	January 1, 2020	March 8, 2020	March 18, 2020	March 18, 2020 (All)

* means they were coming off of March Break. ** means they were also closed for March Break. Information contained was hand-collected from official provincial news releases via their websites or from Canadian media sources.

Table A2: Canadian Perspectives Survey Series Summary Statistics

	Employment Status Categories					
	Employed			Unemployed	Not Stated	Total
	At Work	Absent, Not Covid	Absent, COVID			
Perceived mental health						
Excellent	23.1	13.8	17.1	22.5	32.1	22.1
Very good	30.1	20.2	34.5	31.7	17.7	30.7
Good	29.3	38.3	29.2	25.3	12.9	27.7
Fair	12.8	15.0	14.7	14.6	0.0	13.6
Poor	3.4	10.1	3.0	3.4	11.2	3.7
Not stated	1.3	2.5	1.5	2.4	26.0	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
COVID-19 impacts ability meet financial obligations or essential needs						
Major impact	11.7	16.1	38.3	10.0	19.6	13.6
Moderate impact	15.0	18.2	20.8	13.4	43.4	15.4
Minor impact	17.8	10.3	11.3	15.2	2.0	15.7
No impact	32.8	24.6	8.9	35.9	18.1	31.5
Too soon to tell	22.7	30.7	20.8	25.3	15.6	23.8
Not stated	0.0	0.0	0.0	0.2	1.3	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Scale - I might lose main job or main self-empl income next 4 weeks						
Strongly agree	14.6	20.2	46.2	0.0	27.8	11.6
Agree	14.8	7.3	14.8	0.0	2.5	8.1
Neither agree nor disagree	18.2	24.3	17.6	0.0	9.2	10.6
Disagree	26.4	13.5	12.7	0.0	2.7	13.3
Strongly disagree	26.0	34.8	8.8	0.0	1.1	13.6
Valid skip	0.0	0.0	0.0	100.0	36.2	42.4
Not stated	0.1	0.0	0.0	0.0	20.5	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Data from the Canadian Perspectives Survey Series. Authors' percentages with weights applied. All regressions are estimated using an ordered probit, with weights applied and robust standard errors. The dependent variable in columns 1–3 is a ranking of perceived mental health, ranging from 5 (Excellent), 4 (Very Good), 3 (Good), 2 (Fair), 1 (Poor). All explanatory variables are dummy variables. The base category across all columns is male, single or widowed or separated or divorced, over 55 years old, has above a high school education, and was born in Canada. We omit any observations who respond "Not Stated" to the dependent variable. Observations decrease in columns (2), (3), because our subsample are only those observations which are employed. Columns (1) has explanatory variables that are demographic variables and indicators for labour force status. The omitted category in columns (1) form employment status is "Employed and at work, at least part of the week" Columns (2) has explanatory variables that are demographic variables with indicators for where observations are working. The omitted category in columns (2) is if someone continues to working outside the home. Columns (3) has explanatory variables that are demographic variables with two indicator variables. The first, Impact on financial obligations, equals one if respondents answered "Major Impact" or "Impact" when asked if COVID will impact their ability to meet financial obligations or essential needs. The second is variable, Might lose job, equals one if respondents answered "Strongly Agree" or "Agree" to if they felt they would lose their job in the next 4 weeks.

Table A3: COVID-19-related Layoffs and Absences

	Related Unemployed		
	(1)	(2)	(3)
Post COVID	0.259 (0.0107)	0.254 (0.0090)	0.254 (0.0098)
Observations	418878	418878	418878
Full Week Absence			
Post COVID	0.359 (0.0201)	0.352 (0.0197)	0.346 (0.0200)
Observations	281590	281590	281590
Part Week Absence			
Post COVID	0.133 (0.0510)	0.133 (0.0508)	0.138 (0.0494)
Observations	453519	453519	453519
Indv. Char.		✓	✓
Educ.			✓
Prov. FE	✓	✓	✓
Year FE	✓	✓	✓
Month FE	✓	✓	✓
Prov. X Year FE			✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors are clustered by province. In the top panel, the dependent variable is a binary variable which equals one if and unemployed individual said their reason for leaving work in the previous year was due to: (a) own illness or disability, or (b) being laid off. In the middle panel, the dependent variable is a binary variable which equals one if an employed individual reported a full week of absence during the reference week due to: (a) other reasons, or (b) own illness or disability. In the bottom panel, the dependent variable is a binary variable which equals one if an employed individual reported a part week of absence during the reference week due to: (a) other reasons, or (b) own illness or disability. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns contain fixed effects controlling for province, year and month. Column (2) augments the fixed effects with individual characteristics which include categorical variables for sex, marital status and ages. Column (3) augments the fixed effects and individual characteristics with a categorical variable for highest educational attainment.

