Banking Deserts and the Paycheck Protection Program

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Abstract
PPP was a highly unusual policy measure enacted to provide bridge capital to support small businesses coping with the dramatic downturn in demand due to the COVID pandemic. By design, the program effectively required potential applicants work through the bank with whom they had a relationship. Yet large swathes of the country are effectively banking deserts, which dramatically steepens the gradient for those regions' businesses seeking PPP support. This paper tests the proposition that the exogenous distribution of banks effectively discriminated against those regions where banking services are limited, while also looking at whether loans were distributed to those areas with less dense employment opportunities and higher concentrations of small businesses. The research finds that areas with fewer banking services and lower employment opportunities were systematically disadvantaged in PPP distribution, while there were no significantly greater flows to areas with higher rates of small businesses.

I. Introduction

For much of 2020 and 2021 to date, the COVID-19 pandemic has ravaged the United States, harming both public health and the economy. As of late October 2021, over 45 million people have been infected and over 725,000 have died from the coronavirus in the US. While the unemployment rate is down to 4.8% in September 2021, after peaking at 14.7% in April 2020, GDP shrank through the first two quarters of 2020, creating the first official downturn since the Great Recession. Despite the improving labor market, the economy is still at a deficit of 5 million jobs relative to the beginning of the pandemic. The effects to public health and the economy have exposed many underlying inequalities within communities, between communities – particularly across the urban-rural spectrum – and more broadly, between regions of the country.

One such existing inequality is the access to banking services. Banking services vary regionally, creating inequalities in the ability to access credit between those banking clients residing in markets well-served and those under- or unserved. While many banking services can be transacted remotely via mobile banking and a rising fintech sector, there are still public and personal benefits derived from proximity to a bank branch or headquarters. Local banks are able to utilize "relationship lending" where "soft" information gleaned through business networks can be used for credit decisions (Berger and Udell, 2002; Petach, Weiler, and Conroy, 2021). These

linkages are particularly important for rural small businesses that are informationally opaque, generating an imbalance of information to the disadvantage of the borrower based purely on geography (Akerlof 1970; Bunten et al. 2015; Conroy, Low, and Weiler, 2017).

The personal relationship that bankers can establish with small business owners provides the banks insights into a business's managerial practices, its relationships with suppliers and customers, and its impact on the local economy among other pieces of information that are not included on the canonical balance sheet. Through bank consolidations and closures, many Americans live in a relative banking desert - a community with no physical banks – effectively creating spatial mismatches between financial resource conduits and the business sector. Even more live in areas that are effectively banking hinterlands, with no banking headquarters and served only by branches of national chains, as the distance between headquarters and branches has grown continuously since the turn of the millennium (Petach and Weiler, 2021). Areas may become dependent on branch locations from a single national commercial bank basing their lending on rigid policies, procedures, and credit scoring systems determined by a distant headquarters that do not incorporate the richness of soft information. The inequality in access to local banks can have significant implications on how recovery funds are distributed and thus for the trajectory of post-pandemic recovery, while also leaving a gap in the institutional leadership role that banks and bankers play in communities.

The COVID-19 pandemic caused many businesses to furlough or lay off broad swaths of employees as incoming revenues sharply declined, and businesses were forced to close by their local governments and people stayed home to prevent the spread of the virus. From February to April 2020 alone, the number of active businesses in the U.S. dropped 22% (Fairlie, 2020). Amidst these losses, in March 2020, Congress created the Paycheck Protection Program (PPP) to help struggling small business owners weather these unprecedented headwinds.

The Paycheck Protection Program allowed small businesses to obtain low-interest loans to cover payroll and other expenses. The loans were distributed through banks that were existing SBA 7(a) lenders. Originally $349 billion was allocated for the first round of the program but given the severity of economic hardships experienced by small businesses, these funds ran out in two weeks. We analyze both first-round and overall PPP lending patterns. Crucially, most of the funds were primarily allocated to those businesses that had an existing relationship with a qualified bank. Given the geographical distribution of local banks, this system for loan disbursement may have created greater overall inequality for those areas already experiencing inequality of banking access.

Using data on the Paycheck Protection Program loan receipt and the locations of banking institutions, this study leverages national FDIC and NCUA data to understand how community banking density is related to the disbursement of Paycheck Protection Program loans. We first examine the a priori regional distribution of banks as well the distribution of businesses at the commuting zone level, using combinations of counties that represent a commuting shed. We then map the distribution of PPP loans relative to those distributions of establishments and banks. We will compare these results with measures of regional economic disadvantage – in particular the employment-to-population ratio, a particularly sensitive measure of labor market opportunity (Amior and Manning, 2018) – to see if the distribution of banking services and disbursements of PPP funds in fact mitigated or reinforced existing patterns of regional inequality.

Banking availability will be evaluated by measuring the number of banks per 10,000 population within a commuting zone using the ERS 2000 definition. Commuting zones (CZ's), fully covering the contiguous 48 states and the District of Columbia, are a reflection of local labor markets and more accurately capture the accessibility of banks for establishments within a given region, following the intuitive proposition that business owners shop for banking services in the same geography in which they live and/or work. Banking hinterlands will be classified similarly,

commuting zones without a bank headquarters. The focal dependent variable will be the number of loans per eligible small business establishment, although we will also briefly examine the amount of loans and jobs retained per eligible small business. The latter two variables are more likely to be programmatically tied to payrolls, while the more penetrating marginal decision by banks is how many loans to issue to small businesses.

The empirical framework analyzes a cross-section of all commuting zones, geographically situating banking deserts and hinterlands. There are three primary hypotheses to investigate, which will be introduced into the cross-sectional regression alongside a suite of regional control variables:

- PPP loans were systematically lower in relative banking deserts and hinterlands after accounting for lower business and population concentrations.
- Lower disbursements were more evident in areas that had lower employment-to-population ratios, indicating that loans were going to relatively advantaged labor markets.
- Small businesses of less than 50 as well less than 10 employees were not the major beneficiaries of the PPP program, despite the political rhetoric suggesting that such establishments were primary beneficiaries of the novel funding flows.

We include controls for income inequality, per capita GDP, educational attainment, and non-white share of the CZ's population, all of which may factor into regional loan flows.

