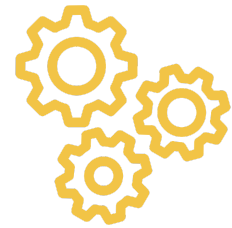## Analysis Plan

Project Name: How Documentation Burdens Affect the Equitable
Distribution of Small Business Relief Funding
Project Code: 2106
Date Finalized: 7/16/2021

Project Description

This project evaluates the effect of a policy change that reduced documentation requirements on equity in access to small business COVID-19 relief funding. We will observe the effect of these changes on the likelihood that historically underserved small businesses (1) submitted applications, (2) progressed to the "under review" phase, and (3) obtained funding for the emergency microloan program. We expect that reductions in documentation requirements may increase the likelihood that businesses owned by members of historically underserved groups apply and gain access to critical financial support to help weather the COVID-19 pandemic.

Documentation requirements for COVID-19 small business relief were generally intended to identify eligible and deserving businesses and to safeguard local governments by facilitating due diligence. However, these documentation requirements create administrative burdens that may include learning costs (i.e. uncertainty or confusion), psychological costs (i.e. stress and loss of autonomy), and compliance costs (i.e. paperwork, digital access, deadlines). Previous work has noted that "some groups of citizens may be more or less targeted by burdens, or more or less able to manage burdens. These divisions are especially important in the context of race, class, and gender differences."[1] Indeed, research finds that socially and economically disadvantaged communities face greater challenges overcoming burdensome documentation requirements.[2] In the PPP program, for instance, Black and Latinx business owners were less likely to apply and

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[1] Moynihan, Donald, Pamela Herd, and Hope Harvey. (2015). "Administrative burden: Learning, psychological, and compliance costs in citizen-state interactions." *Journal of Public Administration Research and Theory* 25, no. 1 (2015): 43-69.

[2] Christensen, Julian, Lene Aarøe Martin Baekgaard Pamela Herd, and Donald P. Moynihan. (2020) "Human Capital and Administrative Burden: The Role of Cognitive Resources in Citizen-State Interactions." *Public Administration Review.*
Nisar, Muhammad A. "Children of a lesser god: Administrative burden and social equity in citizen–state interactions." *Journal of Public Administration Research and Theory* 28, no. 1 (2018): 104-119.
Masood, Ayesha, and Muhammad Azfar Nisar. "Administrative capital and citizens' responses to administrative burden." *Journal of Public Administration Research and Theory* 31, no. 1 (2021): 56-72.
Döring, Matthias. "How-to Bureaucracy: A Concept of Citizens' Administrative Literacy." *Administration & Society* (2021): 0095399721995460.
Barnes, Carolyn Y. ""It Takes a While to Get Used to": The Costs of Redeeming Public Benefits." *Journal of Public Administration Research and Theory* 31, no. 2 (2021): 295-310.
Heinrich, Carolyn J. "The bite of administrative burden: A theoretical and empirical investigation." *Journal of Public Administration Research and Theory* 26, no. 3 (2016): 403-420.
Christensen, Julian, Elizabeth Bell, Pamela Herd, and Donald P. Moynihan. (2021) "Human Capital and Citizen State Interactions: The Effects of Health on Administrative Burden and Program Access." Working Paper presented at Midwest Political Science Association.

more likely to be denied funding, despite being eligible for the program. Indeed, documentation requirements contribute to this inequity in funding by disproportionately excluding businesses owned by members of historically underserved groups, like Black and Latinx Americans and women, because documentation requirements disproportionately:
- discourage some business owners from initiating an application for funding, or
- decrease the likelihood of some business owners completing an application, or
- increase the likelihood that those from some historically underserved groups who apply are found ineligible, for reasons unrelated to their eligibility.

Diagnosing Key Barriers in the Process of Applying for COVID-19 Small Business Relief

We identified four main stages of small business relief funding during which inequities may arise: 1) eligibility 2) awareness 3) application/documentation and 4) selection for funding. In this project, we focus on the third stage. However, it is also important to acknowledge the barriers that arise early in the process.

In the awareness and application/documentation stages, administrative burdens in the form of learning (i.e. uncertainty or confusion), psychological (i.e. stress and loss of autonomy), and compliance costs (i.e. paperwork, digital access, deadlines) abound. For instance, individuals with less human capital and administrative literacy face greater challenges overcoming frictions or administrative burdens in applications for government programs.[3] Additionally, access to the economic, social and political capital to overcome administrative burdens is not evenly distributed across individuals applying for government programs. Therefore, reducing friction increases access to public programs, especially among underserved communities. [4]

In the context of small business relief funding, our descriptive analysis (project 2006) falls in line with the previous evidence on administrative burdens, suggesting that documentation burdens limit equity in funding. However, that project was descriptive with a small sample and there is limited evidence to quantify a disproportionate effect of documentation requirements on underserved groups. In this project, we extend the prior work by providing a rigorous assessment of the potential equity-enhancing effects of reducing burden and increasing access to application assistance among underserved small business owners. We expect that reductions in documentation burdens may increase the likelihood that businesses owned by members of historically underserved groups apply and gain access to critical financial support to help weather the COVID-19 pandemic.

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[3] Christensen, Julian, Lene Aarøe Martin Baekgaard Pamela Herd, and Donald P. Moynihan. "Human Capital and Administrative Burden: The Role of Cognitive Resources in Citizen-State Interactions." *Public Administration Review*. https://onlinelibrary.wiley.com/doi/full/10.1111/puar.13134

[4] Linos, Elizabeth, and Nefara Riesch. "Thick Red Tape and the Thin Blue Line: A Field Study on Reducing Administrative Burden in Police Recruitment." *Public Administration Review* 80, no. 1 (2020): 92-103.
Herd, Pamela, Thomas DeLeire, Hope Harvey, Donald Moynihan. (2013). Shifting Administrative Burden to the State: The Case of Medicaid Takeup." *Public Administration Review*.

