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The Limits of Targeted Hiring Subsidies: Evidence from the Work Opportunity Tax Credit
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ABSTRACT

Employer-side wage subsidies are widely used to promote employment among disadvantaged workers. We study how such subsidies translate into firm hiring behavior using the federal Work Opportunity Tax Credit, which subsidizes up to 40% of first-year wages and covers over two million hires annually. Using linked administrative data from Wisconsin and multiple quasi-experimental designs, we find consistent and precise null effects on hiring, earnings, retention, and related outcomes across designs and firm types. Original data on firm hiring practices suggest two mechanisms that can limit employer-side subsidy efficacy: perceived legal risks discourage eligibility screening and organizational frictions attenuate decision-makers' responsiveness.

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1 Introduction

The United States spends tens of billions of dollars each year on policies to promote employment and upward mobility among disadvantaged groups. Many efforts target workers directly, such as vocational training or the Earned Income Tax Credit. An alternative, labor demand-side approach is targeted wage subsidies: when firms hire individuals from designated groups, they receive financial incentives – often in the form of tax credits or payroll tax deductions – that offset part of those workers' wages. By lowering the cost of employing particular workers, these subsidies can, in principle, encourage firms to take a chance on hiring individuals who lack strong labor market histories or otherwise appear risky. Beyond improving labor market outcomes for these workers, they may also yield non-employment benefits, such as reducing use of public benefit programs or lowering the likelihood of criminal activity.

Despite this potential, many have raised concerns that employer-side wage subsidies could mainly finance the hiring of workers whom employers would have hired anyway, generating little impact on the employment of target populations (Bartik, 2001). A number of mechanisms may limit the extent to which targeted wage subsidies translate into employment. Prior work has emphasized stigma, where identifying job applicants as members of targeted disadvantaged groups may offset the subsidy or even reduce their likelihood of being hired (Burtless, 1985). Firms may also face constraints in identifying eligible applicants at the hiring stage, as eligibility is typically tied to sensitive or legally protected characteristics such as disability status, criminal history, or age. Agency frictions may further weaken responses if hiring decision-makers do not internalize the financial gains from the subsidy accruing to the firm. These and other mechanisms may mediate how wage subsidies translate into labor demand, although the latter two have been largely overlooked in the literature on these programs.

This paper studies how employer-side wage subsidies affect labor market outcomes. Our two primary goals are to estimate the causal effects of targeted wage subsidies on hiring, earnings, worker retention, social program participation, and criminal justice outcomes, and to document the mechanisms that shape their effectiveness. We study these questions in the context of the largest US employer-side wage subsidy program: the federal Work Opportunity Tax Credit (WOTC). Under WOTC, firms that hire applicants from designated disadvantaged groups – such as recipients of means-tested benefits or individuals with prior criminal justice involvement – can claim tax credits of up to 40% of first-year wages, subject to a maximum credit of $2,400 per worker. Established in 1996, the program now subsidizes more than 2 million hires annually (Department of Labor, 2023b); in 2022, over 3% of *all* new hires were certified to have their wages subsidized through WOTC (Bureau of Labor Statistics, 2023b). This figure is more than twice the number of workers earning at or below the federal minimum wage (Bureau of Labor Statistics, 2023a), a policy that has attracted considerably more academic and policy attention.

In the first part of the paper, we use administrative data from over 13 million individuals in the state of Wisconsin spanning the past two decades. Our data links quarterly earnings records to a host of social program data, including Supplemental Nutrition Assistance Program (SNAP),

Temporary Assistance for Needy Families (TANF), unemployment insurance, and criminal justice records. We further merge these data to individual-by-firm level records of over 700,000 applications for WOTC subsidies, which allows us to characterize which types of firms and workers receive benefits from WOTC. Our empirical focus is individuals eligible for WOTC due to receipt of SNAP, who account for roughly two-thirds of all WOTC-subsidized workers (Department of Labor, 2024).[1]

To estimate the effects of subsidy eligibility on labor market outcomes for targeted workers, we use two complementary strategies. Our first strategy exploits a major WOTC expansion in 2007. While SNAP recipients aged 18-24 had been eligible for WOTC prior to 2007, this reform expanded eligibility to include ages 25-39. We use a difference-in-differences design to measure how labor market outcomes changed for SNAP recipients just below age 40 (newly eligible) relative to those just above (ineligible). We conduct a parallel comparison around age 25, contrasting outcomes for individuals just above age 25 (newly eligible) with those just below (always eligible). We complement this strategy with a second approach that leverages the two age-based thresholds for WOTC eligibility among SNAP recipients: age 25 prior to 2007 and age 40 thereafter. We implement a regression discontinuity design around these cutoffs, comparing outcomes for those just eligible with those just ineligible. This approach allows us to estimate the consequences of WOTC eligibility for labor market outcomes over the full sample period rather than just around the 2007 reform.

Across both approaches, we find no evidence that eligibility for the subsidy increases employment. The estimates are extremely precise: for example, using a precision-weighted average of these estimates, the upper bound of the 95% confidence interval around the (null) estimate of the effect of subsidy eligibility on hiring is just 0.2 percentage points. We also find no effect on employment at firms that are most attuned to WOTC, such as the biggest recipients of WOTC subsidies.

These results imply that firms are receiving subsidies for inframarginal workers they would have hired anyway. To quantify the extent of inframarginality, we re-estimate the individual-level specifications with the outcome defined as whether an individual is hired into a WOTC-subsidized job; this captures the effective difference between the eligible and ineligible groups in whether they confer subsidies to their employers. Eligible hires are three times as likely to bring WOTC subsidies to their employers, implying that our findings are not driven by weak program take-up. We divide the estimated effect of WOTC eligibility on hiring by this estimated effect on WOTC-subsidized hiring to estimate the share of subsidized hires whose employment is attributable to the program. Taking a precision-weighted average across our empirical approaches, our estimates imply that 96% of WOTC-subsidized hires are inframarginal, and we cannot reject that all are inframarginal.

However, wage subsidies could still benefit eligible workers even in the absence of employment effects. Eligibility may increase earnings if the subsidy enables them to negotiate higher wages or employers retain them for longer to continue receiving subsidies. Using the same empirical

[1]Other categories include TANF recipients, Supplemental Security Income (SSI) recipients, individuals with a felony conviction, qualified veterans, the long-term unemployed, and other smaller categories. SNAP is by far the largest target group: the next largest, the long-term unemployed, comprised only 6.8% of WOTC-subsidized hires in 2023 (Department of Labor, 2024).

approaches but with earnings as the outcome, we find no evidence of an effect on earnings. The estimates are highly precise: even the upper bound of the precision-weighted 95% confidence interval on quarterly earnings is just $18. We also find no evidence that WOTC eligibility affects receipt of social program benefits (SNAP, TANF, and unemployment insurance) or criminal justice outcomes.

The second section of the paper analyzes the data at the firm level, allowing us to study how the wage subsidies affect other hiring margins as well as worker retention decisions. We begin by testing for patterns of hiring responses to the subsidy that the worker-level empirical strategies may miss, such as if firms expand total employment rather than just employment of subsidy-eligible workers. We again exploit the 2007 eligibility expansion to SNAP recipients aged 25-39 and implement a matched difference-in-differences design, comparing firms that actively used WOTC prior to the expansion to similar firms that did not. Firms that received WOTC subsidies prior to the expansion had a stronger (effective) incentive after the expansion to hire SNAP recipients aged 25-39 and experience a windfall in subsidy receipt. While these treated firms experienced a sharp increase in their receipt of WOTC subsidies following the expansion relative to firms that had not actively used WOTC previously, we find no evidence that this translated into an increase in hiring of newly eligible workers (SNAP recipients aged 25-39), ineligible workers aged 25-39, total hires, or payroll. These results allow us to rule out a number of models of firm behavior that could explain the null results in worker-level regressions.

Time-limited or capped wage subsidies like WOTC may affect not only hiring decisions but also decisions around worker retention. An oft-cited concern is that when subsidies expire after a fixed duration or once a cap is reached, firms may "churn" workers—dismissing subsidized employees once the subsidy is exhausted in order to hire a new cohort of subsidized workers (Government Accountability Office, 2001). Alternatively, the hazard rate of separation may rise at subsidy exhaustion, as the effective cost of employment rises discretely. To test for these responses, we examine the distribution of job durations around subsidy thresholds as well as estimate hazard models that compare separation patterns for subsidized and non-subsidized workers within the same firms. Across these approaches, we find no evidence of bunching or changes in separation hazards at subsidy expiration. These results hold even when restricting to firms that appear more attentive to WOTC. Thus, firms do not appear to adjust retention behavior in response to the time limits or caps embedded in the subsidy.

The final section of the paper addresses the puzzle of why firms appear so unresponsive to a sizable subsidy like WOTC. After showing that this is not easily explained by conventional models of labor supply and demand, we draw on original data on firm hiring practices to document an alternative mechanism. A fundamental tension when targeting subsidies to economically disadvantaged workers is that many of the characteristics used to identify disadvantage may be sensitive, legally protected, or costly to verify before hiring. Firms may thus be reluctant to screen on these attributes during their hiring processes, such that the subsidies do not affect their hiring behavior.

To test the relevance of this mechanism, we collect original data on entry-level job applications for a representative sample of 138 WOTC-using firms. These firms jointly account for more than half of all WOTC applications in the state. Consistent with this explanation, we find that firms

rarely know whether or not a particular job applicant is subsidy-eligible. Even within this sample of firms that file for and receive WOTC subsidies, only around a fifth collect information on their job applications that would allow them to identify WOTC-eligible applicants. Moreover, even within the subset of firms that do collect eligibility information, at least half rely on third party tax servicers, which often do not share this information with the firm before hiring. Survey evidence from hiring professionals at WOTC-participating firms suggests that this limited screening reflects concerns that favoring subsidy-eligible applicants could expose firms to discrimination claims (e.g., the age-based SNAP eligibility criteria could imply preferential treatment of younger applicants over older ones, who are a protected class) and that asking about sensitive characteristics related to eligibility may discourage such candidates from applying. Taken together, these findings indicate that firms' limited ability or willingness to observe eligibility at the hiring stage is an important reason why the wage subsidy does not translate into increased hiring of subsidy-eligible workers.

Finally, we test whether the absence of hiring responses is driven solely by constraints on collecting eligibility information, or whether other mechanisms would still constrain the efficacy of hiring subsidies even if eligibility were observable. Matching our data on job applications to the linked administrative data, we examine the hiring response to WOTC eligibility within the firms that internally screen for WOTC status in their job applications. Even in this subset, we still find no evidence that WOTC eligibility affects hiring, consistent with the presence of other frictions that inhibit the translation of subsides into firm demand for targeted workers.

We next examine several alternative explanations for this null result. We do not find support for three candidate mechanisms: high up-front costs of integrating WOTC into hiring systems, the negative signal of SNAP receipt offsetting the benefit of the subsidy (stigma), or lack of firm attentiveness to the WOTC program. To explore other potential explanations, we draw on our survey of hiring managers and conduct an additional survey of supervisors of low-wage workers at WOTC-participating firms. These responses point to agency and information frictions within the firm: the individuals making hiring and termination decisions may not internalize the subsidy either because they do not personally capture any of the financial gains from the subsidy and/or because they personally do not have the information to act upon these incentives (even if others at the firm do). Consistent with this interpretation, we use our administrative data to study firm responses to notches in the subsidy schedule *after* the hiring decision is made, and document patterns aligned with the presence of these frictions.

Put together, our results point to important limits of employer-side wage subsidies as a policy instrument for improving employment outcomes among disadvantaged groups. Leveraging the context of the largest US wage subsidy program, we find precise null effects of the program on employment, hiring, earnings, public assistance receipt, and criminal justice outcomes among targeted workers, as well as no effects on firms' overall hiring or payroll. We conclude by identifying and providing evidence for two general yet under-studied frictions — external constraints on firms' ability to identify eligible job applicants (e.g., perceived legal liability) and internal organizational frictions (e.g., agency issues) — that can weaken the link between statutory labor cost reductions and actual labor demand.