Table A4: The Impacts of COVID-19: Heterogeneity and Unemployment

	Unemployed			
	(1)	(2)	(3)	(4)
Post COVID	0.0600 (0.007)	0.0796 (0.004)	0.0502 (0.009)	0.0514 (0.007)
Female	-0.00709 (0.003)	-0.00664 (0.003)	-0.00664 (0.003)	-0.00662 (0.003)
Married	-0.0265 (0.004)	-0.0247 (0.004)	-0.0264 (0.004)	-0.0265 (0.004)
15 to 34	0.0183 (0.005)	0.0183 (0.005)	0.0158 (0.005)	0.0184 (0.005)
35 to 54	-0.00265 (0.002)	-0.00265 (0.002)	-0.00228 (0.002)	-0.00260 (0.002)
Less than high school	0.0663 (0.004)	0.0664 (0.004)	0.0664 (0.004)	0.0646 (0.004)
High school or some college	0.0212 (0.002)	0.0212 (0.002)	0.0212 (0.002)	0.0190 (0.002)
Post COVID × Female	0.00808 (0.002)			
Post COVID × Married		-0.0328 (0.003)		
Post COVID × 15 to 34			0.0470 (0.006)	
Post COVID × 35 to 54			-0.00694 (0.006)	
Post COVID × Less than high school				0.0348 (0.005)
Post COVID × High school or some college				0.0406 (0.003)
Observations	3417278	3417278	3417278	3417278
Province, Year, Month FE	✓	✓	✓	✓
Prov. X Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. The dependent variable is a binary variable which equals one if an individual is unemployed and zero otherwise. Columns vary by models. Columns 1, 2, and 3, interact Post COVID with sex, marital status, and age group, respectively. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province × year, year and month.

Table A5: The Impacts of COVID-19: Heterogeneity and Labour Force Participation

	Labour Force Participation			
	(1)	(2)	(3)	(4)
Post COVID	-0.0359 (0.002)	-0.0529 (0.008)	-0.0253 (0.002)	-0.0336 (0.003)
Female	-0.0817 (0.006)	-0.0821 (0.006)	-0.0821 (0.006)	-0.0821 (0.006)
Married	0.0218 (0.013)	0.0202 (0.013)	0.0218 (0.013)	0.0218 (0.013)
15 to 34	0.380 (0.011)	0.380 (0.011)	0.383 (0.011)	0.380 (0.011)
35 to 54	0.443 (0.016)	0.443 (0.016)	0.444 (0.015)	0.443 (0.016)
Less than high school	-0.299 (0.016)	-0.299 (0.016)	-0.299 (0.016)	-0.298 (0.016)
High school or some college	-0.104 (0.012)	-0.104 (0.012)	-0.104 (0.012)	-0.103 (0.012)
Post COVID × Female	-0.00723 (0.003)			
Post COVID × Married		0.0279 (0.009)		
Post COVID × 15 to 34			-0.0373 (0.009)	
Post COVID × 35 to 54			-0.00880 (0.008)	
Post COVID × Less than high school				-0.00686 (0.007)
Post COVID × High school or some college				-0.0192 (0.006)
Observations	5371251	5371251	5371251	5371251
Province, Year, Month FE	✓	✓	✓	✓
Prov. X Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. The dependent variable is a binary variable which equals one if an individual is in the labour force and zero otherwise. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Columns vary by models. Columns 1, 2, and 3, interact Post COVID with sex, marital status, and age group, respectively. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province × year, year and month.

Table A6: The Impacts of COVID-19: Heterogeneity and Real Hourly Wage

	Real Hourly Wages			
	(1)	(2)	(3)	(4)
Post COVID	-0.792 (0.328)	-1.140 (0.171)	-1.182 (0.438)	-0.319 (0.247)
Female	-3.760 (0.318)	-3.749 (0.319)	-3.749 (0.319)	-3.749 (0.319)
Married	3.010 (0.499)	2.957 (0.496)	3.009 (0.499)	3.010 (0.499)
15 to 34	-4.509 (0.193)	-4.508 (0.193)	-4.514 (0.208)	-4.510 (0.193)
35 to 54	1.340 (0.176)	1.340 (0.176)	1.280 (0.169)	1.338 (0.176)
Less than high school	-10.75 (0.292)	-10.76 (0.292)	-10.75 (0.292)	-10.69 (0.296)
High school or some college	-7.894 (0.382)	-7.894 (0.382)	-7.893 (0.381)	-7.833 (0.388)
Post COVID × Female	0.200 (0.221)			
Post COVID × Married		0.971 (0.071)		
Post COVID × 15 to 34			0.0591 (0.365)	
Post COVID × 35 to 54			1.083 (0.307)	
Post COVID × Less than high school				-1.379 (0.156)
Post COVID × High school or some college				-1.135 (0.178)
Observations	2823336	2823336	2823336	2823336
Province, Year, Month FE	✓	✓	✓	✓
Prov. X Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. The dependent variable is the real hourly wage (January 2018, provincial). This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Columns vary by models. Columns 1, 2, and 3, interact Post COVID with sex, marital status, and age group, respectively. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province × year, year and month.