We diagnosed the key barriers to equity in access to small business relief funds through multiple avenues. First, we utilized our existing data from multiple cities to quantify the proportion of underserved businesses that do not get funded due to documentation barriers. In one city, we find that 46% of Hispanic small-business owners compared to 49% of white non-Hispanic business owners were able to successfully provide documentation needed to acquire COVID-19 relief funding. Moreover, when we look across all underserved small-business owners (women, racial minorities, immigrants, disabled), 23% of underserved applicants were funded while 28% of other applicants were funded. There may be differences such as industry, pre-COVID revenue, etc. that contribute to this gap. However, the preliminary data at least suggests that in the application/documentation stage, there are disparities that could exacerbate existing inequities in access to capital among small businesses in underserved communities.
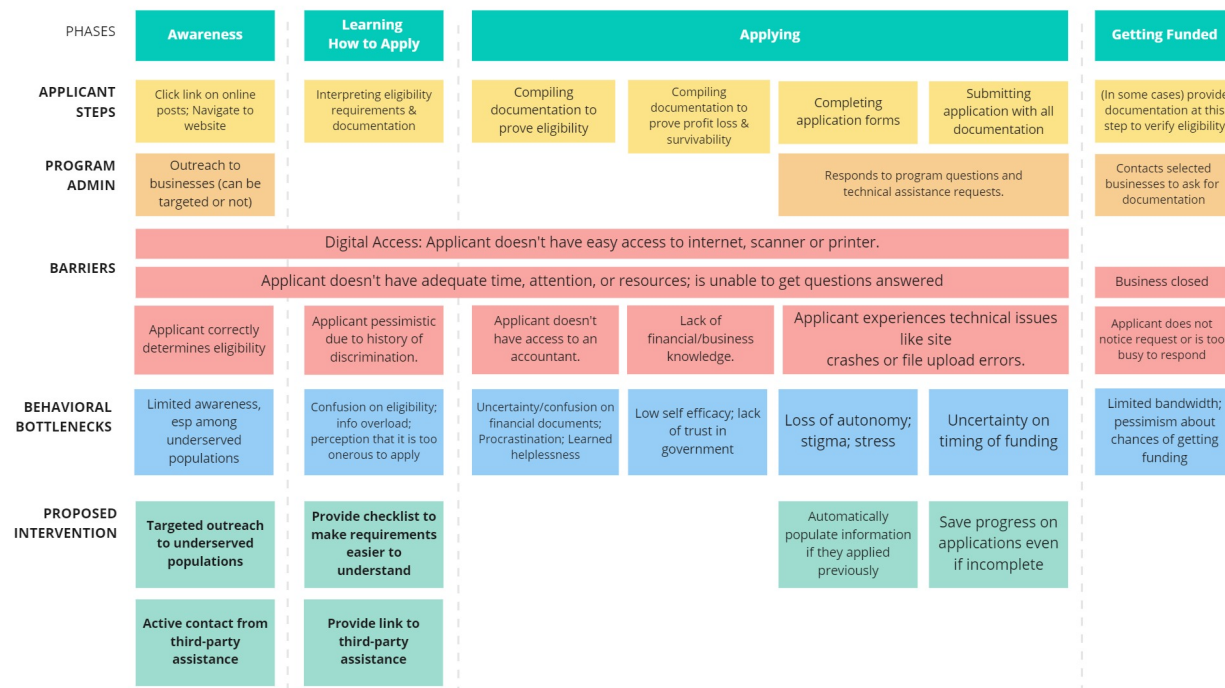
Second, we conducted interviews with organizations providing application assistance to small businesses in multiple cities to dig into *why* underserved communities may face greater barriers in applying for small business relief funds. These interviews revealed multiple behavioral barriers as well as structural barriers to completing required documentation. For example, from our interviews with grant and loan administrators and community organizations that provided application assistance to underserved small businesses in COVID-19 relief programs, we found that Profit & Loss statements and Balance sheets were particularly burdensome for low-volume cash businesses without a staff accountant, such as those with sole proprietors. These businesses are disproportionately owned by those from racially minoritized groups and may also be more likely than larger, better-resourced businesses to be women-owned. Moreover, the substantial documentation requirements discouraged many marginalized business owners from applying not only because of the compliance demands and confusion about specific requirements, but also because many believed that these hurdles were indicative of the city trying to exclude people like them from getting help. This lack of trust in government, which is more common in marginalized communities, was exacerbated by the often non-transparent process by which businesses were selected for funding. Ultimately, in order for it to be worthwhile to put in the time and effort to complete documentation, small business owners had to believe that the government would fund someone "like them". They also had to find the time to compile and submit documentation. This task was likely more difficult for racial and ethnic minorities and women, who were hit harder by the COVID-19 pandemic (i.e. sick friends and family, demands for child care, job losses, and other caring responsibilities during the COVID-19 pandemic).[5]

We created this map to summarize our findings on the multiple intersecting barriers that small business owners from underserved communities face in applying for COVID-19 relief funds.

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[5] Sevilla, Almudena, and Sarah Smith. "Baby steps: the gender division of childcare during the COVID-19 pandemic." *Oxford Review of Economic Policy* 36, no. Supplement_1 (2020): S169-S186.
Alon, Titan, Matthias Doepke, Jane Olmstead-Rumsey, and Michèle Tertilt. *The impact of COVID-19 on gender equality*. No. w26947. National Bureau of economic research, 2020.

