
From Mancession to Shecession: Women's Employment in Regular and Pandemic Recessions

Titan Alon, *University of California San Diego, United States of America*

Sena Coskun, *University of Mannheim, FAU Erlangen-Nuremberg, and IAB, Germany*

Matthias Doepke, *Northwestern University and NBER, United States of America*

David Koll, *European University Institute, Italy, and University of Mannheim, Germany*

Michèle Tertilt, *University of Mannheim, Germany*

I. Introduction

The COVID-19 pandemic has resulted in the sharpest global economic downturn since the Great Depression. Figure 1 displays deviations from long-term trends in gross domestic product (GDP) and aggregate hours worked in the United States, Canada, Germany, the Netherlands, Spain, and the United Kingdom from 2006 until the second quarter of 2020.¹ In each of these countries, the drop in output and labor supply during the pandemic recession is much larger than during any previous downturn in this period, at least twice as large even compared with the Great Recession of 2007–9. Understanding the nature and consequences of this massive economic shock is a central task for economic research.

At the onset of the crisis, Alon et al. (2020a) predicted that beyond its cause and magnitude, a key difference between the pandemic recession and others that preceded it would lie in its impact on women's employment. Recent prepandemic recessions have usually been "mancessions" in which men lost more jobs than women. The prediction by Alon et al. (2020a) that the pandemic recession would be a "shecession" with larger employment losses for women was based on two observations. First, although regular recessions heavily affect sectors such as construction and manufacturing in which many men work, it became quickly apparent that the pandemic recession would have its biggest impact on sectors

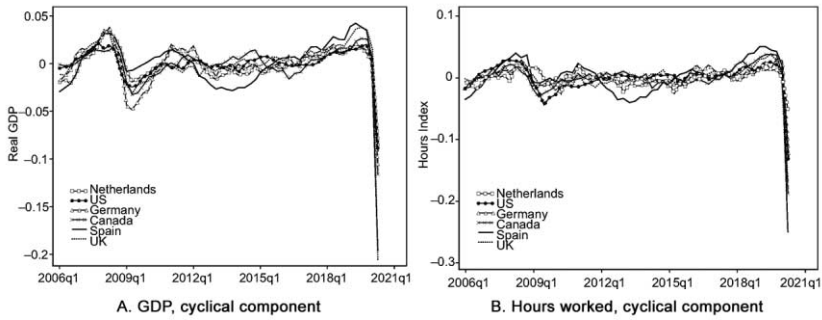


Fig. 1. The pandemic recession in six countries. See the appendix for data sources. Hours index is the index (=100 in 2006) of total hours of adult workers (20–64) in the economy. Seasonally adjusted quarterly real GDP and hours index (2006Q1–2020Q2) are Hodrick–Prescott (HP) filtered with smoothing parameter 1600 and cyclical components are reported. A color version of this figure is available online, and in our NBER Working Paper no. 28632.

such as hospitality and tourism with high female employment shares. Second, the pandemic also led to school and daycare closures that massively increased parents’ childcare needs, and given that mothers provide a much larger share of childcare than fathers do, this would constrain women’s ability to work more than men’s.

With the benefit of hindsight, in this paper we provide a comprehensive empirical assessment of the role of women’s employment in the pandemic recession of 2020. We argue that the evidence largely confirms the expectation of a larger impact on women in general and on working mothers in particular. As an illustration for the case of the United States, Figure 2 reports changes in the employment gap (the difference between the employment rate of women and men) during the pandemic recession of 2020 compared with the Great Recession of 2007–9.² During the Great Recession, women’s employment increased compared with that of men, with gains gradually building as the recession progressed. This is the typical pattern of a mancession that puts more men than women out of employment. In the pandemic recession, in contrast, women’s employment declined relative to that of men. For women without children, this decline was mild, but among women with children the drop in employment exceeded 5 percentage points 2 months into the recession compared with men with children. Employment losses declined somewhat during the summer of 2020 but expanded again in the fall.

Expanding on this evidence, we document the impact of the pandemic recession on women’s versus men’s employment across advanced economies; we use micro data to assess the role of childcare needs, industry

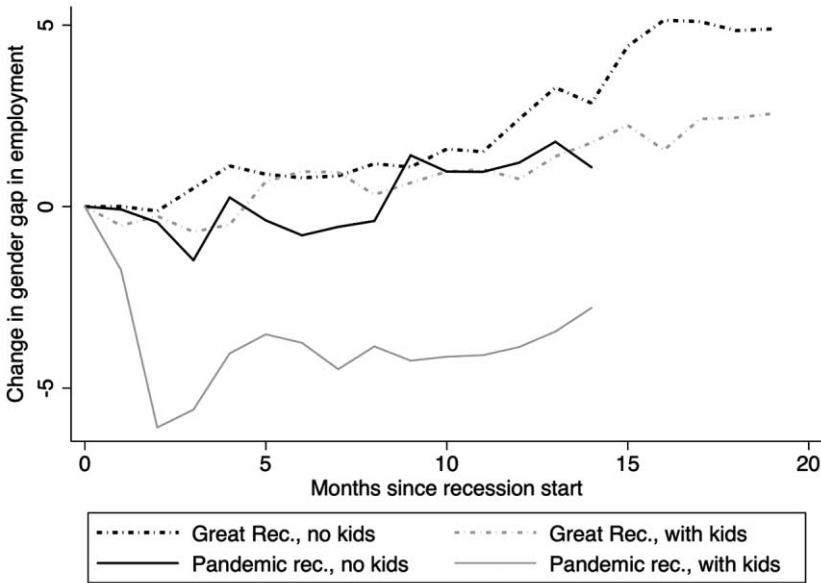


Fig. 2. Change in gender gap in employment in the United States during the Great Recession and the Pandemic Recession. The *y*-axis reports cumulative log point changes in the employment gender gap from the start of each recession (difference between women’s and men’s employment, negative numbers denote a decline in women’s relative employment). Sample includes all civilians ages 25–55 who are either employed, unemployed, or not in the labor force. Employment series are seasonally adjusted by group from January 2000 to October 2020. The Great Recession corresponds to November 2007 to June 2009. The pandemic recession corresponds to February 2020 to April 2021. Workers “with kids” are those who have at least one own minor child (ages 0–17) residing in the same household. A color version of this figure is available online.

and occupation effects, and other factors in generating gender differences; and we assess how the gendered impact of the crisis matters for aggregate outcomes during the recession and for the evolution of gender inequality in the labor market and beyond. We find not only that the pandemic recession had an unusually large impact on working women across a large set of countries, but also that there is wide heterogeneity in the magnitude of the impact and the role of different channels underlying these impacts. The heterogeneity that we observe is informative for the role that policies and institutions play in shaping the economic impact of the recession. We also point to evidence that the pandemic recession will have long-lasting effects on the labor market. In particular, the recession is likely to result in a substantial rise in employment flexibility in the postpandemic “new normal,” which has the potential to greatly benefit many working women.

To provide a baseline to compare the pandemic recession to, the first step in our analysis is to use aggregate data for 28 advanced economies to characterize the impact of regular, prepandemic business cycles on women's versus men's employment. Similar to what Doepke and Tertilt (2016) established for the United States, we find that with few exceptions regular recessions are mancessions in these countries, that is, during a typical business cycle downturn, male labor supply falls by more than female labor supply. We also show that differences in the cyclical volatility between industries with high female-versus-male employment shares play an important role in accounting for this pattern.

Turning to the pandemic recession, we find that in most countries the current recession is a shecession, that is, declines in employment and hours worked are larger among women. Moreover, in the few countries where the pandemic had a larger impact on men, the relative impact on women's labor market is usually more severe than what would be expected based on earlier recessions. Thus, a disproportionate impact on working women is a common feature of the pandemic recession that is shared among a large set of countries.

To learn more about the causes and consequences of this shecession, we turn to micro survey data from the six countries represented in figure 1: the United States, Canada, Germany, the Netherlands, Spain, and the United Kingdom. These countries represent a wide range of experiences in terms of the impact of the pandemic recession on the labor market. In the United States, Canada, and Germany, there is a substantial gender gap in the response of hours worked. In the United States, there is also a large gender gap in terms of employment changes but not so in Germany, a first indication that policy responses (such as more generous employment protection and furlough in Germany) play an important role during the crisis. In the Netherlands, Spain, and the United Kingdom, gender gaps in changes in both employment and hours worked are generally small.

Information on individual characteristics in the micro data allow us to assess the role of childcare needs, industry and occupation, and other factors in generating gender differences during the pandemic recession. Regarding childcare, we find that the impact on the gender gap is largest among parents with school-age children, pointing to the role of school closures. As figure 2 suggests, in the United States the impact of the childcare channel is large. We find large gender gaps in labor supply response among parents of school-age children, even in countries where the overall gender gap in the impact of the pandemic is small, such as

Spain. Beyond childcare, industry and occupation effects account for another sizable part of the gender gap in the impact of the crisis. Nevertheless, childcare, industry, and occupation are not the only channels at work: even when controlling for industry and occupation and considering only workers without children, we still find large gender gaps in several countries. For the United States, a decomposition analysis shows that the childcare and industry/occupation channels each account for a little less than 20% of the gender gap in terms of hours worked, with the remainder due to other factors. Understanding these additional factors behind the pervasive gender gap in the pandemic recession is an important challenge for future research.

We also analyze other dimensions of heterogeneity. A factor that matters a lot in the United States, Canada, and Spain is single parenthood: both hours and employment decline by more for single compared with married mothers. Much of the single-married divide disappears when controlling for industry and occupation, implying that the kind of jobs that single mothers hold matter. We do not find significant differences between married and single mothers in the other countries.

With regard to education, in the United States and Canada we observe larger gender gaps in the labor supply response of less-educated workers. Interestingly, the opposite finding arises in Spain and the United Kingdom (countries with a small overall gender gap in the impact of the pandemic) where we find a substantial gender gap in hours changes among parents of school-age children with college education but not among less-educated parents.

In the United States, it is well documented that the Black and Hispanic populations were particularly strongly affected by the labor market consequences of the pandemic (e.g., Hershbein and Holzer 2021). However, we generally do not find large or statistically significant differences in the gender gap in the labor supply response between different races and ethnicities or between workers with and without a migration background. The two exceptions are Germany, where the gender gap in employment losses is larger among those with a migration background, and Canada, where we observe a similar pattern in both employment and hours.

The disproportionate impact of the pandemic recession on women's employment not only matters for the distribution of the welfare cost of the pandemic recession but also has wider economic repercussions. Based on the analysis of Alon et al. (2020b), we argue that qualitative differences between shecessions and mancessions arise from the different dynamic behavior of women's and men's labor supply. Women's labor

supply is generally more elastic than that of men, suggesting that in a shecession, lowered earning prospects after an unemployment spell are more likely to result in a persistent reduction in labor supply. A shecession also reduces households' ability to self-insure against income shocks, resulting in a stronger transmission from income shocks into consumption demand. In contrast, because women on average work fewer hours and earn less, shecessions can be less severe in terms of GDP losses than mancessions. Overall, whether a recession affects primarily men or women clearly matters: a shecession is not just a mancession with signs reversed.

The legacy of the pandemic recession is likely to include changes in the labor market that will long outlast the recession itself. One feature of the postpandemic new normal that is already becoming apparent now is that working from home, nearly universal among office workers during the pandemic, will have a permanent place in the future workplace (Barrero, Bloom, and Davis 2021). Alon et al. (2020b) argue that increased access to telecommuting and other forms of work flexibility have the potential to drastically reduce gender inequality in the labor market. The basis for this argument is that much of today's gender gap arises from the "motherhood penalty" (i.e., women's earnings start to lag behind those of men after having children). Work flexibility in general and telecommuting in particular are associated with a more equal division of childcare duties among mothers and fathers, thereby lowering the conflict for mothers between having a family and a career. Hence, if the future workplace indeed is more flexible, the motherhood penalty should shrink and so should overall gender inequality in the labor market.

Our empirical results reaffirm the notion that job flexibility is a particular benefit to working mothers. For the countries where we have information on telecommuting, we find that the gender gap in labor supply is concentrated among those who cannot telecommute. Among nontelecommuters, the gender gap is especially large among parents, whereas among those who can work from home, gender gaps are small regardless of whether children are present. Although several recent papers (e.g., Adams-Prassl et al. 2020b) have pointed out that the ability to telecommute protects workers from job loss in the current pandemic, our findings show that it is mothers who reap the largest gains from being able to work from home.

These findings suggest that the pandemic legacy of an expanded ability to telecommute will play an important role in advancing gender equality. Yet, there is a caveat. For the motherhood penalty to be reduced in the

new normal, both mothers and fathers working from home would have to get their work done. However, evidence from the pandemic suggests that combining working from home with caring for children imposes a bigger drag on mothers' compared with fathers' productivity. In the Netherlands, we find that among parents working from home during the crisis, mothers used a larger fraction of the work time to provide childcare at the same time, particularly so if they had school-age children. Other studies document that among academic researchers (where productivity can be measured using publications and new working papers), productivity declined more among women than among men during the pandemic, with the largest productivity declines among mothers of young children (Amano-Patiño et al. 2020; Barber et al. 2021; Ribarovska et al. 2021). Hence, increased work flexibility after the pandemic opens up the potential for reduced gender inequality, but the full potential for change is unlikely to be realized without shifts in additional factors, such as social norms and workplace norms, that also determine the division of labor between mothers and fathers. Understanding the evolution and interplay of these factors shaping gender inequality in the postpandemic labor market is an important challenge for future research on the legacy of the crisis.

Our work contributes to the literature on the role of women's employment over the business cycle. Even though by now women account for the majority of the US workforce, for a long time most business cycle models have been unisex models that do not allow for gender differences. More recent studies argue that the role of women over the business cycle has substantially changed over time due to the rise in female labor force participation (Fukui, Nakamura, and Steinsson 2019; Albanesi 2020). The changed nature of business cycles also matters for policy. Bardóczy (2020) argues that the details of decision-making in the family are an important determinant of the transmission of macroeconomic shocks. Ellieroth (2019) analyzes the quantitative importance of family insurance over the business cycle using a joint-search model. Other contributions to the literature on women's employment and household decision-making within macroeconomics include Greenwood, Seshadri, and Yorukoglu (2005), Ortigueira and Siassi (2013), Doepke and Tertilt (2016), Mankart and Oikonomou (2017), Borella, De Nardi, and Yang (2018), Mennuni (2019), Olsson (2019), and Wang (2019).³ In addition, Albanesi and Şahin (2018) and Coskun and Dalgic (2020) note the impact that the gender breakdown of employment in various industries has on the contrasting cyclicity of male and female employment. This is an important factor in the pandemic recession, because the industries hit the most by the pandemic are not those most

affected by regular recessions. Finally, our work is part of the emerging literature on the impact of the COVID-19 pandemic on gender inequality in the labor market, including contributions such as Alon et al. (2020a, 2020b) and Adams-Prassl et al. (2020b). Our contribution is related in particular to Albanesi and Kim (2021), who take a similar empirical approach but focus entirely on the United States, and the studies by Dang and Nguyen (2020), Galasso and Foucault (2020), Leyva and Urrutia (2020), and Bluedorn et al. (2021), who also provide evidence across countries but without delving into detailed micro data.

In the next section, we examine the impact of the pandemic recession and earlier economic downturns on women's and men's employment in 28 countries using aggregate data. In Section III, we use micro data from national employment surveys to examine the sources of the gendered impact of the pandemic recession. In Section IV, we provide further results for the United States, where the gender gap in the impact of the pandemic recession is particularly large. In Section V, we examine heterogeneity along the dimensions of education, race, single parenthood, and the ability to telecommute. Section VI analyzes the impact of the pandemic on women's and men's productivity at work. In Section VII, we discuss the general lessons that can be learned from our analysis, and in Section VIII, we conclude.

II. Aggregate Evidence across Countries

We start by providing an overview of the impact of earlier recessions and the pandemic recession on women's and men's employment across countries using aggregate data. We use data for 26 European countries from the European Labor Force Survey (EU-LFS), US data from the Current Population Survey (CPS), and Canadian data from the Canadian Labor Force Survey (CLFS).

A. Regular Recessions

Doepke and Tertilt (2016) document that in the United States, women's labor supply is substantially less cyclical than that of men. In recessions, the labor supply of single men usually declines the most, whereas the drop in labor supply is smallest for married women. The same patterns can be observed in most countries in our data set. To characterize how labor supply varies over the cycle, we first compute the cyclical component of GDP as the difference between GDP and a Hodrick-Prescott

trend. We then focus on the correlation between the cyclical component of GDP with the ratio of women's to men's labor supply. Figure 3 shows that in most countries in our data set, male labor supply is more cyclical than female labor supply. This is true both for the extensive and the intensive margin: panel *A* shows a negative correlation between the cyclical components of relative female/male employment and GDP while panel *B* shows a negative correlation between the cyclical components of relative hours and GDP. There are a few exceptions (Romania, Greece, and Belgium for the correlation with relative employment, and Romania and Czechia for the correlation with relative hours), but in all these cases the correlations are small.

