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## Take-up of Payroll Tax-Based Subsidies During the COVID-19 Pandemic

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# TAKE-UP OF PAYROLL TAX-BASED SUBSIDIES DURING THE COVID-19 PANDEMIC

November 8, 2021

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During the COVID-19 pandemic, Congress enacted several subsidies administered through the payroll tax system: a credit for paid sick and family leave, a deferral of some payroll tax liability to future years, and the Employee Retention Tax Credit (ERTC). This paper uses preliminary payroll tax microdata to study the take-up of these subsidies. I find that take-up for the paid sick and family leave credit was imperfect at best and the take-up for deferral and the ERTC was quite low. I then analyze potential explanations for the low take-up. I find that variation by paid preparer explains a substantial component of ERTC take-up, but not deferral or paid sick and family leave take-up.

Keywords: COVID-19, payroll tax, Employee Retention Tax Credit, CARES Act, paid sick and family leave, incomplete take-up

JEL Codes: H25, H32, H84, J32

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# 1 Introduction

During the COVID-19 pandemic, the U.S. federal government provided substantial fiscal support, in many forms. The IRS sent three rounds of Economic Impact Payments (EIPs) totalling \$3,200 per person to most adults. Unemployment insurance was made considerably more generous, with a flat \$600 increase in weekly benefits during much of 2020, leading to wage replacement rates in excess of 100 percent for many unemployed persons (Ganong et al., 2020; Larrimore et al., 2021). And Congress created the Paycheck Protection Program (PPP) which provided approximately \$800 billion in low-interest rate loans to small businesses which could be forgiven under certain conditions, such as incurring sufficient amount of payroll expense.

Additionally, Congress provided support to businesses through the quarterly payroll tax system. First, the Families First Coronavirus Response Act (FFCRA) mandated that most small employers provide paid sick and family leave, which was fully reimbursed by the federal government in the form of a payroll tax credit. Second, in the CARES Act, Congress allowed businesses to defer a portion of their payroll tax obligation to December 2021 and December 2022. Third, the CARES Act created the Employee Retention Tax Credit (ERTC), which initially provided a 50% subsidy for some wages paid by employers experiencing COVID-19-related hardship.

This paper uses payroll tax filings through the second quarter of 2021 to study take-up of these subsidies. While take-up of the paid *sick* leave credits was non-trivial – approaching 50% for firms most likely to be affected – take-up of the *family* leave credits (which applied to leave taken by parents who were unable to work due to a child-care or school closure) was only 15% for such firms. More strikingly, fewer than 3% of employers chose to defer any payroll tax; this share is increasing in the size of the employer, but remains substantially less than 100% even for the largest employers. The take-up rate for the ERTC was even lower: approximately 1% in 2020; take-up increased to about 3% in 2021 when eligibility and generosity were



substantially expanded.

Next, I explore the relatively modest variation in take-up across industry. Conditional on a set of fixed effects for quarter and number of employees, manufacturers were about 5 percentage points more likely to claim paid leave credits, perhaps because manufacturing employees were subject to a higher risk of COVID-19 exposure. Take-up of payroll tax deferral was highest in the “management of companies and enterprises” industry, perhaps because such employers are more sophisticated than would typically be implied by the number of employees directly working for the employer. Take-up of the ERTC was highest in the accommodations and food services and arts, entertainment, and recreation industries, consistent with such employers being more likely to be eligible. Finally, I find that paid preparers can explain a noticeable share of variation in ERTC take-up, but not paid leave take-up or take-up of payroll tax deferral. In particular, I find that ERTC take-up in the restaurant industry (NAICS 722) in 2021Q1 (when eligibility was likely most expansive) would have been as high as 50% had all preparers been replaced by preparers in the 90th percentile of ERTC take-up, rather than 8.6% take-up as was actually seen.

There is a small existing literature studying the effect of the paid leave credit. Andersen et al. (2021) exploits pre-pandemic differences in the population of non-essential workers to find that the policy decreased mobility as measured by mobile phone data. Pichler et al. (2020) use a difference-in-differences design, using states with pre-existing paid leave policies as a control group, and finds that the policy reduced COVID-19 cases by approximately 400 per day. To the best of my knowledge, the present paper is the first to study empirically the deferral of payroll tax liability or the ERTC.<sup>1</sup> More broadly, this paper contributes to the large and growing literature examining the role of fiscal support during the pandemic. While a detailed review is beyond

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<sup>1</sup>In July 2021, the Congressional Budget Office released preliminary information on aggregate amount of paid leave credits and ERTC processed by the IRS, along with brief explanations for why these amounts may have been less than initially predicted (Congressional Budget Office, 2021a,b).



the scope of this paper, some prominent examples include Bhutta et al. (2020) on the simulated effect of fiscal support on financial security, Baker et al. (2020) on the consumption response to EIPs, Marinescu et al. (2021) on the effect of the expanded UI on employment outcomes, and Granja et al. (2020), Hubbard and Strain (2020), and Faulkender et al. (2021) on the effect of the PPP. The present paper contributes to this literature by providing descriptive statistics on a set of subsidies that has received limited attention so far.

This paper is also related to a literature that studies the incomplete take-up of government-provided benefits, tax or otherwise. At least as far back as Moffitt (1983), public finance economists have recognized that take-up of cash or in-kind transfer payments was far from complete, perhaps due to stigma as suggested in this original work, or due to program complexity as argued by Kleven and Kopczuk (2011) and Bhargava and Manoli (2015). While one might expect both stigma and complexity to play less of a role in the context of take-up of benefits for businesses, there is also a literature that has found imperfect take-up of “bonus” depreciation (Kitchen and Knittel, 2016) and net operating loss carrybacks (Zwick, 2021). The present paper contributes to this literature by showing there was substantially imperfect take-up of benefits designed largely to help businesses weather a crisis.

## **2 Background on provisions**

In this section, I provide background information on the three subsidies that I analyze in this paper. This section is not intended to be a comprehensive description of these subsidies. More complete descriptions and the most updated guidance can be found on [irs.gov](https://www.irs.gov).



## 2.1 Paid leave credits

The FFCRA, passed on March 18, 2020, created a mandate for most firms with under 500 employees to provide paid sick and family leave to employees for the period April 1, 2020 through December 31, 2020. The sick leave component required employers to pay 100% of an employee's normal wage (up to \$511 per day) for up to two weeks for certain qualifying COVID-19 related purposes. Some of the most common purposes include being sick with COVID-19, being under a COVID-19-related quarantine order, or caring for an immediate family member sick or under a COVID-19 quarantine order. The family leave component required employees to pay  $\frac{2}{3}$  of an employee's normal wages (up to \$200 per day)<sup>2</sup> for up to ten weeks in the case of an employee unable to work due to needing to care for a child whose school or child-care is closed for COVID-19 related reasons. The statute exempted business with fewer than 50 employees from the requirement to provide family leave if it would "jeopardize the viability of the business as a going concern." Under the provision, all amounts paid for required paid or family leave generate a payroll refundable tax credit, dollar for dollar. However, to the extent that the family or sick leave is paid with the proceeds of a PPP loan, the credit is not allowed. Furthermore, employers were not required to provide leave to employees that had the capability of performing telework. Additionally, employers in the health care industry were excluded from the mandate.

