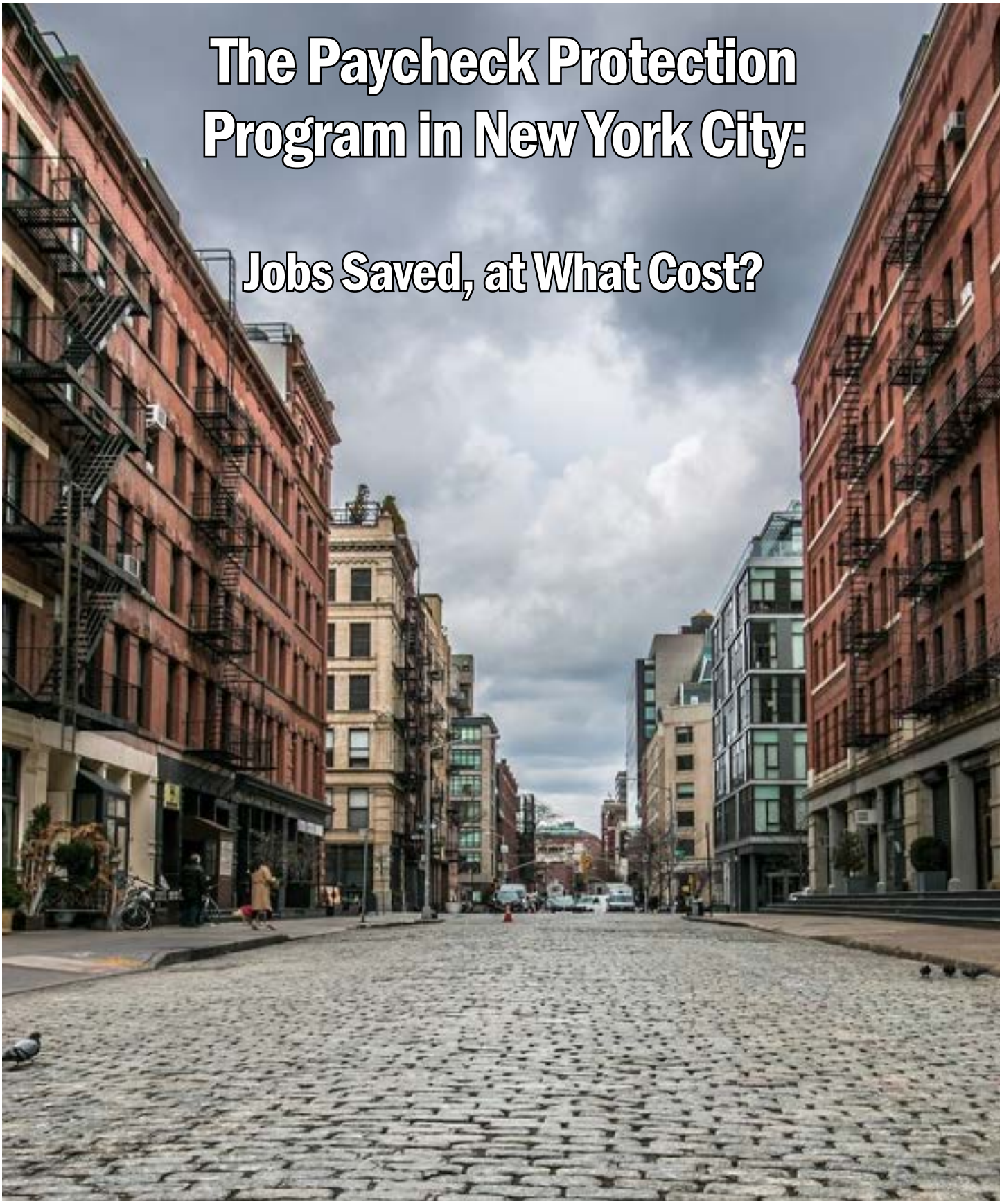
The Paycheck Protection Program in New York City:

Jobs Saved, at What Cost?



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Executive Summary

The Paycheck Protection Program (PPP) was a major component of the federal government's early response to the COVID-19 pandemic, aimed at promoting employee retention amongst small businesses by providing them with potentially forgivable loans to cover payroll costs and certain other business expenses. With about $800 billion in loans distributed nationally across two rounds of the program in 2020 and 2021, the program has received a great deal of attention in the media, particularly by those pointing to inefficiencies in its design and the potential to be misused. Because New York City and its many small businesses suffered disproportionately from the pandemic, especially in its early phases, studying the effectiveness of the program in the context of the city offers particular insights.

IBO conducted an analysis of the employment effects of PPP in New York City, using data tracking nearly all of the employers in the city through the end of 2022, matched to data on PPP loan distributions.

Among our key findings:

- Compared with similar studies conducted nationwide, we find a stronger positive employment effect in the city, and that receipt of a PPP loan is associated with an average sized establishment with 12 employees retaining almost two more employees in August 2020 than businesses that did not receive a loan.
- Additionally, we were able to track this effect over time, and find a positive impact on employment through the end of 2022. In total, we estimate that approximately 691,000 job-years (the equivalent of one job held for one year) were saved through that period.
- Based on the amount of money distributed in the city through PPP loans (just over $30 billion), we estimate that between approximately $40,000 and $65,000 of federal money was spent for each additional job retained, per year, which is substantially lower than estimates based on national data.

These findings provide important context to help evaluate the Paycheck Protection Program. Because of the unique conditions prevalent in New York City early in the pandemic, and our ability to study almost all employers, including very small ones, this study could offer insight in the design of future federal spending programs to maximize efficiency and effectiveness. Most notably, greater targeting toward those businesses who are most at risk of losing employees is associated with substantially improved results.