The literature points out two primary explanations for the counter-cyclicality of women's relative labor supply: the distribution of women's employment by industry and occupation (Albanesi and Şahin 2018; Coskun and Dalgic 2020) and within-family insurance, that is, countercyclical adjustments of women's labor supply in response to job loss (or risk thereof) of their husbands (Doepke and Tertilt 2016). These factors give rise to substantial variation in the cyclical behavior of women's labor supply across countries, depending on factors such as the local industry composition of employment, marriage rates, and married women's labor force participation. Nevertheless, as figure 3 shows in almost all cases, the end result is a lower cyclicality of women's compared with men's labor supply.

Beyond correlations of relative labor supply and the cyclical component of GDP, we can analyze cyclical variation in women's and men's labor supply in more detail using the methodology of Doepke and Tertilt (2016). Their analysis distinguishes the total volatility of labor supply (the percentage standard deviation of the Hodrick-Prescott residual) from its cyclical volatility, which is the percentage standard deviation of the predicted value of the Hodrick-Prescott residual of labor supply on the Hodrick-Prescott residual of GDP per capita. The concept of cyclical volatility captures the part of total volatility that is related to the economic cycle, as opposed to other factors such as variation in cohort sizes.

Table 1 shows how the total and cyclical volatility of labor supply for different groups compare between the United States and five other countries: Canada, Germany, the Netherlands, Spain, and the United Kingdom. In five of the six countries, volatility is smaller for women than for men. Only the Netherlands stands out with a higher volatility for women than men.⁴ When focusing on cyclical volatility, in all countries (including the Netherlands) women's hours worked vary less over the business cycle than men's. The gender gap is sizable, ranging from a modest difference in

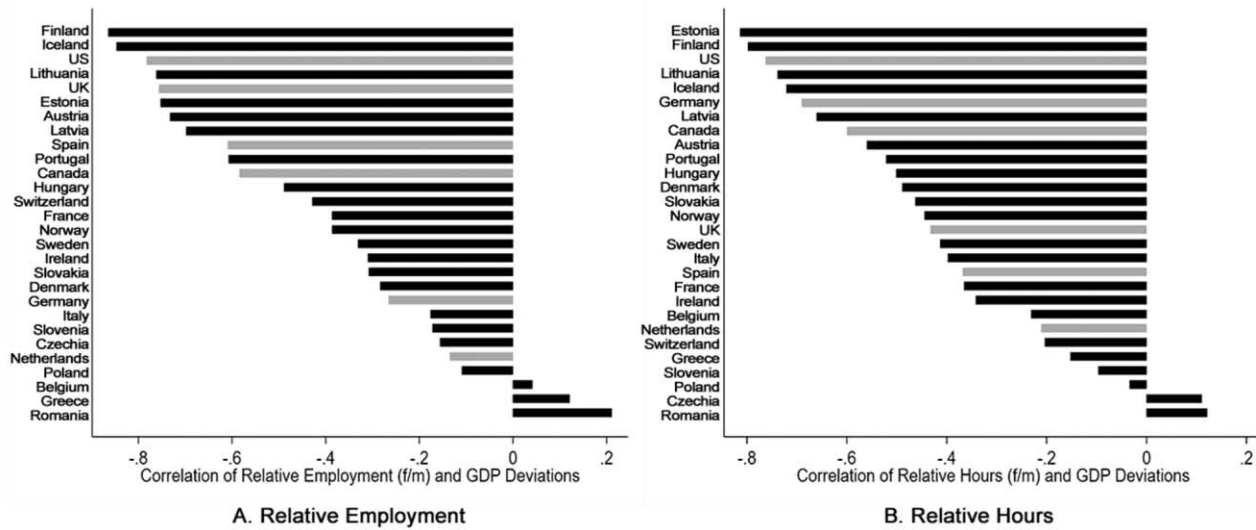


Fig. 3. In most countries, women’s relative labor supply was countercyclical before 2020. The figure reports correlations between the cyclical component of relative employment/hours and the cyclical component of real GDP for each country. To compute trends, relative hours and relative employment (female/male) of individuals ages 20–64 and annual real GDP for the period 1998–2019 are HP filtered with smoothing parameter 6.25. See the appendix for data sources and details. The countries analyzed in detail in Section III are highlighted in gray. A color version of this figure is available online.

Table 1
Volatility of Hours Worked, by Gender and Marital Status, 1998–2019

	Total	All		Married		Single	
		Women	Men	Women	Men	Women	Men
Total Volatility							
United States	1.27	.99	1.54	.80	1.23	1.29	2.12
Canada	.86	.67	1.06	.61	1.01	.93	1.31
Germany	1.02	.87	1.14	.89	.94	1.04	1.59
Netherlands	1.12	1.28	1.10	1.80	.81	1.21	1.62
Spain	1.58	1.41	1.83	1.23	1.49	1.86	2.50
United Kingdom	.74	.76	.82	.65	.60	1.07	1.27
Cyclical Volatility							
United States	1.16	.85	1.41	.64	1.13	1.11	1.92
Canada	.71	.49	.87	.40	.73	.66	1.16
Germany	.82	.62	.93	.51	.74	.72	1.25
Netherlands	.78	.67	.83	.86	.55	.53	1.21
Spain	1.48	1.27	1.64	.90	1.22	1.76	2.26
United Kingdom	.51	.34	.62	.13	.35	.54	1.01
Hours Share							
United States		42.96	57.04	23.57	36.15	19.39	20.89
Canada		41.97	58.03	27.53	39.83	14.44	18.20
Germany		38.27	61.73	19.86	36.76	18.41	24.97
Netherlands		35.39	64.61	17.78	37.24	17.61	27.37
Spain		38.30	61.70	20.71	38.25	17.59	23.45
United Kingdom		39.12	60.88	19.80	35.56	19.33	25.31
Volatility Share							
United States		31.14	68.86	12.87	34.69	18.33	34.11
Canada		29.04	70.96	15.47	41.24	13.42	29.87
Germany		29.45	70.55	12.41	33.36	16.16	38.07
Netherlands		30.58	69.42	19.52	26.05	12.04	42.38
Spain		32.49	67.51	12.44	31.36	20.71	35.49
United Kingdom		26.06	73.94	5.07	24.63	20.37	49.93

Note: See appendix B for data sources. Total volatility is the percentage standard deviation of the Hodrick-Prescott residual of average labor supply per person in each group. Cyclical volatility is the percentage deviation of the predicted value of a regression of the HP-residual of hours on the HP-residual of real GDP. Hours share is the share of each component in total hours. Volatility share is share of each group in the cyclical volatility of total hours.

the Netherlands to a cyclical volatility that is almost twice as high for men relative to women in the United Kingdom.

With the exception of the Netherlands, the cyclical volatility of labor supply is lower for married women than for single women. Among singles, the cyclical volatility of women is lower than that of men in all countries. Thus, women's labor supply in general, and that of married women in particular, tends to dampen fluctuations in aggregate labor

supply over the business cycle. The overall impact of women on the behavior of aggregate labor supply not only depends on the volatility of women's labor supply but also on their share in aggregate labor supply. Women's share of total hours varies from 35% in the Netherlands, where married women usually work part time, to 43% in the United States. Women's contribution to the overall volatility of aggregate labor supply is always lower than the hours share and varies between 26% in the United Kingdom and 32% in Spain. Hence, in all countries women account for less than a third of the volatility of aggregate labor supply. The volatility share of married women differs widely across countries, ranging from only 5% in the United Kingdom to almost 20% in the Netherlands.

Figure A1 (appendix is available online) displays the cyclical component of hours worked over time for each country. An interesting observation that has not been explored yet in the literature is that the male cycle seems to lead the female cycle, especially for singles.

B. The Pandemic Recession

The evidence shown so far establishes that in pre-2020 economic fluctuations, women's labor supply was less cyclical than men's across a wide range of countries. Let us now consider what happened during the pandemic recession of 2020. Figure 4 shows how the labor supply of women versus men changed in each country. Unlike in a regular recession, women's labor supply fell relative to men's in 18 of 28 countries when measured by employment, and in 19 of 28 countries when measured by hours worked. Quantitatively, we observe larger changes in terms of hours worked, with a drop of more than 10% in women's relative hours in Portugal.

Rather than looking at the absolute change in the ratio of women's to men's labor supply, we can also ask how observed changes compare to what would be expected based on the prepandemic relationship of women's and men's labor supply to the business cycle. Accordingly, figure 5 plots the actual change in labor supply in each country against the predicted change based on prepandemic data. Here we see that most countries are below the 45-degree line, implying that women's relative labor supply either declined or increased by less than what would have been expected based on earlier recessions (the few exceptions are all close to the 45-degree line). The countries that display a decline in men's relative employment even during the COVID-19 recessions (most notably Portugal, Austria, and the United Kingdom) are countries that have particularly pronounced mancessions in regular times.

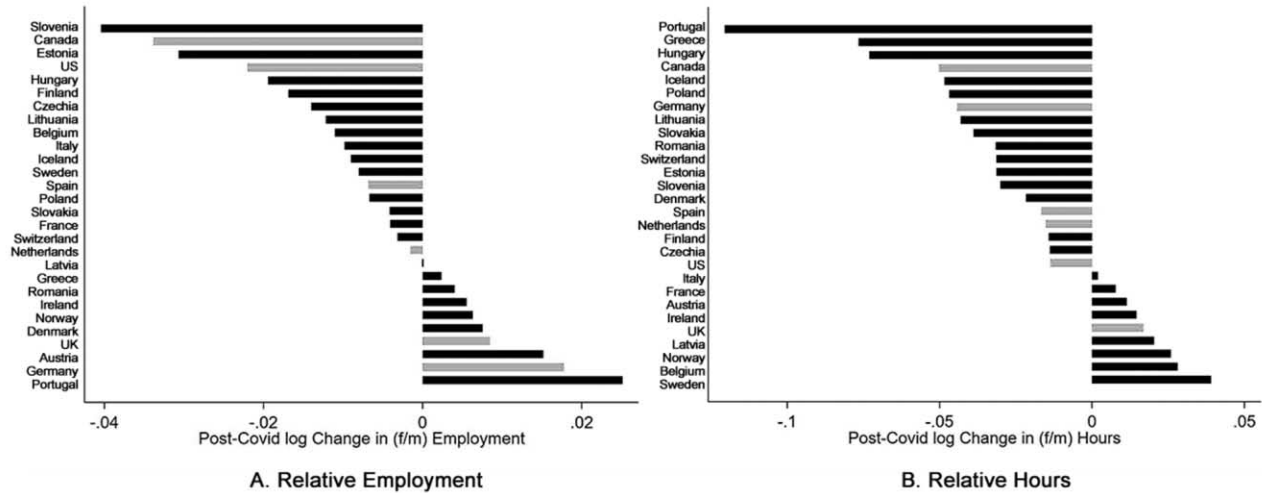


Fig. 4. Post-COVID change in relative female/male labor supply. The figure reports the log change in seasonally adjusted relative employment (female/male) and a relative hour worked index (female/male) between 2019Q4 and 2020Q2. See appendix C for further details and data sources. A color version of this figure is available online.

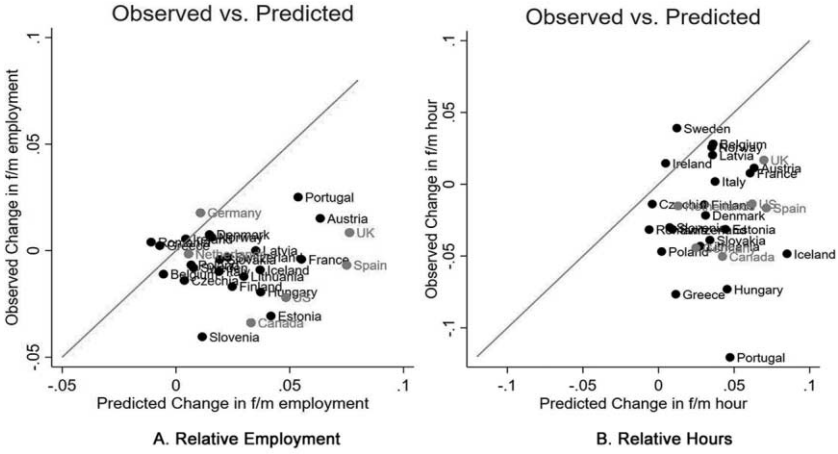


Fig. 5. Predicted versus observed changes in women’s relative labor supply. Observed changes are the ones reported in figure 4. Predicted changes are calculated by multiplying the estimated coefficient from a regression of the cyclical component of relative employment/hours on the cyclical component of GDP (for the years 1998–2019) and the observed GDP change between 2019Q4 and 2020Q2. A color version of this figure is available online.

C. *Pattern across Industries*

Why is the pandemic recession so different from usual recessions in its impact on women’s versus men’s employment, and what explains the substantial variation in the impact across countries? Starting with Alon et al. (2020a), the literature has focused on two explanations for the gendered impact of a pandemic recession. The first explanation is about the impact of the recession on different industries and occupations; because the impact is related to lockdowns and social distancing measures, the parts of the economy most affected by the current downturn are not the ones that decline the most in regular recessions. Second, widespread school and daycare closures affect the ability of parents, and in particular mothers, to work.

We can use our cross-country data set to provide a first assessment of the first explanation, namely the role of the employment composition by industry. To do this, we divide industries into three groups: those with high male employment shares, those with high female employment shares, and “neutral” industries in the intermediate range. The industry classification is the same for all countries (see app. B.2 for details). We

can now check how male, female, and neutral industries are affected by regular recessions and the pandemic recession in each country.

Panel *A* of figure 6 shows that, as expected, in pre-2020 data, male industries display more cyclical volatility in employment than female industries. At the same time, the figure also shows large cross-country variation; for example, in the United States the downward sloping pattern is particularly pronounced, while in Slovenia female industries are more volatile than male ones and in Germany there is little difference in the cyclical volatility between male and female industries.

Panel *B* of figure 6 shows how employment in the same set of industries in each country was affected by the pandemic recession in 2020. In a regular recession, we would expect to observe an increasing slope moving from male to female industries, that is, larger job losses during the recession in male industries. The actual pattern is the opposite: on average, female industries suffered larger employment losses than male industries. In Spain, for example, the employment decline was more than twice as large in female industries than male ones. Once again there is sizable variation across countries. For example, in the United Kingdom employment declines were slightly smaller in female industries. Differences in industry composition together with the impact of the pandemic recession on industries with relatively more female or male workers can account for some of the variation evident in figure 4. For example, women's employment was more strongly affected in Spain compared with the United Kingdom, and according to figure 6*B*, differences in the impact of the crisis across sectors (such as the large impact on and the large size of the tourism sector in Spain) can account for some of that.

Another way to see how starkly different the pandemic recession is from previous recessions is to compare it specifically to the Great Recession. In figure 7, we do this for the United States. Panel *A* shows that the most cyclical sectors, especially construction and manufacturing, also experienced the largest employment declines in the Great Recession. As panel *B* shows, in the pandemic recession the pattern is completely different: the largest employment declines were experienced by the leisure sector, which is usually not particularly cyclical. It also happens to be a sector dominated by female employees.

D. The Childcare Channel in Cross-country Data

In addition to industry effects, increased childcare needs due to school and daycare closures are the other leading explanation for the impact of

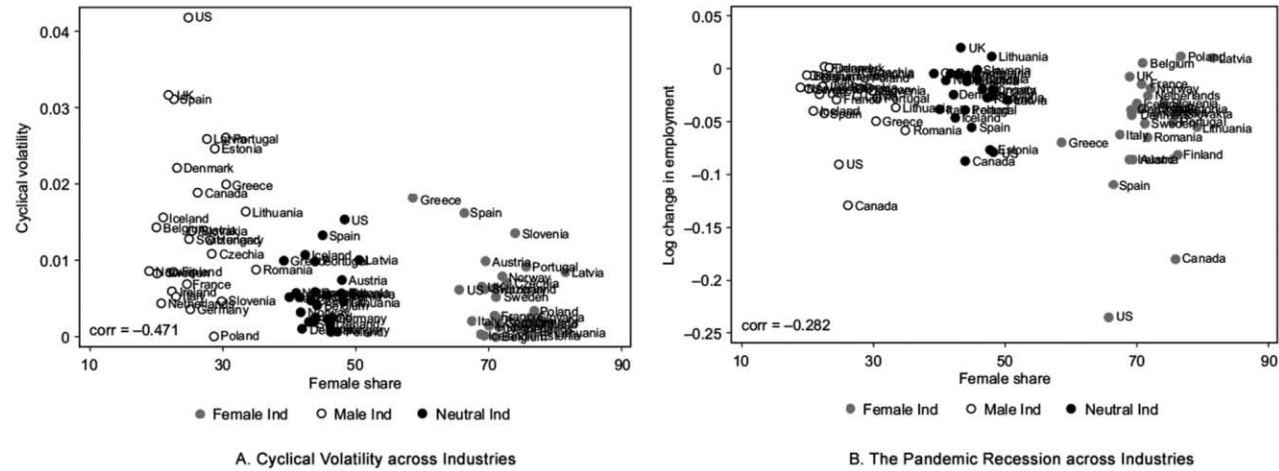


Fig. 6. Regular recessions and the pandemic recession in female versus male industries. Each dot depicts a group of industries (female, male, or neutral) in a country. See the appendix for data sources and details. Panel (b) reports log changes of seasonally adjusted aggregated industry employment between 2019Q4 and 2020Q2. Cyclical volatility is calculated for the period 2008–19 (2010–19 for Switzerland) at a quarterly frequency and is defined as the log deviation of the predicted value of a regression of the HP-residual of industry employment on the HP-residual of real GDP. The female share for each industry is the average of 2019. A color version of this figure is available online.

