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Did the small business administration's COVID-19 assistance go to the hard hit firms and bring the desired relief?

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ABSTRACT

The paper uses newly released Small Business Pulse Survey data on small business' response to questions about overall COVID-19 impact, federal aid request, federal aid receipt, and subsequent changes in revenue and employee hours to evaluate the efficacy of three federal aid programs: Paycheck Protection Program (PPP), Economic Injury Disaster Loan (EIDL), and Small Business Administration (SBA) loan forgiveness programs. The paper finds no evidence that the severity of COVID-19 impact is related to the application and approval rate of any of the SBA assistance programs, implying that the relief funds did not reach the firms that need the liquidity injection the most. But the firms that did receive the relief funds were less likely to report revenue decrease and employee hours decline during the subsequent weeks. This result provides preliminary support to the social insurance value of the relief programs in boosting small businesses' economic activities during the COVID-19 crisis.

1. Introduction

Small businesses across America are facing unprecedented challenges from the Coronavirus outbreak. According to the research released on May 6th from the Society for Human Resource Management, Coronavirus could force half of U.S. small firms out of business within 6 months.¹ To mitigate the impact of the COVID-19 pandemic, congress passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which established several temporary programs administered by the Small Business Administration (SBA) to offer relief funds for small businesses. These federal aid programs from SBA include the Paycheck Protection Program (PPP), Economic Injury Disaster Loan (EIDL), and SBA loan forgiveness.

In this paper, we provide a preliminary assessment of the efficacy of the SBA relief programs, focusing on three questions. First, did small firms hit harder by the Coronavirus have a greater tendency to apply for federal relief? Second, did the firms more adversely affected by the crisis have a higher odds of receiving the aid? Third, did the federal assistance boost the economic activities of the recipient firms as intended. We use data from the newly-released Census Bureau's Small Business Pulse Survey (SBPS)² to investigate the above three questions for the PPP, EIDL, and SBA loan forgiveness programs respectively. The findings below are consistent for all three aid programs.

First, our OLS regressions find no significant relationship between the percentage of firms that submitted relief applications with

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¹ For further detail about SHRM survey, see press release on the SHRM website (<https://www.shrm.org/about-shrm/press-room/press-releases/pages/survey-covid-19-could-shutter-most-small-businesses.aspx>)

² The survey detail can be found in SBA official website, see <https://portal.census.gov/pulse/data/#downloads>

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the percentages of firms that reported a large or moderate negative impact from Covid-19, suggesting that small firms did not make application decisions based on the severity of the damage. Second, akin to the findings for aid application, our OLS regressions of federal aid approval find that the percentage of firms that received the relief is not related to the percentages of firms that reported adverse COVID-19 impact. The only factor influencing the percentage of aid approval is the application rate, suggesting that the best shot for getting approval is simply to apply for the aid, regardless of the severity of damage firms experienced. Lastly, the regressions of economic outcomes of the federal aid show that receiving relief funds is related to fewer firms reporting decreased revenue and declined employee work hours in the subsequent weeks. These results provide preliminary evidence that the federal assistance programs have achieved their intended goals of increasing the economic activities of small businesses.

The remainder of this paper is organized as follows. Section 2 describes the federal aid programs and literature review. Section 3 discusses the data and methodology. Section 4 presents the test results. Section 5 concludes.

2. Background

One of the central relief programs through the CARES Act is the Paycheck Protection Program (PPP), designed to incentivize small businesses to retain workers at their pre-pandemic level by providing forgivable loans. The PPP loan will be fully forgiven if at least 60% of the funds have been used for payroll.³ The CARES Act has allocated a total of \$659 billion of relief fund to the PPP program with the original \$359 billion approved on March 27, 2020, and the additional \$310 billion from the second stimulus bill on April 24, 2020. Besides the PPP relief for Coronavirus, small businesses are able to apply for the Economic Injury Disaster Loan (EIDL), which offers low-interest and favorable terms to help carry affected firms through the COVID-19 crisis. The EIDL program also provides cash advances up to \$10,000 that are forgivable to the eligible applicants. These advances, however, are no longer available as of July 11, because the Small Business Administration (SBA) has given out all \$20 billion allocated for the advances.⁴

