DID THE PAYCHECK PROTECTION PROGRAM HIT THE TARGET?

João Granja
Christos Makridis
Constantine Yannelis
Eric Zwick

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ABSTRACT

This paper takes an early look at the Paycheck Protection Program (PPP), a large and novel small business support program that was part of the initial policy response to the COVID-19 pandemic. We use new data on the distribution of PPP loans and high-frequency micro-level employment data to consider two dimensions of program targeting. First, we do not find evidence that funds flowed to areas more adversely affected by the economic effects of the pandemic, as measured by declines in hours worked or business shutdowns. If anything, funds flowed to areas less hard hit. Second, we find significant heterogeneity across banks in terms of disbursing PPP funds, which does not only reflect differences in underlying loan demand. The top-4 banks alone account for 36% of total pre-policy small business loans, but disbursed less than 3% of all PPP loans. Areas that were significantly more exposed to low-PPP banks received much lower loan allocations. As data become available, we will study employment and establishment responses to the program and the impact of PPP support on the economic recovery. Measuring these responses is critical for evaluating the social insurance value of the PPP and similar policies.

João Granja
Booth School of Business
University of Chicago
5807 S. Woodlawn Avenue
Chicago, IL 60637-1610
joaogranja@chicagobooth.edu

Christos Makridis
MIT Sloan School of Management
christos.a.makridis@gmail.com

Constantine Yannelis
Booth School of Business
University of Chicago
5807 S. Woodlawn Avenue
Chicago, IL 60637
and NBER
constantine.yannelis@chicagobooth.edu

Eric Zwick
Booth School of Business
University of Chicago
5807 South Woodlawn Avenue
Chicago, IL 60637
and NBER
ezwick@chicagobooth.edu

1 Introduction

The COVID-19 pandemic triggered an unprecedented economic freeze and a massive immediate policy response. Among the firms most affected by the freeze were millions of small businesses without access to public financial markets or other ways to manage short-term costs. Without an existing system of social insurance to support these firms, policymakers rushed to develop new programs to help contain the damage, culminating in the CARES Act.

This paper takes an early look at a large and novel small business support program that was part of the initial crisis response package, the Paycheck Protection Program (PPP). The PPP offered guaranteed loans to small businesses through the Small Business Administration (SBA) in order to stimulate lending to liquidity constrained firms. The loans are forgivable if firms do not lay off workers or change their compensation. Our goal is to describe the targeting of the first round of PPP funding. As data become available, we will continue to build on this work to evaluate the economic impacts and thereby the social insurance value of the program.

We bring new data from two sources to study the PPP. First, we obtained data from the SBA on the number and amount of PPP loans disbursed by each participating lender. The data offer a clear look at which lenders were most active in disbursing loans and at the geographic distribution of PPP lending across the U.S. economy. Second, we obtained high-frequency employment data from Homebase, a software company that provides free scheduling, payroll reporting and other services to small businesses, primarily in the retail and hospitality sectors. The granularity of the data, coupled with the focus on sectors most adversely affected by the pandemic, allows us to trace out the response of employment, wages, hours worked, and business closures in almost real-time and evaluate the effects of PPP support.

We consider two dimensions of program targeting. First, did the funds flow to where the economic shock was greatest? A central policy goal is to prevent unnecessary mass layoffs and firm bankruptcies by injecting liquidity into firms. These potential benefits are likely greatest in areas with more pre-policy economic dislocation and disease spread.

We find no evidence that funds flowed to areas that were more adversely affected by the economic effects of the pandemic, as measured by declines in hours worked or business shutdowns. If anything, we find some suggestive evidence that funds flowed to areas less hard hit. The fraction of establishments receiving PPP loans is greater in areas with better employment outcomes, fewer COVID-19 related infections and deaths, and less social distancing.

Second, given that the PPP used the banking system as a conduit to access firms, what role did the banks play in mediating policy targeting? Anecdotal evidence suggests some banks were eager to participate in the program, while others were unable or unwilling to process large numbers of loans in the short program window.[1] Given the magnitude and pace of the evolving pandemic and the resulting disruptions in the marketplace, it is important for policymakers to understand whether banks of different sizes and lending strategies had equal access to the lending program. In particular, we ask whether there are systematic differences in program targeting at the aggregate level driven by bank behavior and then quantify the resulting bank allocation effect on the labor market.

Lender heterogeneity in PPP participation appears to be one reason why we find a weak correlation between economic declines and PPP lending. We find significant heterogeneity across banks in terms of disbursing PPP funds, which does not only reflect differences in underlying loan demand. For example, because of an asset cap restriction in place since 2018, Wells Fargo disbursed a significantly smaller portion of PPP loans relative to their market share of small business loans. We construct a measure of geographic exposure to bank performance in the PPP using the distribution of deposits across geographic regions. The measure exploits the fact that most small business lending is local (Brevoort, Holmes and Wolken, 2010; Granja, Leuz and Rajan, 2018), comparing lenders that did more or less PPP lending relative to other small business lending. We find that areas that were significantly more exposed to banks whose PPP lending shares exceeded their small business lending market shares received disproportionately larger allocations of PPP loans.

Overall, our findings shed light on the nature of and mechanism for how the first round of PPP loans were distributed. PPP loans were disproportionately allocated to areas least affected by the crisis: fifteen percent of establishments in the regions most affected by declines in hours worked and business shutdowns received PPP funding; in contrast, thirty percent of all establishments received PPP funding in the least affected regions. A major factor behind this pattern was the significant heterogeneity in the intensity of PPP participation across lenders. Our findings indicate that underperforming banks—whose participation in the PPP underperformed their share of the small business lending market—account for two-thirds of the small

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[1]For example an article from Forbes notes that in the days preceding the launch of the program, Fifth-Third Bank did not initially participate in the program, while Old National only processed loans for customers that had an existing account. Bank of America was the first bank to process PPP loans, and they only took loans from customers with "pre-existing business lending and business deposit relationship with Bank of America, as of February 15, 2020."

business lending market but only twenty percent of total PPP disbursements. The top-4 banks in the U.S. economy (JPMorgan Chase, Bank of America, Wells Fargo, and Citibank) alone account for 36% of the total number of small business loans but disbursed less than 3% of all PPP loans. These banks were disproportionately located in areas that received less PPP funding.

This paper is part of a broader research program to evaluate the impacts of COVID-19 economic policy responses that target private firms. As data become available, we will build on these findings to evaluate the employment responses, to look at firm closures, and to study the speed and nature of the economic recovery. Measuring these responses is critical for evaluating the social insurance value of the PPP and similar policies.

This paper joins a literature focusing on how government interventions following crises impact recovery and the broader economy. Agarwal, Amromin, Ben-David, Chomsisengphet, Piskorski and Seru (2017) and Ganong and Noel (2018) study the impact of mortgage modifications following the Great Recession. House and Shapiro (2008) and Zwick and Mahon (2017) study the effect of fiscal stimulus in the form of temporary tax incentives for business investment, and Zwick (Forthcoming) documents the role of delegated agents in mediating take-up of tax-based liquidity support for small firms. Mian and Sufi (2012), Parker, Souleles, Johnson and McClelland (2013), Kaplan and Violante (2014) and Baker, Farrokhnia, Meyer, Pagel and Yannelis (2020*a*) study how stimulus payments following recessions affect household consumption. This paper evaluates a very large stimulus program aimed at providing liquidity and support to small firms.

Specifically, this paper also joins a rapidly growing literature studying the impact of the 2020 COVID-19 pandemic on the economy. Jones, Philippon and Venkateswaran (2020), Barro, Ursua and Weng (2020), Eichenbaum, Rebelo and Trabandt (2020), and Berger, Herkenhoff and Mongey (2020) study the macroeconomics of infectious disease outbreaks, while Gormsen and Koijen (2020) use asset prices to back out growth expectations. Baker, Bloom, Davis and Terry (2020) study changes in risk expectations induced by the COVID-19 pandemic. Barrios and Hochberg (2020) and Allcott, Boxell, Conway, Gentzkow, Thaler and Yang (2020) study how partisan affiliation impacts the response to the pandemic, and Coibion, Gorodnichenko and Weber (2020) study short term labor market impacts. Baker, Farrokhnia, Meyer, Pagel and Yannelis (2020*b*) study household consumption during the COVID-19 pandemic using high-frequency household transaction data. Taking a more aggregate approach, Mulligan (2020) and Makridis and Hartley (2020) estimate baseline annual GDP effects of $7 and $2.14

trillion, respectively. Guerrieri, Lorenzoni, Straub and Werning (2020) show how supply-side shocks can generate substantial shocks to demand and aggregate output. We join this emerging literature by providing early microeconomic evidence on how firms and employees were affected as a function of credit supply in the first stages of the 2020 pandemic.

Finally, the paper joins work studying loan guarantees, an important and widely used form of government intervention in credit markets. Classic work such as Smith (1983), Gale (1990) and Gale (1991) focused on modeling government credit interventions such as loan guarantees. Early empirical work focused on loan guarantee programs in France (Lelarge, Sraer and Thesmar, 2010). Recent theoretical work has focused on government guarantees to banks (Atkeson, d'Avernas, Eisfeldt and Weill, 2018; Kelly, Lustig and Van Nieuwerburgh, 2016), economic stimulus (Lucas, 2016) and a burgeoning empirical literature examines the effects of loan guarantees on credit supply, employment and small business outcomes (Bachas, Kim and Yannelis, 2020; Barrot, Martin, Sauvagnat and Vallee, 2019; Mullins and Toro, 2017; Gonzalez-Uribe and Wang, 2019). We study an important and large loan guarantee program, and evaluate the impact of this program during a period of economic contraction.

The remainder of this draft is organized as follows. Section 2 describes the PPP. Section 3 discusses the main data sources used. Section 4 describes how the distribution of relative performance in the PPP is correlated with bank and other characteristics. Section 5 documents how differences across banks in PPP activity imply geographic differences in PPP exposure. Section 6 explores the implications for PPP targeting to different geographic areas. Section 7 concludes.

2   The Paycheck Protection Program (PPP)

The Paycheck Protection Program (PPP) began on April 3rd, 2020 as part of the 2020 CARES Act as a temporary source of liquidity for small businesses, authorizing \$349 billion in forgivable loans to help small businesses pay their employees and additional fixed expenses during the COVID-19 pandemic.[2] Firms apply for support through banks and the Small Business Administration (SBA) is responsible for overseeing the program and processing loan guarantees and forgiveness. An advantage of using the banking system (including FinTech) as a conduit for providing liquidity to firms is that, because nearly all small businesses have pre-existing

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[2]The US Treasury provides more information on program details.

relationships with banks, this connection could be used to ensure timely transmission of funds.

The lending program is generally targeted toward small businesses of 500 or fewer employees. A notable exception was made for firms operating in NAICS Code 72 (accommodations and food services), which are eligible to apply insofar as they employ under 500 employees per physical location.[3] Although the initial round of funding was exhausted on April 16th, funds were drawn from the Economic Injury Disaster Loan Program (EIDL) in the interim to continue funding small businesses until the second round of $310 billion in PPP funding was passed by Congress as part of the fourth COVID-19 aid bill.[4] Small businesses were eligible as of April 3rd and independent contractors and self-employed workers were eligible as of April 10th.

The terms of the loan are the same for all businesses. The maximum amount of a PPP loan is the lesser of 2.5 times the average monthly payroll costs or $10 million. The average monthly payroll is based on prior year's payroll after subtracting the portion of compensation to individual employees that exceeds $100,000.[5] The interest rate on all loans is 1% and their maturity is two years. The loans will be forgiven if two conditions are met. First, the loan proceeds must be used to cover payroll costs, mortgage interest, rent, and utility costs over the eight-week period following the provision of the loan, but not more than 25 percent of the loan forgiveness amount may be attributable to non-payroll costs. Second, employee counts and compensation levels must be maintained. If companies cut pay or employment levels, loans may not be forgiven.[6] However, if companies lay off workers or cut compensation between February 15th and April 26th, but subsequently restore their employment levels and employee compensation, their standing can be restored.

An important feature of the program is that the SBA waived its standard "credit elsewhere" test used to grant regular SBA 7(a) loans. This test determines whether the borrower has the ability to obtain the requested loan funds from alternative sources and amounts to a significant barrier in the access to regular SBA loans. Instead, in the PPP, applicants were only required to provide documentation of their payroll and other expenses, together with a simple two-page

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[3]Firms whose maximum tangible net worth is not more than $15 million and average net income after Federal income taxes (excluding any carry-over losses) of the business for the two full fiscal years before the date of the application is not more than $5 million can also apply. See the SBA for further information about the program.

[4]Recipients of an EIDL loan can receive a $10,000 loan advance that does not need to be paid back. The EIDL loan itself is capped at a maximum of $2 million, is not forgivable, and the funds can be used flexibly for operating expenses.

[5]Payroll costs include wages and salaries but also payments for vacation, family and medical leave, healthcare coverage, retirement benefits, and state and local taxes.

[6]Loan payments on the remainder of the loan can be deferred for six months and interest accrues at 1%.

application process where they certify that the documents are true and that current economic uncertainty makes this loan request necessary to support ongoing operations. In sum, the PPP program was designed to be a "first-come-first-served" program with eligibility guidelines that allowed it to reach a broad spectrum of small businesses.