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Introduction

The Paycheck Protection Program (PPP) was created by a provision in the Coronavirus Aid, Relief, and Economic Security (CARES) Act passed by Congress in March 2020. With the intent of supporting payroll costs and other business expenses during the early months of the pandemic, the program provided low-interest, potentially forgivable loans to small businesses. A second round of loans was made available in the early months of 2021 to a more targeted group of small businesses. Over the 2020-2021 program period, New York City businesses received just over $30 billion in PPP loans, approximately 3.8 percent of the $800 billion of loans distributed nationally. This is slightly larger than New York City's share of U.S. payroll employment in February 2020 (3.1 percent), at least partly because of the disproportionate impact of the pandemic on the local economy.

In this report, IBO examines the effectiveness of the Paycheck Protection Program (PPP) in maintaining employment in New York City during the Covid-19 pandemic. A flagship of the federal government's response in the early weeks of the pandemic, this program has received much attention from policy makers, the media, and economic researchers. Much of this consideration has concentrated on questions of efficiency related to the lack of targeting in the first round of the program and the relatively lax controls in its administration. IBO uses individual establishment-level data from the Quarterly Census of Employment and Wages (QCEW), combined with the Small Business Administration's PPP data, to estimate the impact of PPP receipt on employment throughout the pandemic in New York City.

First, we provide an overview of the PPP's intended purpose and unique programmatic design, as well as features that make its study in New York City, specifically, of particular interest. We then explain the unique data and estimation strategy utilized to derive an estimate of the PPP's impact and cost-effectiveness in the city, before discussing several implications and reasons why the program appears to have had a larger impact than has been estimated in other studies.

Design and Intent of the Paycheck Protection Program Was to Keep Employees on Payroll

Quickly after the onset of the Covid-19 pandemic in the United States, on March 27, 2020, Congress passed the CARES Act. This legislation was intended to provide economic support to individuals, businesses, and state and local governments. One provision of the legislation created the Paycheck Protection Program (PPP) in which eligible employers could apply for low-interest (1.0 percent) loans to cover payroll costs, including wages and salaries, paid leave, health insurance, other fringe benefits, and state and local taxes, as well as mortgage interest, rent, utility expense, and other operating costs. PPP loans were provided by commercial banks, with the Small Business Administration acting as guarantor. To be eligible to apply for a loan, an employer needed to classify as a small business, in most cases having 500 employees or fewer. One notable exception was that chain or franchise accommodation and food service businesses were eligible if the business location had no more than 500 employees. Per employee, the loan was capped at $100,000 on an annualized basis, and the total loan could not exceed $10 million.

Repayment of PPP loans could be forgiven fully or in part by the federal government if certain conditions were met. There were several criteria to qualify for full forgiveness of these loans. Amongst the most significant requirements, at least 60 percent of the amount received had to be spent on direct payroll costs, with the balance (up to 40 percent) to be spent on additional qualifying business expenses.[1] Employment also had to be maintained at a level equivalent to the pre-pandemic era, as measured in 2019, or the amount of the loan forgiven would be reduced. Finally, wage levels could not fall by more than 25 percent from their pre-pandemic level without additional reduction in the forgiveness amount. Borrowers have been able to apply for forgiveness up to the maturity date of the loan–maturity for loans issued prior to June 5, 2020 was two years, and it was five years for loans issued thereafter.

Following two phases of initial federal appropriations for the original program in March and April of 2020, totaling $670 billion, a second round or "second draw" of additional forgivable loans was offered to employers in 2021 as part of the provisions of the Consolidated Appropriations Act of 2021. For receipt of this second round of loans, most employers had to have already taken out PPP loans in the first round.[2] Employers also had to meet additional and more stringent requirements: having 300 or fewer employees and providing evidence of a decline in revenue of greater than 25 percent

in any quarter in 2020, compared to the corresponding quarter in 2019. The allowable usage of loan money from this round was also expanded to include a host of activities targeted at disease mitigation, such as purchases of air filters and personal protective equipment. This second round received an appropriation of $285 billion, bringing total authorized federal spending on PPP to $955 billion, of which around $800 billion was ultimately disbursed.

Existing Research on PPP Outcomes Took National View

Much existing research on the PPP and its effectiveness at meeting its goals makes note of the program's rapid authorization and its distinct operational design.[3] Using the existing capacity of the commercial banking system to quickly issue the loans, later to be forgiven and repaid by the federal government, PPP rapidly got money into the hands of employers who were adversely affected by the pandemic. However, studies also note a distinct lack of targeting, especially in the first round—that is, a lack of prioritization in getting money into the hands of businesses most severely impacted because of employee illness and state or local restrictions prevalent during the initial phases of the pandemic.

