

The Inequitable Distribution of Government Funds: The Case of COVID-19 Economic Injury Disaster Loans

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ABSTRACT

The COVID-19 pandemic brought a wave of challenges to the U.S. economy, from skyrocketing unemployment to state-wide lockdowns which hampered many small businesses. GDP dropped by 8.9% in the second quarter of 2020, and susceptible industries such as Restaurants, Hotels, and Airlines faced the brute of these hardships. In response, the U.S. government initiated enormous Keynesian spending programs to inject liquidity into the economy and support businesses, establishing low interest rates and offering generous loan forgiveness. From March 2020 to June 2022, the government distributed nearly \$4.5 trillion in total budgetary resources to mitigate the struggles faced by Americans. Specifically, the Small Business Administration (SBA) leveraged the Economic Injury Disaster Loans (EIDL) Program to aid small businesses. This study sought to determine whether government funding was equitably distributed on the county level, and whether they resulted in higher employment. The findings reveal inequitable distribution of government funds based on the size of the county (funding per capita or funding per laborer) that may be explained by inequitable COVID-19 impacts (more targeted spending in more urban areas with greater concentration of businesses). Moreover, negative correlations exist between the number of direct payments and the unemployment rate, and the total funding amount and unemployment rate.

Introduction

The global COVID-19 pandemic had unprecedented repercussions on small businesses and the U.S. economy. In the second quarter of 2020 alone, the U.S. GDP tumbled 8.9% (White House, 2022). In what was the worst single-quarter contraction the U.S. has faced in over 70 years, businesses struggled with declining demand, severe supply shortages, and government-mandated closures (Stang, 2021). Many businesses and establishments, especially in finance and insurance, continued paying employees even when they didn't work. A similar trend manifested in the health care and social assistance industries, which employ nearly 8 million workers (Stang, 2021).

As businesses struggled to fund operating expenses and pay employees, the government launched ambitious government spending programs to help businesses. By the end of June, 2022, the U.S. government spent \$4.5 trillion in total budgetary resources, \$3.9 trillion in total outlays, and \$4.3 trillion in total obligations across 43 federal agencies (USA Spending, 2021). The Small Business Administration (SBA) was just one of these 43 agencies that offered economic aid through various spending programs.

The action of government spending to aid in economic downturns is espoused by Keynesian economists. The idea rests in the assumption that if the government increases spending, it opens new employment opportunities. These newly employed workers would then consume more goods and services, and the businesses that produce those goods and services, in turn, would increase their demands of inputs such as capital goods

and labor (de Rugy et al., 2021). During the Great Depression when President Roosevelt launched the New Deal, Milton Friedman famously declared “we are all Keynesians now.” The sentiment voiced by Friedman seems relevant today as economists speculate whether the heavy spending was worth it.

Within this context of government and organizational intervention have arisen questions regarding whether equity should be a goal of economic policy. Although most would agree that extreme inequality of income, wealth, or opportunity is unfair, the extent to which policies should address such inequities and what constitutes fair distribution has met with much contention for decades (Gupta et al., 1999). Debates concerning equity are nothing new to the US, which though called “the land of opportunity” for all has more often than not been characterized as the opposite (Simms, 2018).

During the economic crisis of the pandemic, how have government spending programs been distributed? Can they be characterized as being equitable? In what ways have they been equitably or inequitably distributed, with regards to allocations to businesses and employment rates? This research seeks to assess the level of distributional equity/inequity in the U.S. government’s allocation of emergency injury disaster loans and grants administered by the SBA in 2020 and 2021. It also aims to evaluate whether such funds led to the maintenance, restoration, and/or creation of employment opportunities as posited by John Maynard Keynes.

Literature Review

In a measure to assist small businesses, the government initiated the COVID Emergency Injury Disaster Loans (EIDL) program, which provided up to \$2 million (maximum cap increased from \$500,000 to \$2 million on September 8, 2021) for working capital to fund payroll, fixed debts, accounts payable, and other bills that couldn’t be paid due to the pandemic (Dilger et al., 2020). According to the Congressional Research Service report on COVID-19 Relief Assistance to Small Businesses, the EIDL loan amounts were determined based on the actual economic injury and financial needs of businesses and were not allowed to be used to refinance long-term debts, pay dividends, or expand facilities (Dilger et al., 2020). The EIDL loans had fixed-interest rates at 3.75% for businesses and 2.75% for nonprofits, and all loans had maturities up to 30 years. Applicants were required to have an acceptable credit history.

When COVID-19 struck in March of 2020, the SBA faced numerous requests from states for assistance to small businesses (Dilger et al., 2020). Congress had chosen the SBA to administer COVID relief funding to businesses because of its already existing framework to evaluate business disaster needs and disaster loan eligibility (Dilger et al., 2020). Due to this decision, the SBA took a much more direct and active role in the pandemic response. Through grants (forgivable) and loans (unforgivable, though sometimes subsidized), the SBA’s EIDL program played a major role in the government’s efforts to restore the economy. In the face of the pandemic and its impact on businesses, the SBA made important adaptations such as its criteria for EIDL assistance, changing the state or territory requirement that at least five businesses have suffered substantial economic injury as a result of the disaster, with at least one business located in each declared county/parish. Under the new criteria, states and territories now are only required to certify that at least five small businesses within the state/territory [had] suffered substantial economic injury (Dilger et al., 2020).

Prior to the enactment of loans under the CARES Act, the SBA had roughly \$1.1 billion in disaster loan credit subsidy to protect the government against the risk of likely shortfalls in loan repayments. The \$1.1 billion was to support \$7 billion to \$8 billion in disaster loans. At the time, there was concern that the \$1.1 billion would be insufficient to meet the demand for disaster loans. Through the CARES Act, however, an additional \$10 billion was allocated to further support the program.