All three SBA relief programs, the PPP, EIDL, and loan forgiveness, are intended to inject much-needed liquidity into small businesses to provide some relief as the crisis persists. However, the implementation challenges such as program accessing, bureaucratic hassles, and difficulties establishing eligibility may deter small firms from applying for the relief programs offered by the government (Bartik et al., 2020). Humphries, Neilson, and Ulyssea (2020) found that the smaller firms were less informed of the PPP compared to larger firms. Dua, Mahajan, Millan, and Stewart (2020) reported that the smallest businesses with revenue less than \$250,000 were significantly less likely to apply for the PPP. These findings reveal a disproportionate application across various small business groups. This paper adds to this line of research by investigating the effect of the severity of COVID damage on firms' decision to apply for federal aids, focusing on the question of whether the application rate is higher for firms more adversely affected by COVID-19.

This paper also contributes to the growing literature investigating the distribution of federal aid funds. What is the target of federal assistance? Did relief funds reach the target firms? Those questions have been the focus of recent research on the Paycheck Protection Program. Researchers of public firms borrowers documented that PPP funds tend to flow to start-up firms (Meier and Smith, 2020), smaller firms, firms with more employees but fewer investment opportunities (Cororaton and Rosen, 2020). James, Lu, and Sun (2020) found that a greater portion of first-round PPP lending occurs in areas where community banks have a greater market share. Granja, Makridis, Yannelis, and Zwick (2020) found that first-round PPP funds did not flow to communities that were more adversely affected by the pandemic, but were disproportionately allocated to the areas that were significantly more exposed to banks whose PPP lending shares exceeded their small business lending market shares. Whereas Granja et al. (2020) presented the analysis at aggregated geographies such as counties, the present paper studies the distribution of federal aids at aggregated industry level by investigating whether the aid approval is more likely for the small businesses that experienced more severe damage from the crisis.

Lastly, the paper contributes to the emerging literature on assessing the outcomes of federal aid programs. According to the description on the SBA website, PPP is "An SBA loan that helps businesses keep their workforce employed during the Coronavirus (COVID-19) crisis."⁵ and EIDL "will provide economic relief to small businesses and non-profit organizations that are currently experiencing a temporary loss of revenue."⁶ Clearly, the desired outcomes of SBA relief programs include retaining the workforce and increasing the economic activities of the affected small businesses. Studies focusing on employment outcomes have found some modest positive impacts of PPP on employment. Using administrative data from ADP, Autor et al. (2020) documented that the PPP boosted employment by 2–4.5% for eligible firms relative to the PPP-ineligible firms. Chetty et al. (2020) found that the PPP increased employment at small businesses by 2% using worker-level data from Earnin. Focusing on the liquidity impact of PPP, Granja, Makridis, Yannelis, and Zwick (2020) found that PPP helped firms to meet loan and other payment obligations using Small Business Pulse Survey data. This paper focuses on the impact of federal aid on small firms' economic activities, measured by the percentage of firms reporting decreased revenue and decreased working hours. A negative correlation between the percentage of firms that received the aid and the

³ For further detail about PPP program, see the "Loan details and Forgiveness" section on the SBA website (<https://www.sba.gov/funding-programs/loans/coronavirus-relief-options/paycheck-protection-program>)

⁴ For further detail about EIDL loan and advance, see the "Disaster loan applications" section on the SBA website (<https://www.sba.gov/page/disaster-loan-applications#section-header-0>)

⁵ For PPP description, see the top section on the SBA website <https://www.sba.gov/funding-programs/loans/coronavirus-relief-options/paycheck-protection-program>

⁶ For EIDL description, see the top section on the SBA website <https://www.sba.gov/funding-programs/loans/coronavirus-relief-options/economic-injury-disaster-loans>

Table 1
Descriptive Statistics of all Variables at NAICS3 Sector Level.

