

# The Racial and Spatial Impacts of the Paycheck Protection Program

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T. William Lester<sup>1</sup>  and Matthew D. Wilson<sup>2</sup>

## Abstract

The Paycheck Protection Program (PPP), with spending of nearly \$800 billion, was the largest component in the United States' economic response to the COVID-19 pandemic. The intention of the program was to provide emergency economic relief to small businesses and help them keep employees on their payroll. Critics of the PPP program feared that its reliance on private lending institutions would exacerbate racial and spatial injustice by mirroring existing inequalities in access to capital by race and across space. The authors compare PPP to existing residential and small business lending patterns, and test whether Black and Latinx neighborhoods were disadvantaged in receiving PPP loans. The authors find that majority Black and Latinx neighborhoods received disproportionately fewer PPP loans than majority White and Asian neighborhoods, but that policy changes during the third phase of the PPP resulted in better targeting of lending to lower-income areas, minority borrowers, and smaller businesses.

## Keywords

Paycheck Protection Program, PPP, Economic Inequality, Economic Inclusion, Inequality

The summer of 2020 was a highly turbulent time for the country. The United States was dealing with two seemingly distinct challenges simultaneously. First, the global coronavirus (COVID-19) pandemic was the most severe public health crisis in over 100 years. It has caused over 700,000 deaths to date and led to the most severe economic shock since the Great Depression. Second, the murder of George Floyd sparked a nationwide protest movement that focused the nation's attention on its legacy of racial injustice and systemic inequality seemingly overnight.

While these two phenomena may seem separate, many observers have pointed out ways that they overlap. Research revealed that people of color faced disproportionate risks of contracting COVID-19 for a variety of reasons that are determined by structural inequality (e.g., lack of access to health care, preexisting medical conditions, higher rates of comorbidity) and labor market segmentation (Jahromi & Hamidianjahromi, 2020).

The response by the federal government to these dual crises was disjointed and heavily criticized from public health officials, economists, and social activists. A major concern by critics of the government's response is whether the proposed economic remedies to COVID-19 will ameliorate or exacerbate existing economic inequalities. A key aspect of the federal government's economic response to the pandemic was the Paycheck Protection Program (PPP), which was authorized by Congress in March of 2020 as

part of the \$2 trillion Coronavirus Aid, Relief, and Economic Security Act (CARES) Act. The PPP program included \$679 billion for potentially forgivable loans to be administered by the Small Business Administration (SBA). The intention of the program was to provide emergency economic relief to small businesses that were forced to close or curtail their business due to the pandemic and to help them keep their employees on the payroll. A business that receives a PPP loan can apply any funds used for payroll and other qualified expenses (e.g., rent and utilities) for loan forgiveness (U.S. Small Business Administration, 2020). The initial funding for the PPP program was used up quickly, forcing Congress to allocate more funds in two additional phases.

To date the program has lent over \$790 billion in aid to a variety of businesses. However, there are several reasons that the program may not be reaching minority-owned businesses or targeted toward the neighborhoods hardest hit by the

<sup>1</sup>Department of Urban and Regional Planning, San José State University, San Jose, CA, USA

<sup>2</sup>Associate Director for Economic and Workforce Development, Great Cities Institute, University of Illinois Chicago, Chicago, IL, USA

## Corresponding Author:

T. William Lester, Department of Urban and Regional Planning, San José State University, San Jose, CA, USA.

Email: [twlester@unc.edu](mailto:twlester@unc.edu)

economic downturn. First, the program, while funded and administered through the SBA, uses private lending institutions to process loan applications with businesses. It is well documented that minority businesses already face barriers to access capital from traditional banks and thus may not already have a banking relationship (Bates, 2011; Blanchard et al., 2008; Blanchflower et al., 2003). In addition, Black and Latinx-owned businesses may be operating in neighborhoods that have been redlined in the past and may be less likely to have local lending institutions nearby and that understand their business (Immergluck, 2002). Similarly, economically distressed neighborhoods are often the same neighborhoods that experienced disinvestment and discrimination in the residential mortgage markets (Aaronson et al., 2021). As such they may lack branches of financial institutions and lenders may lack local knowledge, leading to fewer preexisting banking relationships.

In this paper we ask the simple question: Did the PPP—delivered in this manner—exacerbate racial and spatial injustice? We look at this issue directly by comparing the newly released PPP lending data from the SBA to current demographic and social characteristics at the census tract level. We first describe how well PPP funds flowed into minority neighborhoods and assess the degree to which they reached economically distressed communities. Early analysis has already shown that PPP loans took longer to process in minority-majority neighborhoods (Liu & Parilla, 2020) and that minority-owned firms faced direct discrimination in lending (Lederer et al., 2020). We examine the extent to which lending patterns in the residential market—as measured through an analysis of Home Mortgage Disclosure Act (HMDA) data—are associated with access to PPP funds. We then extend this analysis using a predictive model for PPP loan incidence by tract and test whether Black and Latinx neighborhoods were at a disadvantage in receiving PPP loans, controlling for the overall number of businesses in the area, local economic disadvantage, preexisting lending patterns, and regional characteristics.

We find direct evidence that majority Black and Latinx neighborhoods received disproportionately fewer PPP loans and loan dollars than majority White and Asian neighborhoods. However, there was a critical shift in lending patterns during the third phase of the PPP program. Congress took steps to better target lending to minority borrowers and smaller businesses, and lending to majority- Black neighborhoods improved. The same was not true for Latinx neighborhoods. Economically disadvantaged neighborhoods received fewer resources in all phases of the program than wealthier areas, but there was some improvement in lending within high poverty urban tracts and rural areas under Phase 3. The geography of lending patterns in the earlier phases of the program was highly correlated with preexisting residential mortgage lending patterns. We argue that emergency relief programs that rely heavily on existing institutional

structures are likely to exacerbate rather than ameliorate racial and spatial inequality. However, the shift documented under Phase 3 indicates that policy makers have the tools to better target programs and should use them up front.

## Background on COVID-19 and the PPP Program

The COVID-19 pandemic has created numerous challenges for U.S. businesses. In droves, workers have fallen ill, been laid off, or had their workplaces closed due to demand changes or workplace spread of COVID-19 (Crary, 2020; Tappe, 2020), encountered an absence of reliable childcare for their young children and e-learners (Guynn, 2020), or have quit jobs when unwilling to be exposed to perceived dangerous working conditions (Mutikani, 2020). Additionally, the enactment of public health measures such as mandated business closures and stay-at-home orders have culminated to cause an economic recession (Reinicke, 2020). Even before the United States saw a substantial number of positive COVID-19 cases, U.S. businesses faced supply chain disruptions stemming from regions across the world that were more immediately impacted by the pandemic (*COVID-19'S Global Impact on Supply Chains*, n.d.). The first stay-at-home or lockdown order was in China's Hubei province, which entered a 76-day lockdown of its population on January 23, 2020. Italy's first regional lockdown started on February 22, 2020, and was expanded to the entire country by March 10, 2020. Soon after, India entered a national 21-day lockdown starting on March 24th (Reuters Staff, 2020). In the United States, 22 states and numerous counties issued stay-at-home orders in late March 2020<sup>1</sup> and 15 additional states issued stay-at-home orders in early April 2020 (U.S. Department of Defense, 2021).<sup>2</sup> The country entered a recession in February 2020 (National Bureau of Economic Research, 2021) and saw the unemployment rate grow from 3.5% in February 2020 to 14.7% by April 2020 (U.S. Bureau of Labor Statistics, 2020).

