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Research Note: Gender Differences in Employment During the COVID-19 Epidemic

Andrés Villarreal and Wei-hsin Yu

ABSTRACT We investigate the impact of the COVID-19 epidemic on gender disparities in three employment outcomes: labor force participation, full-time employment, and unemployment. Using data from the monthly Current Population Survey, in this research note we test individual fixed-effects models to examine the employment status of women relative to that of men in the nine months following the onset of the epidemic in March of 2020. We also test separate models to examine differences between women and men based on the presence of young children. Because the economic effects of the epidemic coincided with the summer months, when women's employment often declines, we account for seasonality in women's employment status. After doing so, we find that women's full-time employment did not decline significantly relative to that of men during the months following the beginning of the epidemic. Gender gaps in unemployment and labor force participation did increase, however, in the early and later months of the year, respectively. Our findings regarding women's labor force participation and employment have implications for our understanding of the long-term effects of the health crisis on other demographic outcomes.

KEYWORDS COVID-19 epidemic • Women's employment • Women's labor force participation • Gender inequality

Introduction

The COVID-19 epidemic has had devastating effects on the U.S. economy. In the months following the onset of the epidemic in March of 2020, the country experienced the steepest contraction in gross domestic product (GDP) in recorded history (Bauer et al. 2020). In contrast to previous recessions in which men were more likely to experience a job loss (Alon et al. 2020a; Hout et al. 2011), the epidemic has been hypothesized to have had a greater effect on women's employment than men's owing to both labor demand and supply factors (Alon et al. 2020b). On the demand side, the onset of the epidemic resulted in a greater loss of jobs in the service sector (Alon et al. 2020b), which generally employs more women (Charles and Grusky 2004). Jobs in industries such as leisure and hospitality require greater indoor face-to-face interaction and were therefore more affected by state and local policies intended to reduce

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the spread of the virus and by greater fear among customers. In contrast, employment in manufacturing, which employs a disproportionate share of male workers, experienced a smaller decline (Cajner et al. 2020; U.S. Bureau of Labor Statistics 2020).

On the supply side, many daycare centers were closed and schools transitioned to online teaching (Dingel et al. 2020). School closures may have a considerable effect on women's ability to work because a substantial percentage of children live with their mothers only, and because married women generally devote more time to childcare activities than do married men (Alon et al. 2020a; Bianchi 2000; Bianchi et al. 2012). Nevertheless, empirical findings are mixed as to whether the epidemic has indeed reduced the labor supply of mothers with young children more than that of other women (Barkowski et al. 2020; Collins et al. 2021; Landivar et al. 2020).

Because changes in both supply and demand factors during the COVID-19 epidemic potentially disadvantage women more than men, recent research and media reports alike have argued that the epidemic would amplify gender inequality or reverse the trend of a narrowing gender gap in employment (e.g., Collins et al. 2021; Landivar et al. 2020). However, studies examining gender disparities in employment during the health crisis often focus solely on differences in the unemployment rate (e.g., Alon et al. 2020a). While important, the unemployment rate by itself is insufficient to understand the full impact of the epidemic, because it excludes both discouraged workers who stop searching for jobs (Murphy and Topel 1997) and workers who leave the labor force because of a lack of childcare. Moreover, the unemployment rate does not capture individuals who experience a substantial drop in working hours as a result of policies implemented to reduce the spread of the virus or those who report being employed full-time but are temporarily not at work. Women are likely to be overrepresented in all these groups during the epidemic because of a lower demand for the kinds of jobs in which they are employed and because of their family roles. Given that women's lifetime earnings greatly depend on their total length of work experience (Blau and Kahn 2017; England et al. 2016), especially the experience in full-time jobs (Connolly and Gregory 2008; McGinnity and McManus 2007), examining changes in the gender gaps in labor force participation and full-time employment, rather than just unemployment, may better inform us about the long-term effects of the epidemic on gender inequality.