	Mean (%)	SD (%)	Median (%)	Min. (%)	Max. (%)	Count
<i>Large Negative Effect</i>	42.55	0.88	40.00	12.00	85.00	379
<i>Moderate Negative Effect</i>	41.57	0.62	43.00	12.00	66.00	379
<i>Little or No Effect</i>	10.40	0.30	10.00	1.00	29.00	379
<i>Moderate Positive Effect</i>	3.83	0.20	2.00	0.00	27.00	379
<i>Large Positive Effect</i>	1.89	0.11	1.00	0.00	15.00	379
<i>Requested PPP</i>	74.07	0.47	75.00	42.00	91.00	379
<i>Received PPP</i>	65.01	0.70	68.00	21.00	90.00	379
<i>Requested EIDL</i>	26.56	0.52	24.00	7.00	54.00	379
<i>Received EIDL</i>	15.89	0.37	15.00	2.00	40.00	379
<i>Requested Loan Forgiveness</i>	10.08	0.20	10.00	2.00	29.00	379
<i>Received Loan Forgiveness</i>	5.61	0.14	5.00	1.00	17.00	379
<i>Revenue Decreased</i>	54.91	0.65	54.00	25.00	88.00	379
<i>Employee Hours Decreased</i>	30.48	0.61	29.00	9.00	70.00	379

Table 2
The Severity of COVID-19 Impact and Requesting for PPP, EIDL and Loan Forgiveness.

<i>Dep. Variables</i>	<i>PPP Req</i>	<i>EIDL Req</i>	<i>Loan Forgiveness Req</i>	
<i>Intercept</i>	0.8724	0.0671	0.4649	**
<i>LN</i>	-0.0768	0.4693	-0.2856	
<i>MN</i>	0.0222	-0.0236	-0.4294	*
<i>NE</i>	-0.9455	-0.0611	-0.4633	**
<i>MP</i>	-0.2230	0.1072	-0.2803	
<i>LP</i>	-0.0741	0.5741	-0.2731	
Observations	379	379	379	
Adjusted R Square	0.2249	0.6818	0.4024	

** significant at 5% level, * significant at 10 % level.

percentage of firms reporting decreased revenue and working hours in the subsequent weeks could imply the intended efficacy of the relief program. This paper investigates both PPP and EIDL programs in order to provide a comprehensive analysis of SBA relief programs with no intention to distinguish the two programs in terms of their functions and efficacy. In fact, firms do substitute between these programs based on their circumstances or inability to access one or the other.

3. Data and methodology

We obtain data from the newly-released Census Bureau's Small Business Pulse Survey (SBPS), which provides weekly information about how small businesses' operations and finances being affected by the pandemic. The SBPS targets small businesses with receipts greater than or equal to \$1000 and 500 employees or fewer. The survey was run weekly from April 26 to June 27 resulting in a total of 9 weekly reports (Buffington et al., 2020). We focus our analysis on aggregations of small businesses across NAICS3 (North American Industry Classification System 3 digits) sub-sectors over time. For the purpose of this study, we draw upon responses to questions about the overall severity of COVID-19 impact, application and approval of the PPP, EIDL, and SBA loan forgiveness programs since March 13, and firms' most recent changes in revenue and employee hours worked.

Table 1 presents the descriptive statistics of all variables at NAICS3 sub-sector level. The data shows that small businesses did not bode well in the current crisis. Averagely 84 percent of the surveyed small businesses across all industries reported negative overall effects from COVID-19, including 42.55 percent reporting large negative impact and 41.57 percent reporting moderate negative impact. Revenue declined in 54.91 percent of the targeted firms, and 30.48 percent of the respondents reported reduced employee working hours.

The percentages of firms that requested PPP, EIDL, and loan forgiveness are 74.07, 26.56, and 10.08 respectively, and the percentages of aid recipients are 65.01, 15.89, 5.61 for PPP, EIDL, and loan forgiveness programs respectively.

The following OLS regressions were then constructed to explore the association between 1) the severity of overall COVID impact and assistance application, 2) the severity of overall COVID impact and assistance approval, and 3) receiving assistance and subsequent changes in the economic activities undertaken by the firm, as measured by revenue and employee hours changes respectively.

$$Req_{it} = a + bLN_{it} + cMN_{it} + dNE_{it} + eMP_{it} + fLP_{it} \quad (1)$$

$$Rec_{it} = a + bLN_{it} + cMN_{it} + dNE_{it} + eMP_{it} + fLP_{it} + gReq_{it} \quad (2)$$

$$RevD_{it} = a + bRec_{it} + cLN_{it} + dMN_{it} + eNE_{it} + fMP_{it} + gLP_{it} \quad (3a)$$

$$HourD_{it} = a + bRec_{it} + cLN_{it} + dMN_{it} + eNE_{it} + fMP_{it} + gLP_{it} \quad (3b)$$

Table 3
The severity of COVID Impact and Receiving PPP, EIDL, and Loan Forgiveness.