The SBA also provided cash advances up to \$10,000 to eligible applicants. Even if applicants were subsequently denied an EIDL loan, they were not required to repay the advance payment. Since the EIDL advance loans were completely forgivable, they were essentially grants. The SBA limited the Emergency EIDL advances to \$1,000 per employee (up to a maximum of \$10,000) due to anticipated demand (Dilger et al., 2020).

Roughly 90% of the EIDL loans went to small businesses with 10 or less employees. (U.S. Small Business Administration, 2022).

Interestingly, it was found that the best chance for getting approval for a loan was to simply apply, as the only factor influencing the percentage of aid approval was the application rate (Li, 2021). Although Li suggests that “receiving relief funds is related to fewer firms reporting decreased revenue and declined employee work hours in the subsequent weeks” (Li, 2021, p. 115), the research concludes that EIDL, the Paycheck Protection Program (PPP), and SBA’s loan forgiveness programs did not reach firms that needed funding the most.

However, no impediments to applications existed—though implementation challenges manifested and lack of information may have resulted in many firms missing the opportunity to receive government funding (Li, 2021)— as EIDL grants were relatively straightforward to request. Applicants visited the SBA’s disaster loan assistance website, entered basic information, and selected the option for an advance of up to \$10,000. The funds would be directly deposited into the applicant's bank account. The application process would take 18 to 21 days, and another 2 to 5 days would be allotted for loan disbursement (Lipscomb, 2021).

On January 1, 2022, after nearly two years of issuing COVID-19-related EIDL loans, the SBA stopped accepting applications for new COVID EIDL loans or advances. By June 13, 2022, the SBA had approved nearly \$390 billion to 4 million businesses impacted by the pandemic (SBA, 2022). Though yet to be confirmed, the positive impacts of the EIDL loans during the pandemic have been lauded. US House Small Business Committee Chairwoman Nydia M. Velazquez praised the COVID EIDL programs for saving “the livelihoods of countless entrepreneurs and help[ing] pave the way for the rapid recovery of our economy” (SBA, 2022). Claims extended to the impact of other American Rescue Plan-funded programs—the Restaurant Revitalization Fund, the Shuttered Venue Operators Grant, the COVID EDL Targeted and Supplemental Advance Grants, and the Paycheck Protection Program—in addition to that of COVID EIDL on job creation, citing creation of 1.9 million jobs from the support of small business with fewer than 50 employees (SBA, 2022). They believe that the COVID EIDL program, “which was often used for critical business operations such as making payroll,” taken together with the Paycheck Protection Program and American Rescue Plan, played a pivotal role in the creation of jobs.

While it is still unclear whether the EIDL loans alone impacted unemployment rates, it appears that the Paycheck Protection Program (PPP), another SBA relief program that covered up to 8 weeks of payroll costs for small businesses, did to some degree. PPP loans were to be completely forgiven on the condition that at least 60% of the funds were used for payroll. Autor et al. (2020) found that PPP boosted employment at PPP-eligible businesses by 2-4.5%. Chetty et al. (2020) found that PPP loans increased employment but by “only 2%” at small businesses. Despite the increase, they expressed doubts that the loans were taken by firms that intended to lay off employees to begin with and believed that they did little to restore employment. Granja et al. (2020) also found that some firms used the PPP loans to build up savings buffers and make non-payroll fixed payments, which they believed accounted for minimal employment effects. Efficient or not, there seemed to be a link between PPP loans and unemployment rates.

What is also unclear, and what has been a topic of recent investigation, is whether these programs have been disbursed evenly. Focusing on the disproportionate needs of minority communities which tend to be poorer, Fairlie and Fossen (2022) find evidence that PPP loans and EIDL have been disbursed evenly across minority communities in the country, with a positive association between both PPP loans and EIDL programs to minority populations and communities; however, they also found that PPP loan amounts per employee were lower for communities with higher shares of minority populations. Li (2022), however, concludes that application and approval rates of SBA assistance programs did not relate to the severity of COVID-19 impact, implying that aid was not fairly distributed to those with greatest needs. In conducting their research, both authors seem to argue for a certain type of equitable distribution in accordance to the disparate needs of communities and businesses. What of simple equity in terms of population and labor force? Were funds disbursed equitably across sheer numbers?

This research seeks to answer two main questions. Firstly, was government funding equitably distributed across numbers? More specifically, the study seeks to determine whether there were differences in government spending according to the size of the county, measured by population and labor force. Secondly, what was the impact of the financial outlays, if any, on increasing or decreasing unemployment rates at the county level? The data revealed both surprising and unsurprising answers to these two questions.

Data

To investigate the research questions, data was taken from three principal sources: the US Bureau of Labor Statistics, USAspending, and the US Census Bureau. The first source provided essential data regarding the unemployment rate and labor force, two important variables of interest, in the selected US counties from 2012-2021. The labor force is the sum of those who are employed and the unemployed actively seeking work, and the unemployment rate is the number of unemployed individuals as a percentage of the labor force. The second source provided information regarding how much money the government distributed to US businesses, non-profits, and individuals per county in 2020 and 2021 in response to the COVID-19 pandemic. To focus on COVID-19 spending related to small businesses, the data was restricted to funding issued by the Small Business Administration (SBA). The data was further filtered to include funding issued through the Emergency EIDL Grants Program, the Disaster Loans Program, and the Business Loans Program under the Coronavirus Aid, Relief, and Economic Security (CARES) Act, Paycheck Protection Program and Health Care Enhancement Act, Consolidated Appropriations Act, and the American Rescue Plan Act of 2021. The third source provided data from the American Community Survey (5-year estimates) from 2012-2020 for relevant variables including total population, mean income, and median income.