A second complication in the analysis of gender disparities in the impact of the COVID-19 crisis is that many studies do not account for differences in the seasonality in women's employment, that is, the cyclical way in which women's participation in the labor force varies by month of the year (e.g., Collins et al. 2021; Landivar et al. 2020). The initial phase of the epidemic coincided with the early summer months, in which women's employment relative to men's traditionally declines. This decline during the summer months may be partly attributed to the fact that families have greater childcare responsibilities during the summer break. Studies comparing the decline in women's employment relative to that of men that fail to account for seasonal fluctuations therefore risk confounding the effects of the epidemic with the customary decline in women's employment during the summer months (e.g., Collins et al. 2021; Landivar et al. 2020).

In this research note, we investigate the impact of the COVID-19 epidemic on gender disparities in three employment outcomes: labor force participation, full-time employment, and unemployment. We use individual fixed-effects models to examine

the employment status of women relative to men by month for all months of 2020. This approach allows us to estimate differences in gender disparities following the onset of the epidemic in March. To account for seasonal or cyclical patterns in women's employment relative to men's, we compare gender differences in employment with those observed in the preceding year. Our fixed-effects models account for the time-invariant effect of all individual characteristics that are likely stable during the short observation period, such as workers' skills and the occupation and industry in which they are employed. We also test separate models to examine differences between women and men based on marital status and the presence of young children in the household.

Data and Measures

Data for our analysis were drawn from the monthly panels of the Current Population Survey (CPS), available through the Minnesota Population Center's Integrated Public Use Microdata Series (IPUMS) (Flood et al. 2020). The CPS has a 4-8-4 rotating panel structure in which households are interviewed in four consecutive months, left out of the panel for eight months, and then interviewed again in four consecutive months (Drew et al. 2014). Individuals' labor force participation can therefore be followed for a total period of 16 months. Panels are staggered so that approximately one eighth of households in the sample are in each of the eight interviews.

The analytic sample used in our fixed-effects models follows individuals during all months in which they are interviewed. Our initial models examine women's and men's employment from January to December of 2020. This time period allows us to observe changes in employment status occurring during the COVID-19 epidemic and the associated economic contraction starting in March. Our later models compare women's and men's employment status to employment in the same months over the previous year, thus allowing us to account for seasonal differences in employment. In separate models presented in Table A1 of the online appendix, we use the entire previous decade (2010–2019) instead of just the previous year to account for cyclical patterns in women's and men's employment. The results of these models are consistent with those presented here. Our sample is restricted to working-age individuals aged 25–55 who are not employed in the military in any of the waves.[1] Sampling weights provided by the CPS are used throughout our analysis.

Our fixed-effects models examine gender differences in three separate outcomes: labor force participation, full-time employment, and unemployment. Following the Bureau of Labor Statistics' definition, individuals are considered to be in the labor force if they report having a job or are looking for a job. Importantly, in this definition individuals are considered to be in the labor force if they report having a job regardless of the number of hours they work or if they actually worked in the previous week. Our second outcome classifies individuals as employed full-time only if they actually worked 35 hours or more the previous week in all jobs combined

[1] We tested models with alternative age intervals and found consistent results. See Tables B1–B3 of the online appendix.

(U.S. Bureau of Labor Statistics 2018). In this measure, individuals whose hours were substantially reduced and those who report having a job but who did not actually work as a consequence of the epidemic are still included in the analysis but coded as not employed full-time. Our final outcome of unemployment measures whether individuals were not employed the previous week and were actively looking for a job. Individuals who are out of the labor force are excluded from the analysis of unemployment. Our models for labor force participation and full-time employment therefore include all women and men in the specified age range, while the models for unemployment include only individuals who are currently in the labor force.