Focusing on the specific case of the Work Opportunity Tax Credit, its future is currently an active topic of Congressional debate: its reauthorization is under discussion and a bipartisan group of 9 senators have co-sponsored a bill that would substantially expand the program, more than tripling its annual cost (Smucker, 2025; Ernst & Young, 2025). Our results provide much needed insight for decisions around the future of the program—whether through enacting meaningful reforms or considering alternative uses of these funds to better assist disadvantaged workers. Some possibilities for reform include enforcing the requirement that a job applicant's eligibility for WOTC is known to hiring decision-makers prior to extending job offers (Thomson Reuters, 2021) and establishing mechanisms for firms to more easily identify WOTC-eligible candidates. However, even with reforms, the billions of dollars spent annually on WOTC may be more effectively deployed to other forms of support for disadvantaged workers.

This paper contributes to three main literatures. First, it advances the literature on employer-side wage subsidy policies through high-quality quasi-experimental evidence on the largest US employer-side wage subsidy program and identification of mechanisms that determine the translation of such subsidies translate into firm behavioral responses. An older literature used survey data to study earlier federal wage subsidy programs in the US (e.g., Perloff and Wachter, 1979; Hollenbeck and Wilke, 1991; Bishop and Montgomery, 1993) and typically finds modest employment gains, but Katz (1996) highlights important design limitations and concludes that "much uncertainty" remains about the efficacy of wage subsidies. More recent studies on other wage subsidy programs often find promising results, but differ meaningfully from our context. Many study wage subsidies that are bundled with training or job search assistance (e.g., Gelber et al., 2016; Barham et al., 2023) or focus on smaller state tax credits (e.g., Grijalva and Neumark, 2017). Others are based on stated-preference surveys or field experiments that target a different population than we study (e.g., Holzer et al., 2007; Cullen et al., 2023; Bushway and Pickett, 2024).[2] We build on this literature by using a large, linked administrative dataset on workers, firms, and subsidy claims in combination with multiple high-quality empirical strategies. Our approach allows us to provide precise estimates on the consequences of employer-side wage subsidy policies that are operating at a policy-relevant scale, and offers novel evidence on mechanisms that can limit the effectiveness of targeted wage subsidies.

Second, our paper contributes to an empirical literature that studies frictions in hiring processes. Recent papers have examined firm-side constraints, such as information gaps or internal pay equity or wage-setting constraints (e.g., Altonji and Pierret, 2001; Pallais, 2014; Saez et al., 2019; Stanton and Thomas, 2016), as well as worker-side factors, such as lack of information or incorrect beliefs (e.g., Cullen and Pakzad-Hurson, 2023; Roussille, 2024). Our results point to a

[2]Outside of the US, high-quality quasi-experimental studies reach mixed conclusions. Cahuc et al. (2019) and Saez et al. (2019) find positive employment effects from a large hiring credit during the Great Recession and a payroll tax cut to young workers, respectively, but the subsidies in these settings were broad and not targeted to disadvantaged workers. Other studies find effects of hiring subsidies to be concentrated in specific groups (e.g., Boockmann et al., 2012) or close to zero overall (e.g., Huttunen et al., 2013; Schünemann et al., 2015; Fenizia et al., 2025). In developing countries, randomized evaluations of wage subsidy programs typically find short-run employment gains that fade over time (e.g., Galasso et al., 2004; Groh et al., 2016; Abel et al., 2021). The variation in estimated efficacy is plausibly due to differences in subsidy design, target groups, or other contextual factors.

distinct channel through which perceptions of legal constraints shape hiring processes (e.g., Acemoglu and Angrist, 2001; Autor et al., 2006; Agan and Starr, 2018; Aizawa et al., 2024), finding that legislation intended to protect workers can generate unintended negative consequences for the functioning of targeted programs. We also highlight the potential role of underlying agency problems in delegated hiring (e.g., Cowgill and Perkowski, 2024; Aleksenko and Kohlhepp, 2024), where firm-level incentives such as wage subsidies may not be internalized by hiring decision-makers. Although such internal organizational frictions are fundamental to standard theories of the firm, they are largely overlooked in analyses of employer-side wage subsidies, which typically model firms as unitary profit maximizers.

Third, we contribute to a small literature on WOTC specifically. These papers either are descriptive in nature (Gunderson and Hotchkiss, 2007; Hamersma and Heinrich, 2008; Hamersma, 2011; Hunt et al., 2018), use incentives from WOTC as an input to a structural model of employer screening (Aizawa et al., 2024), or focus on a small subset of WOTC-eligible workers and/or an earlier time period when the program was relatively small (Hamersma, 2008; Heaton, 2012). The lack of consensus on WOTC is well-illustrated by a February 2023 release by the Department of Labor containing a list of open questions about the program, including "does the tax credit influence employer hiring decisions?" (Department of Labor, 2023a). Our findings expand on existing work and yield a less favorable appraisal of the program.[3]

2 Institutional Background and Data

Active labor market policies, such as job search assistance, job training, and wage subsidies, are a large part of government budgets in most developed countries, with OECD countries spending an average of 0.58% of GDP on these policies annually (Crépon and Van Den Berg, 2016). Within the academic literature on wage subsides, most of the focus has been on subsidies paid to workers, such as the Earned Income Tax Credit (see Nichols and Rothstein (2015) for a recent review). Research on the EITC has typically found that it generates increases in extensive-margin labor supply, particularly among single mothers (Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001), although a recent re-analysis finds evidence for more limited responses (Kleven, 2024).

However, there is significantly less work on wage subsidies paid to employers, particularly in the context of the United States. Although simple models predict that the incidence of subsidies is independent of who receives them, many factors will break this equivalence, such as imperfect information, transaction costs, and market power (Katz, 1996). For example, if a binding minimum wage limits workers' ability to lower their contract wage in response to subsidies, the employment effects of employer-side subsidies will be larger than worker-side subsidies (see Appendix Figure

[3]The most closely related paper, Hamersma (2008), estimates that WOTC eligibility generates a meaningful increase in employment in the short-run (5.9 percentage points), but that this does not persist in the longer run. Our findings may differ due to sample, timing, or empirical strategy: Hamersma (2008) uses data on approximately 3,500 TANF recipients between 1997-2002 and a propensity-score matching approach to compare the labor market outcomes of individuals who stopped receiving TANF benefits after 6-8 months (ineligible for WOTC) to individuals who received TANF for 9-18 months (eligible).

A1). This makes employer-side subsidies particularly intriguing in low-wage labor markets, such as those in which WOTC operates; in our data, 58% of WOTC-subsized workers have hourly wages within 25% of the prevailing minimum wage of $7.25 (see Appendix Figure A2).

The US has a long history of experimenting with employer-side wage subsidy programs to encourage the hiring of disadvantaged workers, including the Job Opportunities in the Business Sector program in the late 1960s, the Work Incentive (WIN) program in the 1970s for cash welfare recipients, and the New Jobs Tax Credit from 1977-1978 (see, e.g., Perloff and Wachter, 1979; Bishop, 1981). The most extensive of these programs was the Targeted Job Tax Credit (TJTC), which was in effect between 1979 to 1994 and primarily subsidized the hiring of economically disadvantaged youth and beneficiaries of public assistance. Most of the studies of the early US wage subsidy programs find positive effects on employment (e.g., Hollenbeck and Wilke, 1991; Bishop and Montgomery, 1993; Katz, 1996) with some exceptions (Burtless, 1985), although Katz (1996) suggests concerns with the empirical designs of those studies. However, TJTC was eventually phased out due to criticism over "employer windfalls for hiring employees that they would have hired anyway and too many credit-eligible employees leaving their jobs before receiving much work experience" (Government Accountability Office, 2002). The end of TJTC paved the way for the creation of the Work Opportunity Tax Credit, which was established by Congress on August 20, 1996 (P.L 104-188).

2.1 The Work Opportunity Tax Credit

Today, firms can receive WOTC subsidies when they hire individuals who meet any of the following criteria: (1) are ages 18 to 39 and in a family that received SNAP benefits for at least 3 of the 5 months prior to hiring; (2) are in a family that received assistance under TANF for at least 9 of the 18 prior months; (3) are long-term TANF recipients, including those who exhausted their TANF benefits in the past two years; (4) received SSI over the past three months; (5) are long-term unemployed; (6) have a felony conviction and are hired within one year of their conviction or release from incarceration; or other smaller target groups.[4] These populations typically have low rates of labor force participation: for example, only 52% of non-disabled, working-age SNAP participants are employed in a typical month (Keith-Jennings and Chaudhry, 2018).

Subsidies are issued in the form of federal tax credits to employers for earnings over the worker's first 12 months of employment in a job.[5] A firm receives nothing for workers who work fewer than 120 hours, but can claim 25% of wages for workers who worked between 120-400 hours and 40% for employees who worked at least 400 hours, up to a limit of $2,400 in tax credits per worker (typically corresponding to $6,000 in earnings) for most categories of workers (see Appendix Figure A3 for

[4]The target groups were defined more narrowly in earlier years: for example, prior to 2007, SNAP recipients were only eligible if they were aged 18-24, and the long-term unemployed target group was only added in 2015. A few other categories are or have been eligible, such as qualified veterans, residents of "designated communities", and employees of summer youth programs, but these make up a small fraction of all WOTC-subsidized hires.

[5]WOTC is structured as a tax credit, but because the credit amount is tied to first-year wages, it functions as both a wage subsidy and hiring subsidy, and we refer to it as such throughout.

an example of the WOTC subsidy schedule).[6] These tax credits are non-refundable and so require tax liability to be claimed, but they can be carried backward up to one tax year and forward up to 20 tax years.[7] The firm also continues to receive the subsidy even if the worker does not remain in the eligible category after hiring, such as if earnings render them ineligible for SNAP.

All firms are eligible to apply for WOTC and may receive subsidies for an unlimited number of hires, but they can only claim the subsidy once for any given worker (i.e., they cannot fire and rehire the same worker to receive the subsidy a second time). A new employer, however, can still claim the full subsidy if the worker meets the WOTC eligibility criteria at the time of hire, even if that worker's wages were previously subsidized at a different firm. To claim the tax credit, employers need only submit two short forms for each worker within 28 days of hiring to the relevant state agency (plus a one-page form to the Internal Revenue Service at the end of the year aggregating all individual claims).[8] This agency verifies the worker's eligibility, and notifies the firm whether the application was certified or denied.[9] The WOTC application process is almost entirely managed by the firm, and so is likely to be non-salient to the worker; this non-salience could limit pass-through of the subsidy, particularly if firms have market power (Kroft et al., 2024).

WOTC has a number of important differences from its predecessors. One of the most important is a new requirement about when employers collect information on a potential hire's WOTC eligibility: on IRS Form 8850, which firms submit when filing for WOTC, both the hire and firm must sign to confirm that "under penalties of perjury, I declare that the applicant provided the information on this form [indicating eligibility for WOTC] on or before the day a job was offered to the applicant." Under the previous programs, employers did not need to ascertain applicants' subsidy eligibility prior to making hiring decisions, which was thought to generate high rates of inframarginal hires (Government Accountability Office, 2002). For example, this contrasts with the TJTC, under which employers "may claim the tax credit even though they have made no specific effort to recruit, hire, or retain workers targeted by the program" (Government Accountability Office, 1991).[10] It was hoped this requirement would ensure that WOTC directly shifts hiring decisions rather than simply subsidizing them after the fact.