3   Data

We obtained confidential data on the number of approved PPP loans and approved PPP amounts from the Small Business Administration. The data set contains information on the amounts and number of loans approved by each lender, amounts and number of loans received by small businesses in each state, and total amounts and number of PPP loans received by small businesses in each congressional district as of April 15, 2020. The PPP loan amounts in our records account for 336 billion of the 349 billion allocated to the program under the CARES Act.

We hand-match this data set with the Reports of Condition and Income (Call Reports) filed by all active commercial banks as of the fourth quarter of 2019. We are able to match 4,228 out of 4,980 distinct participants in the PPP program to the Call Reports data set. We did not match 1,031 commercial and savings banks that filed a Call Report in the fourth quarter of 2019. We assume that these banks did not participate in the PPP program and made no PPP loans. We further classified 631 PPP program participants as credit unions and the remaining 121 participants as non-bank PPP lenders. This group includes small community development funds but also some large non-bank Fintech lenders. The commercial banks in the PPP sample that we matched to the Call Report account for 93.7% of all PPP loans and 96.8% of the total amount of loans disbursed under the PPP. By contrast, the group of PPP lenders that we classified as credit unions accounted for 3.3% of all loans and 1.4% of the total PPP lending amounts. Non-bank PPP lenders accounted for 3% of all loans and 1.8% of total PPP lending amounts.

We obtain financial characteristics of all banks from the Call Report filed by commercial and savings banks in the fourth quarter of 2019. The Call Report provides detailed data on the size, capital structure, and asset composition of each commercial and savings bank operating in the United States. Importantly, we obtain information on the number and amount of small business loans outstanding of each commercial and savings bank from the Loans to Small Business and Small Farms Schedule of the Call Reports. Using this information, we benchmark

the participation of all commercial and savings banks in the PPP program relative to their share of the small business lending market.

To compute measures of exposure of each state, congressional district, and county to PPP lenders, we match the matched-PPP-call reports data set with Summary of Deposits data containing the location of all branches and respective deposit amounts of all depository institutions operating in the United States as of June 30th, 2019. A significant number of depository institutions merged in the second half of 2019, which means that some branches are assigned to commercial and savings banks that no longer exist as stand-alone institutions. Notably, Sun-Trust Banks, Inc. merged with Branch Banking and Trust Company (BB&T) to create the sixth largest financial institutions in the United States. We use the bank mergers file from the National Information Center to adjust the branch network of merged institutions and account for these mergers. We take advantage of the idea that most small business lending is mostly local (e.g. Granja, Leuz and Rajan (2018)) to use the distribution of deposits across geographic regions to create a measure of exposure of these regions to lenders that did more or less PPP lending than the expected small business lending share benchmark.

To evaluate whether PPP amounts were allocated to areas that were hardest-hit by the COVID-19 crisis, we use data from multiple available sources on the employment, social distancing, and health impact of the crisis. We obtained detailed data on hours worked among employees of firms that use Homebase to manage their scheduling and time clock. Homebase processes exact hours worked by the employees of a large number of businesses in the United States. We use information obtained from Homebase to track employment indicators at a daily frequency across different states and congressional districts. The Homebase data set disproportionately covers small firms in food service, retail, and other sectors (Bartik, Bertrand, Lin, Rothstein, and Unrath, 2020). We complement the Homebase data set with official weekly state unemployment insurance filings from the Department of Labor. We conduct our main analyses at the congressional district level because that is the finest level of geographic disaggregation for which we have aggregate PPP lending. We use data from the County Business Patterns dataset to approximate the number of establishments in the congressional district and compute measures of the average amount of PPP lending per establishment and the fraction of establishments receiving PPP loans in the region.

Finally, we obtain counts of COVID-19 cases by county and state from the Center for Disease Control and use data on the effectiveness of social distancing from Uncacast. Unacast

provides a social distancing scoreboard that describes daily changes in average mobility. Unacast measures the change in average distance travelled using individual's GPS signals. The data is availably on a daily basis, at the county level. We obtain information on the effective dates of statewide shelter-in-place orders from the New York Times.[7]

4 PPPE and Bank Characteristics

4.1 Paycheck Protection Program Exposure

Table 1 shows summary statistics for the 20 largest financial institutions in the United States, as measured by total assets. The left-most column gives the institution's name, while the first column of the table gives total assets as of the fourth quarter of 2019. The second and third columns, respectively, show the share of total PPP volume and the share of the small business loan (SBL) market of each institution. The fifth column presents relative bank performance which is measured as

$$PPPE_b = \frac{ShareVol.PPP - ShareSBLMarket}{(ShareVol.PPP + ShareSBLMarket) \times 0.5} \tag{1}$$

where $ShareVol.PPP$ the share of PPP volume held by bank b, and $ShareSBLMarket$ is their total small business loan volume market share. The next three columns present similar information to columns (2) through (4), using the market share of total number of loans rather than their volume, where

$$PPPE_b = \frac{ShareNbr.PPP - ShareNbr.SBLMarket}{(ShareNbr.PPP + ShareNbr.SBLMarket) \times 0.5}. \tag{2}$$

Here $ShareNbr.PPP$ the share of the number of PPP loans held by bank b, and the term $ShareNbr.SBLMarket$ is their total small business loan market share, based on the number of loans outstanding in each bank's balance sheet as of the fourth quarter of 2019.

Figure 1 shows the distribution of relative performance in the PPP comparing PPP market share against the overall stock of small business loans. The top panel shows the distribution of relative bank performance in the PPP, based on the total volume of PPP loans granted. The bottom panel shows the distribution of relative bank performance in the PPP, based on the

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[7] The New York Times presents some aggregates on shelter-in-place orders.

number of PPP loans granted. Both figures show a wide dispersion of relative performance, with the distribution of performance based on the total number of loans showing greater mass at the tails. We view the volume-based measure of PPPE as a better proxy for exposure because it is value-adjusted.

Figure 2 plots the bank measure of relative performance in the PPP by percentile of bank size. The top panel shows relative performance based on the total volume of PPP loans granted, the middle panel shows relative performance based on the number of PPP loans issued, while the bottom panel shows average PPP loan size. All three panels indicate a similar pattern—larger banks issued more PPP loans than expected given their share of the small business market, whether by volume, number of loans, or average loan size. This pattern could be consistent with larger banks being better suited to take advantage of the PPP program as it was rolled out. This pattern reverses at the very top of the bank size distribution. The very largest banks, those in the top percentile of bank size, significantly underperformed in PPP lending relative to their pre-policy share of small business lending. This underperformance is clear both in terms of lending volume (Panel A) and number of loans (Panel B). Panel C suggests that the underperformance of the top percentile of banks occurs despite their making the largest PPP loans in the sample in terms of average loan amount.

Figure 3 provides evidence concerning the significant dislocations between the share of PPP lending of underperforming banks and the share of PPP that we would expect had these banks issued PPP loans in proportion to their share of the small business lending market. The blue hollow triangles and red hollow circles represent, respectively, the cumulative share of the PPP and small business lending of banks whose PPPE is below a certain threshold. The figure shows that commercial and savings banks, representing 20% of the small business lending market, simply did not participate in the PPP lending program, ($PPPE = -0.5$). The plot further shows that the group of banks whose PPP share is below their share of the small business lending market, ($PPPE < 0$), made less than 20% of the PPP loans but account for approximately two-thirds of the entire small business lending market. Overall, the evidence is consistent with substantial heterogeneity across lenders in their responses to the program's rollout.

The fact that lenders were significantly heterogeneous in accepting and processing PPP loans would not necessarily result in aggregate differences in PPP lending across geographic areas if small businesses could easily substitute and place their PPP applications to lenders that were willing to accept and quickly expedite them. If many lenders, however, prioritize

their existing business relationships in the processing of PPP applications, firms' pre-existing relationships might determine to a large extent whether they are able to tap into PPP funds. In this case, the exposure of geographic areas to banks that over/underperformed in the deployment of the PPP might significantly determine the aggregate PPP amounts received by small businesses located in these areas. Next, we examine if geographic areas that were exposed to banks with weak PPP performance received less PPP lending overall.

5   Geographic Exposure to Bank PPP Performance

We next explore how the geography of the PPPE is related to PPP lending outcomes. Figure 4 presents a map of county level exposure to PPPE based on the share of deposits of each bank in the county. Exposure varies across the United States, with some Western areas with a large Wells Fargo presence showing lower levels of PPPE, suggesting greater exposure to lenders that underperformed in the PPP program relative to their small business lending benchmark. By contrast, the counties with lower median household income ($\rho = -0.13$) and lower share of college educated ($\rho = -0.16$) that were also less affected by the COVID-19 shock were more likely to be exposed to lenders that overperformed in the PPP roll-out.

Figure 5 explores the relationship between PPPE exposure and PPP lending. The top panel of Figure 5 plots aggregate PPP volume per small business by exposure to PPPE for each state, while the bottom panel shows the fraction of all small businesses receiving PPP loans in the state. Both panels present a similar pattern—there is a strong positive relationship between PPP lending and PPPE exposure at the state level. States with higher exposure to banks that performed well in terms of PPPE also saw greater PPP lending. Figure 6 presents a similar pattern at the congressional district level, and a similar correlation emerges.

Table 2 makes this graphical evidence explicit. The top panel shows the relationship between PPPE and aggregate lending, at the congressional district level. Column (1) shows the correlation between aggregate PPP lending and PPPE at the congressional district level. The relationship is highly statistically significant, with an F-statistic of approximately 45. A one-standard deviation increase in the congressional district exposure to PPPE based on total amounts of outstanding PPP and small business loans and weighed by the share of deposits of each bank, leads to a 16.1 percent increase in PPP lending. Column (2) adds in aggregate employment and payroll controls, and column (3) adds in industry shares. The results remain

highly statistically significant at the 1 percent level. Column (4) shows that the correlation holds even within states when we add state fixed effects, although the coefficient remains significant at only the 10 percent level.

The bottom panel repeats the analysis, replacing aggregate lending per business with the fraction of establishments receiving PPP loans in each congressional district. This panel also indicates a very strong relationship between our PPPE measure and lending. In column (1), the first stage F-statistic is now above 200, and even with state fixed effects in column (4) the relationship is highly statistically significant at the 1 percent level. A one-standard deviation increase in our measure of congressional district exposure to bank PPP performance is associated with an increase of 4.3 percentage points in the fraction of establishments receiving loans in a congressional district. These results suggest that businesses were much more likely to receive a PPP loan simply because they were located closer to banks that processed a large share of PPP loans relative to their benchmark share of small business loans.

A potential concern with the above results is that the causality runs reverse. That is, banks do relatively better where demand for PPP loans is abundant. To address this concern, Figure 7 and Table 3 present a case study of a particular bank with a very low share of PPP loans relative to overall market share—Wells Fargo. Wells Fargo was severely constrained from expanding its balance sheet as a result of an asset cap imposed by the Fed in the aftermath of the fake accounts scandal. This asset cap was only lifted on April 10, when the Fed excluded PPP loans from the formula it uses to restrict Wells Fargo's growth. The asset cap limited Wells Fargo's ability to lend under the PPP in the early days for the first phase of the program. Table 1 shows that Wells Fargo, the third largest bank in the nation by total assets, held a 6.5% share of the total outstanding small business loans but processed only 0.04% of the total volume of loans in the PPP program until April 15. Figure 7 shows PPP allocations by the market share of Wells Fargo. The top panel shows volume, while the bottom panel shows the number of loans. Both figures show a similar pattern—firms located in areas with higher Wells Fargo market share see lower PPP allocations, both in terms of overall aggregate loan volume per business and in the fraction of businesses receiving PPP loans.

Table 3 presents similar information, regressing the log total volume and number of loans on the share of Wells Fargo branches in congressional districts. The relationship between PPP allocations and Wells Fargo branches echoes the results seen in Table 2. Areas with higher Wells Fargo exposure (and lower PPPE exposure) see lower PPP allocations. The effect is statistically

significant at the 5 percent level or higher in columns (1) through (3), but loses significance when state fixed effects are included. More broadly, Figure 7 and Table 3 illustrate an example of the variation underlying overall PPPE exposure.

The collection of results in this section suggests that exposure to bank-specific heterogeneity in their willingness and ability to extend PPP loans was a significant determinant of the allocation of PPP loans in the economy. Next, we examine how the PPP allocation and exposure to over/underperforming banks correlated with the local magnitude of the epidemic.

6   Are PPP Allocations Targeted to the Hardest Hit Regions?

Were PPP funds disbursed to geographic areas that were most affected by the epidemic? Figure 8 shows the relationship between PPP allocations, exposure to Bank PPP performance, and the fraction of businesses in each congressional district that shut down during the week of March 29th to April 4th, just before PPP funds were disbursed.[8] We estimate business shutdowns in the congressional district using the high-frequency data set obtained from Homebase. The figure indicates little if any correlation between PPP allocation or relative bank performance and hours worked or business shutdowns. In Figure 9, we follow Bartik, Betrand, Lin, Rothstein and Unrath (2020) and repeat the analysis using the ratio of hours worked on March 31st, 2020 relative to a baseline of the average hours worked in the same weekday of the last two weeks of January. Again, we find that PPP allocations across congressional districts are very weakly correlated to the impact of the epidemic crisis on labor markets and aggregate firm outcomes.