The requirement to provide such leave expired at the end of 2020. However, subsequent legislation extended the credits for paid leave through September 30, 2021. During this period, the credit is equal to the amount of paid leave that *would* have been required had the mandate also been extended. Additionally, subsequent legislation added a new qualifying reason for taking leave: obtaining a COVID-19 vaccination or recovering from their side effects.

The Joint Committee on Taxation (2020a) estimated that the paid leave credits in the FFCRA

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<sup>2</sup>That is, the credit attributable to a given employee on a given day is equal to  $\min(\frac{2}{3}w, 200)$ , where  $w$  is the daily wage.



had a revenue effect of about \$105 billion, with the extensions in the subsequent legislation costing an additional \$8 billion (Joint Committee on Taxation, 2020c, 2021).<sup>3</sup>

## 2.2 Deferral of employer share of Social Security tax

In general, employment generates Social Security tax liability equal to 12.4% of wages up to the Social Security Contribution and Benefit Base (\$137,700 in 2020). Formally, half of this component is paid for by the employee and the other half by the employer. In most cases, this distinction has little practical effect: employers simply deposit the combined amount required to be paid, including both the “employer half” and withholding attributable to the “employee half.” The CARES Act, passed on March 27, 2020, allowed employers to defer payment of the employer half of Social Security tax incurred between March 27, 2020 and December 31, 2020. Half of the deferred amount must be paid no later than December 31, 2021, while any remaining amount must be paid no later than December 31, 2022.

Additionally, on August 8, 2020, President Trump issued an executive memorandum directing the Department of the Treasury to allow employers to defer the *employee* half of Social Security tax on wages paid between September 1, 2020 and December 31, 2020 for employees earning less than \$4,000 on a bi-weekly basis. Any deferred amount must be collected from employees and remitted to the IRS by April 30, 2021. President Trump directed the federal government to take up this deferral on behalf of federal employees.

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<sup>3</sup>JCT estimates do not correspond perfectly to the estimated amount of credits claimed, since they additionally include revenue effects of behavioral adjustments and any effects of the credits on income tax liability. Additionally, these particular estimates include a component of the policy that applies to self-employed persons which I do not study in this paper.



## 2.3 Employee Retention Credit

The CARES Act created the Employee Retention Tax Credit, or ERTC. Under the original version of the credit, eligible employers could claim a credit for 50% certain qualifying wages between March 27, 2020 and December 31, 2020, with qualifying wages capped \$10,000 per employee (aggregated over the entire March 27 - December 31 period). Roughly speaking, an employer could qualify if their gross receipts for the quarter were down by more than 50% relative to the same calendar quarter in 2019 or if they were subject to governmental order to completely or partially suspend operations. For employers with more than 100 full-time employees in 2019, the credit could be claimed with only with respect to wages or health insurance premiums paid to workers who were not working (for this purpose, remote work is considered “working”). For employers with 100 or fewer full-time employees in 2019, the credit could be claimed with respect to the wages and health insurance premiums of all employees during the quarter (if the gross receipts test is met) or during the suspension period. Importantly, an employer who received a PPP loan (whether the loan was forgiven or not) was not eligible to claim the ERTC.

The Consolidated Appropriations Act (CAA), passed on December 21, 2020, extended the ERTC to June 30, 2021 and expanded the ERTC along nearly every dimension. The credit rate was increased from 50% to 70%. The \$10,000 wage cap was changed to apply quarterly, rather than cumulatively. The gross receipts threshold was made more lenient, requiring only a 20% decline in gross receipts. The threshold at which employers could claim the ERTC for all employees (rather than those not working) was increased from 100 to 500 employees.

Finally, and critically, Congress eliminated the automatic denial of the ERTC for all PPP participants, replacing it with a “denial of double benefit” rule under which the same wages could not be used for the ERTC and to obtain PPP forgiveness. This rule nevertheless provides substantial opportunity to benefit from both programs. As a simplified example, consider an





employer with \$100,000 of monthly payroll expenses and assume for simplicity that no worker is paid more than \$10,000 per quarter.<sup>4</sup> The PPP loan amount would generally be 2.5 times monthly payroll, or \$250,000. A business is eligible for forgiveness if its payroll during the “covered period”, which can be as long as 24 weeks, exceeds 60% of the loan amount (\$150,000 in this example). This simplified employer would accrue approximately \$550,000 in payroll costs in a 24-week covered period. In general, it would be optimal for this employer to use \$150,000 in wages for the purpose of PPP forgiveness and use the remaining \$400,000 to claim the ERTC.

The CAA amendments to the ERTC were made with respect to wages paid after December 31, 2021, except that the amendment to the PPP interaction was made retroactively. Thus, an employer who was otherwise ERTC-eligible but who was a PPP participant could file an amended Form 941 in order to claim the credit. However, there is no mechanism to amend a prior PPP forgiveness application – if an employer listed all wages on their PPP forgiveness application (e.g., because they knew they were ineligible for the ERTC under pre-CAA law, so they assumed it was costless to list all wages on the application), then they would not be able to claim the ERTC with respect to any of those wages.

The American Rescue Plan, passed on March 11, 2021, extended the ERTC (as amended by the CAA) to December 31, 2021. It created a third category of eligible employers for the third and fourth quarters of 2021: “Recovery Startup Businesses” (RSPs). An RSP is an employer that begin operations after February 15, 2020 and has less than \$1 million in average annual gross receipts. An RSP computes its credit with respect to the wages it pays during each quarter, subject to an additional \$50,000 per quarter, per employer cap on the total credit. As these provisions take effect after my sample period, I do not study them in this paper.

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<sup>4</sup>The presence of wages above \$10,000 per quarter would tend to enhance the ability to take advantage of both programs, though it gets more complicated if some employees are paid at an annual rate of more than \$100,000.



The Joint Committee on Taxation (2020b) estimated that the CARES Act version of the ERTC would have a revenue effect of \$55 billion, while the additional modifications in later legislation would have a revenue effect of about \$30 billion (Joint Committee on Taxation, 2020c, 2021).

### 3 Data and Empirical Adjustments

All three subsidies studied in this paper are claimed on Form 941.<sup>5</sup> I use data from Form 941 for 2019Q3 through 2021Q2, retrieved on September 20, 2021.<sup>6</sup> Importantly, this database does not include amended Forms 941 – thus, any credits claimed on amended returns will not appear in this analysis. To the extent that a substantial number of employers determine their eligibility with a long delay, the present analysis may non-trivially understate take-up. I make the approximation that firm is identified by the Employer Identification Number (EIN) reported on Form 941; given imperfect information, I do not attempt to aggregate related parties together.

The database holding these records includes only those forms that have been processed by the IRS, meaning that my data does not capture the full population. Although the deadline for filing Form 941 in each quarter under study has passed – meaning that the vast majority of Forms 941 have been filed – the pandemic has caused substantial processing delays for paper-filed returns, including paper-filed Forms 941. Figure 1 shows counts of processed Forms 941, separately by filing method. The number of e-filed Forms 941 has followed a stable trend through 2021Q1, suggesting that the vast majority of e-filed returns are processed promptly. However, there is a

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<sup>5</sup>Form 941, filed by employers each quarter, is used generally to report the tax payments that employers remit to the IRS (1) to satisfy the employer and employees’ FICA (Social Security and Medicare) tax liability and (2) as withholding of individual income tax.