The over \$2 trillion CARES Act was signed into law on March 27, 2020, and authorized the SBA to administer the PPP program. The aim of the program is to provide forgivable loans that help businesses with fewer than 500 employees cover payroll and fixed expenses like rent, mortgages, and utilities while they were adversely affected by the COVID-19 pandemic. Additionally, businesses with more than 500 employees but fewer than 500 employees at any single site, also qualified for PPP loans. Recipients needed to use 75% or more of their PPP loans on payroll and needed to maintain pre-COVID-19 employment levels to be eligible for loan forgiveness (Humphries et al., 2020). The \$349 billion allocated to the first round of PPP loans was spent just 13 days after loans started to be administered on April 3, 2020. On April 24, 2020, a second round of

funding provided an additional \$320 billion to the program and notably allowed recipients to use up to 40% of their loan amount toward nonpayroll expenses. The second round saw lower demand and ran from April 27 to August 8, 2020, distributing only \$176 billion of the available \$320 billion (Duchin et al., 2021). A third round was passed on December 27, 2020 and allocated \$284 billion with changes that responded to previous criticisms that the program did not adequately reach small and minority-owned businesses. The first week of the third round was only open to small lenders and participating SBA-approved Community Financial Institutions. Some notable monies set aside in the third round were \$35 billion for first-time borrowers and \$35 billion for first- and second-draw borrowers<sup>3</sup> with 10 or fewer employees or loans less than \$250,000 in a low- or moderate-income community (Sanchez-Moyano, 2021). Because of the significant policy shift in lending priorities during the third round, we conduct our descriptive and empirical analysis of the PPP program separately for Phases 1 and 2 (combined) and Phase 3.

The changes to the program's focus between rounds were a response to the program being administered in ways perceived to be unfair and against the initial goals of the program. Just before the second round of PPP loans were available, evidence suggested that the first-come, first-served design of the program gave larger companies with dedicated personnel such as lawyers and accountants to apply for loans, an advantage in securing loans (Liu & Parilla, 2020; McLaughlin & Davis, 2020). This was illustrated through Chase Bank's administering of loans to nearly all its roughly 5,500 larger business/commercial banking clients while 300,000 smaller business applicants were approved for loans at the rate of only 6%. Additionally, banks received larger fees for originating larger loans, incentivizing banks to work with their largest customers (McLaughlin & Davis, 2020). The fact that banks worked first with their largest customers creates challenges for small businesses in general, but especially for those in Black and Latinx communities that are more frequently unbanked or underbanked (Liu & Parilla, 2020). In addition to established lending relationships leading to higher PPP utilization, personal connections between borrowers and lending institution executives played a role in loan distribution (Duchin et al., 2021).

## Literature Review

Before reviewing the current literature on racial discrimination in PPP lending, it is useful to examine racial discrimination in lending in the post-Community Reinvestment Act (CRA) period more broadly. The PPP program, by virtue of operating through existing financial institutions, is susceptible to the same lending discrimination seen after CRA reforms. The CRA passed in 1977 in response to banks not

meeting the credit needs of the communities where they did business, particularly in low- and moderate-income areas. Strict enforcement of the CRA began in the 1990s, eventually resulting in loans being more available for housing and businesses in low-income and minority neighborhoods (Bates & Robb, 2016). A national trend of big bank branches replacing smaller neighborhood banks has occurred since the passing of the CRA. These big banks have felt pressure from activists, academics, media, and policy makers to meet the lending needs of their communities and to promote a public perception as doing so (Bates & Robb, 2016). Simultaneously, securitization of mortgages to be sold on the secondary mortgage market incentivized retail lenders to create more mortgages and in favorable terms for the purchasing financial organizations (Stone & Zissu, 2012).

As mortgage originators sought new markets for their loans, minority communities became fertile ground for increased lending but in unfavorable and predatory terms for borrowers that offered high yields for financial organizations (Massey et al., 2016). Even when controlling for income and evaluations of borrowers' risks, Black communities were revealed to be targeted by global financial firms for subprime loans (Wyly et al., 2006). For small minority business enterprises (MBEs), lacking access to capital exacerbates issues stemming from MBEs relatively being younger and smaller than White-owned firms (Blanchard et al., 2008). There are several studies that found minority communities face discrimination in securing business loans (Immergluck, 2002) and minority borrowers are subjected to lending and interest rate discrimination (Bates & Robb, 2013; Blanchard et al., 2008; Cavalluzzo et al., 2002).

The execution of the PPP program illustrates the ongoing inequality in access to capital by race and geography and has been criticized for providing unequal access to loans for small and minority-owned businesses and in predominantly minority communities. Atkins et al. (2021) examined how the design of the PPP program, relying on existing SBA-approved financial institutions to distribute loans, resulted in Black-owned firms receiving smaller and fewer loans than comparable White-owned firms. They found that loan size differences between Black- and White-owned firms were slightly smaller in areas with greater financial competition (i.e., more bank branches). The authors discuss that banks prioritized providing PPP loans to existing customers because banks wanted to advance the interests of their existing clients. Additionally, the authors attribute existing spatial unevenness of the location of bank branches between predominately Black and White areas to a general lack of access to PPP loans.

Kelly and van Holm (2021) examined the spatial distribution of PPP loans at the county level for the months of April and May 2020. They also examined the relationship between PPP loans and county demographics, COVID-19 cases,

changes in unemployment rates in the early pandemic period (February through May 2020), and business and bank concentration. They found that more loans per capita are associated with higher business and bank concentrations; more educated, affluent, and White residents; and increasing change in the unemployment rate. They also found that the number of COVID-19 cases was slightly negatively associated with PPP loans per capita, possibly because areas with large COVID-19 case counts were under lockdowns, which could have made applying for PPP loans more difficult, especially for businesses without strong preexisting relationships with banks.

Fairlie and Fossen (2021) explored how PPP loans flowed to ZIP codes by minority share of businesses in the first two rounds of loans. They found that larger shares of minority businesses were associated with lower loans per firm in the first round and higher loans per firm in the second round. They discussed that this may be the case because of first-round funding being more likely dispersed to businesses with long-time relationships with banks, in rural areas, and to larger firms having access to administrative legal help, all of which are more closely associated with White-owned firms.

In addition, since the PPP program administration was new, awareness of how to access and navigate it played a role in unequal access. Humphries et al. (2020) collected more than 14,208 surveys from small business owners to understand the business impacts of COVID-19. They found that smaller businesses experienced “information frictions,” meaning that smaller firms were less aware of the program’s existence, if they were eligible, and how to access funds. This resulted in fewer small businesses initially applying for PPP loans, if they applied at all. The implications for small businesses applying with less frequency and later is associated with additional layoffs and less optimism about the prospects of economic recovery for survey respondents’ businesses.

This paper provides new insights into discrimination in the PPP program by comparing PPP loan distribution to existing patterns of residential mortgage lending. Through making this comparison, we can discern the extent to which inequality of loan access through the PPP program is related to existing spatial patterns of access to capital and the magnitude of other access-to-capital challenges for businesses. The literature we reviewed suggests that banking relationships, internal business capacity, and physical proximity to banks are important factors in determining PPP loan access. However, much of the literature conceptualizes loan availability by the presence of banks and misses the banks’ actual lending patterns. Utilizing HMDA residential mortgage data provides a more detailed account for lending patterns, which can be aggregated to the census tract level for a more granular view, ultimately measuring the extent to which the PPP program reflects

existing discrimination in access to capital or has new distinct features.