Application Process for Small Business Relief Funding

PHASES	Awareness	Learning How to Apply	Applying				Getting Funded
APPLICANT STEPS	Click link on online posts; Navigate to website	Interpreting eligibility requirements & documentation	Compiling documentation to prove eligibility	Compiling documentation to prove profit loss & survivability	Completing application forms	Submitting application with all documentation	(In some cases) provide documentation at this step to verify eligibility
PROGRAM ADMIN	Outreach to businesses (can be targeted or not)				Responds to program questions and technical assistance requests.		Contacts selected businesses to ask for documentation
BARRIERS	Digital Access: Applicant doesn't have easy access to internet, scanner or printer.						
	Applicant doesn't have adequate time, attention, or resources; is unable to get questions answered						Business closed
	Applicant correctly determines eligibility	Applicant pessimistic due to history of discrimination.	Applicant doesn't have access to an accountant.	Lack of financial/business knowledge.	Applicant experiences technical issues like site crashes or file upload errors.		Applicant does not notice request or is too busy to respond
BEHAVIORAL BOTTLENECKS	Limited awareness, esp among underserved populations	Confusion on eligibility; info overload; perception that it is too onerous to apply	Uncertainty/confusion on financial documents; Procrastination; Learned helplessness	Low self efficacy; lack of trust in government	Loss of autonomy; stigma; stress	Uncertainty on timing of funding	Limited bandwidth; pessimism about chances of getting funding
PROPOSED INTERVENTION	Targeted outreach to underserved populations	Provide checklist to make requirements easier to understand			Automatically populate information if they applied previously	Save progress on applications even if incomplete	
	Active contact from third-party assistance	Provide link to third-party assistance					

Behavioral Barriers

The most notable behavioral barriers are: 1) lack of awareness 2) confusion/uncertainty and 3) distrust of government. Our interviewees explained that small business owners from underserved communities were more likely to be confused about how to fill out additional financial documents that were not usually required for taxes. Interviewees also explained that a large behavioral barrier was the uncertainty regarding how many businesses would be funded and the likelihood that they would benefit. In order to put in the effort to gather and submit documentation, they needed to be encouraged to apply and receive support in the process of gathering and understanding documentation. Finally, our interviewees explained that another behavioral barrier is a lack of trust in government due to historical and contemporary discrimination in local government policies and practices. This made outreach from a third-party that reflected their racial identity in the process of applying for small business grants and loans a key support system/buffer for underserved business owners, because third-party help was more accessible and trustworthy than the help lines provided by the local government (which were often overloaded with calls/emails).

Structural Barriers

In addition to behavioral barriers, the interviews also revealed structural/systemic barriers that prevent small business owners from underserved communities from accessing small business COVID-19 relief funds. The most important structural barriers that were mentioned in the interviews were: 1) disparities in digital access, 2) disparities in access to capital and 3) disparities in technical business knowledge. Putting together a profit and loss statement or a balance sheet

requires some level of technical business knowledge, which is usually provided by an accountant. According to our interviews, small business owners in underserved communities were less likely to have easy access to this technical business knowledge and support, which made the third-party application assistance especially important in submitting applications. Moreover, small business owners from underserved communities were less likely to have access to working capital that may be required for collateral for loans they needed and less likely to have digital access. For these reasons, structural barriers to entry were higher for small businesses in underserved communities.

Intervention & Theory of Change:

We will evaluate a policy change in a city that reduced the set of documentation requirements applicants had to complete in order to gain access to small business COVID-19 relief funds. Reducing documentation requirements, such as removing the requirement to submit Profit & Loss statements, may be a way for cities to increase the likelihood that businesses owned by members of historically underserved groups gain access to critical financial support to help weather the COVID-19 pandemic. [6] With less documentation required, we predict that underserved business owners, who were already facing incredible challenges in the COVID-19 pandemic, would likely have faced less confusion and paperwork hurdles that led many to give up on the application process. In turn, we predict that underserved business owners will be more likely to submit applications and advance to the "under review" stage when documentation requirements are reduced.

Specifically, we expect that reducing documentation requirements:
   a) combats information overload,
   b) decreases the perception that it is too onerous to apply (although the size of this effect will be limited by the actual application demands),
   c) improves self-efficacy about completing applications.

Reducing documentation could also address structural barriers by:
   d) making it possible, or at least easier and faster, for applicants without access to an accountant to compile financial documents.

Via these mechanisms, we predict an increase in the ability of underserved small businesses owners to comply with the requirements by submitting an application.

Hypothesis 1a: Reducing documentation requirements will increase the likelihood that underserved businesses that initiate an application go on to submit an application.

As seen in the Figure "Stages of the Application Process" below, submitted applications could be rejected (for ineligibility), returned (for further documentation), or could advance to being "under

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[6] Linos, Elizabeth, and Nefara Riesch. "Thick Red Tape and the Thin Blue Line: A Field Study on Reducing Administrative Burden in Police Recruitment." *Public Administration Review* 80, no. 1 (2020): 92-103.
Herd, Pamela, Thomas DeLeire, Hope Harvey, Donald Moynihan. (2013). Shifting Administrative Burden to the State: The Case of Medicaid Takeup." *Public Administration Review.*

review." Application submission (Hypothesis 1a) is the primary outcome, because advancing to later stages depends on factors outside of the control of the business applicant, like the business size and structure and the city's administrative capacity to process applications. However, it is worth testing whether the hypothesized changes in application submission will also translate to downstream outcomes, such that underserved businesses are more likely than before to advance to the "under review" stage.

Hypothesis 1b: Reducing documentation requirements will increase the likelihood that underserved businesses advance to the "under review" stage of the application process.

Finally, by increasing the probability of underserved businesses being included in the applicant pool, reducing documentation requirements could also increase the probability of underserved businesses being awarded funding.

Hypothesis 1c: Reducing documentation requirements will increase the likelihood that underserved businesses are awarded small business COVID-19 relief funds.

Based on prior research highlighting the disparate impacts administrative burdens have on underserved communities, we also predict that a reduction in documentation burdens will have a bigger impact on underserved business owners, and potentially could even narrow disparities in application and award rates between underserved and non-underserved businesses. An important assumption underlying these hypotheses is that underserved and non-underserved businesses are equally likely to have the information about the program and the program change, which may not be the case if there was no outreach to underserved communities about the reduction in documentation requirements. However, assuming that there was no difference between underserved and non-underserved businesses in awareness of the program and the reduction in documentation requirements, we predict that the program change will have a bigger impact on underserved business owners, who likely faced more barriers to submitting documentation prior to the program change.

Hypothesis 2a: Reducing documentation requirements will have a larger impact on underserved relative to non-underserved businesses in the likelihood of submitting an initiated application.