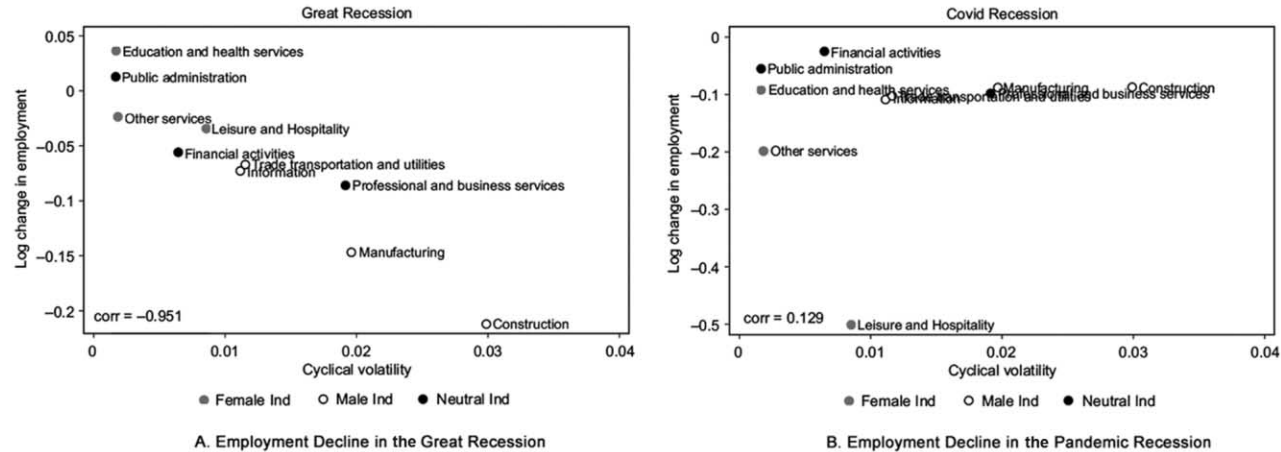


Fig. 7. Employment decline across sectors, United States. Data are from Bureau of Labor Statistics, seasonally adjusted quarterly industry employment numbers 1998–2020. Cyclical volatility has been calculated for the period 1998–2019 and is defined as the log deviation of the predicted value of a regression of the HP-residual of industry employment on the HP-residual of real GDP. Employment change in the Great Recession is the log change in industry employment from peak to trough (as defined by NBER recession dates), and for the COVID-19 recession the employment change corresponds to the period 2019Q4–2020Q2. A color version of this figure is available online.

the recession on working women. The impact of this channel varies across countries, depending on factors such as mothers' labor force participation and the length and severity of school and daycare closures. For example, in Sweden school closures were much more limited than in most other countries, and Sweden is also one of the few countries where women's relative hours increased in the pandemic recession (see fig. 4B).

Childcare (or the lack thereof) likely matters not just for the gender gap in labor supply but also for the overall employment impact of the pandemic. School closures affect all working parents, so the extent of school closures should have an impact on the overall depth of the recession. In addition, the more hours women work in normal times, the more likely it is that reductions in work hours are necessary to cope with the increased childcare needs during the pandemic.

To explore the overall impact of these channels on the labor market during the pandemic recession, in tables 2–5 we present cross-country regression results that show how various country-level characteristics are correlated with the aggregate changes in the labor market and with relative changes for women compared with men. With regard to aggregate employment, in column 1 of table 2 we regress the overall change in labor supply during the crisis (the hours index) in each country on an index that measures the severity of school closures. The regression shows that indeed, countries with more severe school closures experienced a greater

Table 2

Correlates of Change in Aggregate Hours Worked during the Pandemic Recession across Countries

	Change in Hours				
	(1)	(2)	(3)	(4)	(5)
School closure index	-.207 (.007)	-.157 (.033)			-.085 (.241)
Prepandemic Female Hours		.011 (.043)			
Share of hospitality			-1.852 (.001)		-1.943 (.00)
Teleworkable fraction				.642 (.034)	.579 (.041)
<i>N</i>	28	28	28	27	27
<i>R</i> ²	.251	.366	.362	.168	.630

Note: *p*-values are in parentheses. See appendix B.2 for data sources and variable definitions.

drop in labor supply; the school closure index alone accounts for about 25% of the variation in hours changes. However, on its own the school closure index is not associated with larger employment changes or with differential impacts on women versus men (col. 1 in tables 3–5).⁵

In interpreting these results, it should be kept in mind that they represent correlations in cross-country data that are not necessarily causal and that are subject to the usual limitations of cross-country regressions. For example, differences in the severity of the pandemic across countries would be expected to generate some variation in the severity of school closures and also have a direct impact on employment (e.g., through the length of lockdowns). Hence, the results described in tables 2–5 should be interpreted as correlations that help summarize the data and can provide a first pass at assessing the importance of different channels, without being conclusive on their own.

The next variable we explore is the prepandemic level of women’s labor supply. In a country where most mothers work full time, increased childcare needs during the pandemic may have a larger impact compared with a country where many mothers are either out of the labor force or working part time. Our results indicate that, when also controlling for the school closure index, countries where women’s labor supply is higher experienced somewhat smaller aggregate declines in hours (col. 2 of table 2), but larger relative employment declines for women compared with men (col. 2 of table 5).

Table 3
Correlates of Change in Aggregate Employment during the Pandemic Recession across Countries

	Change in Employment				
	(1)	(2)	(3)	(4)	(5)
School closure index	-.001 (.970)	-.006 (.843)			.046 (.080)
Prepandemic female hours		-.001 (.624)			
Share of hospitality			-.479 (.016)		-.474 (.003)
Teleworkable fraction				-.026 (.764)	.121 (.216)
<i>N</i>	28	28	28	27	27
<i>R</i> ²	0	.010	.203	.004	.357

Note: *p*-values are in parentheses. See appendix B.2 for data sources.

Next, we consider the role of industry composition and job characteristics. In the pandemic recession, the hospitality sector (including restaurants) has seen the largest employment decline across countries (see panel *B* of fig. 7 for the United States).⁶ The size of the hospitality sector also varies widely across countries (in our sample, from 5.6% of total employment in Poland to 16% in Spain). Column 3 of tables 2 and 3 shows that a larger hospitality sector is indeed associated with a substantially larger overall decline in hours and employment in a country. However, there is no discernible impact on the relative changes for women versus men (col. 3 of tables 4 and 5).

In terms of job characteristics, arguably the most important one during the pandemic is whether the job can be done from home during shut-downs. Indeed, we find that countries with a larger share of telecommutable jobs experience a smaller decline in labor supply during the pandemic (col. 4 of table 2) and a smaller impact on the labor supply of women compared with men (col. 4 of table 4). When we include both measures together with the school closure index, both continue to have a substantial impact on the total hour change (col. 5 in table 2), whereas the effect of school closures turns insignificant. This regression also has the highest R^2 among specifications considered, accounting for more than 50% of the variance in overall labor supply changes across countries.

We also consider a number of other potential determinants of the labor market impact of the pandemic but find that they show little correlation with employment changes and gender differences.⁷ An additional

Table 4
Correlates of Change in Relative Hours Worked (Women/Men) during the Pandemic Recession across Countries

	Change in Relative Hours (f/m)				
	(1)	(2)	(3)	(4)	(5)
School closure index	-.030 (.392)	-.049 (.182)			.059 (.181)
Prepandemic female hours		-.004 (.125)			
Share of hospitality			-.110 (.676)		-.250 (.307)
Teleworkable fraction				.313 (.016)	.474 (.007)
<i>N</i>	28	28	28	27	27
R^2	.028	.117	.007	.212	.290

Note: *p*-values are in parentheses. See appendix B.2 for data sources.

Table 5

Correlates of Change in Relative Employment (Women/Men) during the Pandemic Recession across Countries

	Change in Relative Employment (f/m)				
	(1)	(2)	(3)	(4)	(5)
School closure index	-.004 (.800)	-.013 (.382)			-.005 (.806)
Prepandemic female hours		-.0026 (.067)			
Share of hospitality			.029 (.795)		.062 (.587)
Teleworkable fraction				-.025 (.648)	-.041 (.587)
<i>N</i>	28	28	28	27	27
<i>R</i> ²	.003	.130	.003	.008	.022

Note: *p*-values are in parentheses. See appendix B.2 for data sources.

conjecture is that the extent of employment protection may explain some of the variation in employment losses across countries. We indeed find that the Organisation for Economic Co-operation and Development (OECD) index of employment protection for temporary workers has a small correlation with overall employment changes in the expected direction, but the effect is quantitatively small and accounts for little of the observed variance across countries. Employment protection does not have a significant effect on gender differences in the impact of the pandemic.

Although the correlations documented in tables 2–5 are suggestive, only so much can be learned from cross-country correlations in aggregate data. To make progress, we now turn to household-level evidence from a smaller set of countries.

III. Micro Data across Countries

The potential explanations for the gendered impact of the current pandemic recession generate distinct implications for which groups of women would suffer the biggest employment losses. For example, if childcare obligations during school closures were the main driving force behind women's employment losses, we would expect to observe a large impact on the employment of mothers with young children but not on women without children or women with adult children. We can use micro data from national employment surveys to examine these implications. For this analysis, we focus on a smaller set of countries for which this data

is already available up to at least the second quarter of 2020, namely the United States, Canada, Germany, the Netherlands, Spain, and the United Kingdom. As table 6 shows, these countries also display a lot of variation in terms of the structure of women's labor supply, industry composition, and the policy response to the pandemic, which will provide further evidence on the additional driving forces discussed in the previous section.

A. Data and Empirical Design

The data stem from a variety of surveys and there is variation in the questionnaires, the frequency of the surveys, and sample selection.⁸ We start by focusing on regressions that can be carried out in a similar way in all countries and give us a set of comparable results. The first set of regressions aims to examine the two leading explanations for the large impact of the pandemic on women's employment, namely the role of childcare and the role of industry and occupation. Our benchmark regression equation takes the form:

$$y_{it} = \beta_0 + \beta_1 F_i + \beta_2 D_t + \beta_3 F_i \times D_t + \beta_4 \mathbf{X}_{it} + \epsilon_{it}. \quad (1)$$

Here, y_{it} is the outcome variable of interest for individual i at time t , which is either a binary employment indicator or the inverse hyperbolic sine transform of hours worked last week. We apply this transformation to approximate the natural logarithm of hours worked last week while keeping the extensive margin of employment (i.e., zero hours).⁹ F_i is an indicator for female, and D_t is an indicator for the COVID-19 pandemic, here corresponding to the second and third quarters of 2020 (the last two quarters in our data sets). The vector \mathbf{X}_{it} consists of control variables that include gender-specific time trends in labor supply, quarterly seasonal dummies, age dummies, education categories, marital status, and race.¹⁰ We also include a dummy for education workers in the summer months, because hours worked for this group drop strongly in the summer months. The main coefficient of interest is β_3 on the interaction of F_i and D_t . Here, $100 \times \beta_3$ captures the percentage difference in the impact of the pandemic on women versus men.¹¹

We use additional regressions to characterize the extent to which the raw gender differences are due to industry, occupation, and childcare responsibilities. To get at the role of industry and occupation, we employ the following specification:

Table 6
Policies and Labor Market Structure Across Six Countries

Country	School Closure Index	Teleworkable Jobs	Average Female Hours	Share of Hospitality, Leisure, Other Services	Emp Protection Temp Worker	Emp Protection Regular Worker	Pre-COVID Cyclicity of Relative Hours
Canada	.88		23.04	.11	.28	1.68	-.60
Germany	.64	.37	22.40	.08	1.92	2.33	-.69
Netherlands	.51	.42	20.45	.09	1.48	2.88	-.21
Spain	.76	.32	20.30	.16	3.10	2.43	-.37
United Kingdom	.78	.44	23.23	.11	.54	1.90	-.43
United States	.50	.42	25.04	.15	.33	1.31	-.76

Note: See appendix B.2 for data sources.

$$y_{it} = \gamma_0 + \gamma_1 F_i + \gamma_2 D_t + \gamma_3 F_i \times D_t + \gamma_4 \mathbf{Job}_{it} + \gamma_5 \mathbf{Job}_{it} \times D_t + \gamma_6 \mathbf{X}_{it} + \epsilon_{it}. \quad (2)$$

Here, \mathbf{Job}_{it} is a vector combining occupation and industry information, with a dummy variable for each occupation-industry combination and an additional dummy variable for those not working to keep them in the sample. This job-type variable is interacted with the pandemic dummy D_t , which captures the differential impact of the recession on workers in different industries and occupations. The coefficient $100 \times \gamma_3$ captures percentage changes in the gender gap net of any industry-by-occupation-specific pandemic effects. For example, if gender differences arose entirely because more women than men work in the hospitality sector, we would expect to see a negative estimate of β_3 in regression (eq. [1]) but a zero estimate of γ_3 in regression (eq. [2]).

Our third main specification examines the role of childcare responsibilities for gender gaps in employment during the pandemic by focusing on differences between individuals with and without children. The specification has the following form:

$$y_{it} = \delta_0 \mathbf{Kid}_{it} + \delta_1 F_i \times \mathbf{Kid}_{it} + \delta_2 \mathbf{Kid}_{it} \times D_t + \delta_3 F_i \times \mathbf{Kid}_{it} \times D_t + \delta_4 \mathbf{X}_{it} + \epsilon_{it}. \quad (3)$$

Here, \mathbf{Kid}_{it} is a vector of three dummy variables grouping households by age of their youngest child into three groups: pre-K (<5), school age (5–17), and a third group that combines those with no or only adult children.¹² The coefficients δ_0 to δ_3 are vectors in this regression with a separate entry corresponding to each child group. In this regression, the coefficients in δ_3 capture the gender gap in the employment impact of the pandemic conditional on the child group. If gender differences arose solely because mothers are more affected by the rise in childcare needs during the pandemic than fathers, we would expect a negative coefficient within the groups with young and school-age children but a zero coefficient in the no-child/adult-child group.

Our final specification combines equations (2) and (3) by adding the work-type controls and interactions to the child-type regressions:

$$y_{it} = \theta_0 \mathbf{Kid}_{it} + \theta_1 F_i \times \mathbf{Kid}_{it} + \theta_2 \mathbf{Kid}_{it} \times D_t + \theta_3 F_i \times \mathbf{Kid}_{it} \times D_t + \theta_4 \mathbf{Job}_{it} + \theta_5 \mathbf{Job}_{it} \times D_t + \theta_6 \mathbf{X}_{it} + \epsilon_{it}. \quad (4)$$

Once again, adding work-type controls allows us to assess how much of the observed effects are due to industry and occupation. For example, one may conjecture that young mothers have different jobs than young

fathers; the full specification allows us to measure the differential impact of the pandemic on the employment of mothers and fathers beyond what is accounted for by such industry and occupation differences.

B. Gender Gaps across Countries in the Micro Data

Table 7 summarizes the results for these regressions with employment status (employed or not) as the left-hand side variable, and table 8 does the same for hours. For comparison, the first row displays the overall percentage employment change (table 7) and hours change (table 8) in each country during the pandemic. Employment dropped by more than 5% in the United States and Canada, by about 4% in Spain, and by less than 1% in Germany and the United Kingdom. Changes in hours are much larger and range from a decline of 36% in the United States to more than 50% in Germany.¹³ The Netherlands is an outlier in both dimensions: the data actually indicate a small but insignificant rise in employment and hours during the crisis. Rather than reflecting a true increase in employment, it is more likely that this increase reflects a change in the questionnaire in the Dutch Longitudinal Internet Studies for the Social Sciences (LISS) survey that reduces comparability of reported hours before and during the pandemic.¹⁴ We keep the Netherlands in the sample because the variation in outcomes across different groups in the crisis is still informative.

It is notable that Germany and the United Kingdom display the smallest decline in employment but among the largest drops in hours. This suggests an important role of furlough schemes in these countries that preserved employment while allowing large reductions in hours (often to zero), which should be kept in mind when interpreting the results.