The key hypotheses of the paper hold in the empirical analysis. Regions with higher concentrations of banks receive greater average numbers of loans, confirming the banking desert hypothesis. Furthermore, more loans per small business were disbursed in regions that had banking headquarters, even while controlling for the number of banks in the region, again affirming our a priori hypothesis. The number of loans did not go systematically to smaller businesses. Finally, loans were also lower in labor-market-challenged areas, as measured by employment-to-population ratios. In total, not only did smaller businesses not gain from the program, the fact that both the

banking desert and banking hinterland hypotheses hold in conjunction with loans flowing to areas of job concentration suggest that there was indeed a spatial mismatch in the program based on geography.

The following section of the paper briefly reviews the related literature. The third section sketches the empirical model and data, with results elaborated in the fourth section. The fifth section concludes.

II. Related Literature

While the notion of banking deserts is anecdotally rich, there are remarkably few independent empirical analyses of the veracity and extent of the banking access problem. Most have found that the concept mainly applies to rural areas rather than cities (e.g. Morgan, Pinovsky, and Perlman, 2018; Kashian, Tao, and Perez-Valdez, 2015; Hrushka, 2020). This repeated theme reinforces the present work's focus on broader commuting zones (CZ's) rather than zip codes, census tracts, or counties as a preferred spatial level of analysis, given CZ's spatial homogeneity in uniting the transportation habits of residents and workers. A focus on metropolitan areas would also miss many of the more significant banking deserts and hinterlands. For the purposes of this paper, businesses are synonymous with business establishments.

Banking deserts are just one level of lack of bank access for businesses. The best banking relationships would develop where the borrower is in proximity of a bank headquarters rather than just a branch of regional or national chain. Credit score sheets created by faraway headquarters are not likely to match local circumstances and promising frontier businesses, hampering capital-led drives for regional employment growth and diversification (Conroy, Low, and Weiler, 2015). In contrast, areas with banking headquarters are more likely to have loan officers that can leverage soft information, improving estimates of loan viability. We therefore explore both banking deserts,

commuting zones with no banks, and banking hinterlands, those commuting zones with no banking headquarters, as well as the overlap of this banking geography with the geography of non-white populations.

Given the newness of the topic, there have been limited studies of the PPP program, with most focusing on optimal allocation theory (Elenev, Landvoigt and Van Nieuwerburgh, 2020; Joaquim and Netto, 2020), bank performance (Granja et al, 2020; Kapinos, 2021), flows to minority communities (Fairlie and Fossen, 2021), and/or business/employment survival (Bartik, Cullen, Glaeser, Luca, Stanton and Sunderam, 2020; Autor, Cho, Crane, Goldar, Lutz, Montes, Peterman, Ratner, Villar and Yildirmaz, 2020). Yet the question of bank access and consequent local relationships is particularly important for this unusual business support policy, as banks were the sole conduit for securing PPP monies. Soft information is especially crucial in these circumstances, as the margins on PPP loans were very small (Marsh and Sharma, 2020). Banks thus had extra incentive to rely on soft information about the borrower to maximize the chance of the loan getting repaid. Again, the availability of such information is least likely in banking deserts, and less likely in banking hinterlands. Banks in such hinterlands are unlikely to have loan officers, while being more likely to use credit score sheets developed by distant headquarters.

Previous work on PPP and bank exposure indicates that there is a disconnect between the status of the local economy and likelihood of receiving PPP loans. Kapinos (2021) found that PPP loans did not systematically flow to counties that experienced unemployment surges in the first round of the pandemic. More generally, using both ZIP code and county data, Granja et al (2020) found little relationship between loan disbursement and local economic conditions; the extent of COVID cases was no better a predictor, with some indication that loans were actually more prevalent where caseloads were lower. In general, however, even this tremendously comprehensive study was somewhat limited by its choice of geography, focusing on ZIP codes and counties,

neither of which are natural markets. Fairlie and Fossen (2021) similarly used ZIP codes in their analysis, which we believe represents too small a microscope to properly understand PPP disbursement.

In contrast, this paper relies on commuting zones as its primary geographic scale of analysis, as these define the extent of commuting and intra-regional cohesion (Amior and Manning, 2018). Buyers of loans are most likely to choose banks that are either close to home or workplace. In terms of the status of the local economy, we focus on the employment/population ratio as an indicator of the density of jobs available to the region's population following the significant downturn in March/April 2020, as well as the proportion of citizens with a higher-education degree and per capita GDP. Amior and Manning (2018) underscore the employment/population ratio as being a particular appropriate measure of economic opportunity, which we leverage in this work.

Our approach follows clues left by the handful of studies on PPP loan distribution. Amiram and Batteti (2020) and Li and Strahan (2020) indeed find those establishments with existing banking relationships tended to get loans first and in the largest amounts. We indirectly test both propositions in the present work, in particular through the resource flows channeled towards the smallest businesses which are less likely to have established banking relationships. Granja et al (2020) further find that those relationships tended to outweigh stated goals of the program, namely targeting those areas and businesses in greatest need of loans due to the pandemic. Barrios, Minnis, Minnis and Sijthoff (2020) finding that establishment payrolls closely predict PPP loan receipt indicates that there may be a positive relationship between business size and loan disbursement, which we test empirically as well. Finally, Fairlie and Fossen (2021) find that early loans went mainly to non-minority applicants, while the later tranche flowed more to these marginalized populations. We follow their lead in testing the significance on non-white shares of CZ populations on loan disbursement.

As previous work has demonstrated, the implications of systematic informational asymmetries based on geography can fundamentally shift innovation and resources away from lagging regions, further entrenching their economic struggles (Weiler, 2000). These geographic information asymmetries (GIA) are most likely to be felt in business-to-business transactions built on the supplier's understanding of those demanding services. Small business lending may be particularly vulnerable to GIA discrimination, given its reliance on credit scoring developed at a bank's headquarters – which may not be congruent with the realities of a rural economy – as well the past viability of similar projects. The latter will be a particularly high hurdle for innovative projects that have no track record in the focal economy. Rural areas tend to have thin informational markets due to lower establishment dynamism and thus fewer datapoints from which to extract the viability of loans (Bunten et al, 2015).

Statistically, the perception of otherwise identical probability distribution of outcomes in two regions will be skewed towards the market with thicker information through greater past business experience. In contrast, the thin market featuring fewer datapoints will lead to higher perceived variance of outcomes, heightening uncertainty and thus risk for bankers (Weiler, Hoag, and Fan, 2006). These risks may deter bankers from making loans to those companies without existing intensive relationships, leading to disproportionate flows towards advantaged regions and businesses. These informational asymmetries may thus be a driving force for systematic discrimination of PPP loans towards those thick-market regions that have denser labor markets as measured by the employment/population ratio, established banking networks, and larger establishments. Our empirical work tests these propositions.