## **Data Sources and Methodology**

To assess the impact of the PPP program on communities of color and distressed neighborhoods, we combine data from the SBA with information from the 2015 to 2019 American Community Survey, and the Home Mortgage Disclosure Act (HMDA) files. The SBA released loan-level data for all firms and nonprofits that received a PPP loan, which included information on the date of loan, the amount approved, and the number of jobs reported by the borrower. The file includes a variable indicating the race of the borrowers; however, this information is left blank for nearly 80% of respondents. Thus, we cannot accurately identify direct lending discrimination or disproportionate access for minority-owned businesses. Therefore, we primarily investigate the PPP program through the spatial patterns of lending. Initially, address information was only listed for businesses that received larger loans (> \$150,000). However, based on many Freedom of Information Act (FOIA) requests by journalists, detailed address information was available for all loans made through April 1, 2021. We geocoded all 8.89 million loan records by address using ESRI’s World Geocoding service within ArcGIS Pro with a match rate of 98%. Each record was then assigned to a census tract based on its latitude and longitude coordinates.<sup>4</sup> The data set was then summarized to the census tract level and contained the total loan count, total loan approval amount (in 2020 dollars), and sum of jobs reported.

While the number of loans and total dollars lent to each tract is useful in measuring the relative flow of PPP resources to majority-minority and/or low-income neighborhoods, this information may be misleading due to the uneven distribution to businesses—and areas zoned for business activity—across the metropolitan landscape. To better assess the degree to which the PPP program systematically excluded or included certain areas, we need to measure lending patterns relative to the number of businesses in each tract that were potentially eligible to receive a PPP loan. Following the methods developed by researchers and reporters at Reveal and the Center for Investigative Reporting (Morel et al., 2021; Oh & Al Elew, 2021), we normalized the total loan count, loan amount, and jobs reported by an estimate of the number of eligible businesses. Specifically, these researchers combined data from the HUD/U.S. Postal Service listing of nonvacant business addresses and the count of self-employed workers at the tract level from the 2015 to 2019 ACS.<sup>5</sup> This is the best proxy for the pool of firms and self-employed workers that were eligible to receive a PPP loan.<sup>6</sup>

Since a key question we ask in this paper is how PPP lending was shaped by preexisting spatial patterns of

access to capital, we use data on residential mortgage lending at a census tract level from the Federal Financial Institutions Examination Council (FFIEC). Specifically, the HMDA requires all mortgage lending institutions to report the decision on each loan application and to gather data on borrower race, ethnicity, income level, and census tract of property. This information is aggregated into a national loan-level data set called the Loan Application Register (LAR).<sup>7</sup> We used the 2019 HMDA LAR file to generate census tract summaries for total loans, total loans originated, and total mortgage capital lent (in dollars), as well as denial rates by race/ethnicity of borrower. To control for variation in owner-occupied versus renter-occupied housing, we also normalize these HMDA totals by the total number of owner-occupied housing units in each tract.

To account for the role that access to local banks may play in the differential access to capital, we use data from the FDIC's Summary of Consumer Deposits, which lists the addresses and latitude/longitude coordinates of every FDIC insured bank and credit union branch in the United States. We geocoded this file following the same steps described above and produced a summary count by census tract.

## Findings

In total, the largest share of PPP resources flowed to majority White, low-poverty neighborhoods. While the percentage of the population living in majority non-White neighborhoods is small, they received disproportionately more PPP loans and loan dollars than majority Black and Latinx neighborhoods<sup>8</sup> received, relative to their share of the population. During the first two phases (through September 2020) only 4.6% and 8.2% of loan dollars went to majority Black and Latinx neighborhoods, while 71.7% of loans went to majority White tracts. As seen in Table 1 there are important differences by phase. Phases 1 and 2 were larger in terms of number of loans made (5.1 million versus 3.7 million), but even more so in total amount lent, with \$517 billion in Phases 1 and 2, and \$215 billion in Phase 3. This makes sense as Congress made fewer dollars available in Phase 3 and took steps to ensure that lending was prioritized to very small businesses.

When we look at average lending rates (Table 2), we see a similar pattern. The mean number of loans—normalized by eligible businesses—made in majority White (0.45) and Asian (0.49) tracts in Phases 1 and 2 was significantly higher than the mean in majority Black (0.39) and Latinx (0.31) tracts. Based on the small standard errors reported below each mean, these differences are statistically significant. In Phase 3 of the program, however, there are some significant shifts in lending across neighborhood racial types. The number of loans in majority Black neighborhoods jumps from 0.39 loans per business across Phases 1 and 2 to 0.68 in Phase 3, representing an increase of 79,000 PPP loans, or 32%. Lending counts fell in

all other racial composition neighborhood types. This is significant as Phase 3 was much smaller overall. While this is important, in that it appears that majority Black neighborhoods benefited from the programmatic changes under Phase 3, this essentially amounts to businesses in majority Black tracts receiving a slightly larger share of a smaller pie. We can also conclude that the increase in loans to majority Black tracts in Phase 3 was because of program design changes and not primarily because majority White tracts had a substantially larger proportion of businesses served in Phases 1 and 2 (Table 2). This shift is not apparent, however, when we look at the average dollar amount lent across the phases. Reflecting the program's focus on smaller businesses and businesses that could not or did not receive funding in the earlier phases, mean lending levels and jobs reported were down in all neighborhood types, including majority Black neighborhoods.

## PPP Lending by Neighborhood Poverty Level and Metropolitan Location

Next, we examine the same flows of PPP lending by neighborhood economic distress and location within the metropolitan structure. We use a threshold poverty rate of 20% to divide all census tracts into "low-poverty" and "high-poverty" tracts (see Jargowsky, 1997), and then calculate normalized PPP lending rates for urban, suburban, and rural<sup>9</sup> areas. We also separate tracts that were defined as part of the CBD (see Hartley et al., 2016). As shown in Table 3, suburban low-poverty neighborhoods received the highest number of loans, followed by urban low-poverty tracts and rural low-poverty tracts during Phases 1 and 2. This is consistent with the literature on access to capital in general, as lower-income areas may have fewer flourishing businesses with preexisting banking relationships. They may also be more likely to have informal businesses, especially in immigrant communities (Fairlie, 2012).

As in our analysis of lending by neighborhood racial and ethnic population, we see a similar shift in lending patterns under Phase 3. Specifically, there was an increase in lending rates per eligible business in high-poverty urban areas outside of downtowns as well as a significant increase for both poor and nonpoor rural areas. However, the mean loan amount per eligible business in Phase 3 was roughly half the size of the amount lent in the first two phases. This reflects the smaller size of the loan pool made available by Congress, as well as a shift toward smaller businesses (as seen in the mean jobs reported figures).

