

## **Impact of Race and Gender on the SBA Paycheck Protection Program (PPP) Loan Amounts**

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## **Abstract**

The Paycheck Protection Program (PPP) helped to preserve employment relationships during the sudden shutdown of economic activity due to the Covid-19 pandemic. In this paper, we analyze access of the minority and women-owned businesses to PPP loans. Our quantitative results show that a minority-owned business with 5 to 9 employees received a 21% smaller PPP loan than their white-owned business counterpart. A women-owned small business with 5 to 9 employees received a 15% smaller PPP loan than a male-owned business. Using Lee bounds, we found that women-owned businesses in rural counties received \$2,634 and \$8,856 smaller PPP loans than those in urban counties. From the interviews with PPP loan recipients in Northeast Ohio, we learned that businesses that received smaller loan amounts had more difficulty with the loan application process compared to businesses that received larger loans. The discrepancy in PPP loans to women- and minority-owned businesses may have stemmed from a lack of access and knowledge about the program itself.

**Keywords:** women-owned business, minority-owned business, Paycheck Protection Program (PPP)

## **Introduction**

The small business crisis has fallen disproportionately on minority- and women-owned businesses. From February to April 2020, the Covid-19 pandemic cut 41% of businesses owned by African-Americans and closed 25% of women-owned firms in the U.S. (Fairlie, 2020). Nevertheless, these companies are important employers and contributors to the economy. In 2018, one million minority-owned small businesses in the U.S. employed almost 10 million workers and generated more than \$1.5 trillion in economic output. Women owned nearly 300,000 of them, employing 2.3 million workers.<sup>1</sup> Minority- and women-owned small businesses tend to be smaller in size. Nationally, over half of them have 1 to 4 employees and nearly 80% have nine employees or less (Appendix Table A1).

This paper analyzes whether small business owner race or gender played a role in the loan amount granted through the Paycheck Protection Program (PPP) loans. PPP loans are guaranteed and potentially forgivable loans offered by the U.S. Small Business Administration (SBA) to small businesses affected by the pandemic to keep their workers on the payroll. With almost \$800 billion approved in more than 11 million loans passing through 5,469 financial institutions, the PPP has been one of the largest economic stimulus programs in U.S. history.<sup>2</sup> In 2020, PPP supported almost 51 million jobs in the U.S. A typical (median) PPP loan of \$22,500 retained 3 jobs. Minority and women-owned businesses may have been more vulnerable to the pandemic, yet studies have shown that they face challenges when it comes to credit access. Our findings highlight differences in the PPP loan amount received by minority- and women-owned small businesses in comparison to white- and male-owned. Policy makers can use our results to design policies that better target minority- and women-owned small businesses.

## **Literature Review and Contribution**

Our contribution to the literature is fourfold. First, our paper adds to the literature on small-business credit access, a crucial element to their growth. The use of commercial financing reduces the exit rates of new firms (Yunwei & Minniti, 2015). In the case of the PPP loans, loans were instrumental in providing fast cash relief for businesses and funds to keep the payroll. Becker (1971) hypothesized that individuals who tend to discriminate behave as though they are

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<sup>1</sup> 2018 U.S. Census Annual Business Survey (ABS), Table ID: AB1800CSA04

<sup>2</sup> Small Business Administration. Paycheck Protection Program (PPP) Report. Approvals through 05/23/2021.

willing to pay something, either directly or in the form of a reduced income, to be able to discriminate. This theory asserts that individuals discriminate because they prefer to avoid members of another race or gender. In the context of credit markets, a financial institution that would normally loan funds at rate  $r$  will require instead a rate of  $r(1 + d)$ , with  $d$  being the discrimination coefficient. Phelps (1972) considers the case in which lenders use demographic group as a proxy for the economically important factors when deciding whom to issue the loan. At the same time, the Equal Credit Opportunity Act (ECOA) requires that equally qualified borrowers be able to access credit regardless of their race, ethnicity, gender, and other protected classes.

National Survey of Small Business Finances (NSSBF), collected by the Federal Reserve from 1987 to 2003, has been used by many researchers as a common source to investigate some of the factors influencing differentials in the credit market experiences of small businesses across different demographic groups. Findings from the 2003, 1998, and 1993 NSSBF reveal that women and minority borrowers experience greater difficulty securing loans than white male borrowers. Using the 1993 NSSBF ( $n = 3,400$ ), Cavalluzzo and Cavalluzzo (1998) observed substantial *ceteris paribus* differences in denial rates between businesses owned by African Americans and white male-owned firms. They conclude that there is not enough evidence to eliminate discrimination as a potential explanation for some observed differences. Using data from the 1993 and 1998 NSSBF ( $n = 3,561$ ), Blanchflower et al. (2003) found that black-owned businesses were about twice as likely to be denied credit even after controlling for observed differences in creditworthiness and other factors. Notably, the magnitude of the black-white differential in small-business loan approval rates is considerably larger than in mortgage discrimination. According to Blanchard et al. (2008), differences in loan approval rates are driven by lenders' stereotypes about the ability of black- and Hispanic-owned businesses to succeed under some circumstances. Using data from the 1998 and 2003 NSSBF ( $n = 1,256$ ), Asiedu et al. (2012) found that both black- and Hispanic-owned businesses faced discrimination in obtaining loan renewals in 2003. Among large-scale, well-established small businesses, loan denial rates were 31.5% for minority-owned businesses and 12.3% for nonminority-owned businesses (Bates & Robb, 2013).

In the Small Business Credit Survey conducted by the Federal Reserve Bank in 2016 ( $n = 7,916$ ), black-owned businesses applied for new funding at a rate 10% higher than white-owned businesses, but their approval rates were 19% lower. When looking only at firms approved for at least some financing, 40% of minority-owned firms with good personal and/or business credit scores received the full amount requested, compared to 68% of nonminority-owned firms in good standing.<sup>3</sup> Similar trends continued in 2019 ( $n = 6,614$ ).<sup>4</sup>

Second, we contribute to the literature examining the role of neighborhood characteristics on small business financing. Neighborhoods, where poverty rates are high and minority residents are numerous, have traditionally been viewed as unattractive markets by risk-averse financial institutions. Using 2004-2011 Kauffman Firm Survey data ( $n = 657$ ), Bates and Robb (2016) investigate loan accessibility among urban small businesses. Black firm ownership, other factors being equal, was associated with smaller loan amounts. Using the Community Reinvestment Act (CRA) small business lending data, Immergluck (2002) measured small business lending flows to neighborhoods in the Philadelphia metropolitan area ( $n = 1,197$ ). Black tracts received fewer loans after accounting for firm density, firm size, industrial mix, neighborhood income, and the credit quality of local firms. This paper uses nationally representative SBA's PPP loan data ( $n = 5,212,128$ ) to test the hypothesis of whether minority- and women-owned businesses in rural counties received lower loan amounts than those in urban counties.

Third, we add to the literature on access to credit by women-owned businesses. Credit constraints are one of the main problems that inhibit small business growth, and they are a bigger issue for women-owned businesses (Carter & Allen, 1997; Giglio, 2020). Women-owned businesses are concentrated disproportionately in crowded subsections of lower-order services, e.g., retail, leisure, and hospitality, and are relatively scarce in value-added and capital intense sectors. This lessens the availability of credit. Asymmetric information for women-owned businesses causes credit to be more difficult to obtain or unfairly priced (Scalera & Zazzaro, 2001). In the 2016 Small Business Credit Survey, women-owned businesses applied for business loans around the same rate as male-owned businesses but were much less likely to obtain

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<sup>3</sup> Fed Small Business. (2017). [2016 Small Business Credit Survey: Report on minority-owned firms.](#)

<sup>4</sup> Fed Small Business. (2019). [Small Business Credit Survey: 2019 Report on minority-owned firms.](#)

financing (47% success compared to 61%). Fewer women-owned businesses were granted all of the financing they requested in comparison to male-owned businesses, and more women-owned businesses received no financial assistance at all.<sup>5</sup>

Finally, we contribute to the literature on unequal access to the PPP program. In September and October 2020, after the first round PPP closed and prospects for additional stimulus funding were uncertain, the Federal Reserve Bank conducted its national Small Business Credit Survey, including firms temporarily closed at the time of survey ( $n = 9,693$ ). The survey found that Black-owned businesses were almost half as likely as white-owned businesses to receive the entire PPP funding amount they requested, and they were nearly five times as likely to receive none.<sup>6</sup> Schweitzer and Borawski (2021) also found that Black, Hispanic, or American Indian or Alaska Native majorities received fewer PPP loans on average. Liu and Parilla (2020) break down how small businesses in majority-white neighborhoods received PPP loans faster than small businesses in majority-Black and majority-Latino or Hispanic neighborhoods. Fairlie and Fossen (2021) also found that PPP funds flowed to minority communities later than to communities with lower minority shares. Additionally, Erel and Liebersohn (2020) found that Fintech was disproportionately used in zipcodes with a larger minority share of the population.

### **The Paycheck Protection Program and Data Description**

The Paycheck Protection Program (PPP) was authorized by the United States federal government's passage of the Coronavirus Aid, Relief, and Economic Security (CARES) Act in late March 2020. These loans were designed to directly incentivize small businesses, self-employed workers, sole proprietors, certain nonprofit organizations, and tribal businesses impacted by Covid-19 to keep their workers on payroll through the pandemic. Congress built on the principles of the SBA's existing 7(a) loan guarantee program to distribute loans through certified lenders (banks, credit unions, CDFIs, and, eventually, financial technology companies and non-bank lenders). SBA removed the majority of the 7(a) program's rules—requiring no fees, no credit scores, and no collateral from applicants.

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<sup>5</sup> Fed Small Business. (2017). [2016 Small Business Credit Survey: Report on minority-owned firms](#).

<sup>6</sup> Fed Small Business. (2021). [Small Business Credit Survey: 2021 Report on employer firms](#).

To be eligible for the Paycheck Protection Program, an applicant must have 500 or fewer employees. The amount of a PPP loan is approximately equal to 2.5 times the applicant's average monthly payroll costs. PPP loans may also be used to pay for mortgage interest, rent, utilities, worker protection costs related to Covid-19, uninsured property damage costs caused by looting or vandalism during 2020. SBA issues loan forgiveness if at least 60% of the proceeds are spent on payroll costs. If not forgiven, PPP loans have an interest rate of 1%.

This paper focuses on the first draw PPP loans issued by SBA from April 3 through August 8, 2020. During this time, SBA issued \$525 billion in PPP loans to over 5 million small businesses. Original PPP funds were depleted on April 16 with \$319 billion allocated to 1,620,219 small businesses. SBA started to accept applications again on April 27, 2020, with extra funds from the Paycheck Protection Program and Health Care Enhancement Act. Thus, there is a gap in PPP loan approvals between April 16 and April 27, 2020. The first draw PPP closed on August 8, 2020, with \$130 billion in available funding that went unclaimed.

We employ the national database of PPP loan recipients released by the U.S. Small Business Administration (SBA). Data include the exact dollar amount for loans with a value below \$150,000 but not borrower names. For larger loans, borrower names are available, though the loan amounts are grouped into bins. SBA issues summary reports of national PPP data including loan size. Using this summary data in the SBA's report from August 8, 2020, we calculated the averages per PPP loan range (Column 4 in Table 1) and used them to impute the amount of PPP loan received when the loan recipient name was unknown.<sup>7</sup>

We compared the distribution of PPP loan counts and amounts by state and industry, in the data released by SBA, against the SBA's Summary Report (Appendix Tables A2-A5). The imputed total amount by state (\$525 billion) is \$211 million smaller (-0.04%) than the total amount of the PPP loans reported by SBA.<sup>8</sup> The imputed total amount by industry is 1.7% larger than in the

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<sup>7</sup> Small Business Administration. Paycheck Protection Program (PPP) Report. Approvals through 08/08/2020.