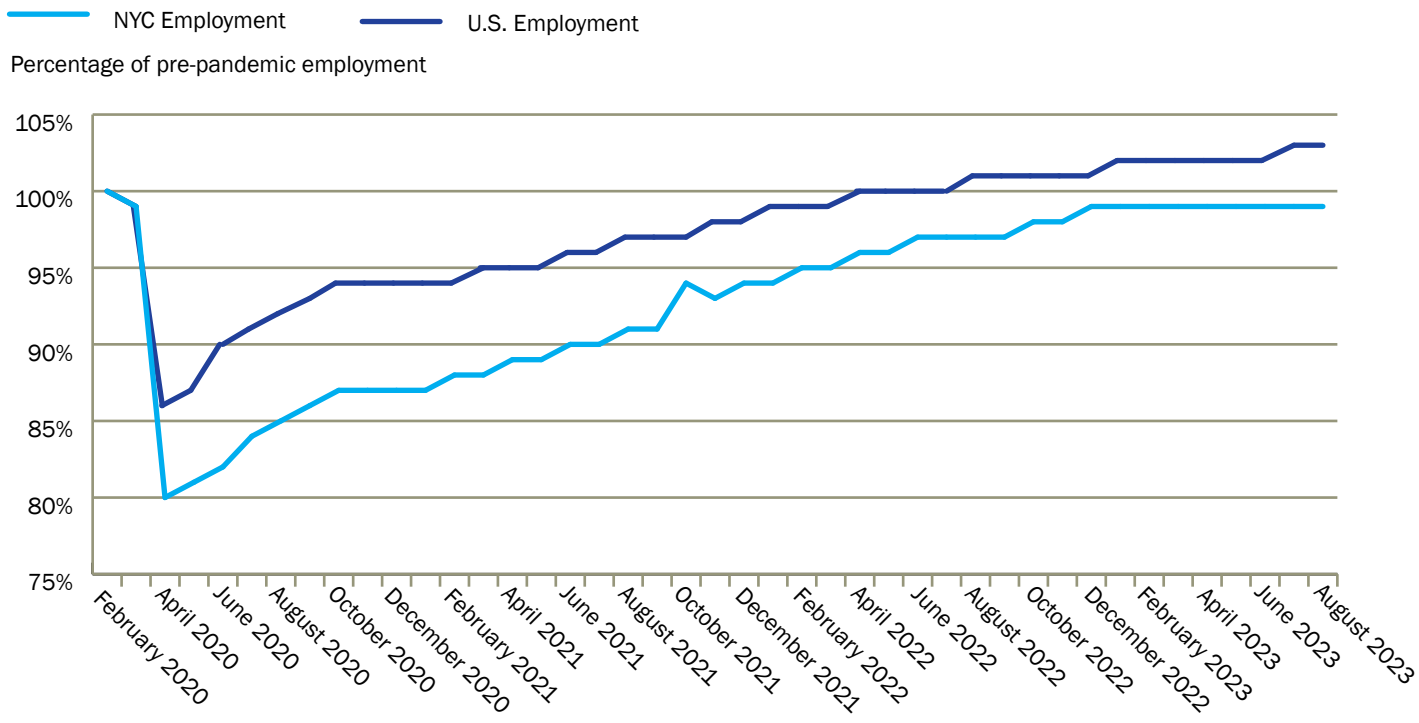
Most studies based their estimates of PPP's employment effects on analyses of national-level data derived from private payroll processing records (Autor et al., 2022, Chetty et al., 2020). They produced cost estimates of the program ranging from $169,000 over 2020 and 2021 (Autor et al., 2022) to $359,000 in 2020 (Chetty et al., 2020) per job saved. Another study (Dalton, 2023) based its estimates on an analysis of the same administrative dataset used in this study, the QCEW, but evaluated just the impact of the first round of PPP at the national level, estimating a cost of $12,000-19,000 per employee-month ($144,000-228,000 per employee-year) through 15 months post-approval. These per-job cost estimates far surpass median and mean wages, suggesting that the program was substantially more expensive to operate than the direct benefits it provided to employees by maintaining payroll. This is further reflected in recent media discussions surrounding PPP, which have focused on many anecdotal cases of fraud or use of PPP loans by firms that were not in significant danger of going out of business or cutting jobs due to the pandemic, even in the absence of receiving a PPP loan.

The Unique Case for Studying PPP Utilization in New York City

New York City offers a unique opportunity to further investigate the effectiveness of the PPP, because the city experienced distinct conditions that intersect with specific considerations of the program's design. The effects of the Covid-19 pandemic were devastating—in both human and economic terms—across the planet and throughout the entirety of the United States. But New York City offers a particularly severe example, as the largest city in the country, the most densely populated large city in the country, and one of the world's first major metropolitan areas to experience widespread disease transmission beginning in early March 2020. To put the severity and immediacy of the health crisis into context, in early April, New York City experienced over 30 percent of all U.S. deaths from Covid-19 (peaking at more than 5,000 in a single week) despite having only 2.7 percent of the nation's population.[4,5] As the pandemic continued to spread across the country, the city's share of national deaths declined, but it remained disproportionately high through 2020, and again with the arrival of additional waves and variants of the virus in the spring of 2021, winter of 2021, and winter of 2022.

In response, New York's government—at both the state and local level—took some of the earliest and strictest actions to combat the spread of the disease, including mandatory shutdowns of non-essential businesses and stay-at-home orders. These measures had a severe impact on the local economy and resulted in an initial loss of employment that substantially exceeded national levels. From its peak in February 2020 to its low point in April 2020, total employment in the city fell by more than 948,000 jobs from 4.7 million to 3.8 million—a decline of 20.1 percent. In contrast, over the same period, national employment declined by only 14.4 percent from 152 million to 130 million. Figure 1 compares both the city's and country's rate of recovery to peak pre-pandemic employment, showing that the city has recovered more slowly than the nation as a whole. National employment recovered to 100 percent of pre-pandemic levels in May 2022, while the city's employment was almost but still not completely recovered—at 99.2 percent—in August 2023.

Figure 1:
New York City Lags Behind Nation in Recovery to Pre-Pandemic Employment



SOURCE: Current Employment Statistics (CES) data from the Bureau of Labor Statistics

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Small Businesses in New York City Saw Majority of Job Losses and Subsequent Gains

While famous for being home to many corporate headquarters, Wall Street, and large Fortune 500 companies, New York City is also characterized by a large number of local small businesses, from the corner bodega to the many restaurants populating storefronts in every neighborhood. Before the pandemic, 1.5 million people were working for an employer with more than 500 employees, yet another 1.5 million people were working at establishments with 50 or fewer employees. The remaining 1.6 million employees were working for an employer sized in between (see Figure 2).

Moreover, Figure 3 shows that most of the job losses suffered at the beginning of the pandemic were concentrated within the smallest firms. Of the approximately 910,000 jobs lost in the city between March and April of 2020, more than half (50.7 percent), or 461,000 jobs, were lost at establishments with 50 of fewer employees, while only 151,000 (16.6 percent) were lost at the largest firms with 501 employees or more.

