

**Breaking Barriers or Widening the Gap? Covid-19's Impact on
Gender Disparities in Small Business Owner Earnings**



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1. Introduction

During the Covid-19 pandemic, stay-at-home orders and social distancing policies resulted in business closures across the United States. Small businesses, which make up 99 percent of all businesses and provide vital employment, innovation, and community, were hit especially hard (US Chamber of Commerce). Prior to the pandemic, one-third of small businesses were operating at a loss or breaking even, so the pandemic compounded the difficulties faced by these enterprises (Bartik, Bertrand, Cullen, and Stanton 2020).

An additional challenge within entrepreneurship is the gender gap, with millions of "missing businesses" due to the lack of women entrepreneurs and women-owned businesses. Currently, women only make up 33 percent of business owners, despite comprising 51 percent of the U.S. population (Liu and Parilla 2020). Women are also less likely than men to start their own businesses (Liu and Parilla 2020). Research shows that reducing this gap could both boost global GDP by three trillion dollars and be key for economic recovery during downturns (World Bank). The 2008 financial crisis provides evidence to support this, as women-owned businesses were especially strong job creators and stabilizers of the economy at the time (Hanna 2021).

Historically, female entrepreneurship has been hindered by a lack of access to economic resources and gender discrimination. Informal financial networks, often dominated by men, have made it challenging for women to secure sufficient financial support to start and grow their businesses (Eastwood 2004). As a result, women typically start their firms with lower levels of funding, rely more on personal loans from family and friends, and have less access to external sources of capital than men. Furthermore, women are under-represented in management positions, with only 29 percent of women in the boardroom in 2022 (Li 2022). This lack of

experience, capital, and access to business networks puts women at a disadvantage when starting their own businesses.

Traditional views on women's roles in the family have also affected women's entrepreneurship negatively. Research shows that women bear more of the burden of childcare and managing work-life balance when they have children, leading to inflexible schedules and lower levels of flexibility (Cesaroni and Paoloni 2016). While this may make it more challenging to run a high-growth business, it has also driven women to start small businesses that can be more easily integrated into family life. Interestingly, women are more likely to start businesses out of necessity, such as a lack of job opportunities or family constraints, further highlighting the importance of examining gender disparities in earnings among business owners.

Overall, Covid-19 has further heightened the hardships faced by women entrepreneurs and may have reversed decades of progress in advancing female entrepreneurship. Therefore, it is crucial to examine the pandemic's impact on women-owned small businesses compared to male-owned small businesses, specifically focusing on women entrepreneurs' individual earnings relative to their male counterparts.

2. Literature Review

The emerging literature has investigated the economic effects of the Covid-19 pandemic on entrepreneurship and small businesses, as well as the disproportionate effect of the pandemic on racial disparities within small business owners. Past research has also evaluated the barriers and challenges faced by women entrepreneurs and ways to address the gender gap. This paper aims to analyze how the Covid-19 pandemic has affected women entrepreneurs and the gender gap between small business owners.

Literature on the effect of Covid-19 on small businesses found that about 43 percent of small firms were closed by December 2020 with the hospitality, retail, personal services, entertainment, and arts sectors most affected (Bartik 2020). The number of working business owners was also found to drop from 15 million in February 2020 to 11.7 million just two months later in April (Fairlie 2020). While the US passed extensive programs to provide funding to small businesses with an estimated \$650 billion spent during the early stages of the pandemic, studies found that it seemed unlikely these policies would be enough to counter the full struggles of small businesses (Belitski, Guenther, Kritikos, and Thurik 2022). Research on how the Covid-19 pandemic affected the earnings of small business owners of color found that while average business earnings dropped by five percent in 2020 for all small business owners, Black business owners saw an 11 percent drop, Asian business owners saw a 15 percent drop, Latinx business owners saw a 7 percent decline, and white business owners only saw a 2 percent decrease (Fairlie 2022). The literature reveals that the pandemic has resulted in small business closures and disproportionately affected business owners of color, which could lead to gender disparities in entrepreneurship being further exacerbated by the pandemic as well.

3. Data

The dataset comes from the Current Population Survey Annual Social and Economic Supplements and initially included a total of 180,101 individuals for 2018 and 2021. After filtering for business ownership and dropping the top and bottom 5 percent of earnings data, the analysis was conducted using a single dataset consisting of 8,248 observations at the individual level. The Y-variable is defined as total own business self-employment earnings for the previous calendar year, where business owners' earnings are calculated from survey questions about

earnings sources, and include information on earnings the individual received from the business during the calendar year. In other words, the Y-variable represents the individual earnings received by business owners and not overall firm revenues, which could skew towards larger companies.