The other entries in tables 7 and 8 are estimates for the gender-gap coefficients of interest β_3 , γ_3 , δ_3 , and θ_3 . Each entry in the table corresponds to an estimate from a separate regression, and p -values are displayed in parentheses. The row labeled as “basic gender gap” displays the coefficient estimate for β_3 for each outcome and for each country. In terms of employment, a sizable and statistically significant gender gap in the impact of the pandemic on employment is observed only in the United States and to a smaller extent in Spain.¹⁵ Note that according to table 6, these two countries have the highest employment share of the hospitality sector. In terms of hours (table 8), we observe a substantially larger impact on women’s compared with men’s labor supply in the United States, Canada, and Germany but no statistically significant difference in the

Table 7

Pandemic-induced Change in Employment and in the Gender Gap in Employment:
Regression Coefficients from Individual Country Regressions

	USA	CAN	DEU	NLD	ESP	GBR
Overall employment decline	-6.34 (0.00)	-5.52 (0.00)	-.28 (.55)	.67 (.13)	-4.08 (0.00)	-.13 (.59)
Basic gender gap (β_3):	-1.91 (0.00)	-.44 (.13)	-1.34 (.13)	1.51 (.21)	-1.01 (.09)	.15 (.81)
Pre-K kids ($\delta_{3,pre-K}$)	.13 (.83)	2.65 (0.00)		1.13 (.59)	.20 (.84)	1.38 (.16)
School-age kids ($\delta_{3,school}$)	-4.23 (0.00)	-1.76 (0.00)	-1.12 (.43)	.92 (.55)	-1.97 (.01)	-.80 (.30)
No kids ($\delta_{3,none}$)	-1.57 (0.00)	-1.05 (0.00)	-1.04 (.33)	2.06 (.13)	-1.13 (.12)	-.47 (.52)
w/ industry and occ controls (γ_3):	-1.09 (0.00)	-.46 (.02)	-1.32 (.16)	1.11 (.28)	.04 (.41)	-.34 (.52)
Pre-K kids ($\theta_{3,pre-K}$)	-.81 (.03)	.14 (.63)		1.05 (.56)	.08 (.15)	.12 (.89)
School-age kids ($\theta_{3,school}$)	-1.79 (0.00)	-1.63 (0.00)	-.99 (.50)	.31 (.81)	-.05 (.41)	-.74 (.26)
No kids ($\theta_{3,none}$)	-.95 (0.00)	-.33 (.15)	-1.20 (.28)	1.52 (.18)	.08 (.15)	-.69 (.25)

Note: Coefficients reported are in percentage points. Sample includes all civilians ages 25–55 who are either employed, unemployed, or not in the labor force. The p -values are reported in parentheses below estimates. Unless otherwise noted, all regressions include gender-specific time trends and controls for age, education, race, and marital status, in addition to quarterly indicators and a fixed effect for education sector workers in summer months to control for seasonality. No controls are used in the estimation of the overall employment decline. For Canada, Germany, the Netherlands, and Spain, we group people by migration background instead of race. Child age brackets are assigned by the age of the youngest child (<5 and 5–17). In Spain, the group of school-age children includes those up to the age of 19. Due to data limitations, for Germany we can only estimate the combined effect of having children below 16 (including pre-K), which in the table is reported in the “school-age kids” rows. Furthermore, due to a shorter data availability, in Germany and the Netherlands we cannot control for gender-specific time trends, quarterly indicators, and the summer-education fixed effect. For details on the data, see appendix C.

Netherlands, Spain, and the United Kingdom.¹⁶ One reason for these cross-country differences is likely the different labor market structure in these countries. The fall in relative hours was large and significant in those countries where the pre-COVID cyclical of relative hours was high and where female hours worked are relatively high (see table 6).

The following rows of tables 7 and 8 break down the gender gap between individuals with young children, school-age children, and either no or older children. Controlling for children matters a lot, in part because of differences within the two groups with children. In most cases, the gender gap in the “no kids” group is similar to the basic gender gap. With the

Table 8

Pandemic-induced Change in Hours and in the Gender Gap in Hours: Regression Coefficients from Individual Country Regressions

	USA	CAN	DEU	NLD	ESP	GBR
Overall hours decline	-36.17 (0.00)	-43.77 (0.00)	-52.18 (0.00)	6.91 (.14)	-49.87 (0.00)	-42.20 (0.00)
Basic gender gap (β_3):	-7.76 (0.00)	-6.50 (0.00)	-26.39 (.01)	-6.63 (.46)	-2.08 (.46)	4.97 (.12)
Pre-K kids ($\delta_{3,pre-K}$)	2.42 (.40)	6.00 (.01)		-67.85 (.01)	11.02 (.03)	13.80 (.01)
School-age kids ($\delta_{3,school}$)	-17.86 (0.00)	-11.08 (0.00)	-16.23 (.29)	-9.25 (.55)	-4.60 (.20)	-4.05 (.34)
No kids ($\delta_{3,none}$)	-6.63 (0.00)	-7.92 (0.00)	-31.25 (.01)	5.89 (.63)	-5.11 (.13)	2.55 (.52)
w/ industry and occ controls (γ_3):	-5.20 (0.00)	-7.21 (0.00)	-22.38 (.03)	-11.21 (.22)	-2.16 (.24)	.53 (.87)
Pre-K kids ($\theta_{3,pre-K}$)	-3.66 (.08)	-5.58 (0.00)		-65.79 (.01)	.43 (.91)	7.06 (.16)
School-age kids ($\theta_{3,school}$)	-8.94 (0.00)	-11.55 (0.00)	-10.17 (.52)	-7.66 (.61)	-4.93 (.05)	-6.31 (.12)
No kids ($\theta_{3,none}$)	-4.19 (0.00)	-4.64 (0.00)	-29.71 (.02)	-4.05 (.72)	-1.23 (.57)	-1.50 (.68)

Note: Coefficients reported are log points difference of the pandemic's effect on women versus men. Hours index is calculated using inverse hyperbolic sine transformation of reported hours worked last week. Sample includes all civilians ages 25–55 who are either employed, unemployed, or not in the labor force. The p -values are reported in parentheses below estimates. Unless otherwise noted, all regressions include gender-specific time trends and controls for age, education, race, and marital status, in addition to quarterly indicators and a fixed effect for education sector workers in summer months to control for seasonality. No controls are used in the estimation of the overall hours decline. For Canada, Germany, the Netherlands, and Spain, we group people by migration background instead of race. Child age brackets are assigned by the age of the youngest child (<5 and 5–17). In Spain, the group of school-age children includes those up to the age of 19. Due to data limitations, for Germany we can only estimate the combined effect of having children below 16 (including pre-K), which in the table is reported in the “school-age kids” rows. Furthermore, due to a shorter data availability, in Germany and the Netherlands we cannot control for gender-specific time trends, quarterly indicators, and the summer-education fixed effect. For details on the data, see appendix C.

exception of the Netherlands, among individuals with pre-K kids there is either no gender gap or women experience smaller employment and hours losses than men in this group. It is among workers with school-age children where large gender gaps in the impact of the crisis arise.

In the United States, for example, there is no significant gender gap among parents of pre-K kids for both employment and hours, a gender gap of 1.6 percentage points for employment and 6.6 percentage points for hours within the no-child group but large gaps of 4.2 and 17.9 percentage points for employment and hours within the group with school-age

children. The patterns in Canada, Spain, and the United Kingdom are qualitatively similar to the United States; although the magnitudes differ, in each case the gender gap is largest among parents of school-age children with the exception of the gender gap in hours in Spain where it equals the one of nonparents (in Germany, we do not have information to distinguish parents of pre-K and school-age children). The only country with a substantially larger impact on the labor supply of women in the pre-K group is the Netherlands, and even here the effect is only observed in terms of hours but not employment. Overall, these findings are consistent with a major role of school closures in explaining gender gaps during the pandemic.

C. The Role of Industry and Occupation

We next turn to the role of differential trends across industries and occupations during the pandemic. The bottom half of tables 7 and 8 shows results after adding work-type controls for all industry-occupation combinations. As shown in equation (2), these work-type controls are interacted with the pandemic dummy, so we account for the differential impact of the pandemic on workers in each industry-occupation combination. If gender differences in a given group were entirely due to a different distribution of women and men in the group across industries and occupations, we would expect to observe a zero coefficient in the regressions controlling for these trends.

The results indicate that industry and occupation effects do matter but only account for a limited fraction of gender gaps. Consider first the United States. After controlling for work type, the overall gender gap declines by 43% in terms of employment and 33% in terms of hours. Among parents of school-age kids, the gender gap declines by more than 50% in terms of employment and a little under 50% in terms of hours. Although this shows that the work-type distribution accounts for a sizable fraction of the gender gap among parents of school-age children, this group still exhibits the largest gender gaps after controlling for work type. Another notable finding is that the gender gap among parents of pre-K kids switches sign; once work type is controlled for, mothers in this group lose more employment and hours than fathers. In other words, mothers of young children are likely to hold jobs that were relatively secure during the pandemic recession. However, even after controlling work-type effects, the gender gap in this group continues to be smaller compared both to parents of older children and individuals without children.

There is a lot of variation in the role of work type across countries. In Canada, for example, gender differences among parents with pre-K children in terms of hours actually increase after controlling for work type, suggesting that fathers of young children work in jobs that were more exposed to the pandemic recession. The gender gap continues to be largest among parents of school-age children, although it shrinks for those without kids. In Germany, controlling for work type has only a small effect on the results. In Spain, controlling for work type accentuates the role of children for gender differences: a large and significant gender gap in terms of hours is only observed among parents of school-age children after including work-type controls. The pattern in the United Kingdom is similar but is just below statistical significance.

D. Interpreting the Empirical Findings

A few broader conclusions arise from the empirical analysis so far. First, in the Netherlands, Spain, and the United Kingdom, gender gaps in the impact of the pandemic are generally small and statistically insignificant for both employment and hours once work type is controlled for. Nevertheless, within this group we find a statistically significant gender gap in the hours response among parents of school-age children in Spain and parents of pre-K children in the Netherlands. In the Netherlands, this gap in hours is quantitatively large, even though there is no gender gap in employment among the same parents. Evidently, many mothers of young children in the Netherlands reduced their hours at work while holding on to their job. The ability to do so depends on the availability of flexible furlough schemes and/or additional parental leave, which is one way in which policy choices shape the gender gap in the labor market during the crisis.

The remaining countries (United States, Canada, and Germany) all display a substantial overall gender gap in the hours response to the pandemic, with or without work-type controls. In the United States and Canada, we also observe gender gaps in the employment impact of the crisis, whereas there are no statistically significant employment effects in Germany. In fact, in Germany there is no statistically significant decrease in overall employment (both men and women), even though the decline in hours is large, once again suggesting that employment protection and furlough schemes—which are extensive in Germany (“*Kurzarbeit*”; see table 6)—play an important role in shaping the employment effects of the recession.

Moving on to the role of childcare, in both the United States and Canada we find that the gender gap in the impact of the pandemic on employment and hours is largest among the parents of school-age children and smallest (and even reversed in sign) among the parents of pre-K children under the age of five. Although the large gender gap among parents of school-age children lines up with a notion from the existing literature that childcare responsibilities during school and daycare closures have a negative effect on mothers' employment, our findings for the parents of younger children do not support this channel and are surprising at first sight. In terms of the sign of the effect on parents of young children, it turns out that controlling for industry and occupation is crucial: without such controls mothers experience smaller employment and hours losses than fathers in this group, but mothers' losses are larger after allowing for different trends across work types. In other words, among parents of young children, mothers who are in the labor force are more likely than fathers to work in industries and occupations that were relatively protected from the effects of the pandemic.

Still, even after introducing work-type controls, the gender gap is substantially smaller among parents of young children compared with parents of school-age children. We conjecture that this observation may reflect a selection effect. The labor force participation of mothers of young children is lower than that of mothers of school-age children. Mothers who decide to work while raising a young child may have stronger labor force attachment than average women. Also, the fact that a mother of a younger child is working may reflect that she has more help with childcare, be it through a father who does a large share of the work, the presence of other family members such as grandparents who help out, or the financial means to employ a nanny. The same factors may also lead to a smaller impact of the pandemic recession on these women's employment. Mothers of young children who managed to work prior to the pandemic without using formal childcare clearly experienced less of a shock to their childcare needs compared with mothers of older children who normally attend school.

A final notable outcome is that even after allowing for the childcare and industry and occupation channels, sizable gender gaps remain. The last rows of tables 7 and 8 show that within the no-child group and after controlling for work-type effects, women suffer larger employment losses than men in the United States and larger reductions in hours of labor supply in the United States, Canada, and Germany. In fact, the gender gap within the no-child group is only slightly smaller than the overall gender

gap in the United States and Canada, and larger (in terms of hours) in Germany. This shows that the gender gap in the impact of the pandemic goes well beyond the childcare and industry/occupation channels that have been emphasized by the literature so far. Understanding this pervasive nature of the gender gap in the impact of the pandemic, which constitutes a sharp difference from previous recessions, is an important challenge for future research.

E. Relating the Findings to the Literature

Several studies have analyzed gender differences in the labor market during the pandemic, typically focusing on one country at a time. None of these studies has applied the same methodology to analyze multiple countries in a comparable way. Existing studies also analyze only a subset of the issues that we do and often only with data from the first couple of months of the pandemic. Still, to the extent that the scope of existing studies overlaps with ours, it is instructive to check how the results line up.

A number of studies have been conducted about the United States, most of them using CPS data as we do. Some of the early studies include data only until April or May 2020 and each of them looks only at a subset of the issues we do. Nevertheless, by and large the results support our findings of large gender gaps in employment and hours reductions in response to the pandemic, especially for those with children (Collins et al. 2020; Couch, Fairlie, and Xu 2020; Cowan 2020; Dias, Chance, and Buchanan 2020; Montenovo et al. 2020; Fabrizio, Gomes, and Tavares 2021). There are two papers that exploit geographic variation in school and daycare closures to isolate the effect of increased childcare needs. Heggeness (2020) studies school closures and finds that mothers living in early closure states were more likely to take temporary leave or stop working entirely. Even mothers who maintained their jobs in early closure states were 53% more likely to not be at work compared with mothers in late closure states. Russell and Sun (2020) analyze childcare center closures instead and find similar effects for mothers of younger children. Using a triple-differences approach, they find evidence that the unemployment rate of mothers of young children increased substantially.

Like we do, studies analyzing Canadian data find sizable gender gaps in labor supply declines. Qian and Fuller (2020) analyze the Canadian LFS (same data as we use) and find a large increase in the gender employment gap for parents of primary school-age (6–12) children. They find even larger gender gaps when “being employed and at work” is used

as an outcome variable. Lemieux et al. (2020) document that employment and hours worked of mothers with school-age children dropped substantially early on in the pandemic. Beauregard et al. (2020) analyze data from Quebec and find a larger impact of the pandemic on mothers relative to fathers in dual-parent households. They also find larger employment declines for single parents compared with dual-parent households. They further exploit the differential timing of primary school reopenings across regions. Using a triple-difference strategy, they find a positive effect of reopenings on parental work, a more pronounced effect on single mothers, and a stronger impact when the job cannot be done from home.

For the United Kingdom, like we do, Hupkau and Petrongolo (2020) find no increase in the gender gap in paid employment using the same labor force survey that we rely on. One explanation for these findings may be a more equal division of childcare within British households. Hupkau and Petrongolo (2020) and Sevilla and Smith (2020) both document a decline in the gender childcare gap during the pandemic, especially when men can work from home or lost their jobs. Within specific subgroups, some studies do find gender gaps even in the United Kingdom. Andrew et al. (2020a) focus on two-parent families and find larger declines in employment for mothers than fathers within this group. Analyzing data from a real-time survey in April, Adams-Prassl et al. (2020b) also find gender gaps in employment losses in the United Kingdom. Adams-Prassl et al. (2020a) document a different kind of gender gap in furlough decisions: mothers were more likely than fathers to initiate furloughing (as opposed to it being the employer's decision), although no such gender gaps were found among childless workers.

For the Netherlands, Holler et al. (2021) use the same data that we employ and find little overall widening of the gender gap in employment or hours, in line with our findings. They distinguish essential from nonessential workers and find that women working in nonessential occupations reduced hours by more than men in the same occupations, but the opposite pattern is observed in essential occupations, where women reduced hours by less. Meekes, Hassink, and Kalb (2020) use administrative data for the Netherlands until June 2020. Like us, they find no significant widening of the gender employment gap in the first half of 2020. They argue that this is largely due to institutions such as a large short-time work scheme, generous paid family leave, and the availability of emergency childcare. The authors do find gender differences among subgroups: single moms of small children classified as essential workers experienced larger reductions in hours worked than other female essential workers.

González (2021) uses the Spanish labor force survey up until the third quarter and, in contrast to us, finds no evidence for a gender gap in employment losses. However, the paper uses a different definition of employment (classifying those furloughed and working zero hours as unemployed, while we define furloughed workers as employed) and does not consider hours worked, which likely explains the different result.

Previous findings for Germany are mixed. Adams-Prassl et al. (2020b) find no significant gender gap in employment losses in data from a real-time survey conducted in April 2020. Möhring, Reifenscheid, and Weiland (2021) find that women participate less in short-time work in Germany, so women's employment is more polarized between job loss and working on-site. Dullien and Kohlrausch (2021) argue that school closures played a relatively small role for aggregate employment and hours losses in Germany. Yet they also find an increase in the gender employment gap. In their survey, 20% of parents with children who need care said they reduced working time because of childcare and home-schooling requirements in April 2020, and 13% said so in June. Also more mothers than fathers perceived the situation as "extremely/strongly stressful" during the pandemic.

IV. A Closer Look at the United States

In this section, we provide a more detailed look at the case of the United States, the largest country in our study and the one with the largest gender gap in the employment impact of the pandemic.