<sup>6</sup>I drop all Forms 941 with zero reported wages. In situations where a measure of firm size (number of employees) is desired, I drop all firms whose implied average compensation is less than \$20 per employee. This deals with a common data entry error where the same amount is reported on the wage line and the “number of employees line” (perhaps with a decimal moved), leading to implausible firm sizes.



substantial drop-off of processed paper-filed returns as early as 2020Q1 (which would have been processed in spring 2020 under the normal schedule), and 2021Q2 has very few paper returns processed.

To provide estimates for population-level take-up, I assign each firm-quarter observation a weight. First, using 2019Q3 and 2019Q4 data, I estimate the probability of being an e-filer in cells of firm size; let  $x$  denote these cells and let  $p_x$  denote the estimated probability of e-filing in each cell. Second, I compute a target amount of wages (that is, Form 941 box 2) for each quarter,  $\hat{Y}_t$ . I compute  $\hat{Y}_t$  as the amount that preserves the ratio of Form 941 wages to National Income and Product Accounts (NIPA) wages<sup>7</sup> that existed in 2019Q4. Put differently, I compute the ratio (denoted by  $\theta$ ) of 2019Q4 941 wages to 2019Q4 NIPA wages. In 2020Q1 and later,  $\hat{Y}_t$  is equal to  $\theta$  times the NIPA wages in  $t$ . Third, I define the weight  $w_{it}$  as equal to  $\max\left(1, \frac{\alpha_t}{1-p_{x(i,t)}}\right)$ . That is, observations that appear to resemble paper-filed returns (i.e.,  $p(x)$  closer to zero) are upweighted, while no firm receives a weight less than one.  $\alpha_t$  is a quarter-specific normalization term that ensures that the weighted sum of 941 wages is equal  $\hat{Y}_t$ . As shown in Appendix Figure A1, this adjustment tends to place higher weight on mid-sized and large firms in 2021Q1 and (especially) 2021Q2 when the data is most limited.<sup>8</sup>

## 4 Results

Table 1 lists the estimated aggregate amounts of credits/deferral claimed by quarter, using the weights described in Section 3. Employers claimed between \$1.5 billion (2020Q3) and \$3.0 billion (2020Q4) in paid leave credits; the share of employers claiming any paid leave credit increased from 3.7% in 2020Q2 to 6.8% in each of 2020Q4 and 2021Q1, before falling to 4.6%

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<sup>7</sup>BEA Account Code NA000275.

<sup>8</sup>Due to data constraints, I must drop the small number of paper-filed 2021Q2 returns when analyzing the paid leave credits. Thus, in 2021Q2, the weights used to analyze the ERTC are different than the weights used to analyze the paid leave credits. (There was no deferral in 2021Q2.)



in 2021Q2. Employers deferred \$41 to \$43 billion of payroll tax in each quarter from 2020Q2 through 2020Q4, though the vast majority (over 97%) of employers did not participate. Employers claimed approximately \$7.6 billion in the ERTC in 2020Q2, much less in 2020Q3 and 2020Q4, before increasing substantially after the year-end expansion of the ERTC: employers claimed \$14.1 billion in ERTC in 2021Q1 and \$16.4 billion in 2021Q2. Participation in the ERTC was very rare during 2020 (take-up between 0.7% and 1.3%) and increased only modestly in to 2.6% in 2021Q1 and 2.8% in 2021Q2. I next explore each of these subsidies in more detail.

#### 4.1 Paid leave credits

Figure 2 plots the extensive margin take-up of paid leave credits as a function of firm size, aggregated over the 2020Q2-2021Q1 period. Take-up is approximately zero for one-employee firms and increases to approximately 45% for firms with 100 to 300 employees. It then falls closer to zero as firm size exceeds 500, the threshold for determining credit eligibility.<sup>9</sup> The vast majority of paid leave claimants claim credits for sick leave; a much smaller share claim credits for family leave.<sup>10</sup>

The upward slope in take-up might largely be explained mechanically: if a firm has more employees, the probability that at least one of them must take COVID-19-related leave increases. Nevertheless, the take-up of the sick leave credits by the largest affected firms – e.g., those with 100-500 employees – is lower than one might initially expect. As a back-of-the-envelope exercise, the number of confirmed COVID-19 cases through the end of 2021Q1 is approximately

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<sup>9</sup>This is not a clean discontinuity, since the definition of firm size for the purpose of credit eligibility is not the same as the concept of firm size as measured on Form 941. Some differences include rules to aggregate different employers together for the purpose of credit eligibility and discrepancies in the point in time when employees are counted.

<sup>10</sup>Form 941 stopped separately tracking paid sick leave wages and paid family wages in 2021Q2, which is why I do not include 2021Q2 in this figure. Appendix Figure A2 plots the take-up of the paid leave credits pooling 2020Q2-2021Q2; the result is very similar to the solid series in Figure 2.



10% of the population, or 2.5% per quarter from 2020Q2 through 2021Q1 (Johns Hopkins University, 2021).<sup>11</sup> If each employee had an independent 2.5% probability of requiring COVID-19-related leave, then over 90% of 100-employee firms and virtually all firms with more than 200 employees would have at least one employee take such leave. Yet, only half of such firms claimed any credit for sick leave wages.

There are several explanations for the seemingly imperfect take-up of the paid leave credits. First, COVID-19 cases tend to be clustered, meaning that the independence assumption in the previous calculation will tend to overstate the number of employers with at least one employee needing such leave. Second, paid leave wages that generate a credit cannot be used for the purpose of obtaining PPP forgiveness, so some employers may have decided to allocate such wages to PPP forgiveness rather than the paid leave credit. Third, some EINs with 100-500 employees may be members of a group of related employers who are required to be aggregated together for the purposes of determining credit eligibility; if the group, aggregated together, had more than 500 employees, then the employer would not be eligible for the credit. Fourth, the leave was not required to be provided to workers who had the capability to work remotely. Finally, it is possible that many employees did not take leave even while infected with COVID-19 or that some employers did not comply with the mandate to provide for such leave.

Next, I explore how take-up varies by two-digit industry. In particular, I regress the take-up dummy on indicators for each two digit NAICS code, while controlling for firm size fixed effects (in bins) interacted with quarter.<sup>12</sup> The first column of Table 2 reports the coefficient estimates for each industry; the top two are reported in bold text while the bottom two are reported in italics. The across-industry variation is relatively modest. Manufacturing (NAICS 31-33) has

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<sup>11</sup>The true share of working-age individuals experiencing COVID-19 is presumably higher than that, both due to underreporting and due to the fact that children have much lower susceptibility to the disease.

<sup>12</sup>I normalize the coefficients on the industry dummies to have mean zero. In this regression and many other regressions in this paper, I use the Stata command `reghdfe` (Correia, 2019).



the highest-takeup, with a fixed effect of approximately 0.048. Public administration (NAICS 92, which is mostly public sector employers) have the lowest take-up, with a fixed effect of -0.046 – consistent with government employers being ineligible for the paid leave credits during most of 2020. All other industries have fixed effects between -0.024 and 0.015.

