The Great CEO Shecession: Evidence from 11 Million US Firms*

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Abstract

Using new data on 11 million US firms with CEO gender information, we uncover a "CEO shecession" in terms of employment: female-led firms experienced significantly sharper excess employment declines than male-led firms during recession periods, specifically during the Great Recession and the Covid-19 pandemic. This finding remains robust even after controlling for the gender and age composition of workers, indicating that the results are not merely driven by the demographic makeup of the workforce. Furthermore, the "CEO shecession" exists across all industries, firm size categories, and states, suggesting that sectoral, size-dependent, or region-specific factors that might attract female CEOs cannot explain away our results. The observed CEO shecession indicates that female and male business leaders encounter dramatically different conditions and respond with distinct strategies during economic crises, inspiring further investigation to fully understand the dynamics.

JEL Codes: J16, J21, D22, M12, M51

Keywords: Gender and Business Management, CEO Gender, Firm Employment, Local Labor Market Composition, The Great Recession, Covid-19 Pandemic

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1 Introduction

Do male and female CEOs respond to economic crises differently? If so, how? The answer to this question is likely to inform key debates in the literature, such as the mechanisms behind the lower share of women CEOs in larger corporations and the effect of gender in top corporate hierarchy (Ahern and Dittmar, 2012; Bertrand et al., 2019), yet we still have limited knowledge of it, especially at an aggregate macroeconomic scale. Although the literature has studied how *workers* of different genders responded to recessions differently in the aggregate economy, there is relatively scant prior work on analogous questions with respect to *CEOs*. This distinction is critical since workers are labor suppliers whereas CEOs make the decisions on labor demands.

In this paper, we use data that contains CEO gender information of several million US firms to pose an underexplored question: *Did firms led by female CEOs adjust their employment differently during recessions?* This inquiry differs from the conventional focus on job losses among the broader working population. The critical distinction lies in the role of CEOs, who, unlike the majority of the workforce, are key decision-makers in determining labor demand within their businesses. In other words, CEOs act as labor demanders rather than suppliers, making the gender gap at the CEO level a reflection of differences in strategic business decision-making rather than differences in labor market participation. Therefore, although existing literature documents that male workers lost more jobs during the Great Recession, while female workers withdrew from the workforce more than men during the Covid-19 pandemic, it remains unclear whether such gender disparities are mirrored at the CEO level.

To gain a more comprehensive understanding of the heterogeneous employment responses between female-led and male-led firms during economic downturns, we utilize the National Establishment Time Series (NETS) data, which provides annual information on a near universe of US firms and establishments, including details on employment, location, industry, and importantly for our purpose, CEO gender. Our analysis begins by exploring the pattern of the data from 2000 to 2021 and provides a motivational stylized fact: employment in female-led firms exhibits greater procyclicality, suggesting that firms led by female CEOs experienced larger employment declines during recessions. Notably, this heightened procyclicality is particularly obvious during both the Great Recession and the Covid-19 pandemic.

We then proceed to formally estimate the impact of CEO gender on firm employment during the Great Recession and the Covid-19 pandemic by employing a difference-in-differences (DiD) research

design. The first difference is whether the firm is led by a female CEO, while the second difference indicates the periods before versus after the onset of the Great Recession or the Covid-19 pandemic. This difference-in-differences approach allows us to quantify the extent to which female-led firms experienced greater employment losses relative to male-led firms during recessions. Our findings are both economically and statistically significant: female-led firms experienced an additional employment decrease of 0.0043 log points – or 0.43% – compared to male-led firms during the Great Recession and an additional employment loss of 0.0241 log points – or 2.41% – compared to their male-led counterparts during the Covid-19 pandemic. In general, we discover a "CEO shecession" in which female-led firms experienced greater employment losses during recession periods.

The key assumption underlying our identification strategy – the parallel pre-trend assumption – is shown to be satisfied in both the Great Recession and the Covid-19 analyses, as demonstrated by our event study graphs. Additionally, we address the potential concern that the observed "CEO shecession" is merely a reflection of a higher proportion of workers of a specific gender or age in female-led firms by controlling for the gender and age composition of local labor markets. Moreover, we establish that the CEO shecession persists across all NAICS 1-digit industries, firm size categories, and states, thereby demonstrating that our findings cannot be explained away by any sectoral, size-dependent, or region-specific factors that might attract female CEOs.

Contributions to the Literature

To the best of our knowledge, our paper is the first to study the heterogeneous employment responses between female-led and male-led firms during recessions using comprehensive US firm-level data. Taking advantage of our detailed firm-level data, we provide strong evidence that female-led firms lost more employment compared to their male-led counterparts during the Great Recession and the Covid-19 pandemic. The paper contributes to gender economics and the economic study of firm performance during recession periods.

First, we contribute to the literature discussing the role of top managers' gender in firm performance (Cliff, 1998; Ahern and Dittmar, 2012; Dezsö and Ross, 2012; Huang and Kisgen, 2013a; Green and Homroy, 2018; Liu, 2018; Francis et al., 2021; Griffin et al., 2021). Specifically, our finding that female-led firms experienced greater employment losses than male-led firms during the Great Recession and the Covid-19 pandemic is particularly relevant to the literature examining the performance of female-led firms during crisis periods. Previous studies have shown that female

managers tend to be more risk-averse (Huang and Kisgen, 2013b; Khan and Vieito, 2013; Levi et al., 2014; Faccio et al., 2016; Fan et al., 2021) and that the risk aversion of CEOs can significantly affect firm performance (Graham et al., 2013; Milidonis and Stathopoulos, 2014; Herranz et al., 2015). In line with this, recent research has suggested that female-led firms perform better during financial crises (Palvia et al., 2015). The "CEO shecession," which potentially implies that female-led firms resort to greater employment layoffs as a strategy for navigating crisis periods, provides new evidence consistent with the view that risk aversion among female CEOs plays a critical role in shaping firm outcomes during economic downturns.

Second, this paper contributes to the literature on the differential impact of the Great Recession on female-led versus male-led firms. While numerous studies have examined the disparate effects of the Great Recession on male and female laborers (Verick, 2009; Elsby et al., 2010; Farber, 2011; Sierminska and Takhtamanova, 2011; Hoynes et al., 2012), research on the differential impact of the Great Recession on female-led and male-led firms is relatively sparse. An exception is Thébaud and Sharkey (2016), which, using survey data, highlighted the heightened difficulties faced by female-led firms during the Great Recession, which could be largely attributed to implicit discrimination in securing financing (Cavalluzzo et al., 2002; Coleman and Robb, 2009; Muravyev et al., 2009; Brooks et al., 2014; De Andrés et al., 2021). Our study broadens this understanding by providing a more comprehensive analysis of how female-led firms underperformed during the Great Recession, thereby underscoring the potential consequences of the financing disadvantages experienced by women business leaders.

Third, our research contributes to the literature examining the heterogeneous effects of the Covid-19 pandemic on female-led versus male-led firms. Again, though there is an extensive body of work exploring the gendered impact of the pandemic on workers (Adams-Prassl et al., 2020; Alon et al., 2020; Amano-Patiño et al., 2020; Albanesi and Kim, 2021; Fabrizio et al., 2021; Dang and Nguyen, 2021; Alon et al., 2022a,b; Goldin, 2022), there is a noticeable gap in studies investigating the differential impact of the Covid-19 pandemic on firms based on the gender of their CEOs. While several papers have analyzed the pandemic's effect on overall firm performance (Barrero et al., 2020; Bartik et al., 2020b,a; Gourinchas et al., 2020; Bloom et al., 2021; Foss, 2021; Bloom et al., 2023), these studies have not primarily focused on the distinctions between female-led and male-led firms.

Our study fills this gap in the literature by providing a more nuanced understanding of how the gender of business leaders influences firm resilience during the COVID-19 pandemic. Among existing

works, two studies most closely related to our research are Hyland et al. (2021) and Torres et al. (2023). However, these studies are limited by small sample sizes, and their findings are primarily descriptive. In contrast, our analysis utilizes a near universe of US firms, enabling us to draw more comprehensive and generalizable conclusions. Additionally, we employ a difference-in-difference design with the parallel trend assumption satisfied, offering stronger identification compared to the cross-sectional analyses used in previous studies. The greater employment losses observed among female-led firms in our analysis may also be linked to the increased childcare burden on women during the Covid-19 pandemic (Alekseev et al., 2023), as female CEOs are more likely to bear childcare responsibilities (Delecourt and Fitzpatrick, 2021), which in turn may influence their employment decisions.