III. Data and Empirical Model

Data on Paycheck Protection Program loans come from the Small Business Administration. These data contain information on all individual loans distributed through the program's first phase which originally ended June 30, 2020 but was extended to August 8. The loan amount, business address, number of jobs reported, date the loan was approved, and demographic characteristics of the business owner are included for each approved loan. For our work, the loan amount, number of jobs reported, and business address are used in the construction of the final data. The demographic characteristics are not used due to the large amount of loans where those questions were unanswered and the likelihood of introducing sample selection bias through their use.

Commuting Zones (CZs), from ERS's 2000 delineations, are the primary unit of analysis. CZs offer two main advantages over other geographic delineations. First, CZs better represent local economies better than other political boundaries by grouping counties together which have strong commuting-ties. Second, CZs contiguously cover the continental United States meaning that all businesses which received a PPP loan will be retained in our sample. Commuting Zones also lend themselves particularly well to studying the distribution of PPP loans. It is conceivable that a small business may have to seek banking services outside of its city or county due to a lack of access to banks in that location. Using CZs as the geographic unit will more accurately capture the number of banks available to a small business. To obtain a measure of the number of loans in a CZ the number of loans are first aggregated to the zip code level. These zip codes are then mapped to the counties in which they reside, and for the zip codes which cross county borders, the number of loans is weighted by the proportion of businesses that reside each county[1]. The aggregate number loans at the county level are then mapped to the appropriate CZ. This process is repeated for both the

amount of loans and the number of jobs reported to get commuting zone measures for these outcomes.

Commuting zones are geographically diverse, do not have identical populations, nor identical economies. For this reason, we normalize our outcomes of interest by the number of small businesses in each CZ. We focus on the number of small businesses in each CZ since the Paycheck Protection Program was designed to provide economic relief for small businesses. The Small Business Administration definition of a small business varies by industry, so we utilize a more general definition of a small business adopted by the Small Business Administration — a business with fewer than 500 employees. To get the number of businesses with fewer than 500 employees, we use data from the most recent County Business Patterns from the U.S. Census Bureau. We implement the same aggregation procedure to get the total number of small businesses for every CZ.

Our main source of commuting zone-level economic characteristics, such as population, household income, demographic characteristics, and level of education, is from the American Community Survey 5-year estimates for 2015-2019. This source provides data on these characteristics at the county level which are then aggregated up to the CZ level. Data on county GDP comes from the Bureau of Economic Analysis Regional Economic Accounts and summed up to CZ GDP. These data are for 2019 since that is the most recent data available at the county level. Data on the number of COVID-19 cases comes from The New York Times which has been tracking the number of daily COVID-19 cases by county since the beginning of the pandemic. To accurately measure the impact of COVID-19 cases and potential local lock-down measures in an area, we use the cumulative count COVID-19 cases for each county on April 3, 2020, which is when the program opened for small businesses. The county case count is then aggregated up to the commuting zone. We get our data for labor market outcomes from the Bureau of Labor Statistics'

(BLS) Local Area Unemployment Statistics. Since the BLS measures employment in first two weeks of the month, we use the county data on employment from April 2020 since these data reflect the reality of local labor markets when business establishments were deciding whether to apply for a PPP loan.

We obtain our data on bank location from two sources: Federal Deposit Insurance Corporation (FDIC) and the National Credit Union Administration (NCUA). We focus on both banks and credit unions because both were authorized to provide PPP loans to small businesses. We obtain the location of all bank branches and headquarters from the FDIC's Institutions and Locations database. This provides the addresses of all federally insured banks, county of banks location, the service type of banks, and whether the bank is the main office or a branch location. We create a measure of total banks by including all full-service banks, both brick and mortar and retail locations, as well as permanent limited-service banks that only accept deposits and payments. We include the latter type of banks to capture the effect of banking hinterlands on the distribution of PPP loans. The county data is again aggregated up to the CZ level. The NCUA Quarterly Call Report Data for the second quarter of 2020 are used to get a list of all credit unions by location. Credit Unions are only listed by address without their county of residence, so we follow a similar zip code to county procedure as with the PPP loan data before we aggregate these to the commuting zone. The number of credit unions are combined with the number of banks to create a total measure of bank concentration for each CZ.

Table 1 presents summary statistics for each of the variables in our sample. The final sample consists of 706 commuting zones. Due to the structure of the program, we only have data for loans that were made during its first iteration in early to mid-2020. To account for population differences across CZs, we normalize the number of banks and credit unions, bank headquarters,

COVID-19 cases, and number of small businesses by CZ population per ten thousand in regional population.

To explore the geographic distribution of PPP loans, banks, and COVID-19 cases, we map the quintiles for data for each in Figure 1. Panel (a) shows the geographic distribution of the number of PPP loans per small business, Panel (b) shows the geographic distribution of banks per 10,000 people, and Panel (c) shows the geographic distribution of the number of COVID-19 cases per 10,000 people. The amount of PPP loans per small business are the highest in the central United States, stretching from North Dakota to the northern portion of Texas. This region shares significant overlap with the geographic distribution of banks per 10,000 people. The Southwest also has a high number of PPP loans per small business, however there is not a high concentration of banks in this region. COVID-19 per 10,000 cases as of April 3rd 2020 are concentrated in the northeast United States, Louisiana, and the Southwest. This geography aligns with where the largest outbreaks of cases were near the beginning of the pandemic. The highest quintile for COVID-19 cases has a very large range (3.52 - 88.29), making some areas appear to have a comparable number of cases despite having much different values of cases per 10,000 people. Overall, these maps suggest that there is significant overlap between the regions where the number of PPP loans and the number of banks is the greatest. There is some overlap between loans and COVID-19 cases, but it does not appear from these maps that the PPP loans went to where COVID-19 cases were the greatest. It is possible that the heterogeneity in the intensity of the stay-at-home orders and business closures near the beginning of the pandemic did not align with where the cases were the highest at the start of the PPP program.