Our first set of individual fixed-effects models examines changes in each of the three employment measures during the months of 2020, using the following specification:

$$y_{im} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{month}_m + \boldsymbol{\beta}_2' female_i \times \mathbf{month}_m + \alpha_i + \varepsilon_{im},$$

where y_{im} is the corresponding measure of employment status for individual i in month m; $\mathbf{month}_m$ is a vector of binary variables for each month of the year; $female_i$ is an indicator of gender; α_i are individual fixed effects; and ε_{im} is an individual-month specific error term. In this specification, the coefficients $\boldsymbol{\beta}_2$ capture the gender differences in the employment outcome for each month of 2020. A stand-alone variable for individuals' gender is not required in the fixed-effects models because gender is assumed to be constant for individuals across waves.[2] Linear probability models (LPM) are used instead of logistic regression models to make coefficients more comparable across model specifications (Mood 2010). Standard errors are adjusted for clusters among individuals.[3]

Our second set of regression models takes into account the seasonality in gender differences in employment status by comparing differences between women and men in the months of 2020 with differences in the same months over the previous year:

$$y_{im} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{month}_m + \boldsymbol{\beta}_2' female_i \times \mathbf{month}_m + \boldsymbol{\beta}_3' yr2020_{im} \times \mathbf{month}_m$$

$$+ \boldsymbol{\beta}_4' yr2020_{im} \times female_i \times \mathbf{month}_m + \boldsymbol{\beta}_5 yr2020_{im} + \alpha_i + \varepsilon_{im},$$

where $yr2020_{im}$ is a binary variable indicating the months corresponding to 2020. In this specification, the coefficients $\boldsymbol{\beta}_2$ capture gender differences in employment status during 2019 relative to January of that year, while the coefficients $\boldsymbol{\beta}_4$ capture any additional gender differences in 2020 relative to the same month in the previous year. The coefficients $\boldsymbol{\beta}_4$ therefore provide estimates of the excess gender inequality in employment for the months following the onset of the COVID-19 epidemic. In this way, the model accounts for seasonality in women's employment relative to men's using information from the previous year. Our model includes a full three-way interaction between $female_i$, $\mathbf{month}_m$, and $yr2020_{im}$. The stand-alone variable for

[2] A small percentage of individuals whose gender varied across waves of the CPS were dropped from the sample (1.3%) because it is impossible to know whether there was an actual change in gender identity or a miscoding of the corresponding variable.

[3] In alternative models, we also included fixed effects for the rotation group to adjust for "rotation group bias," which led to consistent results (Krueger et al. 2017).

$yr2020 \times female_i$ is omitted by including every month in the three-way interaction term.[4]

Descriptive Results

Figure 1 presents the rates of labor force participation, full-time employment, and unemployment for women and men in 2020, using January as the baseline. All three panels show a dramatic decline in the labor market conditions for both women and men following the onset of the COVID-19 epidemic in March of 2020. Women workers appear to have experienced greater shifts in all three measures. For example, women's rate of full-time employment declined by 19.1% by July of 2020 relative to January of that year, compared with a decline of only 11.6% for men. The gender disparities in full-time employment and unemployment were particularly pronounced in the summer months, but they were substantially reduced by September.

It is important to note that Figure 1 compares the decline in women's and men's employment relative to their respective levels before the epidemic in January 2020. A smaller decline in employment relative to January for men can therefore constitute a larger reduction in men's employment rate in absolute terms, leading to no increase in the gender gap in employment at the population level. The apparent decline in women's labor force participation and employment during the epidemic is further confounded with the usual declines experienced by women relative to men during the summer months, when women often leave the labor force or reduce their working hours because of summer vacation and increased childcare responsibilities. This seasonal pattern can be clearly seen in Figure 2, which plots the difference between women's and men's full-time employment rate in 2020 and in the prior year (2019). The decline in women's full-time employment from May through August of 2020 was consistent with the decline in the previous year.

Fixed-Effects Models

Table 1 shows the results of our individual fixed-effects models examining gender differences in the three employment measures in 2020. Consistent with previous studies, we find a significantly greater gender disparity in labor force participation, full-time employment, and unemployment during the months of the COVID-19 epidemic starting in March of 2020: compared with men, women experienced greater declines in employment beginning in that month.