WOTC also introduced a tiered structure designed to encourage longer stints of employment (Government Accountability Office, 2002). Under TJTC, firms could claim the credit once a worker reached a minimum threshold of 90 days or 120 hours. WOTC largely preserved this floor – employers receive no subsidy for workers below 120 hours and a partial (25%) subsidy for workers

[6]The limit is higher for long-term TANF recipients and veterans who meet other criteria, but this is typically less than 10% of all WOTC hires (Department of Labor, 2023b).

[7]Taxable employers can claim WOTC against income taxes, while eligible tax-exempt employers can only claim WOTC against payroll taxes on wages paid to qualified veterans rather than the full set of eligible individuals listed above (Internal Revenue Service, 2024).

[8]The form also requires applicants to supply some evidence of eligibility; for example, for those eligible based on TANF or SNAP receipt, applicants need to provide their case number identifier and/or a signed statement from an Authorized Individual with a description of months of benefits that were received.

[9]While there is an option for workers to get "pre-certified", so that they can present their eligibility to potential employers and avoid this verification process, this accounts for only 1.5% of certifications in our data. Nearly all pre-certifications in our data were eligible for WOTC due to a felony conviction rather than through SNAP.

[10]Despite the updated language, we find that many employers still do not determine eligibility until after making initial job offers: Section 5 discusses this in detail.

between 120 and 400 hours – but added a higher threshold of 400 hours to qualify for the full 40% subsidy rate. At the same time, the number of subsidized workers expanded substantially due to broader eligibility criteria. Whereas TJTC cost about $300 million in 1994 (U.S. Department of Labor Office of Inspector General, 1994), WOTC now typically costs over $1.5 billion annually (Joint Committee on Taxation, 2023) and subsidizes three to four times as many workers as at TJTC's peak. The composition of recipients has also shifted away from cash welfare recipients and economically disadvantaged youth toward a broader set of poor households, potentially reducing stigma and enhancing the subsidy's effectiveness (Burtless, 1985). Taken together, these differences may cause WOTC to have meaningfully different effects than its predecessors.

In its early years, WOTC subsidized the wages of a few hundred thousand individuals annually. Over time, as a result of eligibility expansions and greater awareness of the program, the number of workers whose wages are subsidized by WOTC has grown sixfold; 2.5 million new hires were certified to have their wages subsidized by WOTC in 2022 (Department of Labor, 2023b). Figure 1 plots national WOTC certifications by target group over time using data from Department of Labor annual reports.[11] Most of this growth came between 2008 and 2015, and is due to hiring of SNAP recipients: Appendix B decomposes the reasons for this growth, finding that it is primarily due to growth in the number of individuals who are WOTC-eligible through SNAP rather than changes in firm behavior. SNAP recipients are by far the largest category of beneficiaries, making up around two-thirds of all WOTC certifications in recent years.[12] Using our WOTC micro-data in Wisconsin, we find that patterns of growth in the state (black line of Figure 1) are quite similar to those nationally, suggesting that even though our data is from one state, it will well approximate national patterns.[13]

2.2 Data

A major difficulty with studying WOTC is that the administrative data required to measure eligibility and outcomes are typically siloed across many different state agencies. We overcome this challenge by using linked administrative data from Wisconsin, accessed through the Institute for Research on Poverty (IRP) at the University of Wisconsin-Madison. These data cover over 13 million unique individuals and integrate quarterly earnings records, SNAP benefits, TANF benefits, criminal justice records, unemployment insurance benefits, WOTC application and certification data, and a data core drawing demographic information such as age, gender, and race from various

[11] Note that these data plot *certification* dates as opposed to *hiring* dates. These two dates can vary not only due to standard processing time, but also due to temporary lapses in WOTC authorization in 2004, 2012, and 2014. Firms still received WOTC subsidies for hires made during those lapses, but the certifications were only issued (and recorded in the data) afterwards. This inflates the numbers in 2005, 2013, and 2015 due to displacement from the previous years: e.g., a lapsation between January 1, 2004 and October 4, 2004 displaced certifications from 2004 into 2005 and so inflates the 2005 number. The black line plots the number of annual certifications instead using the *hiring* date based on WOTC micro-data from the state of Wisconsin, which does not have this timing issue.

[12] Federal law places limits on SNAP eligibility for able-bodied adults without dependents (3 months in a 36 month period). Wisconsin had these requirements waived between 2002 and 2015 due to high unemployment, and we do not see evidence of differences in the effects of WOTC during the waiver/non-waiver periods.

[13] Wisconsin closely mirrors national patterns in other measures of implementation — for example, Appendix Figure A4 shows that per capita utilization aligns almost exactly with the national average.

state databases (see Institute for Research on Poverty (2024) for a more extensive overview of the data). In addition to this main source of data, we also use aggregate state WOTC application and certification data from the US Department of Labor, WOTC micro-data from a subset of states and years resulting from Freedom of Information Act (FOIA) requests to those states, and newly collected entry-level job application data and survey data that is detailed in Section 5.

Quarterly earnings records: We use quarterly earnings records between 1998 and 2019 that are collected for Wisconsin's Unemployment Insurance (UI) program from the Department of Workforce Development. These records include quarterly earnings for each worker from each of their employers, along with worker and employer identifiers. While these data exclude some workers, such as self-employed individuals or those who work in a neighboring state, Institute for Research on Poverty (2024) estimates that 95 percent of all legally employed workers in Wisconsin are recorded in the UI data system.

SNAP records: We use FoodShare (Wisconsin's SNAP program) benefit records from 1998 to 2019 obtained from the Department of Health Services. These records report monthly benefit amounts (in dollars) at the household level and include individual identifiers for each household member deemed eligible in that month. They allow us to observe both the timing and intensity of SNAP participation. The data cover the universe of FoodShare recipients in Wisconsin.

TANF records: We use TANF benefit records from 1998 to 2019 obtained from the Wisconsin Department of Children and Families. These records include monthly benefit amounts (in dollars) at the case level, along with individual identifiers for all members associated with the case. The data cover the universe of TANF recipients in Wisconsin during this period.

UI benefits: We use UI benefit records from 2006 to 2019 obtained from the Wisconsin Department of Workforce Development. These records include monthly benefit amounts (in dollars) along with individual identifiers for the beneficiary. The data cover the universe of UI benefit recipients in Wisconsin during this period.

Criminal justice records: We use statewide circuit court records from the Wisconsin Consolidated Court Automation Program (CCAP), covering all public felony, misdemeanor, and criminal traffic cases from 2005 to 2020. The data include case dates, charge dispositions, and punishments, which we use to construct a quarterly indicator for misdemeanor or felony convictions. We also use data on entry and exit dates from correctional facilities from the state Department of Corrections and Milwaukee jails from 2005 to 2019. We use the CCAP and prison/jail records jointly to determine the period of WOTC eligibility for individuals with a felony conviction, which corresponds to within one year after conviction for those not incarcerated, or within one year after release for those incarcerated.

Work Opportunity Tax Credit application and certification data: We use micro-data on the WOTC program between 2005 and 2020 from the Department of Workforce Development, which uses information from IRS Form 8850 and ETA Form 9061. For each WOTC application over this period, these data include the date of the hiring, whether the application was certified or denied, the starting hourly wage, and, starting in 2009, the target group under which the certification was approved. It also includes individual and firm identifiers which allows us to link the WOTC certification data to the other data sources. The data cover 797,411 applications and 426,498 certifications across over 400,000 unique individuals.

Linking across databases: The IRP constructs masked individual and firm identifiers for linkages across datasets. To construct individual identifiers, IRP uses variables from various sources, including Social Security Number (SSN), name, sex, date of birth, place of birth, and parental information (first name, date of birth, and SSN of both mother and father).[14] These identifiers then enable IRP to assign demographic characteristics drawn from multiple datasets. This richer dataset of individuals and their demographic characteristics form the Wisconsin Administrative Data Core (WADC). Firm identifiers are constructed using tax identifiers and UI account identifiers.

Other data: For supplementary analyses, we use annual WOTC application and certification data from Department of Labor annual reports. In addition, we use individual-level WOTC application and certification data from 2018 to 2020 from Wisconsin and seven other states made available through FOIA requests (Corwin, 2022). The variables differ by state, but we observe the following for at least a subset of states: starting wage, name of the firm associated with the application, and exact dates of filing an application and certification.

2.3 WOTC in practice

This section uses our data to describe the individuals and firms involved in the WOTC program and how the program operates in practice. Table 1 reports summary statistics for WOTC-subsidized hires alongside comparison samples. Columns (1) and (2) cover all individuals for whom a firm filed a WOTC application and the subset successfully certified for the subsidy, respectively.[15] Column (3) provides a benchmark sample of individuals aged 18-39 who received SNAP benefits in at least three of the past five months, the main SNAP-based eligibility criteria for WOTC. Panel A reports demographic characteristics. Applicants and certified workers are on average 29 years old, fewer than half are male, and more than one-third are Black. More than three-quarters of certified workers receive SNAP, while only about 10% receive TANF. These features are similar to those of

[14] After pre-processing each variable (e.g., removing illegal characters, standardizing names and formats), a combination of deterministic and probabilistic matching is used to construct a unique identifier for each individual. Probabilistic methods allow matches despite minor discrepancies across records, such as misspellings or digit transpositions. Further details on the matching process are provided in Brown and Thornton (2020).

[15] Columns 1 and 2 only include hires with matches between the WOTC application micro-data and UI earnings records, which excludes anyone who had zero earnings at the firm (i.e., was hired and the firm submitted a WOTC application but never started work).

the SNAP comparison group.

Panel B of Table 1 reports summary statistics at the job spell level, finding that WOTC primarily subsidizes short-term and low-wage employment. As in Panel A, we include job spells with an associated WOTC application (column 1), an associated WOTC certification (column 2), or for hires aged 18-39 who received SNAP benefits for at least three of the past five months at the start of the spell (column 3). Employment spells associated with WOTC certifications are short, averaging 3.4 quarters, with median total earnings of about $2,600. Mean earnings are significantly higher than median earnings, reflecting that many of these employment spells are of a short duration but there is a long right tail. These patterns are not specific to WOTC but reflect the general employment trajectories of SNAP recipients, as seen by the similar statistics of the SNAP sample in column (3). The average starting hourly wage for WOTC-certified workers is $9.[16]

WOTC-subsidized employment is concentrated in three broad and typically low-wage sectors: employment services like temporary staffing agencies (NAICS 5613), restaurants (NAICS 7225), and retail (NAICS 44–45). Participating employers are typically large firms, where the median quarterly payroll is $4.8 million and median quarterly employment is 1304 workers. WOTC hires represent a meaningful share of these firms' workforce, with applications filed for 11.5% of all new hires. However, even WOTC-utilizing firms apply for WOTC subsidies for only 37.2% of workers whom our data indicate are eligible, suggesting scope for even greater utilization.[17]

Among certified hires, 35% work fewer than the minimum number of hours for eligibility for WOTC (120 hours), 24% qualify at a 25% wage subsidy rate (120-400 hours), and 42% reach the 40% subsidy rate (400+ hours). Overall, 33% of all certifications yield the maximum subsidy value of $2400.[18] These numbers are consistent with the number of quarters worked at the firm during the job stint: we estimate a median hours worked of 267 hours, with only 24% of jobs lasting longer than three quarters.

These employment patterns translate into an average subsidy of $1,098 per certification and $609 per application. To gauge the incentives firms face at the point of hire, we compute the expected subsidy rate as total subsidy payments divided by earnings over the first $6,000 of wages (the earnings range covered by WOTC). We focus on this earnings range because firms can choose not to retain the worker after the expiry of subsidy, and this is a distinct decision. Across all workers for whom a WOTC application is filed, this yields an implied subsidy rate of 19.2%. Because certifications typically take more than four months to process, firms are generally unaware of approval status during most of the subsidized window, making the subsidy rate among applications

[16] Appendix Figure A2 shows the starting hourly wage distribution for WOTC workers in Wisconsin from 2005-2020, and finds that most jobs cluster at or just above the minimum wage of $7.25. Data from FOIA requests for WOTC micro-data from seven other states from 2018-2020 show similar wage distributions (Corwin, 2022).