Table A7: The Impacts of COVID-19: Heterogeneity and total actual hours worked

	Total Actual Weekly Hours Worked			
	(1)	(2)	(3)	(4)
Post COVID	-4.894 (0.521)	-5.286 (0.306)	-4.471 (0.775)	-4.074 (0.470)
Female	-5.649 (0.179)	-5.641 (0.173)	-5.641 (0.173)	-5.642 (0.173)
Married	0.673 (0.067)	0.617 (0.065)	0.672 (0.067)	0.673 (0.066)
15 to 34	-1.575 (0.345)	-1.575 (0.345)	-1.512 (0.373)	-1.577 (0.346)
35 to 54	2.042 (0.237)	2.042 (0.237)	2.029 (0.236)	2.038 (0.237)
Less than high school	-6.074 (0.899)	-6.075 (0.899)	-6.075 (0.900)	-5.960 (0.896)
High school or some college	-2.426 (0.220)	-2.427 (0.220)	-2.426 (0.220)	-2.299 (0.215)
Post COVID × Female	0.158 (0.250)			
Post COVID × Married		1.021 (0.256)		
Post COVID × 15 to 34			-1.166 (0.648)	
Post COVID × 35 to 54			0.238 (0.371)	
Post COVID × Less than high school				-2.254 (0.345)
Post COVID × High school or some college				-2.389 (0.171)
Observations	2823336	2823336	2823336	2823336
Province, Year, Month FE	✓	✓	✓	✓
Prov. X Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. The dependent variable is the total actual hours worked across all jobs. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Columns vary by models. Columns 1, 2, and 3, interact Post COVID with sex, marital status, and age group, respectively. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province × year, year and month.

Table A8: The Impacts of COVID-19: Proximity, Exposure, Critical Workers and Work from Home Indexes, Unemployed and Labour Force Participation

	Proximity	Exposure	Unemployed Critical Worker	Work from Home
Post COVID	0.0522 (0.0049)	0.0549 (0.0066)	0.0705 (0.0083)	0.0805 (0.0074)
Index Dummy	0.00452 (0.0010)	0.00411 (0.0009)	0.000769 (0.0014)	-0.0116 (0.0023)
Post COVID \times Index Dummy	0.0309 (0.0047)	0.0231 (0.0022)	-0.00951 (0.0043)	-0.0233 (0.0046)
Observations	2572973	2572973	2572973	2572973
Labour Force Participation				
Post COVID	-0.0355 (0.0034)	-0.0335 (0.0035)	-0.0549 (0.0061)	-0.0583 (0.0046)
Index Dummy	-0.00844 (0.0014)	-0.0213 (0.0006)	-0.00247 (0.0006)	0.00457 (0.0018)
Post COVID \times Index Dummy	-0.0321 (0.0045)	-0.0335 (0.0045)	0.00965 (0.0034)	0.0126 (0.0029)
Observations	2774924	2774924	2774924	2774924
Indv. Char.	✓	✓	✓	✓
Educ.	✓	✓	✓	✓
Prov. FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Month FE	✓	✓	✓	✓
Prov. \times Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors are clustered by province. Panels vary by outcome measure used while columns vary by index measure used. In the top panel, columns 1–4, the dependent variable is a binary variable which equals one if an individual is unemployed and zero otherwise. In the bottom panel, columns 1–4, the dependent variable is a binary variable which equals one if an individual is in the labour force and zero otherwise. Individuals in the labour force were employed at work, employed but absent from work, or unemployed during the survey week. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. Columns 1–4 vary based on the index used. Index Dummy is a dummy variable which is one if the individual is in an occupation above the median index measure for the respective index. In columns 1 and 2, the “physical proximity to others” and “exposure to infection and disease” indexes are used, respectively. In columns 3 – 4, the “critical worker” and “work from home” indexes are used, respectively. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province \times year, year and month.