To explore these and other relationships further, we now turn to a more formal analysis. We seek to answer whether the distribution of banks and banking hinterlands partially determined the distribution of PPP loans. Since the PPP loans were distributed through banks and a limited amount

of initial funds, we hypothesize that regions with a greater concentration of banks as well as bank headquarters received more PPP loans, and that banking deserts and banking hinterlands were systematically disadvantaged in PPP allocations. We take the geographic distribution of banks as being given a priori, and thus exogenous to the analysis. A higher concentration of banks provides more opportunities for small businesses to find a bank that had not already exhausted their allotment of PPP funding. Although the program was originally designed to continue through June 30, 2020, the original amount of funding provided by the CARES Act ran out by April 16, 2020. Businesses in regions with a higher concentration of banks that were able to access the PPP funds earlier likely increased their likelihood of survival, in line with Bartik, Cullen, Glaeser, Luca, Stanton and Sunderam (2020) and Autor, Cho, Crane, Goldar, Lutz, Montes, Peterman, Ratner, Villar and Yildirmaz (2020). We are specifically also interested in whether loans, amounts, and job retained went to the small businesses that were avowedly priorities for the program. To empirically test these hypotheses, we estimate the following equation:

$$\begin{aligned} Y_i = \beta_0 + \beta_1 BankConcentration_i + \beta_2 BankConcentration_i^2 + \beta_3 BankHQs_i + \beta_4 BankHQs_i^2 \\ + \beta_5 Cases_i + \beta_6 NonWhiteShare_i + \beta_7 ShareSmallestBusinesses_i + \beta_8 \frac{Emp.}{Pop.}_i \\ + \beta_9 \frac{HH.Med.Income}{HH.Mean.Income_i} + \beta_{10} perCapitaGDP_i + \beta_{11} BAPlusShare_i + \epsilon_i \end{aligned}$$

where Y_i is the outcome of interest — either the number of PPP loans per small business, amount of PPP loans per small business, number of jobs reportedly retained per small business, or their first round of funding equivalent in commuting zone i. $BankConcentration_i$ is the number of banks and credit unions per 10,000 people in CZ i, $BankMainOffices_i$ is the number bank main offices per 10,000 people in CZ i, $Cases_i$ is the commuting zone number of COVID-19 cases per 10,000 people, $NonWhiteShare_i$ is the share of non-White population in CZ i,

$ShareSmallestBusinesses_i$ is the CZ-level share of businesses that have fewer than 50 or fewer than 10 employees out of all small businesses, $\frac{Emp.}{Pop._i}$ is the commuting zone-level employment-to-population ratio for April 2020, $\frac{HH.Med.Income}{HH.MeanIncome_i}$ is a commuting zone-level measure of inequality measuring the ratio of household median income to household mean income, $perCapitaGDP_i$ is the per capita GDP of CZ i, $BAPlusShare_i$ is the share of the CZ population that has at least a bachelor's degree, $SmallBusinessConcetration_i$ is the number of businesses with less than 500 employees in CZ i, and ϵ_i is an idiosyncratic error term. Variance Inflation Factor (VIF) analyses indicate that there was no substantive multicollinearity among the explanatory variables.

Coefficients β_1 and β_3 are our main coefficients of interest. Consistent with our banking desert and banking hinterland hypotheses, we expect both coefficients to be positive for all outcomes of interest, as more loans flow to those areas with more banks and more bank headquarters rather towards banking deserts and hinterlands. We include the square of both of these variables to account for the possibility that the concentration of banks and bank headquarters beyond a certain threshold does not further increase the outcomes of interest. As discussed in the introduction and literature review, we also focus on the employment/population ratio as a particularly important measure of labor market opportunity, and thus have a keen interest in β_8. If funds had flowed to more distressed labor markets in the wake of the COVID crisis, we would expect β_8 to be negative. However, if funds in fact went to relatively advantaged labor markets, β_8 would be positive. In that sense, β_8 becomes an especially useful bellwether in determining whether PPP in fact served the most economically distressed regions.

Additionally, we are interested in three sub-questions: (1) whether PPP loans went to areas that were most affected by the pandemic, (2) whether commuting zones with a higher proportion of non-white population received fewer loans, and, in particular, (3) whether the smallest small

businesses were particularly disadvantaged in accessing PPP loans. For these questions, we are interested in coefficients β_5, β_6, and β_7 respectively. If PPP funds were distributed to the commuting zones that were most affected then we would expect β_5 to be positive, if communities of color had a harder time accessing or applying for PPP funds then we would expect β_6 to be negative, and finally, if the smallest businesses were particularly disadvantaged in access or applying for PPP loans then we would expect β_7 to also be negative.

IV. Results

a) PPP Program in Total

Table 2 presents results from estimating the effect of bank concentration on the number of PPP loans per small business by Commuting Zone (CZ). Coefficients are standardized to impacts in terms of standard deviation changes in the dependent variables in response to a one standard deviation change in the focal explanatory variable; the Appendix reports all results in non-standardized formats. We also apply two different measures for the share of smallest businesses: one where we define smallest businesses as businesses with fewer than 10 employees and a second as businesses with fewer than 50 employees.

These results suggest that larger concentrations of banks and credit unions in a commuting zone had a positive and statistically significant impact on the number of PPP loans per small business. Commuting zones where the number of banks per 10,000 people is one standard deviation greater see an increase in the number of PPP loans per small business of PPP loans per small business by about 1 standard deviation. There appears to be diminishing returns to increasing the number of banks per 10,000 people, however, given the negative coefficient on the squared term. Once the concentration of banks is greater than 23.3 banks per 10,000 people, the number of PPP loans is negatively affected by additional banks. Even before that level, each additional increase in

the concentration of banks is less effective in increasing the number of PPP loans. This result suggests that in places that have fewer banks per 10,000 people, an additional bank is helpful for obtaining a PPP loan, but that in places that already have a higher concentration of banks, additional banks actually reduce the number of loans.

These findings indicate that the geographical distribution of banks is impacting the number of PPP loans, likely by providing more options to small businesses to apply for a loan. If one local bank was no longer accepting applications for the funds, the small business could look to another bank in their area to apply. Small businesses in areas with fewer banks did not have this luxury. Areas with a sufficient number of banks were not helped by additional banks, with such markets having sufficient bank saturation to handle PPP loan demand.

We find similar first-order effects for the number of banking headquarters per 10,000 people; commuting zones with a concentration of headquarters that is one standard deviation greater received 33.5%-35% of a standard deviation more PPP loans per small business. However, we do not find diminishing returns to the number of bank headquarters; more bank headquarters systematically increase the number of loans. Bank headquarters are likely to have a greater ability to specifically tailor loans by leveraging soft information, creating an advantage for small businesses located in CZs with a bank headquarters over small businesses located in CZs with simply a branch office. These results are stable across both specifications accounting for different definitions of the smallest businesses.