To better illustrate the relation between firm and employment outcomes at the congressional district level and PPP allocations, we stratify congressional districts into 20 bins based on the impact of the COVID-19 epidemic on the fraction of businesses that shut down and on the average decline in hours worked in the congressional district. Figure 10 plots the average fraction of business receiving PPP loans in each business shutdown bin (top panel) and hours worked bin (bottom panel). The plots suggest that approximately 15% percent of businesses located in the most affected congressional districts were able to obtain PPP funding until April 15th, 2020. By contrast, more than 30% of all businesses operating in the least affected congressional districts were able to tap into PPP funding.

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[8]Following Bartik, Betrand, Lin, Rothstein and Unrath (2020), we define a business shutdown as businesses that report zero hours worked during a week.

In Tables 4 and 5, we confirm that the PPP funding did not flow to the areas with largest pre-PPP declines in employment and ratios of shutdown businesses. The tables report the results of ordinary least squares (OLS) regressions examining the relation between the allocation of PPP funds and the share of businesses that shut down operations in the last week of March, and the decline in hours worked between January and the last week of March. In none of the columns are estimates statistically significant at the 5 percent level or higher.

The results suggest that PPP funds were not targeted towards geographic areas that were most affected by the pandemic, at least in terms of small business employment drops. This fact could be a result of the pre-existing bank relationships across counties, rather than a problem with implementation: banks were caught off guard by the pandemic and the corresponding actions taken to social distance. A related factor likely influencing these geographic patterns is differential loan demand in harder hit areas. Because PPP support is more generous for firms that maintain their payroll, the program likely appealed more to firms with smaller reductions in their business. To the extent these geographic patterns reflect such differences in loan demand, the evidence suggests the PPP functioned less as social insurance to support the hardest hit areas and more as liquidity support for less affected firms. Nevertheless, our bank-level results point to an important loan supply channel distorting the distribution of PPP loans. In ongoing work, we are exploring the effects of the PPP funds on employment and small business closures, taking into account differential patterns of loan demand.

The appendix presents suggestive evidence that, if anything, funds were disproportionately allocated to geographic areas that were less hard hit by the virus. Figures A.2 and A.1 repeat the analyses of Figures 8 and 9 at the state-level. Figures A.3 and A.4 show that there is a slight negative correlation between loans and PPPE with COVID-19 confirmed cases and deaths. This fact is consistent with Figure A.5, which indicates that states with earlier shelter-in-place orders—which were presumably harder hit by the epidemic—saw lower fund allocations. Figure A.6 shows that there is little correlation between the magnitude of social distancing at the state level and PPP allocation and bank exposure. Finally, Figure A.7 confirms our findings using the Homebase data with another public data source—we find no consistent relationship between PPP allocation and bank exposure with state UI claims. The totality of the evidence suggests that there was little targeting of funds to geographic areas that were harder bit by the epidemic, and if anything areas hit harder by the virus and subsequent economic impacts received smaller portions of PPP funds.

7 Concluding Remarks and Next Steps

This paper takes an early look at a large and novel small business support program that was part of the initial crisis response package, the Paycheck Protection Program (PPP). We consider two dimensions of program targeting. First, did the funds flow to where the economic shock was greatest? Second, given the PPP used the banking system as a conduit to access firms, we ask what role did the banks play in mediating policy targeting?

We find little evidence that funds were targeted towards geographic regions more severely affected by the pandemic. If anything, preliminary evidence indicates that the opposite is true and funds were targeted towards areas less severely affected by the virus. We do find that bank heterogeneity played an important role in mediating funds. We construct a new measure of geographic exposure of regions to banks that over or underperformed in terms of PPP allocation relative to their share of small business lending. States with higher exposure to banks that performed well in terms of bank PPP exposure also saw higher levels of PPP lending.

The analysis here focuses on ex ante targeting of the PPP, that is, the distribution of funding provided at the start of the program. Ultimate targeting will depend on the extent of loan forgiveness and defaults, as well as subsequent changes to the PPP, including conditions for recoupment based on ex post economic hardship and changes to program eligibility criteria going forward.[9]

This paper is part of a broader research program to evaluate the impacts of COVID-19 economic policy responses that target private firms. As data become available, we will build on these findings to evaluate the employment responses, to look at firm closures, and to study the speed and nature of the economic recovery. Measuring these responses is critical for evaluating the social insurance value of the PPP and similar policies and designing them effectively.

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[9]See Hanson, Stein, Sunderam and Zwick (2020) for a discussion of these dynamic policy considerations in the design of business liquidity support during the pandemic.

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Figure 1: Histogram of Bank Paycheck Protection Program Exposure (PPPE)

Panel A of Figure 1 plots the distribution of the measure of relative bank performance in the PPP based on the volume of PPP loans granted and stock of small business loans at the bank as of fourth quarter of 2019. We compute this measure as: $PPPE_b = \frac{ShareVol.PPP - ShareSBLMarket}{(ShareVol.PPP + ShareSBLMarket) \times 0.5}$.
Panel B of Figure 1 plots the distribution of the measure of relative bank performance in the PPP based on the number of PPP loans granted and number of small business loans held by the bank as of fourth quarter of 2019. We compute this measure as: $PPPE_b = \frac{ShareNbr.PPP - ShareNbr.SBLMarket}{(ShareNbr.PPP + ShareNbr.SBLMarket) \times 0.5}$. Data is obtained from the SBA and call reports.

Panel A: Histogram of Volume-based PPPE
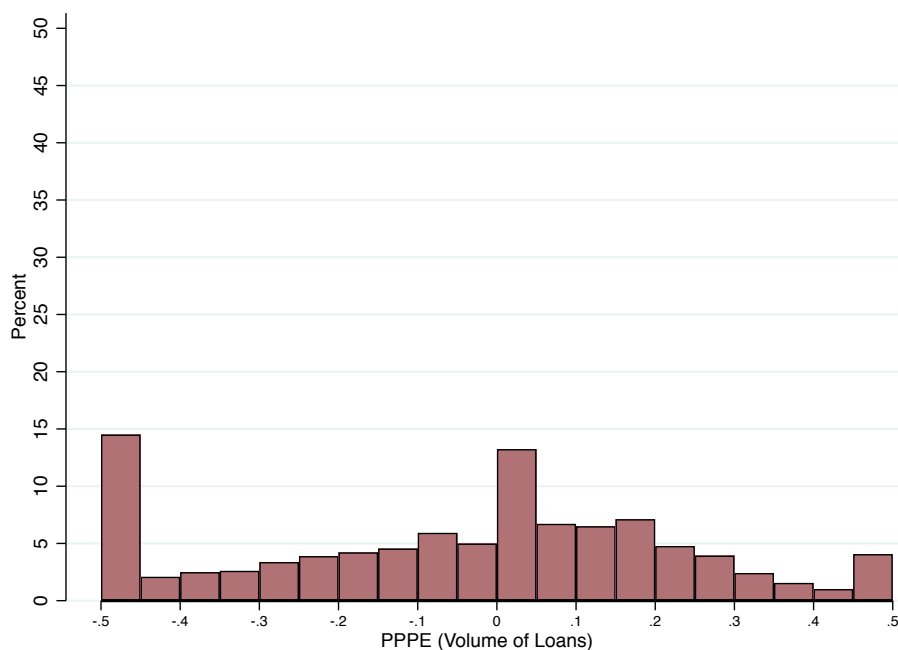
Panel B: Histogram of Number Loans-based PPPE
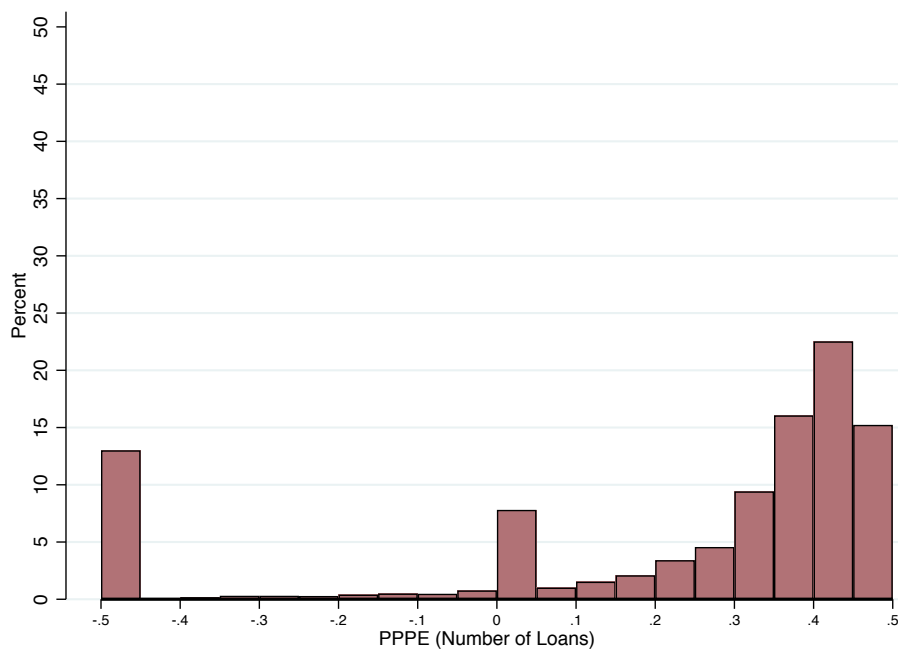
Figure 2: PPPE and Size

Figure 2 plots average PPPE based on volume of PPP loans (Panel A) number of PPP loans (Panel B) and average amount of PPP loan (Panel C) in each percentile size bin. The size bins stratify all commercial banks operating as of the fourth quarter of 2019 based on their total assets. Data is obtained from the SBA and call reports.

Panel A: Volume-based PPPE and Size
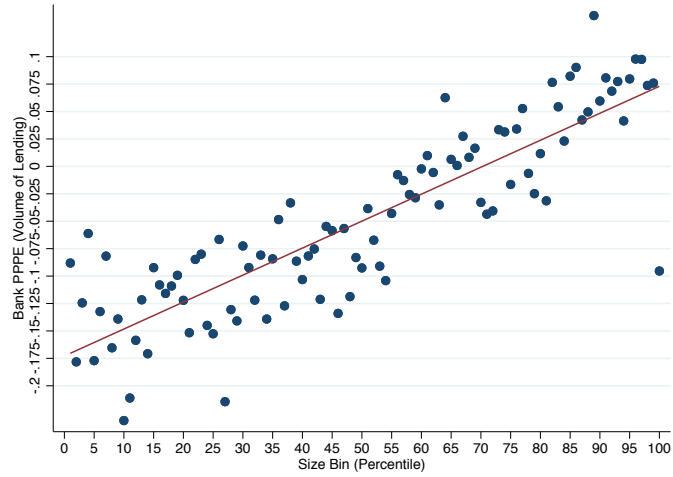
Panel B: Number of Loans-based PPPE and Size
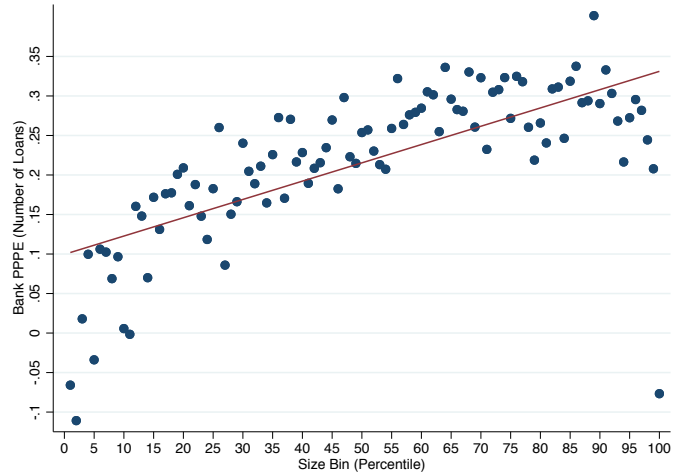
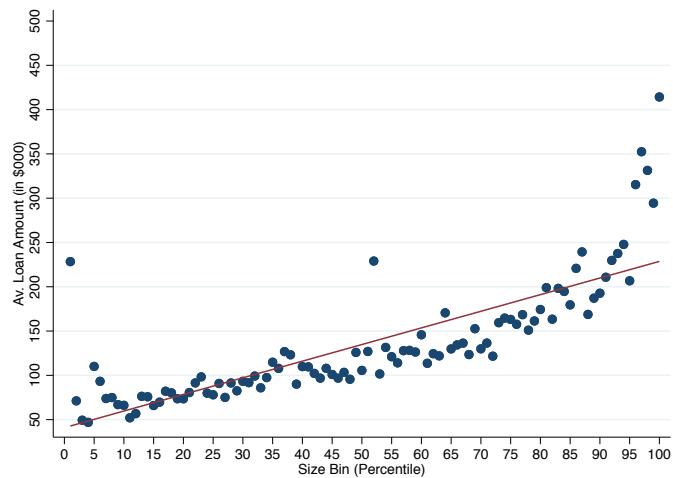### Panel C: Average Amount of Loan and Size

Figure 3: PPPE and PPP Allocation

Figure 3 plots the cumulative share of PPP and SBL lending by all banks whose PPPE is below x, where $x \in (-0.5, 0.5)$. Data is obtained from the SBA and call reports.