Table A9: The Impacts of COVID-19: Proximity, Exposure, Critical Workers and Work from Home Indexes, Real Hourly Wage and Hours of Work

	Real Hourly Wage			
	Proximity	Exposure	Critical Worker	Work from Home
Post COVID	-0.190 (0.1511)	-0.464 (0.2721)	-0.762 (0.3213)	-1.468 (0.1951)
Index Dummy	-2.456 (0.2561)	-3.954 (0.2587)	1.246 (0.0698)	4.715 (0.4056)
Post COVID \times Index Dummy	-1.120 (0.1646)	-0.487 (0.1566)	0.189 (0.2940)	1.283 (0.3092)
Observations	2173327	2173327	2173327	2173327
	Total Actual Weekly Hours Worked			
	Proximity	Exposure	Critical Worker	Work from Home
Post COVID	-3.237 (0.3736)	-3.664 (0.4869)	-4.330 (0.5344)	-6.151 (0.4188)
Index Dummy	-2.134 (0.1375)	-3.319 (0.1398)	0.538 (0.0981)	0.181 (0.1597)
Post COVID \times Index Dummy	-2.962 (0.1671)	-1.813 (0.2853)	-0.612 (0.4933)	2.647 (0.5060)
Observations	2173327	2173327	2173327	2173327
Indv. Char.	✓	✓	✓	✓
Educ.	✓	✓	✓	✓
Prov. FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Month FE	✓	✓	✓	✓
Prov. \times Year FE	✓	✓	✓	✓

Notes: Authors' calculations. Notes: Authors' calculations. Data from the Canadian Labour Force Survey. The time period is January 2016 to May 2020. All regressions are estimated using OLS, with weights applied. Standard errors are clustered by province. Panels vary by outcome measure used while columns vary by index measure used. In the top panel the dependent variable is the real hourly wage (January 2018, provincial). This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. In the bottom panel, the dependent variable is the total actual hours worked across all jobs. This includes individuals who were: civilian; aged 15–69; only public and private sector employees and in the labour force. Those who were unemployed were assigned a value of zero. Post COVID is a binary variable which equals one if the observation occurs during or after March 2020. Columns 1–4 vary based on the index used. Index Dummy is a dummy variable which is one if the individual is in an occupation above the median index measure for the respective index. In columns 1 and 2, the “physical proximity to others” and “exposure to infection and disease” indexes are used, respectively. In columns 3 – 4, the “critical worker” and “work from home” indexes are used, respectively. All columns control for individual characteristics (categorical variables for sex, marital status and ages), a categorical variable for highest educational attainment, and fixed effects for province, province \times year, year and month.

Table A10: Perceived Health, Employment, Work from home, and Stressors, Ordered Probit, Canadian, National-Level

	Perceived Health		
	(1)	(2)	(3)
Female	-0.0497 (0.057)	-0.0821 (0.066)	-0.0854 (0.064)
Married or common-law	0.104 (0.060)	0.0457 (0.071)	0.0415 (0.070)
15 to 34	0.450 (0.085)	0.268 (0.092)	0.229 (0.092)
45 to 55	0.144 (0.065)	0.0985 (0.079)	0.0805 (0.081)
Less than high school	-0.154 (0.121)	-0.354 (0.144)	-0.370 (0.149)
High school diploma or equivalent	-0.106 (0.062)	-0.0159 (0.087)	-0.00631 (0.085)
Immigrant	-0.0479 (0.068)	-0.0856 (0.080)	-0.0448 (0.080)
Employed but absent, not COVID	-0.435 (0.149)		
Employed but absent due to COVID	-0.103 (0.086)		
Unemployed	-0.170 (0.069)		
Work changed from outside home to home		0.00771 (0.077)	
Work remains at home		0.214 (0.107)	
Absent from work		-0.160 (0.092)	
Impact on financial obligations			-0.139 (0.069)
Might lose job			0.0277 (0.075)
Observations	4572	2712	2765

Notes: Authors' calculations. Data from the Canadian Perspectives Survey Series. All regressions are estimated using an ordered probit, with weights applied and robust standard errors. The dependent variable in columns 1–3 is a ranking of perceived health, ranging from 5 (Excellent), 4 (Very Good), 3 (Good), 2 (Fair), 1 (Poor). All explanatory variables are dummy variables. The base category across all columns is male, single or widowed or separated or divorced, over 55 years old, has above a high school education, and was born in Canada. We omit any observations who respond “Not Stated” to the dependent variable. Observations decrease in columns (2), (3), because our subsample are only those observations which are employed. Columns (1) has explanatory variables that are demographic variables and indicators for labour force status. The omitted category in columns (1) from employment status is “Employed and at work, at least part of the week”. Columns (2) has explanatory variables that are demographic variables with indicators for where observations are working. The omitted category in columns (2) is if someone continues to working outside the home. Columns (3) has explanatory variables that are demographic variables with two indicator variables. The first, Impact on financial obligations, equals one if respondents answered “Major Impact” or “Impact” when asked if COVID will impact their ability to meet financial obligations or essential needs. The second variable, Might lose job, equals one if respondents answered “Strongly Agree” or “Agree” to if they felt they would lose their job in the next 4 weeks.