The important variables of interest provided by USAspending include the Number of Direct Payments, Number of Loans, Total Funding Amount, Total Face Value of Loans Amount, Outlay Amount, and Obligated Amount. Direct payments are defined by USAspending as “cash payments made by the federal government to an individual, a private firm, or another private institution.” The CARES Act EIDL grants fell into this category. The Total Funding Amount is the magnitude of the direct payments made out by the government. Loans are defined as “federal awards from the government that the borrower will eventually have to pay back” (USA Spending, 2022). The PPP loans fell into this category. In effect, however, many of the loans were heavily subsidized. The Total Face Value of Loans amount is “the amount that agencies have directly issued (for direct loans) or facilitated by compensating the lender if the borrower defaults (for loan guarantees)” (Data Sources & Methodology, 2022). The Total Face Value of Loans amount “is not considered federal spending, since it does not in itself represent a long-term cost to the government” (Data Sources & Methodology, 2022). Therefore, it is not included in the obligation (promised) amount or outlay (paid) amount figures. The obligated and outlay amounts include the total funding amount and the loan subsidy cost. To investigate whether these funds were distributed equitably across numbers, I calculated per capita and per labor force values of the important government funding variables. 2021 funds were divided by either 2020 population numbers or by the 2020 labor force since decisions to distribute funds according to sheer numbers would be made using prior year’s census data. 2020 funds were also divided by either 2019 population numbers or by the 2019 labor force.

In this study, data was taken from four states in the Northeast: Connecticut, New Jersey, New York, and Pennsylvania. To narrow the scope of the study, the research focused on states that neighbored each other to capture movement of labor across the region, such as commuters from Connecticut, New Jersey, and New York to New York City and New Jersey and Pennsylvania to Philadelphia. All observations were taken from the county level. The four states combined have 158 counties.

Table 1. Counties in the 4 Selected States

State	Number of Counties
Connecticut	8
New Jersey	21
New York	62
Pennsylvania	67

Methods

To determine whether there were statistically significant differences in the amount of funding the government distributed to certain counties based on labor force and population—and to determine if there was equitable distribution—all important economic variables except for unemployment rates were divided by total population of each county to obtain per capita values. The original economic variables were also divided by total labor force to obtain per labor values. These adapted values were then used to test for equitable distribution using two basic techniques.

First, counties were divided into two groups according to size: counties with populations under 100,000 and counties with populations over 100,000. Group 1 included 76 counties and Group 2 included 86 counties. If the government disbursed funding equitably by population or by total labor, the means of the adapted economic variables should be essentially the same. Two-tailed t-tests were used to compare the means of the two groups and to determine if there were any statistically significant differences in the means. The appropriate t-test for the samples were determined using a variance-comparison test, which indicated whether t-tests of equal variance or t-tests of unequal variance should be used. P-values less than the critical value 0.05 for the appropriate t-test meant that we could reject the null hypothesis that the economic variable of interest was the same and that there was, therefore, unequal distribution of funds by numbers. P-values greater than 0.05 meant that we could not reject the null hypothesis, lending support to the conclusion that there was equitable distribution across numbers. The method was used for per capita variables as well as per labor variables.

Subsequently, ANOVA tests were used to determine whether there were statistically significant differences between the means for the important variables of interest across more than two categories. The 158 counties were split into 4 groups based on population. Group 1 included the 39 counties with a population under 50,000. Group 2 included the 33 counties with a population between 50,000 - 100,000. Group 3 included the 58 counties between 100,000 - 500,000. Group 4 included the 28 counties with a population of 500,000+. These numbers were chosen because 50,000 is roughly the size of a town, 50,000 - 99,999 is roughly the size of a small city, 100,000 - 499,999 is roughly the size of a mid-size city, and 500,000+ is roughly the size of a large city according to NYU’s Furman Center. Although these categories are typically delimited for cities according to population size, they were utilized at the county level to facilitate analysis of whether funds were distributed equitably (see Table 2). Tukey tests were also conducted to determine which pairs exhibited statistically significant differences in means.

Lastly, the Pearson correlation coefficient was used to determine the direction and magnitude of the correlation between two continuous variables of interest, potentially elucidating the impact of the different fiscal policies on unemployment rates across the counties.

Table 2. Categories of Counties for ANOVA tests

Population	Categories – NYU Furman Center	Categories Used in This Research
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0 – 49,999	Town	Dispersed County
50,000 – 99,999	Small City	Small County
100,000 – 499,999	Mid-size City	Mid-size County
500,000+	Large City	Large County

Results

State Level

As Figure 1 depicts, the unemployment rate across the four states steadily decreased from 2012-2019, followed by a sharp rise in 2020, and a successive decline in 2021. In 2020, the unemployment rate was 7.8% in Connecticut, 9.5% in New Jersey, 9.9% in New York, and 9.1% in Pennsylvania. In 2021, the unemployment rate fell to 6.3% in Connecticut, 6.3% in New Jersey, 6.9% in New York, and 6.3% in Pennsylvania. Relative to the other states, Connecticut’s unemployment rate was the least affected by the COVID-19 pandemic in 2020, and New York’s unemployment rate remained the highest of the four states in 2021. Overall, the unemployment rate exhibited the same pattern for all four states from 2012-2021.