<sup>8</sup> States with the largest PPP loan amounts have the largest absolute difference between the two amounts: Florida (-\$227,474,945), New York (\$204,326,246), Texas (\$146,563,322), and Ohio (\$90,451,230). The largest relative

SBA's Summary Report because of the disproportionately large amount of PPP loans received by the Transportation sector (Stevenson, 2020). Industries that suffered from the pandemic and social distancing restrictions the most, i.e., Health Care, Retail Trade, Accommodation, and Arts, received one-third of the total allocated PPP amount, \$159 billion in 1,519,514 loans.

The average size of the PPP loan was \$100,769 and the median was \$22,500. From Table 2, 87% of all loans were \$150,000 or less. However, loans above \$150,000 accounted for 72% of the distributed amount. Loans below \$150,000 were more commonly seen after April 27, 2020 (Appendix Tables A6-A7). During the first round (April 3-April 16), the average PPP amount was \$196,788, compared to \$57,458 during the second round (April 27-August 8).

The minimum loan size was 1-cent to a business owner (LLC) from Ocala, Florida on April 8, 2020. The maximum PPP loan ranged from \$5 to \$10 million.<sup>9</sup> To ensure all program rules were followed, all loans went through an automated review. SBA manually reviewed all loans of \$2 million or more. In addition, any loan could be selected for a manual review (SBA, 2020). The dataset includes almost 5,000 large loans totaling \$33 billion. Of these large loans, 74% were distributed during the first two weeks, from April 3 to April 16, 2020.

PPP loan applications must be submitted in English to the PPP lender. SBA provides documents in 17 different languages to explain eligibility requirements, help fill out applications, and answer frequently asked questions.<sup>10</sup> The SBA encouraged PPP loan recipients to support the American economy by asking them to purchase American-made equipment and products to the extent feasible.<sup>11</sup> Non-profits including churches, temples, mosques, synagogues, and other houses of worship qualified for PPP loans as long as they met application requirements. Demographic information for borrowers in the PPP loan application was requested on a voluntary basis.

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difference was 2% to 5% for American Samoa (-5%), -\$640,924; Delaware (-2%), -\$29,027,808; Vermont (-2%), -\$25,863,616; and Northern Mariana Islands (-2%), -\$965,858.

<sup>9</sup> The maximum imputed loan size was \$6,996,438.

<sup>10</sup> U.S. Small Business Administration. [First draw PPP loan](#).

<sup>11</sup> Office of Capital Access. [PPP first draw borrower application form](#). U.S. Small Business Administration.



SBA data includes 536,817 PPP loan recipients with known business owner's race or ethnicity (Table 3). Based on this self-reported demographic information, Minority and Hispanic business owners received 121,081 loans (23%) corresponding to \$11.7 billion (18%). Native American business owners received the highest average PPP loan, \$154,429. African American business owners received lower average PPP loans, \$84,747, compared to Asian Americans (\$92,570), Unanswered Race/Ethnicities (\$98,029), Hispanics or Latinos (\$103,783), and Whites (\$132,741). African American business owners also received a lower median PPP amount, \$20,832, compared to Unanswered Race/Ethnicities (\$21,200), Hispanics or Latinos (\$29,391), Asian Americans (\$33,300), and Whites (\$38,577).

Most zipcodes in the U.S. had associated businesses receiving PPP loans (Figure 1). Only 1,525 out of 33,120 zipcodes (4.6%) did not receive the first draw PPP loan. We used American Community Survey data at the zipcode level to analyze distributions of PPP loans among different neighborhoods in the U.S. (Table 4). On average, a small business located in a majority African American zipcode received smaller PPP loans than a small business located in majority Hispanic or Latino, White, and Asian American neighborhoods.

SBA data includes 1,115,755 PPP loan recipients with known business owner gender. We utilized Mergent Intellect Dataset to determine the gender of the business owner where the gender of the PPP loan recipient was unanswered. Using exact match by company name, zipcode, and state, we filled in 9,540 observations with missing business owner gender information, which corresponds to \$5.6 billion in PPP, or 1% of the total distributed amount. Based on the resulting 1,125,295 observations, the average PPP loan received by the women-owned businesses was \$100,349, which is \$32,435 smaller than the loan amount received by the male-owned businesses (Table 5). The median PPP loan received by the women-owned businesses was \$27,471, which is \$12,059 smaller than the loan amount received by the male-owned businesses.

Differences in PPP amounts across minority- and women-owned businesses may be partially explained by different sizes of these businesses compared to white- and male-owned businesses. PPP loan data included information on the number of jobs retained by each borrower, which we

used as a proxy for the number of employees. On average, women-owned businesses had fewer employees than male-owned businesses (Table 6). African American business owners employed fewer people than Asian American, White, Hispanic or Latino, and Native American business owners (Table 7).

We employed 2013 Rural Urban Continuum Codes to analyze access to PPP loans in rural areas compared to urban areas. Small businesses located in urban counties received 90% of the PPP loan amount (Table 8). On average, small businesses located in rural areas received \$71,842, smaller than in suburban areas (\$77,515) and urban areas (\$104,715). A typical loan received by a small business in rural areas was \$20,000, smaller than in suburban areas (\$20,832) and urban areas (\$23,125).

The SBA also provided the names of the financial institutions (but no other identifiers) that facilitated the loan applications and distributions. PPP loans were allocated through eligible financial institutions. These eligible institutions included regional and community banks, credit unions, Farm Credit Associations, Community Development Financial Institutions (CDFIs), and Minority Depository Institutions, or any other lender approved by the SBA and enrolled in the program. To ensure the funds reached a lot of areas underserved by traditional banks, online lenders, e.g., Fintechs, were made eligible to issue PPP loans on April 14, 2020.

We supplemented information on lender characteristics from various sources. Information on commercial banks was collected from the Federal Deposit Insurance Corporation (FDIC) call reports. Similarly, data on farm credit lenders were collected from call reports made available by the Farm Credit Association. Credit Union information was collected from call reports from the National Credit Union Administration. Lastly, characteristics from non-traditional lenders, e.g., non-banks, Fintechs, CDFIs, were gathered from Mergent, Inc.

Commercial banks distributed most of the first draw PPP loans (95% of the amount and 89% of the loans). Large-scale lenders, possessing over \$50 billion in assets, distributed 36% of the

loans. The top lender was JPMorgan Chase Bank.<sup>12</sup> The vast majority of lenders, 5,338 of 5,460, had less than \$10 billion in assets. The average loan through a bank was almost 3 times higher than a loan through a Fintech, \$108,112 versus \$38,838 (Table 9). The median loan through the bank was \$25,000 while through the Fintech it was \$16,119.

Summary statistics for each variable are shown in Table 10. The number of days to approval represents the number of days since April 3 when the program started to the date of approval. As such, applications made later would have a greater number of days to approval. The number of mandated lockdown days we calculated using the dates from Wu et al. (2020). Small business loan demand was approximated by the amount in loans granted through the credit reinvestment act (CRA). Data on the CRA was collected from the Federal Financial Institutions Examination Council. We aggregated the loan amounts awarded to small businesses and farms during the year of 2019.

## **Hypothesis**

In this study, we investigate whether business owner race or gender affected the loan amount awarded. Using the ordinary linear squares (OLS) estimation, we test two primary hypotheses: 1) women-owned businesses received the same loan amount as male-owned businesses; 2) minority-owned businesses received the same loan amount as white-owned businesses. Then, we run a Lee's (2009) treatment-effect bound estimator to test a secondary hypothesis: 1) women-owned businesses in rural counties received lower loan amount than those in urban counties and; 2) minority-owned businesses located in rural counties received a lower loan amount than those in urban counties.

## **Methodology**

Our analysis is composed of a macro and micro-level. At the macro-level, we investigated whether business owner gender, race, lender type, and business location characteristics affected the loan amount granted. Our macro-level analysis strategy has two parts. For the first part, we estimated linear and truncated regressions. For the second part, we utilized a Lee (2009) bounds

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<sup>12</sup> Office of Capital Access. [Paycheck Protection Program Report through August 8, 2020](https://www.sba.gov/sites/default/files/2020-08/Paycheck-Protection-Program-Report-through-August-8-2020.pdf). U.S. Small Business Administration.

estimator to identify the bounds of the average treatment effects from owner gender and race on the loan amount awarded. At the micro-level, we conducted structural interviews with PPP recipients in Northeast Ohio. The micro-level analysis allowed for a qualitative and in-depth analysis of the impact from PPP loans on small businesses. The Northeast Ohio region was chosen because Covid-19 has heavily impacted its small businesses, and 40% of all layoffs and unemployment claims in Ohio have been attributed to it (Lendel, 2020).

## Macro-Level Analysis

### Model

The following log-log model is used to test the two primary hypotheses:

$$\text{loan amount}_i = \alpha + \beta X_i + \pi M_i + \gamma G_i + \delta Z_i + \theta W_i + \mu_i + l_i + \varepsilon_i \quad (1)$$

where  $X_i$  is a vector of small business and PPP program characteristics,  $Z_i$  a vector of lender characteristics,  $W_i$  is a vector of county-level characteristics,  $\mu_i$  is a control for state fixed effects, and  $l_i$  controls for the different industry sectors, 21 different sectors in total.  $\mu_i$  and  $l_i$  control for unobserved factors in a given state which may affect the PPP loan amount granted.  $M_i$  and  $G_i$  are the treatment variables.  $M_i$  is an indicator for whether the business is minority-owned and  $G_i$  is an indicator variable for the gender of the business owner.

Model (1) also controls for the business size using 8 categories based on the number of employees per PPP loan recipient. Additionally, we control for whether the loan was granted in the first round (April 3-April 16 2020) or the second round (April 27-August 8 2020). As shown in the descriptive statistics (Table 10), the total amount of loans granted in the first round differs from that in the second round. We also control for the days to loan approval (Muravyev et al., 2009; Liu & Parilla, 2020). Granja et al. (2020) discuss the importance of lender size and lender type (i.e. financial intermediary) in PPP loans. The model includes the size of the lender using the amount of their assets. Furthermore, we use information on CRA loans as a measure of small business lending demand prior to Covid-19. CRA has an important role in lending to small businesses (Ding et al., 2018), especially those in low-income areas where businesses may be less resilient to shocks such as the closure and reduction in demand brought on by the pandemic.

When the sample is determined by an exogenous factor, then the sample selection is exogenous and the OLS estimator will be unbiased (Wooldridge, 2013). We also run a truncated regression for the PPP loans below \$150,000 because for this subset the exact dollar amount is available.<sup>13</sup> From Table 2, PPP loans below \$150,000 represent 87% of all loans and account for more than 70% of the distributed amount. In the case of our data, we find no differences between the results of the linear and truncated models (Table 11). Hence, our quantitative results section discusses the results of the OLS estimation.<sup>14</sup>

### Lee Bounds Estimator – Testing the Secondary Hypothesis

In this study, we use the Lee bounds estimator to estimate the effect of treatment on treated. Lee (2009) proposes an estimator applicable to typical treatment evaluation problems in which there is non-random sample selection/attrition. In our case, PPP loans are only observed for those who received the loan. The procedure identifies first the excess number of small businesses that are induced to be selected because of the treatment, and then trimming the upper and lower tails of the outcome (e.g., PPP loan amount) distribution by this number, yielding a worst-case scenario bound. This estimator has the advantage of relying on few assumptions as it requires neither exclusion restrictions nor a bounded support for the outcome of interest (Tauchmann, 2014).<sup>15</sup>

The shares of observations with observed outcomes in the treatment group,  $q_T$ , and its control group,  $q_C$ , can be written as (Tauchmann, 2014):

$$q_T \equiv \frac{\sum_i I(T_i = 1, S_i = 1)}{\sum_i I(T_i = 1)} \text{ and} \quad (2)$$

$$q_C \equiv \frac{\sum_i I(T_i = 0, S_i = 1)}{\sum_i I(T_i = 0)} \quad (3)$$

where  $I(\cdot)$  denotes the indicator function;  $Y_i$  is the outcome, i.e. PPP loan amount;  $T_i$  is the binary treatment indicator, i.e. business owner race or gender,  $S_i$  is the binary selection indicator,

<sup>13</sup> Appendix Tables A8-A9 show similarities in summary statistics of PPP loans  $\leq$  \$150,000 by business owner race, ethnicity, and gender compared to all PPP loans in Tables 3 and 5.