Dep. Variables	PPP Rec	EIDL Rec	Loan Forgiveness Rece
Intercept	0.21973	0.26165	-0.04954
LN	-0.50722	-0.38356	0.03507
MN	-0.53750	-0.27994	0.05644
NE	0.19846	-0.15552	0.06013
MP	-0.24103	-0.20622	0.15418
LP	-0.59002	-0.38214	-0.04584
PPP Req	1.17376	***	
EIDL Req		0.78362	***
Loan Forgiveness Req			0.55569
Observations	379	379	379
Adjusted R Square	0.46602	0.71192	0.54615

*** significant at 1% level.

Where i is industry subsector i , and t is week t when the weekly survey was conducted. Req is the sector aggregated percentage of small firms that requested federal assistance since March 13. Rec is the sector aggregated percentage of small firms that received federal assistance since March 13. $RevD$ is the sector aggregated percentage of small firms that experienced revenue decrease one week before the survey week. $HourD$ is the sector aggregate percentage of small firms that experienced employee hours decrease one week before the survey week. LN is the sector aggregated percentage of small firms that have been largely negatively affected by the crisis. MN is the sector aggregate percentage of small firms that have been moderately negatively affected by the crisis. NE , MP , and LP are the sector aggregate percentages of small firms that reported little or no, moderately positive, and largely positive impact from the COVID-19 crisis respectively.

4. Regression results

Table 2 reports estimation results of regression Eq. (1) for the PPP, EIDL, and loan forgiveness programs in separate columns. The results show that the percentage of firms requesting PPP and EIDL is not related to the percentage of firms reporting any degree of damage, indicating that firms' decision to apply for federal aid does not depend on whether and to what extent firms are being hit by the crisis, except for the loan forgiveness requests. In the case of the loan forgiveness program, the percentage of applications decreases with the percentage of firms reporting little and moderately adverse effects. While it is understandable that firms with little or no adverse impact might not have much need for government assistance, the result that the firms experiencing moderately negative impact chose not to apply for help might because those firms were unlikely to increase hiring and business operations during the crisis, and they feared that they were not able to use the funds directed by the rules. To sum up the results across all three aid programs, we find no evidence that firms that were hit harder were more likely to apply for government assistance. This finding could be attributed to the implementing challenges documented in the literature, like inaccessibility of aid information to smaller businesses (Humphries et al., 2020, Dua et al., 2020), and lack of eligibility guidance, etc (Bartik et al., 2020).

Table 2 presents the results of regression Eq. (1) examining the relationship between the percentage of businesses reporting various degrees of COVID impact and the percentage of businesses that requested federal aid.

$$Req_{it} = a + bLN_{it} + cMN_{it} + dNE_{it} + eMP_{it} + fLP_{it} \text{ Eq. (1)}$$

Where i is industry subsector i , and t is week t when the weekly survey was conducted. Req is the sector aggregated percentage of small firms that requested federal assistance since March 13. LN is the sector aggregated percentage of small firms that have been largely negatively affected by the crisis. MN is the sector aggregate percentage of small firms that have been moderately negatively affected by the crisis. NE , MP , and LP are the sector aggregate percentages of small firms that reported little or no, moderately positive, and largely positive impact from the COVID-19 crisis respectively.

Fig. A1 presents the relationship between requesting PPP and the severity of COVID-19 impact on small firms. Panel A plots the relationship between the percentage of firms that requested PPP and the percentage of firms with large negative. Panel B plots the relationship between the percentage of firms that requested PPP and the percentage of firms with moderate negative COVID-19 impact. Consistent with the regression results in Table 2, no significant correlation is found in either panel.