Figure 2:
Pre-Pandemic Employment in New York City By Establishment Size

Number of Employees on Payroll in March 2020	Number of Employer Locations	Total Number of Jobs
1-50	228,998	1,496,734
51-300	11,778	1,276,797
301-500	850	324,378
501+	1,018	1,512,889

SOURCE: 2020 QCEW Microdata from the NYS Department of Labor

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Figure 3:
Initial Pandemic Job Losses in New York City from March 2020 to April 2020, by Establishment Size

Number of Employees on Payroll in March 2020	Number of Employer Locations	Total Number of Jobs
1-50	225,896	(461,355)
51-300	11,745	(253,285)
301-500	848	(43,953)
501+	1,018	(151,041)

SOURCE: 2020 QCEW Microdata from the NYS Department of Labor

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Due to this disproportionate economic impact, largely affecting small businesses, it is no surprise that many employers in New York City were eager applicants for PPP loans. During the first round of loan disbursement, $21.0 billion was distributed to employers located in the city. During the second round, there was an additional $9.3 billion, for a total of $30.3 billion in PPP loans to New York City employers, which is 3.8 percent of the national total. While these numbers are not as severely disproportionate to the city's share of national employment in 2019 (3.1 percent) as they are to those figures reflecting the impact of early Covid-19 deaths or job losses for the city, they do indicate an increased level of utilization of PPP loans relative to the rest of the country.

Figure 4:
Gains in Jobs in New York City from April 2020 to August 2020, by Establishment Size

Number of Employees on Payroll in March 2020	Number of Employer Locations	Total Number of Jobs
1-50	222,944	194,512
51-300	11,654	43,690
301-500	840	(3,295)
501+	1,013	(20,890)

SOURCE: 2020 QCEW Microdata from the NYS Department of Labor
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Looking at the city's employment situation over the following several months, there was also a notable difference in the distribution of jobs regained, by the size of employer. Figure 4 shows that the smallest establishments, of 50 employees or fewer, had regained nearly 195,000 jobs by August 2020, or 42.2 percent of their losses between March and April. Larger establishments regained substantially less, with the largest categories—those with 301 or more employees—continuing to lose overall employment through August.

Being particularly hard hit in the earliest phases of the COVID crisis, as well as having a large number of small businesses that were most severely impacted, New York is a case where more money was immediately flowing toward those in greatest need during the early days and weeks of the pandemic. This creates a situation of increased natural targeting of PPP loan dollars, relative to the rest of the country. Because of all of this, studying the effects of the PPP specifically within the context of New York City offers a unique opportunity to test how important targeting can be to the effectiveness of this type of influx of federal dollars.

Moreover, access to employment data (discussed below) on nearly all New York City employers through the end of 2022 allowed IBO to observe how long any employment effects of PPP have lasted over time before diminishing. Our research design allows us to retain establishments of all sizes and across all industries in the sample, including the smaller establishments where most job losses and subsequent gains occurred. Studying PPP's effects on small business employment is precluded in some of the other national-level studies, which largely utilize a research design focusing only on larger firms just above or below the 500-employee threshold for loan eligibility. [6]

Matching PPP Loan Data to QCEW Employment Data

We extracted PPP loan-level microdata from the U.S. Small Business Administration (SBA) website, and New York City businesses were identified using the borrower's reported zip code. Every loan that was approved over the program horizon, from April 3, 2020 through June 30, 2021, and remained in the database through July 2022, is observable in this dataset. For each loan, we have the name of the borrower (and the lender) and the borrower's self-reported industry, location, business type, and number of jobs covered by the loan. The data also include details about each loan's size, date of approval, and intended uses.[7] In New York City, there were approximately 385,000 loans, more than half of which went to borrowers who reported just one employee in their business.

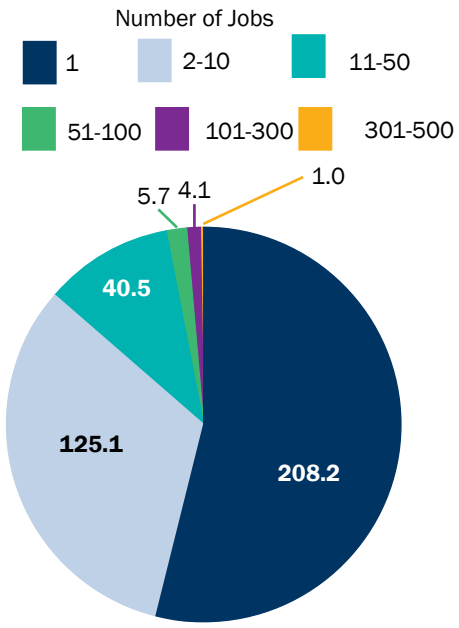
To ascertain the employment effects of the PPP loans over time, IBO merged the PPP data with Quarterly Census of Employment and Wages (QCEW) microdata on businesses located in the city. This comprehensive dataset is assembled using New York State's unemployment insurance (UI) program records and has been made available to the Independent Budget Office via a data-sharing agreement with the State's Department of Labor.[8] Each record in our QCEW dataset represents a New York City establishment and for each establishment, provides the business name, the address of the establishment, the number of employees by month (on the firm's payroll during the week that includes the 12th of

The Majority of New York City's $30.3 Billion in PPP Loans Went to Businesses with 50 or Fewer Employees