One might expect industry-level take-up of the paid leave credits to be correlated with COVID-19 risk of the industry. As a crude test of this hypothesis, I regress take-up on the share of employment that can be done remotely, as measured by Dingel and Neiman (2020), controlling for firm size fixed effects. The regression estimate is economically small and slightly wrong-signed, however, suggesting that either (1) other factors are at play beyond COVID-19 risk or (2) the share of remote work is not a good proxy for COVID-19 exposure; results available upon request. For instance, it is possible that manufacturing workers are uniquely prone to COVID-19 given the nature of their work.<sup>13</sup>

The relatively low take-up of the family leave component of the credit is also noteworthy, given the broad eligibility criteria. In particular, family leave was allowed to be taken when a parent must care for a child whose school or day care facility closed due to COVID-19. Given that the vast majority of schools did in fact close, especially during 2020Q2, a large share of the workforce might have been eligible for such leave. One explanation for the low take-up of family leave is that the wage replacement is much less generous: two thirds of normal wages, up to \$200 per day, rather than 100% of normal wages up to \$511 per day for sick leave. Perhaps, most parents were unwilling to forego one third (or more) of their usual wage in order to avail themselves of this leave.

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<sup>13</sup>For example, COVID-19 outbreaks at meat and poultry packing plants have been well-documented (Middleton et al., 2020).



## 4.2 Deferral of payroll tax

The CARES Act allowed employers to defer the employer share of Social Security tax from March 27, 2020 through December 31, 2020. Employers were also allowed to defer the some employee Social Security tax under the executive memorandum for wages paid between September 1, 2020 and December 31, 2020. Both deferrals are summed together and reported in the same place: line 13b of Form 941. However, the data is consistent with take-up of the employee share being trivially small. First, as seen in Table 1, the share reporting any deferral is fairly constant over the three relevant quarters in 2020, and does not jump in Q3 or Q4 when employee-share deferral became allowed. This suggests that very few firms participated in *only* the deferral of the employee share. Second, I find that only 850 firms (or 0.01% of all firms) deferred more than the employer share in 2020Q3 and 2000 firms (0.03% of all firms) did so in 2020Q4. Thus, in the rest of the paper, I will abstract from the deferral of the employee share and assume that the observed deferral corresponds to the deferral of the employer share.

Figure 3 plots the take-up of deferral as a function of firm size, aggregated over the 2020Q2-2020Q4 period when deferral was allowed. Take-up is very low for the smallest firms and rises substantially – though noticeably less than full – for the largest firms. The second column of Table 2 reports take-up by two-digit industry, controlling for firm size interacted with quarter. Take-up in the management industry is noticeably higher – perhaps reflecting the fact that these employers are more sophisticated than would be implied by the number of employees directly working for them.

There are several candidate explanations for the low take-up of employer share deferral among smaller firms. First, hassle costs – e.g., the extra compliance cost of tracking amounts due several years in the future – could have outweighed the benefit of the effective interest-free loan. Second, managers might have been concerned that they would be unable to pay the deferred liability in the future due to the bankruptcy of the firm. These managers might have



been concerned that they would be held personally liable for the unpaid deferred tax liability under pre-existing principles of tax law. Third, the CARES Act provided that employers with a forgiven PPP loan could not claim deferral; although this prohibition was repealed by June 2020, the initial CARES Act law may have driven 2020Q2 decisions, which may have provided inertia into later quarters.

For larger firms, where hassle costs are presumably much lower relative to the subsidy amount – and ability to pay is less in doubt – the take-up rate is indeed much higher, yet still much less than one. The timing of income tax deductions could provide one explanation for the residual imperfect take-up. In general, employers may claim an income tax deduction for employment taxes paid, including the employer share of Social Security tax. The deduction is claimed when the tax is actually paid – even for accrual-method taxpayers. Thus, deferral employment tax liability effectively shifts income tax deductions from 2020 into a later year. Furthermore, income tax deductions in 2020 might be more valuable than income tax deductions in later years due another CARES Act provision: the temporary ability to carry losses in 2018-2020 back to offset tax liability in prior years. This potentially could allow 2020 deductions – but not 2021 or 2022 deductions – to offset income taxed at the higher tax rates in effect prior to the Tax Cuts and Jobs Act. This slight wedge in effective tax rates on income tax deductions could have offset the benefit of an interest-free loan.

### **4.3 Employee retention credit**

The left panel of Figure 4 plots the take-up of the ERTC, separately in the 2020Q2-2020Q4 period and the 2021Q1-2021Q2 period. The right panel plots a histogram of the the ratio of the total credit to total wages, among those with positive credit. This figure illustrates the extent to which the ERTC functioned very differently in 2020 and 2021. In 2020, the ERTC was predominantly claimed by large firms, who were mostly ineligible for the PPP. These firms





were eligible generally for the less-generous version of the credit that applied only to the wages (and/or health insurance premiums) paid to employees who were not working. As a result, a substantial mass of claimants in 2020 claimed a credit for less than 5% of total wages paid in the quarter, as shown in the left-most point. By contrast, the 2021 version of the credit was tilted more towards small and mid-sized firms, with take-up peaking at just over 5% for firms with about 100 employees. Additionally, in the right panel, the mass is noticeably shifted to the right in 2021Q1-2021Q2 relative to 2020Q2-2020Q4 – even beyond what is explained mechanically by the increase in credit rate from 50% to 70%.<sup>14</sup>

Columns (3) and (4) of Table 2 report how ERTC take-up varies by industry, controlling for firm size and date. Column (3) restricts to 2020Q2-2020Q4 when the credit was focused on large firms and column (4) restricts to 2021Q1-2021Q2 when the credit was focused on smaller firms. In both periods, NAICS 72 (a category including restaurants and hotels) and 71 (a category including casinos, gymnasiums, performing arts, and amusement parks) had the highest take-up. These industries were likely highly affected by reductions in travel and dining out, as well as government suspension orders.

The low take-up in of the ERTC in 2021Q1 is particularly noteworthy, as eligibility is quite broad and the credit is quite generous, especially for firms with fewer than 500 full-time employees. In particular, a firm is eligible for the ERTC in 2021Q1 if their 2021Q1 or 2020Q4 gross receipts have fallen by at least 20% relative to the same calendar quarter in 2019. Meanwhile, Opportunity Insights (2021) finds that average small business revenue is down approximately 30% in this time-period relative to a pre-pandemic baseline, suggesting that a very large share of businesses should qualify under this metric. For a firm with fewer than 500 full-time employees that qualifies under this gross receipts test, the firm can claim the credit against the wages of

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<sup>14</sup>There is some mass to the right of 50% (for 2020Q2-2020Q4) and 70% (for 2021Q1) because of health insurance premiums. The credit attributable to health insurance premiums would appear in the numerator of the ratio while the premiums themselves would not appear in the denominator of the ratio.



all employees. Thus, for such a firm, the credit is a 70% payroll subsidy for the first \$10,000 quarterly wages of all employees.

Finally, the modest increase in take-up in 2021Q2 is worth some discussion. The increasing take-up, combined with the general loosening of COVID-19 restrictions during this quarter, suggests that take-up *conditional on eligibility* may be increasing. Thus, it appears that employers are gradually learning about this credit. Furthermore, it is possible that some new claimants of this credit in 2021Q2 will also file amended returns for past quarters.