We find similar estimation results when the percentage of firms that received the aid is regressed on the percentage of firms reporting varying levels of difficulties. As reported in Table 3, across the board for all three federal aid programs, the percentage of recipient firms is not related to the percentage of firms reporting largely negative, moderately negative, zero impact, or moderately and largely positive COVID impact, suggesting that the relief fund did not flow to the more adversely affected small firms. This finding is consistent with the literature that documented that the government aid was allocated disproportionately to the area less affected by the crisis (Granja et al., 2020). The results indicate that federal aid programs were designed for broad access instead of conditioning on the severity of the damage. The only factor that had a significant relationship with the percentage of recipients is the percentage of firms that requested the aid, indicating the importance of applying on increasing the likelihood of receiving federal aid. For example, the coefficient of PPP Req of 1.17 implies that a 10 percentage point increase in PPP requesting is associated with an 11.7 percentage point increase in the number of firms receiving PPP assistance.

Table 3 presents the results of regression Eq. (2) examining the relationship between the percentage of businesses reporting various

Table 4
Receiving Federal Aid and Changes in Economic Activities.

Panel A: Impact of Federal Aid on Decreased Revenue						
Dep. Variables	RevD		RevD		RevD	
Intercept	0.5065		0.3300		0.3742	0.5686
PPP Rec	-0.4221	***				-0.1836
EIDL Rec			-1.1088	***		-0.7897
Loan Forgiveness Rec					-1.8805	-0.5296
LN	0.4424		0.6770		0.4621	0.5069
MN	0.5207		0.4056		0.3940	0.3105
NE	-0.6366		-0.4775		-0.6230	-0.6844
MP	-0.3734		-0.2967		-0.1642	-0.3509
LP	-0.3836		-0.0227		-0.4695	-0.2733
Observations	379		379		379	379
Adjusted R Square	0.5211		0.5838		0.4470	0.6330

Panel B: Impact of Federal Aid on Decreased Employee Hours						
Dep. Variables	HourD		HourD		HourD	
Intercept	0.3165		0.1430		0.1637	0.3401
PPP Rec	-0.3376	***				-0.2051
EIDL Rec			-0.7840	***		-0.5044
Loan Forgiveness Rec					-1.2789	-0.1430
LN	0.4245		0.6138		0.4681	0.4780
MN	0.1929		0.1316		0.1326	0.0841
NE	-0.3955		-0.2473		-0.3402	-0.4055
MP	-0.3816		-0.3076		-0.2139	-0.3768
LP	0.1391		0.4208		0.1150	0.2348
Observations	379		379		379	379
Adjusted R Square	0.5562		0.5584		0.4752	0.6017

*** significant at 1% level.

degrees of COVID impact and the percentage of businesses that received federal aid.

$$Rec_{it} = a + bLN_{it} + cMN_{it} + dNE_{it} + eMP_{it} + fLP_{it} + gReq_{it} \text{ Eq. (2)}$$

Where i is industry subsector i , and t is week t when the weekly survey was conducted. Rec is the sector aggregated percentage of small firms that received federal assistance since March 13. Req is the sector aggregated percentage of small firms that requested federal assistance since March 13. LN is the sector aggregated percentage of small firms that have been largely negatively affected by the crisis. MN is the sector aggregate percentage of small firms that have been moderately negatively affected by the crisis. NE , MP , and LP are the sector aggregate percentages of small firms that reported little or no, moderately positive, and largely positive impact from the COVID-19 crisis respectively.

Fig. A2 presents the relationship between receiving PPP and the severity of COVID-19 impact on small firms. Panel A plots the relationship between the percentage of firms that received PPP and the percentage of firms with large negative. Panel B plots the relationship between the percentage of firms that received PPP and the percentage of firms with moderate negative COVID-19 impact. Consistent with the regression results in Table 3, no significant correlation is found in either panel.

Table 4 shows the estimation results for the impact of receiving federal aid on changes in economic activities of the recipient firms. Panel A uses the percentage of firms reporting decreased revenue as dependent variable, and Panel B uses the percentage of firms reporting decreased employee hours as a dependent variable. Across the board for PPP, EIDL, and loan forgiveness programs, we find that receiving federal aid is associated with fewer firms reporting revenue decrease and employee hours decrease. For example, the coefficient of $PPP Rec$ of -0.42 in Panel A implies that a 10 percentage point increase in the number of firms receiving PPP is associated with a 4.2 percentage decrease in the number of firms reporting revenue decline. Likewise, the coefficient of $PPP Rec$ of -0.34 in Panel B implies that a 10 percentage point increase in the number of firms receiving PPP is associated with a 3.4 percentage decrease in the number of firms reporting employee hours decline. When the effects of receiving PPP, EIDL, and loan forgiveness are combined together in one regression as shown in the last column, the significantly negative coefficient for each of them indicates that receiving relief from each program plays an incremental role in reversing the slowdown of economic activities with the presence of alternative programs.