The remainder of the paper is organized as follows. Section 2 describes the data, sample construction, and descriptive statistics. Section 3 presents a stylized fact on the procyclicality of firm employment, especially among female-led firms. Section 4 details our empirical strategy and identification. Section 5 presents the "CEO shecession" during the Great Recession and its robustness. Section 6 details the "CEO shecession" during the Covid-19 pandemic and its robustness. Section 7 concludes the paper.

2 Data

Our primary data is the National Establishment Time Series (NETS). Quarterly Workforce Indicators (QWI) is also utilized to construct gender and age worker composition controls. In this section, we describe data sources, sample construction, and descriptive statistics.

2.1 Data Sources

National Establishment Time Series (NETS) To examine the heterogeneous employment responses to recessions between female-led and male-led firms, we utilize the NETS database. The NETS provides an annual panel encompassing nearly the entire universe of US establishments, including a wide range of establishment-level information such as employment, industry, and location. These features enable us to control for sectoral and region-specific trends through granular fixed effects. Each establishment in NETS is assigned a unique identifier along with a headquarters identifier, allowing us to aggregate the data to firm level and track employment dynamics over time.

A key feature of the NETS data for our analysis is the inclusion of CEO gender information,

which forms the basis of our "CEO shecession" analysis. We transform the original CEO gender variable, which categorizes gender as "M" (male), "F" (female), "B" (unknown), or missing, into an indicator variable. The new binary variable equals 1 if the CEO's gender is "F," 0 if it is "M," and missing if the gender is "B" or missing. We use the CEOs' gender at headquarters to determine the firm-level CEO gender. The term "CEO" in this context refers not only to the leaders of large publicly listed firms but also to small business owners, allowing our analysis to encompass a broad spectrum of firms, including even local retailers. By doing so, we provide more comprehensive insights into the employment dynamics across various firm sizes and types.

The source data for NETS is compiled by Dun & Bradstreet, a globally recognized credit rating company. Given Dun & Bradstreet's strong incentive to collect accurate data, any discrepancies between NETS and government data, particularly in subjective aspects such as establishment entry dates and industry classification, should not be solely attributed to inaccuracies in NETS. Numerous studies have validated the accuracy and reliability of the NETS data by comparing it with official datasets (e.g., Neumark et al. 2011; Barnatchez et al. 2017; Behrens et al. 2024). While Crane and Decker (2020) notes irregularities in the establishment entry information within NETS, our analysis does not rely on establishment entries because our main analyses are based on continuing establishments. Furthermore, although employment changes in NETS exhibit some degree of stickiness, this suggests that our estimates might have been even larger had the data not been subject to this stickiness.

Gender Compositioin of Workers In addition to controlling for industry-by-year and county-by-year fixed effects, we account for the share of female workers within each industry-county pair to rule out potential contamination from gender or age composition of workers within local labor markets. Specifically, we utilize NAICS 4-digit industry-by-county worker composition data from the Quarterly Workforce Indicators (QWI). We calculate the share of female workers by dividing the number of female workers, categorized into eight mutually exclusive age groups, by the total number of workers within each industry-county pair. These female worker shares are then interacted with the post-Great Recession or the post-Covid dummies to capture their differential impact on employment outcomes before and after crisis periods.

2.2 Sample Construction

We aggregate establishments based on their headquarters identifiers to construct two firm-level samples: one covering the period from 2005 to 2010 for the Great Recession analysis, and the other from 2016 to 2021 for the Covid analysis. The gender of a firm's CEO is determined by the gender of the CEO at the firm's headquarters. We do not exclude establishments missing CEO gender information prior to aggregation, as these establishments may belong to firms where the CEO's gender is available, making them relevant for our analysis. Firms with CEO gender changes during the corresponding analysis period are excluded. For the Great Recession sample, we exclude firms in regulated utilities (NAICS 2-digit 22) and public sectors (NAICS 2-digit 92). For the Covid sample, we additionally exclude firms in financial (NAICS 2-digit 52), educational (NAICS 2-digit 61), and health services (NAICS 2-digit 62) sectors. Non-employing firms – defined as those with only one employee (the owner) throughout the sampling period – are also excluded. We then further restrict our sample to continuing firms from 2005 to 2010 in the Great Recession analysis and continuing firms from 2016 to 2021 in the Covid analysis. Finally, foreign-owned firms are removed from our sample. Since we do not exclude establishments missing CEO gender information before aggregation, some continuing firms have missing values in the CEO gender variable in certain years between 2005 and 2010 or between 2016 and 2021. Consequently, our final firm-level samples comprise unbalanced panels with 29,264,480 firm-year observations from 6,441,512 unique firms in the Great Recession analysis and 38,755,775 firm-year observations from 6,905,402 unique firms in the Covid analysis. In total, there are 10,962,808 unique firms combining the Great Recession and the Covid sample.

2.3 Descriptive Statistics

Appendix Table A.1 and A.2 report the summary statistics of the variables used in the Great Recession and the Covid analysis, respectively. The Great Recession sample comprises 29,264,480 firm-year observations with 6,441,512 unique firms from 2005 to 2010, while the Covid sample comprises 38,755,775 firm-year observations with 6,905,402 unique firms from 2016 to 2021. Subscript i, t, $ind(4)$, and $county$ denotes firm, year, NAICS 4-digit industry, and county, respectively.

There exists considerable variation in employment across firms and over time. The mean log employment at the firm-year level during the Great Recession is 1.4936, accompanied by a standard deviation of 1.0651. During the Covid-19 pandemic, the mean log employment increases slightly to 1.3237, with a similar standard deviation of 0.9002. The 10th and 50th percentiles of employment

indicate that our sample encompasses a substantial number of small firms. This characteristic distinguishes our findings from existing literature, which predominantly analyzes large enterprises (Thébaud and Sharkey, 2016; Torres et al., 2023). Moreover, there is significant variation in the gender of CEOs, with women being CEOs of 20% to 23% of our sampling firms, and the standard deviations being twice as large as the proportions themselves in both periods. This variation underpins our analyses regarding the influence of CEO gender on firm employment dynamics before and after the onset of economic crises.

Regarding to the share of female workers by specific age brackets within each NAICS 4-digit industry-county pair, a substantial majority of female workers fall within the age range of 25 to 54, which coincides with the typically prime reproductive years. Consequently, controlling for these shares of female workers of specific ages effectively mitigates the possibility that it is not the gender of the CEO but rather the gender and age composition of the workforce that contributes to the observed CEO shecession.

3 Stylized Fact

Firm employment is procyclical and such procyclicality is heightened in female-led firms

To investigate firm employment patterns in our NETS data and their relationship with business cycles, we first separately plot the average firm employment growth rates from 2000 to 2021 for female-led and male-led firms. As depicted in Figure 1, the disparity in average firm employment growth rates between female-led and male-led firms widened during recession periods, specifically during the Great Recession and the Covid-19 pandemic.

To analyze such disparity more rigorously, we calculate business cycle statistics following the methodology outlined in Mankart and Oikonomou (2017). As shown in panel A of Table 1, the employment growth rate of female-led firms exhibits greater volatility (measured by relative standard deviation with GDP) and a stronger correlation with GDP. This pattern persists even when 2021 is excluded, as presented in panel B of Table 1, suggesting that our finding is not solely driven by the Covid-19 pandemic. Furthermore, we separately calculate the business cycle statistics for recession and non-recession periods in panels C, D, and E of Table 1. These results indicate that the employment of female-led firms' heightened volatility and stronger correlation with GDP were more pronounced during recessions than in non-recession periods.

Based on the graph and the business cycle statistics, we propose that there exists a "CEO shecession" during recessions, wherein female-led firms demonstrate greater procyclicality and consequently, experience more significant employment losses during economic downturns. Moreover, the stronger procyclicality of female-led firms' employment during recessions motivates further investigation into the two most severe recessions of the 21st century: the Great Recession and the Covid-19 pandemic, as will be explored in the following sections.