As with Hypothesis 1, our primary hypothesis is about the effect on submission, because this is the first stage of the process and the one that the change in documentation requirements was primarily designed to influence. **Thus, Hypotheses 1a and 2a are the primary hypotheses in this project.**

Although making it to "under review" and receiving funding are secondary outcomes, it is worth examining whether effects of the reduction in documentation requirements extend to these outcomes. As discussed below, tests of hypotheses about these outcomes will be useful for understanding the size and extent of the effect that the change in documentation requirements can produce.

Hypothesis 2b: Reducing documentation requirements will have a larger impact on underserved relative to non-underserved businesses in the likelihood of advancing to the "under review" stage.

Hypothesis 2c: Reducing documentation requirements will have a larger impact on underserved relative to non-underserved businesses in the likelihood of being awarded small business COVID-19 relief funds.

We will test these hypotheses using data from a city emergency microloan/grant program (*we will refer to the city anonymously throughout the analysis plan to align with city officials' wishes to remain anonymous*). This program was subject to changes in the middle of implementation, which creates variation that we leverage to examine the relationship between documentation requirements and equity in access to COVID-19 small business relief funds.

Background on the Emergency Microloan Program
The city created the Small Business Emergency Microloan Program in March 2020 to distribute $11 million to businesses located in the city. The implementation of the program started prior to federal CARES Act funds appropriations. This program was implemented by the Economic Development Department (EDD) and built on an existing microloan framework, but had lower interest rates (either 0% for a term of six months to one year, or 3% to 5% for a term of up to five years) and a lower loan limit ($5000 - $20,000) than the standard Microloans offered by EDD (which range from $5000 - $50,000 at 7-9% interest over 1-5 years).

The emergency microloan program in the city required a long list of documentation requirements originally, as shown in Table 1 below. The long list of requirements for applicants was driven by the use of CDBG funding to support the program, which comes with strict requirements for documentation and verification. However, after the city government realized that the extensive documentation requirements may be shutting out underserved small business owners who were disproportionately more likely to need support and less likely to be able to overcome administrative burdens, they changed the program. Specifically, the city decided not to utilize CDBG funding and to instead leverage different sources of funding within the city budget that did not require stringent documentation requirements. As a result of this change in the source of funding, the mayor announced Wednesday, May 21, 2020 that EDD relaxed documentation requirements for the Small Business Emergency Microloan.

EDD along with the Mayor's Office hoped that this critical adjustment to the program would greatly improve the process and allow EDD to disburse the much needed funds in a timely and equitable manner. As seen in the table below, after May 21st the documentation requirements were significantly less burdensome. Specifically, by making the profit and loss statement optional, the city removed the most significant documentation barrier that we identified in our interviews with front-line workers that serve racially minoritized and other underserved communities. In December 2020, the City Council approved the conversion of loans to grants if businesses complied with the provisions of the loan agreement (i.e. spending the funds in accordance with

CARES requirements, not relocating the business outside the city, and submitting a certificate of compliance certifying their compliance with all provisions).

Table 1. Documentation Requirements Before and After Policy Change

| Documentation Prior to May 21st	Documentation After May 21st
REQUIRED: ● Business Tax Registration Certificate (valid prior to March 2020) ● Breakdown of Sources and Uses (budget) to check whether they were authorized expenses ● Credit check authorization ● Profit and Loss statement ● Business Plan ● Projections (3-5 years) ● Commercial Lease Agreement ● Commercial Liability Insurance ● Workers Comp Insurance (if applicable) ● Personal Financial Statement ● Personal Income Tax Returns (2 years) ● Business Tax Returns (1-2 years, if available) ● Business Financial Statements (3 months) ● Resumes ● Business Bank Statements (3 months, latest available) ● Personal Bank Statement (1 month, latest available)	**REQUIRED:** ● Business Tax Registration Certificate (valid prior to March 2020) ● Breakdown of Sources and Uses (budget) to check whether they were authorized expenses ● Business Tax Returns (1-2 years, if available) ● Business Financial Statements (1 month) ● Business Bank Statements (3 months, latest available) ● Personal Bank Statement (1 month, latest month available)
OPTIONAL:	**OPTIONAL** (provision of these documents had no effect on the **probability** of obtaining assistance): ● Credit check authorization ● Profit and Loss statement ● Business Plan ● Projections (3-5 years) ● Commercial Lease Agreement ● Commercial Liability Insurance

	• Workers Comp Insurance (if applicable)
	• Personal Financial Statement
	• Personal Income Tax Returns (2 years)
	• Resumes

The mayor also announced that he had instructed EDD to prioritize loans that were previously denied so they could be reassessed based on the new eligibility standards. However, according to our interviews with the EDD office, they were already reaching out to applicants who had submitted incomplete applications prior to the change in documentation. So, the major policy change was that the number of required documents decreased. This major program change provides an opportunity for building evidence on the impact of documentation burdens on equity in access to small business COVID-19 relief funding.

There are multiple mechanisms by which the reduction in documentation requirements could have impacted equity in access to small business relief funding. First, the announcement from the Mayor could have prompted businesses that had not yet applied to initiate an application. Second, the announcement could have prompted businesses that submitted incomplete applications prior to the change, or which had initiated but never submitted an application prior to the change, to submit or re-submit an application. Finally, the program change changed the efficiency of application processing, and the set of required documentation on the online application portal, regardless of whether businesses were aware of the change or not.