Table 4 presents the results of regression Eq. [3] examining the relationship between the percentage of businesses that received federal aid and the percentage of businesses that reported a decline of economic activities, as measured by revenue decrease in Panel A and employee hours decrease in Panel B.

$$RevD_{it} = a + bRec_{it} + cLN_{it} + dMN_{it} + eNE_{it} + fMP_{it} + gLP_{it} \text{ Eq. (3a)}$$

$$HourD_{it} = a + bRec_{it} + cLN_{it} + dMN_{it} + eNE_{it} + fMP_{it} + gLP_{it} \text{ Eq. (3b)}$$

Where i is industry subsector i , and t is week t when the weekly survey was conducted. $RevD$ is the sector aggregated percentage of small firms that experienced revenue decrease one week before the survey week. $HourD$ is the sector aggregate percentage of small firms that experienced employee hours decrease one week before the survey week. Rec is the sector aggregated percentage of small firms that received federal assistance since March 13. LN is the sector aggregated percentage of small firms that have been largely

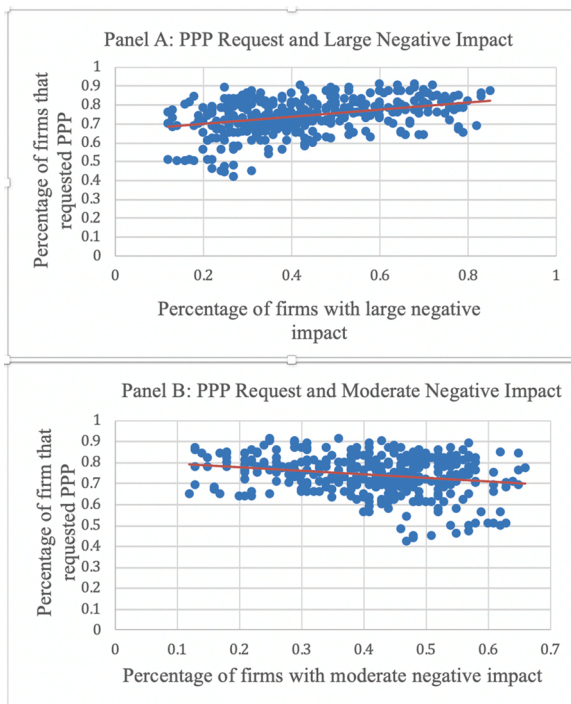


Fig. A1. PPP Request and the Severity of COVID-19 Impact.

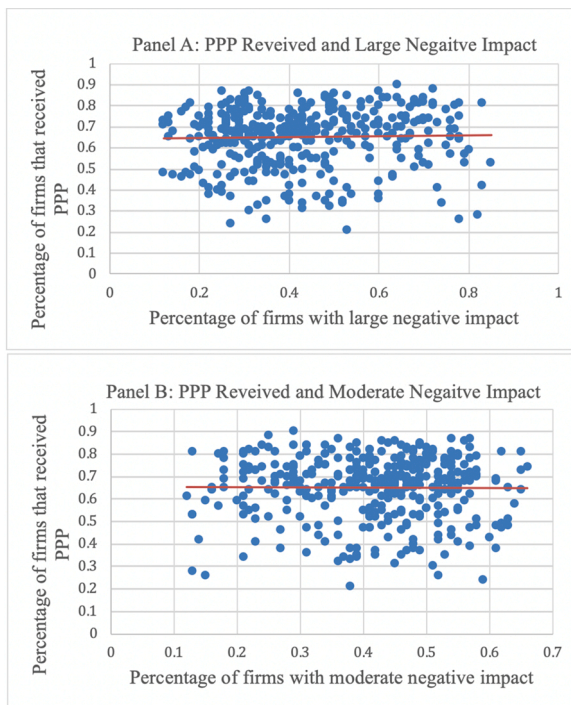


Fig. A2. PPP Received and the Severity of COVID-19 Impact.

negatively affected by the crisis. *MN* is the sector aggregate percentage of small firms that have been moderately negatively affected by the crisis. *NE*, *MP*, and *LP* are the sector aggregate percentages of small firms that reported little or no, moderately positive, and largely positive impact from the COVID-19 crisis respectively.