Figure 1 shows maps of PPP loans per business by census tract in Chicago for Phases 1 and 2, and Phase 3. The data are presented in deciles for the MSA, so tracts are symbolized by decile. The map on the left shows loans per business in Phases 1 and 2 with general clusters of upper deciles on the predominantly White north side with some small concentrations within Chicago's predominantly Black south and

**Table 1.** Aggregate PPP Loan Counts, Loan Amounts and Jobs Reported by Neighborhood Race/Ethnic Majority and Phase.

Neighborhood type	Census tracts	Total loans						Total loan amount (\$billions)						Total jobs reported					
		Phases 1 and 2			Phase 3			Phases 1 and 2			Phase 3			Phases 1 and 2			Phase 3		
		N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent		
Majority Asian	724	1.0%	61,256	1.2%	42,863	1.1%	7	1.4%	3	1.4%	773,046	1.3%	325,402	1.4%					
Majority Black	5,930	8.2%	249,874	4.9%	329,116	8.8%	23.7	4.6%	12.2	5.7%	2,847,132	4.7%	1,250,178	5.2%					
Majority Latinx of any race	7,677	10.6%	421,580	8.2%	314,684	8.4%	42.6	8.2%	18	8.3%	5,487,720	9.1%	2,095,577	8.7%					
Mixed	9,286	12.8%	712,073	13.9%	534,862	14.3%	83	16.0%	34.1	15.8%	9,339,673	15.4%	3,616,260	15.1%					
Majority White non-Latinx	48,722	67.4%	3,674,238	71.8%	2,510,565	67.3%	361.7	69.8%	148.3	68.8%	42,114,782	69.5%	16,671,462	69.6%					
Total	72,339	100.0%	5,119,021	100.0%	3,732,090	100.0%	517.9	100.0%	215.6	100.0%	60,562,353	100.0%	23,958,879	100.0%					

Notes: Author's analysis of SBA PPP loan level data released through April 1, 2021. Census tracts with greater than 50% of residents of each race/ethnicity are considered majority. Mixed neighborhoods include tracts where no single racial or ethnic group makes up 50% or more of the total population.

**Table 2.** Normalized Mean PPP Lending Patterns by Majority Race/Ethnicity Census Tract by Phase.

Normalized means		Loans per eligible business		Mean loan amount per eligible business		Mean jobs reported per eligible business	
Neighborhood type	Number of tracts	Phases 1 and 2	Phase 3	Phases 1 and 2	Phase 3	Phases 1 and 2	Phase 3
Majority Asian	724	0.49 (0.02)	0.35 (0.01)	55,018 (9,178)	19,830 (1,187)	7.83 (2.45)	2.60 (0.41)
Majority Black	5,930	0.39 (0.01)	0.68 (0.02)	30,244 (516)	19,879 (351)	3.70 (0.06)	1.90 (0.03)
Majority Latinx of any race	7,677	0.31 (0.01)	0.25 (0.00)	24,530 (364)	11,169 (170)	3.48 (0.06)	1.39 (0.03)
Mixed	9,286	0.39 (0.00)	0.34 (0.00)	34,655 (392)	15,865 (179)	4.25 (0.04)	1.74 (0.02)
Majority White non-Latinx	48,722	0.45 (0.00)	0.34 (0.00)	36,785 (186)	16,045 (94)	4.56 (0.02)	1.87 (0.01)

Notes: Author's analysis of SBA PPP loan level data. Standard errors listed below mean in parenthesis.

**Table 3.** Normalized PPP Lending Patterns by Metropolitan Status and Poverty Concentration, by Phase.

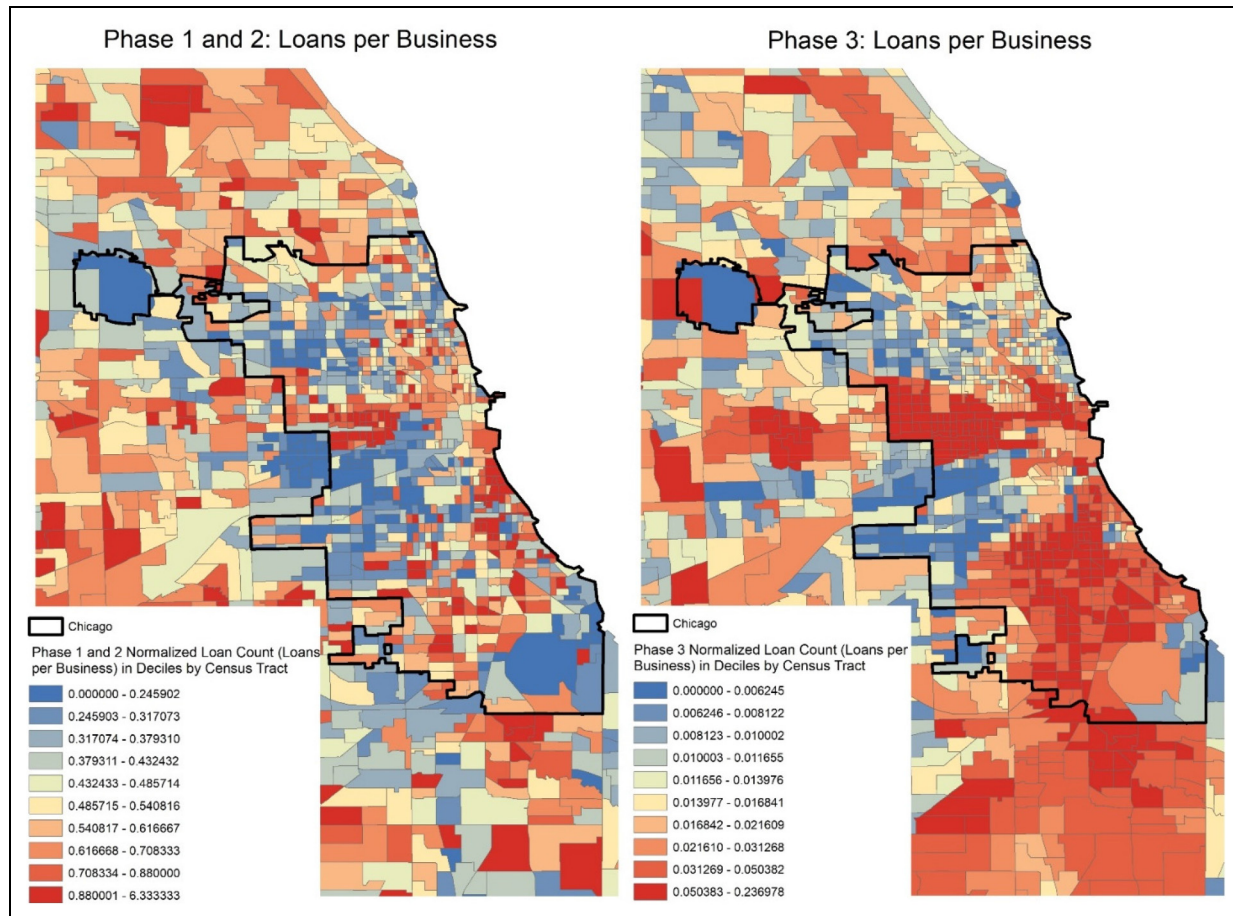
		Mean loans per eligible business		Mean loan amount (\$) per eligible business		Mean jobs reported per eligible business	
Metropolitan poverty status	Number of tracts	Phases 1 and 2	Phase 3	Phases 1 and 2	Phase 3	Phases 1 and 2	Phase 3
Rural low poverty	8,350	0.421 (0.005)	0.494 (0.011)	28,627 (325)	15,319 (286)	3.671 (0.042)	1.737 (0.031)
Rural high poverty	3,558	0.336 (0.005)	0.361 (0.009)	27,329 (834)	11,863 (340)	3.744 (0.095)	1.469 (0.040)
Suburban low poverty	33,757	0.471 (0.003)	0.336 (0.002)	38,115 (229)	16,537 (107)	4.671 (0.029)	1.902 (0.014)
Suburban high poverty	6,366	0.321 (0.003)	0.304 (0.005)	31,864 (733)	14,176 (259)	4.022 (0.086)	1.626 (0.035)
Urban low poverty	10,543	0.445 (0.005)	0.345 (0.006)	36,133 (386)	16,627 (184)	4.526 (0.047)	1.872 (0.019)
Urban high poverty	8,316	0.316 (0.003)	0.396 (0.009)	31,279 (455)	15,864 (236)	3.838 (0.046)	1.677 (0.021)
CBD	838	0.376 (0.005)	0.222 (0.004)	54,357 (1,278)	21,476 (538)	5.835 (0.104)	2.302 (0.049)