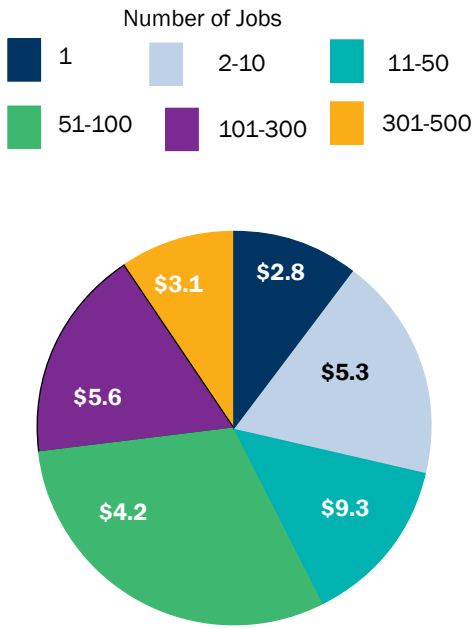
Over the 2020-2021 program period, New York City businesses received just over $30 billion in PPP loans, approximately 3.75 percent of the $800 billion of loans distributed nationally. This is slightly larger than New York City's share of U.S. payroll employment in February 2020 (3.1 percent), at least partly because of the disproportionate impact of the pandemic on the city's local economy. As shown below, most of the loans were received by the smallest employers in New York City.

- Though nearly 87 percent of the loans went to businesses reporting 10 or fewer employees, these loan amounts were smaller in size and this group accounted for only 27 percent of the loan dollars distributed in New York City.
- Almost 70 percent of PPP loan dollars in New York City were disbursed in the first round of the Paycheck Protection Program, which began in April 2020.
  - In that first round, 53 percent of the loan dollars for New York City firms went to businesses reporting 50 or fewer employees.
  - In the second round, distributed in 2021, the proportion going to firms with 50 or fewer employees increased to 68 percent, as the U.S. Small Business Administration made a concerted effort to make the money easier to access by small businesses.
- More than 15 percent of the nearly 385,000 loans went to businesses in the transportation industry that reported to be sole proprietorships, independent contractors, or self-employed—likely reflecting a large number of for-hire vehicle drivers. The transportation sector as a whole received $1.4 billion in PPP loan distributions.
- Almost a fifth ($6.0 billion) of the PPP loan dollars in NYC went to Professional and Business Services firms, a sector that includes law offices, accounting firms, and firms providing business administrative services, among others. Leisure and Hospitality businesses, particularly hard hit by pandemic shutdowns, received 16 percent ($4.9 billion) of the loans.

Number of PPP Loans Issued to New York City Businesses
In thousands



Total PPP Loan Distributions to New York City Businesses
Dollars in billions



SOURCE: PPP loan data from the Small Business Administration

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the month), aggregate wages paid by quarter, the date UI liability began, the date UI liability ended, and other relevant information about the establishment.[9]

Because the federal employer identification numbers (FEINs) were not reported in the PPP data, we merged the PPP data to the QCEW microdata using a multi-step algorithm that involved using the business names and geocoded addresses, after having removed loans that reported business types of independent contractor, self-employed or sole proprietorship as those are not present in the QCEW data.[10] While the level of observation might differ between the datasets (PPP loans were applied for by and distributed to firms that may have multiple establishments and the QCEW data is at the establishment level), we were nonetheless able to find matches for nearly 75 percent of the relevant loans.[11] More specifically, we found matches for approximately 94,000 firms that received a PPP loan in 2020 and about 64,000 firms that received one in 2021.

Model Specification

Our regression model facilitates the comparison of employment levels between those firms that received a PPP loan and those that did not after the PPP loans were distributed, controlling for the employment level before loans were made available. Our approach also controls for the size of the drop in the first month of the pandemic, as that may also affect the measurement of PPP's effect. For this reason, we included the employment levels in both March and April of 2020 in the model—the inclusion of March employment implicitly accounts for (most of) the initial loss of jobs seen in the first month of the pandemic. Because of the degree of variation in establishment sizes in both the pre- and post-PPP periods, the employment data was log-transformed.[12] This allows for a non-linear estimate of the relationship between the post- employment variable and the explanatory variables, which better fit the true relationships. It also means that the coefficients on the PPP variables can easily be transformed to be interpreted as percentage differences in employment.

We also recognized that the effect of PPP likely varies by neighborhood and industry. To account for this variation and avoid the bias that would result from their omission, we included in the model both Neighborhood Tabulation Area (NTA)

Estimating Equations

The estimating equation can be specified:

(1) $\text{Log}(\text{PostEmp}_{it}) = \beta_0 + \beta_1\text{Log}(\text{March20Emp}_i) + \beta_2\text{Log}(\text{April20Emp}_i) + \beta_3\text{PPP2020}_i + \lambda_2\text{NTA2}_i + \ldots + \lambda_j\text{NTAj}_i + \delta_2\text{NAICS2}_i + \ldots + \delta_k\text{NAICSk}_i + u_i$

where PPP2020 is a dummy variable indicating an establishment's receipt of a PPP loan in 2020, i is the New York City establishment, t is the month in the post- period, j is the number of NTAs, k is the number of 3-digit NAICS industries, and u is a random error term.

For months t in 2021 and 2022, PPP loans approved and distributed in 2021 are relevant, and PPP2021 is included as an additional variable in the model:

(2) $\text{Log}(\text{PostEmp}_{it}) = \beta_0 + \beta_1\text{Log}(\text{March20Emp}_i) + \beta_2\text{Log}(\text{April20Emp}_i) + \beta_3\text{PPP2020}_i + \beta_4\text{PPP2021}_i + \lambda_2\text{NTA2}_i + \ldots + \lambda_j\text{NTAj}_i + \delta_2\text{NAICS2}_i + \ldots + \delta_k\text{NAICSk}_i + u_i$

where each term is defined as in Model (1) and PPP2021 is a dummy variable indicating an establishment's receipt of a PPP loan in 2021.