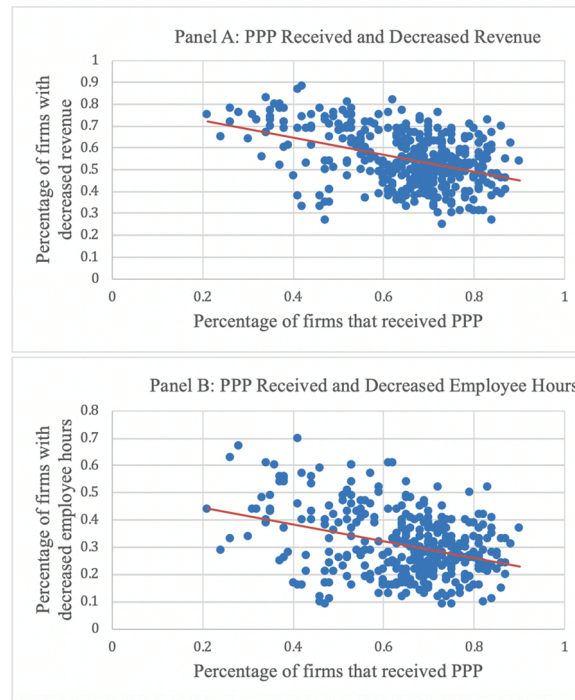


Fig. A3. PPP Received and Decreased Economic Activities.

Fig. A3 presents the impact of receiving PPP on small firms' economic activity changes. Panel A plots the relationship between percentage of firms that received PPP and the percentage of firms reporting decreased revenue. Panel B plots the relationship between percentage of firms that received PPP and the percentage of firms reporting decreased employment hours. Consistent with the regression results in [Table 4](#), the downward sloping trend lines indicate that receiving PPP is associated with lower percentage of firms reporting revenue and employment hours declines.

5. Conclusion

Drawing upon the Small Business Pulse Survey data recently released on the SBA website, this paper examines the relation between 1) the severity of overall COVID impact and government assistance application, 2) the severity of the overall COVID impact and assistance approval, and 3) receiving assistance and subsequent changes in revenue and employee working hours.

We find no evidence that small firms more severely affected by the virus are more likely to apply for federal aid, nor do they have a greater chance of receiving the funds. In light of the finding that increasing aid request is the only effective means to increase the likelihood of aid approval, it is essential for SBA to encourage small businesses to apply for government relief funds by establishing and maintaining clarity and consistency of eligibility requirements. Currently, all businesses with 500 or fewer employees are eligible to apply for SBA relief funds, and there are no other requirements or certifications needed to qualify for a loan.

Even though the federal assistance does not seem to reach the firms that need the liquidity injection the most, our finding shows that all three relief programs play important roles in promoting the economic activities of the recipient firms. Firms that received funds are less likely to report revenue and employee hours decline. Generally speaking, these findings confirm the social insurance value of the SBA relief programs in providing the lifeline to firms going through the turmoil of the COVID-19 crisis.

Appendix A

Fig. A1 presents the relationship between requesting PPP and the severity of COVID-19 impact on small firms. Panel A plots the relationship between the percentage of firms that requested PPP and the percentage of firms with large negative. Panel B plots the relationship between percentage of firms that requested PPP and the percentage of firms with moderate negative COVID-19 impact.

Fig. A2 presents the relationship between receiving PPP and the severity of COVID-19 impact on small firms. Panel A plots the relationship between the percentage of firms that received PPP and the percentage of firms with large negative. Panel B plots the relationship between percentage of firms that received PPP and the percentage of firms with moderate negative COVID-19 impact.

Fig. A3 presents the impact of receiving PPP on small firms' economic activity changes. Panel A plots the relationship between percentage of firms that received PPP and the percentage of firms reporting decreased revenue. Panel B plots the relationship between percentage of firms that received PPP and the percentage of firms reporting decreased employment hours.

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