<sup>14</sup> We also run an F-test to see whether the interacted terms (gender\*company size, and minority\*company size) are statistically significant. In both cases, the null hypothesis is rejected. For the F-test of whether the coefficients of the interaction of gender\*company size, the F-Statistic is  $F(23, 3143) = 2601.67$  with a p-value of 0.00. For the F-test of whether the coefficients of the interaction of minority\*company size, the F-Statistic is  $F(14, 3143) = 40.93$  with a p-value of 0.00. Therefore, the interaction terms are valid and can be interpreted.

<sup>15</sup> We used command `leebounds` to implement the Lee bounds estimator in Stata (Tauchmann, 2014).

i.e. PPP loan recipient location. When the treatment group is larger than the control group ( $q_C < q_T$ ),  $q = \frac{(q_T - q_C)}{q_T}$  and  $1 - q$  marks the quantiles where the control outcome distribution is trimmed (Tauchmann, 2014). This procedure excludes the extreme values. As such, the marginal values of the outcome that are considered in the trimmed means are  $(y_q^T, y_{1-q}^T)$ :

$$y_q^T = G_{Y|T=1, S=1}^{-1}(q) \quad (4)$$

$$y_{1-q}^T = G_{Y|T=1, S=1}^{-1}(1 - q) \quad (5)$$

where  $G_Y^{-1}$  denotes the inverse distribution of the outcome function. We now have all elements to calculate estimates for the upper and lower bound (Tauchmann, 2014):

$$\hat{\theta}^{upper} = \frac{\sum_i 1(T_i = 1, S_i = 1, Y_i \geq y_q^T) Y_i}{\sum_i 1(T_i = 1, S_i = 1, Y_i \geq y_q^T)} - \frac{\sum_i 1(T_i = 0, S_i = 1) Y_i}{\sum_i 1(T_i = 0, S_i = 1)} \quad (6)$$

$$\hat{\theta}^{lower} = \frac{\sum_i 1(T_i = 1, S_i = 1, Y_i \geq y_{1-q}^T) Y_i}{\sum_i 1(T_i = 1, S_i = 1, Y_i \geq y_{1-q}^T)} - \frac{\sum_i 1(T_i = 0, S_i = 1) Y_i}{\sum_i 1(T_i = 0, S_i = 1)} \quad (7)$$

The range of the effect from the treatment (i.e. PPP loan amount by race, gender, and location) can be narrowed using covariates (Tauchmann, 2014). We use the categorical variable company size as a covariate to tighten the range of the treatment effect. Information on how the analytical standard errors are calculated can be found in Lee (2009). The Lee bounds allows us to identify whether the effect is different from zero. In cases where the bounds do not include zero, we can conclude whether the treatment on treated was positive or negative, which allows us to test the secondary hypothesis.

## Robustness Checks

We run a series of robustness checks on the linear method to control for unobserved effects due to the month of PPP loan approval, zipcode level effects, state effects, and the interaction of these. In order to control for the average demographic characteristics of business owners in a certain location, we run county and zipcode fixed effects (Appendix Table A10).<sup>16</sup> Adding these fixed effects reduces the need for other controls such as the CRA loan demand and income levels. We also control for underlying factors that may be affecting everyone in a state at a given time by interacting state and month. Similarly, we cluster standard errors at the zipcode level and

<sup>16</sup> We used the Stata command `reghdfe` to implement the high dimensional fixed effects estimation (Correia, 2017). This allows for an OLS estimation with a large number of fixed effects (or dummies).

also as two-way clusters: zipcode and state\*month, zipcode and industry, zipcode and state (Appendix Table A11). The statistical significance of the coefficients, their magnitude, and signs are robust to these variations.

## Quantitative Results

Table 11 presents the results from the linear model and the truncated regression. Given the similarity in the results, this section will focus on discussing the findings from the linear regression (Column 1). The linear model presents standard errors clustered at the county level and an R-squared of 0.41.

Small business owner's race and ethnicity played a large role in the amount of PPP loans received. On average, a minority-owned business received 6% less than a white-owned business (or \$1,939 less). As expected, given the nature of the program, the loan amount awarded varies given the size of the company (number of employees). Nationwide distribution of minority-owned small businesses shows that 81% of them have nine employees or less (Appendix Table A1). The interacted coefficient of minority and company size shows that a minority-owned business with 5 to 9 employees received 21% less than their white-owned business counterpart<sup>17</sup>. These businesses represent 18% of all minority-owned small businesses.

Similar to the case of the owner's race and ethnicity, the owner's gender also seemed to play a larger role in the amount of PPP loans awarded. On average, a women-owned business received 22% less than a male-owned business (or \$6,464 less). The size of this difference reduces as the company size increases. Nationally women-owned small businesses with nine employees or less accounted for 82% of all women-owned businesses (Appendix Table A1). The interacted coefficient of female and company size shows that a women-owned business with 5 to 9 employees received 15% less than its male-owned business counterpart. The difference in PPP loans awarded to male and women-owned businesses is larger when the company size is smaller.

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<sup>17</sup> To estimate the impact from an interaction term you need to add the coefficient from the interaction to that of the coefficient from gender or minority on its own. For example, the effect for minority and company size with 5 to 9 employees is  $-0.06 - 0.15 = -0.21$  (~21%). For further details see Wooldridge (2013).

For example, women-owned businesses with 20 to 99 employees received 5% less in PPP loans than their male counterparts.

Suburban and rural areas received smaller PPP loans compared to urban areas, which may be linked to difficulties accessing PPP lenders in underbanked and underserved communities and a greater need for technical assistance to businesses in rural areas. Using Lee bounds, we find that women-owned businesses in rural counties received a lower PPP loan amount than those in non-rural counties, between \$2,634 and \$8,856 smaller (Table 12). As for minority-owned businesses, we cannot find a statistically significant difference between PPP amounts received by minority-owned businesses in rural counties versus non-rural counties. The range received by minority-owned businesses in rural counties goes from a negative to a positive amount. The treatment effect overlaps the zero value.

Counties with higher median income levels and higher small business loan demands (proxied by past CRA lending) are positively related to the loan amount awarded (Table 11). This result aligns with the findings from Schweitzer and Borawski (2021) showing that PPP loans had a wide reach to low- and middle-income communities served by the CRA loans. The same authors also find that PPP loans reached higher-income communities to a larger extent. Comparing the magnitude of the coefficients, our results suggest a larger impact from increases to income in comparison to increases in loan demands.

Results also show that larger lenders, those with a higher amount of assets, distributed larger PPP loans. An increase of 1% in lender assets is associated with an increase of 0.01% (or \$3.23). Corresponding with the data description, loans approved in the second round (April 27-August 8) were smaller compared to the loans in the first round (April 3 - April 16). This result may be associated with the fact that a greater number of smaller businesses applied later in the program, while larger companies applied early on.

### **Data Limitations**

As mentioned in the data section, answering the gender or race portions on the PPP loan application was optional. We tried replacing the unanswered parts by using data from Mergent



Intellect on women-owned or minority certifications. Nevertheless, a substantial proportion is still unanswered. Even though we control for the unanswered data we do not observe them. Such limitation could mean that our results may be under or overestimating the true values. Therefore, our results need to be interpreted with caution. Although we conducted a series of robustness checks, the reasons for observing differences in loan amount may be due to different factors, for instance, owners' lack of knowledge about their eligibility to the program. We attempt to identify these factors in the interviews we conducted and which are discussed in the qualitative results section of the paper.

### **Micro-Level Analysis – Structural Interviews**

In order to conduct a qualitative review of business' experiences applying for and receiving PPP loan funds, we performed 19 structural interviews with a variety of small businesses in Northeast Ohio. Our sample was composed of small businesses that received PPP loans under and over \$150,000. Companies that received more than \$150,000 in loan funding were identified using SBA data for business name and location and the Mergent Intellect Database for corresponding contact information. Since SBA data does not provide business names for loans of \$150,000 or less, we reached these PPP loan recipients through local communities' Facebook pages. We also used personal contacts along with publicly available USA Spending data on PPP.

We targeted small businesses in Northeast Ohio (NEO), an 18-county area containing approximately 36% of Ohio's population, employment, and GDP.<sup>18</sup> Poverty and low income are persistent issues in Northeast Ohio that contribute to economic distress; as the region lost good-paying manufacturing jobs, low-wage service sector jobs took their stead.<sup>19</sup> Adding to this, the Coronavirus pandemic forced many businesses to close, and the economic situation in the region has become even more distressed as a result. In 2020, at least 800,000 workers in NEO filed for first-time unemployment benefits compared to 150,000 in 2019. Nearly 40% of previously employed residents filed for unemployment, an increase from 7% in 2019 (Figure 2). The

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<sup>18</sup> Approved IRB-FY2021-147

<sup>19</sup> In 2019, per capita income in NEO was 8% lower than in the U.S. Every tenth family in NEO, almost 600,000 people, live in poverty, exceeding the poverty rate in the U.S. Source: [5-year ACS and BEA Data using StatsAmerica Measuring Distress tool](https://www.statsamerica.com/measuring-distress)

pandemic has heavily affected small businesses that supported nearly 80% of all jobs in NEO (Demko et al., 2021).

From March through May 2021, we sent out a total of 316 e-mails inviting businesses to participate in the interview, with a follow-up reminder about one week after the first e-mail. There was a 6% positive response rate from the e-mails. Participants self-selected to participate and did not receive any direct benefits from the interview. The interviews were held via Zoom or telephone and ranged from 15 to 50 minutes, averaging around 30 minutes in length. Appendix B lists the 18 questions we asked each participant (Approved IRB-FY2021-147). We asked if the business had a certification of minority-owned, business-owned, or veteran-owned. We did not prompt answers about the role of gender, race, or ethnicity in small businesses' access to PPP loans.

Small businesses in our sample represented various industries of the economy such as professional services, wholesale trade, transportation, information services, construction, administrative services, and manufacturing. In terms of legal form, participants included 12 LLCs, 4 S Corporations, 2 C Corporations, and 1 Non-profit. The largest business had 240 employees, and two participants were sole proprietorships. The PPP loan amount responding businesses received varied from about \$20,000 to over \$2 million. Ten of the businesses received \$150,000 or less in PPP loan funding, whereas nine businesses received over \$150,000. Ten PPP recipients only included payroll in PPP while nine added rent, utilities, and personal protective equipment expenses.

### **Interview Findings**

In general, the companies interviewed did not report any issues with PPP as it related to gender or race. In some instances, businesses reported that having a certain type of business certification helps them get business contracts. It is important to highlight that our sample is not representative of all experiences but provides a case study of small business experiences with PPP loans in Northeast Ohio. In diving deeper into the responses, we found strong differences between businesses that received less than, or equal to, \$150,000 in PPP funds and businesses that received over \$150,000. In general, businesses that received smaller loan amounts reported

more difficulty with the loan application process, filing a larger number of applications and pursuing more unique funding sources such as FinTech.

Some universal experiences emerged across the majority of the businesses interviewed. With the exception of one respondent, businesses received the full loan amount requested. Only two businesses remembered that the application asked loan recipients to buy American-made products when possible. Almost every business vocalized some form of frustration with the application process and uncertainty around what it entailed. Every small business voiced appreciation for the assistance provided by the government in the form of PPP loans, and the majority stated that the loan helped them retain employees. Despite the PPP loan, a wide variety of strategies had to be implemented through the pandemic beyond layoffs, including partial and complete furloughs, reduced hours, and reduced salaries and wages for both employees and management. Several businesses had owners who took no salary for at least one quarter of 2020, whereas some larger businesses instituted management salary cuts of up to 25%. One business discussed their strategy of approaching employees later in their career and asking them to take early retirement; approximately 20 of their 240 employees were either terminated or took the early retirement option. Other businesses also had employees who retired, given the increased health risks posed by the pandemic.