Table 2 shows the results of our complete model in which seasonality in women's employment relative to men's is accounted for by comparing the months of 2020

[4] Our national-level models do not examine differences in the effect of the COVID-19 epidemic by state. Because our fixed-effects models include state-level fixed effects, they control for any time-invariant effect of state characteristics. This includes the exact date in which the epidemic and state-level policies intended to combat the spread of the virus began. We tested ancillary models to examine the time-varying effect of the onset of the epidemic and of state-level mandatory restrictions. In all cases, results were consistent with those reported in Table 2. See the online Appendix C for further details.

Fig. 1 Labor force participation, full-time employment, and unemployment rates for women and men relative to January of 2020 (January = 100)

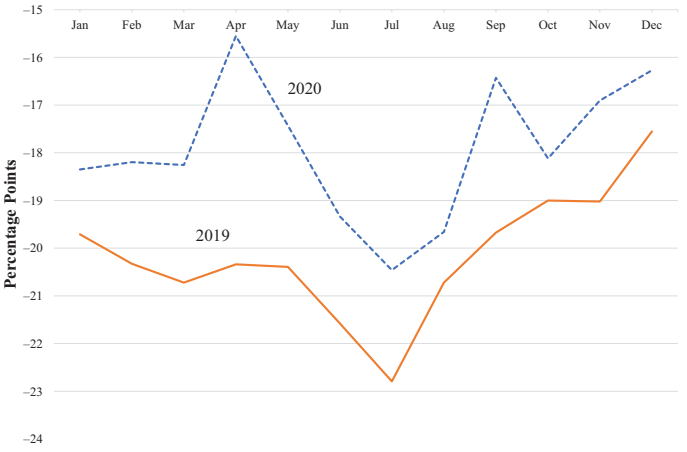

Fig. 2 Difference between women's and men's full-time employment rates in 2020 and 2019

to the corresponding months of 2019. The interaction terms between year, gender, and month show that differences in women's full-time employment are completely explained by seasonal patterns in women's employment over the previous year. In fact, the gender disparities in full-time employment were significantly lower in some months of 2020 relative to the same months in the previous year (i.e., the coefficients for the three-way interaction are positive and significant). The results for labor force participation are similar, although women's relative participation rates were significantly lower than men's from October to December, suggesting that the usual rebound in women's labor force participation following the summer months did not materialize in 2020. The coefficients for the regression model using unemployment as a dependent variable for individuals currently in the labor force continue to show that women experienced a greater increase in the risk of unemployment than men in two months of 2020 (April and May), even when the usual seasonal pattern is taken into account. As discussed earlier, unemployment captures only part of the effect of the COVID-19 epidemic. The full-time employment rate may be a better indicator of women's economic position and of the likely long-term effects of the epidemic because it also captures individuals who left the labor force or were compelled to work fewer hours.

Finally, Table 3 shows the results of models for full-time employment tested separately for women and men by marital status and age of their youngest child (to conserve space, only the coefficients for the three-way interactions are shown). The gender disparity in full-time employment did not increase in the months of 2020 in any of the models after accounting for seasonality (i.e., none of the regression coefficients are negative and statistically significant). In fact, surprisingly, among married individuals and those with young children, the gender disparity was reduced in some months. That is to say, women's probability of full-time employment relative to men was significantly higher than in the previous year, probably because the full-time employment rate was unusually low among married men and fathers of young children during these months of the epidemic.

Table 1 Results of individual fixed-effects models predicting the employment status of women and men in 2020