#### 4.4 The role of paid preparers

One hypothesis is that paid preparers could mitigate or reinforce the low take-up of these subsidies, much as Zwick (2021) found in the context of net operating loss carrybacks. To quantify this, I examine the factors that explain take-up of each subsidy in a regression sense. In Table 3, I report the adjusted  $R^2$  from regressions of take-up on successively more thorough sets of fully-interacted fixed effects. Adding more fixed effects will mechanically increase the  $R^2$ ; by contrast, the degrees-of-freedom adjustment for the adjusted  $R^2$  means that the adjusted  $R^2$  can fall if a sufficiently uninformative variable (or set of fixed effects) is added to a regression.<sup>15</sup> The three columns refer to the three subsidies, while the rows vary the sets of fixed effects. The first three rows of the table show that, as expected, firm size and industry play a non-trivial role in explaining variation in take-up, consistent with the results seen so far.

Most importantly, the final row of Table 3 shows that preparers explain very little of the variation in take-up of paid leave credits and deferral of payroll tax. By contrast, preparers appear much more important in the context of the ERTC. The preparer fixed effects add 5.1 percentage points to the adjusted  $R^2$ , which is substantially larger than the incremental contribution of both

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<sup>15</sup>The usual formula for  $R^2$  is  $1 - \frac{RSS}{TSS}$ , where RSS is residual sum of squares and TSS is total sum of squares. The formula for adjusted  $R^2$  is  $1 - \frac{RSS}{TSS} \left( \frac{N-1}{N-L} \right)$ , where  $N$  is the sample size and  $L$  is the degrees of freedom used up by the fixed effects.



the firm size and industry fixed effects.

To provide further context into the role of preparers in the context of the ERTC, I focus on the restaurant industry (NAICS 722) in 2021Q1, the quarter in which ERTC eligibility was expanded substantially. Even if a restaurant does not satisfy the gross receipts test, it is fairly likely to satisfy the “full or partial suspension” test to qualify for the ERTC, so most restaurants would probably be eligible for the ERTC.<sup>16</sup> But, in order to claim the ERTC, employers would need to manage the complicated interaction with the PPP. Preparers might be especially valuable in this environment. In the end, only 8.6% of restaurants in fact claimed the ERTC in 2021Q1.

In Table 4, I report actual take-up of the ERTC by restaurants as well as take-up under three counterfactuals where preparers are more likely to have their clients claim the ERTC. In particular, restricting the data to the restaurant industry in 2021Q1, I regress ERTC take-up on interacted fixed effects for firm size, state, and six digit NAICS code, as well as a separate fixed effect for preparer. Row 1 reports the overall mean take-up rate by restaurants, 8.7%. In the second row, I take the mean of the regression fit computed as if all below-median preparers (including the outside option) were replaced with the median preparer.<sup>17</sup> This take-up under this counterfactual is only slightly higher, at 9.0%. In the third and fourth rows, I repeat the same exercise at the 75th and 90th percentiles respectively. Even at the 75th percentile, the effect is quite modest: take-up would have been 9.6%. Reflecting the skewness of ERTC claiming at the preparer level, the 90th percentile counterfactual is substantially higher: take-up would have been 50.3% if all preparers below the 90th percentile would have been replaced by the 90th percentile preparer.

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<sup>16</sup>Indeed, IRS guidance specifically addresses when a restaurant passes this test. In particular, IRS Notice 2021-20 specifically states that a restaurant (for whom indoor dining was normally a “more than nominal” part of their sales) would typically qualify under this test if indoor dining was banned by order, or if indoor dining was allowed but social distancing constraints (e.g., mandated capacity limits) had a more than nominal effect on its operations.

<sup>17</sup>To be precise, I compute the median preparer weighted by number of clients, excluding the “no-preparer” firms. When calculating the counterfactual fit, I take the larger of the actual preparer fixed effect – including, if applicable, the fixed effect for not having a preparer at all – and the fixed effect of the median preparer.



Several caveats are in order for this finding. First, it may be the case that the high-ERTC preparers are being overly aggressive – causing their clients to claim the ERTC in situations where they may not be eligible. Put differently, the 90th percentile counterfactual may involve some over-claiming of the ERTC. Second, it may be the case that different preparers have different client pools – e.g., the 90th percentile preparers might be those whose typical client happens to be more likely to be ERTC-eligible. Controlling for firm size, state, and detailed industry code mitigates this explanation, but I cannot rule it out completely.

## 5 Conclusion

This paper studies take-up of COVID-19-related subsidies administered through the payroll tax system. I find that take-up of paid leave credits, deferral of the employer share of Social Security tax, and the ERTC, were modest at best. I find that take-up is correlated with firm size, both when eligibility is linked to firm size (as in the case of paid leave credits) as well as when it is not (as in the case of payroll tax deferral). I also find that differences across paid preparers explain a noticeable portion of ERTC take-up, but not take-up of deferral or paid leave credits.

One key limitation of this study is that the data source does not include amended returns. This may be especially important in the case of the ERTC; employers may learn about their eligibility some time after filing their Form 941 for the quarter and claim the credit on an amended return. To the extent that this occurs, some of the puzzles regarding the low take-up of a very broad, very generous credit may become resolved.



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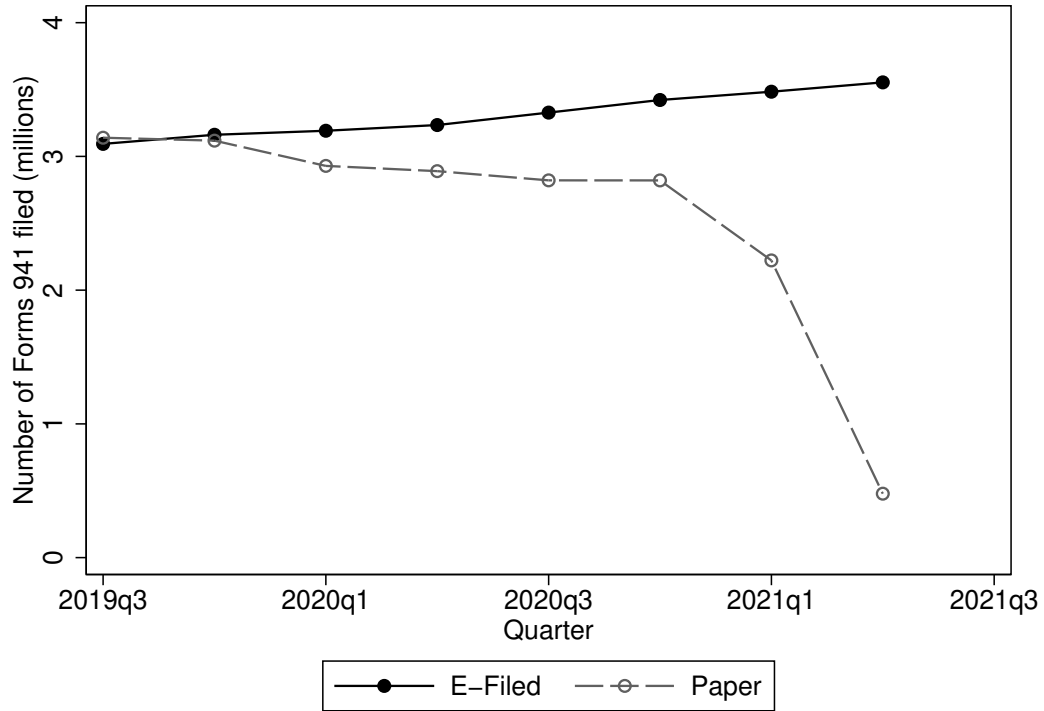