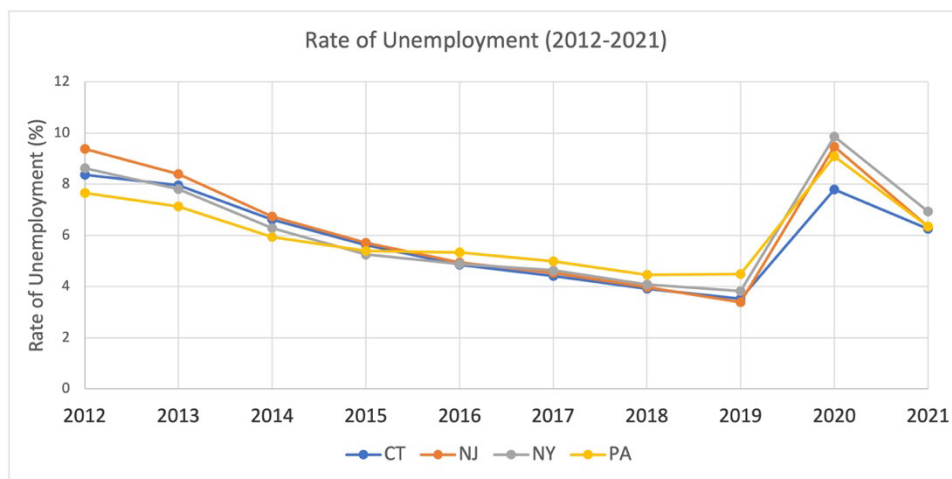


Figure 1. The Rates of Unemployment in CT, NJ, NY, and PA (2012-2021)

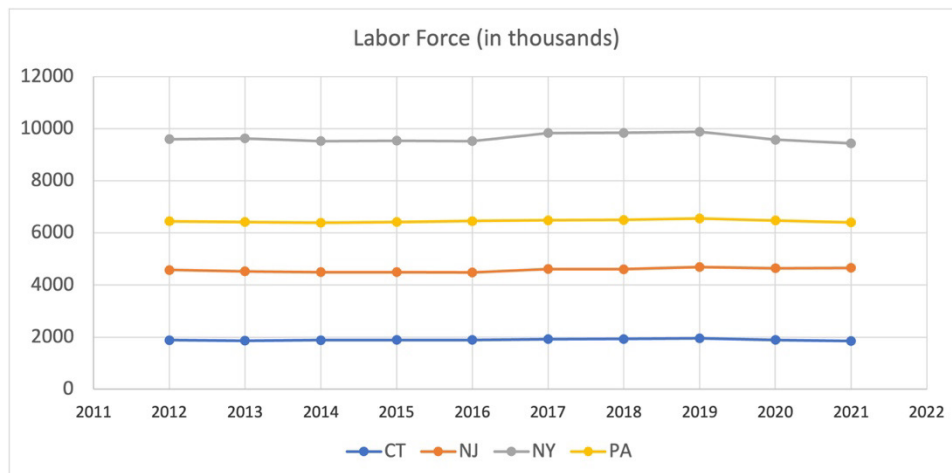


Figure 2. Labor Force, in thousands, in CT, NJ, NY, and PA (2012-2021)

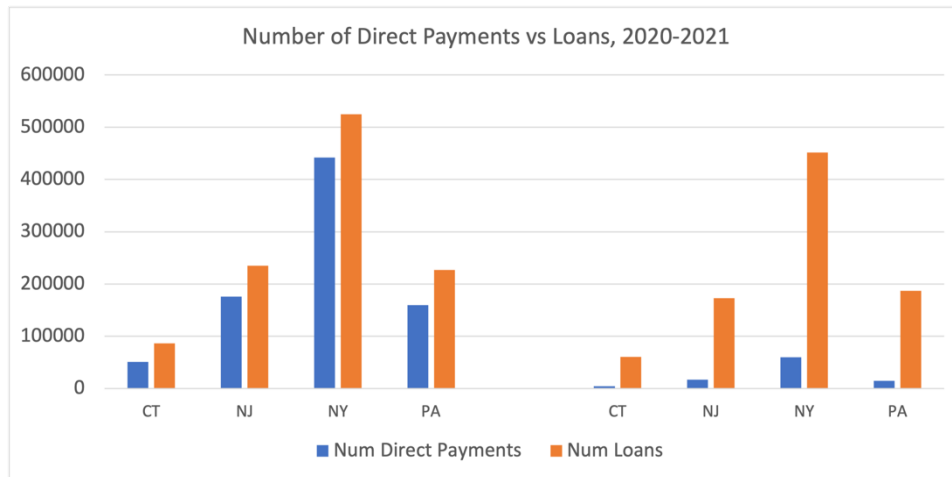


Figure 3. The Number of Direct Payments vs Loans in CT, NJ, NY, and PA (2020 – 2021)

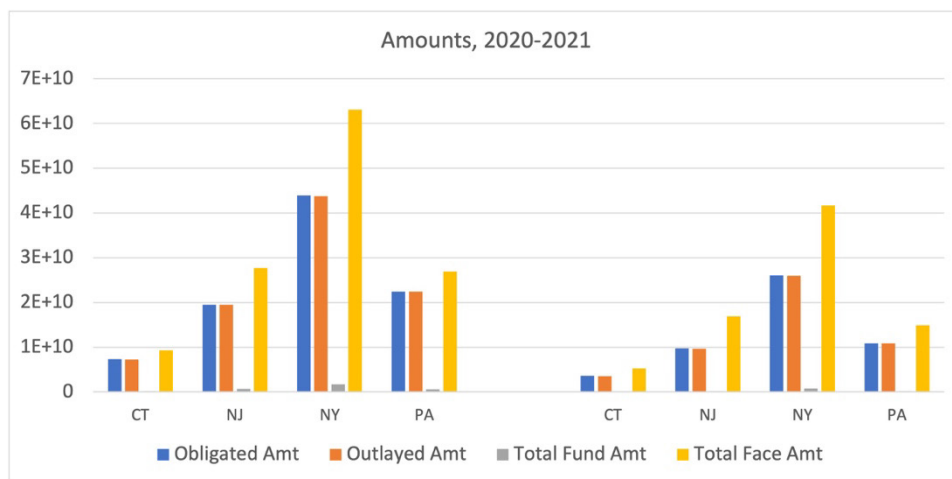


Figure 4. The Amounts for the Different Funds Allocated in CT, NJ, NY, and PA (2020 – 2021)

The labor force (see Figure 2) remained relatively constant across all four states from 2012-2019 but declined slightly from 2019-2021. The size of New York’s labor force, more than twice the size of New Jersey’s and the greatest by far amongst the four states, faced the steepest decline, dropping from 9,880,209 to 9,441,461 (4.6%), while New Jersey’s labor force only declined by 25,613 (0.39%). Although there was movement in and out of the states, the net labor force remained the same and relatively constant from 2012-2021 across all four states.