[17] We calculate these statistics by restricting to firms that have previously submitted at least one WOTC application. Among all subsequent hires at these firms (and, separately, among those subsequent hires whom our data identifies as WOTC-eligible), we measure the share with an associated WOTC application.

[18] To estimate total hours worked for the employer, we divide total earnings for the worker from that employer in this work stint by the starting hourly wage, which is reported in the WOTC application. This could be incorrect if workers receive a raise in their hourly wage, but that is quite unlikely since 400 hours is still only 10 weeks of full-time work and so workers are unlikely to receive a raise so quickly.

the relevant margin for firm decision-making.[19]

Finally, we use this implied subsidy rate to benchmark expected employment responses to WOTC under standard elasticities of labor supply and demand. Applying conservative labor demand elasticities of -0.1 to -0.2 (Lichter et al., 2015; Harasztosi and Lindner, 2019) and labor supply elasticities of 0.25 to 0.5 (Meyer and Rosenbaum, 2001; Chetty et al., 2013), standard formulas (Hamermesh, 1993) predict employment gains of 1.4-2.8%. Under less conservative elasticities, predicted effects are larger, so these calculations provide a lower bound for assessing whether our estimates align with canonical models or require alternative explanations.

3 Effects of WOTC eligibility on individual outcomes

In this section, we apply two distinct identification strategies – a difference-in-differences approach leveraging the 2007 expansion of SNAP eligibility and a regression discontinuity approach around SNAP eligibility age cutoffs – to worker-level data to estimate the effects of WOTC eligibility on labor market and related outcomes. We also check for differential effects across different types of workers and firms and examine robustness using placebo tests and a triple-differences approach. Section 4 examines similar questions with a complementary firm-level design, which also allows us to examine other margins of adjustment such as more aggregate hiring effects and effects on separations.

3.1 SNAP expansion

We first examine a large expansion of WOTC eligibility among SNAP recipients. Prior to 2007, individuals who were between the ages of 18-24 and had received SNAP benefits in at least three of the five months preceding their hire date were eligible for WOTC. In January 2007, eligibility was expanded to include SNAP recipients between the ages of 25 to 39 who met the same benefit-duration requirement. To be clear: eligibility is determined at the date of hire; if individuals turn 40 or are no longer SNAP eligible *after* being hired, that has no bearing on WOTC eligibility. Appendix Figure A5 shows that this produced an immediate response from employers, with the total number of WOTC certified new hires in Wisconsin increasing by over 60%.

To study the impact of this expansion, we construct a sample of individuals who have received SNAP benefits in at least three of the last five months. We conduct two complementary analyses and then combine their estimates for improved precision. First, we compare individuals who are slightly younger than 40 (newly eligible for WOTC after 2007) before and after the policy change to individuals slightly above age 40 (never eligible). Second, we analogously compare individuals in

[19]For three states for which we observe the exact dates of filing an application and certification for WOTC (Arizona, Rhode Island, and Tennessee), the median time between application and certification is 119 days, with a standard deviation of 115 days. These data come from FOIA requests for WOTC data from 2018 to 2020 (Corwin, 2022). Using separate and coarser data from the Department of Labor that records the number of WOTC applications, certifications, and rejections at the quarterly level, we can estimate the number of quarters (rather than days) in which applications are processed in every US state. The processing speed of these three states is close to the national average, so the estimates of number of days for processing are likely to generalize more broadly.

the sample who are slightly older than age 25 (newly eligible after 2007) before and after the policy change to individuals slightly below age 25 (always eligible). To the best of our knowledge, these age cutoffs were not used as cutoffs for other programs experiencing contemporaneous reforms. We restrict attention to comparison groups that lie close to each cutoff and are therefore similar in age to the treated group, increasing the likelihood that their post-reform labor market trajectories provide a valid counterfactual. We focus on the period from July 2005 through December 2008 and estimate both event study and difference-in-differences specifications.

The event study specification is:

$$Y_{i,t} = \sum_{s=2005q3,\, s\neq 2006q4}^{2008q4} \beta_s \left[\mathbf{1}\{t = s\} \times treatment_{i,t}\right] + \delta' X_{i,t} + \eta_t + \gamma_{age_{i,t}} + \varepsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ is an outcome for individual i measured in quarter t, $X_{i,t}$ are individual-level controls, η_t are year-quarter fixed effects, and $\gamma_{age_{i,t}}$ are age (in months) fixed effects where $age_{i,t}$ measures individual i's age at the start of quarter t, and the treatment indicator $treatment_{i,t}$ is equal to one for individuals in the treated age range and zero otherwise. We also estimate the corresponding difference-in-differences (DD) specification, which provides the average difference between the pre- and post-policy β_s coefficients:

$$Y_{i,t} = \beta^{DD} \times treatment_{i,t} \times 1\{t \geq 2007q1\} + \delta^{DD} X_{i,t} + \eta_t^{DD} + \gamma_{age_{i,t}}^{DD} + \epsilon_{i,t} \tag{2}$$

For both the event study and DD specifications, we cluster standard errors at the individual level.

For the age-40 cutoff analysis, the sample in each quarter consists of individuals who have received SNAP benefits in at least three of the last five months and are within a two year age band above or below age 40: either $age_{i,t} \in [37.75, 39.75]$ or $age_{i,t} \in [42.0, 44.0]$ at the start of the quarter. Individuals below age 40 are eligible for WOTC, but we restrict the treated group to those aged 39.75 or younger at the start of the quarter so they will be eligible for WOTC for the entirety of quarter after the 2007 expansion. The untreated group consists of individuals of ages ranging from 42 to 44. We exclude those aged 40 up to 42 to ensure that no one in the untreated group was ever eligible for WOTC in the eight quarters following the 2007 expansion. For example, an individual who turns 40 in the second quarter of 2007 would have been 39.75 (and thus eligible for WOTC) in the first quarter of 2007.

For the age-25 cutoff, the sample consists of individuals who have received SNAP benefits in at least three of the last five months and either $age_{i,t} \in [22.75, 24.75]$ or $age_{i,t} \in [25.0, 27.0]$ at the start of the quarter. The treated group comprises individuals aged 25 to 27 at the start of a quarter (newly eligible after 2007) and the comparison group consists of individuals aged 22.75 to 24.75 (always eligible). As with the age-40 cutoff, we select the 24.75 cutoff to ensure that all individuals in the comparison group remain eligible for WOTC for the entirety of quarter t prior to 2007.[20]

[20] In this analysis, it is not necessary to exclude individuals aged 25-27 because those under age 25 are always eligible for WOTC. Thus, the likelihood that individuals above age 25 are in a WOTC-subsidized job that began before turning 25 should be similar before and after 2007. This contrasts with the age-40 sample, where someone aged 40.25 is more likely to be in a WOTC job after 2007 (when eligibility expanded to ages 25-39) than before.

We also estimate stacked specifications that pool observations around both cutoffs. The stacked model directly corresponds to Equations (1) and (2), with age (in months) fixed effects ($\gamma_{age_{i,t}}$), and year-quarter by age cutoff sample (i.e., age-25 sample or age-40 sample) fixed effects (η_{tc}) so that comparisons are always between individuals in the same age-cutoff sample. We focus on the stacked estimates in the discussion below, as they offer the strongest statistical power and closely match the separate age-25 and age-40 results.

We begin by examining whether this expansion leads to a meaningful increase in WOTC utilization among the newly treated. Table 2 reports estimates from the DD regressions, with Panel (a) showing the estimated effects for the stacked sample, and Panels (b) and (c) showing the effects separately for the age-40 and age-25 cutoffs, respectively.[21] Column (1) finds that the likelihood of the newly eligible population being employed in a WOTC certified job in quarter t increases by 2.1 percentage points.[22] Panel (a) of Figure 2 plots the corresponding event study estimates, with dashed lines indicating the averages of the pre- and post-expansion coefficients (see Appendix Figures A6 and A7 for the split by age cutoffs). While there is an initial period of adjustment over the first three quarters after expansion, the increased likelihood of employment in a WOTC job stabilizes at close to 3 percentage points. Column (2) of Table 2 instead investigates whether the individual is newly hired into a WOTC-certified job in quarter t (i.e., the *flow* rate), finding that this probability nearly triples for the newly WOTC eligible group. Panel (b) of Figure 2 also examines the hiring rate, showing that firms adjust quickly and so the adjustment period for employment is mostly about settling into steady state rather than learning. Thus the expansion meaningfully increases the likelihood that firms receive WOTC subsidies for the newly eligible group.

Columns (3) and (4) of Table 2 investigate whether WOTC eligibility translates into a greater likelihood of employment or being hired into a new job (defined as having positive earnings in quarter t in a firm at which the worker did not have positive earnings in the prior quarter). The latter outcome provides a sharper test since it removes noise generated by workers who are persistently employed over the sample period and so are unlikely to be affected by the policy; flows into employment are also the primary goal of the policy. There is no detectable effect of the expansion on either outcome, and the confidence intervals around β_{DD} are tight: for example, the upper bound of the 95% confidence interval on being hired corresponds to a minuscule 0.3 percentage point increase. Panels (c) and (d) of Figure 2 report the corresponding event study coefficients for the stacked sample, and find no evidence of a pre-trend in outcomes prior to the policy change. We thus conclude that eligibility for WOTC does not translate into an increased likelihood of employment.[23]

[21] All specifications include a control for earnings in the quarter prior to the sample period in case of any remaining differences in labor market histories between the treatment and control groups. This increases precision by 10-15% for the labor market outcomes, and estimates are similar without the control (Appendix Table A1).

[22] Note that untreated individuals and individuals prior to 2007 may still be employed in WOTC jobs by virtue of other eligibility criteria, such as a felony conviction or receipt of TANF. However, for this to affect the analysis there would need to be a differential change in the likelihood of being eligible through other eligibility criteria for treated versus untreated individuals after 2007. Moreover, the dependent variable means of the treatment group prior to the policy change are very small, indicating the majority of SNAP-eligible individuals do not also qualify through other eligibility criteria.

[23] In a related paper, Cullen et al. (2023) use a field experiment to measure how wage subsidies affect employer

Even if employment rates are unaffected, WOTC eligibility could increase job tenure or wage rates: firms may be more reluctant to terminate workers bringing subsidies into the firm or workers who bring in subsidies may be able to negotiate for higher wages. Either channel would imply that WOTC eligibility conveys greater total earnings, but column (5) of Table 2 and Panel (e) of Figure 2 find no evidence of any effect on total quarterly earnings, with tight confidence intervals around zero.[24] Some potential explanations for the lack of wage response include low rates of bargaining over wages among low-wage workers (Hall and Krueger, 2012) or that the WOTC program is non-salient to workers.

Finally, proponents of WOTC frequently claim that the program results in net savings for the government by helping people obtain jobs that pull them off of public assistance and out of criminal activity (Cappelli, 2012; United States Senate Committee on Finance, Employment and Community Development Taskforce, 2019). Recent work does find that public policies designed to improve economic well-being can reduce engagement in criminal activity (Deshpande and Mueller-Smith, 2022; Agan and Makowsky, 2023), but the precise null estimates of the effect of WOTC on labor market outcomes suggest that this is unlikely to be true here. Nonetheless, we examine effects on: (1) the dollar amount of benefits that an individual received from SNAP, TANF, or UI in quarter t;[25] and (2) if the individual has a criminal conviction during quarter t. Columns (6) and (7) of Table 2 and Panels (a) and (b) of Appendix Figure A8 show similar null effects for these two outcomes. It is thus unlikely to be true that these wage subsidies generate savings for the government.