#### ***Small PPP Loans Recipients (\$150,000 or less)***

This group included ten small businesses that received \$150,000 or less in PPP loan funding. The smaller loan amount businesses pursued more unique lenders to receive PPP loans. Repeatedly these businesses reported difficulties in applying for the program using commercial banks, even those with whom they had extensive working relationships. This resulted in these businesses having to submit multiple applications with multiple banks and for several of them to ultimately pursue Fintech lenders like Lendio, Ready Capital, and Paypal. Respondents cite the reason for these difficulties stemming from the size of their business. For instance, a business owner complained: “[I] could not get anyone’s attention or response because I am a small business.” Many owners in this category vocalized the belief that “banks were incentivized to work with bigger businesses because they were paid a percentage of the loan amounts.”

Beyond the difficulty in finding a lender, smaller PPP loan recipients also vocalized frustration regarding the information each lender required for the application. Documentation required was not standard across lenders. One business complained that they had to submit multiple applications, even though it was with the same lender. The application form kept changing as the rules around PPP funding were clarified. “I would spend hours pulling the information, then the form changed,” says this business owner. This increased substantially the time required for submission. Another owner described the most frustrating part of the process was “the release of new guidelines and clarifications weekly, making it super hard to stay on top of.”

Lack of clarity and transparency about the PPP application was voiced overall by the respondents. Businesses expressed frustration over PPP amount limits and its use. For example, a few respondents did not realize that rent, mortgage, and utility payments could be included, and even vocalized their desire that these expenses had been permitted to be part of the calculations. This lack of clarity caused business owners to miss out on the opportunity to request higher PPP loan amounts. One business owner, in particular, stated that while the PPP loan was very helpful, it was not enough and that they wished they had been able to include rent and utilities in the loan application.

### ***Large PPP Loans Recipients (over \$150,000)***

Nine businesses interviewed received larger loan amounts over \$150,000, with the highest loan being over \$2 million. These businesses themselves varied widely in size, from employee counts of 10 to 240. All businesses received funding through a commercial bank; none had to pursue an alternative funding source. Nevertheless, many of these businesses vocalized frustration with their bank, the application process, and the need to submit multiple applications. One business aptly explained the lack of communication: “the funny thing is, it seems the rules were so vague that the amount of money you were eligible for depended on what person you got on the phone with and what their interpretation and understanding of the rules were.” However, overall their experience was more streamlined when compared with smaller loan recipients we interviewed. As one business owner stated, “it became just a matter of where we fell in line.”

Further, these businesses reported getting approved for funds more quickly, within the range of a few days to three weeks. One business owner shared that they were “pretty much instantly approved; it only took a day or two both times.” Another echoed this, stating “approval was pretty immediate.” Smaller loan amount businesses, on the other hand, reported that approval and receipt of funds from 10 days to 6 weeks. Larger loan amount businesses did report spending several more hours on their applications, given the complexities of having a larger business with greater employee counts. Some businesses reported spending “up to 20 or 30 hours” on their application, with others saying it took several days to gather the requisite information. On the other hand, smaller businesses said the application took as quick as 8 minutes to complete, echoing the expected time for completing the PPP loan application by SBA.<sup>20</sup>

Several businesses did voice that SBA substantially improved the application process between the first and second draws, with one larger business stating, “communication and clarity, my biggest issues, were drastically improved from the first round.” Another larger business said that the process had “been improved through automation, making it a lot easier to apply” for the second draw. Some businesses still stated that lenders could have been further incentivized to work with businesses of all loan amounts.

### **Policy Implications and Conclusions**

Of all small businesses, minority-owned have proven to be most vulnerable. Even before the pandemic, these businesses showed signs of limited financial health in terms of profitability and credit scores, and they are more likely to be concentrated in industries most immediately affected by the pandemic (Dua et al., 2020). Greater access to more affordable loans may facilitate economic recovery, enable minority- and women-owned businesses to improve their credit scores, and grow business. In addition, expanded access to borrowing opportunities may encourage women-owned businesses to enter into small business ownership at higher rates, which is important because the pandemic has hit women harder than men (Stevenson, 2020). In February 2020, women’s labor force participation rate was 57%, the lowest it has been since 1988 (Ewing-Nelson, 2021).

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<sup>20</sup> Office of Capital Access. [PPP first draw borrower application form](#). U.S. Small Business Administration.

Our quantitative results point to discrepancies between the PPP amounts received by women-owned businesses versus male-owned businesses, and minority-owned businesses versus white-owned businesses, after controlling for business size (number of employees). We also find that women-owned companies in rural counties received a lower PPP loan than those in urban counties. Nevertheless, it would be incorrect to read our findings as an accusation of the PPP program of discrimination. Rather, our findings highlight that further actions may be needed if the PPP loan program intends to reach a more diverse pool of applicants. The discrepancy in PPP loans to women- and minority-owned businesses may have stemmed from a lack of access and knowledge about the program itself. Further research is needed to investigate this hypothesis.

As such, women- and minority-owned businesses tend to fall under the case of businesses that may have applied for smaller PPP loans. Our qualitative findings suggest that smaller businesses faced difficulties in identifying lenders as well as knowing whether they were eligible for the program and the amount they could request. Similar to Humphries et al. (2020), we found that the smallest businesses had the least awareness of government assistance programs, including PPP, relative to larger firms. Minority- and women-owned small businesses may have benefited from technical assistance with the program application, as they also tend to have fewer resources to pay consultant fees. Effective policy requires that its rules and regulations be clear and transparent and that they reach eligible applicants through various business networks and associations. As an example, the smaller PPP recipients we interviewed mentioned using local Facebook groups and Twitter to navigate the application process and crowdsource finding lenders.

Similar to Bartik et al. (2020), our results identify the important role of borrower-lender relationships when applying for the PPP loan. Although PPP loans were intended for small businesses of all sizes, responses from the interviews suggest that larger businesses were preferred by larger lenders, such as commercial banks. Non-bank lenders were often the last resort after seeking more traditional lenders such as commercial banks. Businesses with loans of \$150,000 or under also recounted having to submit multiple applications with multiple banks, with many of them ultimately having more success at smaller, local banks rather than larger multistate banks. This means that policymakers may want to pay close attention to bank mergers

and the exits of local banks from underserved communities. Policymakers may also want to add further incentives to lenders that reach out to smaller businesses of diverse ownership and size, such as banks that have high participation in CRA lending.

From a policy perspective, if the goal is to target ethnic disparities and support inclusion in federal aid for entrepreneurs, then the program cannot be one size fits all (Hamilton, 2020; Carpenter & Loveridge, 2018). In 2021, during the second draw of PPP funding, SBA tried to address the unevenness of coverage by setting aside a two-week exclusive application period for smaller businesses and non-profits with fewer than 20 employees.<sup>21,22</sup> SBA also revised the PPP's funding formula for sole proprietors, independent contractors, and self-employed individuals. As a result, loans to minority-owned businesses increased by 20%, loans to women-owned businesses increased by 14%, and loans to small businesses in rural areas increased by 12% compared to the daily average rate of loans before the exclusivity period (SBA, 2021). While a few small businesses interviewed in Northeast Ohio did mention that the exclusive application period SBA created for smaller businesses during the second draw was a valuable change, others felt that it was not enough and that more targeted outreach programs would have been necessary.

Beyond this, valuable feedback directly from program participants repeatedly mentioned the need for a centralized application portal. As described above, different lenders had entirely different applications that asked for different information, and this added confusion and complexity to the process when businesses had to approach several different lenders and fill out new applications with new information each time. Further, a centralized portal would help avoid the problem of lenders being overwhelmed with processing applications. While several lenders have created their own online application portals, a centralized portal would make the process more transparent and less arduous for applicants. This centralized portal also would have increased clarity on the application requirements and eligibility by ensuring uniformity and providing increased communication.

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<sup>21</sup> [PPP lender information](#). U.S. Small Business Administration.

<sup>22</sup> SBA also capped the maximum loan amount in the second draw at \$2 million compared to \$10 million in the first draw. Eligible borrowers had to have no more than 300 employees and demonstrate at least a 25% reduction in gross receipts due to the pandemic impact. Source: [Second draw PPP loan](#). U.S. Small Business Administration.

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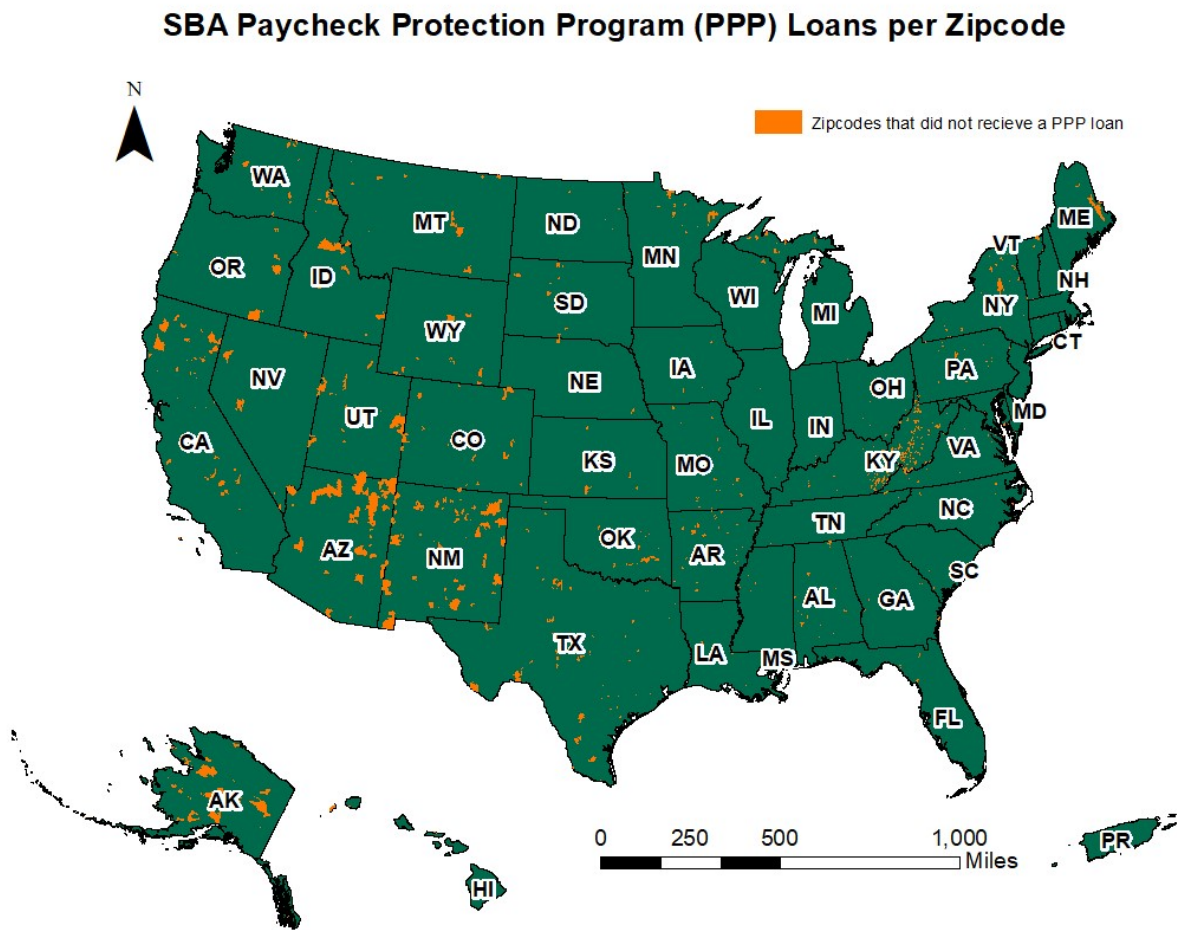
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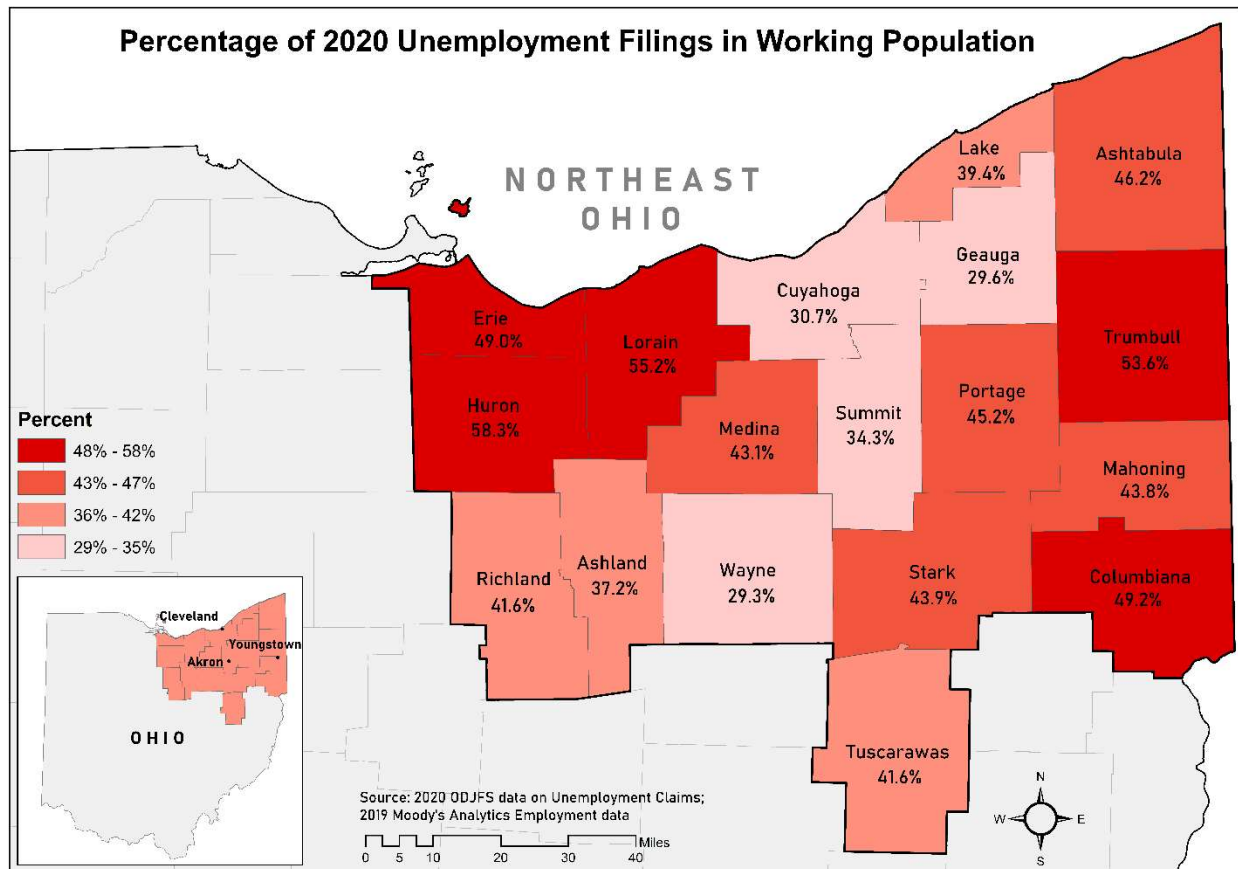
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Figure 1. PPP Loans Distribution per Zipcode