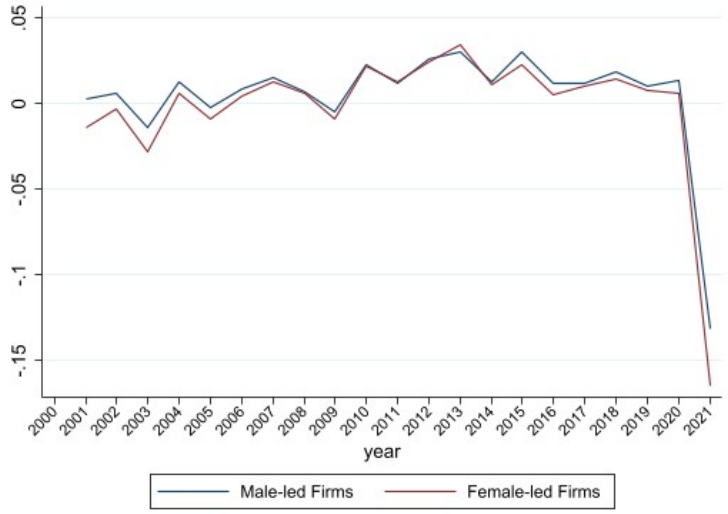

Figure 1: Average Yearly Employment Growth Rate, 2001 $\sim$ 2021

Notes: The figure shows the average Davis-Haltiwanger employment growth rate separately for female-led and male-led firms from 2000 $\sim$ 2021. The sample excludes entrants, exiters, and firms belonging to regulated or public sectors. The blue line represents male-led firms, while the red represents female-led firms.

Table 1: Firm Employment Business Cycle Statistics

	Total Firm Employment	Female-led Firm Employment	Male-led Firm Employment
		Panel A. 2000 $\sim$ 2021	
$\frac{\sigma_x}{\sigma_y}$	2.0335	3.5314	1.9828
$\rho_{x,y}$	0.9103	0.9524	0.9029
		Panel B. 2000 $\sim$ 2020	
$\frac{\sigma_x}{\sigma_y}$	2.1039	3.6049	2.0551
$\rho_{x,y}$	0.9112	0.9504	0.9045
		Panel C. 2007 $\sim$ 2010	
$\frac{\sigma_x}{\sigma_y}$	0.4477	0.6123	0.4520
$\rho_{x,y}$	0.3952	0.8538	0.3512
		Panel D. 2019 $\sim$ 2021	
$\frac{\sigma_x}{\sigma_y}$	0.4258	7.6010	0.4854
$\rho_{x,y}$	0.9819	0.6948	0.2129
		Panel E. 2000 $\sim$ 2021 Excluding 2007 $\sim$ 2010 and 2019 $\sim$ 2021	
$\frac{\sigma_x}{\sigma_y}$	2.3068	3.9110	2.2543
$\rho_{x,y}$	0.9216	0.9754	0.9146

Notes: The table shows business cycle statistics for the US firm employment. $\frac{\sigma_x}{\sigma_y}$ is the relative standard deviation of log total / female-led / male-led firm employment (x) and log GDP (y) in the previous year since our firm employment figures are recorded every January. $\rho_{x,y}$ is the corresponding correlation coefficient between x and y. Periods of the business cycle statistics are indicated in each panel.

4 Empirical Strategy

Inspired by the "CEO shecession" pattern found in the descriptive evidence in Section 3, we formally investigate such phenomenon by estimating the following difference-in-difference equations for the Great Recession and the Covid-19 pandemic separately:

$$\begin{aligned}\ln(Y_{it}) =&\beta_0 + \beta_1 \mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t + \gamma Z_{ind(4),county} \times \text{PostRecession}_t \\ &+ \delta_i + \delta_t + \delta_{ind(4),t} + \delta_{county,t} + \delta_{ind(4),county} + \delta_{ind(SIC),t} + \delta_{ind(SIC),county} + \varepsilon_{it} \qquad (4.1)\\ \ln(Y_{it}) =&\beta_0 + \beta_1 \mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t + \gamma Z_{ind(4),county} \times \text{PostCovid}_t \\ &+ \delta_i + \delta_t + \delta_{ind(4),t} + \delta_{county,t} + \delta_{ind(4),county} + \delta_{ind(SIC),t} + \delta_{ind(SIC),county} + \varepsilon_{it} \qquad (4.2)\end{aligned}$$

where Y_{it} is the employment of firm i in year t. The first interaction term on the right-hand side of each equation is our variable of interest. $\mathbb{1}\{\text{CEO is female}\}_i$, the first difference, is an indicator variable that takes the value of 1 when the CEO of firm i is female during the corresponding analysis period.[1] We define the second difference for the two analysis periods as follows:

$$\text{PostRecession}_t = \begin{cases} 0 \text{ if } t = \text{January of 2005, 2006, 2007} \\ 1 \text{ if } t = \text{January of 2008, 2009, 2010} \end{cases}$$

$$\text{PostCovid}_t = \begin{cases} 0 \text{ if } t = \text{January of 2016, 2017, 2018, 2019, 2020} \\ 1 \text{ if } t = \text{January of 2021} \end{cases}$$

since NETS takes January snapshots of Dun & Bradstreet data. The Great Recession began in December 2007, so our January 2007 data is classified as pre-Great Recession period. Similarly, the outbreak of Covid-19 pandemic was in March 2020, so our January 2020 data is classified as pre-Covid period.

$Z_{ind(4),county}$ is NAICS 4-digit industry-by-county level gender and age worker composition controls. In practice, we gradually include controls for the share of female workers in each industry-county pair, the share of female workers in 8 mutually exclusive age groups in each industry-county pair, and the share of workers (regardless of gender) in each age group in each industry-county pair. All worker composition controls are taken in the first year of the analysis periods[2] and interacted with PostRecession_t or PostCovid_t dummy to account for their potential differential impact before and after the crisis periods.

δ_i and δ_t are basic two-way fixed effects, i.e., firm and year fixed effects. Additionally, we include NAICS 4-digit industry-by-year fixed effects $\delta_{ind(4),t}$ to control for any time-varying industry-level common trends. We also incorporate county-by-year[3] fixed effects $\delta_{county,t}$ to control for any time-varying county characteristics, such as different degrees of the housing net worth shock during the Great Recession or varying numbers of Covid-19 cases and deaths during the pandemic across counties. NAICS 4-digit industry-by-county fixed effects $\delta_{ind(4),county}$ are included to absorb away time-invariant local labor market conditions of each industry-county pair.[4] Lastly, we add SIC 4-digit

[1] Recall that we exclude firms with CEO gender changes during the corresponding analysis period, so the gender of CEO is a time-invariant variable.

[2] Specifically, we use 2005 worker composition data in the Great Recession analysis and 2016 worker composition data in the Covid analysis.

[3] The county of a firm is defined by the county in which the firm's headquarters is located.

[4] NAICS 4-digit industry-county pair worker composition controls without interaction with post-Great Recession or

or 8-digit industry-by-year and industry-by-county fixed effects $\delta_{ind(SIC),t}$ and $\delta_{ind(SIC),county}$, which provide more granular divisions of industries, for further robustness.[5] Standard Errors are clustered at firm level for every regression throughout the paper.

Our identification strategy rests on the assumption that the relative employment of female-led and male-led firms remains stable before the crises. To check whether our parallel trend assumption holds, we estimate the following event study models for both analysis periods respectively:

$$\begin{aligned}\ln(Y_{it}) =&\beta_0 + \sum_{\tau \neq 2007} \beta_\tau \mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i \\ &+ \delta_i + \delta_{ind(4),t} + \delta_{county,t} + \delta_{ind(4),county} + \delta_{ind(SIC),t} + \delta_{ind(SIC),county} + \varepsilon_{it} \qquad (4.3)\\ \ln(Y_{it}) =&\beta_0 + \sum_{\tau \neq 2020} \beta_\tau \mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i \\ &+ \delta_i + \delta_{ind(4),t} + \delta_{county,t} + \delta_{ind(4),county} + \delta_{ind(SIC),t} + \delta_{ind(SIC),county} + \varepsilon_{it} \qquad (4.4)\end{aligned}$$

where the second terms on the right-hand side of both equations interact $\mathbb{1}\{\text{CEO is female}\}_i$ with all year dummies in our analysis period, except the omitted baseline categories (2007 in the Great Recession analysis or 2020 in the Covid analysis). $\beta_{2008} \sim \beta_{2010}$ in the Great Recession analysis also allows us to track the dynamic treatment effect and the recovery from the recession.

5 CEO Shecession: the Great Recession

In this section, we present the estimates of the CEO shecession during the Great Recession and show its robustness toward worker composition, industrial composition, size dependence, and region-specific confounders.

5.1 Overall Great Recession CEO Shecession Effect

Table 2 reports the results of estimating Equation (4.1), which quantify the CEO shecession effect during the Great Recession by a difference-in-difference design. Column (1) presents the simplest specification, including only two-way fixed effects, i.e., firm and year fixed effects. In Column (2), year fixed effects are replaced with NAICS 4-digit industry-by-year fixed effects. Columns (3) and (4)

post-Covid dummy are absorbed away by NAICS 4-digit industry-by-county fixed effects $\delta_{ind(4),county}$.