	Labor Force Participation	Full-Time Employed	Unemployed
Month (baseline = January)			
February	0.000	0.001	–0.002
	(0.002)	(0.004)	(0.002)
March	–0.006*	–0.020**	0.002
	(0.003)	(0.005)	(0.003)
April	–0.030**	–0.150**	0.084**
	(0.003)	(0.006)	(0.004)
May	–0.022**	–0.102**	0.070**
	(0.004)	(0.006)	(0.004)
June	–0.017**	–0.067**	0.053**
	(0.004)	(0.007)	(0.004)
July	–0.015**	–0.071**	0.044**
	(0.004)	(0.007)	(0.005)
August	–0.013**	–0.050**	0.034**
	(0.004)	(0.007)	(0.004)
September	–0.014**	–0.138**	0.027**
	(0.004)	(0.007)	(0.004)
October	–0.013**	–0.044**	0.021**
	(0.004)	(0.007)	(0.004)
November	–0.016**	–0.058**	0.021**
	(0.004)	(0.007)	(0.004)
December	–0.022**	–0.041**	0.022**
	(0.004)	(0.007)	(0.004)
Female × Month (baseline = January)			
Female × February	0.001	–0.004	0.002
	(0.003)	(0.006)	(0.003)
Female × March	–0.002	–0.005	0.008*
	(0.004)	(0.007)	(0.004)
Female × April	–0.009	0.017*	0.028**
	(0.005)	(0.008)	(0.006)
Female × May	–0.016**	–0.005	0.028**
	(0.005)	(0.009)	(0.006)
Female × June	–0.021**	–0.032**	0.026**
	(0.006)	(0.009)	(0.006)
Female × July	–0.017**	–0.040**	0.025**
	(0.006)	(0.010)	(0.007)
Female × August	–0.018**	–0.027**	0.018**
	(0.006)	(0.010)	(0.006)
Female × September	–0.016**	0.011	0.014*
	(0.006)	(0.010)	(0.006)
Female × October	–0.019**	–0.012	0.012*
	(0.006)	(0.009)	(0.006)
Female × November	–0.018**	–0.002	0.007
	(0.006)	(0.009)	(0.006)
Female × December	–0.016**	0.004	0.006
	(0.006)	(0.009)	(0.005)
Constant	0.834**	0.649**	0.033**
	(0.002)	(0.003)	(0.002)
Persons	167,079	167,079	141,273
Person-months	482,261	482,261	394,169
R^2	.8732	.7575	.7369

*$p < .05$; **$p < .01$ (two-tailed tests)

Table 2 Results of individual fixed-effects models predicting the employment status of women and men in 2020 relative to 2019

	Labor Force Participation	Full-Time Employed	Unemployed
Year 2020 × Month			
Year 2020 × February	–0.002	–0.001	–0.001
	(0.003)	(0.005)	(0.002)
Year 2020 × March	–0.008*	–0.032**	0.006
	(0.003)	(0.006)	(0.003)
Year 2020 × April	–0.029**	–0.176**	0.092**
	(0.004)	(0.007)	(0.004)
Year 2020 × May	–0.020**	–0.131**	0.078**
	(0.004)	(0.007)	(0.004)
Year 2020 × June	–0.012**	–0.080**	0.061**
	(0.004)	(0.007)	(0.004)
Year 2020 × July	–0.010*	–0.071**	0.051**
	(0.004)	(0.007)	(0.004)
Year 2020 × August	–0.009*	–0.061**	0.040**
	(0.004)	(0.007)	(0.004)
Year 2020 × September	–0.009*	–0.170**	0.034**
	(0.004)	(0.007)	(0.004)
Year 2020 × October	–0.006	–0.068**	0.029**
	(0.004)	(0.007)	(0.004)
Year 2020 × November	–0.009*	–0.082**	0.027**
	(0.004)	(0.007)	(0.004)
Year 2020 × December	–0.014**	–0.051**	0.025**
	(0.004)	(0.007)	(0.004)
Female × Month			
Female × February	0.000	–0.007	–0.002
	(0.003)	(0.005)	(0.002)
Female × March	–0.005	–0.011	0.001
	(0.003)	(0.006)	(0.003)
Female × April	–0.007	–0.012	0.004
	(0.004)	(0.006)	(0.003)
Female × May	–0.008	–0.014	0.005
	(0.004)	(0.007)	(0.004)
Female × June	–0.009*	–0.032**	0.009*
	(0.005)	(0.007)	(0.004)
Female × July	–0.014**	–0.042**	0.009*
	(0.005)	(0.008)	(0.004)
Female × August	–0.009	–0.022**	0.006
	(0.005)	(0.008)	(0.004)
Female × September	–0.008	–0.015*	0.001
	(0.005)	(0.008)	(0.004)
Female × October	–0.003	–0.008	0.002
	(0.005)	(0.007)	(0.004)
Female × November	–0.002	–0.003	–0.002
	(0.005)	(0.007)	(0.004)
Female × December	0.001	0.011	–0.005
	(0.004)	(0.007)	(0.004)
Year 2020 × Female × Month			
Year 2020 × Female × January	0.003	0.008	–0.007
	(0.004)	(0.007)	(0.004)
Year 2020 × Female × February	0.005	0.015*	–0.005
	(0.004)	(0.007)	(0.004)