In addition to our main hypotheses about the geographic locations of banks, we are also interested in whether the PPP funds went to areas that were the most affected by the pandemic. Commuting zones with more COVID-19 cases per 10,000 people received more loans. Places where COVID-19 cases per 10,000 people that are one standard deviation above the mean increases the amount of loans received by 5.1% to 6% of a standard deviation all else equal. In the early

stages of the pandemic, regions that had more cases were likely to have more restrictions on the types of business which could remain open. Our empirical results in fact suggest that loans were going to CZs that were in greater health distress. Regions that had a greater employment-to-population ratio of one standard deviation also received about a 20% of a standard deviation greater share of PPP loans, indicating that PPP loans went to regions that generally had advantageous labor market conditions. We also ran the models using March 2020 employment data, which gave substantively identical findings.

While the Paycheck Protection Program was not designed to specifically help minority owned small businesses, we do find that regions with a greater share of non-white population received a larger amount of PPP loans per small business. A one standard deviation larger share of non-white population received about 16% of a standard deviation more PPP loans per small business. This finding is consistent with the findings in Fairlie and Fossen (2021), and is important because minority-owned businesses were some of the most affected businesses by the economic shutdown (Fairlie, 2020).

We were also interested in whether the smallest small businesses were disadvantaged by the PPP loan process. For this query, we created two different measures to represent the share of the smallest small businesses in a commuting zone: one for the share of business with fewer than 10 employees out of all small businesses and one for small businesses with fewer than 50 employees. We find that CZs with a greater share of small businesses with fewer than 10 employees and fewer than 50 employees did receive fewer PPP loans. Places with a one standard deviation higher concentration of businesses with fewer than 10 employees received 14.8% of a standard deviation fewer PPP loans and places where the concentration of small businesses with less than 50 employees was one standard deviation greater also received about 15% of a standard deviation fewer PPP loans.

Next, we turn to whether the geographical distribution of banks and banking headquarters affected the amount of the loans distributed to commuting zones and the number of jobs that were reportedly saved with the PPP loans. Column 1 of Table 3 presents the results for the PPP loan amount per small business and Column 2 presents results for the number of jobs retained per small business.

We find that a greater concentration of banks and credit unions in a CZ reduced the amount of PPP loans per small business per small business by 23.4% of a standard deviation but did not affect the number of jobs retained. Each bank that participated in the program received a block of PPP funds to distribute. Since commuting zones with a higher concentration of banks distributed more loans from their limited funds, the average loan and average number of jobs retained may have been smaller given the allotment constraint. Conversely, in regions with a lower concentration of banks may not have distributed as many loans, but the small businesses which did receive loans received a larger amount and retained more jobs per small business.

This finding highlights another benefit of relational lending in these areas with a low concentration of banks: an already existing relationship with a bank made it easier to receive a PPP loan and the loan was larger on average than in regions where relational lending was less important. The number of bank headquarters did not significantly impact the amount of the loans, nor the number of jobs retained per small business. This result may be an artifact of the application process. The application uses a set formula to determine the funds that the business is eligible to receive. This means that bank headquarters are not able to influence these outcomes directly but are only able to influence these outcomes by determining which loan applications are prioritized.

We also find a positive and significant result for CZs with a higher employment-to-population ratio for both the amount of the PPP loans per small business and the number of jobs retained per small business. A one standard deviation positive difference in the employment-to-

population ratio raised the loan amount per small business by 26% of a standard deviation and also heightened the number of jobs retained per small business by 21.9% of a standard deviation. A possible reason for this result is that commuting zones with a higher employment-to- population ratio applied for larger loans in order to avoid laying off their employees and therefore retained more jobs. We do not find any significant impacts of a greater non-white share of the population.

b) First Round of PPP

The Paycheck Protection Program was originally designed to be in effect from April 3 to June 30, 2020, but it ran out of funds by April 16, and it was unclear if more funding would be approved. The magnitude of the economic impacts of the beginning of the pandemic meant that missing out on this first round of funding could impact the survival of small businesses that were affected by the government-imposed lockdown orders. For these reasons, we examine whether the concentration of banks impacted the receipt of these first-round loans. We present the findings in Table 4.

Once again, we find that greater concentrations of banks and credit unions increased the number of PPP loans per small business. Areas with a one standard deviation positive difference in the number of banks and credit unions per 10,000 people raised the number of first round PPP loans nearly 1 standard deviation. This is again subject to diminishing returns as in the full sample of PPP loans, with a lower threshold at 20 banks per 10,000 people. We also find that bank headquarters were also an important determinant of the number of PPP loans per small business. Commuting zones where the concentration of bank headquarters per 10,000 people was one standard deviation greater than another commuting zone received between 39.7% and 41.4% of a standard deviation more PPP loans per small business. In the first round of the program, this result is also subject to diminishing returns. This finding highlights the importance of bank access in the distribution of

these loans. Small businesses that are in commuting zones with more banks were able to access funds earlier than small businesses that were in relative banking deserts and banking hinterlands.

We also find that these early loans were not distributed to regions that were the most affected by the pandemic at the outset of the program. Fewer loans went to regions with a higher concentration of COVID-19 cases and to regions where the employment-to-population ratio were lower. During the first round of funding areas with COVID-19 cases per 10,000 that were one standard deviation greater received fewer loans per small business by 3.5% to 4.3% of a standard deviation. Commuting zones with an employment-to-population ratio that was one standard deviation higher received about 22% of a standard deviation more loans per small business. Regions with fewer cases per person were likely not under as severe lockdown restrictions as regions where the virus was spreading more broadly, and businesses were able to continue operating at a closer to normal capacity. Similarly, regions with a greater employment-to-population ratio and thus deeper job markets may not have been experiencing the same pandemic induced layoffs but still received a greater share of these first-round loans. At the time it was unclear whether there would be more support for small businesses, so these results represent a serious shortcoming of the program by advantaging areas with stronger labor market conditions.

In the first round of PPP the smallest businesses were disadvantaged compared to their large counterparts. Increasing the share of small businesses with fewer than 10 employees by one standard deviation decreased the number of first round PPP loans per small business by over 15.5% of a standard deviation. We find a similar result when we expand our definition of the smallest businesses to those with fewer than 50 employees (12.2% of a standard deviation fewer loans). This highlights that the smallest businesses, which were likely to be most in need of the additional support, had unequal access to economic relief. We do not find that CZs with a higher proportion of non-white residents also received more of these first-round funds. Combined with the results from

the full set of PPP loans, this finding suggests that small businesses in regions with a higher proportion of non-white people had to wait longer to receive PPP funds, a finding consistent with the results in Fairlie and Fossen (2021).