[5] To elaborate, there are only 307 NAICS 4-digit industries, but 970 SIC 4-digit and 15,781 SIC 8-digit industries in the Great Recession sample. Analogously, there are only 271 NAICS 4-digit industries, but 905 SIC 4-digit and 14825 SIC 8-digit industries in the Covid sample.

additionally introduce county-by-year and NAICS 4-digit industry-by-county fixed effects, respectively. Column (5), which serves as our baseline specification, further includes SIC 4-digit industry-by-year and industry-by-county fixed effects. Across all specifications, the coefficients on the DiD term of interest are consistently negative and statistically significant, indicating that firms led by female CEOs experienced greater employment losses during the Great Recession – a phenomenon we refer to as the "CEO shecession" effect. Quantitatively, our baseline specification reveals that female-led firms lost an additional 0.0043 log points – or 0.43% – employment during the Great Recession. This finding confirms the stronger procyclicality among female-led firms, particularly during crisis periods, thereby corroborating the stylized fact presented in Section 3.

Table 2: Female CEO and Employment, 2005 $\sim$ 2010

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0030***	-0.0034***	-0.0039***	-0.0037***	-0.0043***
	(0.0003)	(0.0004)	(0.0004)	(0.0003)	(0.0004)
Year FE	✓	-	-	-	-
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	-	✓	✓	✓	✓
County-by-year FE	-	-	✓	✓	✓
NAICS 4-digit Industry-by-county FE	-	-	-	✓	✓
SIC 4-digit Industry-by-year FE	-	-	-	-	✓
SIC 4-digit Industry-by-county FE	-	-	-	-	✓
N	28916239	28916237	28916230	28908905	28898456
adj. R^2	0.9560	0.9565	0.9565	0.9576	0.9578

Notes: The table reports OLS results of Equation (4.1). The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2005 to 2010. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

To check for our identification assumption – the parallel pre-trend assumption – in Figure 2 we plot the estimated coefficients along with their 95% confidence intervals on the interaction terms of the year dummies and the female CEO indicator ($\mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i$) from Equation

(4.3), incorporating the baseline fixed effects in column (5) of Table 2. The estimated coefficients prior to the Great Recession are statistically indistinguishable from zero, effectively ruling out any pre-trends that could bias our difference-in-difference estimates. Furthermore, the magnitude of the negative coefficients after the outbreak of the Great Recession closely mirrors the severity of the recession, reaching a nadir in January 2009 and rebounding thereafter.

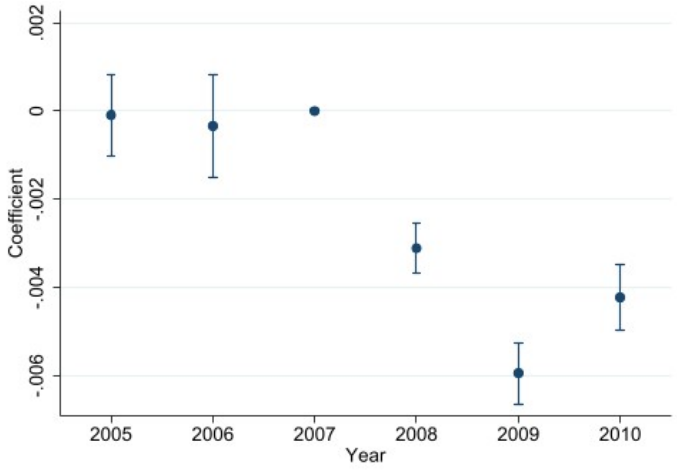

Figure 2: Dynamic Impact of Female CEO on Employment, 2005 $\sim$ 2010

Notes: The figure displays the estimated coefficients and the corresponding 95% confidence intervals for interactions of the year dummies and the female CEO indicator ($\mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i$) in Equation (4.3). $\mathbb{1}\{\tau = 2007\} \times \mathbb{1}\{\text{CEO is female}\}_i$ is omitted as the control group. All fixed effects in column (5) of Table 2 are included.

5.2 Great Recession CEO Shecession Effect: Worker Composition

The Great Recession has often been characterized as a "mancession" due to the disproportionate job losses among young male workers (Verick, 2009; Elsby et al., 2010; Farber, 2011; Sierminska and Takhtamanova, 2011; Hoynes et al., 2012). Considering the gendered impact of the Great Recession on the labor market, one might be concerned that the CEO shecession we observe was partially driven by differences in gender and age composition of workers between female-led and male-led firms. To address such concern, in Table 3 we extend our baseline specification by introducing 2005[6] NAICS 4-digit industry-by-county level worker composition controls interacted with the post-Great Recession dummy. Column (1) reproduces the results from column (5) of Table 2. In column (2), we replace the SIC 4-digit fixed effects with their more granular SIC 8-digit analogies. Column (3)

[6]The first year of the Great Recession analysis.

includes controls for the share of female workers in each industry-county pair interacted with the post-Great Recession dummy. In column (4), these controls are further decomposed into interactions for the shares of female workers in 8 mutually exclusive age groups within each industry-county pair and the post-Great Recession dummy. Column (5) adds interactions for the shares of workers (regardless of gender) in 8 mutually exclusive age groups within each industry-county pair and the post-Great Recession dummy. Reassuringly, the sign and magnitude of our DiD term of interest remain consistent with our baseline specification, reinforcing that the CEO shecession effect we found during the Great Recession was not merely a result of different worker compositions between female-led and male-led firms.

Detailed coefficients for the gender and age composition controls are provided in Appendix Table A.3. Considering the "worker mancession" characteristic of the Great Recession, one might anticipate significantly positive coefficients on the share of female workers across age groups, suggesting that a higher initial proportion of female workers (of specific ages) could potentially mitigate employment declines. However, most of these estimates are either statistically insignificant or negative, indicating that the gender and age composition of the workforce was not a primary factor driving the "CEO shecession" during the Great Recession.

Table 3: Female CEO and Employment with Female Worker Share Controls, 2005 $\sim$ 2010

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0043***	-0.0034***	-0.0041***	-0.0040***	-0.0047***
	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0006)
All Age Female Worker Share$_{ind(4),county}$ $\times$PostRecession$_t$			✓		
Each Age Female Worker Share$_{ind(4),county}$ $\times$PostRecession$_t$				✓	✓
Each Age Worker Share$_{ind(4),county}$ $\times$PostRecession$_t$					✓
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	-	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	-	✓	✓	✓
SIC 8-digit Industry-by-year FE	-	✓	-	-	-
SIC 8-digit Industry-by-county FE	-	✓	-	-	-
N	28898456	28838772	20806690	12595765	10546003
adj. R^2	0.9578	0.9576	0.9585	0.9597	0.9602

Notes: The table reports OLS results of Equation (4.1) with more granular fixed effects and female worker share controls. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i, t, $ind(4)$, and $county$ denote firm, year, NAICS 4-digit industry, and county, respectively. The data span from 2005 to 2010. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

5.3 Great Recession CEO Shecession Effect: Industrial Composition

The employment collapse during the Great Recession exhibited substantial heterogeneity across sectors, with significant contractions in construction and manufacturing, while industries such as food, education, and health services were less affected (Verick and Islam, 2010; Aum et al., 2017; Gertler and Gilchrist, 2018). Consequently, there may be concerns that the observed CEO shecession during the Great Recession was driven by sector-specific effects, that is, it was attributable to the difference in industrial composition between female-led and male-led firms. To address this industrial

composition concern, we estimate Equation (4.1) using our baseline fixed effects in column (5) of Table 2 within each NAICS 1-digit industry. As presented in Table 4, the coefficients on the DiD term of interest are consistently negative across all industries, with many of them achieving statistical significance despite reduced sample sizes. These results suggest that the CEO shecession during the Great Recession was not simply a consequence of differences in industrial composition between female-led firms and their male-led counterparts.