The X-variable in the study is defined by the sex of the business owner. To address confounding variables, the analysis will control for age, race, business industry, education level, and geographical location. These variables can affect business owner earnings due to factors such as length of time in business, professional experience and skill level, industry size, and average income in different regions. Demographic information such as age, race, and education level is collected through the US Census Bureau's annual survey questions. The dataset also includes information on the industry of the business and the geographical location of each individual.

The CPS survey collects information on business ownership and earnings by identifying individuals who report owning a business as their primary employment over the previous calendar year. An individual's primary employment is the job with the highest number of hours worked during the year, ensuring that people with side businesses who work more hours in wage and salary jobs are excluded from the analysis. Additionally, the CPS data includes business owners who are employers and non-employers, as well as owners of large and small businesses. However, I will interpret the data as generally covering small businesses because 99 percent of the businesses in the US are small businesses, and I have dropped the top 5 percent of earnings data in my analysis. It should be noted that while the data captures the number of active business owners, it is not possible to discern how temporary or permanent business closures have impacted this figure or whether the business owners are new or established. Moreover, since the

data was collected on an individual level, if there were multiple owners for a business, the earnings of each individual owner were included in the dataset.

To analyze the data, the time periods will be specified as the pre-COVID period (2018) and the COVID period (2021). These years were chosen to examine the impact of the pandemic on businesses and consumers, while also allowing for a recent year before any COVID-related effects.

Summary Statistics Table 1: Business Owner Age & Earnings

	Mean	Std.Dev.	Min	Max
Age	48.17	14.40	15	85
Earnings	33830.86	27846.48	1	13000

Note: There were 80 business owners in the dataset under 18 years old. The minimum earnings was 1 after dropping the bottom 5 percent of the data because there were business owners with 0 earnings.

Summary Statistics Table 2: Business Owner Demographics

	Frequency	Percent	Cumulative
Male	4789	58.06	58.06
Female	3459	41.94	100.00
White	6838	82.90	82.90
Black	614	7.44	90.35
Native American	126	1.53	91.88
Asian	445	5.40	97.27
High School Dropout	136	1.65	1.65
High School Graduate	2314	28.06	29.71
College Dropout	1381	16.74	46.45
Bachelor's	1688	20.47	66.92
Master's	623	7.55	74.47
Professional Degree	155	1.88	76.35
Doctorate Degree	153	1.85	78.2

Summary Statistics Table 3: Business Industry & Geography

	Frequency	Percent	Cumulative
Military	456	5.53	5.53
Agriculture	122	1.48	7.01
Oil/Gas	17	0.21	7., 21
Construction	1557	18.88	26.09
Manufacturing	238	2.89	28.98
Transportation	499	6.05	43.03
Information	100	1.21	44.24
Finance	541	6.56	50.80
Education	891	10.80	81.04
Entertainment	580	7.03	88.07
Public Services	5	0.06	100.00
Northeast	1265	15.34	15.34
Midwest	1302	15.79	31.12
South	2809	34.06	65.18
West	2849	34.54	99.72

4. Methodology

I will be running a “difference-in-difference” regression that compares the change in the differences in observed outcomes between female and male business owners’ earnings across the pre-COVID (2018) and COVID (2021) periods. Earnings is defined as the individual earnings received by business owners and not overall firm revenues, which could skew towards larger companies. The first “difference” is male business owner earnings minus female business owner earnings, and the second “difference” is pandemic business earnings minus pre-pandemic business earnings. Thus, the regression will estimate the effects of the pandemic on small business owners and the gender gap in business owner earnings. In the model, $Earnings_{it}$ represents the annual business earnings for owner i in the calendar year t , $COVID_t$ represents the time period of either pre-COVID (2018) or COVID (2021), and Sex_i includes the sex of the business owner. The interaction term, $Covid_t * Sex_i$ stores the multiplication of the two variable values for each observation. The variable X_i controls for the confounding variables, age, industry, race, education level, and geography, and the error term ε_i captures the effect of all factors that the model was not able to adequately represent.