Robustness checks One concern with the analysis is that treated individuals may experience differential shocks to labor demand over time relative to untreated individuals despite their similar ages. To check for this, we estimate a triple-differences specification by including individuals in the WADC who are in the same age ranges but are not SNAP recipients in quarter t.[26] Intuitively, this is like re-running the same difference-in-difference specification while restricting to the sample of individuals in the relevant age ranges who are not recipients of SNAP, and then subtracting these estimates from our baseline estimates to remove any differential age-related labor market dynamics. The triple-differences specification again finds no evidence of responses to WOTC eligibility

willingness to hire a worker with a criminal record, experimentally varying the subsidy amount from 0% to 100%. Our findings are consistent with theirs: they find no response to wage subsidies of up to 25%, which is close to the effective subsidy rate for WOTC calculated in Section 2. However, the difference in context across papers makes the comparison difficult to interpret: for example, workers with a criminal record tend to have greater labor market stigma and lower rates of formal labor market participation than SNAP recipients (Garin et al., 2025; Hjalmarsson et al., 2025). Most crucially, Cullen et al. (2023) make the availability of the subsidy highly salient for the hiring decision, which Section 5 shows is not the case for most people hiring WOTC workers.

[24]Due to the lack of impact on employment, we can directly interpret effects on earnings as the impact of WOTC without concerns about changes in the composition of eligible and ineligible workers due to the subsidies.

[25]UI benefits are only present in the data beginning in 2006. However, results are unchanged when UI payments are excluded from this measure.

[26]The WADC data do not contain age information for every state resident; an individual appears only if they have contact with a state agency that records their date of birth and shares its data with IRP. Nonetheless, coverage is quite high: we observe birth dates for 6.9 million unique individuals and around two-thirds of all hires. This rate is even higher for hires in the types of low-wage jobs we study: for example, the rate is approximately 80% for low-wage hires at WOTC firms.

(Appendix Table A3).

A related concern is that the presence of WOTC could change the composition of SNAP recipients. WOTC may pull individuals of WOTC-eligible ages into the workforce, and thereby reduce their likelihood of being SNAP recipients. If this were the case, then the composition of the treatment groups may change after 2007 in a way that could invalidate our approach. Columns (1) and (2) of Appendix Table A4 check whether being of a WOTC eligible age affects the likelihood of receiving SNAP benefits. In particular, we use the same specification as Equation (2) to test whether in 2007, when individuals aged 25-27 (37.75-39.75) became eligible to have their wage subsidized through WOTC, their likelihood of being a SNAP recipient changed relative to individuals aged 22.75-24.75 (42-44), whose eligibility status did not change. We find no evidence for such an effect.

Another issue is that some workers in the sample may already be employed such that WOTC has a limited effect on employment outcomes. Appendix Figure A9 and Appendix Table A2 also re-run all of the main specifications restricting the sample to individuals who enter quarter t unemployed, a population that is more likely to be seeking a job. Again, we do not find evidence of effects.[27]

Finally, WOTC could generate spillovers across workers, whereby subsidized employment for workers in the treated group may displace employment in the untreated group. However, such spillovers would *increase* differences in employment outcomes between the treated and untreated groups rather than bias estimates towards zero, and so the null effect estimates dispel this concern.[28]

3.2 Age-based discontinuities for SNAP

We next exploit the sharp age-based cut-offs in WOTC eligibility among SNAP recipients using a regression discontinuity (RD) design. Prior to 2007, SNAP recipients just below age 25 were eligible for WOTC, whereas those just above were not; after 2007, there is a similar discontinuity around age 40. The RD approach has several advantages relative to the previous analysis: it allows us to estimate the consequences of WOTC eligibility throughout the full sample period (rather than only around the 2007 expansion) and yields a much larger sample, providing excellent statistical power for examining potential heterogeneity in treatment effects.

Our main analysis combines two sharp regression discontinuity designs: around age 25 for the period 1998 to 2006 and around age 40 for the period 2007 to 2019. Our estimates are based on the following specification:

$$Y_{i,t} = \gamma_0 + \gamma_1 1\left\{age_{i,t} \geq A_t\right\} + f_1\left(age_{i,t}\right) + f_2\left(age_{i,t}\right) 1\left\{age_{i,t} \geq A_t\right\} + \epsilon_{i,t} \tag{3}$$

where $Y_{i,t}$ is the labor market outcome for individual i in quarter t, $age_{i,t}$ measures their age at the start of quarter t, and A_t is equal to 25 for years < 2007 and 40 for years ≥ 2007. The coefficient γ_1 captures the (negative) treatment effect, while the functions f_1 and f_2 reflect a continuous but

[27]The point estimate for public benefit receipt is statistically significant at the 10% level, but with the opposite sign of the plausible effect. We interpret this as statistical noise given the large number of regressions being run.

[28]Furthermore, substitution is unlikely to come purely from the untreated group in the sample: for example, in the age-40 sample, it could be that employment of the treatment group displaces someone not from ages 42-44 but SNAP recipients of older ages or non-SNAP recipients.

potentially non-parametric relationship between the running variable and the outcome. Crossing the age threshold entails a change from treated to untreated, and so γ_1 is equal to the treatment effect multiplied by negative 1. Using the data-driven approach of Calonico et al. (2014), we apply a triangular weighting kernel in distance from the threshold, calculate a MSE-optimal bandwidth with a linear polynomial estimated within the bandwidth on either side of the cutoff, and calculate heteroskedasticity-robust standard errors clustered at the individual level. As in the SNAP expansion analysis, we restrict the sample to individuals who have received SNAP for at least three of the five months preceding the start of a given quarter, i.e., the condition for WOTC eligibility through SNAP. We also drop the quarters in which $age_{i,t}$ crosses the relevant threshold (i.e., individuals whose age at the beginning of a quarter is (24.75,25) before 2007 or (39.75,40) after 2007), as those are difficult to interpret since individuals are partially treated.

This approach relies on several key identifying assumptions. The first is that the running variable, age, is not manipulable around the threshold, such as if individuals lie about their age to state agencies. We test for continuity in the age distribution around the cut-offs (Cattaneo et al., 2018), as seen visually in Appendix Figure A10: the estimated p-value of 0.27 indicates no evidence of manipulation. This test also alleviates a separate concern that individuals may be more likely to apply for SNAP benefits when below the relevant age threshold in order to make themselves eligible for WOTC; this would generate excess mass to the left of the threshold, which the test shows is not the case.

The second concern is continuity of covariates across the age threshold, i.e., that the composition of individuals in the sample does not change discontinuously at the cutoff. For example, such changes could occur if WOTC eligibility alters employment, thereby affecting SNAP utilization and shifting the composition of SNAP recipients above and below the threshold.[29] We also examine whether observable covariates change discontinuously across the threshold, focusing on gender, race, and lagged employment and earnings. Pooling data before and after 2007, Appendix Table A5 and Appendix Figure A11 show no evidence of discontinuities in any of these variables.

Having provided evidence that the identifying assumptions hold, we next examine whether crossing the age eligibility threshold has an effect on the same set of outcomes as Section 3.1. We first show that the age threshold generates differences in the likelihood of being in a WOTC-subsidized job. Table 3 and Figure 3 find that individuals at ages below the discontinuity are approximately 1.0 percentage points more likely to be in a WOTC-subsidized job (column 1 in Panel A of Table 3 and Panel (a) of Figure 3) or be hired into a WOTC job in the quarter (column (2) in Panel A of Table 3 and Panel (b) of Figure 3).[30] Panels B and C of Table 3 provide estimates

[29] As a direct test of this particular concern, columns (3) and (4) of Appendix Table A4 examine whether the likelihood of receiving SNAP benefits changes around the age threshold. We find no evidence for this in either the pre-2007 period (age-25 cut-off) or post-2007 period (age 40 cut-off). It is anyway unclear whether changes in employment would substantially affect SNAP utilization, since WOTC jobs are so low-wage. For example, in 2010 the SNAP income limit for a family of three was $36,620 annually; a household with two adults working full-time at the median WOTC wage in our sample ($9 per hour) would still qualify.

[30] Note that some individuals to the right of the age threshold may still be hired into WOTC-subsidized jobs by virtue of other eligibility criteria, such as a felony conviction or receipt of TANF, or continue to be employed in WOTC-subsidized jobs that they acquired before crossing the age threshold. To avoid the latter issue of job

when subsetting into the pre- and post-2007 periods, respectively (i.e., age cut-offs at age 25 and 40), and Appendix Figures A12 and A13 show the corresponding figures.

Next, we test whether this increased likelihood of being in a subsidized job translates into better labor market outcomes. Column (4) of Panel A of Table 3 and Panel (d) of Figure 3 show that crossing the age threshold into WOTC eligibility does not change the likelihood of being hired, and column (5) and panel (e) show no effect on earnings. Our preferred employment outcome is new hires rather than employment because this isolates flows into jobs. This removes holdover of jobs across the age threshold (e.g., an individual who is hired into a WOTC-subsidized job at age 39 may still be employed in that job at age 40), which would tend to push estimates towards zero.[31] However, examining employment directly (column (3) and Panel (c)) likewise points to no effect. Finally, columns (6) and (7) of Table 3 and Panels (c) and (d) of Appendix Figure A8 show no effects on public benefit usage or criminal convictions. All of these null estimates are even more precise than the difference-in-differences estimates based on SNAP expansion – with standard errors around half the magnitude – reflecting the larger sample size in the RD analysis. Together, these results reinforce the conclusion from the DD analysis in Section 3.1 that WOTC eligibility does not meaningfully improve labor market outcomes for targeted workers.

One concern with the DD approach in Section 3.1 is that it was based on an expansion in 2007, but the WOTC program has grown considerably since then. As part of this growth, firms may have updated their screening practices for WOTC-eligible job applicants such that WOTC now affects hiring decisions in a way that it did not in earlier years of the program. A strength of the RD approach is that it allows us to re-estimate the consequences of WOTC eligibility for employment at different points in time. Appendix Figure A15 subsets the data into six four-year intervals and re-estimates the RD within each of these time interval. We do not find any evidence of differential effects over time as the program expands.

Robustness checks Another concern with the RD approach is that other policies may use the same age thresholds; for example, if there were labor market support policies targeted to individuals above age 40, this could bias our estimates downwards. To test for this, we conduct a placebo analysis examining how labor market outcomes vary across the age thresholds during years when they were not relevant for WOTC: specifically, the age 40 discontinuity in the pre-2007 data and the age-25 discontinuity in the post-2007 data. If other policies affected labor market outcomes of SNAP recipients at these age thresholds, we should observe the effects of these other policies in this placebo analysis. Appendix Table A7 shows no such effects, consistent with the RD approach

holdover, our RD analysis focuses on flow outcomes for which holdover is not relevant (e.g., being hired into a new job in quarter t) rather than stock outcomes that may include holdover from past quarters (e.g., being employed in quarter t), although we report both outcomes for completeness.