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# Figures

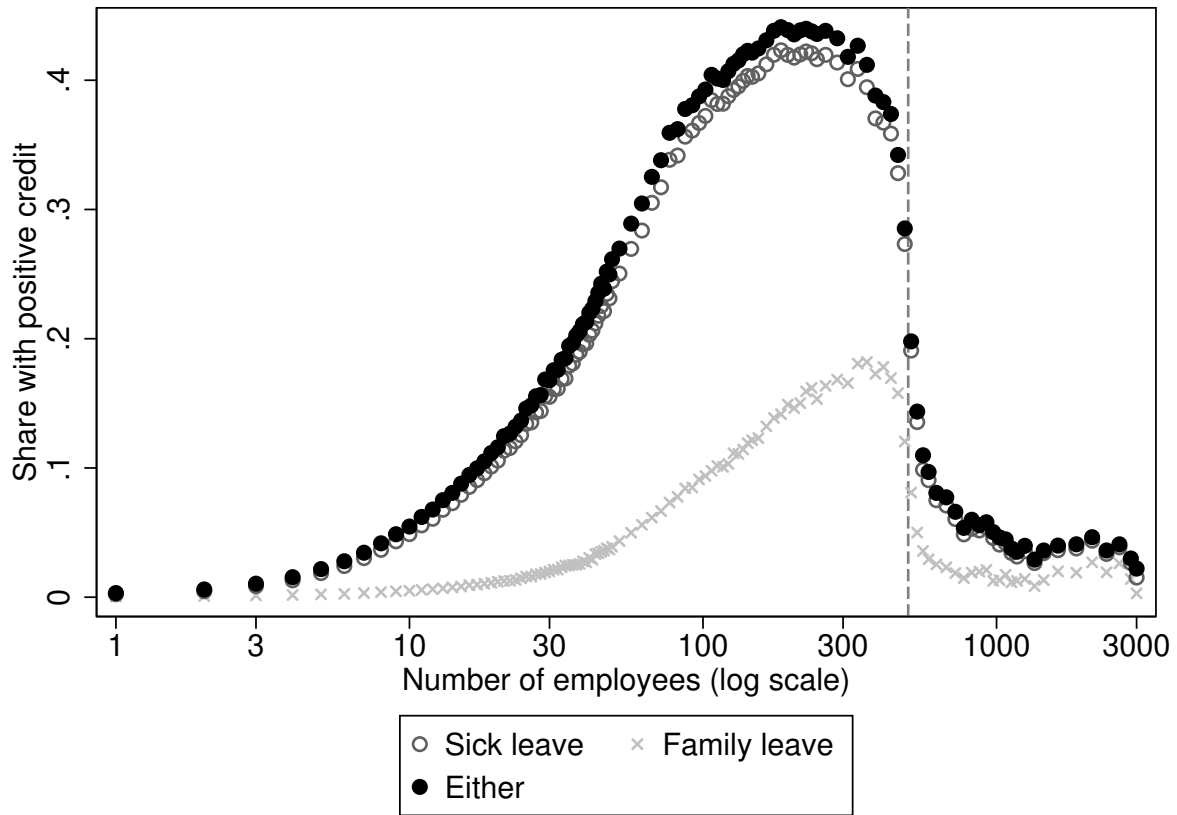
Figure 1: Number of processed Forms 941 in database, by filing method



*Notes:* This figure plots the number of Forms 941 currently available in the database for each quarter, separately by filing method. The data was retrieved on September 20, 2021. Source: Author's calculations based on the population of available Forms 941.



Figure 2: Take-up of paid leave credits by firm size

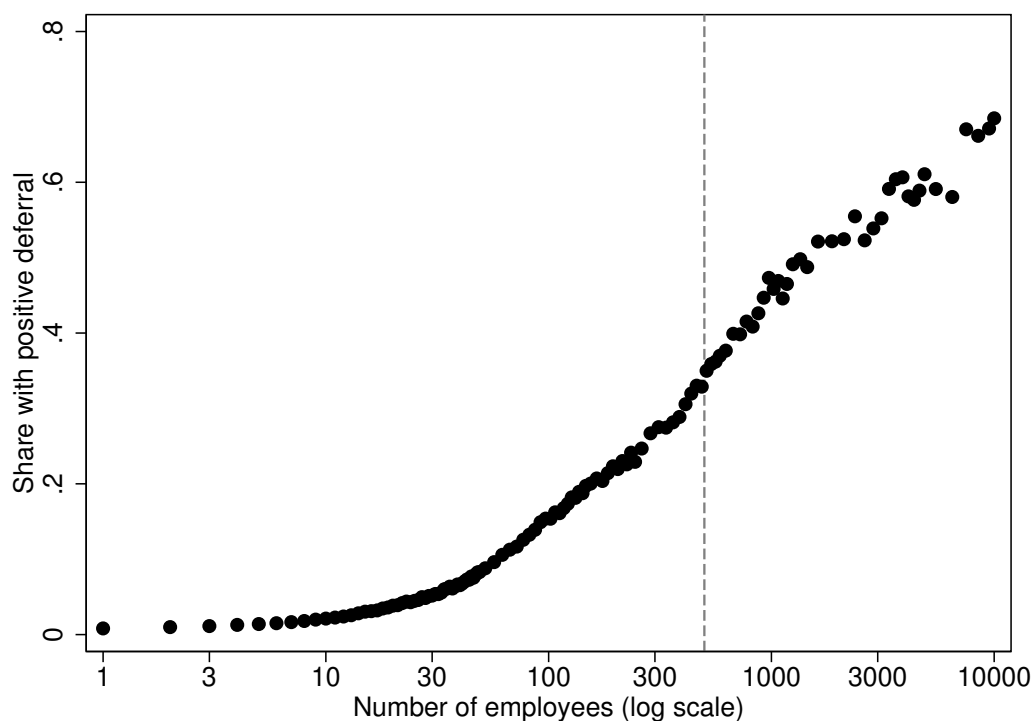


Notes: This figure plots the probability that a given firm-quarter (*it*) observation claimed a credit for paid family or medical leave. The series marked by the gray X plots the share taking up the family leave component. The hollow circles plot the share taking up the sick leave component. The dark solid circles plot the share taking up either component of the credit. The data is pooled over the 2020Q2-2021Q1 period and uses the weights described in Section 3. These estimates do not include any amounts claimed on amended returns. For the sake of readability, all firms with more than 3,000 employees are coded as having 3,000 employees in this figure. Source: Author's calculations based on the population of available Forms 941.