The number of direct payments and loans (see Figure 3) issued by the government in 2020 were substantially greater than the number of direct payments and loans issued in 2021, when the pressing need for government support was not as urgent. New York, the state with the greatest population amongst the four states, unsurprisingly received the largest number of direct payments and loans across both years. Interestingly, however, New Jersey was issued a greater number of direct payments and loans in 2020 than Pennsylvania although it has a smaller population and labor force.

In terms of the total face value of loans in 2020 (see Figure 4), New York received more than double the amount that any of the other three states received. Even in 2021, New York received more than the amount that any single state received in 2020. Interestingly, although Pennsylvania recorded greater outlay and obligated amounts than New Jersey in both 2020 and 2021, New Jersey received the greater face value of loans. As expected, the outlay amounts were marginally smaller than the obligated amounts across all situations, and government support in 2020 was significantly greater than in 2021.

County Level

In 2020, the mean unemployment rate across the 158 counties was 8.6%, the highest since 2012 (see Table 3). Atlantic County, NJ had the highest unemployment rate among all the counties at 17.2%, potentially due to the county's reliance on Atlantic City and its large casino industry which temporarily closed down in 2020 (Danzis, 2020). Across the 158 counties, the mean labor force was 143,028. Kings County, coextensive with the borough of Brooklyn and the most populous county in New York, recorded the largest labor force of 1,210,703.

Under the assumption of equitable distribution of government funds, one would assume that larger populations (total population or total labor force) should receive both larger numbers of payments and loans and a greater amount of funding. Unsurprisingly, Kings County, NY received the greatest number of direct payments in 2020 and 2021, as well as the greatest number of loans in 2021 (see Table 4). The three most populous counties in New York—Kings County, Queens County (coextensive with the borough of Queens), and New York County (coextensive with the borough of Manhattan)—generally received the most funding across all the important variables of interest. Interestingly, Manhattan, though trailing Brooklyn and Queens in population and labor force, received the greatest total face value of loans in both 2020 (\$15.6 B) and 2021 (\$9.9 B).

Table 3. Mean, Min, and Max Values on Economic Variables in 2020 – County Level

Variable (2020)	Mean	Min	Max
Unemployment Rate	8.629747	5.8% (Centre County, PA)	17.2% (Atlantic County, NJ)
Labor Force	143028.7	1,815 (Forest County, PA)	1,210,703 (Kings County, NY)
Number of Direct Payments	5239.184	28 (Cameron County, PA)	76,958 (Kings County, NY)
Number of Loans	6794.456	41 (Forest County, PA)	93,520 (New York County, NY)
Outlay Amount	\$5.89e+08	\$1,534,127 (Forest County, PA)	\$1.17e+10 (New York County, NY)
Obligated Amount	\$5.91e+08	\$1,534,127 (Forest County, PA)	\$1.17e+10 (New York County, NY)
Total Funding Amount	\$21,080,789	\$129,000 (Cameron County, PA)	\$336,393,758 (Kings County, NY)
Total Face Amount	\$8.05e+08	\$1,692,370 (Forest County, PA)	\$1.56e+10 (New York County, NY)

Table 4. Mean, Min, and Max Values on Economic Variables in 2021 – County Level

Variable (2021)	Mean	Min	Max
Unemployment Rate	5.908861	3.7 (Tompkins County, NY)	13.6 (Bronx County, NY)
Labor Force	141548.5	1747 (Forest County, PA)	1193447 (Kings County, NY)
Number of Direct Payments	610.2658	0 (Hamilton County, NY)	15735 (Kings County, NY)
Number of Loans	5519.861	30 (Cameron County, PA)	76427 (Kings County, NY)
Outlay Amount	\$3.18e+08	\$1442325 (Forest County, PA)	\$6.74e+09 (New York County, NY)
Obligated Amount	\$3.19e+08	\$1442325 (Forest County, PA)	\$6.76e+09 (New York County, NY)
Total Funding Amount	\$8489806	\$0 (Hamilton County, NY)	\$2.20e+08 (Kings County, NY)
Total Face Amount	\$5.00e+08	\$2855391 (Cameron County, PA)	\$9.87e+09 (New York County, NY)

Accordingly, smaller populations should receive smaller numbers as well as amounts. As expected, counties like Cameron County, Pennsylvania’s least populous county, and Forest County, Pennsylvania’s third-least populous county, consistently received the least government funding across most variables of interest, namely the number of loans and total face value of loans. Surprisingly, there was one county (Hamilton County, NY) that did not receive any direct payments in 2021, though they did receive 71 loans during the year. Apart from a few exceptions, the expectation that the largest counties should receive the greatest funding and the smallest counties the least funding seems to hold true when looking at the extremes in the sample population of counties.

The data indicates that the mean unemployment rate in 2020 across the counties was 8.6%, which fell to 5.9% in 2021. Though the county with the greatest unemployment rate in 2020 was Atlantic County, the county with the greatest unemployment rate in 2021 was Bronx County, NY at 13.6%. The Bronx faced New York City’s highest rates of COVID-19 related hospitalizations and deaths as well as economic and social inequities such as jobs less conducive to remote work (Jain, 2021).