The coefficients on the PPP dummy variables can then be transformed to indicate the impact of having received a PPP loan (in either 2020 or 2021, or both) on employment in the post- period, in percentage terms, controlling for employment in the pre- period, the initial drop in employment due to the pandemic, and the establishment's neighborhood and industry.

and 3-digit North American Industry Classification System (NAICS) industry controls.[13] The model was estimated with standard errors clustered at the industry level.

Estimating the Impact of PPP on Retaining Jobs in New York City

Using the estimating equation described above, regressions were run using employment in a series of months as the dependent variable to be explained. Figure 5 shows the results of the regressions. In each regression, the coefficients on the dummy variables that indicate an establishment that received a PPP loan in 2020 (PPP2020) and in 2021 (PPP2021) are highly statistically significant—that is, we found that receipt of the PPP loans had an impact on the employment level of firms in the post-loan period, at least through the end of 2022. And as one might expect, the measured effect of receiving a PPP loan on subsequent employment faded somewhat as time went on.

Employment Impact for 2020 Loan Recipients. IBO found that the loans disbursed in 2020 had the largest impact on employment in August 2020, with a coefficient of 0.15, and that coefficient estimate fell to 0.06 in December 2022. However, the first round of loans appeared to have a slightly stronger effect in 2022 than they did at the end of 2021.[14] To better understand these findings, we can transform our estimated coefficients to determine the number of jobs saved and correspondingly, the cost per job saved. Column 1 of the regression results (Figure 5) displays the results of the regression measuring the impact of receiving a PPP loan on employment in August 2020 as the dependent variable. Using the exponential formula to transform the coefficient on PPP2020, we estimate that all else equal, firms that received a PPP loan had 16.2 percent more employees in August than did a firm that didn't receive a PPP loan—the difference in terms of numbers of employees is more sizeable for larger firms than for smaller ones. The mean size of establishments that received a PPP loan was 12 employees in March 2020. Using that level, the 16.2 percent estimate translates to an additional 1.95 employees per establishment. At the mean establishment size (12 employees), then, establishments that received a PPP loan had almost 2 more employees in August 2020 than establishments that did not receive a PPP loan, all else equal.

Even a year after we saw the initial impact of the pandemic and subsequent policy response on business activity (column 3 of Figure 5, relating to the April 2021 employment), the 2020 PPP loans continued to have a statistically significant impact on employment. Our estimates suggest that otherwise similar firms that received a PPP loan in 2020 had 6.6 percent more employees in April 2021 than did those that didn't receive a PPP loan in 2020. At a mean employment

Figure 5:
Regression Results

	Log of Employment in							
	(1) Aug 2020	**(2) Dec 2020**	**(3) Apr 2021**	**(4) Aug 2021**	**(5) Dec 2021**	**(6) Apr 2022**	**(7) Aug 2022**	**(8) Dec 2022**
Intercept	0.03325	0.05356**	0.02036	0.03994	0.07719***	0.06032***	0.08430***	0.09566***
	(0.02884)	(0.02387)	(0.03086)	(0.02746)	(0.02829)	(0.02131)	(0.02477)	(0.02558)
Log of Emp in Mar 2020	0.49791***	0.53713***	0.53248***	0.56003***	0.58368***	0.57017***	0.55892***	0.56261***
	(0.02771)	(0.02404)	(0.01886)	(0.01532)	(0.01372)	(0.01260)	(0.01400)	(0.01500)
Log of Emp in Apr 2020	0.41283***	0.35957***	0.34605***	0.30794***	0.27529***	0.26826***	0.26563***	0.25305***
	(0.02659)	(0.02268)	(0.01994)	(0.01983)	(0.01770)	(0.01733)	(0.01835)	(0.01741)
PPP2020	0.15053***	0.12447***	0.06374***	0.05902***	0.05491***	0.06479***	0.06377***	0.06042***
	(0.02153)	(0.01896)	(0.00860)	(0.01047)	(0.00991)	(0.01142)	(0.01268)	(0.01343)
PPP2021			0.21813***	0.21812***	0.20664***	0.20456***	0.19578***	0.18643***
			(0.04194)	(0.04558)	(0.04502)	(0.04218)	(0.04104)	(0.03986)
N	253,184	253,180	250,235	250,214	250,218	247,534	247,534	247,532
R-Squared	0.7976	0.7634	0.7266	0.6921	0.6664	0.6302	0.6027	0.5853

NOTES: The numbers in parenthesis are standard errors and *s indicate statistical significance. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

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level of 12, firms that received a PPP loan in 2020 had 0.8 more employees than otherwise similar firms that did not receive the 2020 loan. Then, by the end of 2022, we estimate that firms that received PPP loans in 2020 had 0.75 more employees than their counterparts that did not receive the loan.

Employment Impact for 2021 Loan Recipients. The estimates of the relationship between receipt of 2021 PPP loans and employment in the relevant post-loan period are even larger in magnitude than those associated with the loans distributed in 2020.[15] The coefficient estimate on PPP2021 in the regression with employment in April 2021 as the dependent variable (column 3 of Figure 5) can be interpreted as showing that firms that received a PPP loan in 2021 had 24.4 percent more employees in April 2021 than otherwise similar firms that did not receive a PPP loan in 2021. However, because of the greater degree of targeting associated with the second round of PPP approved in early 2021, the mean size of firms receiving a loan in 2021 was smaller than it was for the 2020 round. Applying the 24.4 percent estimate to the mean size of 10 employees, firms that received a PPP loan in 2021 had 2.4 more employees than otherwise similar firms in April 2021. Then, by the end of 2022, at the mean employment level of 10, firms that received a PPP loan in 2021 had 2.0 more employees than firms that did not receive the 2021 PPP loan, all else equal. So, not only did the 2021 loans have a larger estimated impact on employment, but the effect also appears to have faded to a lesser extent, or at least more slowly, than did the impact of the 2020 PPP loans.[16]