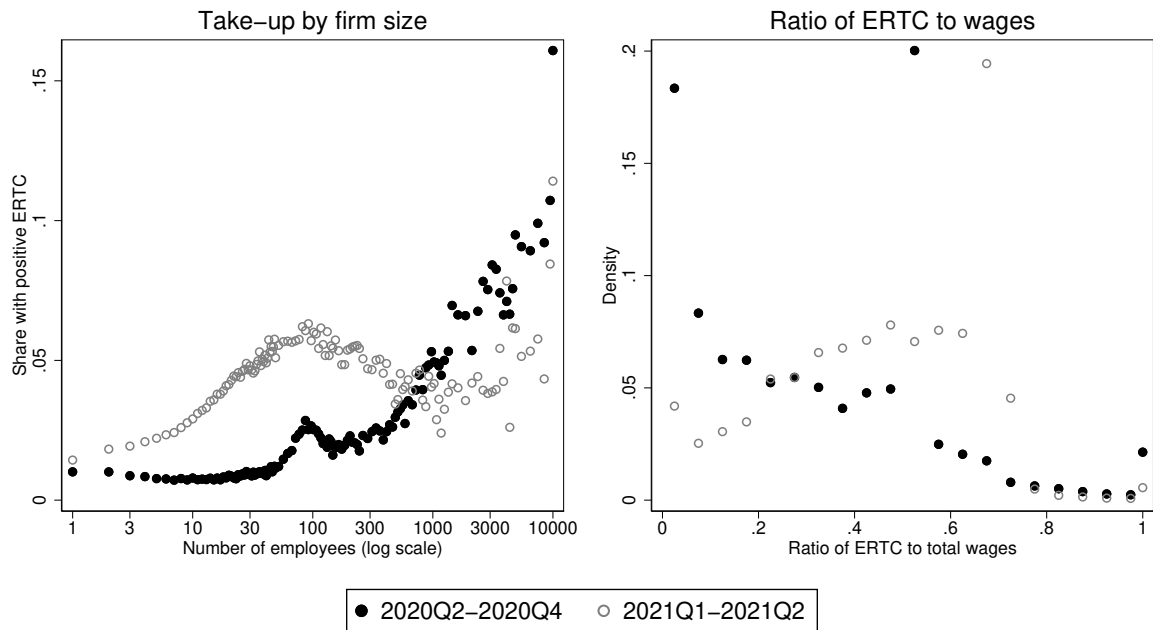
Figure 3: Take-up of payroll tax deferral



*Notes:* This figure plots the probability that a given firm-quarter (*it*) observation deferred any amount of employer Social Security tax as permitted under Section 2302 of the CARES Act. The data is pooled over the 2020Q2-2020Q4 period and uses the weights described in Section 3. For the sake of readability, all firms with more than 10,000 employees are coded as having 10,000 employees in this figure. Source: Author's calculations based on the population of available Forms 941. These estimates do not include any amounts claimed on amended returns.



Figure 4: Employee Retention Credit



*Notes:* The left panel plots the share of employers taking up the ERTC, separately in the 2020Q2-2020Q4 period and 2021Q1-2021Q2 period. For the sake of readability, all firms with more than 10,000 employees are coded as having 10,000 employees in this panel. The right panel plots a histogram of the ratio of ERTC to total wages (i.e., box 2 of Form 941), separately by these two periods, among those with positive ERTC. Employers with a ratio greater than one are placed in the right-most bin. Both panels use the weights described in Section 3. These estimates do not include any amounts claimed on amended returns.



## Tables

Table 1: Aggregate amount of credit/deferral claimed

	Paid Leave Credits		Payroll Tax Deferral		Employee Retention Credit	
	Amount (1)	Share (2)	Amount (3)	Share (4)	Amount (5)	Share (6)
2020q2	\$1.920b	0.037	\$41.292b	0.026	\$7.632b	0.013
2020q3	\$1.507b	0.043	\$42.352b	0.028	\$2.008b	0.007
2020q4	\$3.012b	0.068	\$42.520b	0.026	\$1.858b	0.010
2021q1	\$2.201b	0.068	\$0.000b	0.000	\$14.132b	0.026
2021q2	\$1.142b	0.046	\$0.000b	0.000	\$16.448b	0.028

*Notes:* Columns (1), (3), and (5) report the estimated amount of credits or deferral claimed in each quarter. Columns (2), (4), and (6) report the share of employers claiming a positive amount of credit or deferral. These estimates use the weights described in Section 3. Payroll tax deferral refers to the deferral of the employer share of Social Security tax under section 2302 of the CARES Act. Source: Author's calculations based on the population of available Forms 941. These estimates do not include any amounts claimed on amended returns.





Table 2: Subsidy take-up by industry

NAICS code	Description	Paid Leave	Deferral	ERTC	
				2020Q2-2020Q4	2021Q1-2021Q2
0	Missing/Invalid Industry	-0.023	<i>-0.010</i>	-0.001	-0.010
11	Agriculture, Forestry, Fishing and Hunting	-0.002	-0.005	-0.003	-0.009
21	Mining, Quarrying, and Oil and Gas Extraction	0.000	0.011	0.000	0.010
22	Utilities	0.001	<b>0.022</b>	-0.004	<i>-0.015</i>
23	Construction	0.002	-0.005	-0.002	-0.007
31-33	Manufacturing	<b>0.048</b>	0.011	-0.001	-0.002
42	Wholesale Trade	<b>0.015</b>	0.003	-0.001	-0.005
44-45	Retail Trade	0.005	-0.003	-0.000	-0.007
48-49	Transportation and Warehousing	-0.001	-0.000	-0.001	-0.008
51	Information	-0.013	0.019	-0.000	-0.003
52	Finance and Insurance	0.002	0.003	<i>-0.004</i>	-0.013
53	Real Estate and Rental and Leasing	0.005	0.002	-0.002	-0.007
54	Professional, Scientific, and Technical Services	0.002	0.006	-0.002	-0.002
55	Management of Companies and Enterprises	-0.000	<b>0.054</b>	0.002	0.001
56	Admin. and Support and Waste Mgmt. Services	-0.002	0.001	-0.001	-0.006
61	Educational Services	-0.009	-0.009	0.004	0.003
62	Health Care and Social Assistance	0.009	0.004	-0.002	-0.010
71	Arts, Entertainment, and Recreation	-0.014	0.002	<b>0.010</b>	<b>0.024</b>
72	Accommodation and Food Services	<i>-0.024</i>	-0.004	<b>0.010</b>	<b>0.054</b>
81	Other Services (except Public Administration)	-0.002	-0.004	0.002	0.004
92	Public Administration	<i>-0.046</i>	<i>-0.027</i>	<i>-0.009</i>	<i>-0.025</i>

*Notes:* This table reports the coefficient estimates from a regression of subsidy take-up on industry dummies, controlling for firm size fixed effects interacted with quarter. In columns (1) and (2), the regression is pooled over the 2020Q2-2021Q1 period. Column (3) uses the 2020Q2-2020Q4 period, while column 4 restricts to 2021Q1-2021Q2. The regression and uses the weights described in Section 3. The largest two estimates are bolded; the smallest two estimates are reported in italics. Source: Author's calculations based on the population of available Forms 941. These estimates do not include any amounts claimed on amended returns.

Table 3: Share of take-up explained by fixed effects

	Adjusted $R^2$ for take-up of...		
	Paid leave credits	Deferral	ERTC
Quarter fixed effects	0.003	0.009	0.004
Add interaction with firm size fixed effects	0.174	0.107	0.011
Add interaction with 3-digit NAICS	0.207	0.148	0.031
Add interaction with 6-digit NAICS	0.230	0.165	0.042
Add preparer fixed effects	0.227	0.167	0.093

*Notes:* This table reports the adjusted  $R^2$  for a regression of take-up on successively more thorough sets of fully-interacted fixed effects. Each row adds an interaction to the set of fixed effects in the prior row (except for the 6-digit NAICS, which replaces the 3-digit NAICS interaction). The regression uses the weights described in Section 3. Source: Author's calculations based on the population of available Forms 941. These estimates do not include any amounts claimed on amended returns.