In Table 5 we examine whether the geographic distribution of banks affected the amount of these first-round loans and the number of jobs these loans helped retain in Columns 1 and 2, respectively. In contrast to our previous results using the full set of PPP loans, we do not find many significant results for these outcomes using just the first round of loans. For the first round of PPP loans, banks and credit unions do not affect the amount of PPP loans nor the number of jobs retained per small business. The number of bank headquarters does impact the loan amount per small business and the number of jobs retained per small business for the first-round loans. Commuting zones with a one standard deviation positive difference in the concentration of bank headquarters received loan amounts that were 21.1% of a standard deviation greater and retained 36.4% of a standard deviation more jobs. Above a certain concentration, however, these outcomes were hurt by having a greater concentration of bank headquarters. COVID-19 cases and the share of non-white population also do not impact the amounts or jobs retained of the first round PPP loans. All of these findings are likely attributable to the applications process. The amount of the loan and the number of jobs it was used to retain are not determining factors for loan approval, so once the loan is approved, these factors no longer influence these amount and job outcomes.

We do find that a higher CZ employment-to-population ratio does correlate with a greater number of first round loan amounts and jobs retained per small business. Increasing the CZ employment-to-population ratio by one standard deviation raised the first-round loan amount by 32% of a standard deviation. The same difference in the employment-to-population ratio raised the number of jobs retained per small business by 26.1% of a standard deviation. Commuting zones with more employment received more first-round loans and therefore received a greater share of the

total amount available and were able to retain more jobs. As has now been consistently shown, this finding suggests that larger loans went to areas with relatively strong labor markets, potentially increasing inter-regional inequality

V. Conclusions

This paper's novel contribution is an empirical assessment of the PPP at the appropriate geographic scale to reflect a spatial comparison of loan disbursement against measures of regional banking concentration and labor market opportunity. In contrast to other work on these emergency business loans, we focus on commuting zones as the spatial unit of analysis, as well as leverage an oft-ignored measure of labor market opportunity, the employment/population ratio. We also inquire whether flows of loans indeed went to small businesses.

Our findings show that PPP loans went disproportionately towards more job-dense regions, effectively widening existing spatial labor market inequality. This result applies not only to the number of loans disbursed, but also to loan amounts and jobs retained. Furthermore, PPP loans flowed less towards those regions characterized by banking deserts, again reinforcing existing regional inequalities. Even when controlling for banking deserts, banking hinterlands also received fewer loans, highlighting the vulnerability of regional businesses to simple branch banking which appears to put such regions at a significant disadvantage relative to those featuring headquarters. The smallest businesses were systematically disadvantaged in loan distribution. Areas with greater non-white populations had no advantage in the first round of loan distribution, but finally gained more access to loans in the following disbursals.

This paper's findings suggest that the PPP distribution of resources seems to have furthered regional inequality both at the banking and labor market levels. Advantaged regions received more loans, with loan amounts and retained jobs following thick labor markets as well. The findings on banking deserts and banking hinterlands in particular underscore that when designing policies to be implemented locally through banks, the spatial distribution of such

financial institutions should be considered to ensure that the policy is not creating or deepening spatial inequality – as was apparently the case for the PPP program.

Notes:

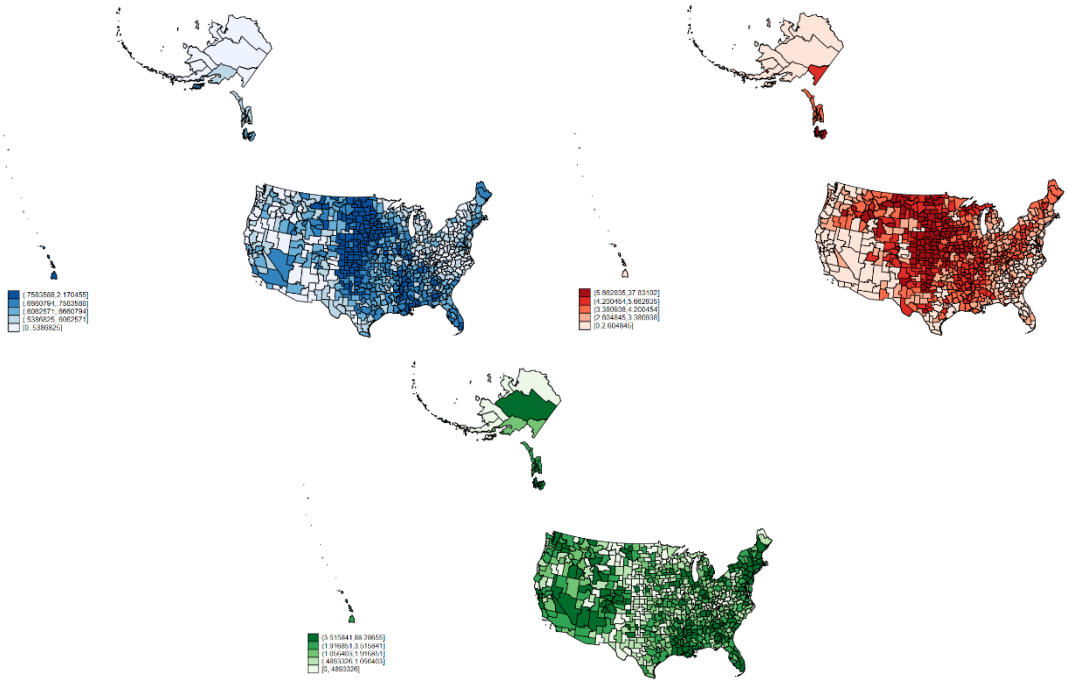
[1] We test an alternative aggregation procedure where zip codes are assigned to the county where the majority of businesses reside and do not find any substantial difference in our results.