Statistical Model:

$$Earnings_{it} = a + \beta_1 * Covid_t + \beta_2 * Sex_i + \beta_3 * (Covid_t * Sex_i) + \beta_4 * X_{it} + \varepsilon_i$$

Variables	Variable in Model	Regression Coefficients	Variable Descriptions
Covid-19 Time Period	Covid	β_1	0 = pre-COVID 2018 1 = COVID 2021
Sex	Sex	β_2	0 = Male 1 = Female
Interaction term	<i>Covid * Sex</i>	β_3	
Age	X	β_4	00-79 = 0-79 years old 80 = 80-84 years old 85 = 85+ years old
Education	X	β_4	38 = High School Dropout 39 = High School Graduate 40 = College Dropout 43 = Bachelor's Degree 44 = Master's Degree 45 = Professional School Degree 46 = Doctorate Degree
Race	X	β_4	0 = White

			<p>1 = Black</p> <p>3 = Asian</p>
Hispanic	X	β_4	<p>0 = Not Hispanic/Latino</p> <p>1 = Hispanic/Latino</p>
Region	X	β_4	<p>1 = Northeast</p> <p>2 = Midwest</p> <p>3 = South</p> <p>4 = West</p>
Industry	X	β_4	<p>1 = Agriculture</p> <p>2 = Oil/Gas</p> <p>3 = Construction</p> <p>6 = Transportation</p> <p>7 = Information</p> <p>8 = Finance</p> <p>10 = Education</p> <p>11 = Entertainment</p>

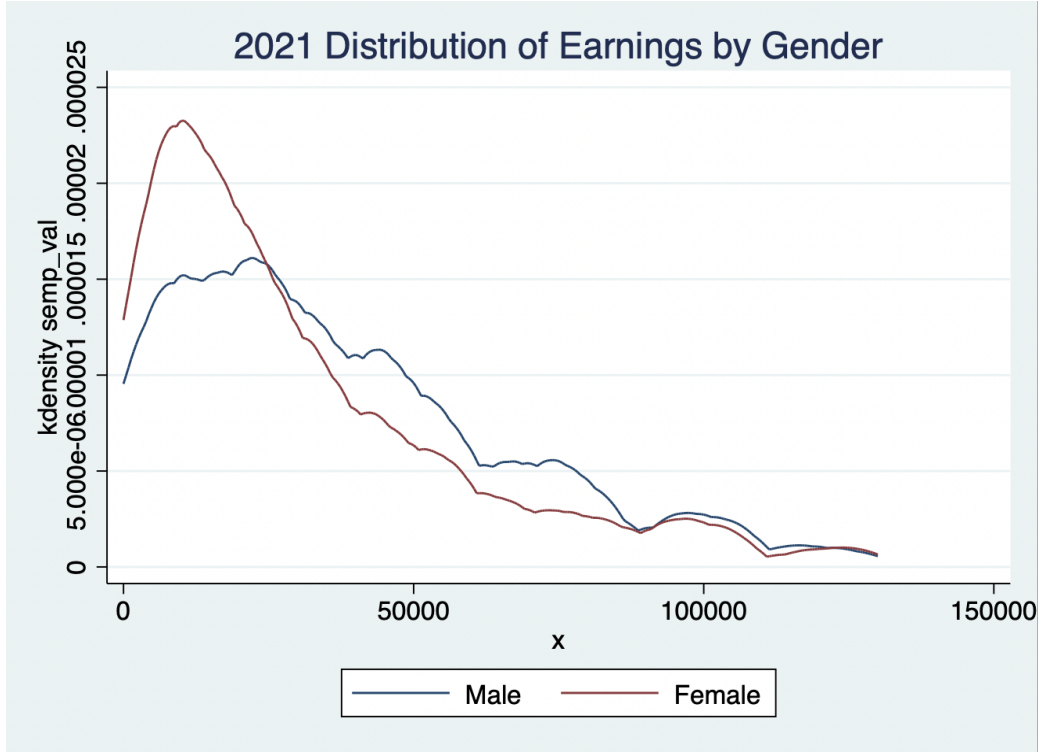
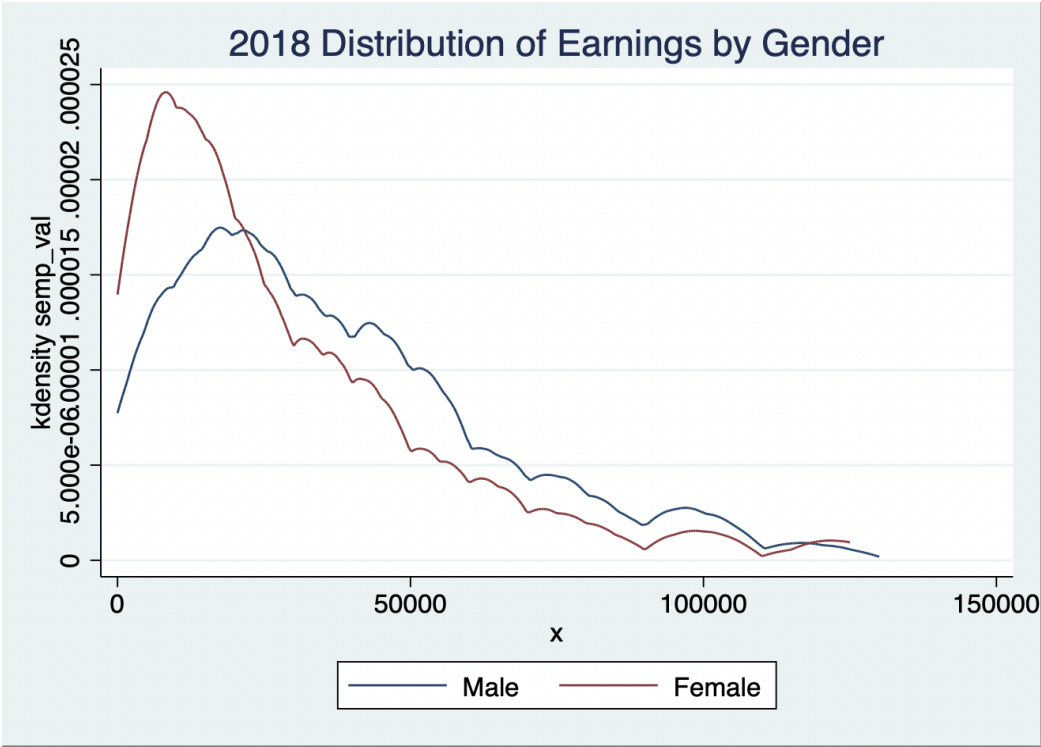
5. Results