Notes: Author's analysis of SBA PPP loan level data. High poverty census tracts are those with greater than 20% of persons living in households with incomes below the poverty level. CBD is the central business district. Standard errors listed below mean in parenthesis.

west sides. Notably, Latinx's areas, which are on the south-west and northwest sides of Chicago, were largely in low deciles of loans per business. Loans per business in Phase 3 shown in the map on the right has a clearer pattern of predominantly Black areas receiving more loans per business than White and Latinx areas. However as noted earlier and seen when comparing the legends of the maps, the size of Phase 3 was much smaller than Phases 1 and 2. Symbolic of this is that the highest decile of loans per business in Phase 3 aligns with the lowest in Phases 1 and 2. This means that while lending was tilted more toward predominantly Black areas of Chicago in Phase 3, the lending amount in Phases 1 and 2 were much larger.

Figure 2 shows loan amounts per business in Phases 1 and 2, and Phase 3 at the census tract level symbolized in decile ranks for the MSA. Loan amounts per business were highest near Chicago's downtown with some clustering around its industrial corridors that run through the north, west, and south-west sides. Most of the south, west, northwest, and far north sides ranked in the lower deciles in Phases 1 and 2. Phase 3, shown in the map on the right, shows more clear patterns of spatial concentration and illustrates that high loan amounts were in the top three deciles that were highly concentrated in predominantly Black census tracts as well as in the downtown area. The loan amounts per business size were comparable but tended to be smaller in Phase 3 as illustrated in a





**Figure 1.** Phases 1 and 2 and phase 3 PPP loans per business by census tract in Chicago.

comparison of the map legends for the respective phases. These maps clearly illustrate that the program was successful in reorienting toward non-White neighborhoods; however, this reorientation is reflected in predominantly Black but not Latinx census tracts in Chicago.

### HMDA Lending Patterns

Researchers have long recognized both racial and spatial inequality in access to mortgage capital in the United States. Although racial discrimination in lending has been explicitly outlawed since the 1968 Fair Housing Act, and geographic redlining was banned by the Community Reinvestment Act of 1974, structural inequalities and lending discrimination persist. The HMDA data from 2019 illustrate this starkly unequal pattern. Overall, Black borrowers received only 6% of mortgage dollars in 2019, despite making up just over 12% of the population. Latinx borrowers are also underrepresented, receiving 14.4% of mortgage dollars and representing 18% of the population. Conversely, White borrowers received 73.4% of mortgage

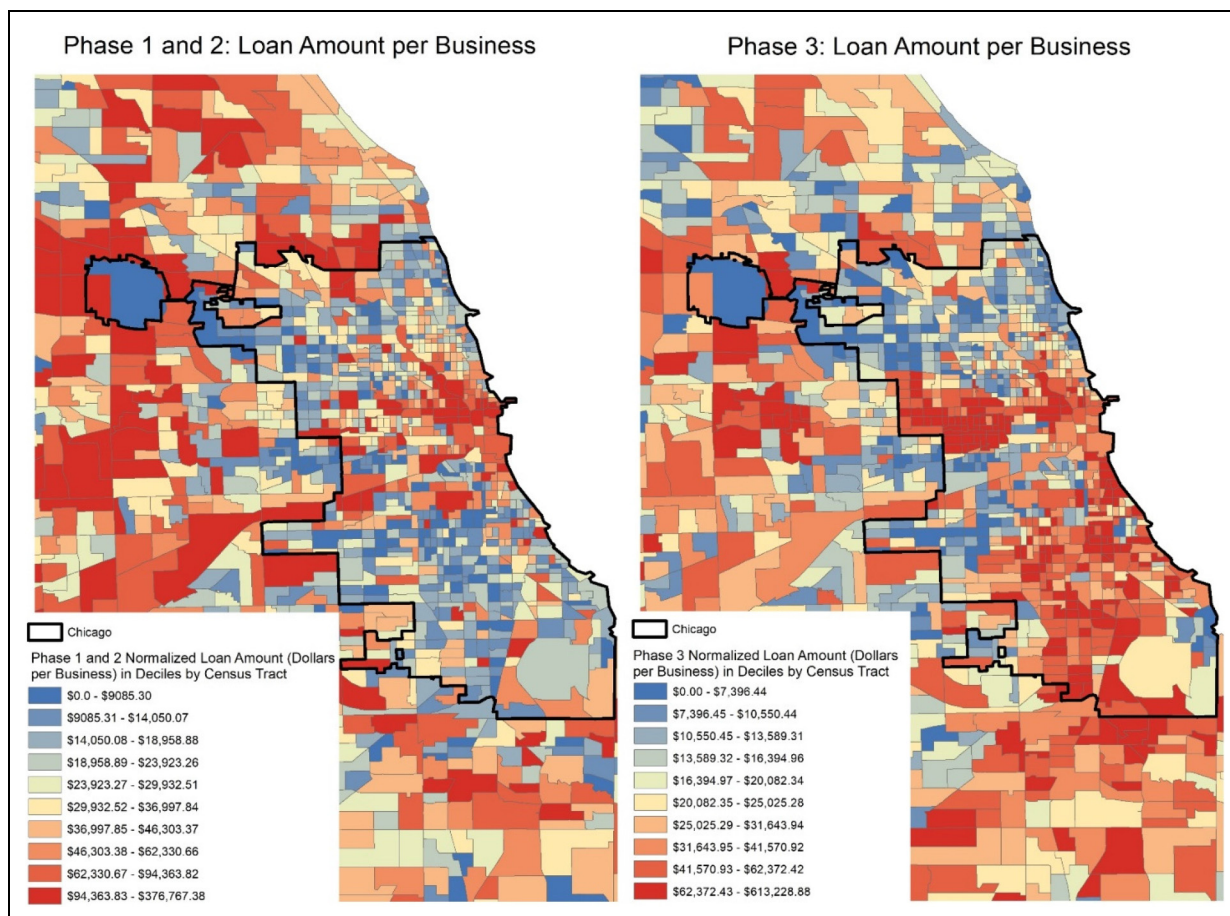
dollars while representing 60.1% of the population and Asian borrowers received 13.6% but represent only 5.4% of the population.