Tables and Figures:

Table 1: Summary Statistics

	Mean	Std. Dev.	Min.	Max.	N
PPP Loans per Small Business	0.672	0.204	0	2.17	706
PPP Loan Amount per Small Business	51750.003	14474.729	0	131018.211	706
PPP Jobs Retained per Small Business	5.857	1.41	0	15.075	706
Round 1 Loans per Small Business	0.295	0.121	0	1.261	706
Round 1 Loan Amount per Small Business	36682.66	12374.749	0	97266.570	706
Round 1 Jobs Retained per Small Business	4.027	1.27	0	11.313	706
Banks + C.U.s per 10k people	4.492	2.908	0	37.831	706
Bank Headquarters per 10k people	0.636	0.972	0	9.653	706
COVID-19 Cases per 10k people	2.808	5.756	0	88.287	706
$\frac{Employment}{Population}$	0.403	0.065	0.224	0.666	706
$\frac{MedianHH.Inc.}{MeanHH.Inc.}$	0.754	0.042	0.598	0.904	706
GDP per Capita in Thousands	54.045	25.504	22.774	392.175	706
Share of Pop. with at least a B.A.	0.236	0.078	0.073	0.556	706
Non-White Population Share	0.183	0.157	0.007	0.894	706
Small Businesses per 10k people	252.649	86.404	57.157	1005.714	706
Share of Small Businesses $<$10 Employees	0.748	0.05	0.607	1	706
Share of Small Businesses $<$50 Employees	0.962	0.017	0.911	1	706

Figure 1: Geographic Distribution of PPP Loans, Banks and COVID-19 Cases



Panel (a) on the upper left shows the geographic distribution of PPP loans per small business. Panel (b) on the upper right shows the geographic distribution of banks per 10,000 people. Panel (c) at the bottom shows the geographic
of COVID-19 cases per 10,000 people. All maps show the quintile distribution of the data.

Table 2: Number of PPP Loans per Small Business

	PPP Loans per Small Business	PPP Loans per Small Business
Banks + C.U.s per 10k people	1.002***	1.006***
	(6.89)	(6.70)
Banks + C.U.s per 10k people Squared	-0.527***	-0.519***
	(-5.76)	(-5.54)
Bank Headquarters per 10k people	0.333**	0.349**
	(2.46)	(2.52)
Bank HQs per 10k people Squared	-0.115	-0.139
	(-1.24)	(-1.40)
COVID-19 Cases per 10k people	0.060**	0.051**
	(2.32)	(2.09)
Employment/Population	0.203***	0.194***
	(4.08)	(3.76)
Median HH. Inc./Mean HH. Inc.	-0.009	-0.004
	(-0.22)	(-0.11)
GDP per Capita in Thousands	-0.124***	-0.119***
	(-2.84)	(-2.72)
Share of Pop. with at least a B.A.	0.072**	0.058*
	(2.14)	(1.76)
Non-White Population Share	0.159***	0.164***
	(3.40)	(3.60)
Share of Small Businesses <10 Employees	-0.148***	
	(-3.39)	
Share of Small Businesses <50 Employees		-0.151***
		(-3.58)
Observations	706	706
R^2	0.570	0.570
Adjusted R^2	0.563	0.563

Standardized coefficients reported. Robust standard errors were calculated. T-statistics in parentheses. Employment statistics are from April 2020. Small business data comes from the most recent County Business Patterns (2019). p<0.1* p<0.05** p<0.01***

Table 3: PPP Loan Amount and Jobs Retained per Small Business

	PPP Loan Amount per Small Business	PPP Jobs Retained per Small Business
Banks + C.U.s per 10k people	-0.234*	-0.183
	(-1.78)	(-1.37)
Banks + C.U.s per 10k people Squared	0.049	0.012
	(0.57)	(0.15)
Bank Headquarters per 10k people	0.102	0.215
	(0.73)	(1.61)
Bank HQs per 10k people Squared	-0.079	-0.096
	(-0.47)	(-0.60)
COVID-19 Cases per 10k people	0.093	0.047
	(1.58)	(0.87)
Employment/Population	0.260***	0.219***
	(3.20)	(2.67)
Median HH. /Inc.Mean HH. Inc.	-0.024	-0.083
	(-0.49)	(-1.53)
GDP per Capita in Thousands	0.100	-0.075
	(0.90)	(-0.97)
Share of Pop. with at least a B.A.	0.165**	-0.021
	(2.50)	(-0.31)
Non-White Population Share	0.010	0.016
	(0.15)	(0.21)
Observations	706	706
R^2	0.179	0.046
Adjusted R^2	0.167	0.033

Standardized coefficients reported. Robust standard errors were calculated. T-statistics inparentheses. Employment statistics are from April 2020. Small business data comes from themost recent County Business Patterns (2019). p<0.1* p<0.05** p<0.01***

Table 4: First-Round Number of PPP Loans per Small Business

	Round 1 Loans per Small Business	Round 1 Loans per Small Business
Banks + C.U.s per 10k people	0.968***	0.940***
	(7.05)	(6.69)
Banks + C.U.s per 10k people Squared	-0.564***	-0.543***
	(-6.69)	(-6.32)
Bank Headquarters per 10k people	0.397***	0.414***
	(2.96)	(3.05)
Bank HQs per 10k people Squared	-0.272***	-0.301***
	(-3.39)	(-3.68)
COVID-19 Cases per 10k people	-0.035*	-0.043**
	(-1.80)	(-2.18)
Employment/Population	0.229***	0.224***
	(5.45)	(5.07)
Median HH. Inc./Mean HH. Inc.	0.038	0.039
	(0.93)	(0.96)
GDP per Capita in Thousands	-0.147***	-0.139***
	(-4.56)	(-4.40)
Share of Pop. with at least a B.A.	-0.032	-0.047
	(-0.98)	(-1.44)
Non-White Population Share	0.050	0.053
	(1.37)	(1.43)
Share of Small Businesses <10 Employees	-0.155***	
	(-4.32)	
Share of Small Businesses <50 Employees		-0.122***
		(-3.33)
Observations	706	706
R^2	0.572	0.566
Adjusted R^2	0.566	0.559

Standardized coefficients reported. Robust standard errors were calculated. T-statistics in parentheses. Employment statistics are from April 2020. Small business data comes from the most recent County Business Patterns (2019). p<0.1* p<0.05** p<0.01***