Stages of Application Process
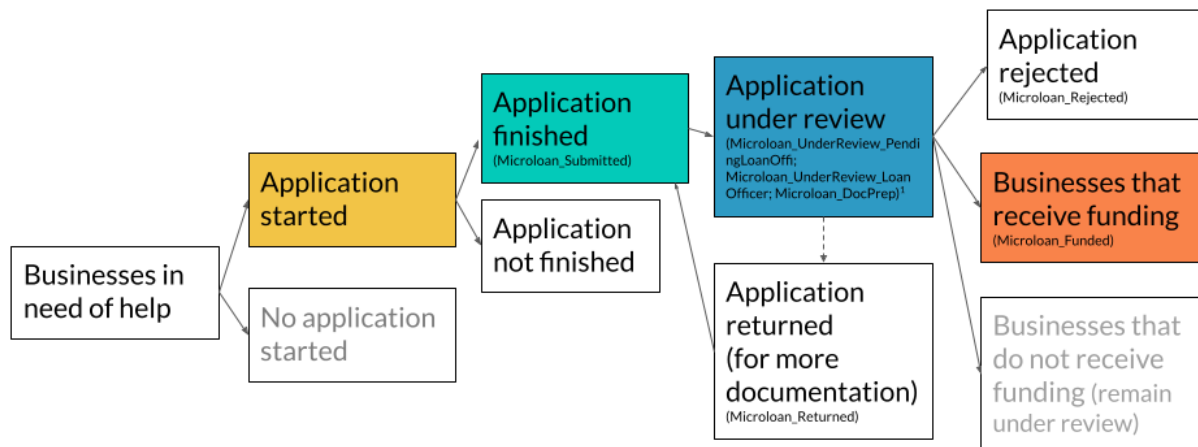
[1] These are three consecutive stages. They are visualized together here as they will be treated together in the analysis.

The figure above shows the stages of the application process for small business owners applying for the emergency microloan program. Due to the extensive documentation requirements and the disparities in social and economic capital, we expect that businesses owned by members of

historically underserved groups will be less likely than other businesses to make it through one or more of these stages. Therefore, reducing the documentation requirements should particularly increase the likelihood that underserved businesses make it through each stage of the application process.

Data and Data Structure

This section describes variables that will be analyzed, as well as changes that will be made to the raw data with respect to data structure and variables.

Data Source(s):
[Identify the source(s) of the data to be analyzed, if appropriate.]
The data were provided by the city's Economic Development Department. We received a data file containing all of the businesses that initiated applications for the emergency microloan program.

Transformation of data structure:

The raw data includes multiple rows for each small business that initiated an application for the emergency microloan program. Each row depicts the status of the application for small businesses as well as the date that the application status changed (see Figure 1 for the full set of application stages). For the main analysis, we will transform the raw data into a dataset that includes a row for each day in the application period for underserved and non-underserved businesses (2 rows per day) with columns that capture the proportion of applications reaching each stage of the application process. *For the businesses that initiate or submit multiple applications, we will take the time stamp of the first application initiation but fill in any missing variables using information from other status changes to reduce missingness.*[7] This ensures that we are not double counting single businesses in our count outcome variables, which would induce bias in the estimation of treatment effects and standard errors.

For a secondary set of analyses looking at women-owned businesses and minority-owned businesses specifically (as opposed to the overarching category "underserved businesses" in the primary analyses), we will create a separate data file that includes a row for each day in the application period for (1) women-owned, not minority owned, (2) women-owned, minority owned, (3) not women owned, minority owned, (4) not women owned, not minority-owned businesses (4 rows per day). This will allow us to examine the interaction between women-owned and minority-owned businesses in the analysis.

Transformations of Variables and Outcome Variables to Be Analyzed:

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[7] For example, if the first submission was after the policy change, this would be classified as treatment, regardless of whether the first initiation was prior to or after the policy change. However, if they submitted prior to and after the change, we would take the first submitted date, which would mean they are in the control group (pre-treatment group) because they submitted an app when there was the longer list of documentation requirements. In terms of coding the underserved status variables and the timing of application for each business, we will (1) use underserved/employee fields from last status update if that's available (original.submission.date) and (2) if that status update timestamp is missing, use the begin date instead.

Independent Variables: Identifying Underserved Businesses & Timing of Application

The raw data includes dichotomous variables for whether a business is a:

1. Certified woman-owned business
2. Uncertified woman-owned business
3. Certified veteran-owned business
4. Uncertified veteran-owned business
5. Certified minority-owned business
6. Uncertified minority-owned business
7. Certified disabled-owned business

For disability status, the data for the microloan program only includes officially certified disabled business owners. However for Veteran, Minority, and Women-owned business owner flags, there are separate variables for underserved business owners that are certified and uncertified.

From this raw data, for the primary analysis, we will create a measure capturing whether a business is **non-underserved** based on the sum of all of the following indicators equaling 0:

1. Women-owned (certified or uncertified)
2. Veteran-owned (certified or uncertified)
3. Minority-owned (certified or uncertified)
4. Disabled-owned (certified ONLY, because the data only include certified)

We will also examine the intersection of multiple axes of marginalization by looking at the interaction between gender and minority status, if we have sufficient power.[8] There are only 12 businesses that have certified disabled owners and veteran owners are also rare, which does not allow for analysis of the intersection of disability or veteran status with other statuses. Therefore, we will focus our intersectionality analysis on whether the reduction in documentation burdens impacted the likelihood of successful applications among businesses that are owned by women who are racial minorities.

For the timing variable, we will create a dichotomous indicator for whether the day in question is after or before May 21, 2020 (After). We summarize each of these key independent variables in Table 1 below.

Table 1. Key Independent Variables

Independent Variables	Description
Non-Underserved business	Dichotomous indicator coded as 1 for businesses that were **not** classified as any of the following: a. Women-owned, b. Veteran-owned, c. Minority-owned, or d. Disabled-owned.

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[8] To maximize statistical power and sample size, we will include all women, minority, and veteran-owned businesses, rather than limiting the analysis to include only small businesses with these specific certifications.

	and coded as 0 otherwise.
After	A dichotomous variable for whether the day in question is before (coded as 0) on or after (coded as 1) the documentation requirements changed on May 21, 2020.
Time elapsed since the start of the application period	Measured as the days since the start of the application period.

In Table 2, we highlight the set of control variables we will include for each key outcome of interest.