Table 2 (continued)

	Labor Force Participation	Full-Time Employed	Unemployed
Year 2020 × Female × March	0.008	0.019**	–0.003
	(0.004)	(0.007)	(0.004)
Year 2020 × Female × April	0.002	0.041**	0.015**
	(0.005)	(0.008)	(0.006)
Year 2020 × Female × May	–0.003	0.021**	0.015**
	(0.005)	(0.008)	(0.006)
Year 2020 × Female × June	–0.007	0.011	0.007
	(0.005)	(0.008)	(0.005)
Year 2020 × Female × July	0.002	0.014	0.006
	(0.005)	(0.008)	(0.005)
Year 2020 × Female × August	–0.004	0.008	0.003
	(0.005)	(0.008)	(0.005)
Year 2020 × Female × September	–0.006	0.036**	0.006
	(0.005)	(0.008)	(0.004)
Year 2020 × Female × October	–0.013**	0.005	0.002
	(0.005)	(0.007)	(0.004)
Year 2020 × Female × November	–0.015**	0.010	0.002
	(0.005)	(0.007)	(0.004)
Year 2020 × Female × December	–0.015**	0.002	0.004
	(0.005)	(0.007)	(0.004)
Year Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Constant	0.834**	0.636**	0.039**
	(0.002)	(0.003)	(0.001)
Persons	269,245	269,245	230,192
Person-months	1,027,872	1,027,872	844,529
R^2	.8467	.7178	.6618

*$p < .05$; **$p < .01$ (two-tailed tests)

Conclusions

Our analysis of the effect of the COVID-19 epidemic on gender disparities in labor market outcomes highlights the importance of considering alternative measures of employment status. Previous studies have often relied exclusively on the unemployment rate to measure differences in the impact of the epidemic on women and men (Alon et al. 2020a). However, the unemployment rate does not capture the full consequences of the epidemic because it leaves out many scenarios in which the epidemic alters individuals' work status. Specifically, the unemployment rate does not capture individuals who remained employed but whose work hours were substantially reduced, those who left the labor force entirely, and those who were temporarily not at work. Gender differences in labor force participation and full-time employment may also be better indicators of the epidemic's long-term effects on gender inequality than differences in unemployment because the former gauge employment changes experienced by the entire male and female populations rather than only among men and women already in the labor market. Our analysis further highlights the importance of accounting for seasonality or cyclicality in women's employment relative to

Table 3 Results of individual fixed-effects models predicting full-time employment of women and men in 2020 relative to 2019, by marital status and by age of youngest child