Table 4: ERTC take-up by in 2021Q1 in restaurant industry under preparer counterfactuals

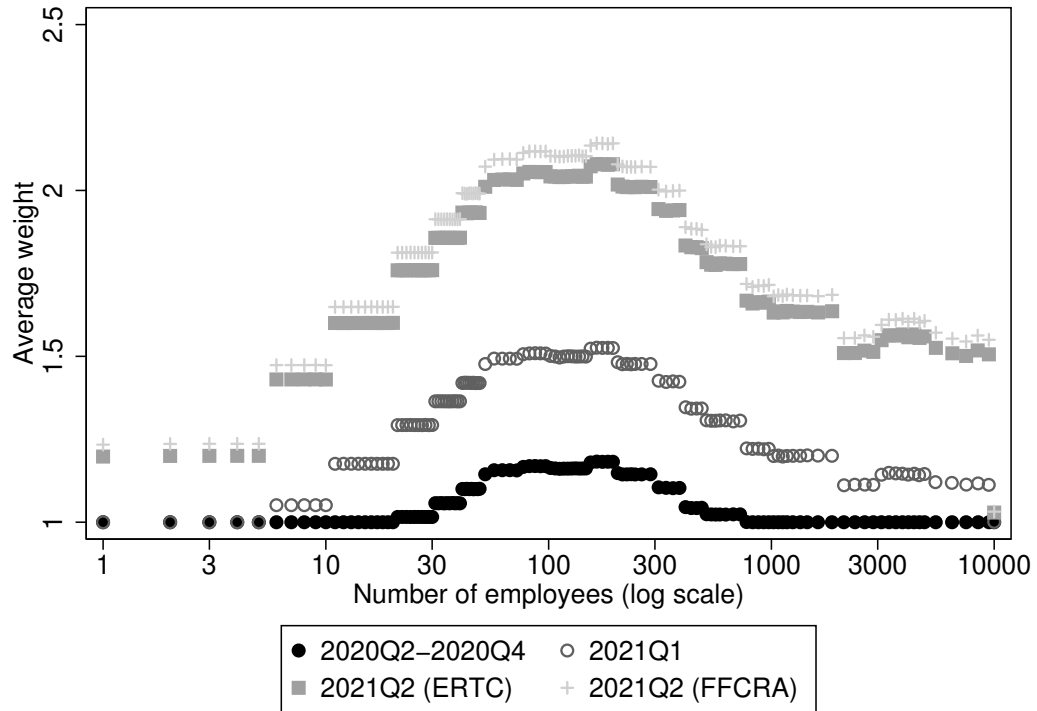
	Counterfactual take-up
Baseline	0.086
Replace below median	0.090
Replace below 75th p'tile	0.096
Replace below 90th p'tile	0.503

*Notes:* This table reports 2021Q1 take-up rates in the restaurant industry under various counterfactuals. Row 1 reports the estimated amount of take-up actually observed. The second row reports the estimated amount of take-up as if all below-median preparers (including self-prepared returns) were replaced with the median preparer, as measured in a regression of take-up on preparer fixed effects, controlling for state, firm size, and six-digit NAICS code. Rows 3 and 4 repeat the same exercise at the 75th and 90th percentiles respectively. The regression is estimated restricting the data to 2021Q1 and uses the weights described in Section 3. Source: Author's calculations based on the population of available Forms 941. These estimates do not include any amounts claimed on amended returns.



# Appendix

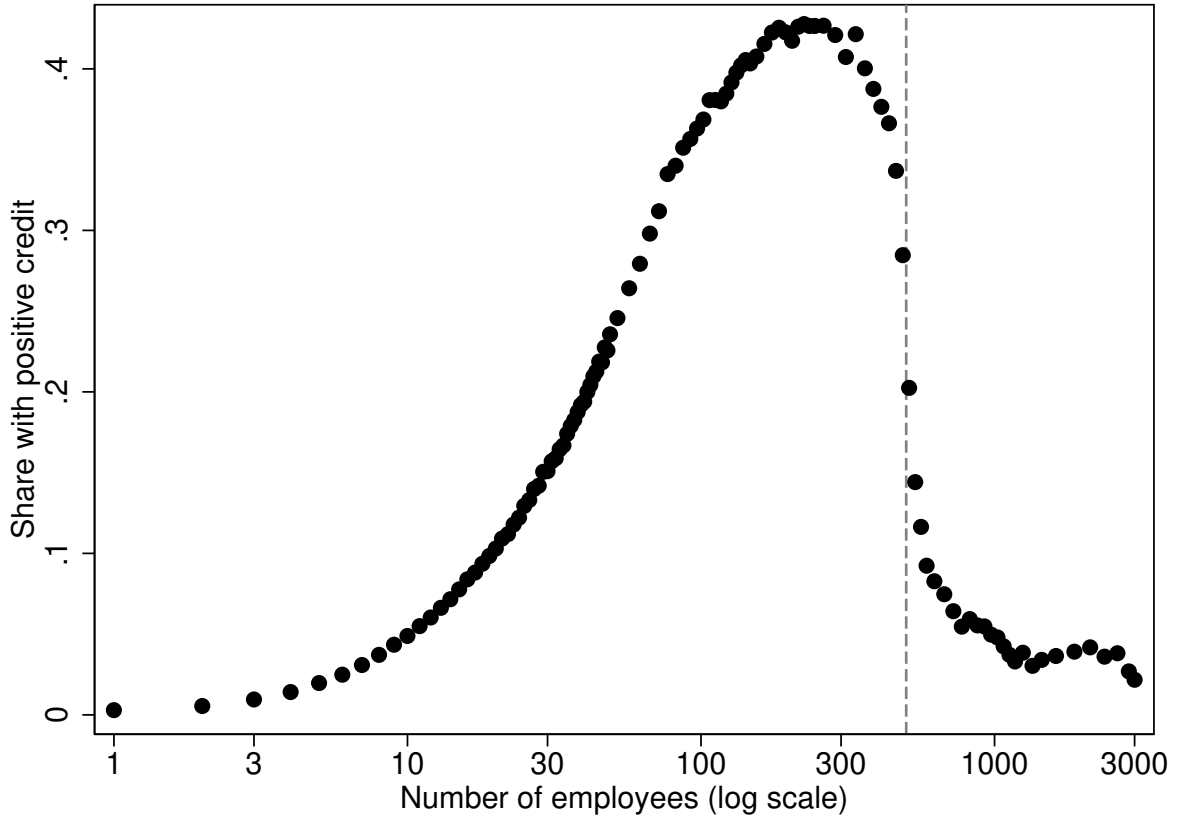
Figure A1: Average weight as a function of firm size



*Notes:* This figure plots the mean value of the weights, as a function of employee size, separately for 2020Q2-2020Q4, 2021Q1, 2021Q2 (ERTC), and 2021Q2 (paid leave credits). For the sake of readability, all firms with over 10,000 employees are coded as having 10,000 employees. Source: Author's calculations based on the population of available Forms 941.



Figure A2: Take-up of paid leave credits by firm size, 2020Q2-2021Q2



Notes: This figure plots the probability that a given firm-quarter (*it*) observation claimed a credit for paid family or medical leave. The data is pooled over the 2020Q2-2021Q2 period and uses the weights described in Section 3. These estimates do not include any amounts claimed on amended returns. For the sake of readability, all firms with more than 3,000 employees are coded as having 3,000 employees in this figure. Source: Author's calculations based on the population of available Forms 941.