A. *Decomposition of Channels Underlying the Gender Gap*

Building on the regression results in the previous section, we start by providing a decomposition analysis to assess the relative importance of the childcare and occupational channels for generating gender gaps in the impact of the pandemic. Given the results of regression equation (4), the decomposition answers the following question: how much of the pandemic-induced change in the gender gap can be explained by the presence of children, and how much is due to industry and occupational effects? We apply this decomposition to the population of workers who were employed on the eve of the pandemic.¹⁷

An intuitive way to understand our decomposition is as follows: for each individual, we use the regression results of equation (4) to predict their pandemic-induced change in labor supply. Given the specification,

this will depend on their gender, the presence of children, and their occupation. We then calculate the pandemic-induced change in the gender gap as the difference in the average change in labor supply for women and the average change in labor supply for men (in logs). Consequently, the aggregate change will depend on the micro effects (the estimated parameters θ_2 , θ_3 , and θ_5) and the joint distribution of characteristics—specifically gender, children, and occupations—in the population. For example, the contribution of the childcare channel is larger when more workers have a child. For our analysis, we use the distribution of characteristics in the prepandemic data (i.e., $D_t = 0$). The decomposition then assigns aggregate changes associated with θ_5 to the labor demand channel. The childcare channel captures contributions from θ_2 and θ_3 relative to the effect on those with no kids. The residual accounts for any widening in the gender gap among workers with no kids that is not explained by occupation effects ($\theta_{3,\text{none}}$). Details on the derivation and implementation of this decomposition are provided in appendix D.

Table 9 gives the results. We find that about 14% of the gender gap in the employment decline and 18% in the hours decline can be attributed to the childcare channel. The occupational channel can account for 12% and 20%, respectively. These numbers imply that there is a large residual: two-thirds of the widening in the gender gap cannot be explained by the two channels. The size of the residual is likely related to a missing data problem: for many individuals who are temporarily not working, no information on occupation or industry is collected. This creates noise that likely reduces the measured contribution of the occupational channel. To assess the importance of this issue, we reestimate our model on the sample of employed individuals only. Conditioning on employment means we can only decompose the intensive margin, as we are losing the extensive margin by construction. We do carry out this decomposition in appendix D. The decomposition of the widening of the gender gap in hours (conditional on working) based on an estimation using employed workers only

Table 9
Decomposition of Pandemic-induced Change in the Gender Gap

Outcome	Childcare Channel (%)	Occupation/Industry Channel (%)	Residual (%)
Employment	13.7	12.4	73.9
Hours	17.7	19.8	62.5

Note: See appendix D for details.

leads to a much smaller residual: we find that 21% of the gender gap can be attributed to the childcare channel and 50.5% to the occupational channel, leaving a residual of 28.5%. Note that although the occupation channel gains in importance, the contribution of the childcare channel is similar to the decomposition based on estimates for the entire sample.

Even a residual of just under 30% suggests that in the pandemic recession, there are channels beyond childcare and occupation that have a sizable role in explaining the disparate effects of the pandemic on women and men. One possible channel is related to the gender wage gap. If families try to minimize family exposure to COVID-19, some family members may quit jobs or reduce hours to reduce the family's total infection risk. Such a behavior would make the most sense for family members with low earnings or working in high-contact occupations, such as women working as nurses, physical therapists, or grocery store clerks. A second possibility is that our estimate of the childcare channel understates the total effect because, for instance, it ignores the effects on grandmothers in multigenerational households, some of whom may also have reduced work to provide more childcare. Yet another possibility is that other care-giving responsibilities went up as women spent more time caring for elderly relatives and other family members.

B. The Impact over Time

Because for the United States we have monthly data through October 2020, we can estimate how the gender gap changes over time. To do so, we reestimate the regression equations (2) and (4), but instead of interacting the female and job effects with a pandemic indicator, D_t , we interact them with monthly time fixed effects. To add precision, we take advantage of the longitudinal dimension of the CPS data and include individual level fixed effects in the regression.¹⁸ Also, we simplify child groups into a binary variable by combining parents of pre-K and school-age kids into one group. This leaves us with two groups: those who have children under the age of 18 and those who do not. Results for the overall gender gap are depicted in figure 8, and figures 9 and 10 provide separate results for those with and without children. In each case, changes are reported relative to January 2020.

Figure 8 shows that the gender gap was the largest early on in the pandemic. In April and May 2020, the gender gap was 2 percentage points higher compared with January in terms of employment and 10 percentage points higher in terms of hours. The employment gender gap started

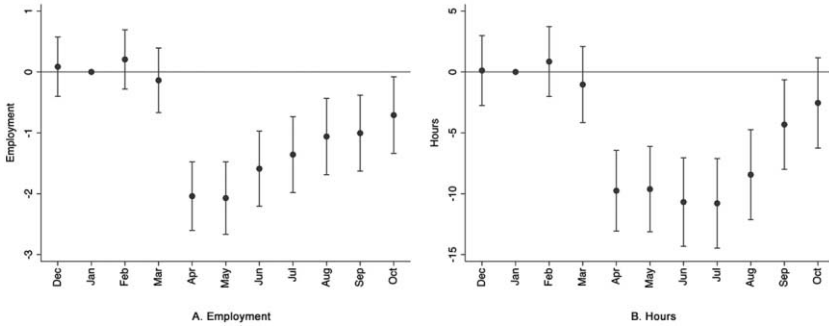


Fig. 8. Change in the gender gap over time, December 2019 to October 2020. The figure displays changes in the gender gap in the United States relative to January 2020. Error bands represent 95% confidence intervals. See appendix E for further details on the empirical specification. A color version of this figure is available online.

to narrow in June and had more than halved by October. The hours gap stayed wide for longer and started narrowing only in September. The decline over time of the gendered impact of the pandemic in the United States has also recently been pointed out by Lee, Park, and Shin (2021).

Figures 9 and 10 plot estimates over time for those with and without children. Although both groups faced a widening of the gender gap in hours and employment due to the pandemic, in April and May 2020 the gender employment gap among parents had widened by almost

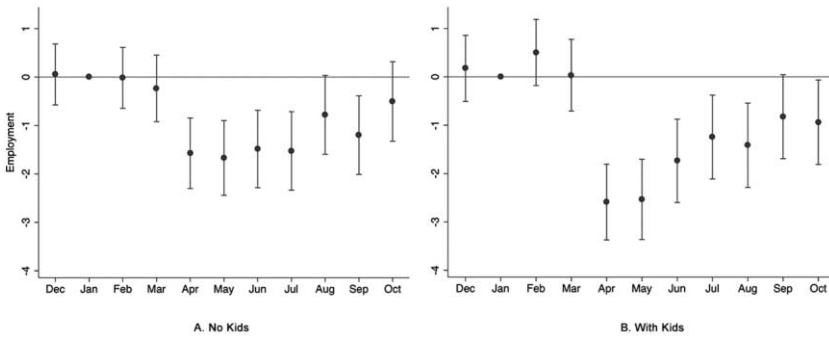


Fig. 9. Change in the employment gender gap by presence of children, December 2019 to October 2020. The figure displays changes in the gender gap in the United States relative to January 2020. Error bands represent 95% confidence intervals. See appendix E for further details on the empirical specification. A color version of this figure is available online.

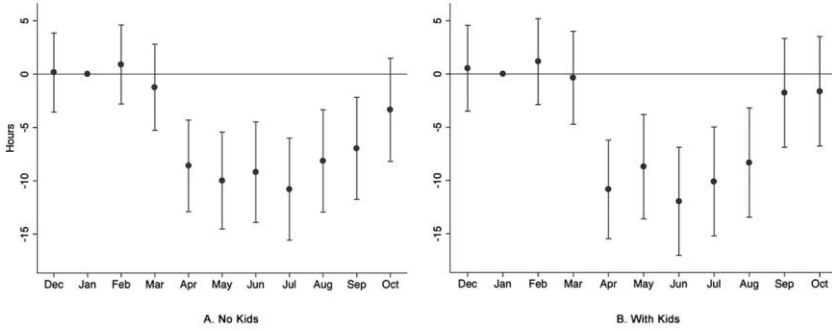


Fig. 10. Change in the hours gender gap by presence of children, December 2019 to October 2020. The figure displays changes in the gender gap in the United States relative to January 2020. Error bands represent 95% confidence intervals. See appendix E for further details on the empirical specification. A color version of this figure is available online.

3 percentage points relative to January, compared with about 2 percentage points among nonparents. For hours worked, trends across those with and without kids are similar. The gender gap in hours and employment declines over time, and by October 2020 the gender gap in employment remains statistically significant only among parents.

Generally, the impact of having children in the results displayed in figures 9 and 10 is smaller compared with the raw data displayed in figure 2 (and also fig. A4). Unlike figure 2, the regressions underlying figures 9 and 10 rely on micro data and include various controls, individual fixed effects, and differential trends across industries and occupations. Clearly, allowing for these controls and trends accounts for some of the raw gender gap displayed in figure 2.

C. Pandemic Recession versus Great Recession

In our analysis of the micro data, we have so far focused entirely on outcomes during the pandemic recession. We have already established in Section II that the aggregate impact of the pandemic recession on women versus men is drastically different from regular recessions in a large set of countries, but this still leaves open the question of whether there are gender gaps related to parenthood and childcare in other recessions too. To make one such comparison, we focus on the contrast between the pandemic recession and the Great Recession of 2007–9 in the United States.¹⁹

Table 10

Gender Gaps in Hours and Employment Changes during the Great Recession in the United States, December 2007 to May 2008

	Hours		Employment	
	Benchmark	Work Controls	Benchmark	Work Controls
Basic gender gap (β_3/γ_3):	10.13 (0.00)	3.39 (0.00)	1.88 (0.00)	.39 (.01)
Pre-K kids ($\delta_{3,pre-K}/\theta_{3,pre-K}$)	12.51 (0.00)	2.51 (.09)	2.54 (0.00)	.19 (.44)
School-age kids ($\delta_{3,school}/\theta_{3,school}$)	8.08 (0.00)	3.12 (.01)	1.40 (0.00)	.34 (.10)
None ($\delta_{3,none}/\theta_{3,none}$)	10.37 (0.00)	3.64 (0.00)	1.92 (0.00)	.44 (.01)

Note: Coefficients reported are percentage points. Sample includes all civilians ages 25–55 who are either employed, unemployed, or not in the labor force (NILF). The p -values are reported in parentheses below estimates. Unless otherwise noted, all regressions include gender-specific time trends and controls for age, education, race, and marital status, in addition to quarterly indicators and a fixed effect for education sector workers in summer months to control for seasonality. Child age brackets are assigned by the age of the youngest child (<5 and 5–17).

Table 10 provides results for the same specifications as in tables 7 and 8 for the Great Recession in the United States. To focus on the first 6 months of the recession (as we do in tables 7 and 8), we set the recession indicator D_t to one starting in December 2007 until May 2008. As expected, given the results in Section II, the table shows that, unlike the pandemic recession, the Great Recession was a mancession with larger declines in both hours and employment for men. Furthermore, the impacts on the gender gap among parents and nonparents are of the same sign and of a similar magnitude. These findings are consistent with the notion that both the overall impact on women in the labor market and the special role of parenthood are unique to the pandemic recession of 2020.

V. Heterogeneity by Education, Race, Single Parenthood, and Ability to Work from Home

We now return to the full set of countries and explore which other dimensions of heterogeneity (beyond parenthood and industry/occupation) are connected to gender differences in the labor market during the pandemic recession.

A. *The Role of Education and Race*

Consider, first, the role of education. Tables 11 and 12 present results analogous to tables 7 and 8 with separate results for individuals with at least college education and less-educated workers.²⁰ The regressions in tables 11 and 12 already include industry and occupation controls and thus capture education effects beyond those that arise because education and work type are correlated.²¹

Recall that only the United States and Canada display a large and statistically significant overall gender gap for both employment and hours after controlling for industry and occupation effects (tables 7 and 8). Tables 11 and 12 show that in the same two countries, the gender gap for both employment and hours is much larger among less-educated workers. In both countries, the gender gap for employment is more than three times larger among less-educated workers compared with workers with college education. For hours, the gender gap among less-educated workers is three times as large among the less educated in the United States and a bit more than 50% larger in Canada. The role of childcare in accounting for these differences varies across countries. In the United States, it is notable

Table 11
Pandemic-induced Changes in the Gender Gap in Employment by Education,
with Occupation/Industry Controls

	USA	CAN	DEU	NLD	ESP	GBR
BA degree or higher (γ_3):	-.52	-.20	-1.92	1.71	.01	-.57
	(.03)	(.42)	(.18)	(.13)	(.78)	(.34)
Pre-K kids ($\theta_{3,pre-k}$)	-.53	.73		2.46	.10	-.28
	(.20)	(.08)		(.22)	(.23)	(.79)
School-age kids ($\theta_{3,school}$)	-1.82	-.62	-1.95	-.58	-.08	-.46
	(0.00)	(.12)	(.37)	(.67)	(.41)	(.57)
No kids ($\theta_{3,none}$)	.08	-.51	-.56	2.52	.04	-.99
	(.80)	(.09)	(.75)	(.06)	(.45)	(.19)
Less than BA degree (γ_3):	-1.59	-.66	-.83	.44	.05	-.16
	(0.00)	(0.00)	(.49)	(.73)	(.36)	(.80)
Pre-K kids ($\theta_{3,pre-k}$)	-1.24	-.32		-1.15	.08	.04
	(.03)	(.39)		(.70)	(.23)	(.98)
School-age kids ($\theta_{3,school}$)	-1.82	-2.34	.28	.77	-.04	-.84
	(0.00)	(0.00)	(.89)	(.67)	(.67)	(.31)
No kids ($\theta_{3,none}$)	-1.75	-.31	-1.55	.58	.10	-.38
	(0.00)	(.23)	(.27)	(.69)	(.20)	(.62)

Note: The notes of table 7 apply. All regressions include occupation \times industry controls interacted with the pandemic indicator. For details on the data, see appendix C.

Table 12
 Pandemic-induced Changes in the Gender Gap in Hours by Education,
 with Occupation/Industry Controls

	USA	CAN	DEU	NLD	ESP	GBR
BA degree or higher (γ_3):	-2.24 (.10)	-5.38 (0.00)	-22.60 (.15)	-17.57 (.15)	-4.06 (.08)	-4.23 (.27)
Pre-K kids ($\theta_{3,pre-K}$)	-4.79 (.07)	-2.01 (.42)		-71.19 (.01)	-5.45 (.31)	-.82 (.90)
School-age kids ($\theta_{3,school}$)	-7.66 (0.00)	-5.32 (.03)	1.56 (.95)	10.05 (.59)	-8.11 (.03)	-12.64 (.02)
No kids ($\theta_{3,none}$)	1.20 (.49)	-5.46 (0.00)	-42.47 (.01)	-15.26 (.35)	-1.35 (.65)	-5.15 (.30)
Less than BA degree (γ_3):	-7.75 (0.00)	-8.75 (0.00)	-21.56 (.10)	-4.41 (.73)	-.81 (.70)	4.46 (.22)
Pre-K kids ($\theta_{3,pre-K}$)	-3.22 (.26)	-8.62 (0.00)		-50.31 (.23)	5.16 (.26)	14.65 (.03)
School-age kids ($\theta_{3,school}$)	-9.86 (0.00)	-15.73 (0.00)	-14.63 (.47)	-24.28 (.27)	-2.46 (.42)	-2.32 (.65)
No kids ($\theta_{3,none}$)	-8.49 (0.00)	-5.03 (0.00)	-23.73 (.13)	7.89 (.60)	-1.59 (.55)	1.91 (.67)

Note: The notes of table 8 apply. All regressions include occupation \times industry controls interacted with the pandemic indicator. For details on the data, see appendix C.

that among college-educated workers, the gender gap in the impact of the crisis is entirely due to those with children—there is no significant gender gap for either employment or hours among those without kids. In contrast, among less-educated workers, women suffer larger declines in employment and hours even without children. In the United Kingdom (where the gender gap in the impact of the crisis is generally small) as well as in Spain, the only group where we observe a large and statistically significant gender gap in the decline in hours worked consists of college-educated workers with school-age children.

Another salient dimension of heterogeneity is race; in the United States for example, overall employment losses have been substantially larger among Black and Hispanic workers compared with White workers. Tables 13 and 14 examine whether the gender gap in the impact of the crisis also varies across races. The underlying regressions include industry and occupation controls and thus are not driven by differences in the distribution of workers of different races across work types.²² Data on race are available only for the United States and the United Kingdom; for these countries, to maintain sufficiently large sample sizes, we focus on differences between white workers and all others. For Canada, Germany,

Table 13
 Pandemic-induced Changes in the Gender Gap in Employment by Race or Migration Background, with Occupation/Industry Controls

	White/Nonwhite		Migration Background			
	USA	GBR	CAN	DEU	NLD	ESP
Gender gap: whites/no migration (γ_3):	-1.14 (0.00)	-.32 (.55)	.20 (.37)	-.55 (.56)	1.68 (.11)	.02 (.58)
Pre-K kids ($\theta_{3,pre-K}$)	-.94 (.02)	.26 (.78)	.39 (.26)		3.50 (.06)	.08 (.23)
School-age kids ($\theta_{3,school}$)	-1.96 (0.00)	-.75 (.26)	-.76 (.02)	-.09 (.95)	1.12 (.41)	-.04 (.49)
No kids ($\theta_{3,none}$)	-.91 (0.00)	-.65 (.30)	.32 (.19)	-.62 (.59)	1.65 (.16)	.05 (.33)
Gender gap: nonwhites/migration (γ_3):	-.93 (.01)	-.53 (.61)	-1.88 (0.00)	-9.36 (.01)	-.69 (.67)	.10 (.37)
Pre-K kids ($\theta_{3,pre-K}$)	-.33 (.69)	-.67 (.74)	-.48 (.29)		-7.98 (.05)	.09 (.25)
School-age kids ($\theta_{3,school}$)	-1.26 (.04)	-.68 (.68)	-3.31 (0.00)	-8.11 (.10)	-3.01 (.26)	-.09 (.66)
No kids ($\theta_{3,none}$)	-1.10 (.02)	-.95 (.53)	-1.91 (0.00)	-9.22 (.05)	1.37 (.49)	.22 (.17)

Note: The notes of table 7 apply. All regressions include occupation \times industry controls interacted with the pandemic indicator. For Canada, Germany, the Netherlands, and Spain, we group people by migration background instead of race. For details on the data, see appendix C.

the Netherlands, and Spain, we display analogous results focusing on differences between the native-born population and workers with a migration background (see app. C for details).