Figure 4: Map of County Exposure to PPPE

All U.S. Counties

(.0692246,.5]
(-.0146123,.0692246]
(-.1120996,-.0146123]
[-.5,-.1120996]
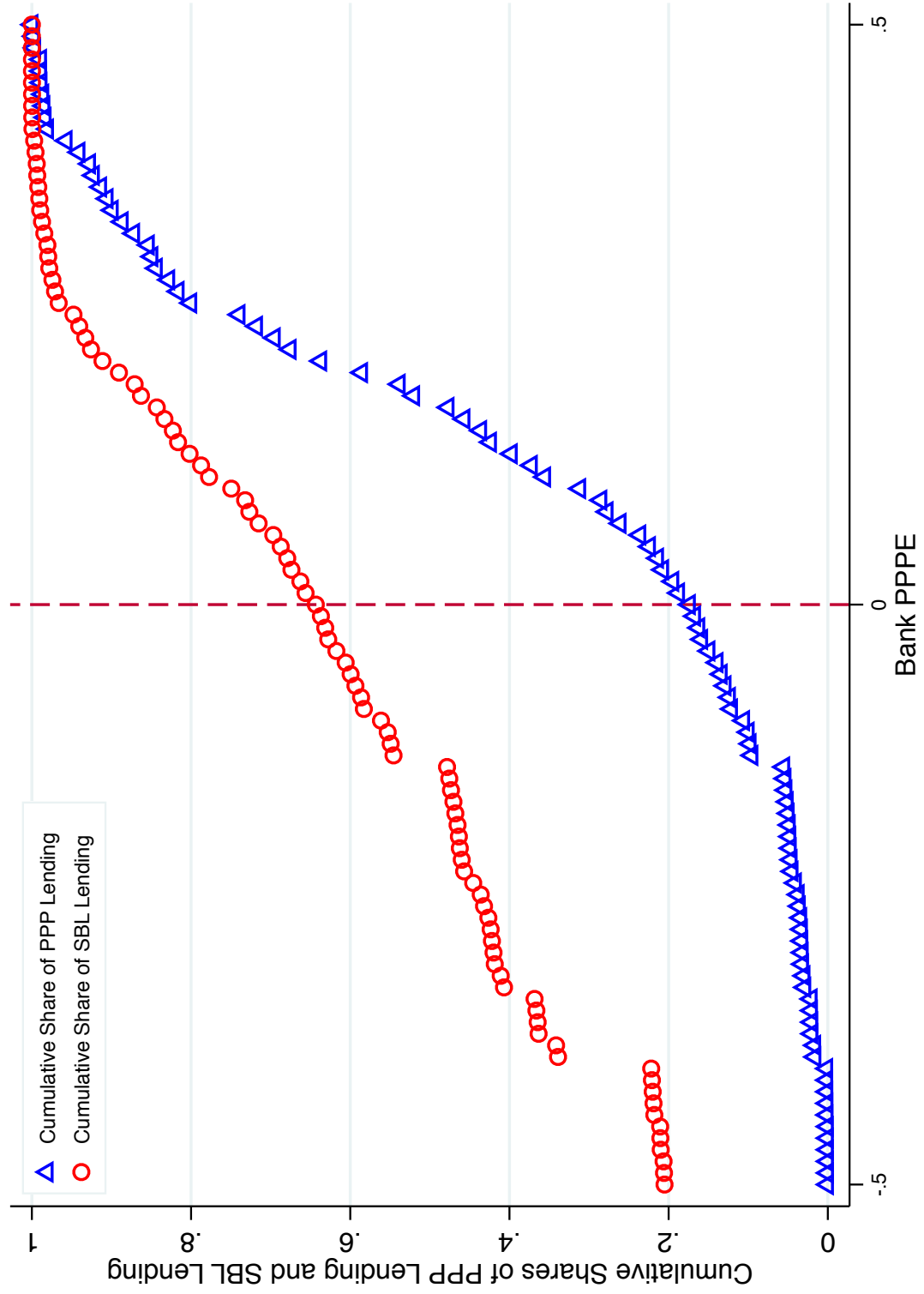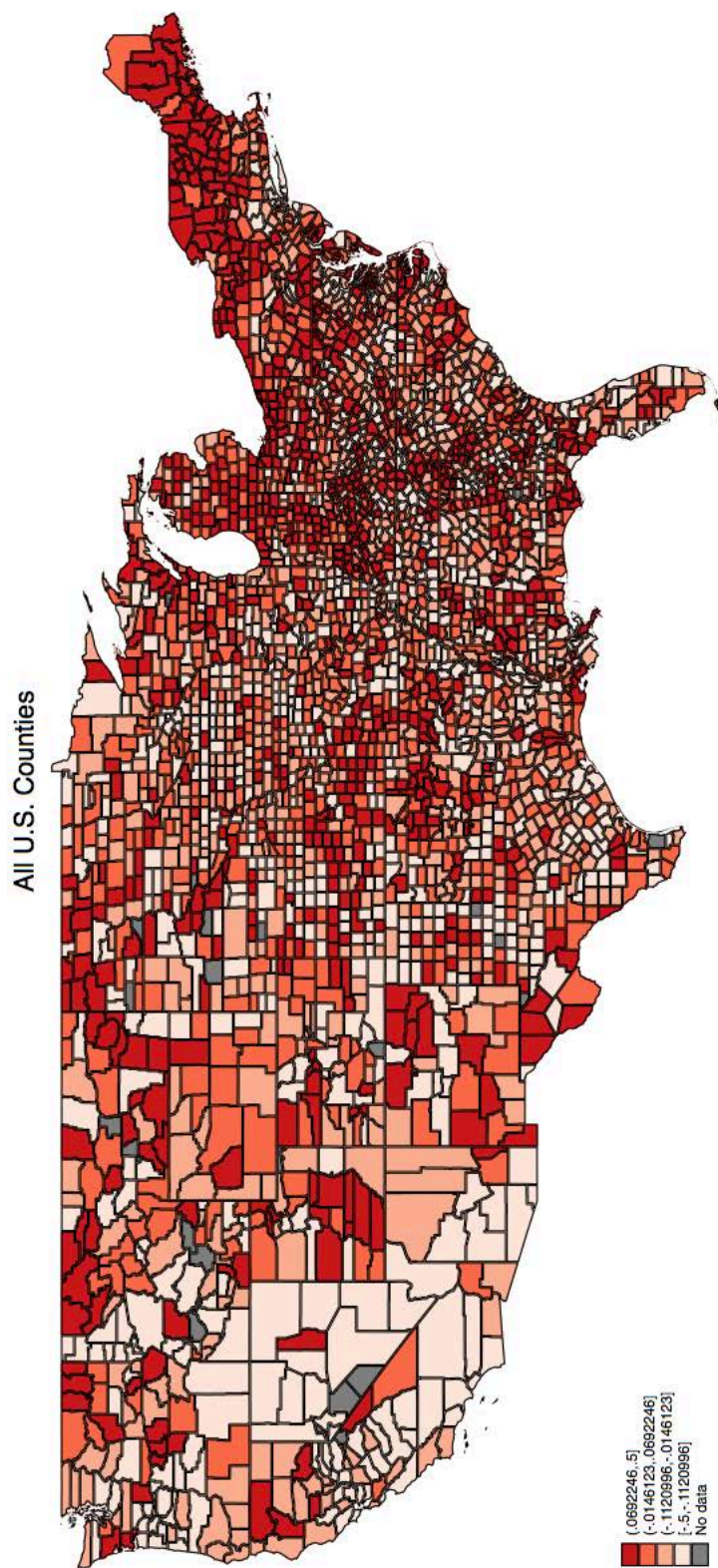No data

Figure 4 plots the average exposure of each county to the volume-based PPPE. County exposure to PPPE is computed as the average of the PPPE of each bank with a branch presence in the county. The PPPE of each bank is weighed by the share of deposits of the bank in the county as of June 30th, 2019. Data is from the SBA, Call Reports, and FDIC's Summary of Deposits.

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Figure 5: State Exposure to PPPE and PPP per Establisment

Figure 5 are scatterplots of the total PPP allocation per small business establishment in the state and the state exposure to the volume-based PPPE (Panel A) and fraction of small business establishments receiving a PPP loan and the state exposure to the PPPE based on the number of loans (Panel B). Data comes from SBA, Call Reports, Summary of Deposits, and County Business Patterns.

Panel A: State Exposure to Volume-Based PPPE and PPP Allocation per Small Business

Panel B: State Exposure to Number-Based PPPE and Fraction of Small Businesses receiving PPP

Figure 6: Congressional District Exposure to PPPE and PPP per Establisment

Figure 6 are scatterplots of the total PPP allocation per establishment in the congressional district and the congressional district exposure to the volume-based PPPE (Panel A) and fraction of establishments receiving a PPP loan and the congressional district exposure to the PPPE based on the number of loans (Panel B). Data comes from the SBA, Call Reports, Summary of Deposits, and County Business Patterns.
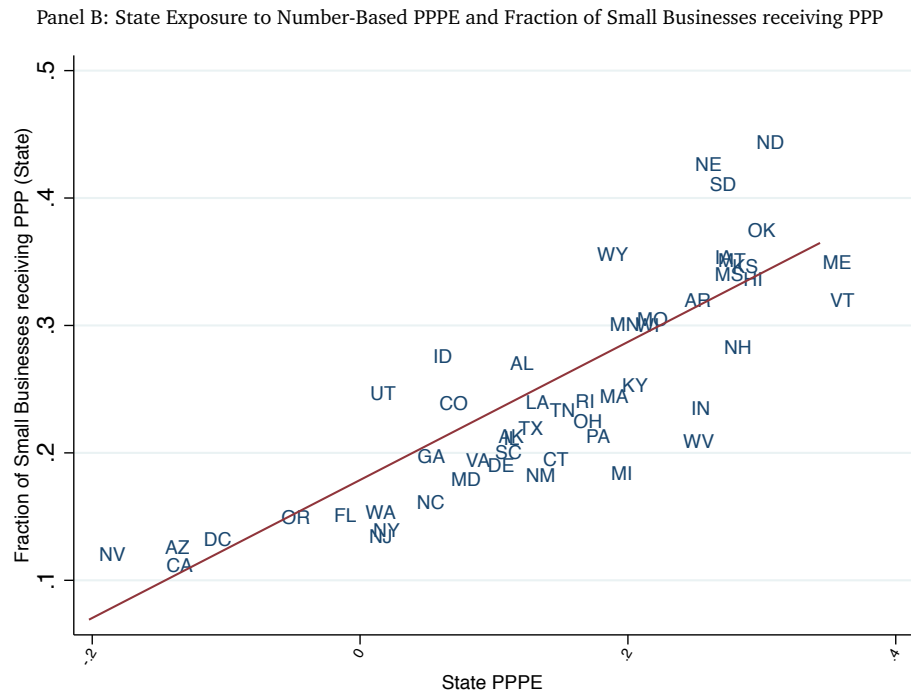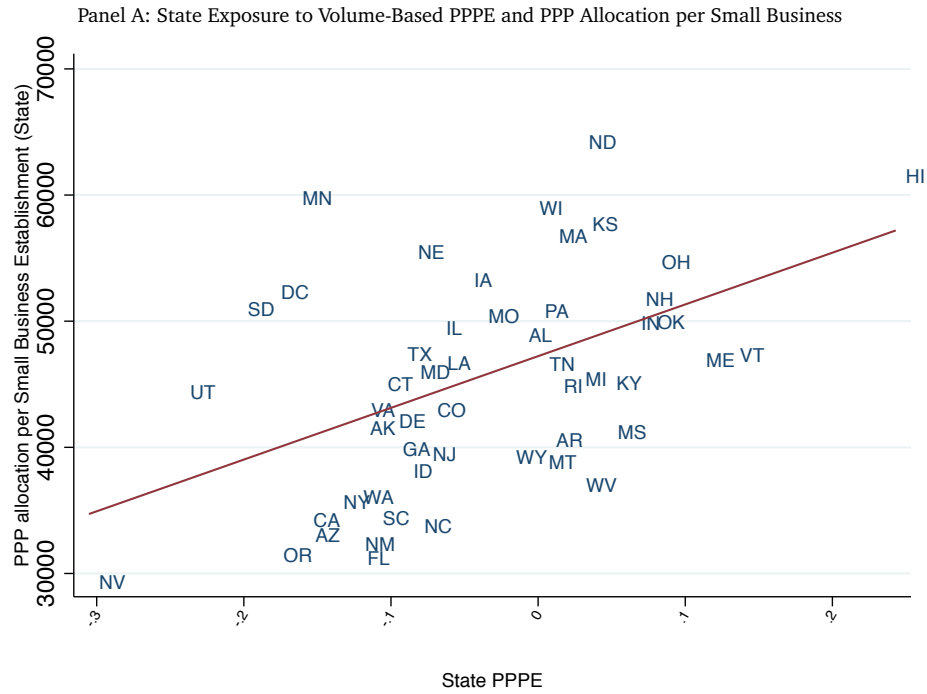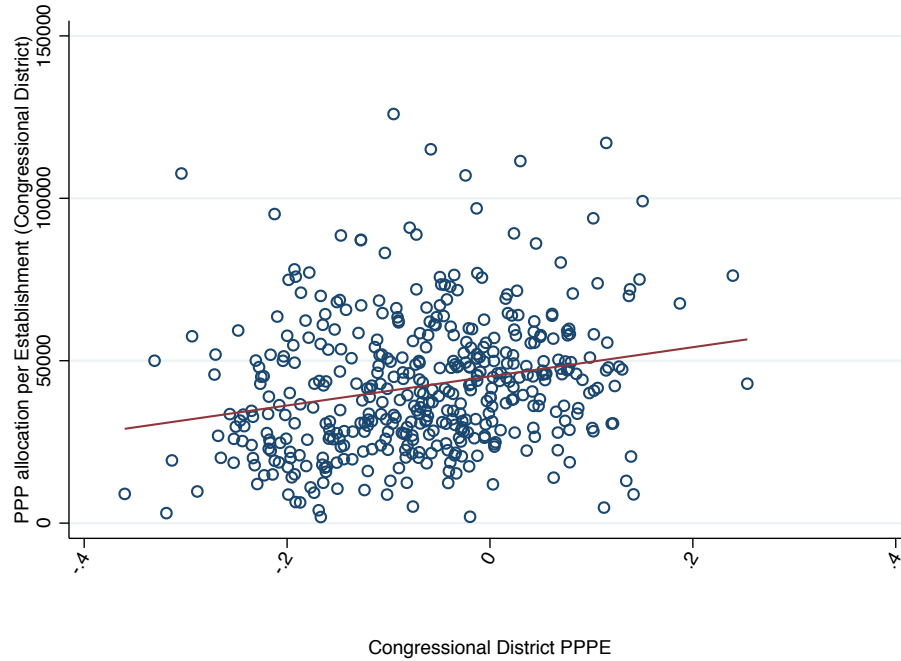
Panel A: Congressional District Exposure to Volume-Based PPPE and PPP Allocation per Small Business