Source: SBA First Draw PPP Data

Figure 2. Unemployment Filings in Northeast Ohio in 2020



**Table 1. Reported Ranges of the PPP Loans with known Recipients Names**

PPP Loan Range	PPP Loan Count	Total PPP Amount	Average Loan Size
>\$150K -\$350K	377,797	\$84,782,932,509	\$224,414
>\$350K -\$1M	199,679	\$113,558,427,234	\$568,705
>\$1M -\$2M	53,218	\$73,887,171,387	\$1,388,387
>\$2M -\$5M	24,248	\$72,184,996,045	\$2,976,946
>\$5M - \$10M	4,734	\$33,121,136,431	\$6,996,438

Source: Authors' calculations and SBA's PPP report on Approvals through 08/08/2020

**Table 2. PPP Loans Amount Summary Statistics, 04/03/2020-08/08/2020**

PPP Loans by Size	Number of Loans	Mean	Median	Std Dev	Minimum	Maximum	Sum
PPP Loans ≤ \$150,000	4,549,613	\$32,322	\$20,661	\$32,836	\$0.01	\$149,999	\$147,051,687,518
PPP Loans > \$150,000	662,515	\$570,812	\$224,414	\$793,446	\$224,414	\$6,996,438	\$378,171,796,465
All PPP loans	5,212,128	\$100,769	\$22,500	\$336,359	\$0.01	\$6,996,438	\$525,223,483,983

**Table 3. Summary Statistics – PPP loans by Business Owner Race and Ethnicity**

<b>Business Owners</b>	<b>Number of Loans</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
African American Business Owners	17,281	\$84,747	\$20,832	\$281,981	\$83	\$6,996,438	\$1,464,514,626
Hispanic or Latino Business Owners	42,058	\$103,783	\$29,391	\$300,689	\$74	\$6,996,438	\$4,364,889,550
Asian American Business Owners	58,840	\$92,570	\$33,300	\$273,205	\$8	\$6,996,438	\$5,446,844,510
White Business Owners	415,736	\$132,741	\$38,577	\$362,140	\$0.01	\$6,996,438	\$13,533,983,860
Native American Business Owners	2,870	\$154,429	\$40,000	\$455,526	\$290	\$6,996,438	\$443,210,992
Business Owners - Other Races (Eskimo)	5	\$8,691	\$6,000	\$5,888	\$4,900	\$18,957	\$43,457
Business Owners - Two and More Races	11	\$43,285	\$20,800	\$64,125	\$6,200	\$224,414	\$476,136
Unanswered Race/Ethnicity	4,675,327	\$98,029	\$21,200	\$334,948	\$1	\$6,996,438	\$458,318,498,048
<b>All Loans</b>	<b>5,212,128</b>	<b>\$100,769</b>	<b>\$22,500</b>	<b>\$336,359</b>	<b>\$0.01</b>	<b>\$6,996,438</b>	<b>\$525,223,483,983</b>

Source: Authors' calculations based on the SBA's Self-Reported Demographic Data in the First Draw PPP loan data

**Table 4. Summary Statistics – PPP loans by Zipcode Demographic Characteristics**

<b>Business Owners</b>	<b>Number of Loans</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Majority African American	238,997	\$91,315	\$20,594	\$330,612	\$0.01	\$6,996,438	\$21,824,125,069
Majority Hispanic or Latino	409,124	\$98,157	\$20,833	\$328,645	\$1	\$6,996,438	\$40,158,462,380
Majority Asian American	45,432	\$110,432	\$24,900	\$375,690	\$1	\$6,996,438	\$5,017,136,055
Majority White	4,477,456	\$99,627	\$23,000	\$330,202	\$1	\$6,996,438	\$446,073,705,101
Majority Native American Races	2,635	\$137,235	\$23,600	\$466,846	\$100	\$6,996,438	\$361,614,730
Majority Other Races	8,652	\$84,307	\$19,300	\$306,443	\$100	\$6,996,438	\$729,427,308
Majority Two and More Races	62	\$81,964	\$20,833	\$152,283	\$1,900	\$568,705	\$5,081,760

Source: Authors' Calculation based on U.S. Census Bureau's American Community Survey (ACS) Data and SBA's First Draw PPP loan data



**Table 5. Summary Statistics – PPP loans by Business Owner Gender**

<b>Business Ownership</b>	<b>Number of Loans</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Female-Owned	262,628	\$100,349	\$27,471	\$285,355	\$13	\$6,996,438	\$26,354,351,670
Male-Owned	862,667	\$132,783	\$39,530	\$362,706	\$0.01	\$6,996,438	\$114,547,599,561
Unanswered	4,096,373	\$95,192	\$20,833	\$335,541	\$1	\$6,996,438	\$389,943,182,746
<b>All PPP Loans</b>	<b>5,212,128</b>	<b>\$100,769</b>	<b>\$22,500</b>	<b>\$336,359</b>	<b>\$0.01</b>	<b>\$6,996,438</b>	<b>\$525,223,483,983</b>

Source: Authors' calculations based on the SBA's Self-Reported Demographic Data in the First Draw PPP loan data and Mergent Intellect Dataset

**Table 6. PPP Loan Recipients by Size and Business Owner Gender**

<b>Business Owner Gender</b>	<b>Number of Jobs</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Female-Owned	253,537	12	4	29	0	500	3,029,282
Male-Owned	827,190	14	5	34	0	500	11,729,227
Unanswered	3,793,523	10	2	30	0	500	36,165,583
<b>All PPP Loans</b>	<b>4,874,250</b>	<b>10</b>	<b>3</b>	<b>31</b>	<b>0</b>	<b>500</b>	<b>50,924,092</b>

**Table 7. PPP Loan Recipients by Size and Business Owner Race/Ethnicity**

<b>Race/Ethnicity</b>	<b>Number of Jobs</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
African American Business Owners	16,785	11	3	32	0	500	190,152
Hispanic or Latino Business Owners	40,916	14	5	34	0	500	558,407
Asian American Business Owners	56,744	13	6	28	0	500	734,916
White Business Owners	405,409	14	5	33	0	500	5,804,336
Native American Business Owners	2,772	17	6	43	0	500	47,078
Business Owners - Other Races (Eskimo)	5	1	1	1	0	1	3
Business Owners - Two and More Races	9	6	4	8	1	24	58
Unanswered Race/Ethnicity	4,351,610	10	3	30	0	500	43,589,142
<b>All Loans</b>	<b>4,874,250</b>	<b>10</b>	<b>3</b>	<b>31</b>	<b>0</b>	<b>500</b>	<b>50,924,092</b>

**Table 8. PPP Loan Recipients by Degree of County Urbanization**

<b>Degree of County Urbanization</b>	<b>Number of Loans</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Urban Areas	4,518,211	\$104,715	\$23,125	\$346,399	\$0.01	\$6,996,438	\$473,125,764,580
Suburban Areas	401,702	\$77,515	\$20,832	\$264,783	\$27	\$6,996,438	\$31,137,921,504
Rural Areas	287,092	\$71,842	\$20,000	\$254,658	\$54	\$6,996,438	\$20,625,152,375

**Table 9. PPP Loan Recipients by Lender Type**

<b>Lender Type</b>	<b>Number of Loans</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Commercial Bank	4,617,584	\$108,112	\$25,000	\$351,643	\$0.01	\$6,996,438	\$499,218,172,432
Non-Traditional (non-banks, Fintechs, CDFIs, etc.)	362,265	\$38,838	\$16,119	\$152,515	\$1	\$6,996,438	\$14,069,469,492
Credit Union	211,849	\$48,188	\$16,499	\$164,392	\$8	\$6,996,438	\$10,207,945,777
Farm Credit Association	15,093	\$82,045	\$19,330	\$355,178	\$96	\$6,996,438	\$1,238,312,230