Table 4: Female CEO and Employment, 2005 $\sim$ 2010 in Each NAICS 1-digit Industry

	(1)	(2)	(3)	(4)	(5)
	NAICS1 0	NAICS1 1	NAICS1 2	NAICS1 3	NAICS1 4
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0048	0.0045**	-0.0008	-0.0108***	-0.0044***
	(0.0063)	(0.0021)	(0.0014)	(0.0016)	(0.0006)
N	122912	981268	3218276	1619620	5918977
adj. R^2	0.9624	0.9411	0.9514	0.9732	0.9654
	NAICS1 5	NAICS1 6	NAICS1 7	NAICS1 8	
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0049***	-0.0004	-0.0124***	-0.0011	
	(0.0006)	(0.0010)	(0.0014)	(0.0012)	
N	8654870	3039630	1807990	3457703	
adj. R^2	0.9499	0.9667	0.9589	0.9279	
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓	✓

Notes: The table reports OLS results of Equation (4.1) with specification in column (5) of Table 2 separately for each NAICS 1-digit industry. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2005 to 2010. NAICS 1-digit industry 9 (public administration) is dropped in the Great Recession sample. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

5.4 Great Recession CEO Shecession Effect: Firms Size Categories

The employment collapse during the Great Recession was particularly severe among young and small firms (Fort et al., 2013; Siemer, 2014). Thus, a potential concern is that the observed CEO shecession effect might be attributable to the generally smaller size of female-led firms (Kalleberg and Leicht, 1991; Cliff, 1998; Bardasi et al., 2011; Jennings and Brush, 2013), which could render them more vulnerable to economic downturns. To address this issue, we estimate Equation (4.1) using our baseline fixed effects in column (5) of Table 2 across six mutually exclusive employment size categories by their initial[7] employment levels. As presented in Table 5, the coefficients of interest remain significantly negative across all groups, effectively ruling out the firm size as a confounding factor to the CEO shecession effect.

Table 5: Female CEO and Employment, 2005 $\sim$ 2010 in Each Employment Size Category

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Firm Employment)					
Initial (2005) Employment	1	2	3 $\sim$ 10	11 $\sim$ 50	51 $\sim$ 100	$\geq$ 101
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0265***	-0.0090***	-0.0087***	-0.0112***	-0.0296***	-0.0222***
	(0.0023)	(0.0005)	(0.0005)	(0.0010)	(0.0050)	(0.0067)
Firm FE	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓
N	1827567	9176352	12957356	4003534	488355	412002
adj. R^2	0.6685	0.7132	0.8747	0.8631	0.6991	0.9359

Notes: The table reports OLS results of Equation (4.1) with specification in column (5) of Table 2 separately for different initial (2005) firm size categories. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2005 to 2010. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

[7] In the Great Recession analysis, the initial year is 2005.

5.5 Great Recession CEO Shecession Effect: States

According to the existing literature, the impact of the Great Recession likely varied across regions, influenced by factors such as the extent of housing net worth shocks (Mian and Sufi, 2014). To account for potential regional differences, we estimate our baseline fixed effects specification in column (5) of Table 2 across every US state to check whether female-led firms experienced greater employment losses due to differential exposure to the recession. As shown in Table 6, the consistently negative coefficients suggest that the CEO shecession effect is not confounded by regional differences in exposure to the Great Recession.

Table 6: Female CEO and Employment, 2005 $\sim$ 2010 in Each State

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	AL	AK	AZ	AR	CA	CO	CT	DE
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0010	0.0024	-0.0057**	-0.0021	-0.0035***	-0.0054**	-0.0045	-0.0019
	(0.0029)	(0.0077)	(0.0028)	(0.0039)	(0.0010)	(0.0025)	(0.0029)	(0.0069)
N	386742	68910	451849	247193	3321462	545480	417613	74450
adj. R^2	0.9595	0.9426	0.9539	0.9579	0.9552	0.9527	0.9603	0.9604
	DC	FL	GA	HI	ID	IL	IN	IA
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	0.0055	-0.0040***	-0.0021	-0.0100*	-0.0025	-0.0039**	-0.0051**	0.0036
	(0.0070)	(0.0013)	(0.0021)	(0.0055)	(0.0052)	(0.0017)	(0.0025)	(0.0032)
N	74722	2176929	852403	104445	163514	1142372	593039	395216
adj. R^2	0.9579	0.9427	0.9515	0.9562	0.9527	0.9652	0.9640	0.9612
	KS	KY	LA	ME	MD	MA	MI	MN
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0077**	-0.0035	-0.0045	-0.0084	-0.0046*	-0.0073***	-0.0042**	-0.0018
	(0.0039)	(0.0028)	(0.0030)	(0.0055)	(0.0026)	(0.0022)	(0.0020)	(0.0029)
N	295466	398702	405420	143815	507559	716329	948475	581101
adj. R^2	0.9604	0.9592	0.9577	0.9585	0.9583	0.9620	0.9624	0.9623
	MS	MO	MT	NE	NV	NH	NJ	NM
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0050	-0.0026	-0.0045	-0.0045	-0.0035	-0.0002	-0.0038**	0.0052
	(0.0040)	(0.0026)	(0.0053)	(0.0044)	(0.0045)	(0.0050)	(0.0019)	(0.0044)
N	235083	549214	142551	219349	191834	150644	873220	172670
adj. R^2	0.9579	0.9633	0.9514	0.9608	0.9457	0.9595	0.9655	0.9556
	NY	NC	ND	OH	OK	OR	PA	PR
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0054***	-0.0025	-0.0101	-0.0007	-0.0061*	-0.0092***	-0.0067***	-0.0027
	(0.0014)	(0.0023)	(0.0078)	(0.0019)	(0.0033)	(0.0031)	(0.0018)	(0.0071)
N	1841967	788047	90777	1064917	322743	417294	1190820	66686
adj. R^2	0.9631	0.9525	0.9592	0.9639	0.9608	0.9513	0.9626	0.9694
	RI	SC	SD	TN	TX	UT	VT	VA
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0048	0.0042	0.0084	-0.0070***	-0.0068***	-0.0100**	0.0005	-0.0055**
	(0.0054)	(0.0032)	(0.0070)	(0.0026)	(0.0013)	(0.0041)	(0.0065)	(0.0025)
N	107745	359325	111025	514957	2022281	258821	85441	645434
adj. R^2	0.9665	0.9556	0.9558	0.9576	0.9550	0.9515	0.9566	0.9561
	VI	WA	WV	WI	WY			
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	0.0173	-0.0065***	-0.0007	-0.0045*	-0.0147**			
	(0.0309)	(0.0025)	(0.0055)	(0.0026)	(0.0062)			
N	2382	612051	134344	585182	71943			
adj. R^2	0.9698	0.9537	0.9572	0.9655	0.9557			
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The table reports OLS results of Equation (4.1) with specification in column (5) of Table 2 separately for each US state. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2005 to 2010. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6 CEO Shecession: the Covid-19 Pandemic

In this section, we investigate the CEO shecession during the Covid-19 pandemic, which is robust to worker composition, industrial composition, size-dependence, and region-specific confounding factors.

6.1 Overall Covid CEO Shecession Effect

Table 7 presents the results of estimating Equation (4.2), which gauges the Covid CEO shecession effect utilizing a difference-in-difference design. The fixed effects specifications align with those in Table 2. Across all five columns, the coefficient of interest is negative and statistically significant at 1 percent level. These results indicate that female-led firms experienced a more substantial decline in employment compared to male-led firms during the Covid-19 pandemic, further reinforcing the stylized fact in Section 3 – the stronger procyclicality in female-led firms, particularly in recession periods. This finding also confirms that the "CEO shecession" we find is not a unique pattern during the Great Recession but a general phenomenon during economic downturns. The coefficients are quantitatively consistent across all specifications, ranging from -0.0157 to -0.0242. In our baseline specification, column (5), female-led firms lost an additional 0.0241 log points – or 2.41% – employment relative to male-led firms during the Covid-19 pandemic.

Table 7: Female CEO and Employment, 2016 $\sim$ 2021

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0157***	-0.0242***	-0.0237***	-0.0236***	-0.0241***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Year FE	✓	-	-	-	-
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	-	✓	✓	✓	✓
County-by-year FE	-	-	✓	✓	✓
NAICS 4-digit Industry-by-county FE	-	-	-	✓	✓
SIC 4-digit Industry-by-year FE	-	-	-	-	✓
SIC 4-digit Industry-by-county FE	-	-	-	-	✓
N	38587539	38587539	38587529	38581534	38572965
adj. R^2	0.9648	0.9670	0.9671	0.9683	0.9694

Notes: The table reports OLS results of Equation (4.2). The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2016 to 2021. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

To check for the parallel pre-trend assumption underlying our difference-in-difference identification strategy, Figure 3 presents the estimated coefficients and their corresponding 95% confidence intervals of the interactions between the year dummies and the female CEO indicator ($\mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i$) from Equation (4.4) with baseline fixed effects in column (5) of Table 7. Prior to the onset of the pandemic, the estimated coefficients are stable and close to zero, supporting the validity of our identification assumption. Consistent with the results in Table 2, β_{2021} is significantly negative and sharply far from zero, suggesting the large magnitude of the CEO shecession during the Covid-19 pandemic.