Panel B: Congressional District Exposure to Number-Based PPPE and Fraction of Small Businesses receiving PPP
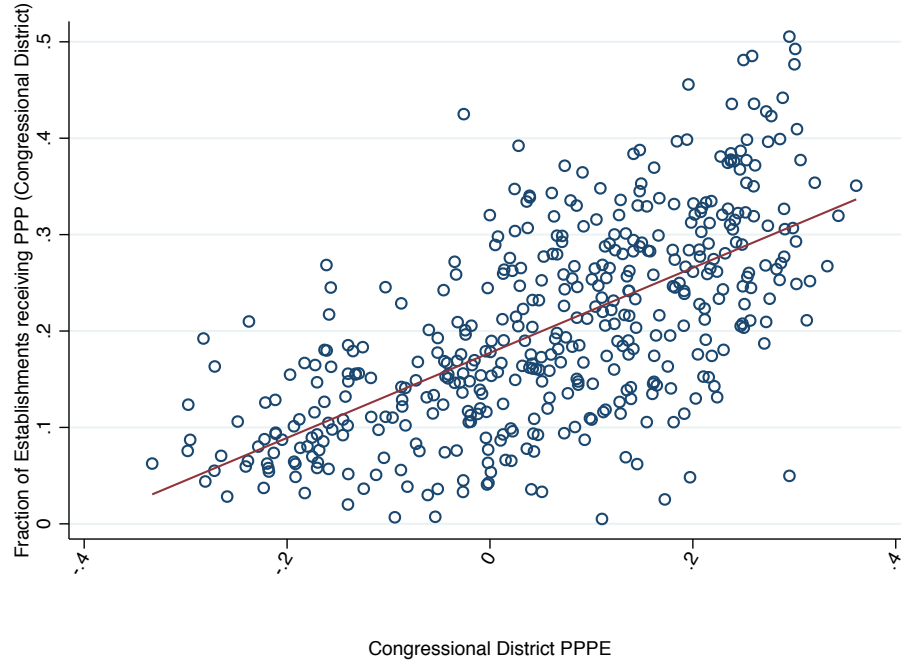
Figure 7: Wells Fargo Exposure and PPP per Establishment

Figure 7 are scatterplots of the total PPP allocation per establishment in the congressional district and the share of branches of Wells Fargo in the Congressional District (Panel A) and fraction of establishments receiving a PPP loan and the share of Branches of Wells Fargo in the Congressional District (Panel B). Data comes from the SBA, Summary of Deposits, and County Business Patterns.
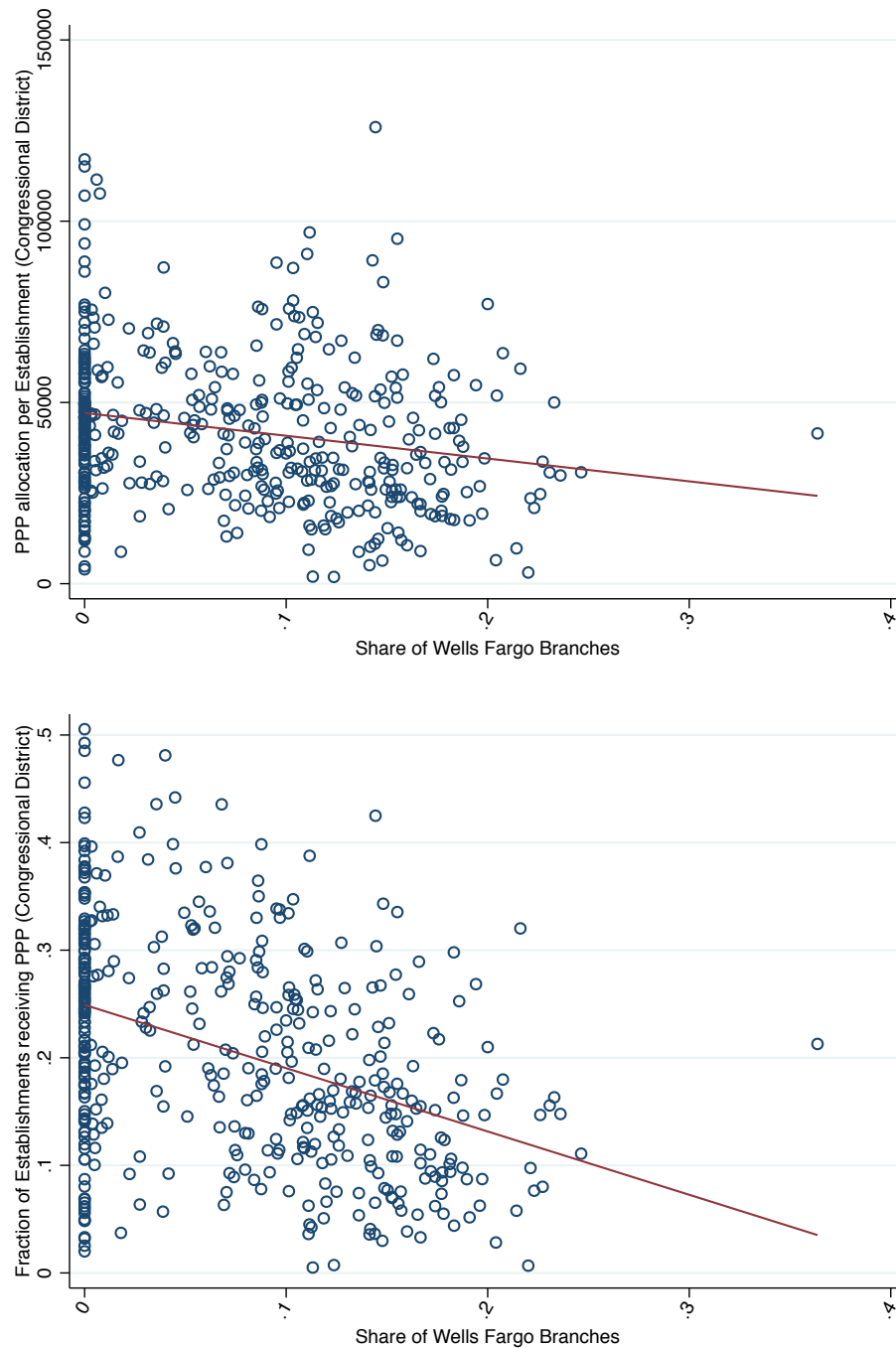
Figure 8: Business Shutdowns and PPP Allocation by Congressional District

Figure 8 presents four scatterplots of the share of businesses in each state that shutdown that in the week of March 29th–April 4th and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans.

Figure 9: Decline in Hours Worked and PPP Allocation by Congressional District

Figure A.2 presents four scatterplots of the decline in hours worked in each congressional district relative to a January baseline and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans.
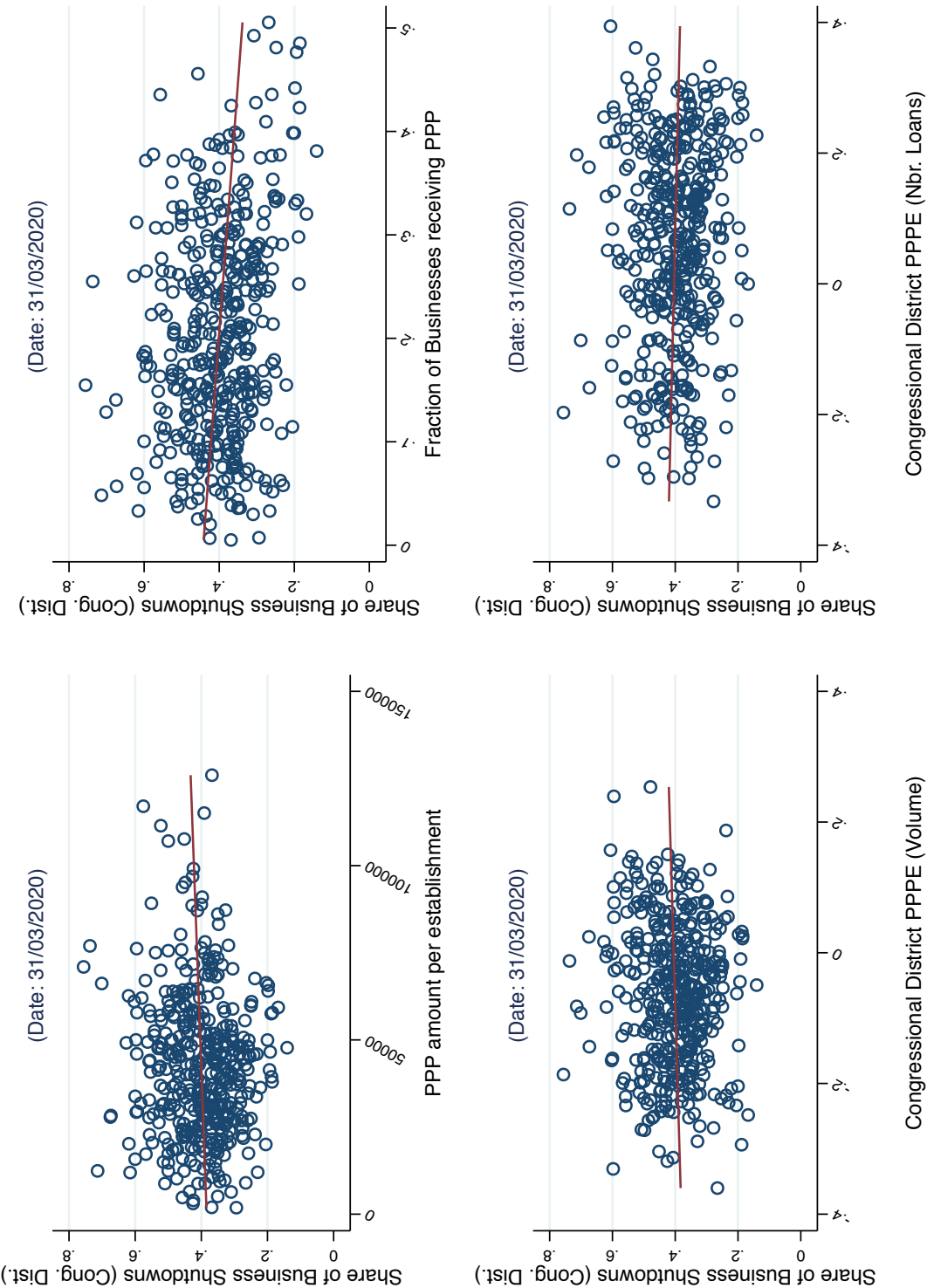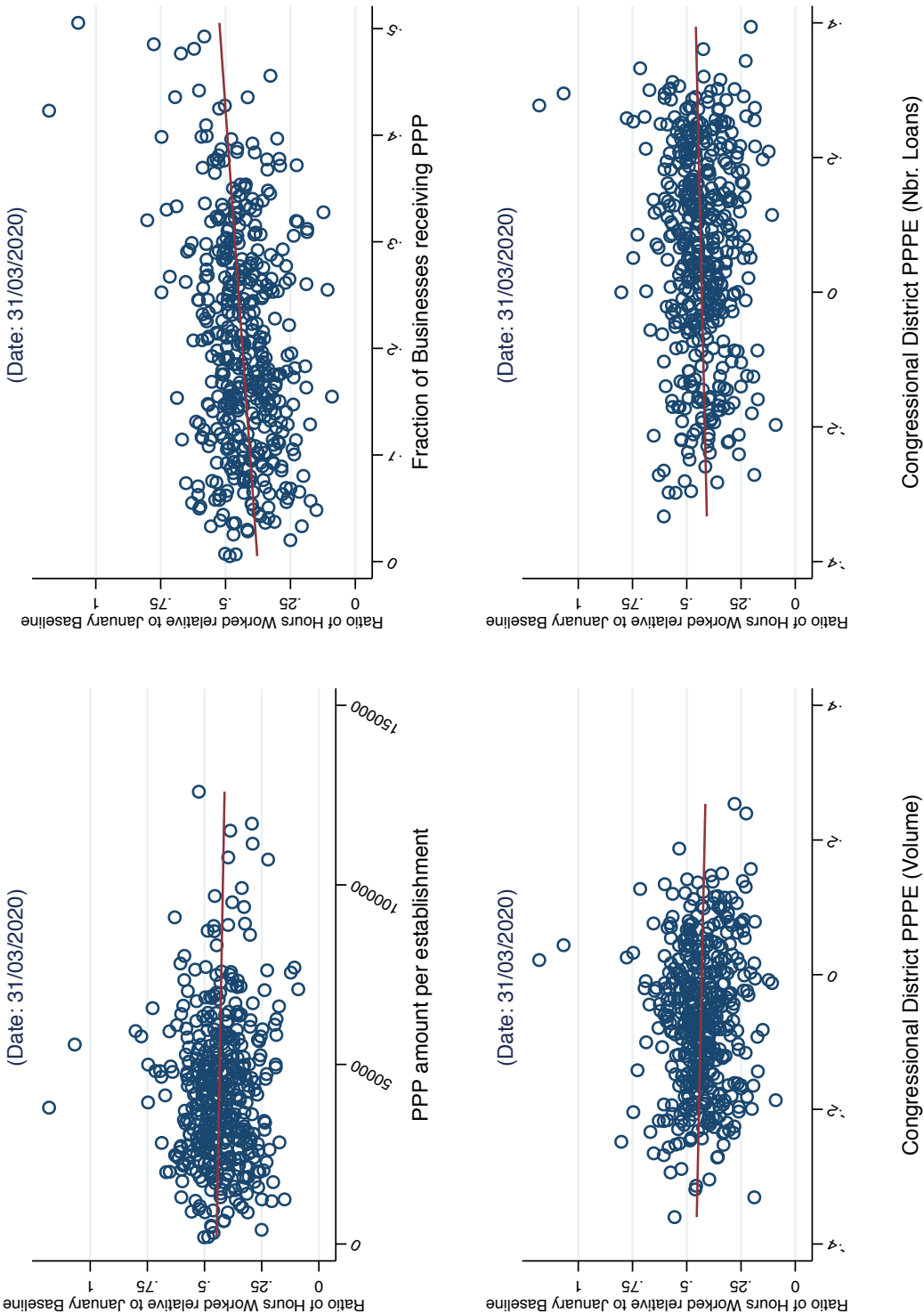
Figure 10: PPP Allocation by Employment Shock Bin