[31] In Appendix Table A6 and Appendix Figure A14, we use a second approach to overcome this concern by restricting the sample to individuals who are unemployed at the start of the quarter t, and thus for whom job holdover is not relevant. The resulting estimates are quite similar to those in Table 3, suggesting this is not a major concern. The similarity in estimates reflects the very short duration of most WOTC-subsidized jobs (Table 1 and Section 4.2), which limits the scope for bias due to holdover.

cleanly identifying the effect of WOTC.[32]

3.3 Combining the estimates

While both the DD and RD approaches yield precise estimates, we can further improve precision by combining them into a precision-weighted average; this approach approximates estimation via seemingly unrelated regression (Wooldridge, 2010). Because the underlying samples are not independent (e.g., the same individual may appear in both the RD and SNAP expansion DD samples), we construct standard errors via block bootstrapping at the individual level.[33] The precision-weighted estimates are 0.00059 (i.e., 0.06 percentage points) for employment (se=0.00138), 0.00042 (i.e., 0.04 percentage points) for new hires (se=0.00105), and -$1.86 (se= $8.45) for earnings, indicating that the confidence intervals are tightly centered around zero.[34]

Another informative measure of the efficacy of WOTC is the extent of inframarginality: among workers whose jobs are subsidized through WOTC, what share would have been hired even in the absence of the subsidy? For example, if WOTC eligibility increases the targeted group's probability of being hired into a WOTC-subsidized job by 1 percentage point, but raises their likelihood of being hired into any job by only 0.25 percentage points, then 25% of WOTC-subsidized hires are attributable to the subsidy while the remaining 75% are inframarginal. Many subsidy programs in other domains have been found to exhibit high rates of inframarginality, generating questions about their cost-effectiveness (e.g., Boomhower and Davis, 2014; Houde and Aldy, 2017).

For each empirical strategy, we take the point estimates for: (1) the likelihood of being hired into a WOTC-subsidized job; and (2) the likelihood of being hired into any job. We then divide the second estimate by the first one, following the logic of the example in the previous paragraph.[35] This ratio can also be viewed as a normalization: since each empirical strategy corresponds to a different increase in the likelihood of being hired into a WOTC-subsidized job, dividing by that likelihood yields a comparable measure of inframarginality across designs. The precision weighted average of these ratios is 0.0381, implying that 96.2% of hires are inframarginal; we cannot reject the null hypothesis that all WOTC hires are inframarginal ($p = 0.72$). This further reinforces that WOTC has little to no effect on employment of eligible workers.

[32] A related concern is that firms may not be able to distinguish between job applicants who are just above (ineligible) and below (eligible) the relevant age threshold. If so, WOTC application rates would be similar on either side of the threshold. Appendix Figure A16 finds that this is not true: individuals below the age threshold are significantly more likely to have an associated WOTC application.

[33] Specifically, we draw a random sample (with replacement) of Wisconsin residents in WADC and re-estimate both the DD and RD specifications within the bootstrap sample. We then construct precision-weighted averages of the resulting estimates and repeat across 1000 bootstrap samples.

[34] As a benchmark for interpreting the precision of null estimates on employment, we compare our estimates to those from two recent papers published in top economics journals whose main findings are null effects on employment (Cengiz et al., 2019; Garin et al., 2025). Using standard errors as the metric of precision, our estimates are an order of magnitude more precise.

[35] We focus on estimates related to hiring rather than employment for constructing this ratio. Using estimates related to employment will implicitly weight each hiring episode by length of employment (e.g., a job lasting for three quarters counts three times as much as one lasting a single quarter), which is more difficult to interpret.

3.4 Testing for heterogeneity by firm type

Our estimates indicate that subsidy eligibility does not impact worker labor market outcomes on average. However, it may be that a subset of firms respond to wage subsidies, but that it is difficult to detect in the overall sample or there is a compositional reallocation of WOTC-eligible workers from firms that do not respond to those that do. This section zooms in on labor market outcomes among firms for which one might most expect to find effects.[36]

We first examine whether WOTC eligibility affects labor market outcomes among firms with the greatest potential financial exposure to WOTC, as these firms have the strongest economic incentives to incorporate the subsidy into hiring decisions. We therefore focus on the 50 firms with the largest number of WOTC certifications over the sample period. We estimate that each firm in this group receives an average of over $165,000 in WOTC subsidies per year in Wisconsin, implying substantial and recurring subsidy revenue. We re-estimate Equations (2) and (3), redefining the outcome as whether individual i is employed in quarter t at one of these high-exposure firms. The first columns of Appendix Tables A8 and A9 show no evidence that WOTC eligibility increases employment (Panel A) or hiring (Panel B) at these firms.

Next, we focus on outcomes at firms that have HR procedures that are potentially more attentive to the wage subsidy policy. Using administrative data on public benefits receipt and criminal convictions, we identify all hires who are potentially eligible for WOTC through the SNAP, TANF, or felony criteria at the time of hiring. For each firm, we compute the share of their potentially eligible hires for whom the firm is certified to receive WOTC tax credits. We then classify firms in the top quartile of certification fraction (among WOTC-using firms) as high-attentiveness firms and examine the outcomes of employment and hiring at these firms. These firms are meaningfully more attentive than other WOTC-using firms, receiving certifications for an average of 52.0% of potentially eligible hires, compared to an average application rate of 24.6% among the other firms. Column (2) of Appendix Tables A8 and A9 finds no evidence of increases in employment at these firms.

The third column, which will be discussed in detail in Section 5.2, leverages data on the hiring process of WOTC firms to test for employment effects among firms whose job applications meaningfully screen for WOTC eligibility. We find that even among this subset of firms that most plausibly could make hiring decisions incorporating WOTC eligibility, there is no response. The final two columns of the table examine employment and hiring at employment services agencies (primarily providing temporary employees to businesses), which are the biggest category of firms claiming WOTC and so may be most attentive to the policy, and firms in the top 25% of most competitive industries (four digit NAICS codes) based on data from the 2022 US Economic Census, which may be more responsive to policies like WOTC due to their lower margins. Again, there is non-statistically significant and near zero employment and hiring estimates for each of these types of firms.

[36]We also test whether there are some categories of workers among which there is a detectable response, but Appendix Tables A10 and A11 find no evidence of heterogeneity by race, gender, and whether the individual has a past criminal conviction in the court records data.

Putting these pieces together, we find no evidence of concentrated effects even among particular firms or sectors that are likely to be most responsive to WOTC policy. The next two sections of the paper parse these findings through the lens of firm-level effects and examine the mechanisms that can explain this lack of response.

4 Firm-level responses to wage subsidies

The preceding analyses focused on workers as the unit of observation. We now shift to the level of the firm. Examining firm-level outcomes allows us to test for behavioral responses to wage subsidies that could not be tested using our worker-level identification strategies, such as increases in aggregate hiring rather than solely among the targeted groups. It also enables us to study adjustment along margins beyond hiring. Even if firms do not incorporate subsidy eligibility into initial hiring decisions, the subsidy may become salient after a worker is hired, potentially affecting retention or separation decisions. The first part of this section focuses on the hiring margin, while the second part analyzes the separation margin, providing a more complete picture of how employers respond to targeted wage subsidies.

4.1 Hiring margin

The empirical analyses in Section 3 compared similar WOTC-eligible and ineligible individuals to estimate the effect of WOTC eligibility on labor market outcomes. However, these strategies may miss some types of firm responses to WOTC. First, individuals making hiring decisions may not know the specific age eligibility rules of the WOTC program or be unable to accurately distinguish who receives SNAP. If so, firms might respond to WOTC by increased hiring of all SNAP recipients (rather than focusing within the age cutoffs) or probabilistically favoring applicants whose observable characteristics are correlated with SNAP receipt.[37] Second, wage subsidies may operate at a more aggregate margin, such as through firm-wide increases in hiring or wages, rather than by altering the relative hiring or wage rate of eligible and ineligible workers.[38]

To test for both of these possible firm responses to wage subsidies, we again exploit the 2007 eligibility expansion to SNAP recipients aged 25-39, and use a matched difference-in-differences design to compare firms that were active WOTC users prior to the expansion to a matched set of observationally similar firms that were not receiving subsidies from the program. For firms that were already using the WOTC program, the expansion generated a new (effective) incentive to hire SNAP recipients aged 25-39 that is absent for firms that do not engage with WOTC. It also generates a windfall in subsidy receipt for WOTC-using firms if they were already engaged in hiring

[37] Someone within the firm must understand the age-eligibility rules—as Appendix Figure A16 shows much higher WOTC application rates for hires whose ages are just within the eligibility threshold as compared to just outside—but the information used to file WOTC applications may not flow to hiring decision-makers.

[38] Another margin of adjustment is the recruitment process of applicants: firms could attempt to recruit more WOTC-eligible applicants into the applicant pool. While we do not observe the recruitment process directly, we can infer that if it was occurring in a meaningful way then it should translate into hiring outcomes; furthermore, if it does not translate into hiring, this implies the subsidies are not having the desired effect for policy.

SNAP recipients aged 25-39, since these hires now generate subsidies.

To construct the matched comparison group, we implement propensity score matching using firm-level characteristics measured in the pre-expansion period.[39] Within this matched sample, we estimate both a difference-in-differences specification and an event-study specification. The difference-in-differences specification is:

$$Y_{f,t} = \alpha_f + \delta_t + \beta \left(\text{Treated}_f \times \text{Post}_t\right) + \varepsilon_{f,t} \tag{4}$$

where $Y_{f,t}$ is a firm-level outcome for firm f in quarter t, α_f are firm fixed effects, and δ_t are quarter fixed effects. Treated_f is an indicator for firms that used WOTC prior to 2007q1, and Post_t equals one for quarters beginning in 2007q1. The coefficient β captures the differential change in outcomes at treated firms relative to matched control firms following the expansion. The key identifying assumption is that no other contemporaneous shock differentially affected treated firms relative to matched controls. Appendix Table A12 finds that the untreated firms in the sample look quite similar to the treated ones on pre-period hiring patterns, industry exposure, and firm scale, as well as unmatched moments, which reduces the likelihood of differential shocks occurring. Standard errors are clustered at the firm level.

We begin by confirming that the 2007 SNAP expansion generated a differential increase in WOTC utilization among treated firms (i.e., that control firms do not immediately adopt WOTC, removing the difference between the treated and untreated group). The first two columns of Table 4 (and Panels (a) and (b) of Figure 5) confirm that treated firms indeed experience a large growth in the number of WOTC certified hires, with this number increasing by approximately 50% (from a baseline of 3.4% of their hires to 5.1% of hires; column (2)).

We next examine whether this increase in subsidy receipt translates into broader changes in hiring behavior. The individual-level analyses in Section 3 compare outcomes for workers near the age eligibility cutoffs. However, if firms expand recruitment of SNAP recipients across a broader age range or engage in probabilistic hiring, then our individual-level designs may miss this response because there would be increases in hiring across a wider age range, including potentially above the age cut-off. However, these responses would still generate increased hiring of SNAP recipients aged 25–39 among WOTC-participating firms relative to non-participants. Column (3) of Table 4 and Panel (c) of Figure 5 test for this directly, using the outcome of SNAP hires aged 25–39. The estimated coefficient is small and statistically indistinguishable from zero, and pre-trends are flat, indicating parallel hiring trajectories at treated and untreated firms. These findings rule out probabilistic screening and broader recruitment as explanations for the null individual-level results.

A second alternative margin of adjustment is that subsidies act as a cash injection to the firm that increases the total number of workers rather than only potentially WOTC-eligible workers.

[39]The propensity score predicts whether a firm used WOTC prior to 2007 as a function of: (i) the share of hires who were SNAP recipients aged 25–39; (ii) the fraction of hires within the firm's four-digit NAICS industry that were WOTC-certified; (iii) the firm's average log wage bill; and (iv) the number of hires in each quarter of the pre-period. As in Chetty et al. (2026), we take the five nearest neighbors in propensity score, but our estimates are insensitive to features of the matching procedure such as the caliper or number of matches used (e.g., 1 or 10).

Column (4) of Table 4 tests for increases in the hiring of non-SNAP workers in the same 25–39 age range, while columns (5) and (6) look at all hires in levels and logs, respectively (Panels d, e, and f of Figure 5). We find no evidence of increases along any of these margins. Firms may also face pay equity or other internal wage setting constraints that prevent them from raising the wages of individual workers, and so they may respond by raising the wages of all entry-level hires (Saez et al., 2019; Giupponi and Machin, 2024). This should translate into higher total payroll, but column (7) of Table 4 (and Panel g of Figure 5) does not find evidence of this. A plausible explanation is that WOTC subsidies constitute only a small fraction of overall payroll, given the low wages earned by eligible workers, and are therefore too small to generate meaningful firm-wide adjustments.