Using our estimates of the impacts of PPP loans on employment levels in the post-loan period combined with the counts of firms receiving PPP loans in each year and the amount of loan distributions, we can also understand the impact of PPP relative to its cost. If we simply use the 1.95 employee estimate from the regression run using August 2020 employment as the dependent variable, along with the number of relevant loans distributed in the city in 2020 and the corresponding amount of loan distributions, our estimate of the cost per job saved in New York City was just under $74,000—approximately 72 percent more than the median annual earnings of approximately $43,000 for individuals aged 16 years and over in New York City, as reported by the U.S. Census Bureau's 2021 American Community Survey 1-Year Estimates.[17]

Cost Per Job-Year Saved by the Paycheck Protection Program. Another approach to assessing the benefit relative to the cost is to use our estimates over time to calculate the cost per job-year saved by the program—job-years capture not only the number of jobs but also the longevity of those jobs. Our estimates indicate that the employment effects of the PPP loans declined from the latter half of 2020 through 2022, but that they lasted, in a statistically significant manner, through the end of that period. To calculate the number of job-years saved through 2022, we first apply the percentage estimates to the respective mean employment levels, as we did above. Then we multiply by the number of relevant loans in 2020 and 2021, respectively, and sum the weighted average number of jobs. This yields an estimate of approximately 691,000 job-years saved.

When we calculate the annual cost, incorporating the estimated employment effects through the end of 2022, the program cost per job saved on an annual basis was just under $40,000 ($27.5 billion in loans provided to firms that were not independent contractors, sole proprietors or self-employed, divided by our estimate of approximately 691,000 job-years saved), or 7 percent less than the median annual earnings. In other words, through 2022, we found that the federal spending associated with the PPP loans accrued to employees who were able to keep their jobs as a result of the program.

PPP Program Seems More Effective in New York City than National Studies Suggest

At the time of publication, this is the only study to incorporate three years of employment data. So, to understand our estimate of $40,000 relative to those in the current literature, we can remove the effects seen in 2022. Through the end of 2021, we estimate that the cost per job saved on an annual basis was approximately $65,000 or about 50 percent more than the median annual earnings of $43,000. But even that estimate is substantially lower than the minimum of estimates produced by other researchers in the current literature, who used national data.

Why did we find the program more cost effective than did other researchers? There are a few possibilities. First, we considered the employment effects of the PPP in New York City—an area that was particularly hard hit by the pandemic, especially at its start. Because of that, most businesses in the city were negatively impacted by the pandemic and its

related public health policies. So, even with the rather minimal requirements for eligibility, the PPP loans were inherently better targeted in New York City to businesses that needed them than they were in other parts of the country.

Additionally, while other researchers focused their analysis primarily on the firms with between 250 and 750 employees to be able to compare firms just under the 500-employee eligibility threshold to those just over it, we used establishments of all sizes. As shown in Figures 3 and 4, most of the changes in April 2020 and then again through August 2020 were concentrated amongst establishments with fewer than 50 employees, so much of the existing research would not have been able to pick up those effects.[18] This is acknowledged in the literature (see Autor et al., 2022, Chodorow-Reich et al., 2021), noting that smaller firms are more liquidity constrained. Thus, smaller firms may have been more likely to reduce staff, shut down in the face of the financial hardships created by the pandemic, or both, in the absence of funds provided by PPP loans.

Moving beyond the scope of other studies, we were able to gather monthly employment data over a period of three years to estimate the employment effects of the PPP over time. And while some expected the effects to diminish to zero quickly, we found that even at the end of 2022, the effects of the PPP loans remained statistically significant, and the estimated impact of the 2021 PPP loans was still quite large more than a year after they were distributed.[19] These lasting effects indicate that it is important to continue studying the effects of the PPP and other pandemic-era spending programs beyond the immediate and initial impacts in order to gain a full understanding of their effectiveness and efficiency as a government response to drastic economic shocks.

Conclusion

When the Paycheck Protection Program was initiated in March 2020 to help thwart a potentially catastrophic economic collapse, it was unknown how effective the program would be in boosting employment. With the intent to quantify the benefit relative to the cost, we used the QCEW establishment-level employment data combined with the SBA's PPP loan-level data to estimate the employment effects of the PPP loans in New York City. We estimate that approximately 691,000 job-years were saved in New York City through 2022, which translates to a cost just under $40,000 per job-year. This estimate is below the median earnings in New York City of $43,000 in 2021, an indication that the program was relatively efficient in terms of preserving jobs relative to the cost.

In the ongoing discussion about the PPP's effectiveness and efficiency, the results of this study provide preliminary evidence that adds additional context to understanding the program's impact and design. While we found that the impact from the first round of loans in 2020 was positive and significant, the impact from the second round of loans in 2021 was even more pronounced.[20] What's more, the effects appear to have longevity, with loans from both years retaining significant impacts through the end of 2022, and the impact of 2021 loans in particular decaying to a much lesser degree over this time period.

All of this supports the argument for enhanced targeting in the design of such public spending programs, in order to optimize outcomes. Because of the nature of the crisis in the city, initial loan dollars flowing to New York City were already better targeted toward businesses that were being severely impacted than elsewhere in the country. The fact that the second round of loans, with stricter eligibility requirements, is associated with even stronger and longer-lasting outcomes lends further support to the importance of this consideration of program design. While no one hopes for a replication of the situation in New York City at the beginning of the pandemic, there are potential lessons to learn from its experience when designing more efficient stimulatory spending programs in future alternate scenarios.

Glossary

Job-year: A unit of measurement reflecting one job, for one year. For example, two different jobs that last for three years each would be measured as six job-years.

Neighborhood Tabulation Area (NTA): 197 geographical units created by the New York City Department of City Planning which aggregate Census tracts to the size approximating New York City neighborhoods.

North American Industry Classification System (NAICS) code: A classification system developed by the federal Office of Management and Budget to categorize businesses and other employers for the purposes of researching and reporting about the U.S. economy by sector.