**Table 10. Summary Statistics for the Variables Used in the Macro-Level Analysis**

Variables	Description	Mean	Standard Deviation	Observations
PPP Loans ≤ \$150,000	Loan amount awarded through the PPP program from \$0 to \$150,000	\$32,322	\$32,836	4,549,613
<i>Owner race</i>				
White-Owned	White-owned businesses take the value of 1 and zero otherwise (Base-case)	0.07	0.27	4,549,613
Minority-Owned	Minority-owned businesses take the value of 1 and zero otherwise	0.02	0.15	4,549,613
Unanswered Owner Race	Owner race characteristics unknown take the value of 1 and zero otherwise	0.90	0.30	4,549,613
<i>Owner gender</i>				
Male-Owned	Male owned businesses take the value of 1 and zero otherwise (base-case)	0.15	0.36	4,549,613
Women-Owned	Women owned businesses take the value of 1 and zero otherwise	0.05	0.22	4,549,613
Unanswered Owner Gender	Owner gender characteristics unknown take the value of 1 and zero otherwise	0.80	0.40	4,549,613
Urban County	Dummy that takes on the value of 1 if county is a metro county (this is the base case)	0.86	0.34	4,544,937
Rural County	Dummy that takes on the value of 1 if county is remote rural and zero otherwise	0.06	0.23	4,544,937
Suburban County	Dummy that takes on the value of 1 if county is metro adjacent and zero otherwise	0.08	0.27	4,544,937
Loan demand	Total amount of CRA loans made to small businesses and farms in 2019	\$1,617,993	\$2,727,590	4,530,991
Median Income	Median county income	\$73,305	\$30,930	4,500,939
Lender Assets	Total lender assets	\$785,000,000	\$5,090,000,000	4,450,113
<i>Lenders</i>				
Credit Union	Credit Union lender takes the value of 1 and zero otherwise (Base-case)	0.04	0.21	4,544,921
Commercial Bank	Commercial bank lender takes the value of 1 and zero otherwise	0.79	0.41	4,544,921
Farm Credit Association	Farm Credit Association lender takes the value of 1 and zero otherwise	0.00	0.06	4,544,921
Non-traditional Lender	Non-traditional (incl. non-banks, Fintechs, CDFI, etc) lender takes the value of 1 and zero otherwise	0.17	0.37	4,544,921
Second PPP Round (Apr 27-Aug 8 2020)	Dummy that takes on the value of 1 if application is from the second round (Apr 27-Aug 28th) and zero otherwise	0.74	0.44	4,549,613
Days to approval	Number of days between April 3rd 2020 and the loan approval	35.42	30.24	4,549,613
Days in Lockdown	Total days of mandated state or county lockdown	6.76	5.58	4,549,501
Non-Profit	Business is a non-profit takes the value of 1 and zero otherwise	0.03	0.17	4,549,628
<i>Company Size</i>				
Less than 5 Employees	Companies with less than 5 employees take the value of 1 and zero otherwise (base-case)	0.64	0.48	4,548,943
5 to 9 Employees	Companies with 5 to 9 employees take the value of 1 and zero otherwise	0.18	0.38	4,548,943
10 to 19 Employees	Companies with 10 to 19 employees take the value of 1 and zero otherwise	0.09	0.29	4,548,943
20 to 49 Employees	Companies with 20 to 49 employees take the value of 1 and zero otherwise	0.03	0.16	4,548,943
50 to 99 Employees	Companies with 50 to 99 employees take the value of 1 and zero otherwise	0.00	0.04	4,548,943
100 to 249 Employees	Companies with 100 to 249 employees take the value of 1 and zero otherwise	0.00	0.02	4,548,943
250 to 499 Employees	Companies with 250 to 499 employees take the value of 1 and zero otherwise	0.00	0.01	4,548,943
Unanswered	Company size is unknown take the value of 1 and zero otherwise	0.07	0.25	4,548,943

**Table 11. Linear Regression (OLS) and Truncated Regression Results. Standard Errors are in Parenthesis (Continues on Next Page)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Truncated Regression Log PPP Loans ≤ \$150,000
Minority-Owned	-0.06 *** (0.010)	-0.06 *** (0.010)
Minority-Owned 5 to 9 Employees	-0.15 *** (0.011)	-0.15 *** (0.011)
Minority-Owned 10 to 19 Employees	-0.07 *** (0.010)	-0.07 *** (0.010)
Minority-Owned 20 to 49 Employees	0.08 *** (0.012)	0.08 *** (0.012)
Minority-Owned 50 to 99 Employees	-0.04 (0.044)	-0.04 (0.044)
Minority-Owned 100 to 249 Employees	0.32 (0.236)	0.27 (0.258)
Minority-Owned 250 to 499 Employees	-0.47 * (0.274)	-0.47 * (0.274)
Women-Owned	-0.22 *** (0.005)	-0.22 *** (0.005)
Women-Owned 5 to 9 Employees	0.07 *** (0.005)	0.07 *** (0.005)
Women-Owned 10 to 19 Employees	0.09 *** (0.005)	0.09 *** (0.005)
Women-Owned 20 to 49 Employees	0.17 *** (0.007)	0.17 *** (0.007)
Women-Owned 50 to 99 Employees	0.17 *** (0.035)	0.17 *** (0.035)
Women-Owned 100 to 249 Employees	0.04 (0.160)	0.003 (0.162)
Women-Owned 250 to 499 Employees	0.05 (0.239)	0.05 (0.239)
Rural County	-0.05 *** (0.012)	-0.05 *** (0.012)
Suburban County	-0.05 *** (0.010)	-0.05 *** (0.010)
Log Loan demand	0.04 *** (0.004)	0.04 *** (0.004)
Log Median Income	0.07 *** (0.012)	0.07 *** (0.012)
Log Lender Assets	0.01 *** (0.001)	0.01 *** (0.001)
Commercial Bank	0.28 *** (0.008)	0.28 *** (0.008)
Farm Credit Association	0.38 *** (0.014)	0.38 *** (0.014)
Non-Traditional Lender	0.10 *** (0.010)	0.10 *** (0.010)
Second PPP Round (Apr 27-Aug 8 2020)	-0.30 *** (0.001)	-0.30 *** (0.001)
Days to Approval	-0.003 *** (0.001)	-0.003 *** (0.001)
Days in Lockdown	0.03 (0.029)	0.03 (0.029)
Non-Profit	0.23 *** (0.001)	0.23 *** (0.001)

**Table 11. Linear Regression (OLS) and Truncated Regression Results. Standard Errors are in Parenthesis (Continued)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Truncated Regression Log PPP Loans ≤ \$150,000
Unanswered Owner Race	0.02 *** (0.006)	0.02 *** (0.006)
Unanswered Owner Gender	-0.15 *** (0.004)	-0.15 *** (0.004)
5 to 9 Employees	1.02 *** (0.005)	1.02 *** (0.005)
10 to 19 Employees	1.45 *** (0.007)	1.45 *** (0.007)
20 to 49 Employees	1.68 *** (0.010)	1.68 *** (0.010)
50 to 99 Employees	1.78 *** (0.023)	1.78 *** (0.023)
100 to 249 Employees	0.81 *** (0.120)	0.87 *** (0.106)
250 to 499 Employees	0.71 *** (0.120)	0.71 *** (0.120)
Unanswered Company Size	0.73 *** (0.020)	0.73 *** (0.020)
Minority-Owned Company Size Unanswered	-0.01 (0.028)	-0.01 (0.028)
Unanswered Race-Owned 5 to 9 Employees	-0.06 *** (0.006)	-0.06 *** (0.006)
Unanswered Race-Owned 10 to 19 Employees	-0.04 *** (0.008)	-0.04 *** (0.008)
Unanswered Race-Owned 20 to 49 Employees	0.00 (0.001)	0.00 (0.001)
Unanswered Race-Owned 50 to 99 Employees	-0.07 ** (0.028)	-0.07 ** (0.028)
Unanswered Race-Owned 100 to 249 Employees	0.19 (0.123)	0.13 (0.115)
Unanswered Race-Owned 250 to 499 Employees	0.54 *** (0.171)	0.54 *** (0.171)
Unanswered Race-Owned Unanswered Company Size	-0.12 *** (0.021)	-0.12 *** (0.021)
Women-Owned Company Size Unanswered	0.09 *** (0.016)	0.09 *** (0.016)
Unanswered Owner Gender 5 to 9 Employees	0.07 *** (0.004)	0.08 *** (0.005)
Unanswered Owner Gender 10 to 19 Employees	0.08 *** (0.007)	0.07 *** (0.007)
Unanswered Owner Gender 20 to 49 Employees	0.07 *** (0.001)	0.07 *** (0.006)
Unanswered Owner Gender 50 to 99 Employees	-0.03 *** (0.022)	-0.03 (0.022)
Unanswered Owner Gender 100 to 249 Employees	-0.15 ** (0.079)	-0.16 ** (0.078)
Unanswered Owner Gender 250 to 499 Employees	-0.53 *** (0.135)	-0.53 *** (0.135)
Unanswered Owner Gender Unanswered Company Size	-0.18 *** (0.012)	-0.18 *** (0.012)
Constant	8.24 *** (0.230)	8.29 *** (0.231)
State Fixed Effects	YES	YES
Industry Fixed Effects	YES	YES
Observations	4,389,632	4,389,632
R-Squared	0.405	0.64
sigma		0.85 *** (0.003)
Clusters (County-level)	3,144	3,144

\*10%, \*\*5%, and \*\*\*1% are levels of statistical significance.



**Table 12. Lee Bounds Estimates for Women- and Minority-Owners in Rural Areas**

	Loan Amount	Loan Amount		Loan Amount
Female			Minority	
Lower	-12,602.71 *** (305.72)	-8,855.82 *** (258.39)	Lower	-37,083.51 *** (499.85)
Upper	-2,722.74 *** (211.92)	-2,633.83 *** (227.13)	Upper	24,712.38 *** (299.97)
Covariate	No	Company Size		No
Observations	1,101,959	1101959		522,674
Number of Cells		7		
Selected observations	202,216	202216		121,889
Overall trimming porportion	0.09	0.0861		0.66
Selection	Rural	Rural		Rural
95% Confidence Interval	[-13,000, -2,400]	[-9,300, -2,300]		[-38,000, 25,000]

Rural counties were determined as those with a rural urban continuum code of 4 or higher.

\*\*\* 1% level of statistical significance

The covariate for company size was omitted since there were occasions where information was not available for minority in rural and urban in certain categories

**Appendix Table A1. National Distribution of Minority- and Women-Owned Small Businesses by Number of Employees**

<b>Firm Size</b>	<b>Number of Minority-Owned Firms</b>	<b>Percent of Minority-Owned Firms</b>	<b>Number of Female-Owned Firms</b>	<b>Percent of Female-Owned Firms</b>
Firms with no employees	121,775	12%	152,923	13%
Firms with 1 to 4 employees	542,545	52%	593,464	52%
Firms with 5 to 9 employees	185,615	18%	190,325	17%
Firms with 10 to 19 employees	113,065	11%	113,310	10%
Firms with 20 to 49 employees	61,282	6%	64,133	6%
Firms with 50 to 99 employees	15,608	1%	16,829	1%
Firms with 100 to 249 employees	6,189	1%	7,585	1%
Firms with 250 to 499 employees	1,329	0.1%	1,729	0.2%
Firms with 500 employees or more	919	0.1%	1,111	0.1%
<b>Total</b>	<b>1,048,327</b>		<b>1,141,409</b>	

Source: U.S. Census Annual Business Survey (ABS) 2018, Table AB1800CSA04

**Appendix Table A2. PPP Loans Counts by Industry**

	<b>Industry</b>	<b>Loans Count in SBA data</b>	<b>Loans Count in SBA Summary Report</b>	<b>Absolute Difference between SBA's Summary Report and SBA Data</b>	<b>% Difference</b>
1	Professional Services	681,111	681,111	0	0%
2	Other Services	583,385	583,385	0	0%
3	Health Care	532,775	532,775	0	0%
4	Construction	496,551	496,551	0	0%
5	Retail Trade	472,418	472,418	0	0%
6	Accommodation	383,561	383,561	0	0%
7	Real Estate	262,921	262,921	0	0%
8	Administrative Services	258,907	258,907	0	0%
9	Manufacturing	238,494	238,494	0	0%
10	Transportation	229,565	229,565	0	0%
11	Else	219,502	219,502	0	0%
12	Finance	181,493	181,493	0	0%
13	Wholesale Trade	174,707	174,707	0	0%
14	Agriculture	149,535	149,535	0	0%
15	Arts	130,760	130,760	0	0%
16	Education	88,022	88,022	0	0%
17	Information	73,824	73,824	0	0%
18	Mining	22,503	22,503	0	0%
19	Public Administration	14,291	14,291	0	0%
20	Management	9,472	9,472	0	0%
21	Utilities	8,331	8,331	0	0%
	<b>Total</b>	<b>5,212,128</b>	<b>5,212,128</b>	<b>0</b>	<b>0%</b>