We find that in the United States, the gender gap is generally of a similar size between white and other workers. Having school-age children expands the gender gap a bit more among white workers. Likewise, in the United Kingdom there are no significant differences in patterns between white and nonwhite workers. Notice that these results reflect relative changes between women and men; even though nonwhite workers generally experienced a larger reduction in employment and hours, this does not seem to affect women more strongly than men, and in the United States it is somewhat less so if they have school-age children.

In Germany, the gender gap in the impact on employment is much larger among workers with a migration background. This difference is not driven by childcare: the gap is similar among workers with and without children. The same gap is not observed for hours. This suggests that

Table 14
 Pandemic-induced Changes in the Gender Gap in Hours by Race or Migration Background, with Occupation/Industry Controls

	White/ Nonwhite		Migration Background			
	USA	GBR	CAN	DEU	NLD	ESP
Gender gap: whites/no migration (γ_3):	-5.20 (0.00)	-.69 (.83)	-5.42 (0.00)	-23.06 (.03)	-4.59 (.65)	-1.66 (.37)
Pre-K kids ($\theta_{3,pre-K}$)	-3.23 (.15)	7.32 (.17)	-3.33 (.11)		-50.84 (.06)	2.12 (.59)
School-age kids ($\theta_{3,school}$)	-9.73 (0.00)	-9.82 (.02)	-8.81 (0.00)	-11.96 (.47)	-2.54 (.88)	-4.54 (.08)
No kids ($\theta_{3,none}$)	-3.89 (.01)	-1.93 (.61)	-3.55 (.02)	-28.95 (.02)	1.31 (.92)	-.97 (.67)
Gender gap: nonwhites/migration (γ_3):	-5.16 (.01)	6.67 (.27)	-10.79 (0.00)	-15.19 (.67)	-31.52 (.09)	-3.51 (.32)
Pre-K kids ($\theta_{3,pre-K}$)	-4.79 (.28)	5.34 (.63)	-10.29 (0.00)		-123.02 (.01)	-3.95 (.60)
School-age kids ($\theta_{3,school}$)	-6.33 (.05)	11.00 (.26)	-16.79 (0.00)	4.13 (.93)	-28.14 (.44)	-6.27 (.30)
No kids ($\theta_{3,none}$)	-4.95 (.05)	.37 (.97)	-6.66 (0.00)	-48.18 (.32)	-16.85 (.47)	-1.19 (.81)

Note: The notes of table 8 apply. All regressions include occupation \times industry controls interacted with the pandemic indicator. For Canada, Germany, the Netherlands, and Spain, we group people by migration background instead of race. For details on the data, see appendix C.

among workers with an immigration background, women were more likely to lose their job in the crisis, whereas immigrant men and native workers were more likely to hold on to their job but then reduce hours through the use of furlough schemes. Some of this pattern may arise because many immigrant women have “minijobs” without formal employment protection. In the Netherlands, there is a substantial gender gap for both employment and hours among parents of young children with a migration background. In Canada, the gender gap among immigrants widens substantially for both employment and hours, particularly for those with school-age children. For nonimmigrants we observe a similar effect for hours but of a smaller magnitude.

B. The Role of Single Parenthood

Our results so far indicate that childcare obligations are one major reason why women in many countries faced a deterioration in labor market

opportunities during the crisis. The role of childcare suggests that single parents, who have less flexibility in sharing responsibilities with a partner, should be particularly exposed to the effects of the crisis. To examine this possibility, we now consider differences in the impact of the crisis on single mothers versus mothers living with a partner. The regressions take the form

$$y_{it} = \kappa_0 \mathbf{Kid}_{it} + \kappa_1 S_i \times \mathbf{Kid}_{it} + \kappa_2 \mathbf{Kid}_{it} \times D_t + \kappa_3 S_i \times \mathbf{Kid}_{it} \times D_t + \kappa_4 \mathbf{X}_{it} + \epsilon_{it}. \quad (5)$$

Here y_{it} is the outcome variable for individual i at time t , S_i is an indicator for a single mother, D_t is the indicator for the COVID-19 pandemic, and \mathbf{Kid}_{it} is a vector of two dummy variables grouping households by age of their youngest child into two groups: pre-K (<5) and school age (5–17).²³ The vector \mathbf{X}_{it} consists of the same control variables as in the earlier regressions. We run this regression on a sample consisting only of mothers with kids up to the age of 18 (below 20 in Spain); here we are interested in the coefficients κ_3 on the interaction of S_i , D_t , and \mathbf{Kid}_{it} , which captures the difference in the impact of the pandemic on single mothers versus mothers living with a partner by child age.

We also carry out a version of this regression analogous to equation (4) with work-type controls:

$$y_{it} = \lambda_0 \mathbf{Kid}_{it} + \lambda_1 S_i \times \mathbf{Kid}_{it} + \lambda_2 \mathbf{Kid}_{it} \times D_t + \lambda_3 S_i \times \mathbf{Kid}_{it} \times D_t + \lambda_4 \mathbf{Job}_{it} + \lambda_5 \mathbf{Job}_{it} \times D_t + \lambda_6 \mathbf{X}_{it} + \epsilon_{it}. \quad (6)$$

Table 15 shows the estimates of the parameters κ_3 and λ_3 in these regressions. In the results without work-type controls, we find that in the United States, Canada, and Spain, single mothers of school-age children experienced larger declines in employment and hours compared with mothers living with a partner. In the United States and Canada, the same is true for single mothers of younger children. In contrast, in Germany, the Netherlands, and the United Kingdom, there are no significant differences in the impact of the crisis on single versus other mothers.

The results controlling for work type indicate that a lot of the large impact on single mothers in the United States, Canada, and Spain is due to the fact that single mothers are likely to have jobs in industries and occupations that experienced larger employment declines in the crisis. In all three countries, the gap between single mothers and mothers living with a partner is substantially reduced once differential trends across job types

Table 15
 Pandemic-induced Changes in Labor Supply for Single Mothers

	USA	CAN	DEU	NLD	ESP	GBR
Single mothers employment gap:						
Pre-K kids ($\kappa_{3,pre-K}$)	-5.67 (0.00)	-3.69 (0.00)		4.82 (.54)	-.03 (.99)	-2.64 (.29)
School-age kids ($\kappa_{3,school}$)	-1.44 (.03)	-2.04 (0.00)	6.80 (.11)	-2.15 (.42)	-2.82 (.02)	.85 (.51)
w/ ind and occ controls:						
Pre-K kids ($\lambda_{3,pre-K}$)	-.14 (.82)	-.48 (.38)		5.73 (.39)	.10 (.36)	.56 (.80)
School-age kids ($\lambda_{3,school}$)	.28 (.50)	-1.02 (0.00)	7.59 (.08)	-4.52 (.03)	-.27 (.12)	.58 (.57)
Single mothers hours gap:						
Pre-K kids ($\kappa_{3,pre-K}$)	-25.09 (0.00)	-28.10 (0.00)		43.64 (.58)	-4.08 (.73)	-15.15 (.09)
School-age kids ($\kappa_{3,school}$)	-12.59 (0.00)	-10.99 (0.00)	68.71 (.18)	23.20 (.43)	-22.20 (0.00)	-2.57 (.67)
w/ ind and occ controls:						
Pre-K kids ($\lambda_{3,pre-K}$)	-1.51 (.64)	-14.40 (0.00)		14.41 (.86)	-5.27 (.53)	2.72 (.75)
School-age kids ($\lambda_{3,school}$)	-3.20 (.13)	-5.06 (.03)	84.68 (.10)	7.54 (.77)	-9.21 (.01)	3.26 (.54)

Note: Hours coefficients reported are log points difference of the pandemic's effect on single mothers versus nonsingle mothers. Employment coefficients are percentage points difference. Sample includes all mothers with children (ages <5 or 5–17, by youngest child) ages 25–55 who are not in the military. In Spain, the group of school-age children includes those up to the age of 19. For Spain, Germany, and the United Kingdom, we use cohabitation-marriage status (=1 if married or cohabiting, =0 if neither cohabiting nor married). Otherwise, all notes from tables 7 and 8 apply. For further details on the data, see appendix C.

are controlled for. In the United States, in fact, all differences become statistically insignificant. In Canada, the additional impact on single mothers remains quantitatively large even after controlling for work type. For example, hours for single mothers decline by an additional 5.1 percentage points for mothers of school-age children and by 14.4 percentage points for mothers of younger children. In Spain, we observe a similarly strong decline in hours for single mothers of school-age children by an additional 9.2 percentage points when taking work type into account. In the Netherlands, the impact on the employment of single mothers with school-age kids is larger after controlling for work type.

The results not only provide support for the view that single mothers faced particularly large challenges during the crisis but also show that local conditions matter. The extent of school closures and the availability of emergency childcare varied widely across the countries considered. So

does mothers' baseline labor supply. In Germany and the Netherlands, for example, relatively few mothers work full time, which may give them additional flexibility to deal with childcare needs compared with otherwise similar mothers in the United States or Canada who were working full time at the beginning of the crisis. We also note that for the Netherlands and Germany, we have only few observations of single mothers, making it more difficult to reliably identify the role of single motherhood in these countries.

C. The Role of the Ability to Work from Home

We already saw that the impact of the pandemic on workers varied widely across industries and occupations. Among the underlying job characteristics that give rise to these differences, arguably the most important one is the ability to work from home. Job losses were highest in industries and occupations where working from home is impossible, including much of the hospitality industry. In contrast, other groups such as office workers and academics were able to continue work via telecommuting and rapidly adopted remote-working tools such as videoconferencing on Zoom and similar services in the process. The ability to work from home also interacts with childcare needs; looking after children in virtual school is easier for a parent who is working on a laptop a few feet away compared with a parent who has to commute to a workplace.

To examine how telecommuting shaped the labor market experiences of women versus men during the pandemic, we now consider how the gender gap in the impact of the crisis differs between workers who are able to work from home during the pandemic and those who are not. We focus on the United States, the United Kingdom, and the Netherlands, where information on telecommuting during the crisis is available. Moreover, we limit attention to the intensive margin of labor supply (hours worked conditional on being employed), because the place of work is only known for the employed.

For the United States, information on telecommuting during the pandemic is available from the COVID-19 supplement to the CPS.²⁴ The answers are available starting in May 2020, and we classify individuals as telecommuting if they worked remotely at any point from May 2020 to September 2020. We retrieve labor market outcomes predating May 2020 using the panel dimension of the CPS monthly files. In the United Kingdom, telecommuting information is available for all employed individuals, including those who report zero hours of work (i.e., workers on

furlough). Note that our information is on actual telecommuting rather than just the ability to work from home, so that results could be influenced by workers' decision whether to work from home if they have the ability to do so. Nevertheless, we conjecture that during the crisis most workers who were able to work from home actually did so. In the Netherlands, the data contains information on the hours worked from home in the reference week for March, April, May, June, and September 2020. Hence, we follow the same approach as for the United States and define individuals to be able to telecommute if they have been working from home at any point between March and September 2020.

Table 16 displays how the gender gap in the impact of the crisis differs between workers who can work from home and those who cannot. For the United States, the result is straightforward to summarize: there are large gender gaps among workers who are unable to work from home but only small ones among telecommuters, which become insignificant when controlling for work types. This continues to be true when we separate results between parents and others. Among telecommuters, gender gaps are small among both parents and nonparents. In contrast, among nontelecommuters, there is a large gender gap even among workers without kids and an even larger one among parents. Unlike in our baseline results that do not control for telecommuting, this time the largest gender gap is found among parents of young (pre-K) children: in this group, mothers are estimated to reduce hours by about 17 percentage points more than fathers do. The gender gap amounts to 14 percentage points among parents of school-age children, whereas it is 9 percentage points among those without kids under the age of 18. Interestingly, the results are essentially the same regardless of whether we also introduce job-type controls or not. This suggests that the ability to work from home is the main job-type characteristic that matters during the pandemic, so that few additional effects arise when telecommuters and nontelecommuters are already separated.

The central role of the combined effect of the ability to work from home and childcare needs is also apparent from the raw data on labor supply for women and men during the pandemic. Table 17 displays average hours worked conditional on being employed in the United States broken down by gender, parental status, and telecommuting. For men, weekly work hours vary little across these groups and are close to 40 hours per week in each case. Similarly, for women who can telecommute, labor supply is roughly constant across groups, with all groups averaging between 35 and 38 hours per week. For women who cannot telecommute, however,

Table 16
 Pandemic-induced Change in the Gender Gap in the Intensive Margin of Employment by Telecommuting Status

	United States		United Kingdom		The Netherlands	
	Benchmark	Work Type	Benchmark	Work Type	Benchmark	Work Type
No telecommuting (β_3/γ_3):	-12.42 (0.00)	-11.87 (0.00)	-1.00 (.74)	-2.18 (.49)	6.19 (.69)	7.96 (.64)
Pre-K kids ($\delta_{3,pre-K}/\theta_{3,pre-K}$)	-17.18 (0.00)	-17.33 (0.00)	-3.02 (.58)	-4.39 (.43)	-66.07 (.21)	-60.23 (.24)
School-age kids ($\delta_{3,school}/\theta_{3,school}$)	-14.89 (0.00)	-14.09 (0.00)	-10.70 (.01)	-9.01 (.04)	-13.44 (.64)	-19.01 (.51)
No kids ($\delta_{3,none}/\theta_{3,none}$)	-9.45 (0.00)	-8.76 (0.00)	2.93 (.43)	-1.15 (.97)	18.81 (.33)	22.48 (.29)
Telecommuting (β_3/γ_3):	-3.60 (.06)	-2.07 (.29)	9.35 (.08)	12.80 (.02)	-11.99 (.27)	-12.32 (.30)
Pre-K kids ($\delta_{3,pre-K}/\theta_{3,pre-K}$)	-3.52 (.34)	-1.47 (.69)	12.82 (.28)	18.47 (.11)	-41.71 (.13)	-49.50 (.08)
School-age kids ($\delta_{3,school}/\theta_{3,school}$)	-4.51 (.09)	-2.90 (.28)	3.50 (.67)	9.95 (.22)	-3.23 (.86)	4.87 (.80)
No kids ($\delta_{3,none}/\theta_{3,none}$)	-3.51 (.11)	-2.27 (.32)	13.25 (.08)	12.85 (.08)	-7.60 (.61)	-12.32 (.42)

Note: Coefficients reported are log percentage point differences of the pandemic’s effect on women versus men. Sample includes all civilians ages 25–55 who are employed (in the United States restricted to positive hours, in the United Kingdom including those with zero hours, e.g., those on furlough). The *p*-values are reported in parentheses below estimates. All regressions include gender-specific time trends and controls for age, education, race, and marital status, in addition to quarterly indicators and a fixed effect for education sector workers in summer months to control for seasonality. Child age brackets are assigned by the age of the youngest child (<5 and 5–17). For details on the data, see appendix C.

motherhood makes a big difference: nontelecommuting mothers of pre-K children work more than 5 hours less per week during the pandemic compared with nontelecommuting women without children. For mothers of middle school children, there is still a gap of about 3 hours per week.

In the Netherlands, we observed in our baseline regression a large and significant gender gap in hours for parents with pre-K kids (see table 8). The coefficients in table 16 suggest that this result is to some extent driven by those parents who cannot telecommute. In this group, we observe a stark contrast between those with small children and those without children, although the results are not tightly estimated due to small sample size.

Table 17

Hours Worked during the Pandemic in the United States by Telecommuting, Gender, and Children

	Women		Men	
	Nontele	Telecommute	Nontele	Telecommute
No or adult children	35.2	37.9	39.1	39.9
Pre-K children	30.0	35.2	40.3	40.4
Middle school children	32.5	36.6	40.5	41.5
High school children	34.1	36.8	40.6	41.4

Note: Sample includes all employed individuals, ages 25–55, not in the military. Report values correspond to weighted average hours worked last week by sex, child group, and telecommuting status from May 2020 through October 2020. Child age brackets are assigned by the age of the youngest child (pre-K: <5, middle school: 5–13, high school: 14–17).