	By Marital Status		By Age of Child			
	Unmarried	Married	No Child or >18 Years	0–4 Years	5–12 Years	13–18 Years
Year 2020 × Female × Month						
Year 2020 × Female × January	0.008	0.008	−0.006	0.034*	0.012	0.017
	(0.012)	(0.008)	(0.010)	(0.017)	(0.016)	(0.021)
Year 2020 × Female × February	0.032**	0.004	0.022*	0.025	0.000	0.006
	(0.012)	(0.008)	(0.010)	(0.017)	(0.016)	(0.020)
Year 2020 × Female × March	0.032**	0.011	0.018	0.025	0.025	0.019
	(0.012)	(0.009)	(0.010)	(0.018)	(0.016)	(0.021)
Year 2020 × Female × April	0.038**	0.044**	0.027*	0.084**	0.057**	0.029
	(0.013)	(0.009)	(0.011)	(0.019)	(0.018)	(0.023)
Year 2020 × Female × May	0.019	0.022*	0.013	0.066**	0.013	0.009
	(0.013)	(0.009)	(0.011)	(0.019)	(0.017)	(0.022)
Year 2020 × Female × June	0.010	0.011	0.009	0.041*	−0.007	0.003
	(0.013)	(0.009)	(0.011)	(0.019)	(0.017)	(0.024)
Year 2020 × Female × July	0.006	0.017	0.012	0.045*	0.000	−0.018
	(0.013)	(0.001)	(0.011)	(0.020)	(0.018)	(0.024)
Year 2020 × Female × August	−0.002	0.014	−0.004	0.052**	0.026	0.000
	(0.013)	(0.010)	(0.011)	(0.020)	(0.018)	(0.023)
Year 2020 × Female × September	0.014	0.051**	0.017	0.085**	0.059**	0.038
	(0.013)	(0.010)	(0.011)	(0.019)	(0.018)	(0.022)
Year 2020 × Female × October	0.000	0.007	−0.002	0.038*	0.016	0.003
	(0.012)	(0.009)	(0.010)	(0.018)	(0.017)	(0.021)
Year 2020 × Female × November	−0.009	0.022*	0.005	0.050**	0.010	0.012
	(0.012)	(0.009)	(0.010)	(0.019)	(0.017)	(0.020)
Year 2020 × Female × December	−0.022	0.019*	−0.008	0.043*	0.003	0.014
	(0.012)	(0.009)	(0.011)	(0.019)	(0.017)	(0.021)

Table 3 (continued)

	By Marital Status		By Age of Child			
	Unmarried	Married	No Child or >18 Years	0–4 Years	5–12 Years	13–18 Years
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year 2020 × Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Female × Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.609**	0.657**	0.642**	0.583**	0.643**	0.655**
	(0.005)	(0.003)	(0.004)	(0.007)	(0.006)	(0.008)
Persons	121,266	152,190	150,855	47,398	53,505	32,138
Person-months	427,402	600,470	541,000	172,734	196,742	117,396
R^2	.7218	.7190	.7245	.7369	.7264	.7234

*$p < .05$; **$p < .01$ (two-tailed tests)

men's. Because the initial stage of the COVID-19 epidemic coincided with the summer months in which women often leave their jobs, failing to account for seasonal patterns may lead to overestimates of the effect of the epidemic on gender disparities.

After accounting for seasonality in women's employment status, we found that women's labor force participation and full-time employment did not decline significantly relative to men's during the initial months of the COVID-19 epidemic. In fact, the epidemic actually led to a slight reduction in gender disparities in some months. Adjusting for seasonality also significantly reduced gender differences in the unemployment rate. Notably, however, the gender gap in labor force participation increased significantly in the fall of 2020 after controlling for seasonality. This suggests that the usual rebound in women's employment at the end of the summer months did not materialize.

It is important to note that the lack of gender disparities in the effect of the COVID-19 epidemic on our measures of employment in the initial months of the epidemic does not mean that women did not suffer a decline in employment during this period. On the contrary, both women and men experienced a decline in labor force participation and full-time employment, and an increase in unemployment, after the onset of the epidemic in March of 2020.

Finally, our analysis captures only the short-term effects of the COVID-19 epidemic on gender disparities in employment. Greater gender disparities may emerge if labor market conditions deteriorate further. We may also observe an increase in the gender gap if women's return to full-time employment is more delayed than men's in the coming months. The significantly higher gender disparities in labor force participation in some of the later months of 2020, when the difference in full-time employment rate remained the same, suggest than an increase in gender inequality in part-time employment may already be emerging. Future research is needed to determine whether the epidemic will have long-term consequences for economic inequality between women and men. ■

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Andrés Villarreal (corresponding author)
avilla@soc.ucla.edu

Villarreal • Department of Sociology, University of California, Los Angeles, Los Angeles, CA, USA; https://orcid.org/0000-0003-1560-1717

Yu • Department of Sociology, University of California, Los Angeles, Los Angeles, CA, USA; https://orcid.org/0000-0002-3074-3636