Differential access to mortgage capital is even more pronounced spatially. Majority Black neighborhoods received \$49.9 billion in mortgage investments in 2019, which is just 2.3% of all loan dollars. Black borrowers within majority Black neighborhoods received about half of this figure (\$23.3 billion). As indicated in Table 4, Black and Latinx majority neighborhoods had significantly lower average levels of loan originations and loan amounts, compared to Asian, White, and mixed neighborhoods. Lending disparities persist, even after we normalize by the number of owner-occupied housing units in each tract.

### Are PPP and HMDA Lending Patterns Associated?

Given the persistence of deep racial and spatial inequality in residential mortgage lending, coupled with anecdotal evidence from the early rounds of the PPP program suggesting that businesses with preexisting banking relationships were





**Figure 2.** Phases 1 and 2 and phase 3 PPP loan amounts per business by census tract in Chicago.

prioritized, we feel it is critical to examine the relationship between residential mortgage lending patterns and the PPP program. To do so, we rank each census tract's position in terms of HMDA mortgage lending by total originations and dollars lent within each metropolitan area, from lowest (1) to highest (max rank = # of tracts in metro). We construct a similar ranking for the PPP program and then calculate the Pearson's *R* correlation statistic for each metropolitan area. Table 5 ranks all metropolitan areas with a minimum of 1 million people by how correlated their PPP lending was with the spatial pattern of mortgage lending. Throughout the entire country, the correlation in ranks is very high at 0.80 for total loan count and 0.79 for loan amounts in Phases 1 and 2, falling to .72 and .75 in Phase 3.

As shown in Table 5, there is considerable variation in how tightly lending patterns are correlated between the HMDA and PPP data. Metropolitan areas with very high correlations tend to be older industrial cities located in the Midwest and South. These cities also happen to be some of the most racially segregated regions with high levels of concentrated poverty (e.g., Milwaukee, Baltimore, Chicago).

Metropolitan areas with lower correlations tended to be more automobile oriented areas in the West (e.g., San Jose, Tucson, Seattle, Portland) with lower levels of segregation. The correlations changed substantially and were mostly lower in Phase 3. Chicago had the largest correlation decrease from Phases 1 and 2 to Phase 3, going from .624 in Phase 1 and 2 to .059 in Phase 3. Cleveland, Milwaukee, Atlanta, and Detroit rounded out the top five largest decreases in correlation, decreasing .394, .289, .284, and .267, respectively.

### Predicting PPP Lending

Finally, we conduct a descriptive regression model of PPP lending patterns to test the relative role of three major factors determining access to PPP resources—race, neighborhood economic distress, and the structure of the lending industry in each region. Our dependent variables ( $PPP_{i,m}$ ) are the normalized number of PPP loans and total amount lent per eligible business in each census tract *i* in each metropolitan area, *m*. To capture the effects of neighborhood racial

**Table 4.** Summary of Home Mortgage Disclosure Act (HMDA) Lending Patterns by Majority Race/Ethnicity Census Tract, 2019.

Neighborhood type	Total loan applications	Total originations	Loan approval rate	Total amount originated (\$millions)	Mean loan applications	Mean originations	Mean amount (\$)	Originations per owner occupied HH	Mean loan amount per owner occupied HH
Majority Asian (N = 650)	114,922	64,065	55.7%	34,821	157.2 (7.7)	93.7 (4.4)	50,908,048 (2,974,723)	0.122 (0.019)	66,069 (13,990)
Majority Black (N = 5,775)	617,014	255,400	41.4%	49,983	104.0 (1.8)	44.2 (0.8)	8,647,587 (206,376)	0.066 (0.001)	13,409 (298)
Majority Latinx of any race (N = 6,870)	1,043,106	479,505	46.0%	117,059	133.7 (2.0)	62.0 (1.0)	15,147,374 (263,435)	0.093 (0.001)	24,615 (359)
Mixed (N = 9,193)	2,003,465	1,003,331	50.1%	290,184	215.6 (2.6)	108.7 (1.3)	31,445,994 (477,893)	0.118 (0.002)	34,860 (720)
Majority White non-Latinx (N = 48,612)	11,923,395	6,625,773	55.6%	1,686,017	244.5 (1.0)	136.2 (0.6)	34,658,896 (200,181)	0.107 (0.000)	27,644 (142)

Notes: Author's analysis of FFIEC HMDA Loan Application Record (LAR) files from 2019. HH = Household. Standard errors listed below mean in parenthesis.

**Table 5.** Pearson's Correlation Between HMDA Total Origination Rank and PPP Total Origination Rank among Census Tracts Within Metropolitan Areas with Populations Above 1 Million.

Core-based statistical area name	HMDA/PPP Tract rank correlation P1/2	HMDA/PPP Tract rank correlation P3
Milwaukee-Waukesha, WI	0.693	0.404
Indianapolis-Carmel-Anderson, IN	0.655	0.501
Birmingham-Hoover, AL	0.653	0.501
Memphis, TN-MS-AR	0.632	0.367
Baltimore-Columbia-Towson, MD	0.630	0.554
Chicago-Naperville-Elgin, IL-IN-WI	0.624	0.059
Pittsburgh, PA	0.611	0.566
Kansas City, MO-KS	0.589	0.550
St. Louis, MO-IL	0.579	0.386
Cleveland-Elyria, OH	0.576	0.182
Columbus, OH	0.564	0.460
Buffalo-Cheektowaga, NY	0.559	0.542
Philadelphia-Camden-Wilmington, PA-NJ-DE	0.559	0.403
Detroit-Warren-Dearborn, MI	0.539	0.272
Rochester, NY	0.535	0.535
Boston-Cambridge-Newton, MA-NH	0.529	0.443
Jacksonville, FL	0.526	0.413
Cincinnati, OH-KY-IN	0.516	0.359
New Orleans-Metairie, LA	0.514	0.373
Houston-The Woodlands-Sugar Land, TX	0.510	0.424
Oklahoma City, OK	0.490	0.526
Dallas-Fort Worth-Arlington, TX	0.487	0.431
Charlotte-Concord-Gastonia, NC-SC	0.484	0.427
Hartford-East Hartford-Middletown, CT	0.479	0.428
Richmond, VA	0.473	0.497
Grand Rapids-Kentwood, MI	0.468	0.412
Atlanta-Sandy Springs-Alpharetta, GA	0.461	0.177
Virginia Beach-Norfolk-Newport News, VA-	0.459	0.411
New York-Newark-Jersey City, NY-NJ-PA	0.448	0.246
Louisville/Jefferson County, KY-IN	0.437	0.389
Providence-Warwick, RI-MA	0.432	0.402
Tampa-St. Petersburg-Clearwater, FL	0.424	0.395
Austin-Round Rock-Georgetown, TX	0.422	0.481
Orlando-Kissimmee-Sanford, FL	0.406	0.339
Minneapolis-St. Paul-Bloomington, MN-WI	0.402	0.346
Raleigh-Cary, NC	0.394	0.407
Washington-Arlington-Alexandria, DC-VA-M	0.389	0.308
Nashville-Davidson-Murfreesboro-Franklin, TN	0.380	0.324
San Antonio-New Braunfels, TX	0.377	0.484
Los Angeles-Long Beach-Anaheim, CA	0.373	0.311
Phoenix-Mesa-Chandler, AZ	0.364	0.386
Miami-Fort Lauderdale-Pompano Beach, FL	0.350	0.217
San Diego-Chula Vista-Carlsbad, CA	0.330	0.294
Las Vegas-Henderson-Paradise, NV	0.305	0.260
Riverside-San Bernardino-Ontario, CA	0.290	0.345
San Jose-Sunnyvale-Santa Clara, CA	0.251	0.253
Salt Lake City, UT	0.232	0.238
Sacramento-Roseville-Folsom, CA	0.207	0.254
Denver-Aurora-Lakewood, CO	0.176	0.205
San Francisco-Oakland-Berkeley, CA	0.173	0.117
Tucson, AZ	0.106	0.156
Portland-Vancouver-Hillsboro, OR-WA	0.054	0.051
Seattle-Tacoma-Bellevue, WA	0.035	-0.016

Notes: Author's analysis of SBA PPP and HMDA loan level data.