Taken together, these firm-level results show that although the expansion increased subsidy receipt at treated firms, it did not shift hiring toward newly eligible workers or generate broader increases in hiring or payroll. This suggests that firm behavior like probabilistic screening, imperfect knowledge of eligibility thresholds, or aggregate labor demand adjustments do not explain the null results of Section 3.[40]

4.2 Separation margin

Capped wage subsidy programs such as WOTC may affect not only hiring decisions but also firms' incentives around worker separation. Subsidy caps could influence separation behavior in two distinct ways. At one extreme, firms may "churn" workers—dismissing employees once they reach the subsidy cap in order to replace them with newly subsidized hires. Such behavior could help explain the short duration of WOTC-subsidized job spells, of which only 24% last more than three quarters.

A second possibility is that the subsidy affects the hazard *rate* of separation. In a simple framework, firms retain workers when the marginal cost of employment is less than the current benefit plus the expected continuation value of the match. When the subsidy is in place, firms may tolerate negative shocks (e.g., tardiness or poor performance that updates beliefs about the continuation value of the match) that would otherwise trigger termination because the effective cost of employment is lower. When the subsidy expires, this employment cost rises discretely, and shocks that were previously tolerable now lead to separation. In this case, the hazard rate of separation would rise after subsidy exhaustion even without deliberate churning. Studying the separation margin has broad relevance, as employer-side wage subsidy programs typically include either a cap on total subsidy per worker or a defined expiration period after which a worker's wages are no longer subsidized.[41]

[40] As a robustness check, Appendix D.1 analyzes a similar set of firm-level outcomes, but exploits a different source of variation: the staggered timing of firms' initial engagement with the WOTC program ("adoption"). Intuitively, when firms begin to claim WOTC subsidies for eligible hires, the effective cost of employing such workers declines. Using a triple-differences design, we test whether adopter firms increase hiring of SNAP recipients below age 40 (WOTC eligible) relative to those above age 40 (WOTC ineligible), as compared to not-yet-adopter firms before and after adoption. Results are highly consistent, with no evidence of increases in hiring of the subsidized relative to unsubsidized workers.

[41] For example, Germany's *Eingliederungszuschuss* and the United Kingdom's *Kickstart Scheme* provide wage subsidies for a fixed period (typically 6–12 months), while Italy's *Incentivi all'assunzione* imposes a cap on the maximum

WOTC caps eligible first-year wages at $6,000 per worker, yielding a maximum subsidy of $2,400 at the 40% subsidy rate. If firms engage in churning, the distribution of total earnings in WOTC-subsidized job spells should exhibit bunching just above $6,000, the point at which the firm no longer receives the subsidy. Panel (a) of Figure 4 plots the distribution of total earnings prior to separation for WOTC-subsidized job spells. There is no visual evidence of bunching around $6,000, and a formal test using the local polynomial density estimator of Cattaneo et al. (2020) fails to reject continuity in the earnings density at the threshold ($p = 0.86$). These results provide evidence against the presence of churning.

Next, we test for changes in the hazard rate of separation at the subsidy exhaustion threshold. We restrict the sample to job spells at WOTC-using firms and compare the hazard rate of separation for hires with an associated WOTC application to non-WOTC hires at the same firms. This within-firm comparison differences out any firm-specific separation patterns over time. Panel (b) of Figure 4 plots the estimated hazard functions for WOTC and non-WOTC workers. Although the overall separation rate is slightly higher for WOTC workers, the hazard evolves similarly across the two groups, and there is no visible differential shift at $6,000 in earnings. Appendix Table A13 reports estimates from the corresponding parametric hazard model, where the coefficient on "Post X WOTC" tests for a differential change in the separation rate at the $6,000 threshold for WOTC workers relative to non-WOTC workers.[42] The estimated coefficient is economically small and statistically insignificant, corroborating the visual evidence that firms do not adjust separation behavior when the subsidy is exhausted.

While we do not detect these behaviors on aggregate, it could be that this behavior is concentrated among certain types of firms that are more sensitive to WOTC. We focus on the same categorizations of firms as in Section 3.4: (1) the top 50 WOTC-using firms; (2) firms that are attentive to WOTC among hires (i.e., they receive WOTC subsidies for a high fraction of WOTC-eligible hires); (3) firms that screen for WOTC on their job applications; (4) employment services firms (NAICS 5613); and (5) firms in highly competitive industries. Panels (a) through (e) of Appendix Figure A17 plot the distribution of worker earnings for each of these types of firms and tests for bunching around subsidy expiration, while Panels (a) through (e) of Appendix Figure A18 plot the hazard rates of separation. Consistent with the aggregate results, these figures show no evidence of bunching or differential changes in separation hazards at subsidy exhaustion. Appendix Table A14 provides complementary statistical tests by re-estimating the parametric hazard model from Appendix Table A13 within each subset of firms; the estimates similarly show no detectable response at the threshold.

Based on these analyses, we conclude that firms do not change separation behavior in response to the capped subsidy, even among firms that are likely to be most responsive to WOTC policy. The next section explores mechanisms behind this lack of response at both the hiring and separation

monetary value of the subsidy.

[42] This specification corresponds to a difference-in-discontinuities design in the hazard context. The key coefficient tests whether the hazard rate for WOTC workers shifts discontinuously at $6,000 relative to non-WOTC workers, allowing for differential levels and slopes on either side of the threshold. We test multiple bandwidths around $6,000, but find that our estimates are insensitive to bandwidth choice.

margins.

5 Why don't firms respond to wage subsidies?

These findings pose a puzzle: why would profit-maximizing firms fail to adjust their hiring and retention decisions in response to wage subsidy programs like WOTC? The puzzle is sharpened by the lack of response even when we focus on firms that actively apply for WOTC subsidies, ruling out general lack of awareness of the program as an explanation. Understanding the mechanisms behind this disconnect is essential for evaluating when targeted wage subsidies can succeed in improving labor market outcomes.

We first consider whether the lack of hiring effects can be reconciled within a standard competitive model of labor supply and demand. In such a model, a wage subsidy shifts out the labor demand curve for eligible workers by lowering their effective cost to firms (Panel (b) of Appendix Figure A1). The absence of any observed change in either employment or wages could only be rationalized if labor demand for these workers is perfectly inelastic: firm labor demand is fixed, and the full value of the subsidy accrues to firms as the more inelastic side of the market.[43] Perfectly inelastic demand would imply that firms view eligible and ineligible workers as non-substitutable, which is not very plausible since many of our empirical designs compare highly similar groups, such as SNAP recipients just above and below an age cutoff. Nonetheless, Appendix D.2 conducts an empirical test of substitutability using hiring responses to worker exits (Jäger and Heining, 2022). We find that firms treat eligible and ineligible workers as highly substitutable, implying that perfectly inelastic demand is unlikely to explain our findings.[44]

5.1 External constraints on observability of eligibility information

A central challenge for employer-side wage subsidies is that policymakers typically aim to encourage employment of economically disadvantaged workers, yet the characteristics used to identify disadvantage are frequently sensitive, legally protected, or costly for firms to verify at the point of hiring. Firms may thus be reluctant to incorporate these attributes into hiring or personnel decisions, such that the subsidy does not affect decisionmaking. To understand how firms integrate WOTC eligibility information into their hiring processes and whether this could explain our null results, we collect original data on job applications for a sample of WOTC-using firms. We supplement this with a survey of individuals with experience at WOTC-using firms to understand the reasons behind firms' screening and hiring practices around WOTC.

We began by drawing a random sample of 179 WOTC-using firms, with sampling probability

[43] If instead labor supply was perfectly inelastic and labor demand was downward sloping, then the subsidy would fully pass through to the worker as an increase in wages. If labor supply was perfectly elastic, the subsidy would expand employment. In intermediate cases, the wage subsidy should lead to an increase in both wages and employment. Even under monopsony, standard models would predict an increase in employment even if the wage responses are muted.

[44] In Section 2.3, we show that even under conservative estimates of the elasticity of labor demand, standard formulas (Hamermesh, 1993) predict employment gains of a magnitude that we are easily powered to reject.

proportionate to the number of WOTC applications filed. We sampled firms using FOIAed data on all WOTC applications and certifications in Wisconsin between 2018 and 2020, which, unlike the anonymized administrative data used in our main analysis, includes firm names and thus allows us to identify specific employers and locate their job postings. We then searched for entry-level job postings by these firms, locating one for 77% of firms; the firms with postings jointly account for 52.6% of all WOTC certifications in this period. We recorded the types of information collected on their job applications, including whether the firm collects information related to WOTC eligibility and, if so, the framing of these questions (see Appendix C.1 for additional details on the data collection process).

Table 5 reports summary statistics from these applications. Since WOTC eligibility is generally not directly observable to firms from external sources, they must rely on self-reported information about eligibility from applicants.[45] Yet strikingly, even among this representative sample of firms that apply for WOTC subsidies, only 22% have questions about eligibility on their applications. Among the remaining firms who do not screen on WOTC in their application, eligibility may only be assessed after the hiring decision, such as during onboarding. This is consistent with a public letter regarding WOTC recently sent to the IRS by Automatic Data Processing (ADP), one of the largest payroll processors in the United States, which notes that "many WOTC service providers, tax professionals and employers conduct the Form 8850 pre-screening on a date after an oral, conditional or 'non-firm' job offer is made [such as when the formal contract is signed] ... As a result, screening happens in many cases during on-boarding (i.e. after acceptance of the offer by the applicant) and in some instances even on the date the employee begins work" (Automatic Data Processing, Inc., 2021).[46]

Moreover, in 60% of applications with questions about WOTC eligibility, the applicant provides the information to a third-party tax consultant or payroll processor rather than the firm itself. In this case, information is not necessarily shared with the firm, but instead, if the worker is hired, the outside party uses it to file for WOTC tax credits on behalf of the firm. In these cases, it is common for the job application to explicitly state that their eligibility for WOTC will not be shared with the employer or affect hiring decisions; such language is present in 30% of applications that collect WOTC information.[47] To the extent that this information is *never* shared with the firm, this lack of information could also explain the null retention effects. Overall, this evidence implies that firms and consequently hiring decision-makers may be aware of an applicant's WOTC eligibility in less than a tenth of cases when firms file for the subsidy.

These exercises clarify one key mechanism underlying the lack of hiring response to WOTC:

[45] Felony status can be determined through a criminal background check, but this category makes up a relatively small share of all WOTC certifications (less than 4%). However, for the most common eligibility category – receipt of SNAP benefits – there is no straightforward way for firms to independently determine the status of an applicant.

[46] As discussed in Section 2, firms and workers must attest that screening for a job applicant's eligibility for WOTC occurred "on or before the day that a job was offered." However, Automatic Data Processing, Inc. (2021) notes that the meaning of "date of offer" is not clearly defined on the IRS form, allowing firms to interpret this date as being after a worker has accepted an informal offer and passed all background checks.