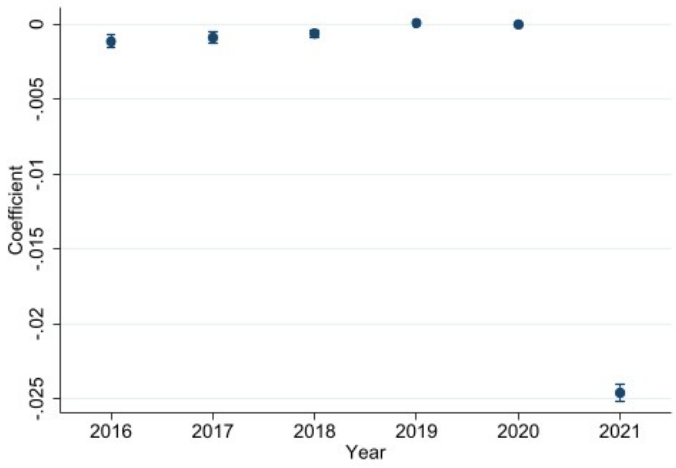

Figure 3: Dynamic Impact of Female CEO on Employment, 2016 $\sim$ 2021

Notes: The figure displays the estimated coefficients and the corresponding 95% confidence intervals for interactions of the year dummies and the female CEO indicator ($\mathbb{1}\{\tau = t\} \times \mathbb{1}\{\text{CEO is female}\}_i$) in Equation (4.4). $\mathbb{1}\{\tau = 2020\} \times \mathbb{1}\{\text{CEO is female}\}_i$ is omitted as the control group. All fixed effects in column (5) of Table 7 are included.

6.2 Covid CEO Shecession Effect: Worker Composition

Contrary to the unemployment trends observed during previous recessions (including the Great Recession), women's unemployment rates were higher than those of men during the Covid-19 recession (Alon et al., 2020; Albanesi and Kim, 2021; Fabrizio et al., 2021; Dang and Nguyen, 2021; Alon et al., 2022a,b; Goldin, 2022). Given that female-led firms are documented to hire more women workers (Cohen et al., 1998; Chan and Wang, 2018), it seems plausible that female-led firms experienced greater employment losses due to a higher proportion of female workers (of specific ages). In Table 8, we test this hypothesis. Analogous to the method in Table 3, we incorporate 2016[8] gender and age composition of workers interacted with the post-Covid dummy as additional controls. The results in the table show that the direction and magnitude of the coefficients on the DiD term of interest remain stable and comparable to those in Table 7, thereby mitigating the concerns that the CEO shecession during the Covid-19 pandemic was merely capturing the impact of a larger proportion of female workers (of specific ages) in female-led firms.

We present detailed coefficients for the gender and age composition controls in Appendix Table A.4. Given that female workers were disproportionately hit during the Covid-19 pandemic, one

[8]The first year of the Covid analysis.

might expect significantly negative coefficients for the shares of female workers (of specific ages). However, such negative coefficients are only observed in age groups that constitute a small proportion of female workers, as indicated by the descriptive statistics in Appendix Table A.2. For women of prime working age (22 - 44), the coefficients are even positive, further suggesting that the higher shares of female workers in female-led firms were not the primary factor driving the "CEO shecession" during the Covid-19 pandemic.

Table 8: Female CEO and Employment with Female Worker Share Controls, 2016 $\sim$ 2021

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0241***	-0.0186***	-0.0244***	-0.0269***	-0.0294***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0005)
All Age Female Worker Share$_{ind(4),county}$ $\times$PostCovid$_t$			✓		
Each Age Female Worker Share$_{ind(4),county}$ $\times$PostCovid$_t$				✓	✓
Each Age Worker Share$_{ind(4),county}$ $\times$PostCovid$_t$					✓
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	-	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	-	✓	✓	✓
SIC 8-digit Industry-by-year FE	-	✓	-	-	-
SIC 8-digit Industry-by-county FE	-	✓	-	-	-
N	38572965	38507443	28900068	15467281	12314391
adj. R^2	0.9694	0.9710	0.9704	0.9721	0.9727

Notes: The table reports OLS results of Equation (4.2) with more granular fixed effects and female worker share controls. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i, t, $ind(4)$, and *county* denote firm, year, NAICS 4-digit industry, and county, respectively. The data span from 2016 to 2021. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.3 Covid CEO Shecession Effect: Industrial Composition

There was significant variation in the employment collapse across industries during the pandemic. For instance, firms in industries with a higher capacity for remote work arrangements were more resilient during the pandemic (Barrero et al., 2021, 2023; Bick et al., 2023). Additionally, sectors characterized by lower mobility faced more severe challenges from lockdown policies (Alexander and Karger, 2021; Barrot et al., 2024). Given this industry-level heterogeneity, there is a concern that the observed CEO shecession during the Covid-19 pandemic might be driven by industry-specific effects, particularly if female-led firms were disproportionately concentrated in industries more adversely affected by the pandemic. To address this industrial composition concern, we estimate Equation (4.2) within each NAICS 1-digit industry, using the fixed effects specification from column (5) of Table 7. The results, presented in Table 9, show that the estimated coefficients on the DiD term of interest are consistently significant and negative across all industries. This finding effectively rules out the possibility that the CEO shecession during the Covid-19 pandemic was driven by differences in industrial composition between female-led and male-led firms.

Table 9: Female CEO and Employment, 2016 $\sim$ 2021 in Each NAICS 1-digit Industry

	(1)	(2)	(3)	(4)
	NAICS1 0	NAICS1 1	NAICS1 2	NAICS1 3
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0303***	-0.0220***	-0.0288***	-0.0683***
	(0.0041)	(0.0017)	(0.0012)	(0.0023)
N	217690	974063	4354442	1780184
adj. R^2	0.9709	0.9726	0.9687	0.9713
	NAICS1 4	NAICS1 5	NAICS1 7	NAICS1 8
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0296***	-0.0130***	-0.0445***	-0.0276***
	(0.0006)	(0.0003)	(0.0012)	(0.0007)
N	7354190	16004042	2931533	4806414
adj. R^2	0.9726	0.9618	0.9686	0.9669
Firm FE	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓

Notes: The table reports OLS results of Equation (4.2) with specification in column (5) of Table 7 separately for each NAICS 1-digit industry. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2016 to 2021. NAICS 1-digit industry 6 (educational services, health care, and social assistance) and industry 9 (public administration) are dropped in our Covid analysis. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.4 Covid CEO Shecession Effect: Firms Size Categories

One might also suspect that the observed CEO shecession effect during the Covid-19 pandemic was solely driven by extremely small firms rather than by mid-sized and large firms, given that small firms were disproportionately affected by the pandemic (Bartik et al., 2020a; Barrero et al., 2020), and female-led firms tend to be smaller than their male-led counterparts (Kalleberg and Leicht, 1991; Cliff, 1998; Bardasi et al., 2011; Jennings and Brush, 2013). To investigate this possibility, we decompose our sample into groups based on their employment levels in the first year of our Covid

analysis period (2016) and separately estimate Equation (4.2) for each group using the baseline fixed effects specification from column (5) of Table 7. The results, presented in Table 10, reveal consistently negative coefficients across firms of varying initial sizes. This indicates that the CEO shecession observed during the Covid-19 pandemic was not solely driven by the female-led firms smaller in size.

Table 10: Female CEO and Employment, 2016 $\sim$ 2021 in Each Employment Size Category

	(1)	(2)	(3)	(4)	(5)	(6)
	Log(Firm Employment)					
Initial (2016) Employment	1	2	3 $\sim$ 10	11 $\sim$ 50	51 $\sim$ 100	$\geq$ 101
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0189***	-0.0085***	-0.0318***	-0.0439***	-0.0022	-0.0139***
	(0.0024)	(0.0003)	(0.0004)	(0.0011)	(0.0032)	(0.0038)
Firm FE	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓
N	982609	16227218	16286238	4315926	400709	325261
adj. R^2	0.7117	0.6505	0.8918	0.9023	0.7160	0.9821

Notes: The table reports OLS results of Equation (4.2) with specification in column (5) of Table 7 separately for different initial (2016) firm size categories. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2016 to 2021. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.5 Covid CEO Shecession Effect: States

Another concern is that the CEO shecession we find during the Covid-19 pandemic could be confined to specific regions that were most severely hit by the pandemic, given the significant regional variation in the spread of Covid-19 (White and Hébert-Dufresne, 2020; Desmet and Wacziarg, 2022) and the varying extent of lockdown policies enforcement across states (Alexander and Karger, 2021; Barrot et al., 2024). However, our analysis indicates that this is not the case. As evidenced in Table 11, female-led firms experienced significantly greater employment losses in almost every state during the Covid-19 pandemic, thereby ruling out the possibility that the observed CEO shecession during the pandemic was limited to particular regions.