Table 2. Control Variables

Derived Control Variables	Description
Day of the Week	An indicator for which day of the week it is, which will help account for potential idiosyncratic temporal variation. These dummy variables for each day of the week will improve precision.
Average days applicants have to change status (days relative to program change)	Calculated as the number of days an applicant has to change status (in the pre- or post-program change period), based on when they initiated, submitted, or went under review (depending on the outcome of interest). This means that for the submitted outcome, if an applicant initiates an application the day before the program change, they will be given a 1 because they only have one day to submit. However, if they initiate the application 30 days before the program change, they will be given a 30. For applicants initiating in the post-period this will be calculated as the number of days until the application period ends relative to the day in question.
COVID-19 rates	Calculated as the number of new COVID-19 cases and deaths in the County for each day in the application period.[9]

Outcome Variables: Application Status

Based on the transformed dataset, we will utilize the submission status data changes to construct three outcome variables of interest, described in Table 2 below. To begin this process, we will identify the stage of submission (initiated, submitted, under review, funded)[10] as well as the date on which the status changed (if applicable). We will use the indicator for each status change date to construct the following key outcome variables below for:

1. Underserved business applicants, as a whole,

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[9] We downloaded this data from the County Public Health Dashboard.
[10] We collapse the submission stages into 4 main stages: initiated, submitted, under review, and awarded funding. This is for ease of interpretation, and because these are the main stages where there is likely drop-off in the application process.

2. Each type of underserved business applicant for which we have sufficient statistical power to identify effects (Women-owned, Minority-owned, Women+Minority-owned)[11], and
3. Non-underserved business applicants.

The main model of interest will be comparing underserved and non-underserved business applicants, and we will supplement that model with a separate specification that looks at specific groups including women-owned businesses and minority-owned businesses.

Table 2. Key Outcome Variables, for Each Group of Interest

Outcome Variables	Description
Primary Outcomes Included in OES abstract	
Proportion making it to the submitting phase	Calculated as the proportion of applications initiated on each day in the application period that ever make it to "submitted" status (within the pre- and post-period). Therefore, for any business initiating in the pre-period, we would be capturing the likelihood that they submit JUST in the pre-period.[12] For businesses initiating in the post-period, we would be capturing if they submit in the post-period.
Proportion making it to the "under review" phase	Calculated as the proportion of applications submitted on each day in the application period that ever make it to "under review" status (within the pre- and post-period). Therefore, for any business submitting in the pre-period, we would be capturing the likelihood that they get to the "under review" phase in JUST in the pre-period. For businesses initiating in the post-period, we would be capturing if they advance to "under review" in the post-period.
Proportion making it to the funded phase	Calculated as the proportion of applications "under review" on each day in the application period that ever make it to funded status (within the pre- and post-period). Therefore, for any business that goes "under review" in the pre-period, we would be capturing the likelihood that they get to the funded phase in JUST in the pre-period. For businesses initiating in the post-period, we would be capturing if they advance to the funded phase in the post-period.

Imported Variables:
[Describe variables that will be added to the raw data. These may be variables used in the experimental design (e.g., blocking variables) or covariates merged in from a different dataset.]
We will be importing data from the American Community Survey on neighborhood characteristics including the percentage of the block group that is considered low or moderate income, and the

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[11] If we are not able to detect a half standard deviation change in the dependent variable, we consider that to be underpowered.

[12] This means that for businesses that initiate in the pre-period, but submit in the post period, they are not counted in the proportion making it to the submitted phase.

percentage of the Census block group that is Black or Hispanic. This data will be used to compare the businesses in the pre- and post-change time period to enhance our understanding of whether the applicants are systematically different in ways that could bias the estimation of treatment effects in the interrupted time series model. We will also pull data from the County Health Dashboard on COVID-19 daily cases and deaths to account for this potentially confounding time-varying factor.

Data Exclusion:

We will exclude data that does not include the timing of any application status, as this is essential to the analysis.

Treatment of Missing Data:

For the underserved status variables, which were optional and have substantial missingness[13], we will do three main specifications. First, we will code all missing values as equal to zero for underserved status and run the analysis. Second, we will code all missing values as equal to one for underserved status and run the analysis. Finally, we will perform a robustness analysis where observations with missing underserved status are dropped to test the sensitivity of the results to the inclusion of these applicant businesses.

The reason we take this approach is because there is reason to suspect that these applications are primarily from non-underserved businesses, who see no reason to provide the information. But there is also reason to suspect that they are from underserved businesses which are concerned about being discriminated against. Because of this lack of clarity and the fact that this variable is essential in the analyses, we believe it is essential to test the sensitivity of the results by imputing and estimating a variant where they are dropped from the analysis. If the results vary significantly across these specifications, we will also estimate a variant of the model where we probabilistically impute gender based on the first name of the applicant and we will also explore the possibility of imputing race/ethnicity based on the business owner name.

For the business applicants who have missing information on control variables, we will not be imputing any of the other information--we will simply take the average on each day for the businesses whose information is not missing in constructing the analytical dataset.

Descriptive Statistics, Tables, & Graphs

As a descriptive first step, we will visualize the number and proportion of businesses from underserved and non-underserved groups (based on the non-imputed data) at each of the four stages of the application process, over time, and in the pre- versus post-May 21st periods. This is an important piece of evidence to generate because part of the policy goal for the change in documentation requirements was to get more underserved businesses to apply in the first place.

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[13] Approximately 30 percent or 5,000 out of 15,000 applications have missing data on these variables.

While our ITS analyses will make more formal comparisons of the likelihood of success for underserved business applicants, relative to non-underserved businesses in pre- and post-periods, it is also important to note whether there were descriptive changes in the representation of underserved businesses in the application pool. We expect the visual representations of the applications from each group over time to provide useful, although non-causal, insight into the role of the change in documentation requirements.[14]

Statistical Models & Hypothesis Tests

In the absence of random assignment, we employ a quasi-experimental design to obtain plausibly causal estimates that reduce the potential for omitted variable bias. Specifically, we leverage the discontinuity in time created by the program change to estimate the effect of this change on diversity in the application pool. In other words, we compare the diversity of the applicant pool prior to and after the implementation of the program change in an interrupted time series model.