The assumption that the government distributed greater amounts of funding in 2021 than 2020 is buttressed when looking at the data at the county level. The mean values across all the important variables of interest related to government spending were greater in 2021 than in 2020. However, to determine whether funding was equitably distributed based on labor force and population across the counties of all four states, more advanced statistical tests like t-tests and ANOVA tests are required.

Analysis

For all the important variables of interest, two-tailed t-tests were used to determine whether there was a statistically significant difference in the means between counties with a population under 100,000 people and counties with a population over 100,000 people. First, it is important to note that there was no statistically significant difference between the unemployment rates for the two groups. Although the rates may have been the same, counties with a larger population had a larger number of unemployed residents.

As we were interested in determining whether there was equitable distribution, all important economic variables except for unemployment rates were divided by either total population or labor force. For both groups, the p-values for the t-tests for all per capita variables (the number of direct payments, loans, outlay amount, obligated amount, total funding amount, and total face value of loans) between the two groups were found to be less than 0.05. Therefore, we could reject the null hypothesis that the means of the per capita values were the same. Counties with higher populations were found to have statistically significant higher allocations of funding per capita.

For both groups, the number of direct payments, loans, outlay amount, obligated amount, total funding amount, and total face value of loans were divided by the county labor force to determine if the spending was distributed equitably per laborer, and in turn gauge if funding was distributed equitably amongst individuals, businesses, and nonprofits.

Surprisingly, there seems to be a bias towards larger counties across all variables of interest (besides unemployment rate), proven by statistically significant differences between the two means (see Table 5 and Table 6). For example, in 2020, the average face value of loans divided by the total labor force—or average face value of loans per laborer—in counties with a population under 100,000 was \$2,844, while the average face value of loans per laborer in counties with a population over 100,000 was \$4,582 (see Table 5). Similarly, the average outlay amount per laborer in counties with a population under 100,000 was \$2,331, while the average outlay amount per laborer in counties with a population over 100,000 was \$3,514. This phenomenon can also be seen in the important variables of interest in 2021 (see Table 6), apart from unemployment rate, the number of direct payments, and the total funding amount—all of which had associated p-values for t-tests of greater than 0.05. For most of the variables, counties with a population over 100,000 received a greater amount of government funding per laborer than in counties under 100,000.

A potential justification for this “bias” could be that COVID-19 disproportionately impacted big urban areas where social interaction, public transportation networks, and crowded housing are key features (Matheson et al., 2020). Moreover, there is a greater spatial concentration of economic activities in cities (Melo, 2016), and therefore a greater spatial concentration of businesses in counties with populations over 100,000 than counties with populations under 100,000. Hence, these cities and larger counties would require greater funding per laborer to have the same “aiding” effect as that seen in smaller counties. Further research would have to be done in this area to obtain a conclusive answer, but this “bias” favoring larger counties is evident in Connecticut, New Jersey, New York, and Pennsylvania.

Table 5. Two Tailed T-test between Counties with Populations Under vs Over 100,000 per Labor, 2020

Variable (per Labor)	Smaller Counties Mean (Standard Deviation)	Larger Counties Mean (Standard Deviation)
Unemployment Rate p = 0.1608	8.41944 (1.484344)	8.805814 (1.957991)
Number of Direct Payments***	0.0194656 (0.0007894)	0.0280292 (0.0013037)
Number of Loans***	0.0298679 (0.0087993)	0.040017 (0.0133425)
Outlay Amount***	2331.705 (696.503)	3506.5 (1333.468)

Obligated Amount***	2336.239 (698.14)	3514.064 (1336.301)
Total Funding Amount***	78.34447 (24.93968)	110.4692 (52.30211)
Total Face Value***	2844.187 (901.3569)	4582.582 (1939.028)

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Table 6. Two Tailed T-test between Counties with Populations Under vs Over 100,000 per Labor, 2021

Variable (per Labor)	Smaller Counties Mean (Standard Deviation)	Larger Counties Mean (Standard Deviation)
Unemployment Rate $p = 0.1125$	5.713889 (1.206707)	6.072093 (1.609797)
Number of Direct Payments $p = 0.0905$	0.0021749 (0.0011663)	0.0027573 (0.0028952)
Number of Loans***	0.0215594 (0.0056036)	0.0304827 (0.0122653)
Outlay Amount***	1239.424 (483.8163)	1809.604 (802.3604)
Obligated Amount***	1242.67 (486.2955)	1815.184 (805.079)
Total Funding Amount $p = 0.0837$	29.69845 (16.06849)	38.04054 (40.71133)
Total Face Value***	1716.983 (746.1998)	2756.49 (1386.172)

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Although differences exist between the economic variables per laborer for the two groups across the 2 years, those differences also subside from 2020 to 2021. For example, the difference in 2020 between the average face value of loans per laborer was approximately \$1,738. The difference in 2021 fell to approximately \$1,040. Reasons for this drop were not investigated but may include declining severity of impacts in more concentrated areas and more information regarding the distribution of COVID-19 impacts on counties as well

as more up-to-date information on more effective and efficient allocation of government funding. Further research would need to be conducted to elucidate this matter as well.

To further investigate whether funds were equitably distributed, the counties were re-divided into four categories based on population to see if this bias still held true. In 2020, there were statistically significant differences between the means for the outlay amount, obligated amount, total funding amount, and total face value of loans amount. In general, counties with a population of 0-49,999 (dispersed) received less per laborer than counties with a population of 50,000-99,999 (small counties), which received less per laborer than counties with 100,000-499,000 (mid-size counties), which received less per laborer than counties with populations of 500,000+ (large counties). In effect, the pattern held true for most of the important variables of interest (see Table 7).