Figure 10 stratifies congressional districts on 20 bins based on the share of Homebase businesses that shutdown in the week of March29th–April 4th (Panel A) and on their decline in hours worked relative to a January baseline. The y-axis represents the fraction of businesses receiving PPP funds in each bin computed as total number of PPP loans in that bin divided by total number of establishments of congressional districts in that bin. Data is from SBA, Homebase, and County Business Patterns.

Business Shutdown Shock

Decline in Hours Worked Shock

Table 1: Top 20 Banks by Total Assets and PPPE

Table 1 reports individual bank statistics and the PPPE index for the 20 largest financial institutions in the United States. Total Assets is computed using information from fourth quarter 2019 call reports. Share of total vol. PPP program is the total amount disbursed by each financial institution relative to the total amount disbursed under the first wave of the PPP. Share of SBL market is the share of the total outstanding amount of small business loans held by each financial institution relative to the total outstanding amount of small business loans as of 2019:Q4. PPPE (volume) is the volume-based bank PPP index. Total assets are in $ millions. Share of loans in PPP program is the total number of loans processed by each financial institution relative to the total number of loans processed i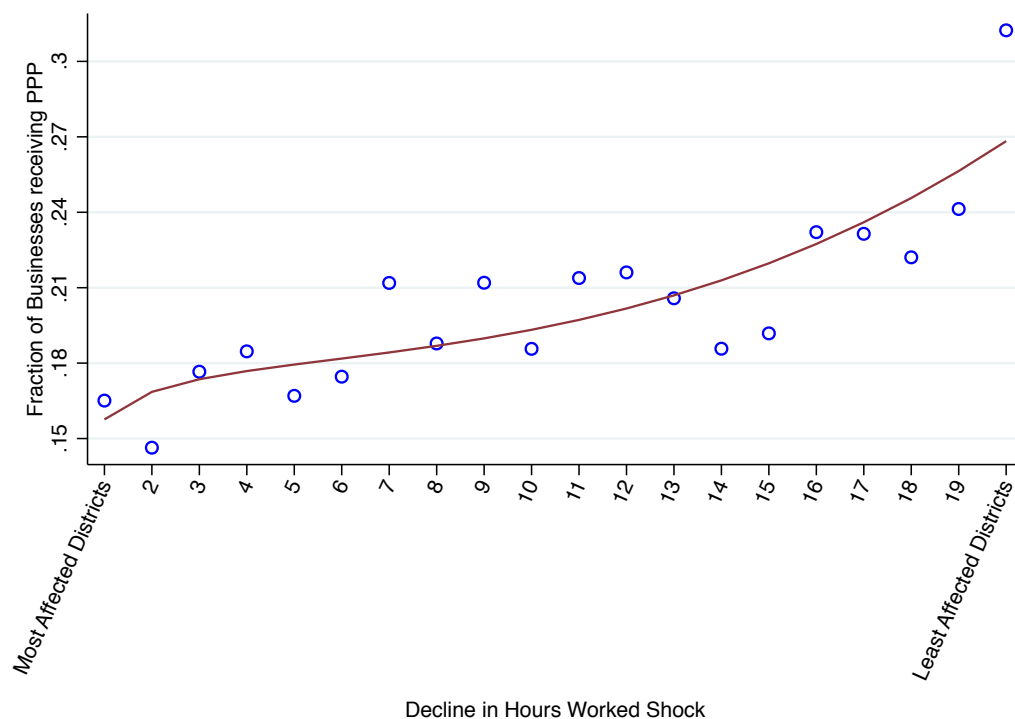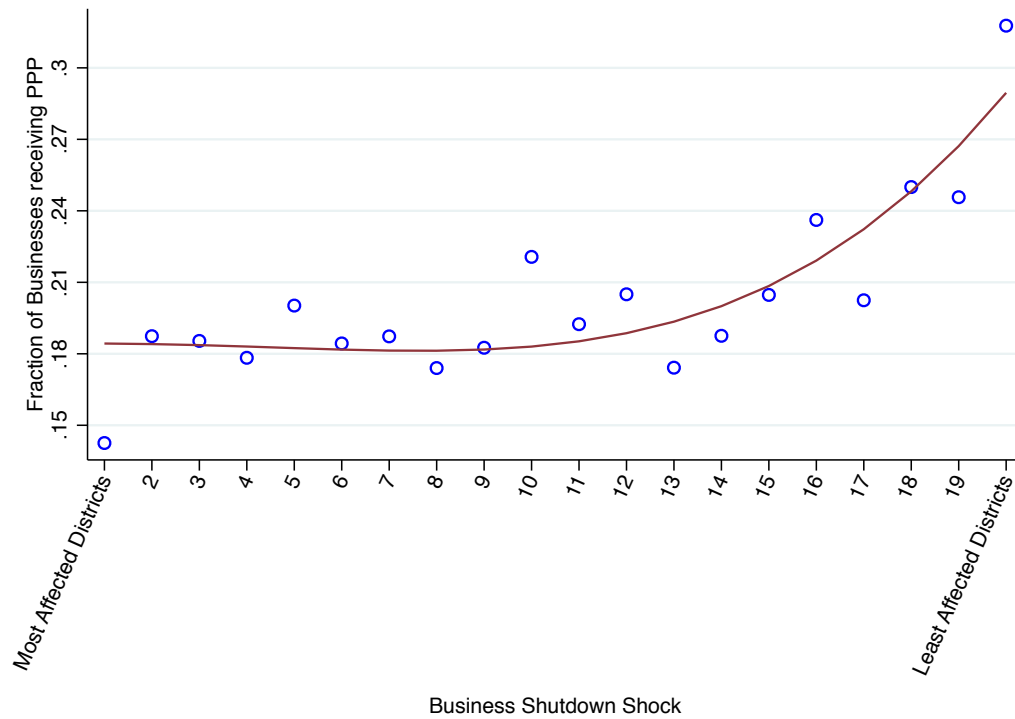n the first wave of the PPP Share of loans in SBL market is the share of the total number of outstanding small business loans held by each financial institution relative to the total outstanding number of small business loans as of 2019:Q4. PPPE (Nbr. Loans) is the number-based bank PPP index.

Financial Institution Name	(1) Total Assets	(2) Share of total vol. PPP	(3) Share of SBL Market	(4) PPPE (vol.)	(5) Share of loans in PPP	(6) Share of loans in SBL Market	(7) PPPE (Nbr. Loans)
JPMORGAN CHASE BANK, NATIONAL ASSOCIATION	2,337,707	3.892%	6.547%	-0.127	1.432%	10.47%	-0.380
BANK OF AMERICA, NATIONAL ASSOCIATION	1,866,841	1.199%	9.510%	-0.388	.5565%	11.86%	-0.455
WELLS FARGO BANK, NATIONAL ASSOCIATION	1,736,928	.0362%	6.502%	-0.494	.0664%	4.308%	-0.485
CITIBANK, N.A.	1,453,998	.3348%	2.121%	-0.364	.4431%	9.729%	-0.456
U.S. BANK NATIONAL ASSOCIATION	486,004	.6953%	3.327%	-0.327	1.120%	5.643%	-0.334
TRUIST BANK	461,256	3.160%	2.011%	0.111	2.078%	1.732%	0.045
CAPITAL ONE, NATIONAL ASSOCIATION	453,626	.0212%	2.822%	-0.493	.0134%	10.38%	-0.499
PNC BANK, NATIONAL ASSOCIATION	397,703	2.765%	1.124%	0.211	1.235%	1.373%	-0.027
BANK OF NEW YORK MELLON, THE	342,225	0%	.0024%	-0.500	0%	.0001%	-0.500
TD BANK, N.A.	338,272	1.837%	.6876%	0.228	1.698%	.5698%	0.249
STATE STREET BANK AND TRUST COMPANY	242,148	0%	0%	0.000	0%	4.493%	-0.500
CHARLES SCHWAB BANK	236,995	0%	.0745%	-0.500	0%	.0039%	-0.500
MORGAN STANLEY BANK, N.A.	229,681	0%	.1445%	-0.500	0%	.0089%	-0.500
GOLDMAN SACHS BANK USA	228,836	0%	.0032%	-0.500	0%	.0001%	-0.500
HSBC BANK USA, NATIONAL ASSOCIATION	172,888	.1411%	.0845%	0.125	.0697%	.0140%	0.332
FIFTH THIRD BANK, NATIONAL ASSOCIATION	167,845	.9991%	.4589%	0.185	.5948%	.1920%	0.256
ALLY BANK	167,492	.2639%	2.118%	-0.389	.0631%	1.382%	-0.456
CITIZENS BANK, NATIONAL ASSOCIATION	165,742	1.072%	.8077%	0.070	1.148%	.5274%	0.185
KEYBANK NATIONAL ASSOCIATION	143,390	2.370%	.7295%	0.265	2.236%	.2743%	0.391
BMO HARRIS BANK NATIONAL ASSOCIATION	137,588	1.385%	1.959%	-0.086	.7133%	.5413%	0.069
ALL OTHER BANKS	6,889,908	79.82%	58.96%	-0.048	86.52%	40.97%	0.218

Table 2: PPPE and PPP Allocation

Table 2 reports the results of ordinary least squares (OLS) regressions examining the impact of the congressional district exposure to PPPE on the cross-sectional allocation of PPP funds to congressional districts. The dependent variable of the specifications, *Ln(Total PPP Allocation per establishment)*, is the natural logarithm total amount of PPP funds disbursed to small businesses in each congressional district divided by the number of establishments in the congressional district. The dependent variable of the specifications in Panel B, *Fraction of Establishments receiving PPP* is the total number of PPP loans made to small businesses in each congressional district divided by the number of establishments in the congressional district. *Cong. Dist. Exposure to PPPE (Vol)* is the congressional district average of the PPPE based on total amounts of outstanding PPP and small business loans, weighed by the share of deposits of each bank in each congressional district. *Cong. Dist. Exposure to PPPE (Nbr.)* is the congressional district average of the PPPE based on the number of outstanding loans, weighed by the share of deposits of each bank in each congressional district. *Ln(Payroll)* is the natural logarithm of the sum of payroll of all establishments in the congressional district. *Ln(Employment)* is the natural logarithm of total employment in the congressional district. *Industry Shares* are additional controls for the share of establishments in each two-digit NAICS code industry. The specification of column (4) includes state fixed effects. Standard errors are presented in parentheses, and are clustered at the level of the state. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Total PPP Allocation per Establishment at the Congressional District