**Appendix Table A3. PPP Loan Numbers Counts by State**

	State	Loans Count in SBA data	Loans Count in SBA Summary Report	Absolute Difference between SBA's Summary Report and SBA Data	% Difference
1	CA	623,352	623,360	8	0.001%
2	FL	432,888	432,893	5	0.001%
3	TX	417,266	417,276	10	0.002%
4	NY	348,869	348,870	1	0.000%
5	IL	225,433	225,409	-24	-0.011%
6	GA	174,425	174,429	4	0.002%
7	PA	173,543	173,552	9	0.005%
8	NJ	157,404	157,405	1	0.001%
9	OH	149,152	149,144	-8	-0.005%
10	NC	129,286	129,289	3	0.002%
	<b>All Other States</b>	<b>2,380,510</b>	<b>2,380,501</b>	<b>-9</b>	<b>0.000%</b>
	<b>Total</b>	<b>5,212,128</b>	<b>5,212,128</b>	<b>0</b>	<b>0.000%</b>

**Appendix Table A4. PPP Loans Amount by State**

	<b>State</b>	<b>Imputed Loan Amount</b>	<b>Loan Amount Reported by SBA</b>	<b>Absolute Difference between Reported and Imputed Amount</b>	<b>% Difference between Reported and Imputed Amount</b>
1	CA	\$68,642,204,259	\$68,644,418,670	\$2,214,411	0.003%
2	TX	\$41,179,890,946	\$41,326,454,268	\$146,563,322	0.355%
3	NY	\$38,495,621,440	\$38,699,947,686	\$204,326,246	0.528%
4	FL	\$32,478,897,381	\$32,251,422,436	-\$227,474,945	-0.705%
5	IL	\$22,815,314,934	\$22,849,324,883	\$34,009,949	0.149%
6	PA	\$20,729,940,425	\$20,742,750,517	\$12,810,092	0.062%
7	OH	\$18,442,389,116	\$18,532,840,346	\$90,451,230	0.488%
8	NJ	\$17,400,499,221	\$17,360,085,952	-\$40,413,269	-0.233%
9	MI	\$16,018,858,254	\$16,040,039,297	\$21,181,043	0.132%
10	GA	\$14,736,473,005	\$14,688,047,519	-\$48,425,486	-0.330%
	<b>All Other States</b>	<b>\$234,283,395,003</b>	<b>\$233,876,869,548</b>	<b>-\$406,525,455</b>	<b>-0.174%</b>
	<b>Total</b>	<b>\$525,223,483,983</b>	<b>\$525,012,201,122</b>	<b>-\$211,282,861</b>	<b>-0.04%</b>

**Appendix Table A5. PPP Loans Amounts by Industry**

	<b>Industry</b>	<b>Imputed Loan Amount</b>	<b>Loan Amount Reported by SBA</b>	<b>Absolute Difference between Reported and Imputed Amount</b>	<b>% Difference between Reported and Imputed Amount</b>
1	Health Care	\$67,861,928,247	\$67,802,899,625	-\$59,028,622	-0.1%
2	Professional Services	\$66,908,788,745	\$66,806,585,368	-\$102,203,377	-0.2%
3	Construction	\$64,984,450,975	\$65,070,483,743	\$86,032,768	0.1%
4	Manufacturing	\$53,634,733,126	\$54,101,623,487	\$466,890,361	0.9%
5	Accommodation	\$42,608,088,446	\$42,477,369,498	-\$130,718,948	-0.3%
6	Retail Trade	\$40,621,758,567	\$40,576,055,345	-\$45,703,222	-0.1%
7	Other Services	\$32,026,304,195	\$31,687,938,997	-\$338,365,198	-1.1%
8	Wholesale Trade	\$27,765,166,826	\$27,650,501,453	-\$114,665,373	-0.4%
9	Administrative Services	\$26,413,599,760	\$26,591,901,997	\$178,302,237	0.7%
10	Transportation	\$17,566,688,110	\$26,591,901,997	\$9,025,213,887	34%
11	Real Estate	\$15,782,264,203	\$15,732,532,646	-\$49,731,557	-0.3%
12	Finance	\$12,261,099,886	\$12,202,534,934	-\$58,564,952	-0.5%
13	Education	\$11,980,151,018	\$12,075,274,769	\$95,123,751	0.8%
14	Else	\$9,827,662,739	\$9,652,279,182	-\$175,383,557	-2%
15	Information	\$9,284,773,768	\$9,336,848,657	\$52,074,889	0.6%
16	Arts	\$8,268,120,282	\$8,223,383,720	-\$44,736,562	-0.5%
17	Agriculture	\$8,199,738,348	\$8,140,628,410	-\$59,109,938	-0.7%
18	Mining	\$4,458,221,930	\$4,542,309,832	\$84,087,902	1.9%
19	Public Administration	\$1,748,526,117	\$1,755,782,485	\$7,256,368	0.4%
20	Management	\$1,545,190,245	\$1,561,247,060	\$16,056,815	1.0%
21	Utilities	\$1,476,228,451	\$1,501,077,180	\$24,848,729	1.7%
	<b>All Industries</b>	<b>\$525,223,483,983</b>	<b>\$534,081,160,385</b>	<b>\$8,857,676,402</b>	<b>1.7%</b>

**Appendix Table A6. PPP loans ≤ \$150,000**

	<b>Timeline</b>	<b>Number of PPP loans</b>	<b>Share</b>	<b>Amount of PPP loans</b>	<b>Share</b>
First Round	April 3-April 16 2020	1,202,834	26%	\$57,053,380,443	39%
Second Round	April 27-August 8 2020	3,346,779	74%	\$89,998,307,075	61%
<b>Total PPP Loans ≤ \$150,000</b>		<b>4,549,613</b>		<b>\$147,051,687,518</b>	

**Appendix Table A7. PPP loans > \$150,000**

	<b>Timeline</b>	<b>Number of PPP loans</b>	<b>Share</b>	<b>Amount of PPP loans</b>	<b>Share</b>
First Round	April 3-April 16 2020	417,385	63%	\$261,786,249,145	69%
Second Round	April 27-August 8 2020	245,130	37%	\$116,385,547,320	31%
<b>Total PPP Loans &gt; \$150,000</b>		<b>662,515</b>		<b>\$378,171,796,465</b>	



**Appendix Table A8. Summary Statistics – PPP Loans ≤ \$150,000 by Business Owner Race and Ethnicity**

<b>Business Owners</b>	<b>Number of Jobs</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
African American Business Owners	15,437	\$29,680	\$18,700	\$31,793	\$83	\$149,750	\$458,169,638
Hispanic or Latino Business Owners	35,863	\$36,134	\$21,100	\$35,535	\$74	\$149,942	\$1,295,872,713
Asian American Business Owners	51,788	\$39,203	\$27,300	\$34,166	\$8	\$149,987	\$2,030,265,024
White Business Owners	336,972	\$40,164	\$26,200	\$36,599	\$0	\$149,999	\$13,533,983,860
Native American Business Owners	2,314	\$40,030	\$27,200	\$35,854	\$290	\$148,900	\$92,630,227
Business Owners - Other Races (Eskimo)	5	\$8,691	\$6,000	\$5,888	\$4,900	\$18,957	\$43,457
Business Owners - Two and More Races	10	\$25,172	\$18,950	\$23,645	\$6,200	\$79,317	\$251,722
Unanswered Race/Ethnicity	4,107,224	\$31,564	\$20,300	\$32,369	\$1	\$149,999	\$129,640,470,876
<b>All PPP Loans ≤ \$150,000</b>	<b>4,549,613</b>	<b>\$32,322</b>	<b>\$20,661</b>	<b>\$32,836</b>	<b>\$0.01</b>	<b>\$149,999</b>	<b>\$147,051,687,518</b>

Source: Authors' calculations based on the SBA's Self-Reported Demographic Data in the PPP loan data

**Appendix Table A9. PPP Loan  $\leq$  \$150,000 Recipients by Size and Business Owner Gender**

<b>Business Owner Gender</b>	<b>Number of Jobs</b>	<b>Mean</b>	<b>Median</b>	<b>Std Dev</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>
Female-Owned	224,084	\$34,448	\$20,833	\$34,320	\$13	\$149,990	\$7,719,166,599
Male-Owned	700,926	\$40,861	\$27,335	\$36,294	\$0.01	\$149,999	\$28,640,358,635
Unanswered	3,624,603	\$30,539	\$19,961	\$31,753	\$1	\$149,999	\$110,692,162,284
<b>All PPP Loans <math>\leq</math> \$150,000</b>	<b>4,549,613</b>	<b>\$32,322</b>	<b>\$20,661</b>	<b>\$32,836</b>	<b>\$0.01</b>	<b>\$149,999</b>	<b>\$147,051,687,518</b>

**Appendix Table A10. Liner Regression (OLS) with Variations in Fixed Effect Variables. Standard Errors are in Parenthesis (Continues on Next Page)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000
Minority-Owned	-0.05 *** (0.010)	-0.07 *** (0.008)
Minority-Owned 5 to 9 Employees	-0.17 *** (0.011)	-0.15 *** (0.011)
Minority-Owned 10 to 19 Employees	-0.08 *** (0.010)	-0.06 *** (0.010)
Minority-Owned 20 to 49 Employees	0.06 *** (0.012)	0.08 *** (0.012)
Minority-Owned 50 to 99 Employees	-0.05 (0.044)	-0.05 (0.042)
Minority-Owned 100 to 249 Employees	0.31 (0.269)	0.33 (0.263)
Minority-Owned 250 to 499 Employees	-0.51 * (0.278)	-0.47 * (0.287)
Women-Owned	-0.22 *** (0.005)	-0.21 *** (0.005)
Women-Owned 5 to 9 Employees	0.07 *** (0.005)	0.07 *** (0.005)
Women-Owned 10 to 19 Employees	0.09 *** (0.005)	0.09 *** (0.005)
Women-Owned 20 to 49 Employees	0.17 *** (0.008)	0.18 *** (0.008)
Women-Owned 50 to 99 Employees	0.18 *** (0.035)	0.17 *** (0.035)
Women-Owned 100 to 249 Employees	0.02 (0.160)	0.020 (0.159)
Women-Owned 250 to 499 Employees	0.08 (0.237)	0.06 (0.238)
Rural County	-0.05 *** (0.011)	a
Suburban County	-0.05 *** (0.010)	a
Log Loan demand	0.02 *** (0.001)	0.01 *** (0.000)
Log Median Income	0.08 *** (0.010)	a
Log Lender Assets	0.02 *** (0.001)	0.01 *** (0.000)
Commercial Bank	0.31 *** (0.009)	0.27 *** (0.008)
Farm Credit Association	0.40 *** (0.014)	0.39 *** (0.014)
Non-Traditional Lender	0.15 *** (0.010)	0.09 *** (0.009)
Second PPP Round (Apr 27-Aug 8 2020)	-0.11 *** (0.005)	-0.30 *** (0.006)
Days to Approval	-0.01 *** (0.000)	-0.003 *** (0.000)
Days in Lockdown	0.03 (0.028)	0.000 (0.008)
Non-Profit	0.23 *** (0.007)	0.23 *** (0.006)