Table 5: First-Round PPP Loan Amount and Jobs retained per Small Business

	Round 1 Loan Amount per Small Business	Round 1 Jobs Retained per Small Business
Banks + C.U.s per 10k people	0.001	0.057
	(0.01)	(0.47)
Banks + C.U.s per 10k people Squared	-0.097	-0.142*
	(-1.38)	(-1.86)
Bank Headquarters per 10k people	0.211*	0.364***
	(1.68)	(2.92)
Bank HQs per 10k people Squared	-0.256*	-0.338**
	(-1.74)	(-2.16)
COVID-19 Cases per 10k people	0.014	-0.035
	(0.29)	(-0.87)
Employment/Population	0.320***	0.261***
	(4.37)	(3.73)
Median HH. Inc./Mean HH. Inc.	0.006	-0.043
	(0.12)	(-0.84)
GDP per Capita in Thousands	0.026	-0.129***
	(0.34)	(-2.84)
Share of Pop. with at least a B.A.	0.081	-0.040
	(1.35)	(-0.68)
Non-White Population Share	-0.012	0.011
	(-0.21)	(0.19)
Observations	706	706
R^2	0.145	0.100
Adjusted R^2	0.133	0.087

Standardized coefficients reported. Robust standard errors were calculated. T-statistics in parentheses. Employment statistics are from April 2020. Small business data comes from the most recent County Business Patterns (2019). p<0.1* p<0.05** p<0.01***

A. Appendix

Non-Standardized Coefficients for Tables 2-5

Table A1: Non- Standardized PPP Loans Per Small Business

	PPP Loans per Small Business	PPP Loans per Small Business
Banks + C.U.s per 10k people	0.0702***	0.0705***
	(0.0102)	(0.0105)
Banks + C.U.s per 10k people Squared	-0.00161***	-0.00159***
	(0.000280)	(0.000286)
Bank Headquarters per 10k people	0.0698**	0.0731**
	(0.0284)	(0.0291)
Bank HQs per 10k people Squared	-0.00417	-0.00504
	(0.00336)	(0.00361)
COVID-19 Cases per 10k people	0.00211**	0.00182**
	(0.000910)	(0.000870)
Employment/Population	0.639***	0.611***
	(0.157)	(0.163)
Median HH. Inc./Mean HH. Inc.	-0.0439	-0.0219
	(0.195)	(0.192)
GDP per Capita in Thousands	-0.000987***	-0.000950***
	(0.000347)	(0.000349)
Share of Pop. with at least a B.A.	0.188**	0.150*
	(0.0881)	(0.0853)
Non-White Population Share	0.207***	0.214***
	(0.0609)	(0.0594)
Share of Small Businesses <10 Employees	-0.600***	
	(0.177)	
Share of Small Businesses <50 Employees		-1.764***
		(0.493)
Constant	0.553**	1.800***
	(0.244)	(0.557)
Observations	706	706
R^2	0.570	0.570
Adjusted R^2	0.563	0.563

Table A2: Non-Standardized PPP Loan Amount and Jobs Retained per Small Business

	PPP Loan Amount per Small Business	PPP Jobs Retained per Small Business
Banks + C.U.s per 10k people	-1148.1*	-0.0875
	(644.4)	(0.0639)
Banks + C.U.s per 10k people Squared	10.48	0.000242
	(18.47)	(0.00166)
Bank Headquarters per 10k people	1500.8	0.308
	(2049.9)	(0.191)
Bank HQs per 10k people Squared	-201.3	-0.0240
	(431.3)	(0.0397)
COVID-19 Cases per 10k people	229.2	0.0113
	(145.2)	(0.0131)
Employment/Population	57140.7***	4.727***
	(17869.7)	(1.768)
Median HH. Inc./Mean HH. Inc.	-8240.8	-2.775
	(16790.8)	(1.809)
GDP per Capita in Thousands	55.86	-0.00409
	(62.06)	(0.00421)
Share of Pop. with at least a B.A.	30043.2**	-0.368
	(12019.0)	(1.175)
Non-White Population Share	915.1	0.141
	(6049.8)	(0.681)
Constant	28154.5**	6.518***
	(13124.2)	(1.430)
Observations	706	706
R^2	0.179	0.046
Adjusted R^2	0.167	0.033

Table A3: Non-Standardized First Round PPP Loans per Small Business

	Round 1 Loans per Small Business	Round 1 Loans per Small Business
Banks + C.U.s per 10k people	0.0401***	0.0389***
	(0.00568)	(0.00582)
Banks + C.U.s per 10k people Squared	-0.00102***	-0.000980***
	(0.000152)	(0.000155)
Bank Headquarters per 10k people	0.0492***	0.0512***
	(0.0166)	(0.0168)
Bank HQs per 10k people Squared	-0.00584***	-0.00647***
	(0.00172)	(0.00176)
COVID-19 Cases per 10k people	-0.000722*	-0.000897**
	(0.000400)	(0.000411)
Employment/Population	0.426***	0.418***
	(0.0782)	(0.0823)
Median HH. Inc./Mean HH. Inc.	0.111	0.113
	(0.118)	(0.118)
GDP per Capita in Thousands	-0.000692***	-0.000655***
	(0.000152)	(0.000149)
Share of Pop. with at least a B.A.	-0.0492	-0.0726
	(0.0504)	(0.0503)
Non-White Population Share	0.0385	0.0405
	(0.0281)	(0.0283)
Share of Small Businesses <10 Employees	-0.371***	
	(0.0860)	
Share of Small Businesses <50 Employees		-0.843***
		(0.253)
Constant	0.187	0.729**
	(0.134)	(0.291)
Observations	706	706
R^2	0.572	0.566
Adjusted R^2	0.566	0.559

Table A4: Non-Standardized First Round Loan Amount and Jobs Retained per Small Business

	Round 1 Loan Amount per Small Business	Round 1 Jobs Retained per Small Business
Banks + C.U.s per 10k people	6.070	0.0246
	(498.9)	(0.0525)
Banks + C.U.s per 10k people Squared	-17.94	-0.00270*
	(12.98)	(0.00145)
Bank Headquarters per 10k people	2660.6*	0.473***
	(1581.3)	(0.162)
Bank HQs per 10k people Squared	-561.8*	-0.0763**
	(323.6)	(0.0354)
COVID-19 Cases per 10k people	29.44	-0.00760
	(101.5)	(0.00877)
Employment/Population	60700.8***	5.104***
	(13893.2)	(1.370)
Median HH. Inc./Mean HH. Inc.	1750.9	-1.318
	(14629.6)	(1.572)
GDP per Capita in Thousands	12.47	-0.00637***
	(36.33)	(0.00224)
Share of Pop. with at least a B.A.	12745.3	-0.638
	(9420.4)	(0.933)
Non-White Population Share	-926.4	0.0894
	(4475.7)	(0.480)
Constant	6844.0	3.234***
	(11108.5)	(1.184)
Observations	706	706
R^2	0.145	0.100
Adjusted R^2	0.133	0.087

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