Targeting: Designing a policy or programs to more specifically reach and impact individuals or groups that would be most greatly benefit by the policy or program's provisions.

Statistical significance: A measure of the confidence that a numerical relationship is real, and is not just the result of random chance.

Quarterly Census of Employment and Wages: A dataset coordinated nationally by the Bureau of Labor Statistics, which includes monthly employment counts and quarterly aggregate wages for more than 95 percent of U.S. jobs and is collected through each state or territory's unemployment insurance system.

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Endnotes

[1]These provisions describe the final requirements for loan forgiveness after the passage of the Paycheck Protection Program Flexibility Act of 2020 in June, 2020. Amongst changes to various timeframes, the original authorizing legislation required 75 percent of the loan amount to be used for payroll expenses, which was subsequently reduced to 60 percent.

[2]Specific provisions within the authorizing legislation allowed for some employers who were ineligible for first round loans or were part of communities who underutilized first round loans, to apply for and receive loans in the second round.

[3]See Autor et al. (2022), Chetty et al. (2020), Granja et al. (2022).

[4]Weekly data from the Center for Disease Control's COVID Data Tracker: https://covid.cdc.gov/covid-data-tracker

[5]Based on the 2020 Census results, with NYC's population being 8.8 million and a U.S. population of 331.4 million.

[6]See Chetty et al. (2020) for a complete description of this regression discontinuity approach to estimating the impact and cost of the PPP on job retention. In order to prevent capturing effects of selection bias, only two size-groups are utilized in this research design: firms with between 251 and 500 employees, and firms with between 501 and 750 employees.

[7]While there was an attempt to collect other interesting demographic information about the business owner, the majority of borrowers in New York City did not answer optional questions indicating gender, race, and veteran status.

[8]QCEW data cover more than 95 percent of the jobs in the U.S. The remaining 5 percent are businesses not required to participate in state unemployment insurance programs.

[9]We accounted for the establishments that closed and had employment at the establishment fall to zero in the 2020-2022 period by replacing missing values for monthly employment with zeroes for establishments that reported an end liability date in the corresponding or a previous year. By doing so, firms that close do not fall out of the sample used for estimation.

[10]We standardized the names and estimated the spelling distance between the business names provided in the two datasets. We then geocoded the addresses provided in each dataset, ensuring that the closest name match matched by location, as well. We then pursued a manual process to find additional matches.

[11]Our level of observation for the regression analysis is at the New York City establishment level. Thus, if we did not match a loan to the appropriate establishment, we would likely err by underestimating the effect of PPP because the establishment would be classified as part of the untreated control group when it was, in fact, treated. This is true for the aforementioned exception of accommodation and food service businesses as only the location for which the address was provided on the PPP loan application would match in our sample.

[12]We added 1 to the employment levels (both the dependent and explanatory variables) before log-transforming them to avoid losing observations that showed zero values, as those zero values were meaningful to the analysis.

[13]NTAs are 197 geographical units created by the New York City Department of City Planning which aggregate Census tracts to the size approximating New York City neighborhoods. NAICS is a standard system of classification of industries used by governments and other researchers.

[14]This may result from the possibility that firms that received PPP loans were on a more solid footing because of the loans and were, therefore, more capable of adding employees in response to the resurgence in consumer demand and the return to a more normal environment that occurred in 2022.

[15]Because the second round of loans was largely dependent on receipt of the first round of loans, the coefficients on PPP2021 might be inflated (and those on PPP2020 deflated) as PPP2021 might have taken some of the variation from PPP2020. Even accounting for this possibility, the impact of PPP2021 appears to be larger than the impact of PPP2020.

[16] Most of the 2021 loans were loans were made available as part of the second round of PPP, which was passed by Congress in January 2021. As we mentioned above, the requirements for the second round were more stringent than the first round. Our estimates indicate a larger effect of the loans approved and distributed in 2021, compared with 2020 loans, which would be expected given these differences.

[17]We use the median annual earnings of approximately $43,000 because the PPP loans had an associated annual salary maximum of $100,000 per worker, and in New York City, the mean earnings estimates are affected by a disproportionately high fraction of workers that exceed the PPP cap. We therefore opted for a more conservative estimate of the central tendency of earnings.

[18]Other researchers designed their analyses to address the endogeneity associated with our variable of interest—receipt of a PPP loan. We acknowledge that the firms that applied for and subsequently received PPP loans are likely different from firms that did not and that the difference is likely correlated with the jobs gained subsequent to the employment trough. To evaluate the extent to which endogeneity might affect our estimates, we ran the model in column 1 of the regression results using the log of August 2019 employment as the dependent variable and we replaced the log of March 2020 employment and the log of April 2020 employment with the log of March 2019 employment and the log of April 2019 employment, respectively, on the right-hand side. Though the coefficient estimate on PPP was statistically significant, the size of the coefficient was substantially smaller—0.012 versus the coefficient estimate on PPP in Column 2 of the regression results (0.151)—less than 10 percent the size. The same is true when we used the log of December 2019 employment as the dependent variable—the coefficient on PPP was 0.014. We also tried to instrument for PPP with a variable shown by the current literature to be an important determinant of the decision to apply for a PPP loan—a relationship with a bank authorized to process PPP loan applications, as proxied by proximity to the bank. While the distance to the nearest bank variable had a statistically significant and meaningful relationship with our PPP dummy and the instrument was not determined to be weak, the results using the instrument in a 2SLS model were very large, so we opted to report the more conservative of the estimates.

[19]This is another potential explanation of the difference between our estimates and those in the current literature. To our knowledge, this is the only study to incorporate the second round of PPP (as we did with PPP2021) in the analysis.

[20] See note 15 above about the relationship between coefficients on PPP2020 and PPP2021.