**Appendix Table A10. Liner Regression (OLS) with Variations in Fixed Effect Variables. Standard Errors are in Parenthesis (Continued)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000
Unanswered Owner Race	0.02 *** (0.005)	0.04 (0.006)
Unanswered Owner Gender	-0.14 *** (0.004)	-0.15 *** (0.004)
5 to 9 Employees	1.01 *** (0.005)	1.01 *** (0.005)
10 to 19 Employees	1.43 *** (0.007)	1.43 *** (0.007)
20 to 49 Employees	1.67 *** (0.010)	1.66 *** (0.009)
50 to 99 Employees	1.77 *** (0.023)	1.77 *** (0.024)
100 to 249 Employees	0.81 *** (0.120)	0.79 *** (0.120)
250 to 499 Employees	0.70 *** (0.121)	0.64 *** (0.123)
Unanswered Company Size	0.72 *** (0.019)	0.71 *** (0.018)
Minority-Owned Company Size Unanswered	-0.01 (0.028)	0.00 (0.027)
Unanswered Race-Owned 5 to 9 Employees	-0.06 *** (0.006)	-0.05 *** (0.006)
Unanswered Race-Owned 10 to 19 Employees	-0.04 *** (0.008)	-0.03 *** (0.008)
Unanswered Race-Owned 20 to 49 Employees	0.00 (0.001)	0.01 (0.009)
Unanswered Race-Owned 50 to 99 Employees	-0.07 ** (0.028)	-0.07 ** (0.028)
Unanswered Race-Owned 100 to 249 Employees	0.19 (0.123)	0.19 (0.121)
Unanswered Race-Owned 250 to 499 Employees	0.54 *** (0.172)	0.61 *** (0.174)
Unanswered Race-Owned Unanswered Company Size	-0.10 *** (0.020)	-0.12 *** (0.019)
Women-Owned Company Size Unanswered	0.08 *** (0.016)	0.09 *** (0.016)
Unanswered Owner Gender 5 to 9 Employees	0.07 *** (0.004)	0.07 *** (0.007)
Unanswered Owner Gender 10 to 19 Employees	0.08 *** (0.005)	0.08 *** (0.005)
Unanswered Owner Gender 20 to 49 Employees	0.07 *** (0.001)	0.07 *** (0.007)
Unanswered Owner Gender 50 to 99 Employees	-0.02 *** (0.022)	-0.03 (0.023)
Unanswered Owner Gender 100 to 249 Employees	-0.15 ** (0.078)	-0.16 ** (0.079)
Unanswered Owner Gender 250 to 499 Employees	-0.53 *** (0.135)	-0.53 *** (0.136)
Unanswered Owner Gender Unanswered Company Size	-0.17 *** (0.012)	-0.17 *** (0.011)
Constant	7.99 *** (0.215)	9.86 *** (0.061)
Zipcode Fixed Effects		YES
County Fixed Effects		YES
Industry Fixed Effects	YES	YES
State*Month Fixed Effects	YES	
Observations	4,389,632	4,388,647
R-Squared	0.413	0.42
Clusters (County-Level)	3,144	3,143

\*10%, \*\*5%, and \*\*\*1% are levels of statistical significance. <sup>a</sup> dropped due to collinearity

**Appendix Table A11. Liner Regression (OLS) with Variations in Standard Errors Clustering. Standard Errors are in Parenthesis (Continues on Next Page)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000
Minority-Owned	-0.06 *** (0.017)	-0.06 *** (0.017)	-0.06 *** (0.012)
Minority-Owned 5 to 9 Employees	-0.15 *** (0.018)	-0.15 *** (0.018)	-0.15 *** (0.016)
Minority-Owned 10 to 19 Employees	-0.07 *** (0.018)	-0.07 *** (0.018)	-0.07 *** (0.016)
Minority-Owned 20 to 49 Employees	0.08 *** (0.021)	0.08 *** (0.021)	0.08 *** (0.017)
Minority-Owned 50 to 99 Employees	-0.04 (0.046)	-0.04 (0.046)	-0.04 (0.044)
Minority-Owned 100 to 249 Employees	0.32 (0.299)	0.32 (0.299)	0.32 (0.228)
Minority-Owned 250 to 499 Employees	-0.47 * (0.230)	-0.47 * (0.230)	-0.47 ** (0.227)
Women-Owned	-0.22 *** (0.008)	-0.22 *** (0.043)	-0.22 *** (0.007)
Women-Owned 5 to 9 Employees	0.07 *** (0.006)	0.07 * (0.034)	0.07 *** (0.006)
Women-Owned 10 to 19 Employees	0.09 *** (0.006)	0.09 * (0.043)	0.09 *** (0.006)
Women-Owned 20 to 49 Employees	0.17 *** (0.011)	0.17 *** (0.043)	0.17 *** (0.010)
Women-Owned 50 to 99 Employees	0.17 *** (0.029)	0.17 *** (0.052)	0.17 *** (0.029)
Women-Owned 100 to 249 Employees	0.04 (0.125)	0.038 (0.104)	0.04 (0.121)
Women-Owned 250 to 499 Employees	0.05 (0.211)	0.05 (0.289)	0.05 (0.212)
Rural County	-0.05 ** (0.022)	-0.05 ** (0.022)	-0.05 ** (0.015)
Suburban County	-0.05 ** (0.019)	-0.05 ** (0.019)	-0.05 *** (0.012)
Log Loan demand	0.04 *** (0.008)	0.04 *** (0.008)	0.04 *** (0.006)
Log Median Income	0.07 *** (0.020)	0.07 *** (0.020)	0.07 *** (0.020)
Log Lender Assets	0.01 *** (0.002)	0.01 *** (0.002)	0.01 *** (0.002)
Commercial Bank	0.28 *** (0.016)	0.28 *** (0.016)	0.28 *** (0.015)
Farm Credit Association	0.38 *** (0.046)	0.38 *** (0.046)	0.38 *** (0.038)
Non-Traditional Lender	0.10 *** (0.018)	0.10 *** (0.018)	0.10 *** (0.026)
Second PPP Round (Apr 27-Aug 8 2020)	-0.30 *** (0.016)	-0.30 *** (0.016)	-0.3 *** (0.020)
Days to Approval	-0.003 *** (0.000)	-0.003 *** (0.000)	-0.003 *** (0.000)
Days in Lockdown	0.03 *** (0.002)	0.03 (0.002)	0.03 ** (0.016)
Non-Profit	0.23 *** (0.015)	0.23 *** (0.015)	0.23 *** (0.012)

**Appendix Table A11. Liner Regression (OLS) with Variations in Standard Errors Clustering. Standard Errors are in Parenthesis (continued)**

	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000	Linear Regression (OLS) Log PPP Loans ≤ \$150,000
Unanswered Owner Race	0.02 * (0.010)	0.02 * (0.010)	0.02 ** (0.010)
Unanswered Owner Gender	-0.15 *** (0.008)	-0.15 *** (0.025)	-0.15 *** (0.009)
5 to 9 Employees	1.02 *** (0.017)	1.02 *** (0.044)	1.02 *** (0.015)
10 to 19 Employees	1.45 *** (0.018)	1.45 *** (0.057)	1.45 *** (0.017)
20 to 49 Employees	1.68 *** (0.019)	1.68 *** (0.035)	1.68 *** (0.017)
50 to 99 Employees	1.78 *** (0.039)	1.78 *** (0.009)	1.78 *** (0.032)
100 to 249 Employees	0.81 *** (0.126)	0.81 *** (0.233)	0.81 *** (0.135)
250 to 499 Employees	0.71 *** (0.105)	0.71 *** (0.125)	0.71 *** (0.112)
Unanswered Company Size	0.73 *** (0.027)	0.73 *** (0.052)	0.73 *** (0.026)
Minority-Owned Company Size Unanswered	-0.01 (0.029)	-0.01 (0.029)	-0.01 (0.032)
Unanswered Race-Owned 5 to 9 Employees	-0.06 *** (0.011)	-0.06 *** (0.011)	-0.06 *** (0.011)
Unanswered Race-Owned 10 to 19 Employees	-0.04 *** (0.011)	-0.04 ** (0.012)	-0.04 ** (0.012)
Unanswered Race-Owned 20 to 49 Employees	0.00 (0.012)	0.00 (0.012)	0.00 (0.012)
Unanswered Race-Owned 50 to 99 Employees	-0.07 * (0.037)	-0.07 * (0.037)	-0.07 ** (0.032)
Unanswered Race-Owned 100 to 249 Employees	0.19 (0.159)	0.19 (0.149)	0.19 (0.151)
Unanswered Race-Owned 250 to 499 Employees	0.54 *** (0.144)	0.54 *** (0.144)	0.54 *** (0.152)
Unanswered Race-Owned Unanswered Company Size	-0.12 *** (0.025)	-0.12 *** (0.025)	-0.12 *** (0.025)
Women-Owned Company Size Unanswered	0.09 *** (0.018)	0.09 ** (0.027)	0.09 *** (0.016)
Unanswered Owner Gender 5 to 9 Employees	0.07 *** (0.008)	0.07 ** (0.019)	0.07 *** (0.007)
Unanswered Owner Gender 10 to 19 Employees	0.08 *** (0.008)	0.08 *** (0.011)	0.08 *** (0.009)
Unanswered Owner Gender 20 to 49 Employees	0.07 *** (0.010)	0.07 *** (0.010)	0.07 *** (0.007)
Unanswered Owner Gender 50 to 99 Employees	-0.03 *** (0.023)	-0.03 (0.023)	-0.03 (0.023)
Unanswered Owner Gender 100 to 249 Employees	-0.15 ** (0.063)	-0.16 ** (0.063)	-0.16 ** (0.066)
Unanswered Owner Gender 250 to 499 Employees	-0.53 *** (0.142)	-0.53 *** (0.142)	-0.53 *** (0.141)
Unanswered Owner Gender Unanswered Company Size	-0.18 *** (0.015)	-0.18 *** (0.014)	-0.18 *** (0.015)
Constant	8.24 *** (0.192)	8.24 *** (0.192)	8.24 *** (0.172)
State Fixed Effects	YES	YES	
Industry Fixed Effects	YES	YES	
Observations	4,389,632	4,389,632	4,389,632
R-Squared	0.405	0.405	0.405
Cluster (State-level)	52		
Two-way cluster (State and Month)			260
Cluster (Industry-Level)		21	
Cluster (Zipcode-level)	29,610	29,610	29,610

\*10%, \*\*5%, and \*\*\*1% are levels of statistical significance.

## **Appendix B: Interview Questions (Approved IRB-FY2021-147)**

1. Does your business have any of the following certifications? (Select all that apply)
  - Minority-owned business
  - Veteran-owned business
  - Women-owned business
  - None of the above
2. How would you describe the impact your business is currently experiencing due to the COVID-19 pandemic?
  - COVID-19 is not impacting my business in any way (positive or negative)
  - COVID-19 is positively impacting my business. Please explain how. Provide some examples.
  - COVID-19 is negatively impacting your business. Please explain how. Provide some examples.
3. How many full-time, part-time, and or seasonal employees worked at your business prior to the stay-at-home order in Ohio in March 2020?
4. Did you employ any of the following strategies since the beginning of the pandemic in March 2020? (From the options below choose all that apply)
  - Layoffs
  - Furloughs (Complete/Partial)
  - Reduced Employee Salaries/Wages
  - Reduced Supervisor/Management Salaries/Wages
  - Other (please specify):
5. Please tell us in your own words about your experience with applying to the PPP loan.
6. Who was your lender? (Choose an option below and state the name of your lender)
  - Commercial bank
  - Credit Union
  - Farm Credit
  - FinTech
  - Other
7. SBA said the estimated time for completing the PPP loan application, including gathering data needed, was 8 minutes. Do you agree? How long did it take you to submit the application?
8. Did you have any difficulties in the PPP loan application process? If so, please explain.
9. Did you receive help with the application? If so, who helped you? How did they help you?
10. How long did you have to wait for the PPP loan approval?

11. Did you receive the full amount in PPP loan requested? If not, what percentage of the amount requested did you receive? (Please choose the option below with the best estimate the percentage of the requested amount.)
  - Less than 20% of the requested amount
  - 20-39% of the requested amount
  - 40-59% of the requested amount
  - 60-79% of the requested amount
  - 80-99% of the requested amount
12. Please describe how the PPP loan helped your business or your business's economic activities.
13. Did the PPP loan allow you to retain employees? If so, how many?
14. Will you need to lay off any employees due to the pandemic impact on your business in the next 3 months? If yes, how many?
15. PPP application asked your business to purchase only American-made equipment and products to the extent feasible. Did you have difficulties finding American products or equipment?
16. Have you applied/do you plan to apply for the PPP loan forgiveness?
17. Have you applied/do you plan to apply for the second round of PPP loans in 2021?
18. Do you have any other comments related to your experience and use of the PPP loan that you would like to share?

**Thank you for your participation in this interview. We will be happy to share the results of our study with you. Please let us know if you would like to receive the study report.**