**Table 6.** OLS Regression Model Results, Predicting Normalized Loan Counts and Amounts, by Phase.

	(1) Normalized loan count <sup>1,3</sup>	(2) Normalized loan count <sup>1,3</sup>	(3) Normalized loan amount <sup>1,3</sup> (\$)	(4) Normalized loan amount <sup>1,3</sup> (\$)
	Phase 1 and 2	Phase 3	Phase 1 and 2	Phase 3
Percent Black/African-American <sup>2</sup>	−0.0532*** (0.0111)	0.596*** (0.0120)	−6,680*** (943.8)	6,298*** (487.4)
Percent Latinx of any race <sup>2</sup>	−0.325*** (0.0130)	−0.260*** (0.0142)	−11,940*** (1,107)	−10,415*** (571.5)
Percent Asian <sup>2</sup>	0.0118 (0.0231)	0.0273 (0.0252)	3,834* (1,977)	−206.9 (1,021)
Poverty rate <sup>2</sup>	−0.384*** (0.0204)	−0.426*** (0.0222)	−14,233*** (1,747)	−8,136*** (902.0)
Total population <sup>2</sup>	−6.92e-06*** (9.02e-07)	3.20e-06*** (9.83e-07)	−1.789*** (0.0730)	−0.556*** (0.0377)
Total employment <sup>4</sup>	−6.83e-06*** (5.40e-07)	−6.85e-06*** (5.88e-07)	1.497*** (0.0567)	0.251*** (0.0293)
CRA loan count <sup>5</sup>	0.000301*** (1.69e-05)	6.41e-05*** (1.84e-05)		
CRA loan amount <sup>5</sup>			1.844*** (0.0373)	0.608*** (0.0193)
Tract rank in HMDA lending <sup>6</sup>	2.36e-05*** (4.77e-06)	−5.57e-05*** (5.20e-06)	2.418*** (0.407)	−0.300 (0.210)
Number of bank branches <sup>7</sup>	−0.00943*** (0.00110)	−0.0119*** (0.00119)	−2,291*** (95.86)	−819.7*** (49.51)
PPP lenders per loan made <sup>1</sup>	−0.00998*** (0.000731)	−0.00502*** (0.000797)	−1,687*** (63.26)	−773.8*** (32.67)
Constant	0.571*** (0.00616)	0.407*** (0.00671)	43,157*** (530.8)	20,468*** (274.1)
CBSA fixed effect	Y	Y	Y	Y
Observations	65,887	65,887	65,787	65,787
R-squared	0.113	0.161	0.183	0.124

Notes: Dependent variable is the number of PPP loans or PPP loan dollars approved in each census tract, divided by the estimated number of eligible businesses. Sources: 1) SBA, 2) Census 2015-2019 ACS, 3) Reveal/CIR, LODS, 5) CRA, 6) FFIEC HMDA, 7) FDIC. Standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

composition, we include the share of each tract's population that is Black, Latinx, and Asian ( $X_r RACE_{i,m}$  for each racial category  $r$ ).

$$\begin{aligned}
 PPP_{i,m} = & \beta_x X_r RACE_{i,m} + \beta_2 POV_{i,m} \\
 & + \beta_3 HMDARank_{i,m} + \beta_4 CRA Loans_{i,m} \\
 & + \beta_5 Banks_{i,m} + \beta_6 LenderComp_{i,m} \\
 & + \beta_7 Emp_{i,m} + \beta_8 TotPop_{i,m} + \gamma_m \quad (1)
 \end{aligned}$$

We use the neighborhood poverty rate,  $POV$ , as the measure of local economic distress. To measure the existing lending characteristics of each region, we include the within-metro census tract rank of mortgage lending ( $HMDARank$ ). This will account for how correlated PPP lending is to preexisting patterns in mortgage lending. We also use Community Reinvestment Act (CRA) small business loan data to capture local small business loan activity. CRA small business loan data include loans for businesses with annual

revenues of \$1 million or less.<sup>10</sup> From CRA data, we use the number of small business loans or loan amounts ( $CRA Loans$ ) following the dependent variable in model specifications. Next, we include the total number of bank branches ( $Banks$ ) in each tract to capture physical accessibility to potential lenders. Finally, we calculate the number of different lenders who made any PPP loan in each tract and normalize by the total number of loans ( $LenderComp$ ). This lender-per-loan index is a rough proxy for the level of local competition in the PPP program. Finally, we include a control for the number of local jobs<sup>11</sup> ( $Emp$ ) to account for the aggregate size of businesses, a simple population control ( $TotPop$ ), and a fixed effect for each metropolitan area ( $\gamma_m$ ). While rural areas are excluded from this analysis, we include the vast majority of U.S. census tracts and thus the U.S. population. We include metro fixed effects for two important reasons. First, as indicated in Table 5, there is wide variation in the structure of capital flows across metropolitan areas as indicated by the correlation between

mortgage lending and PPP lending. Second, we are particularly interested in the within-metro spatial equity of the PPP program and which neighborhoods are or are not shut out of the program. Since the spatial structure of opportunity varies across regions—with some areas featuring concentrated poverty in the urban core and others where the disadvantaged are forced to live on the exurban fringe—we focus our attention within metropolitan areas.

The results of the ordinary least squares (OLS) analysis follow closely the descriptive findings described above. As summarized in Table 6, the coefficients for percentage Black and percentage Latinx are negative and significant in Phases 1 and 2 for both total loan count (column 1) and loan amount (column 3). Yet, for Phase 3 the coefficient for percentage Black flips and becomes positive and significant for both normalized loan count and total dollars lent (columns 2 and 4). However, the impact for Latinx remains negative. This shows that neighborhood racial composition is associated with access to PPP loans, controlling for neighborhood poverty levels and other factors. The dramatic shift in effect for the percentage Black variable is interesting and bears further investigation but is suggestive that the policy changes enacted before Phase 3 may have been effective in reversing some of the biases in the earlier phases. The fact that this reversal did not seem to accrue to Latinx neighborhoods could be related to recent findings by Bates et al. (2022), which suggested that banks are not meeting the credit needs of Latinx businesses located in non-White areas. With fewer existing banking relationships between banks and Latinx businesses in non-White areas, the pool of businesses banks could expand lending to may have been smaller in Latinx than in Black neighborhoods, which saw the largest increases in loans and loan amounts between Phases 1 and 2 and Phase 3.

Neighborhood economic distress, as indicated by the percentage of residents living in poverty, is negatively associated with receiving PPP loans. On average, poorer areas received smaller loan amounts, although the magnitude of the differences was somewhat reduced in Phase 3. This finding is consistent with the narrative that PPP lending flowed first to more economically advantaged places, which already tend to have more resources.