	(1)	(2)	(3)	(4)
	Ln(Total PPP Allocation per Establishment)			
Cong. Dist. PPPE (Vol)	0.160***	0.174***	0.126***	0.148**
	(0.023)	(0.023)	(0.038)	(0.067)
Ln(Total Payroll)		0.290	0.279	0.191
		(0.223)	(0.233)	(0.242)
Ln(Employment)		-0.089	-0.113	0.112
		(0.397)	(0.351)	(0.376)
Observations	436	436	436	436
Adjusted R^2	0.071	0.109	0.135	0.102
Industry Shares	No	No	Yes	Yes
State Fixed Effects	No	No	No	Yes

Panel B: Fraction of Establishment receiving PPP at the Congressional District

	(1)	(2)	(3)	(4)
	Fraction of Establishments receiving PPP			
Cong. Dist. PPPE (Nbr.)	0.068***	0.067***	0.056***	0.047***
	(0.005)	(0.005)	(0.007)	(0.009)
Ln(Total Payroll)		-0.017	-0.045	-0.029
		(0.038)	(0.036)	(0.037)
Ln(Employment)		0.028	0.051	0.050
		(0.062)	(0.059)	(0.066)
Observations	436	436	436	436
Adjusted R^2	0.414	0.412	0.449	0.482
Industry Shares	No	No	Yes	Yes
State Fixed Effects	No	No	No	Yes

Table 3: Wells Fargo and PPP Allocation

Table 3 reports the results of ordinary least squares (OLS) regressions examining the impact of the exposure of the Congressional District to Wells Fargo on the allocation of PPP funds. The dependent variable of the specifications, *Ln(Total PPP Allocation per establishment)*, is the natural logarithm total amount of PPP funds disbursed to small businesses in each congressional district divided by the number of establishments in the congressional district. The dependent variable of the specifications in Panel B, *Ln(Total PPP Allocation per establishment)* is the total number of PPP loans made to small businesses in each congressional district divided by the number of establishments in the congressional district. *Share of Wells in the Congressional District* is share of branches owned by Wells Fargo in the Congressional District. *Ln(Payroll)* is the natural logarithm of the sum of payroll of all establishments in the congressional district *Ln(Employment)* is the natural logarithm of total employment in the congressional district *Industry Shares* are additional controls for the share of establishments in each two-digit NAICS code industry. The specification of column (4) includes state fixed effects Standard errors are presented in parentheses, and are clustered at the level of the state. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Total PPP Allocation per Establishment at the Congressional District

	(1)	(2)	(3)	(4)
	Ln(Total PPP Allocation per Establishment)			
Share of Wells Branches in Cong Dist.	-1.871***	-1.977***	-1.277**	-2.317
	(0.526)	(0.594)	(0.629)	(1.721)
Ln(Total Payroll)		0.078	0.116	0.127
		(0.299)	(0.253)	(0.251)
Ln(Employment)		0.259	0.105	0.183
		(0.521)	(0.354)	(0.367)
Observations	436	436	436	436
Adjusted R^2	0.047	0.088	0.125	0.097
Industry Shares	No	No	Yes	Yes
State Fixed Effects	No	No	No	Yes

Panel B: Fraction of Establishment receiving PPP at the Congressional District

	(1)	(2)	(3)	(4)
	Fraction of Establishments receiving PPP			
Share of Wells Branches in Cong Dist.	-0.588***	-0.492***	-0.272**	-0.287
	(0.148)	(0.137)	(0.108)	(0.276)
Ln(Total Payroll)		-0.162***	-0.119***	-0.071*
		(0.061)	(0.043)	(0.041)
Ln(Employment)		0.233**	0.172***	0.099
		(0.098)	(0.062)	(0.070)
Observations	436	436	436	436
Adjusted R^2	0.151	0.210	0.376	0.455
Industry Shares	No	No	Yes	Yes
State Fixed Effects	No	No	No	Yes

Table 4: Business Shutdowns and PPP Allocation

Table 4 reports the results of ordinary least squares (OLS) regressions examining the relation between the allocation of PPP funds and the share of businesses that shutdown operations in the last week of March. The dependent variable, *Share of Firms Shutdown (March 31st, 2020)*, is the share of businesses in the congressional district that did not operate in the week of March29th–April 4th. *Ln(Total PPP Allocation per establishment)* is the natural logarithm total amount of PPP funds disbursed to small businesses in each congressional district divided by the number of establishments in the congressional district. *Fraction of Establishments receiving PPP* is the total number of PPP loans made to small businesses in each congressional district divided by the number of establishments in the congressional district. *Congressional District PPPE (Vol)* is the congressional district average of the PPPE based on total amounts of outstanding PPP and small business loans, weighed by the share of deposits of each bank in each congressional district. *Congressional District PPPE (Nbr.)* is the congressional district average of the PPPE based on the number of outstanding loans, weighed by the share of deposits of each bank in each congressional district. *Ln(Payroll)* is the natural logarithm of the sum of payroll of all establishments in the congressional district *Ln(Employment)* is the natural logarithm of total employment in the congressional district *Industry Shares* are additional controls for the share of establishments in each two-digit NAICS code industry. Standard errors are presented in parentheses, and are clustered at the level of the state. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Share of Firms Shutdown (March 31st, 2020)					
Fraction receiving PPP	-0.078	-0.025						
	(0.049)	(0.045)						
Ln(PPP loan per establishment)			0.008	0.008				
			(0.007)	(0.006)				
Congressional District PPPE (Vol)					0.020*	-0.008		
					(0.010)	(0.008)		
Congressional District PPPE (Nbr.)							0.019	-0.015
							(0.012)	(0.011)
Ln(Total Payroll)	0.062	0.011	0.071*	0.014	0.096**	0.006	0.095**	-0.004
	(0.039)	(0.022)	(0.041)	(0.021)	(0.044)	(0.025)	(0.044)	(0.030)
Ln(Employment)	0.023	0.010	-0.000	-0.001	-0.038	0.016	-0.038	0.028
	(0.050)	(0.043)	(0.053)	(0.040)	(0.064)	(0.046)	(0.066)	(0.051)
Observations	436	436	436	436	436	436	436	436
Adjusted R^2	0.317	0.583	0.315	0.584	0.335	0.584	0.325	0.586
Industry Shares	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes

Table 5: Decline in Hours Worked and PPP Allocation

Table 5 reports the results of ordinary least squares (OLS) regressions examining the relation between the allocation of PPP funds and the share of businesses that shutdown operations in the last week of March. The dependent variable, *Decline in Hours Worked (March 31st, 2020)*, is the decline in hours worked at establishments located in the congressional district related to the average hours worked in the same weekdays of the last two weeks of January at the same congressional district. *Ln(Total PPP Allocation per establishment)* is the natural logarithm total amount of PPP funds disbursed to small businesses in each congressional district divided by the number of establishments in the congressional district. *Fraction of Establishments receiving PPP* is the total number of PPP loans made to small businesses in each congressional district divided by the number of establishments in the congressional district. *Congressional District PPPE (Vol)* is the congressional district average of the PPPE based on total amounts of outstanding PPP and small business loans, weighed by the share of deposits of each bank in each congressional district. *Congressional District PPPE (Nbr.)* is the congressional district average of the PPPE based on the number of outstanding loans, weighed by the share of deposits of each bank in each congressional district. *Ln(Payroll)* is the natural logarithm of the sum of payroll of all establishments in the congressional district *Ln(Employment)* is the natural logarithm of total employment in the congressional district *Industry Shares* are additional controls for the share of establishments in each two-digit NAICS code industry. Standard errors are presented in parentheses, and are clustered at the level of the state. ***, **, and *, represent statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Decline in Hours Worked (March 31st, 2020)							
Fraction receiving PPP	0.121*	0.051						
	(0.067)	(0.068)						
Ln(PPP loan per establishment)			-0.005	-0.005				
			(0.007)	(0.007)				
Congressional District PPPE (Vol)					-0.022**	-0.001		
					(0.010)	(0.011)		
Congressional District PPPE (Nbr.)							-0.024*	-0.002
							(0.014)	(0.017)
Ln(Total Payroll)	-0.073**	0.014	-0.087**	0.009	-0.114***	0.008	-0.117***	0.007
	(0.032)	(0.043)	(0.034)	(0.041)	(0.038)	(0.047)	(0.038)	(0.052)
Ln(Employment)	-0.011	-0.065	0.017	-0.054	0.063	-0.058	0.069	-0.056
	(0.043)	(0.069)	(0.046)	(0.068)	(0.059)	(0.076)	(0.063)	(0.083)
Observations	436	436	436	436	436	436	436	436
Adjusted R^2	0.274	0.462	0.267	0.461	0.286	0.461	0.280	0.461
Industry Shares	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes

Figure A.1: Decline in Hours Worked and PPP Allocation by State

Figure A.2 presents four scatterplots of the decline in hours worked relative to a January baseline and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans.

Figure A.2: Business Shutdowns and PPP Allocation by State

Figure A.2 presents four scatterplots of the share of businesses in each state that shutdown that in the week of March29th–April 4th and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans.

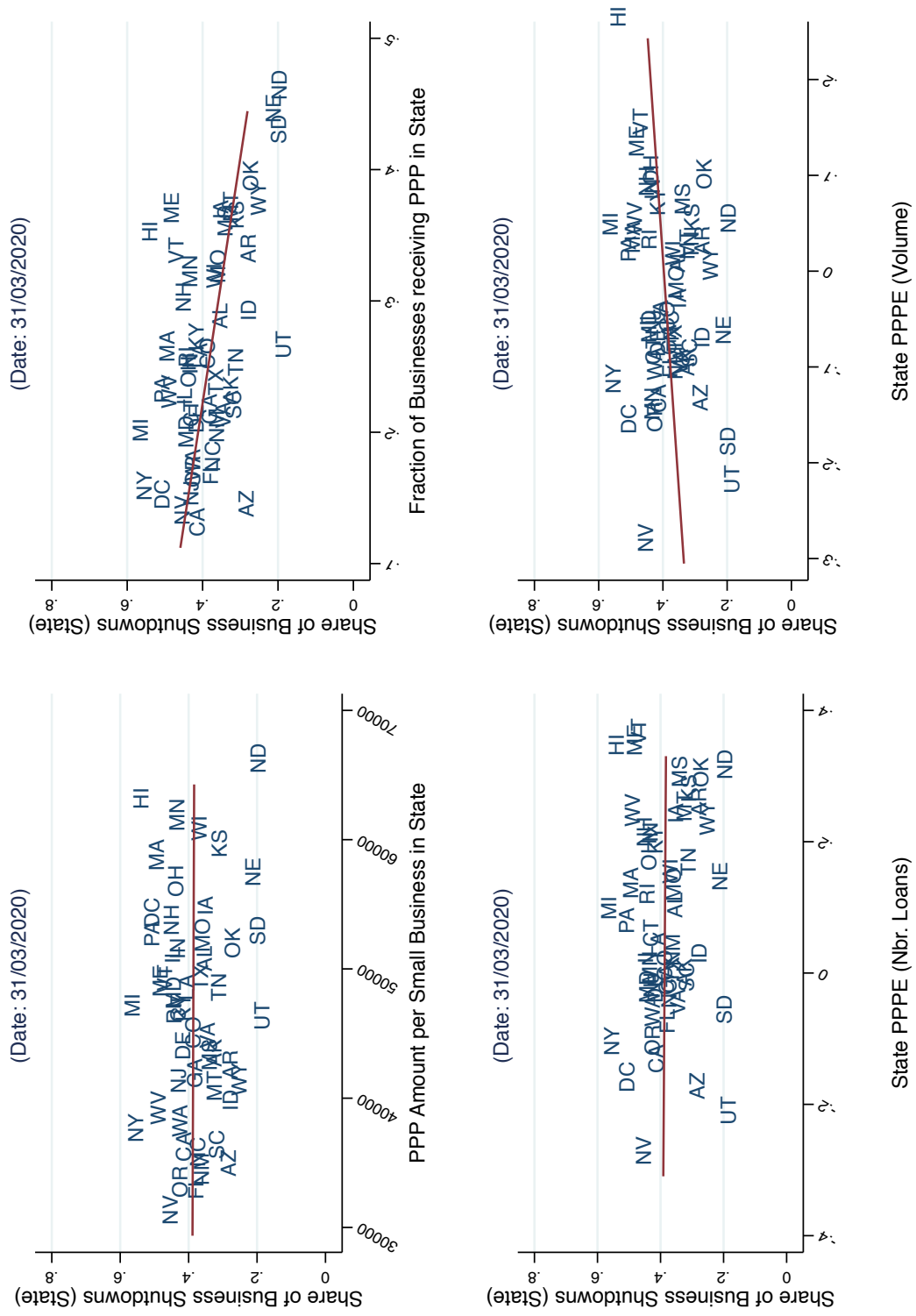Figure A.3: COVID-19 Cases and PPP Allocation by State

Figure A.3 presents four scatterplots of the number of confirmed COVID-19 cases per thousand as of April, 3rd 2020 and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans. Data comes from the Center for Disease Control, SBA, Call Reports, and FDIC Summary of Deposits.