Table 11: Female CEO and Employment, 2016 $\sim$ 2021 in Each State

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	AL	AK	AZ	AR	CA	CO	CT	DE
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0237***	-0.0288***	-0.0323***	-0.0212***	-0.0232***	-0.0232***	-0.0242***	-0.0213***
	(0.0028)	(0.0049)	(0.0019)	(0.0029)	(0.0008)	(0.0017)	(0.0023)	(0.0049)
N	422207	113235	803902	292561	4417519	802408	542589	100686
adj. R^2	0.9745	0.9678	0.9618	0.9739	0.9687	0.9686	0.9711	0.9752
	DC	FL	GA	HI	ID	IL	IN	IA
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0193***	-0.0162***	-0.0274***	-0.0296***	-0.0349***	-0.0227***	-0.0300***	-0.0246***
	(0.0055)	(0.0007)	(0.0016)	(0.0051)	(0.0040)	(0.0016)	(0.0022)	(0.0027)
N	82499	4319203	1193248	123742	200599	1175232	709160	445507
adj. R^2	0.9747	0.9612	0.9665	0.9726	0.9699	0.9758	0.9738	0.9748
	KS	KY	LA	ME	MD	MA	MI	MN
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0252***	-0.0190***	-0.0179***	-0.0354***	-0.0202***	-0.0239***	-0.0282***	-0.0276***
	(0.0028)	(0.0023)	(0.0015)	(0.0042)	(0.0023)	(0.0018)	(0.0017)	(0.0021)
N	322495	490616	720354	155448	584049	897369	1032016	741580
adj. R^2	0.9774	0.9726	0.9744	0.9770	0.9718	0.9722	0.9763	0.9728
	MS	MO	MT	NE	NV	NH	NJ	NM
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0262***	-0.0291***	-0.0279***	-0.0329***	-0.0205***	-0.0213***	-0.0354***	-0.0269***
	(0.0034)	(0.0022)	(0.0039)	(0.0035)	(0.0039)	(0.0038)	(0.0019)	(0.0038)
N	250132	636800	182497	254450	221313	183295	932113	206335
adj. R^2	0.9736	0.9743	0.9703	0.9753	0.9657	0.9747	0.9743	0.9699
	NY	NC	ND	OH	OK	OR	PA	PR
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0248***	-0.0281***	-0.0330***	-0.0313***	-0.0242***	-0.0228***	-0.0251***	-0.0346**
	(0.0012)	(0.0017)	(0.0057)	(0.0016)	(0.0026)	(0.0018)	(0.0015)	(0.0174)
N	2011763	1106615	111765	1295192	418393	687441	1611648	28102
adj. R^2	0.9732	0.9689	0.9750	0.9722	0.9726	0.9698	0.9695	0.9671
	RI	SC	SD	TN	TX	UT	VT	VA
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0190***	-0.0282***	-0.0368***	-0.0230***	-0.0222***	-0.0434***	-0.0304***	-0.0175***
	(0.0051)	(0.0026)	(0.0055)	(0.0022)	(0.0009)	(0.0033)	(0.0052)	(0.0016)
N	127447	428959	132270	617210	3206881	363847	107265	1034539
adj. R^2	0.9736	0.9721	0.9743	0.9729	0.9671	0.9614	0.9715	0.9719
	VI	WA	WV	WI	WY			
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0133	-0.0265***	-0.0285***	-0.0267***	-0.0186***			
	(0.0684)	(0.0017)	(0.0044)	(0.0023)	(0.0057)			
N	1526	837715	152564	601825	84745			
adj. R^2	0.9620	0.9714	0.9737	0.9799	0.9743			
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The table reports OLS results of Equation (4.2) with specification in column (5) of Table 7 separately for each state. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i and t denote firm and year, respectively. The data span from 2016 to 2021. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

7 Conclusion

The business cycle is a consistently important research topic in economics due to its recurrent nature over time. Understanding how firms with distinct characteristics respond to recessions differently is therefore crucial. In this paper, we investigate the role of CEO gender in shaping their employment responses when facing economic downturns using a near universe of US firms. We identify a general "CEO shecession" during crisis periods, specifically during the Great Recession and the Covid-19 pandemic. Our robustness checks reveal that the significantly sharper excess employment declines among female-led firms persist even after controlling for the gender and age composition of workers. Moreover, the CEO shecession occurs in every industry, firm size category, and state, indicating that sectoral, size-dependent, or region-specific factors that might attract female CEOs do not account for our findings.

Surprisingly, there has been a lack of understanding in the literature regarding the heterogeneous performance of female-led versus male-led firms, especially employment, during the Great Recession, not to mention the more recent Covid-19 recession. While some studies have examined differential financial outcomes between female-led and male-led firms (Thébaud and Sharkey, 2016; Torres et al., 2023), the disparity in employment outcomes remains underexplored. We hope that our work will inspire future research to fill this gap, especially because the employment dynamics reflect the reallocation of resources between firms. If growth opportunities are expected to be equitable between female-led and male-led firms, researchers must investigate why and how female-led firms experienced greater employment losses during economic downturns. This paper aims to serve as a catalyst and guide for further research in this area.

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Appendix A Additional Tables

Table A.1: Summary Statistics for the Great Recession Sample, 2005 $\sim$ 2010

	Obs.	Mean	Std Dev.	P10	P50	P90
$\ln(\text{Employment}_{it})$	29,264,480	1.4936	1.0651	0.6931	1.0986	2.9957
$\mathbb{1}\{\text{CEO is female}\}_i$	29,264,480	0.2008	0.4006	0	0	1
All Age Female Worker $\text{Share}_{ind(4),county}$	21,080,541	0.4629	0.235	0.1591	0.4615	0.7914
14 - 18 Age Female Worker $\text{Share}_{ind(4),county}$	17,326,340	0.0135	0.0257	0	0.0047	0.0383
19 - 21 Age Female Worker $\text{Share}_{ind(4),county}$	18,196,796	0.0225	0.0276	0	0.0131	0.0597
22 - 24 Age Female Worker $\text{Share}_{ind(4),county}$	18,642,280	0.0309	0.0268	0	0.0253	0.0655
25 - 34 Age Female Worker $\text{Share}_{ind(4),county}$	19,762,674	0.1053	0.0658	0.0286	0.0959	0.1971
35 - 44 Age Female Worker $\text{Share}_{ind(4),county}$	20,057,550	0.115	0.0622	0.0405	0.1081	0.2
45 - 54 Age Female Worker $\text{Share}_{ind(4),county}$	20,030,588	0.1083	0.063	0.0364	0.0982	0.1959
55 - 64 Age Female Worker $\text{Share}_{ind(4),county}$	19,431,486	0.0602	0.0414	0.018	0.0513	0.1135
65 - 99 Age Female Worker $\text{Share}_{ind(4),county}$	18,134,148	0.0186	0.0192	0	0.0147	0.0377
14 - 18 Age Worker $\text{Share}_{ind(4),county}$	14,748,268	0.0274	0.0457	0	0.0115	0.074
19 - 21 Age Worker $\text{Share}_{ind(4),county}$	16,202,956	0.0447	0.0393	0.0083	0.0342	0.0967
22 - 24 Age Worker $\text{Share}_{ind(4),county}$	16,984,803	0.0615	0.0321	0.0295	0.057	0.1019
25 - 34 Age Worker $\text{Share}_{ind(4),county}$	19,048,228	0.2257	0.0582	0.157	0.2252	0.2942
35 - 44 Age Worker $\text{Share}_{ind(4),county}$	19,418,290	0.2538	0.0500	0.1911	0.2578	0.3081
45 - 54 Age Worker $\text{Share}_{ind(4),county}$	19,409,743	0.2293	0.0561	0.1623	0.2298	0.2931
55 - 64 Age Worker $\text{Share}_{ind(4),county}$	18,563,143	0.1258	0.0474	0.0741	0.1214	0.1839
65 - 99 Age Worker $\text{Share}_{ind(4),county}$	16,553,856	0.0416	0.0314	0.0152	0.0356	0.0732

Notes: The table reports the summary statistics of the variables used in the Great Recession analysis. The sample comprises 29,264,480 firm-year level observations from 6,441,512 unbalanced firms during 2005 to 2010. Subscripts i, t, $ind(4)$, and *county* denote firm, year, NAICS 4-digit industry, and county, respectively.