Interrupted Time Series (ITS) Model

Because we observe the application success of small business applicants prior to and after the reduction of documentation requirements, we can leverage temporal variation to provide evidence on the impact of the program change on outcomes of interest. In the simplest form, the ITS model would compare the number of underserved small business applicants successfully completing an application and acquiring funding prior to and after the reduction in documentation requirements. By leveraging variation over time, we provide a model that is unaffected by typical time invariant confounding variables, such as socioeconomic status, as these characteristics are taken into account when modelling the underlying long-term trend. However, time-varying confounders, such as seasonality or a COVID-19 outbreak, may introduce bias in the results. For this reason, we include a vector of observable characteristics that are unaffected by the treatment that vary over time to better isolate the treatment effect of reducing documentation burdens. We will estimate the following models for each key outcome in a Generalized Linear Regression model [15]:

$$Y_{it} = \beta 0 + \beta 1 After_{it} + \beta 2 T_{it} + \beta 3 NonUnderserved_{it} + \beta 4 (After_{it} * T_{it}) + \beta 5 (NonUnderserved_{it} * T_{it}) + .$$

$$\beta 6 (After_{it} * NonUnderserved_{it}) + \beta 7 (After_{it} * T_{it} * NonUnderserved_{it}) + \beta 8 X_{it} + \varepsilon_{it}$$

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[14] We also note that the influx of applications post-May 21st may be driven by a mechanism that is not the program change (for instance, it could be that business owners had more time in the post-May 21st period). Ultimately, we are unable to rule out all alternative explanations for the effects we may observe, and we caution against the interpretation of the results as precise causal estimates of the treatment effect especially if we find that there were compositional changes in the applicant pool (we expand on this in the limitations section below).

[15] We will base the link function on the distribution of the dependent variable, which is unknown to us as we have not looked at the outcome data to adhere to best practices for specifying pre-analysis plans. If the distribution is gaussian, we will estimate a standard OLS regression.

- where i is an indicator for whether the row is for underserved or non-underserved businesses and t represents each day in the application period;
- Y_{it} is an indicator of our three outcomes of interest on each day for non-underserved and underserved business applicants;
- $After_{it}$ is a dichotomous indicator of whether the day is before or after May 21st 2020
- T_{it} is the time elapsed (i.e. days) since the start of the application period measured as a continuous variable rather than a set of dichotomous variables to maximize power;
- $NonUnderserved_{it}$ is a dichotomous indicator for whether the row is capturing the outcome for non-underserved businesses (1) on each day or underserved businesses (0);
- X_{it} is a vector of observable characteristics observed over time, including day of the week fixed effects to capture seasonality, the number of days the applicant had to change statuses, and COVID-19 deaths and cases in the county on each day.
- ε_{it} is a robust idiosyncratic error term, clustered by day.

In the equation above,
- β_0 represents the baseline level at T = 0 when every other quantity is also set equal to zero,
- β_1 is the level change following the intervention for underserved businesses,
- β_2 is the change in application and funding rates associated with a time unit increase (which represents the underlying pre-intervention trend),
- β_3 indicates the difference in the outcome for non-underserved businesses compared to underserved businesses,
- β_4 indicates the slope change in the number of business applicants making it to each stage of the application process following the intervention (for underserved businesses),
- β_5 indicates how the time trend for non-underserved businesses differs compared to the time trend for underserved businesses,
- β_6 indicates the level change in the outcome of interest for non-underserved businesses, relative to underserved businesses after the program change, and
- β_7 indicates how the slope change in the outcome of interest after the program change differs for non-underserved businesses, compared to the slope change for underserved businesses

For Hypothesis 1, our coefficient of interest is β_1 which captures the level change in the outcome for underserved businesses after the program change. H1 will be supported by a positive and significant β_1.

For Hypothesis 2, our main coefficient of interest is β_6 which captures the level change in the outcome for non-underserved businesses, relative to underserved businesses after the program change. We predict that β_6 will be negative, given that we hypothesize a larger effect of the documentation reduction for underserved businesses. H2 will be supported by a negative and significant β_6.

Follow-Up Analyses:

If we find that Hypothesis 1 is supported and underserved businesses were positively impacted by the program change, we will also estimate a secondary analysis that includes separate coefficients

for Women-owned*After and Minority-owned*After. These heterogeneous treatment effects can help identify the type of businesses that may have been most affected by the program change.

As a robustness check, we will also estimate the models above when we only include businesses that initiated an application in the pre-treatment time period. For these models we will estimate the proportion of business applicants that reach each stage both before and after the program change to test whether the likelihood of progressing is higher after documentation requirements are reduced. This will help rule out the possibility that the treatment effect is driven entirely by the businesses in the post-intervention period being systematically different rather than the program change driving the effects (or lack of effects) we observe. For instance, if the coefficients in our main model and in this robustness check are in the same direction, we argue that it is less likely that the results stem from compositional changes in the applicant pool. In contrast, if the results from those two models differ (e.g. the coefficient has different directionality or is significant versus not significant), then that suggests that the effect may be traceable to compositional changes in the type of businesses that initiate applications before and after the program change. Finally, we will also conduct a placebo test where we estimate the model with a set of pre-intervention time periods as the interruption in the time series to increase confidence in the estimates.

Inference Criteria, Including Any Adjustments for Multiple Comparisons:
[What criteria will you use to make inferences? Please describe the information you will use (e.g., specify the *p*-values), as well as cut-off criteria, where appropriate. Will you be using one- or two-tailed tests for each of your analyses? If you are comparing multiple conditions or testing multiple hypotheses, what method will you use to correct for multiple tests? If you are taking into account practical significance, please specify a minimum effect size of interest.]

The two primary hypotheses involve the significance tests of the coefficient β_1, and of the coefficient β_6. To correct for multiple tests, we will use the Holm-Bonferroni method. We will reject the null hypothesis for the analysis that produces the smaller of the two p-values when that value is < .025 (.05/2). If the smaller p-value is < .025 and the larger is < .05, we will also reject the null hypothesis for the analysis that produced the larger of the two p-values.