Regarding the United Kingdom, recall that unlike the other countries considered here, we did not find a substantial gender gap in the impact of the crisis. Once we separate out telecommuters, most gender-gap coefficients in table 16 continue to be small and statistically insignificant. However, we now do find a sizable gender gap among workers who cannot telecommute and who have school-age children. In this group, the negative impact on the labor supply of mothers is 9–11 percentage points larger compared with fathers. Thus, even in the United Kingdom, the combination of having to look after school-age children and being unable to work from home is associated with a large decline in mothers' labor supply.

The gender gap among parents of school-age children in the United Kingdom is related to the use of furlough schemes; there are more mothers than fathers recorded as employed but working zero hours.²⁵ Furloughing accounts for most of the gender gap in labor supply of nontelecommuting parents with school-age children: if we exclude those who record zero hours, the gender gap turns insignificant.²⁶ Hence, the data suggest that furlough schemes gave workers additional flexibility in dealing with the crisis, and that it was mothers of school-age children who used this flexibility to select into not working temporarily (i.e., asking their employer to be furloughed if telecommuting was not an option).²⁷

Table 18 provides a further breakdown of the results of table 16 for the United Kingdom by allowing for separate interactions for more-educated (bachelor of arts [BA] degree or higher) and less-educated (less than BA) workers. Here we see that the option to telecommute in the presence of children matters a lot more for highly educated mothers. Among telecommuting workers with at least BA education, there is no significant

Table 18
 Pandemic-induced Change in the Gender Gap in the Intensive Margin of Employment in the United Kingdom by Telecommuting Status and Education

	Benchmark		w / Occupation × Industry	
	Less than BA	BA or Higher	Less than BA	BA or Higher
No telecommuting (β_3/γ_3):	.40 (.91)	-7.97 (.03)	2.83 (.47)	-7.62 (.04)
Pre-K kids ($\delta_{3,pre-K}/\theta_{3,pre-K}$)	1.53 (.84)	-14.54 (.05)	5.72 (.46)	-12.62 (.09)
School-age kids ($\delta_{3,school}/\theta_{3,school}$)	-7.96 (.14)	-19.76 (0.00)	-3.11 (.58)	-17.78 (0.00)
No kids ($\delta_{3,none}/\theta_{3,none}$)	3.75 (.43)	-3.02 (.54)	3.72 (.44)	-4.03 (.41)
Telecommuting (β_3/γ_3):	3.88 (.60)	6.63 (.35)	6.43 (.38)	17.74 (.01)
Pre-K kids ($\delta_{3,pre-K}/\theta_{3,pre-K}$)	-8.76 (.63)	22.34 (.14)	-2.66 (.88)	34.13 (.02)
School-age kids ($\delta_{3,school}/\theta_{3,school}$)	-2.83 (.80)	-1.80 (.87)	2.91 (.79)	14.32 (.21)
No kids ($\delta_{3,none}/\theta_{3,none}$)	14.95 (.15)	6.22 (.55)	12.52 (.22)	13.41 (.18)

Note: Coefficients reported are log points difference of the pandemic’s effect on women versus men. Sample includes all civilians ages 25–55 who are employed (including those with zero and positive working hours in the last week). The *p*-values are reported in parentheses below estimates. All regressions include gender-specific time trends and controls for age, education, race, and marital status, in addition to quarterly indicators and a fixed effect for education sector workers in summer months to control for seasonality. Child age brackets are assigned by the age of the youngest child (<5 and 5–17). For details on the data, see appendix C.

gender gap in the impact of the crisis regardless of having children. In contrast, the gender gap among educated parents who cannot work from home is large. Depending on the age of the children and on whether we control for additional occupation and industry effects, the labor supply of nontelecommuting educated mothers falls by 13–20 percentage points more than the labor supply of fathers in this group. Among less-educated workers, these gender gaps are small or nonexistent. Thus, even though overall the gender gap in the impact of the crisis is small in the United Kingdom, even here we find that the clash of childcare needs and having to be at work during the crisis was a challenge for many mothers.

Overall, our results suggest that the ability to work from home played a central role in shaping the impact of the pandemic on working women. Being able to telecommute is a clear advantage for all workers during the pandemic, both because this reduces the probability of employment

loss and because working at home reduces the risk of exposure to disease. Parents get the additional benefit of having an easier time dealing with additional childcare and supporting their children's education during school and daycare closures. Although this benefit in principle accrues to both fathers and mothers, our results show that in practice it was primarily women's employment that suffered where a conflict between children's needs and a lack of ability to telecommute arose.

VI. The Impact of the Pandemic on Workers' Productivity

So far we have focused on labor supply to document inequality in the impact of the pandemic on the labor market. Although we find a lot of evidence of gender inequality during the crisis, we also document that workplace flexibility in the form of the ability to work from home appears to protect women's labor market prospects. This could be taken as a hopeful sign for the long-run impact of the pandemic on gender inequality. The recent literature on the "motherhood penalty" shows that the combined challenge of career and family goals is at the root of much of the gender inequality in the labor market today. Our results suggest that workplace flexibility substantially reduces the conflict between work and childcare. Moreover, now that many employers have adopted working from home, liked the results, and plan to preserve work-from-home options in the future, we can expect that after the pandemic, workplace flexibility will be much more widely available than previously. Should we therefore expect a smaller motherhood penalty and lower gender gaps in the postpandemic labor market?

Although such an outcome of lower future gender equality is a possibility, our evidence on labor supply may paint an incomplete picture of the impact of the crisis on working women and men. Even though working from home allowed many parents to continue working while also supervising their children, productivity at work may still have suffered in the process. Moreover, if the division of childcare duties is unequal in the family, the productivity impact may be more severe for mothers than for fathers. The evidence indeed suggests that on average, mothers provided the larger share of the additional childcare during the pandemic. For example, Adams-Prassl et al. (2020b) show that during the pandemic, women with children who worked from home spent 1–2 hours more every day on childcare and homeschooling compared with men in the same situation, with remarkably similar patterns in the United States, Germany, and the United Kingdom.²⁸ This evidence suggests that combining

working from home with childcare was a greater challenge for mothers compared with fathers.

Our data for the Netherlands provide direct evidence of a greater clash between work and childcare responsibilities for women compared with men. Table 19 shows that in April 2020, Dutch parents spent on average 13 hours per week working from home. A lot of this time was combined with childcare: averaging between mothers and fathers, parents report that for more than 60% of the time working at home they were simultaneously looking after their children. However, there is a large gender gap in doing double duty. In line with our other results, this gender gap is largest for those with school-age children (ages 6–14) who likely need help with homeschooling. In this group, mothers spent three quarters of their work time at home on simultaneously taking care of children, which is 30% more than the fathers in this group. As a fraction of all work hours (including those done outside the home), mothers of school-age children spent close to 40% of work time on also doing childcare, about 40% more than fathers did.

Andrew et al. (2020a) provide additional evidence of a gender gap in doing double duty of work and childcare based on a survey of parents in the United Kingdom carried out in April and May 2020. The authors find that mothers generally spent more time on childcare and house work and less time on paid work compared with fathers. To assess the extent to which other responsibilities such as childcare affect the quality of the time spent working, the authors focus on work interruptions, defined as doing

Table 19
Working from Home while Looking after Children in the Netherlands, April 2020

	Hours Worked from Home per Week	Percent of Home Work Hours also Spent on Childcare	Percent of All Work Hours also Spent on Childcare
All parents	13.0	61.1	30.8
Single parents	12.9	64.3	32.6
Mothers, kids 1–5	9.9	59.4	34.8
Fathers, kids 1–5	17.2	49.5	26.1
Mothers, kids 6–14	11.1	76.0	38.7
Fathers, kids 6–14	15.4	58.5	27.7
Mothers, kids 15–18	8.8	54.6	22.9
Fathers, kids 15–18	19.8	51.7	24.3

Note: See appendix C.4 for details.

at least one nonwork activity during an hour of paid work. Whereas prior to the pandemic, both mothers and fathers used to be interrupted proportionally to their work hours, during the crisis mothers are interrupted about 50% more often. For mothers, 90% of these interruptions are due to childcare. Overall, fathers working for pay ended up with nearly twice as many uninterrupted work hours compared with mothers working for pay.

This evidence suggests even though working from home may have cushioned the impact of school and daycare closures on employment, the quality of parents' work time and productivity are likely to have suffered in the process. This impact is much larger for mothers than for fathers. Lower productivity at work, in turn, may have implications for human capital accumulation on the job and future career prospects. Whereas in some occupations a short-run dip in productivity may be of little concern, in others mothers with high childcare obligations during the crisis may miss out on raises or promotions in the near future. In "up-or-out" occupations such as law, falling behind peers during the crisis could put up a permanent ceiling to future career prospects.

For the most part, the productivity losses of working parents during the pandemic will show up in the data only some years down the road. There is one sector characterized by "up-or-down" promotions where evidence on productivity during the crisis is already available: academia. The productivity of academic researchers can be proxied by real-time output measures such as publications and working papers. Several recent research papers document a gender gap in researchers' productivity since the beginning of the pandemic. Amano-Patiño et al. (2020) use data from the National Bureau of Economic Research (NBER) and the Centre for Economic Policy Research (CEPR) working paper series and the CEPR's *Covid Economics: Real-Time and Vetted Papers* online journal to analyze the contribution of female economists during the first wave of the pandemic. They find that while the relative number of female authors remained constant at about 20%, women constituted only 12% of all authors working on COVID-19 research. Because COVID-19 research was carried out during the pandemic, while most other working papers were likely based on research started well before the onset of the pandemic, this suggests a sizable decline in the relative research productivity of women. Similarly, Ribarovska et al. (2021) document a small reduction in female-last authors in a neurology journal, and a much larger reduction of female-first and -last authors among articles in a COVID-19 special issue. Kim and Patterson (2020) analyze Twitter

posts by academic political scientists between June 2019 and June 2020 and find a larger decline in work-related tweets for women compared with men. The authors argue that this gender gap is likely driven by increased family obligations, because at the same time female researchers became relatively more likely to tweet about family-related matters. Barber et al. (2021) use a survey of members of the American Finance Association to examine determinants of research productivity during the pandemic and find that productivity fell more for women and for researchers with young children.

Many universities have announced policy changes to respond to the challenge that the crisis poses for young researchers, such as tenure-clock extensions for assistant professors. However, with few exceptions, these policies do not distinguish between women and men or make special provisions for researchers with major childcare responsibilities during the crisis. Given the emerging evidence of a relative productivity decline of women in academia, the likely result is a deterioration of many female researchers' relative prospects for tenure and career advancement. Given the broader evidence of a more severe clash between work and childcare responsibilities for mothers compared with fathers during the pandemic, it is likely that similar repercussions will occur in other industries and occupations, although it will take some time until it will be possible to verify this in the data.

VII. What Have We Learned and Why Should We Care?

What general lessons can be learned from our analysis of data on labor market outcomes for women and men during the coronavirus pandemic? Even though there are a lot of differences across countries, a few common themes emerge. In this section, we summarize our findings and discuss what they imply for how differences in the impact on working women and men matter for economic outcomes during the crisis and beyond.

A. *Summarizing the Findings*

The main conclusions arising from our empirical analysis are as follows:

1. The pandemic recession is a shecession (almost) everywhere. Figure 4 shows that in 18 out of 28 advanced economies, women's employment fell by more than men's during the pandemic, and in 19 out of 28 countries, women experienced a larger decline in hours worked. What is

more, even in countries where the impact on women and men was similar, this still presents a sharp deviation from usual recessions, which tend to be mancessions in most countries. Figure 5B shows that in all but two countries (Ireland and Sweden), the negative impact of the recession on women's hours worked relative to men's was larger than what would be expected based on earlier recessions. Overall, we conclude that the unusually large impact of the pandemic recession on working women is a common feature among a large set of economies and a key distinction between this and earlier recessions.

2. Industry/occupation effects and childcare needs are the main, but not the only, cause of gender gaps. Figure 6 demonstrates that in many countries, the pandemic recession had an unusually large impact on industries with high female employment shares, such as leisure and hospitality. Tables 7 and 8 show that in the countries with significant gender gaps in the impact of the pandemic on employment or hours, the gender gap is usually substantially reduced when controlling for different trends across industries and occupations. The same tables show larger gender gaps among parents of school-age children, indicating the importance of childcare and homeschooling obligations. Nevertheless, gender gaps go beyond industry/occupation and childcare effects. Tables 7 and 8 show that in countries where there are statistically significant overall gender gaps in the impact of the pandemic on employment or hours, a substantial and statistically significant gap is observed even among workers without children and after controlling for industry/occupation effects. The decomposition analysis for the United States in Section IV shows that the childcare and industry/occupation channels account for less than half of the total gender gap. Clearly, there are additional factors that made women's employment more vulnerable in the pandemic, and understanding these factors is an important challenge for future research on the pandemic recession.

3. Gender gaps during the pandemic recession vary widely across countries. Although qualitatively in most countries the pandemic recession is a shecession, quantitatively there is wide variation in the gaps between the impacts on women and men across countries (see fig. 4). What is more, there is only a loose correlation between the impact of the gender gap in terms of employment and hours. The United States is an example of a country with a large gender gap in the decline in employment, yet hours worked relative to men changed less than in other countries. In contrast, in countries such as Denmark and Germany, women experienced not only fewer employment losses than men but also a large reduction in

relative hours worked, implying that women's labor supply conditional on working dropped sharply.

4. Policy difference likely contributed to cross-country differences in the impact of the crisis, but evidence is inconclusive. The policy response to the pandemic varied widely across countries, for example, in terms of the severity and duration of lockdowns and the extent and duration of school closures. Given that much of the pandemic recession is due to the response of the crisis rather than a direct consequence of disease, one would expect that policy differences contribute to cross-country variation in gender gaps. Tables 2 and 3 show that the extent of school closures is indeed correlated with employment losses during the pandemic across countries. However, there is no conclusive evidence that these policy differences underlie cross-country differences in gender gaps (tables 4 and 5). Another relevant policy dimension is the use of furlough policies (such as *Kurzarbeit* in Germany) to protect employment during the crisis. Tables 7 and 8 show that in Germany there is only a small effect on overall employment and no gender gap in this dimension but a large overall impact and a large gender gap in hours. In the United States, with little use of furlough policies, the overall impact and gender gaps are much larger in terms of employment and smaller in terms of hours. These observations suggest that furlough policies in Germany protected formal employment relationships while also providing flexibility for large adjustments of labor supply on the intensive margin.

5. Work flexibility in the form of the ability to work from home greatly reduces the impact of the pandemic on gender gaps. Table 16 shows that in the United States and the United Kingdom, there is no statistically significant larger impact on women's hours worked among workers who can work from home during the crisis, regardless of industry, occupation, or childcare obligations. Table 4 shows that the fraction of jobs that allow for telecommuting is the only variable that is significantly correlated with differences in the gender gap across countries. This evidence suggests that work flexibility greatly reduces gender differences in the labor market during the pandemic. However, there is evidence that among those working from home, mothers experienced a larger decline in productivity while simultaneously engaging in work and childcare. Table 19 shows that in the Netherlands, mothers working from home spent a much larger fraction of the work time while also looking after their children than fathers did. Survey evidence for other countries and direct productivity measures for academic research also suggest a larger dip in women's work productivity during the pandemic.

B. Wider Implications for the Nature of the Pandemic Recession

Is a shecession the same as a mancession with signs reversed? For sure, the simple issue of whether the bulk of employment losses falls on women rather than men is a big part of what makes these types of recessions distinct. But there are equally important qualitative differences between shecessions and mancessions. Understanding these differences matters for policy tradeoffs during the recession and for the shape of the economic recovery that follows.

A first qualitative difference between shecessions and mancessions arises from the different dynamic behavior of women's and men's labor supply. Women's labor supply is generally more elastic at the micro level (e.g., Blundell and MaCurdy 1999). Men's labor supply elasticity is lower, and particularly so for married men. This implies that when men lose employment in a recession, they are likely to stay in the labor force and return to full-time employment in the recovery. In contrast, given their more elastic labor supply, when losing employment in a recession, women are relatively more likely to drop out of the labor force or to only seek part-time work. At the economy-wide level, these patterns suggest that in a shecession, when job losses are concentrated on women, the decline in aggregate labor supply will be more persistent and continue to be concentrated on women during the recovery (see Alon et al. 2020b for a quantitative analysis making this point).

A second difference between shecessions and mancessions relates to insurance within the household. Married couples can provide each other with insurance for income shocks. The mere presence of a second earner implies that a temporary job loss has a smaller proportional impact on earnings compared with single-earner households. Couples are also able to provide each other with active insurance, such as the "added worker effect" of a secondary earner joining the labor force in response to unemployment of the primary earner (Lundberg 1985). Blundell, Pistaferri, and Saporta-Eksten (2016) show that within-family insurance is the primary insurance channel for many households, and Bardóczy (2020) argues that this insurance channel plays a central role in the transmission of aggregate shocks.

The distinct behavior of women's and men's labor supply suggests that family insurance is less effective in the pandemic recession compared with a regular recession. The large overall impact on the employment of both women and men implies that there are many families where both husband and wife experience earnings losses, which reduces the scope for

passive insurance. More importantly, active insurance relies on the ability of the spouse who did not experience unemployment or reduced earnings to increase labor supply. In a mancession, the spouse who provides insurance is usually the wife. More married women than men work either part time or are out of the labor force, which means that there is scope for increasing labor supply. Therefore, in a mancession, active insurance can play an important role in buffering income losses for households. In contrast, when married women lose employment in a shecession, their husbands are often unable to provide active insurance, because they already work full time and because married men's labor supply is generally inflexible. Overall, family insurance is much less effective in a shecession such as the current pandemic recession compared with a regular recession.