The same was mostly true in 2021, apart from a surprising anomaly (see Table 8). The data showed that for the number of direct payments and the total funding amount, small counties (50,000-99,000) received more per laborer than mid-size counties (100,000-499,999). The reason for this is unclear and would also require further research to explain. Another interesting pattern was that for both years, the difference in the means between mid-size and large counties was the greatest across all important variables of interest. For the total face value of loans amount, for example, large counties received 73% more per laborer than midsize counties. Midsize counties received only 22% more per resident than small counties.

Table 7. ANOVA test between the 4 County Types (Dispersed, Small, Mid-size, and Large) per Labor, 2020

Variable (per Labor)	Dispersed Counties Mean (Standard Deviation)	Small Counties Mean (Standard Deviation)	Mid-size Counties Mean (Standard Deviation)	Large Counties Mean (Standard Deviation)
Unemployment Rate	8.3666667 (1.5342293)	8.4818182 (1.4442677)	8.4896552 (1.8133704)	9.4607143 (2.1136837)
HSD exist between Dispersed & Large Counties				
Number of Direct Payments***	0.01824262 (0.00634595)	0.02091098 (0.00691074)	0.02275998 (0.00702358)	0.03894387 (0.01314645)
HSD exist between Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				
Number of Loans***	0.02786498 (0.00682817)	0.03223505 (0.01028393)	0.03516302 (0.00961121)	0.05007165 (0.01449049)
HSD exist between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				
Outlay Amount***	2124.7318 (649.67429)	2576.309 (679.13647)	3089.883 (852.20638)	4369.4911 (1708.6376)
HSD exist between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				

Obligated Amount***	2128.7636 (650.90223)	2581.4381 (681.05885)	3095.9102 (853.73562)	4380.2406 (1711.5142)
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HSD exist between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Total Funding Amount***	72.942318 (23.32109)	84.728823 (25.623915)	88.027252 (25.762466)	156.95611 (62.351198)
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HSD exist between Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Total Face Value***	2540.6676 (748.10725)	3202.8928 (945.00915)	3899.3467 (1251.88)	5997.8565 (2334.0944)
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HSD exist between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Table 8. ANOVA test between the 4 County Types (Dispersed, Small, Mid-size, and Large) per Labor, 2021

Variable (per Labor)	Dispersed Counties Mean (Standard Deviation)	Small Counties Mean (Standard Deviation)	Mid-size Counties Mean (Standard Deviation)	Large Counties Mean (Standard Deviation)
Unemployment Rate*	5.6794872 (1.1466609)	5.7545455 (1.2908551)	5.8034483 (1.2778773)	6.6285714 (2.0578409)
HSD exists between Dispersed & Large Counties and Small & Large Counties.				
Number of Direct Payments***	0.00198719 (0.00127907)	0.00239674 (0.00099083)	0.00188674 (0.00105767)	0.00456047 (0.00436197)
HSD exists between Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				
Number of Loans***	0.02062072 (0.00520012)	0.0226687 (0.0059343)	0.02511685 (0.00640537)	0.04159757 (0.01403641)
HSD exists between Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				
Outlay Amount***	1104.2982 (395.78856)	1399.1187 (533.65575)	1534.5348 (428.28864)	2379.3902 (1067.8305)
HSD exists between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.				

Obligated Amount***	1106.7102 (397.15278)	1403.3488 (536.87926)	1538.8849 (429.8412)	2387.5185 (1070.8557)
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HSD exists between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Total Funding Amount***	27.11196 (17.6158)	32.755215 (13.659538)	25.808045 (14.511325)	63.379272 (61.530146)
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HSD exists between Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Total Face Value***	1494.9794 (544.75801)	1979.3502 (867.16373)	2259.9967 (881.86754)	3784.9401 (1667.5965)
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HSD exists between Dispersed & Mid-size Counties, Dispersed & Large Counties, Small & Large Counties, and Mid-size & Large Counties.

Note: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

Financial Outlays and Unemployment Rates

Now that the differences in government funding according to the size of the state and county have been evaluated, the study seeks to determine the impact of the financial outlays on the unemployment rates for the counties across the four states. Using Pearson's Correlation, a weak negative relationship (-0.2295) was found between the number of direct payments (per labor force) and the unemployment rate difference (see Figure 5). A weak negative relationship (-0.2363) was also found between the total funding amount (per labor force) and the unemployment rate difference (see Figure 6). The number of direct payments and the total funding amount (the total value of the direct payments) were the only two variables that exhibited statistically significant correlations with the unemployment rate difference. The greater the number of direct payments and the higher the funding amount, the greater the percentage points by which the unemployment rate dropped. Although there could have been correlations between the unemployment rate difference and the other important variables of interest such as the number of loans, they weren't determined to be statistically significant.

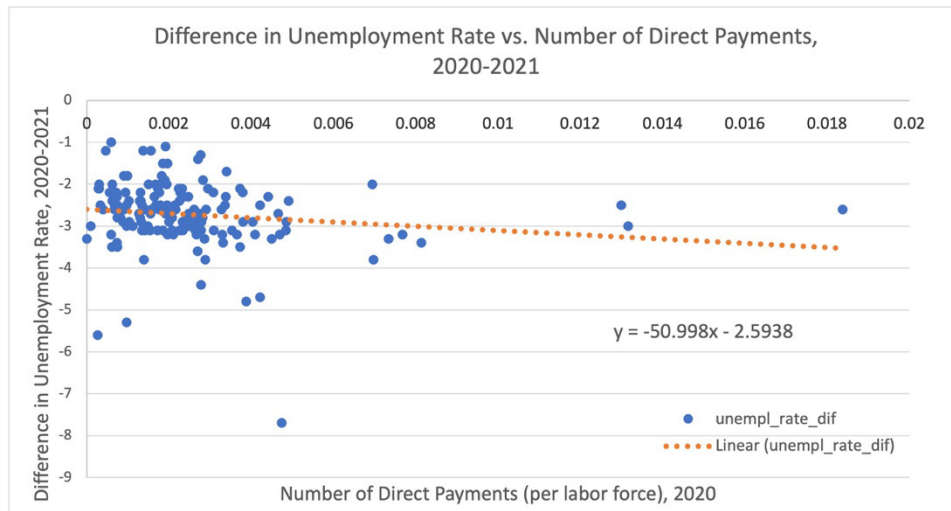


Figure 5. The Difference in Unemployment Rate vs. The Number of Direct Payments, 2020-2021