The variables that are meant to capture the structure of preexisting lending patterns and lender competition within the PPP program are mixed. In Phases 1 and 2, the tract rank in residential mortgage and CRA lending totals are positive and significant for both normalized loan count and total dollars. This means that tracts that received relatively more mortgage and CRA loans tended to receive more PPP loans. However, by Phase 3 the coefficient flipped signs for residential mortgages and is significant for loan counts (but not dollars). It decreased but remained positive for CRA loan counts and amounts. This could be indicative of the policy changes made in Phase 3 that set aside money for

nontraditional bank lenders and Community Development Financial Institutions that may not have followed the highly uneven pattern seen in the overall mortgage market. The number of bank branches and the lending competition variables are both negatively associated with PPP lending. This is a bit confusing and deserves further inquiry.

## Conclusion and Policy Implications

In terms of the PPP program's overall impact on racial and spatial justice, we conclude that the program mostly followed existing mechanisms of capital flow that resulted in fewer resources reaching communities of color and low-income neighborhoods. During the first two phases—when approximately 60% of all loans and 70% of total loan dollars were allocated—majority Black and Latinx neighborhoods received disproportionately fewer loans and dollars, controlling for the number of potentially eligible businesses and self-employed borrowers. Economically disadvantaged places, as measured by relatively high concentrations of poverty, received disproportionately fewer resources across all phases.

The turnaround for Black neighborhoods documented in Phase 3 is interesting and indicates that the policy changes, including allowing early access to SBA-approved Community Financial Development Institutions and setting aside specialized loan pools for first-time borrowers and very small businesses, may have worked. This shift, however, does not seem to significantly reduce disadvantage in majority Latinx areas. This shift, while promising in some respects, is worthy of future investigation that could be conducted through case studies of specific cities like Chicago, which appeared to show a pronounced spatial shift in lending patterns from Phases 1 and 2 and Phase 3.

Finally, our analysis shows that the overall spatial pattern of PPP lending closely follows the pattern seen in pre-pandemic residential mortgage lending. (Loan-level data for small business lending are not available in the same detail as HMDA records.) While the overall correlation between a tract's within-metro rank in receiving mortgage capital and PPP loans is very high, there is considerable variation in this pattern across regions. Overall, regions with high levels of spatially segregated economic opportunity and a history of racial segregation were the regions with the highest correlation in lending patterns. Yet, the documented shifts from phases suggest that policy changes can impact the long history of institutional racism and disinvestment in access to capital.

There are important limitations to our analysis. First, we do not directly observe racial discrimination in the PPP program as the data collected on the race of borrowers were not collected in a manner that allowed for confident analysis. Thus, we had to use space as a proxy, by examining lending by racial and economic conditions measured at the census tract level. Second, given the inconsistencies in

identifying specific lenders across the HMDA, CRA, and PPP data sets, we could not systematically assess the lending patterns of specific lending institutions between the residential mortgage market, small business lending, and the PPP program. In addition, we do not have access to data on borrowers' or firms' creditworthiness (i.e., credit scores or Dun and Bradstreet ratings) and therefore cannot directly prove lending discrimination. Finally, we acknowledge that there still may be issues of selection bias in our analysis of the PPP program, even after normalizing for the number of potential businesses and self-employed people in each tract. Thus, our findings should be interpreted as showing an association between neighborhood racial and economic conditions and PPP loan access, rather than a causal link.

We foresee several potential policy recommendations stemming from this work. First, the descriptive analysis indicates that future emergency relief programs should include incentives for targeting credit access to communities of color and minority-owned businesses at the start. The changes passed by Congress in Phase 3 were made in response to criticism of the first two phases. Now that the policy changes seem to be at least partially corrective of previous barriers, the lesson should be integrated into future policies. Additionally, the increased lender pool that included Fintech lenders, and the nonbank lenders used in Phase 3 that have a demonstrated history of improving access to capital in low income and communities of color, should be utilized at the onset of the program to lessen the reproduction of access to capital inequalities seen in Phases 1 and 2.

Further, this work also suggests that the Federal government collect and disseminate better loan-level data on small business lending decisions similar to the data collected under HMDA. This would allow for not only a more precise estimate of the equity of the PPP program, or programs like it, but would also allow activists and advocates better transparency into the loan operations of lending institutions.

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### ORCID iD

T. William Lester  <https://orcid.org/0000-0003-2132-8665>

### Notes

1. States issuing stay-at-home orders in March included Alaska, California, Colorado, Delaware, Hawaii, Idaho, Illinois,

Indiana, Louisiana, Michigan, Minnesota, Montana, New Jersey, New Mexico, Ohio, Oregon, Rhode Island, Vermont, Washington, West Virginia, Wisconsin, and New York.

2. States issuing stay-at-home orders in early April included Alabama, Arizona, Florida, Georgia, Maryland, Mississippi, Missouri, Nebraska, Nevada, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia.
3. Of the \$35 billion, \$15 was set aside for first draw and \$25 for second-draw borrowers.
4. Specifically, we relied on the "shp2dta" and "geoinply" user written functions within STATA. Thanks to Kevin Crow and Robert Picard, respectively.
5. Oh, S. et al. (2021-05-01) Geocoded loan data from the Paycheck Protection Program 2020 (PPP) by Reveal from the Center for Investigative Reporting. Stanford Digital Repository. Available at: <http://purl.stanford.edu/cn690cd8420>. Morel, L. C., Al ELew, M. & Harris, E. "Hundreds of billions of dollars in PPP loans marred by racial inequity." Reveal. May 1, 2021. <https://revealnews.org/article/rampant-racial-disparities-plagued-how-billions-of-dollars-in-ppp-loans-were-distributed-in-the-u-s/>.
6. While we recognize this proxy is imperfect in that it cannot account for self-employed workers who maintain a business address outside their home, we do not believe this bias occurs differentially by race or geography.
7. <https://ffiec.cfbp.gov/data-publication/dynamic-national-loan-level-dataset/2019>
8. Majority neighborhoods by race and ethnicity are defined when one racial or ethnic group accounts for greater than 50% of the residential population. Majority Black, Asian, and White neighborhoods are defined as the "non-Hispanic or Latino" population of each racial category. Majority Latinx neighborhoods are defined as having 50% of more population of any race who identified as "Hispanic or Latino."
9. Urban tracts are tracts located in a principal city of a metropolitan area outside of the CBD. Suburban tracts are tracts located in an MSA outside of the principal city. Rural tracts are tracts located in micropolitan areas and outside of metropolitan areas.
10. For 2019 CRA reporting, commercial banks and savings associations with total assets of \$1.28 billion or more were required to report their small business lending.
11. We used workplace-based data from the Local Origin-Destination Employment Statistics (LODES) program to summarize total employment counts by census tract. (<https://lehd.ces.census.gov/data/>)

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### Author Biographies

**T. William Lester** is a professor of urban and regional planning at San José State University. His research interests are broad within the field of urban and regional economic development, but generally focus on the role of social institutions and policy interventions in reducing income inequality and promoting balanced economic growth.

**Matthew D. Wilson** is the associate director for economic and workforce development at the Great Cities Institute at the University of Illinois Chicago. His research interests are in place-based economic development, neighborhood change and revitalization, labor markets, and job quality.