Table 1: Average business owner earnings by gender in 2018 and 2021

	Mean Earnings	
	2018	2021
Male	36745	37606
Female	27972	30671

Note: The table shows business owners who had earnings in at least one of the two years. The CPS ASEC data does not include information on when people started their businesses.

Graph 1: 2018 vs 2021 Distribution of Business Owner Earnings by Gender



The results show that there is a gender gap in average business earnings between male and female business owners, but that the gender gap in earnings decreased during COVID (Graph 1). During the pre-COVID year in 2018, the average earnings of male business owners was \$36,745 while the average earnings of female business owners was \$27,972. In comparison, during the Covid-19 year in 2021, the average earnings of male business owners was \$37,606 while the average earnings of female business owners was \$30,671. It is also interesting to observe the change in density of the male and female business owners' earnings pre-COVID versus COVID (Graph 1). The shape and location of the density of female business owners' earnings remained nearly unchanged in 2021 relative to 2018 with the majority of observations concentrated at roughly \$20,000. However, there is a slight change in 2021, as the highest female business owner earned around the same amount as the highest male business owner at slightly more than \$125,000. In 2018, the highest earnings of female business owners was still less than the highest earnings of male business owners. On the other hand, the shape of the density curve of male business owner earnings changed in 2021 compared to 2018. In 2018, the peak of the curve was concentrated at roughly \$30,000, while the curve flattened out in 2021, with about an equal amount of male business owners earning in the \$20,000 to \$30,000 range. This change might be explained by the effects of the Covid-19 pandemic on consumer spending and business recovery.