Table A.2: Summary Statistics for the Covid Sample, 2016 $\sim$ 2021

	Obs.	Mean	Std Dev.	P10	P50	P90
$\ln(\text{Employment}_{it})$	38,755,775	1.3237	0.9002	0.6931	1.0986	2.5649
$\mathbb{1}\{\text{CEO is female}\}_i$	38,755,775	0.2307	0.4213	0	0	1
All Age Female Worker $\text{Share}_{ind(4),county}$	29,064,650	0.4193	0.1887	0.168	0.4298	0.6629
14 - 18 Age Female Worker $\text{Share}_{ind(4),county}$	22,795,980	0.0087	0.0211	0	0.0012	0.0278
19 - 21 Age Female Worker $\text{Share}_{ind(4),county}$	24,451,260	0.0162	0.0236	0	0.0071	0.0501
22 - 24 Age Female Worker $\text{Share}_{ind(4),county}$	25,410,389	0.0245	0.0236	0	0.0185	0.0579
25 - 34 Age Female Worker $\text{Share}_{ind(4),county}$	27,232,541	0.0923	0.0566	0.0285	0.086	0.1613
35 - 44 Age Female Worker $\text{Share}_{ind(4),county}$	27,416,993	0.0866	0.0438	0.0345	0.0829	0.1425
45 - 54 Age Female Worker $\text{Share}_{ind(4),county}$	27,631,434	0.0958	0.0486	0.0404	0.0909	0.1579
55 - 64 Age Female Worker $\text{Share}_{ind(4),county}$	27,319,907	0.0746	0.0452	0.0291	0.0664	0.1336
65 - 99 Age Female Worker $\text{Share}_{ind(4),county}$	25,943,748	0.0291	0.0256	0.0081	0.023	0.0562
14 - 18 Age Worker $\text{Share}_{ind(4),county}$	18,679,857	0.0189	0.0391	0	0.0044	0.0645
19 - 21 Age Worker $\text{Share}_{ind(4),county}$	21,833,541	0.0358	0.0374	0.0025	0.0235	0.0898
22 - 24 Age Worker $\text{Share}_{ind(4),county}$	23,422,864	0.0538	0.0315	0.0237	0.047	0.0986
25 - 34 Age Worker $\text{Share}_{ind(4),county}$	26,493,318	0.2181	0.0583	0.1508	0.2173	0.2879
35 - 44 Age Worker $\text{Share}_{ind(4),county}$	26,713,500	0.2129	0.045	0.1577	0.2152	0.2631
45 - 54 Age Worker $\text{Share}_{ind(4),county}$	26,953,293	0.2275	0.0528	0.1591	0.2325	0.2856
55 - 64 Age Worker $\text{Share}_{ind(4),county}$	26,570,190	0.1759	0.0574	0.1063	0.1727	0.2452
65 - 99 Age Worker $\text{Share}_{ind(4),county}$	24,591,352	0.0677	0.0396	0.0323	0.0605	0.1115

Notes: The table reports the summary statistics of the variables used in the Covid analysis. The sample comprises 38,755,775 firm-year level observations from 6,905,402 unbalanced firms during 2016 to 2021. Subscripts i, t, $ind(4)$, and *county* denote firm, year, NAICS 4-digit industry, and county, respectively.

Table A.3: Female CEO and Employment with Female Worker Share Coefficients, 2005 $\sim$ 2010

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$	-0.0043***	-0.0034***	-0.0041***	-0.0040***	-0.0047***
	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0006)
All Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$			0.0033		
			(0.0022)		
14 - 18 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0290	-0.0329
				(0.0195)	(0.0671)
19 - 21 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0226	0.0503
				(0.0227)	(0.0570)
22 - 24 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0105	0.1734***
				(0.0244)	(0.0562)
25 - 34 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0125	-0.0554**
				(0.0110)	(0.0236)
35 - 44 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				-0.0158	-0.0453*
				(0.0120)	(0.0244)
45 - 54 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0023	0.0542**
				(0.0124)	(0.0255)
55 - 64 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				0.0306*	-0.0418
				(0.0169)	(0.0368)
65 - 99 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$				-0.0527**	0.1350**
				(0.0242)	(0.0568)
14 - 18 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					0.0842
					(0.0955)
19 - 21 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					-0.0216
					(0.0958)
22 - 24 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					-0.0382
					(0.0955)
25 - 34 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					0.0554
					(0.0895)
35 - 44 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					0.0555
					(0.0893)
45 - 54 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					-0.0074
					(0.0895)
55 - 64 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					0.0820
					(0.0920)
65 - 99 Age Worker $\text{Share}_{ind(4),county} \times \text{PostRecession}_t$					-0.0881
					(0.0933)
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	-	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	-	✓	✓	✓
SIC 8-digit Industry-by-year FE	-	✓	-	-	-
SIC 8-digit Industry-by-county FE	-	✓	-	-	-
N	28898456	28838772	20806690	12595765	10546003
adj. R^2	0.9578	0.9576	0.9585	0.9597	0.9602

Notes: The table presents the coefficients on the gender and age worker composition controls of Table 3. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Great Recession dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostRecession}_t$). Subscripts i, t, $ind(4)$, and *county* denote firm, year, NAICS 4-digit industry, and county, respectively. The data span from 2005 to 2010. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.4: Female CEO and Employment with Female Worker Share Coefficients, 2016 $\sim$ 2021

	(1)	(2)	(3)	(4)	(5)
	Log(Firm Employment)				
$\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$	-0.0241***	-0.0186***	-0.0244***	-0.0269***	-0.0294***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0005)
All Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$			-0.0054***		
			(0.0016)		
14 - 18 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				-0.0477**	-0.2298***
				(0.0191)	(0.0737)
19 - 21 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				0.0057	-0.4332***
				(0.0213)	(0.0561)
22 - 24 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				0.0877***	0.6074***
				(0.0213)	(0.0547)
25 - 34 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				-0.0649***	0.0398*
				(0.0093)	(0.0228)
35 - 44 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				0.0620***	0.0327
				(0.0116)	(0.0268)
45 - 54 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				0.0408***	-0.0909***
				(0.0107)	(0.0256)
55 - 64 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				-0.1207***	-0.1050***
				(0.0115)	(0.0284)
65 - 99 Age Female Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$				0.0825***	0.1117**
				(0.0155)	(0.0442)
14 - 18 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.1655
					(0.1397)
19 - 21 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.3960***
					(0.1391)
22 - 24 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					-0.1632
					(0.1397)
25 - 34 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					-0.0359
					(0.1354)
35 - 44 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.1699
					(0.1361)
45 - 54 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.1960
					(0.1340)
55 - 64 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.0680
					(0.1366)
65 - 99 Age Worker $\text{Share}_{ind(4),county} \times \text{PostCovid}_t$					0.1155
					(0.1369)
Firm FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-year FE	✓	✓	✓	✓	✓
County-by-year FE	✓	✓	✓	✓	✓
NAICS 4-digit Industry-by-county FE	✓	✓	✓	✓	✓
SIC 4-digit Industry-by-year FE	✓	-	✓	✓	✓
SIC 4-digit Industry-by-county FE	✓	-	✓	✓	✓
SIC 8-digit Industry-by-year FE	-	✓	-	-	-
SIC 8-digit Industry-by-county FE	-	✓	-	-	-
N	38572965	38507443	28900068	15467281	12314391
adj. R^2	0.9694	0.9710	0.9704	0.9721	0.9727

Notes: The table presents the coefficients on the gender and age worker composition controls of Table 8. The dependent variable is log firm employment (Log(Firm Employment)). The independent variable is an interaction of the female CEO dummy and the post-Covid dummy ($\mathbb{1}\{\text{CEO is female}\}_i \times \text{PostCovid}_t$). Subscripts i, t, $ind(4)$, and $county$ denote firm, year, NAICS 4-digit industry, and county, respectively. The data span from 2016 to 2021. Standard errors are clustered at firm level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.