Figure A.4: COVID-19 Deaths and PPP Allocation by State

Figure A.4 presents four scatterplots of the number of COVID-19 deaths per thousand as of April, 3rd 2020 and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans. Data comes from the Center for Disease Control, SBA, Call Reports, and FDIC Summary of Deposits.
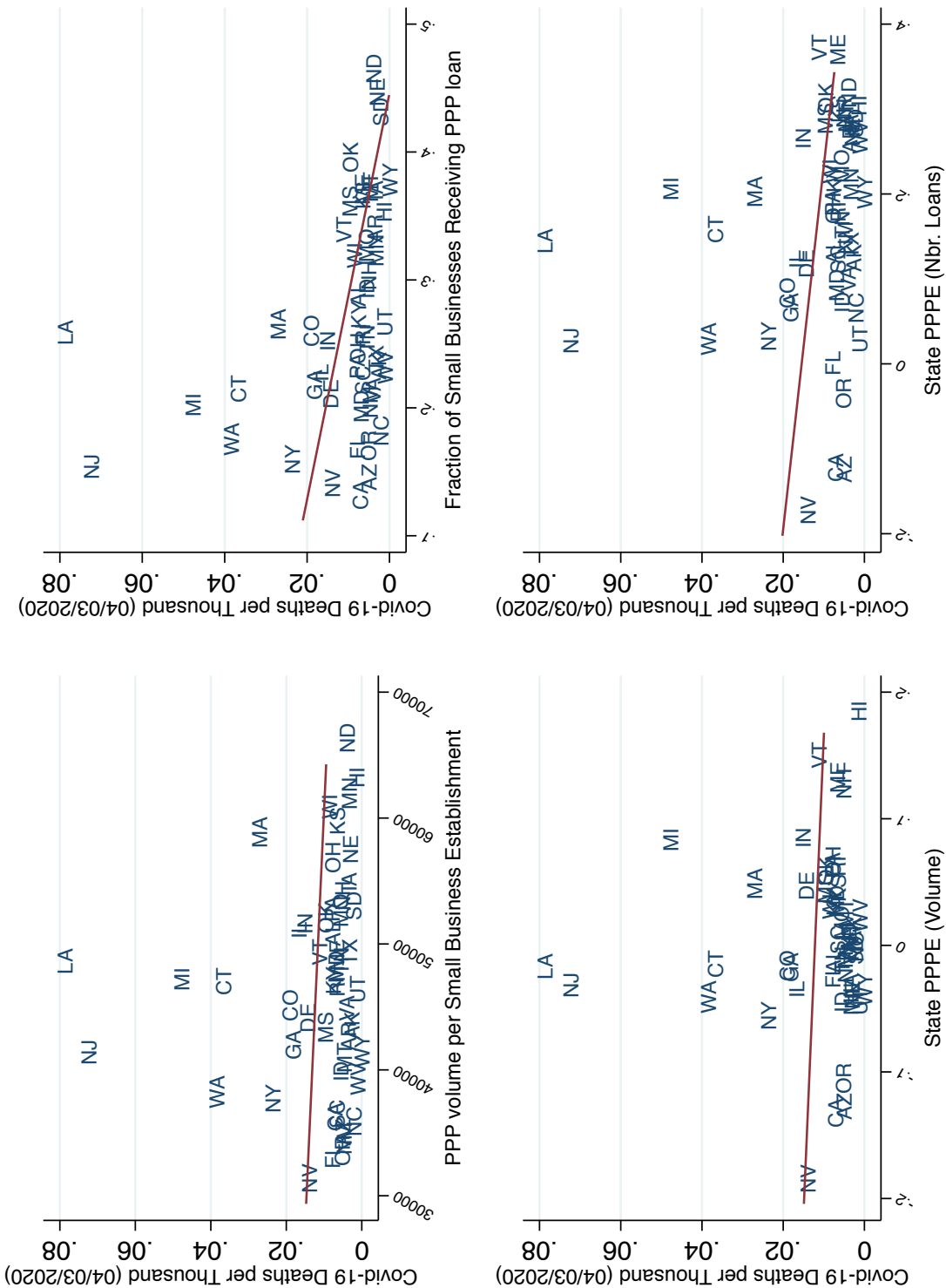
Figure A.5: Shelter-in-Place Orders and PPP Allocation by State

Figure A.5 presents four scatterplots of the timing of statewide shelter-in-place orders and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans. Data comes from the New York Times, SBA, Call Reports, and FDIC Summary of Deposits.
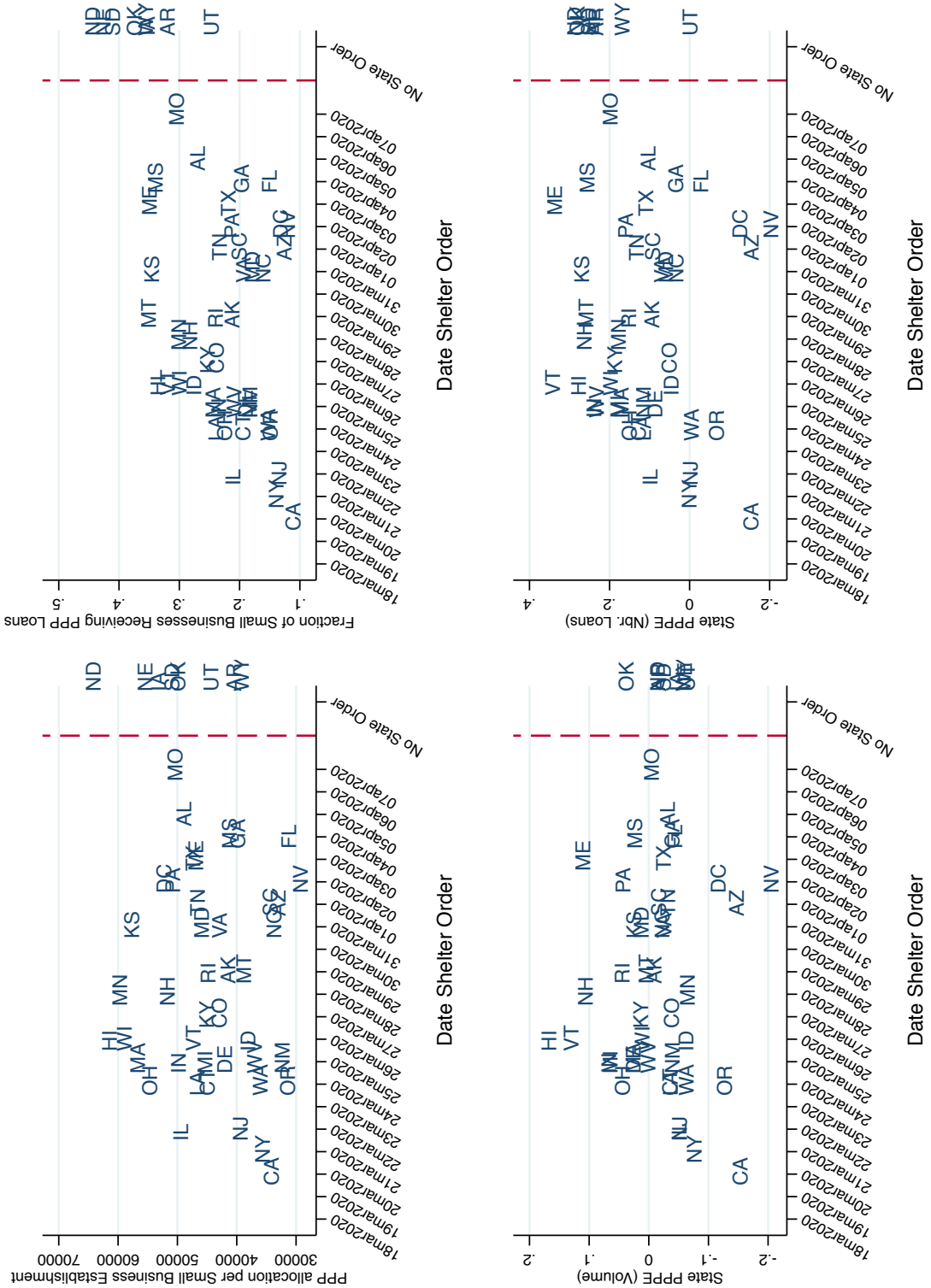
Figure A.6: Social Distancing Index and PPP Allocation by State

Figure A.6 presents four scatterplots of and four alternative measures of allocation of PPP funds across states. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans. Data comes from the SBA, Call Reports, and FDIC Summary of Deposits.
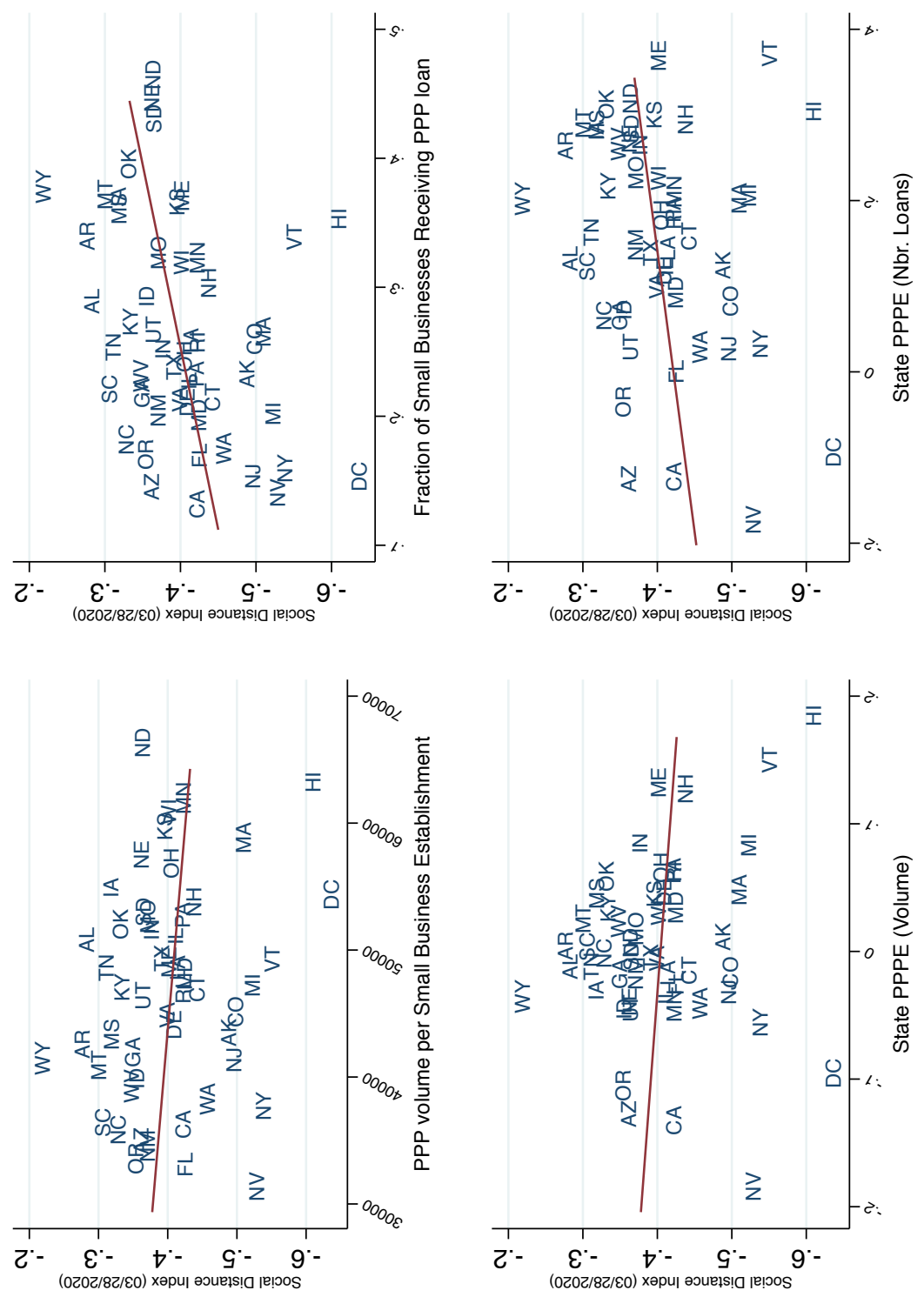
Figure A.7: State Unemployment Insurance and PPP Allocation by State

Figure A.7 presents four scatterplots of the ratio of state unemployment insurance claims to employment covered by unemployment insurance and four alternative measures of allocation of PPP funds across states. State unemployment insurance claims are the sum of filed claim in the weeks ended March 21st, March 28th, and April 4th, 2020. The figure on the top left plots the amount of PPP loans received by small businesses in each state divided by the total number of small businesses in the state. The figure on the top right corner plots the fraction of small businesses in each state that received a PPP loan. The figure on the bottom left corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total volume of loans. The figure on the bottom right corner plots the fraction of small businesses in each state that received a PPP loan and the state exposure to the PPPE measured in terms of the total number of loans. Data comes from the Department of Labor, SBA, Call Reports, and FDIC Summary of Deposits.