Table 2: Difference-in-Difference Regression Including Confounding Variables

Age	-47.624* (20.925)	White	0.000 (.)
High School Dropout	4889.880 (5661.994)	Black	-2921.042* (1143.464)
High School Graduate	6980.774 (5214.495)	Hispanic/Latino	-2109.04** (2377.778)
College Dropout	8170.206	Asian	3456.922** (1319.756)
Bachelor's	14345.322** (5228.978)	Northeast Region	0.000 (.)
Master's	18649.259*** (5300.171)	Midwest	-1343.979 (1049.548)
Professional School Degree	23813.623*** (5617.237)	South	-2197.432* (903.817)
Doctorate	28789.081*** (5621.973)	West	-956.739 (900.333)
Male	0.000 (.)	Agriculture	21575.217*** (2701.503)
Female	-9274.145*** (874.827)	Oil/Gas	30540.306*** (6544.559)
pre-Covid	0.000 (.)	Construction	19268.750*** (1446.984)
Covid	1327.384 (770.950)	Transportation	18198.888*** (1736.549)
Male × pre-Covid	0.000 (.)	Information	20589.782*** (2936.802)
Male × Covid	0.000 (.)	Finance	28760.782*** (1699.581)
Female × pre-Covid	0.000 (.)	Education	14143.854*** (1568.941)
Female × Covid	1265.475 (1186.006)	Entertainment	14463.536*** (1668.484)
Mean	33830.86		
Observations	8248		
R ²	0.10		

Notes.

individual-level observations.

All estimates are from OLS models.

* p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests).

The regression results show that there is no statistical significance in the effect of the Covid-19 pandemic on the gender gap in earnings between male and female business owners. In other words, the regression does not suggest that female business owners were more adversely affected than male business owners regarding earnings as a result of the pandemic. This is because Table 1 shows that while the *Covid* coefficient is positive, suggesting that female business owners' earnings increased between 2018 to 2021, it is statistically insignificant because the p-value is equal to 0.270. Similarly, the *Covid * Sex* interaction term is positive, which would indicate that the pandemic had a greater negative impact on the earnings of male business owners compared to female business owners, but is statistically insignificant because the p-value is 0.143.

Additionally, the R-squared value is 0.10, which indicates that the regression line only explains 10 percent of the variance in the dependent variable, which is the gender gap in earnings between male and female business owners, while the remaining 90 percent of the variance is not explained by the regression line. This means there is a weak relationship between the gender of the business owner and earnings of the business owner during the pandemic. Moreover, the *Sex* coefficient is negative and significant with a p-value of zero, which shows that there is a gender gap in earnings between female business owners and male business owners in 2018.

The regression results that control for confounding variables show that education level, race, age, region, and business industry all have a statistically significant effect on the earnings of business owners when all other variables are held constant (Table 2). This is because the p-values of each of the coefficients are less than 0.05. Interestingly, among the different levels of education, only obtaining a Bachelor's, Master's, Professional School, or Doctorate degree showed statistical significance and was associated with higher earnings. In relation to race, there

was a negative correlation between identifying as Black or Hispanic/Latino and earnings in contrast to White business owners, while identifying as Asian had a positive correlation with higher earnings. Furthermore, all business industries analyzed were linked to higher earnings, but being situated in the South was associated with lower earnings.

6. Discussion

To summarize, the analysis included a difference-in-difference regression to test whether the pandemic affected the gender gap between male and female business owners' individual earnings. Business owner earnings is defined as the earnings the individual owner receives from the business for the previous calendar year and not overall firm revenues. The results showed that the effect of the Covid-19 pandemic on the gender gap in earnings between male and female business owners is statistically insignificant. The R-squared value of 0.10 also described a weak relationship between the gender of the business owner and earnings of the business owner during the pandemic.

It is important to note that there are several limitations with the analysis. First of all, social distancing and safety policies differed across each state and county during the pandemic. For example, Republican states generally had shorter and less restrictive Covid-19 measures compared to Democratic states. This was not accounted for in the regression and thus could have impacted small business operations and the results of the paper. In addition, timing is a measurement error because each state and county ordained its own rules and regulations, which resulted in variations in when policies were implemented. For future investigation, it could be helpful to determine the state or county of residence and the political party of the state, to better account for differences across geography of business owners' earnings. Furthermore, another

limitation was that the data did not include information on business closures and how temporary and permanent business closures might have affected the gender gap. This is because the data counted the number of active business owners and also did not differentiate between new and already established business owners. Incorporating the effects of business closures could have highlighted the gender disparity among small business owners, especially if more women-owned businesses permanently shut down as a result of the pandemic.

Potential future work could attempt to address these limitations, and it would be interesting to expand upon the paper by examining the post-pandemic recovery of small businesses and how it has impacted the gender gap of business owner earnings. This would require data from 2022 and the following years, but it would add more insight into whether the pandemic has helped break barriers for women or widened the gap in business and entrepreneurship.

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