There is some concern that the Holm-Bonferroni method is too conservative in this instance, because the two primary hypotheses are dependent (the outcome measure for both is the same, although the sample is larger when testing one of the hypotheses). A less conservative approach that still contains the familywise error rate at < .05 would be to use a simulation study to set the significance level, as described in the OES Multiple Comparison Adjustments Guide. The simulation approach in this instance is somewhat complex because of the nature of the data and analyses, so we will only adopt that approach if the smaller of the two p-values in the analyses described in the previous paragraph falls between .025 and .05. Hypotheses 1b, 1c, 2b, and 2c are also confirmatory, although they apply to secondary outcomes. We will use the Holm-Bonferroni method as described for the primary tests. Hypotheses 1b and 2b are a "family" so the smaller of those p-values will be compared to .025. Hypotheses 1c and 2c are also a "family" and the smaller

of those p-values will be compared to .025. Because these are secondary hypotheses, we will not use a simulation study to set the significance level regardless of results.

Finally, there are exploratory hypotheses about the effect of the documentation change specifically on women-owned, minority-owned, and women + minority-owned businesses. Because those are exploratory, no adjustment for multiple comparisons will be used. The same is true for the additional analyses conducted for robustness checks (e.g. excluding businesses missing values on underserved status). ***Below, we detail the simulation approach (if necessary):***

The key tests are of the coefficients on the *After* main effect in the model estimated with the sample of underserved businesses, and of the *After*Underserved* interaction effect in models estimated with the sample of all businesses, for dependent variable count of submitted applications

To set the significance level for the tests of these coefficients, we will:
1. Randomly shuffle the submission dates on all applications that have at least reached the submitted stage
2. Derive control variables based on shuffled dates (day of week, etc.) and aggregate data to the day level.
3. Run Models 1-2 with outcome "submitted". Record the p-values on the *After* coefficient from the model 1, and the *After*Underserved* coefficients from Model 2.).
4. Repeat steps 1-3 1000 times.
5. Choose alpha (a significance level) such that only 50 of the 1000 simulations would have either of the 2 coefficients with p < alpha.

Limitations:

First, it is important to note that we only have information about businesses which **at least** start an application. This series of analyses does not say anything about equity gaps in starting an application.

Second, while our ITS design has the benefit of external validity and realism, it also runs the risk of lower levels of internal validity. One possibility is that businesses before and after the implementation of the application process changes are systematically different in ways that bias our estimation of the effects (the most likely direction of the bias would be downward, so we will likely provide conservative estimates of the true treatment effect. See below for more details.). Ultimately, we are unable to rigorously estimate whether the changes we observe are due to the program change or due to a systematically different set of business applicants in the post-intervention time period. However, we will look at compositional changes empirically to provide the best possible evidence regarding the mechanism driving potential effects.

Exploratory Analysis:

If we have sufficient power, we will examine whether there are differences in the impact of reducing documentation requirements across underserved businesses that are registered, compared to those that are not formally registered as an underserved business in the city. Pending sufficient power, we will also estimate a model that identifies the effects of the program change for businesses that are owned by Women and racial minorities.

Anticipated Utilization of Results and Findings

Action Supported by Positive Result:

If we find that reducing documentation requirements enhances equity in access to small business COVID-19 relief funding, this provides important evidence for future small business relief programs. A central pillar of the current administration is [enhancing social equity](#), and this project provides an important empirical test of whether reducing documentation burdens can be a tool for promoting social equity not just in small business programs in local communities, but also at the federal level.

However, Hypotheses 1a and 2a might both need to be supported to make the case for reducing documentation requirements as an "equity-enhancing" intervention. If 1a is supported but 2a is not, then reducing documentation helps all businesses to a similar extent. And while any of these patterns of results would provide useful evidence about the effect of documentation requirements, in order to be an "equity-enhancing" intervention, it would need to not only help underserved businesses, but also help underserved businesses more than non-underserved businesses. A positive result on both hypotheses would make a stronger case that the Small Business Administration and other agencies (e.g. HUD which administers CDBG funding) should consider reducing documentation requirements to enhance equity in access to federal funding.

Interpreting a Null Result:

In the event that we find reducing documentation requirements did not increase application success for underserved businesses, we still believe this is valuable evidence. From a theoretical standpoint, we would hypothesize that an intervention at the documentation stage of the application process may be a necessary but not sufficient condition for increasing equity in access to small business COVID-19 relief funding. If the city focused efforts on outreach to small businesses in underserved communities from trusted sources and also provided reduced documentation requirements and personalized support, we may observe the largest positive effects on equity.

It is also possible that we find null results because our estimates are downwardly biased. First, it could be the case that marginalized small business owners that are able to acquire a loan and business license to start a business are more savvy, and therefore that these business owners would not face significantly more difficulty than non-underserved business owners. However, this is unlikely based on our examination of the application data from multiple cities and from our

interviews. Second, the treatment group (businesses applying after the program change) are more likely to be different from the businesses applying in the pre-intervention period. Most notably, the "after" group will include many of the businesses that either considered initiating an application but didn't or that initiated but didn't submit an application. This selection effect is made explicit by the fact that the city offices are calling up folks who started the application before the change and encouraging them to submit. And, we expect this will affect the underserved pool more (assuming these businesses were indeed more affected by the substantial administrative burdens in the "pre" period). In short, we're not starting with a new pool of potential applicants in the post period, we're working with a pool that is composed of some businesses who opted out in the pre period. We predict that this will downwardly-bias the treatment effect, although there are a lot of factors that could work in different directions, which we will do our best to empirically test.

Finally, it is interesting to consider the implications of finding support only for secondary hypotheses. For instance, if we found that reducing documentation requirements improved the chances that underserved businesses received funding (Hypothesis 1c) but not the chances that they submitted an application (Hypothesis 1a), this would imply that the effects are coming from a mechanism other than the one we are exploring. For instance, maybe a reviewer independently decided to start prioritizing underserved applicants around the same time as documentation requirements were reduced. While we think this is unlikely, support for secondary but not primary hypotheses would dictate a closer examination of other program changes.

Post-Commitment Adjustments