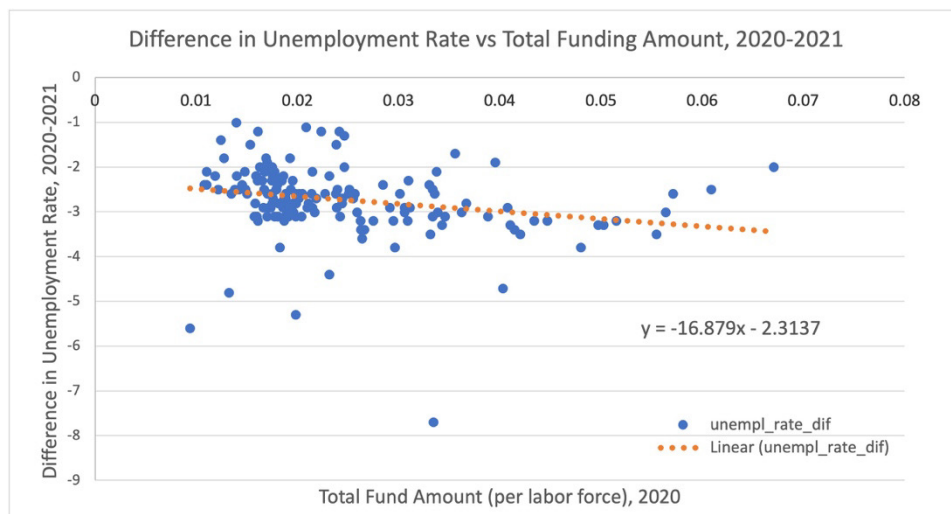


Figure 6. The Difference in Unemployment Rate vs. The Total Fund Amount, 2020-2021

These findings suggest that the EIDL Grants program could have had a measurable impact on lowering unemployment rates across the four states. It also lends credence to earlier findings suggesting that the SBA relief programs, namely the Paycheck Protection Program, were effective to some extent. Although correlations do not mean causation, the fact that counties that received both larger numbers of direct payments (i.e., wider distribution of funds across many businesses within a county) and/or total funding amounts of loans with which they could continue their operations exhibited greater declines in their unemployment rates corroborate findings of other research. Despite the fact that most of the prior research found links between PPP loans and lower rates of unemployment, this data suggests that there could be a link between the EIDL grants and lower rates of unemployment as well. The two relief programs were similar in that they were either completely forgivable (for loans) or simply granted to the businesses (direct payments) and were directly intended to cover payroll costs and important operating expenses.

Conclusion

With unemployment rates rapidly rising in 2020 and the economy sputtering due to the COVID-19 pandemic, the United States government issued substantial amounts of funding to Connecticut, New Jersey, New York, and Pennsylvania through the Small Business Administration. The data reveals that the government distributed greater amounts of funding to larger counties in Connecticut, New Jersey, New York, and Pennsylvania. Unsurprisingly, the most populous counties in New York such as Brooklyn, Manhattan, and Queens received the most funding.

It is likely that there was inequitable distribution of funds to address the disproportionate impacts of COVID-19. In general, larger counties received more funding per laborer than smaller counties. There was the greatest leap in funding per resident when going from mid-size cities (100,000-499,999) to large cities (500,000+). In effect, there was substantially greater funding per laborer in large cities where businesses were most concentrated and hindered by the repercussions of the pandemic, including city-wide shutdowns. This pattern is reflected in COVID-19 infection rates. The pandemic has attacked large counties containing major U.S. cities at much higher rates—growing approximately 2.5 times faster in the New York Metropolitan area, population of roughly 20 million, than in Oaks Harbor, Washington, population of roughly 84,000 (Wang, 2020). In fact, Kings County and Queens County, the two most populous counties included in the study, are 1st and 2nd respectively in COVID-19 deaths among the four states (Johns Hopkins Coronavirus Resource Center, 2022). They even rank 4th and 5th in the entire United States behind Los Angeles, Maricopa, and Cook.

Lastly, SBA relief programs may not have been efficient, but they were effective to a certain extent. The government's massive expenditures have been criticized for low multiplier effects and growing inflation. The government's aggressive interest rate hikes to drive down inflation has led to concerns that the economy could contract if it slows down too quickly (Bokat-Lindell, 2022). There has been evidence that the SBA relief programs, particularly PPP loans and potentially EIDL grants (as seen in the negative correlation obtained from the data), raised employment, but it is hotly debated whether the benefits outweighed the consequences. Successful or not, the government's response to the COVID-19 pandemic in these four states and 158 counties included unique programs and endeavors to stimulate the economy, which were unparalleled in size and magnitude.

Though the research revealed interesting insights, the study has several limitations due to the scope of the data. Though the findings focused on four states (Connecticut, New Jersey, New York, Pennsylvania), they aren't necessarily generalizable to the Northeast as a whole. Moreover, the data is limited to the Northeast where the impact of the pandemic could have been different from the South and the Midwest. Moreover, due to the fact that the pandemic was so recent, research is limited to the immediate impact of COVID-19 spending from 2020-2021. It would be interesting to gauge the long-term impact of COVID-19 spending on unemployment rates and the economy a few years down the line when more data is available.

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