Beyond shaping labor supply responses, the lack of family insurance also matters for how aggregate consumption and savings evolve in the recession. If households have less access to insurance, economic shocks translate more directly into consumption. The strength of this transmission can be summarized by the marginal propensity to consume (MPC), which is the fraction of a one-dollar loss in income for a household that will be reflected in lower consumption in the same period (instead of in lower savings). Alon et al. (2020b) show that the loss of family insurance in a pandemic recession results in a sustained raise in MPCs relative to a regular recession. Higher economy-wide MPCs, in turn, can result in a deeper recession and in a slower recovery, because higher MPCs mean that aggregate demand will drop more sharply during the recession. To be sure, a pandemic recession has additional implications for MPCs that do not relate to the relative impact on women's versus men's employment, for example, because of reduced consumption opportunities during lockdowns and the effects of stimulus payments during the crisis. Depending on policy responses, the overall evolution of MPCs in a pandemic recession is therefore ambiguous, but the family insurance channel is a force toward higher MPCs in this type of recession.

There are also opposing channels that suggest less severe effects of shecessions compared with mancessions. First, employed women work on average fewer hours than employed men. Hence, the same employment losses in a shecession will lead to lower aggregate hours losses than a mancession of the same size (when measured by employment declines). Second, women on average earn less than men, so even the same hours losses in a shecession will lead to lower GDP declines compared with a mancession with the same aggregate hours losses. Third, one might argue

that women's more elastic labor supply arises because of better alternative uses for their time, for example, home production rather than playing video games (Aguiar et al. 2020). Although this point is surely debatable, it suggests the possibility that the welfare losses of job loss differ between women and men. Relatedly, domestic violence generally goes up in recessions (van den Berg and Tertilt 2012), and one might hypothesize that this would be less true in shecessions. However, due to the pandemic-induced lockdowns, which put stress on families, studies in fact do find an increase in domestic violence (Bullinger, Carr, and Packham 2021; Leslie and Wilson 2020). But it is possible that other side effects of recessions, such as increases in the crime rate or drug abuse, are less pronounced in shecessions. Further data will be needed to evaluate such hypotheses empirically.

The impact of the pandemic recession on women's employment also matters through its interaction with policies and institutions. In many countries, unemployment insurance is the primary social insurance channel in recessions. However, women who stop working during the pandemic because of childcare needs are usually out of the labor force rather than unemployed, that is, they stop looking for work. Therefore, traditional unemployment insurance would not be accessible to women in this situation. Many countries instituted temporary changes to their insurance systems during the crisis, such as expanding furlough pay and making unemployment benefits available also to those who stop working because of family obligations. Still, some of these policy changes were temporary and implementation varied across countries and US states, so some policy-induced asymmetries remain.

C. *Wider Implications for the Future Labor Market*

The pandemic recession will also have repercussions for the future of the labor market that far outlast the recession and the subsequent recovery. It is well-known that losing employment during a recession is associated with persistent earnings losses for the affected workers (Stevens 1997; Davis and von Wachter 2011). The fact that more women than men were affected by employment losses will tend to increase the gender pay gap in the years after the recession. Women's higher flexibility of labor supply is also likely to result in persistent changes in labor force participation; some women (especially married women) who lost employment during the crisis will drop out of the labor force for an extended period

or only return to part-time work. Hence, women's labor force participation will be lower as a result of the recession for years to come.

In addition to the direct impact on workers during the recession, the shock of the pandemic will also result in broader changes in the labor market that will shape the experience of current and future cohorts of workers alike. Arguably the most important one of these changes is increased employment flexibility, such as a much expanded ability to work from home for many workers. During the pandemic, most jobs that could be done from home in principle were switched to being done from home in practice. Office workers who spend their days primarily working with computers almost universally worked from their living rooms, kitchens, and spare bedrooms during the pandemic, rapidly adopting new remote-work tools such as videoconferencing through Zoom in the process. Much of this change is likely to persist beyond the crisis. Employers and employees have paid the fixed cost of adopting remote work; learning by doing has taken place; employers have realized that working from home does not have to result in lower productivity; and employers have started to appreciate the savings from needing much less office space (Barrero et al. 2021). Many have already announced that working from home will continue to be central to the postpandemic work environment and have started the process of canceling leases for office space.

How is this new normal in the postpandemic workplace going to change the labor market? Change is likely to occur in a number of dimensions, from commuting patterns and the commercial real estate market to new ways of fostering coherence and interaction in a workplace where face-to-face contact with coworkers is the exception rather than the norm.

For our purposes, the most interesting changes concern gender inequality in the labor market. We believe that increased work flexibility in the new normal has the potential to substantially reduce gender inequality. This expectation is based on two observations about the pre-pandemic labor market.

The first observation is that much gender inequality in the labor market in today's advanced economies is related to parenthood and childcare. The literature on the "motherhood penalty" establishes that gender-wage gap is small among young workers who do not have children. In contrast, after having a child, the earnings of mothers stall, whereas fathers continue climbing the career ladder (e.g., Miller 2011; Adda, Dustmann, and Stevens 2017; Gallen 2018; Kleven, Landais, and Sogaard 2019; Kleven et al. 2019). These observations suggest that the unequal division of the

burden of childcare between mothers and fathers is now the primary cause of gender gaps in the labor market.

The second observation is that job flexibility can do much to reduce inequality in the division of labor between spouses in terms of childcare and other home work. The general point that workplace flexibility is a particular benefit to women's careers has been advanced by Goldin and Katz (2011) and Goldin (2014). Regarding telecommuting specifically, Alon et al. (2020a) show that in prepandemic data, the ability to telecommute is strongly predictive of mothers' and fathers' engagement in childcare. For example, fathers who are able to work from home and are married to mothers who cannot, spend about 50% more hours on childcare compared with otherwise similar fathers who cannot telecommute.

Taken together, these observations suggest that the expansion of work flexibility brought about by the pandemic recession may substantially reduce gender inequality in the labor market in the long term, by allowing a more even division of childcare responsibilities among the now much larger share of couples who can both work from home, and by reducing the motherhood penalty that is at the root of today's gender inequality in the process. Our finding above that there were hardly any gender differences in the impact of the pandemic among workers who can telecommute is an indication of how powerful this channel can be.

Although this justifies some optimism about gender equality in the future workplace, there is an important caveat. The evidence discussed in Section VI suggests that among couples with children who both worked from home during the crisis, women continued to spend substantially more time on childcare, and their productivity likely suffered as a result. Even if the effects are not immediately visible, lower productivity at work will ultimately hinder career advancement and lower mothers' future earnings prospects. Albanesi and Olivetti (2009) show that expectations of an unequal division of labor in the household, once established, can become self-fulfilling and create new barriers in the labor market. The implications of increased workplace flexibility for gender inequality are therefore closely linked to what happens to the division of labor inside the home.

Hence, the upshot is that the pandemic is likely to bring about changes in the postpandemic workplace that open up the potential for much reduced gender inequality in the labor market. But for this potential to be realized, changes in the workplace are not enough; there also needs to be a shift in social norms and expectations that lead mothers and fathers to make more equal use of the added flexibility that the new workplace

offered. Without such a shift, the strain of failing to do full justice to work, family, and self-maintenance needs that were shared by many workers during the pandemic will continue to be the reality of many working mothers in the new normal. Given these countervailing forces, evaluating the actual impact of expanded workplace flexibility on gender inequality in the postpandemic labor market is an important task for future research.

VIII. Conclusions

In this paper, we have documented that in a large set of countries, the COVID-19 recession had a much larger impact on women's relative employment compared with prepandemic recessions. One cause of this disproportional impact on working women was the sectoral distribution of the recession, which fell heavily on service sectors with high female employment shares. Another cause was the increase in childcare needs during closures of schools and daycare centers, which had a bigger impact on mothers' versus fathers' labor supply. Yet even when controlling for industry and occupation and considering only workers without children, in several countries we still find large remaining gender gaps, the causes of which are not yet well understood.

The fact that the pandemic recession was a shecession matters for the shape of the economic downturn and the recovery. Moreover, the pandemic recession is also likely to result in permanent changes in the labor market, such as a wider availability of work-from-home options and other forms of employment flexibility in the postpandemic new normal. These changes are likely to result in persistent changes in women's and men's labor force participation and will shape gender inequalities in the labor market.

Beyond the employment of women and men, there are additional dimensions that make the pandemic recession of 2020 distinct from most others, and some of these dimensions are likely to interact with the issues considered here. One example is the impact of the pandemic on children's education. Early evidence suggests that virtual learning during school closures is often a poor substitute for in-person schooling and that children's skill acquisition will suffer as a result (e.g., Kuhfeld et al. 2020; Maldonado and De Witte 2020). Moreover, a growing literature suggests that school closures during the pandemic will widen educational inequality across richer and poorer families (Andrew et al. 2020b; Fuchs-Schündeln et al. 2020; Grewenig et al. 2020; Jang and Yum 2020;

Agostinelli et al. 2022). If learning losses result in a greater need for parental support in the following years, the impact on children can further amplify the persistent effect on women's employment documented here. Once again, the ability to work from home plays a central role, as parents who can work from home have an easier time supporting their children's learning (Agostinelli et al. 2022). Hence, lack of work flexibility likely had a double-negative effect on many families during the crisis, through the direct impact on employment and through the repercussions for children's education.

Another likely consequence of the pandemic is a sharp drop in fertility rates (Kearney and Levine 2020), which is already becoming evident in data on birth rates in late 2020 and early 2021. To some extent, the drop in fertility may reflect a delay in childbearing that will be compensated by higher fertility in subsequent years, leading to additional interactions with women's labor supply at that time.

Our analysis has also been limited to a set of high income countries. Many of the conditions that created a disproportionate impact on women's employment in this group are equally applicable to countries at other stages of development. For example, at the height of the COVID-19 pandemic, schools closed in most countries of the world, making increased childcare needs during the crisis a near-universal phenomenon. Researchers have addressed how the optimal response to the pandemic in terms of health policy should be modified in developing countries (e.g., Alon et al. 2020c), but there is less work to date on implications for gender inequality in the labor market. Both the short-run impact on and the long-run repercussions for working women are likely to be different in developing countries compared with the group considered here, for example, because of a bigger role of informal employment and much more limited remote-work opportunities. Addressing the impact of the global COVID-19 pandemic on the labor market for women and men in a broad set of countries is an important challenge for additional research on the crisis.

Endnotes

Authors' email addresses: Alon (talon@ucsd.edu), Coskun (sena.coskun@uni-mannheim.de), Tertilt (tertilt@uni-mannheim.de), Doepke (doepke@northwestern.edu), Koll (koll@uni-mannheim.de). We thank Suzanne Bellue, Kwok Yan Chiu, and Laura Montbruck for excellent research assistance and the German Research Foundation (through the CRC TR 224 project A3 and the Gottfried Wilhelm Leibniz Prize) and the National Science Foundation for their financial support. We thank Laura Pilosoph and Loukas Karabarounis for excellent discussions and Steve Davis and Claudia Goldin for helpful comments. We thank Katja Möhring and Ulrich Krieger for help and access to the German

data and Hans-Martin von Gaudecker for help with the Dutch data. This paper is also based on data from Eurostat, EU-LFS, 1998–2019. The responsibility for all conclusions drawn from the data lies entirely with the authors. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see <https://www.nber.org/books-and-chapters/nber-macroeconomics-annual-2021-volume-36/mancession-shecession-womens-employment-regular-and-pandemic-recessions>.

1. The figure depicts the cyclical components of both GDP and hours worked. Fig. A2 shows the raw data.

2. An analogous figure reporting hours worked by gender is provided in the appendix (fig. A4).

3. Macroeconomic studies of the policy implications of joint household decisions include Guner, Kaygusuz, and Ventura (2012, 2020), Bick (2016), and Wu and Krueger (2019).

4. The higher volatility for women in the Netherlands is related to a large decline in hours worked of married women in 2005 (see fig. 1B). There was a break in the time series in 2005, which we attempted to correct but which may still have an impact on measured volatility.

5. The severity of school closures may also be endogenous to the labor market structure. For example, in countries where many employees have children, political pressure may have kept more schools open. Indeed, fig. A3 shows that in countries where women work more and/or a greater share of labor force is in need of childcare, schools closures were less severe.

6. In these regressions, we use a broad definition of hospitality that includes hospitality, leisure, and other services.

7. These include the existence of emergency care, the duration of short-term work allowances, a government response stringency index, and the fraction of employees with childcare obligations.

8. We use the Current Population Survey for the United States, the Canadian Labor Force Survey for Canada, the Economically Active Population Survey for Spain, the UK Labour Force Survey for the United Kingdom, the Dutch LISS Panel as described in von Gaudecker et al. (2021) for the Netherlands, and the German Internet Panel and the Mannheim Corona Study for Germany as described in Blom et al. (2015, 2020). See app. C for details on the data sources and the samples used.

9. See Bellemare and Wichman (2020) for more discussion and applications of the inverse hyperbolic sine transformation.

10. For Germany, the Netherlands, Canada, and Spain, we use migration status instead of race (see app. C for details).

11. Throughout our micro data analysis, we use this difference in the percentage point change to measure the gendered impact of the pandemic. An alternative measure would be the difference in the percent changes, which generally should lead to larger gender gaps as women's employment rates were lower than men's prior to the pandemic. Thus, we see our estimates as a lower bound of the gendered impact of the pandemic. See Bluedorn et al. (2021) for a useful comparison of the two measures in cross-country data.

12. In Spain, the group of school-age children includes children up to the age of 19, based on the available age brackets in the Spanish micro data set. Similar data limitations in Germany allow us to only form two groups of households in Germany: those with a child below 16 and those without.

13. The large impact on hours worked in Germany arises in part because the work-time measure here includes commuting time, which drops while many people work from home during the pandemic. In addition, in the German data, postpandemic hours are observed primarily in Q2/2020, potentially leading to larger effects compared with other countries that rely on hours observed all the way through September 2020. Finally, for Germany we have only one pre-COVID data point on hours dating back to 2018. See app. C.3 for details on the German data.

14. See app. C.4 for details.

15. To reconcile the results in tables 7 and 8 with fig. 4, note that the regression includes various controls such as time trends and seasonal dummies, implying that results are not directly comparable. In addition, fig. 4 displays changes between Q4/2019 and Q2/2020,

whereas the results in the current section are based on a longer time horizon. In those cases where coefficients are significant, the sign of effect does line up with fig. 4.

16. Note that our measure of hours worked for Germany includes commuting time. Because men on average spend more time commuting than women, they also likely faced larger reductions in commuting time during the pandemic. Thus, the true increase in the gender gap in hours worked (without commuting) should likely be even larger than our estimate.

17. Workers who are out of the labor force for prolonged periods lack information on industry and occupation, so that a decomposition taking occupation effects into account is more informative for initially employed workers.

18. The time trends and covariates in our benchmark model are now subsumed by the individual and time fixed effects. We continue to control for industry and occupation using nonparametric time trends by work type. More details on the specification can be found in app. E.

19. We focus on the United States here because the overall impact of the 2007–9 financial crisis on employment and the timing of the related economic downturn differed substantially across the countries we consider.

20. We include a dummy indicating college education as an additional interaction term in our regression specifications (eqs. [1]–[4]). Hence, tables 11 and 12 report the pandemic-induced gender gap interacted with the respective education level (and the presence of children).

21. Tables A3 and A4 display results without work-type controls.

22. Tables A5 and A6 display results without work-type controls.

23. In Spain, the group of school-age children includes children up to the age of 19, based on the available age brackets in the Spanish micro data set.

24. The relevant question is as follows: “At any time in the last 4 weeks, did (you/ name) telework or work at home for pay because of the coronavirus pandemic? (Enter ‘No’ if person worked entirely from home before the coronavirus pandemic)”

25. The percentage point difference between mothers and fathers with a school-age child reporting zero hours while being employed increases from 2.2 percentage points in Q1/2020 to 5.2 percentage points in Q2/2020 and even further to 7.8 percentage points in Q3/2020. For those with pre-K children, there is always a sizable gender gap in those employed but working zero hours (18.5 percentage points in Q1/2020), likely due to generous parental leave policies. For this group, we also observe increases, but they are less pronounced: 18.5 percentage points in Q1/2020, 19.2 percentage points in Q2/2020, and 21.7 percentage points in Q3/2020. In contrast, the difference is stable for those without kids: 2.0 percentage points in Q1/2020, 1.5 percentage points in Q2/2020, and 2.3 percentage points in Q3/2020.

26. In fact, if we exclude those who report zero hours, the impact of the pandemic on the gender gap decreases in absolute value from -10.7 to -1.0 and once we control for work type from -9.0 to -0.7 .

27. Adams-Prassl et al. (2020a) indeed find that UK mothers were more likely to initiate furloughing than fathers (as opposed to the employer), while no such gender gaps were found among childless workers.

28. See also Zamarro and Prados (2021) for additional evidence for the United States.

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