[47] Two examples of how firms collect this information on their job applications can be found in Appendix Figure A19. Appendix Table A15 reports the exact language around how firms say WOTC information will be used from all applications we observed that include WOTC screening questions.

firms do not screen on WOTC, and so they typically lack the necessary information to respond to WOTC.[48] But this raises a further puzzle of *why* firms do not collect this information and encourage hiring decision-makers to incorporate it in their decisions. To understand this, we surveyed individuals involved in making hiring decisions at firms that receive WOTC subsidies. Respondents were sampled through the Prolific platform and asked questions about hiring practices at their company, especially as related to WOTC screening and application procedures.[49]

We focus on the 65 respondents who worked at firms that receive WOTC subsidies but do not ask about WOTC eligibility prior to making a hiring decision. Respondents were asked why their firm does not collect this information and then asked to rank these reasons in order of importance. The most common reasons were "Fear of discrimination lawsuits" (60% of respondents), "Hard to explain to applicants why we are asking these questions" (42%), and "Don't want to scare people off of applying for the position"(35%).[50]

The most important reason, "Fear of discrimination lawsuits", refers to the concern that the company could be sued by unsuccessful job applicants alleging discriminatory hiring practices if they favor WOTC-eligible applicants. For example, since the eligibility criteria for WOTC favors younger applicants (under age 40), making decisions based on WOTC status could be seen as age discrimination since older individuals are a protected class. Consistent with this being an important factor, firms have repeatedly sought clarification from the Equal Employment Opportunity Commission (EEOC) on the legality of screening for WOTC status. In response, EEOC issued at least 12 informal discussion letters between 2000 and 2019 suggesting that such screening would be permissible, but these documents "explicitly cannot be relied upon [in court]" and therefore did not fully resolve the uncertainty (U.S. Equal Employment Opportunity Commission, 2020b). A risk of legal liability can reduce the benefit to the firm from screening.[51,52]

The other two most common concerns refer to the possibility that explicit WOTC screening could deter potential applicants from applying to the firm. Applicants unfamiliar with the WOTC program may believe that screening on receipt of SNAP or TANF signals that the firm prefers not

[48] Despite the lack of explicit screening on WOTC eligibility, hiring might still respond to observable characteristics correlated with eligibility. Appendix D.5 repurposes the audit study data from Kline et al. (2024) to test whether WOTC-using firms indeed respond to such characteristics, but finds they do not. Thus, WOTC-utilizing firms do not appear to screen on WOTC eligibility either explicitly or implicitly.

[49] Prolific has been found to perform better than other platforms for soliciting survey respondents (Peer et al., 2017), and has been used in other economics papers to interview hiring decision-makers to learn about their processes (Agan et al., 2024). See Appendix C.2 for details.

[50] After these, the next most common reasons were "Don't want to make job applications too long" (16%) and "Too time-consuming for the company to keep track of" (11%).

[51] The language of the job applications also reflects this concern. A firm aiming to attract WOTC-eligible candidates might want to signal this explicitly to candidates. Yet only two firms had any language in their application suggesting that WOTC eligibility could improve likelihood of being hired (Appendix Table A15, companies 13 and 21); even in this case, the statements are relatively weak, perhaps to survive legal scrutiny ("The information you supply ... may assist members of targeted groups in securing employment").

[52] After two decades of ambiguity, the EEOC finally issued a Formal Opinion Letter in April 2020 (U.S. Equal Employment Opportunity Commission, 2020a) that "create[s] a binding defense in court" protecting firms from employment discrimination lawsuits if they favor WOTC eligible workers (U.S. Equal Employment Opportunity Commission, 2020b). However, our job application and survey data show that hiring decision-makers at firms continue to harbor this concern, echoing broader evidence that employers often misperceive labor laws (Bertrand and Crépon, 2021).

to hire such workers and so elect not to apply. The low wage labor markets in which WOTC is common typically have a high rate of turnover, and so firms depend on a steady flow of applicants. Employers may therefore prefer to postpone screening until after hiring decisions are made, especially since workers may also feel less incentive to misreport eligibility at that point, and so firms may actually be more likely to correctly apply for WOTC for an eligible hire. The language of job applications at WOTC-using firms is consistent with the concern that many applicants worry about the consequences of reporting eligibility: of job applications in our sample that included language referring to WOTC, over three-quarters told job applicants that their answers about WOTC eligibility either would have no effect on hiring (30%, Table 5) or that providing this information would not negatively affect employment opportunities (46.7%); see Appendix Table A15 for the exact language.

Broadly, these findings highlight a general limitation of demand-side targeting. Policymakers typically aim to direct subsidies toward economically disadvantaged workers, yet the characteristics that define disadvantage may be challenging to use in personnel decisions. When firms deliberately do not collect eligibility information, subsidies are unlikely to influence behavior. Designing programs around criteria that employers can readily and lawfully observe may therefore be critical for ensuring that demand-side incentives operate well in practice rather than only in theory.

5.2 Additional mechanisms

The job application and survey evidence provide a coherent explanation for how external constraints on observability of eligibility can prevent wage subsidies from affecting firm behavior. Yet even if firms observe eligibility, other mechanisms may still hinder the translation of demand-side subsidies into employment. If this is the case, then even if the external eligibility information constraint were removed, targeted wage subsidies could still fail to achieve their desired outcomes.

To isolate how subsidies operate when external eligibility information constraints do not bind, we match our job application data to firms in the employment database. We then examine the subset of firms whose job applications *do* explicitly screen on WOTC, focusing on firms that collect eligibility information internally, rather than relying on third-party processors, and therefore are most likely to make hiring decisions based on it. Column (3) of Appendix Table A8 and Appendix Table A9 finds that even among this subset, WOTC eligibility has no effect on the likelihood of being employed at these firms, with estimates tightly centered around zero. The absence of effects among firms that explicitly screen suggests that reducing external information frictions alone may be insufficient to generate behavioral responses to the subsidy. We next investigate and provide suggestive evidence on additional mechanisms that may prevent wage subsidies from translating into employment effects. Understanding these mechanisms is relevant for wage subsidy policy across a broad range of contexts, as well as for what would happen if policy interventions relaxed external (e.g., legal) information constraints.

Up-front costs of integrating WOTC into hiring systems The first possibility is that responding to WOTC requires firms to incur substantial up-front implementation costs, such as modifying application or payroll systems, building workflows to collect and process eligibility information, and engaging in outreach to job seekers who are likely to be eligible (e.g., job fairs for SNAP recipients). These are firm-level set-up costs of incorporating WOTC into recruitment practices, distinct from the above mechanism of whether eligibility is difficult to observe for a given applicant (or the mechanism below of whether hiring managers internalize the subsidy's value to the firm). If such implementation costs are important, only firms with sufficiently large expected subsidy revenue would find it worthwhile to make these investments and respond to the subsidy.

To evaluate this explanation, we investigate the hiring practices among firms who screen on WOTC during hiring *and* also receive substantial revenue from WOTC. We use the earlier definition of the largest 50 WOTC using firms, where these firms receive an average of over $165,000 per year in WOTC subsidies. Appendix Table A16 looks at employment and hiring at screening firms within the largest 50 WOTC using firms, with Panel A using the difference-in-differences analysis around the 2007 SNAP expansion (Section 3.1) and Panel B using the age-based regression discontinuity design (Section 3.2). Columns (1) and (2) show no evidence that WOTC eligibility increases hiring even at these firms, which likely have the most to gain from integrating WOTC into hiring systems. These results suggest that implementation costs are not a primary explanation for the lack of hiring responses to WOTC.

Attentiveness A second explanation is that firms differ in attentiveness to the WOTC program, and attentive firms may respond to the subsidy. Following the same logic as the previous test, we examine hiring of WOTC eligible workers among firms that screen on WOTC during hiring *and* are the most attentive to the program. As in Section 3.4, we measure the share of potentially eligible hires for whom a firm is certified to receive WOTC tax credits. We then classify firms in the top quartile of certification fraction (among WOTC-using firms) as high attentiveness firms. High attentiveness firms that screen on their applications are meaningfully more attentive than other WOTC-using firms, receiving certifications for an average of 48.7% of potentially eligible hires (compared to 24.6% among non-highly attentive firms). Columns (3) and (4) of Appendix Table A16 find no evidence of increases in employment at firms with high WOTC attentiveness among potentially eligible hires.

Stigma A third possibility is that firms interpret subsidy eligibility itself as a negative signal of productivity (stigma). While this mechanism is difficult to isolate, we present two pieces of suggestive evidence that stigma is not the primary mechanism driving our findings. First, Appendix D.3 examines how firms' hiring of SNAP recipients above age 40 changes following WOTC adoption (defined as a firm's initial engagement with the WOTC program; see Appendix D.1 for more details). After adopting WOTC, firms are more likely to observe whether a job applicant receives SNAP, including for those above age 40. However, if a SNAP recipient is above the age of 40, they do not generate subsidies for the firm, so SNAP receipt is purely an informational signal. Consistent with

SNAP receipt not constituting a major negative signal, we do not find that firms reduce hiring of these workers after adopting WOTC (relative to matched control firms).

Second, we test the possibility that the negative signal associated with WOTC eligibility exactly offsets the value of the subsidy. If this were the case, firms would have no incentive to alter hiring in response to WOTC, consistent with our findings. Appendix D.4 exploits the introduction of electronic filing for WOTC applications, which lowered application costs by making it easier for firms to apply for WOTC, thereby raising the net benefit of WOTC. If the absence of hiring effects prior to electronic filing reflected an exact offset between subsidy value and negative signal, then reducing application costs should have tilted the balance and increased hiring of eligible workers. In practice, while we find a substantial increase in WOTC applications and certifications after the introduction of electronic filing, we find no effect on labor market outcomes of eligible workers.

Together, these patterns suggest that stigma is unlikely to be a major factor explaining our results, though we cannot rule out effects too small for us to detect. This is perhaps unsurprising given the current size of the SNAP program, where SNAP recipients make up such a sizable fraction of the low-wage labor market that it would be difficult for firms to avoid such workers. Stigma may nonetheless play a more meaningful role for other WOTC eligibility groups, such as TANF recipients (Burtless, 1985) or individuals with a felony conviction, which may convey a more negative association.

Internal organizational frictions A final possibility is that internal organizational frictions prevent wage subsidies from affecting hiring or retention decisions. In many firms, hiring and termination decisions are delegated to frontline managers or recruiters who do not directly capture the financial gains from tax credits accruing to the firm. As a result, these decision-makers may not internalize the subsidy when making employment decisions. In addition, even when eligibility information is collected by a firm, *internal* information frictions may prevent information about certification status or subsidy schedules from reaching those making personnel decisions. Organizational frictions of this type are well established in the theory of the firm (e.g., Holmstrom, 1979; Baker et al., 1994). However, the literature evaluating employer-side wage subsidies typically abstracts from internal organizational constraints and instead models firms as unitary profit maximizers responding to changes in effective labor costs. Ignoring these constraints may lead standard models to overstate the extent to which employer-side subsidies affect labor demand.

To examine whether internal organizational frictions may be present, we first revisit our analysis of the separation margin from Section 4.2, but now focus on notches in the subsidy schedule around hours worked. Under WOTC, firms receive no subsidy for workers who are employed at the firm for less than 120 hours, a 25 percent subsidy on all hours worked if the worker is employed at the firm for between 120 and 400 hours, and a 40 percent subsidy on all hours worked if they are employed at the firm for over 400 hours (up to a cap of $2400 in subsidy per worker; see Appendix Figure A3). In a firm without agency or information frictions, there are large financial gains to deferring separation when workers approach 120 or 400 total hours: firms would earn more by retaining the worker until the subsidy notch is exceeded, even if the worker produced nothing during those

marginal hours. For example, at the median wage of $9 per hour, retaining a worker for 400 hours instead of 399 yields roughly $540 in additional subsidies. This suggests that there should be missing mass below these thresholds, particularly very close to the thresholds, accompanied by bunching in completed hours just above each threshold.[53]

Panel (c) of Figure 4 plots the distribution of hours worked at a firm in WOTC-subsidized jobs. We find no evidence of this pattern at either the 120-hour or 400-hour notch, and formal density tests fail to reject continuity at both thresholds. Appendix Figure A20 finds the same when we focus on firms that heavily utilize the subsidy program or explicitly screen for eligibility. Because the marginal subsidy gain at these thresholds is large relative to hourly wages, this absence of missing mass right below the 120-hour and 400-hour notches is difficult to reconcile with a standard model of firm optimization.[54]

The absence of bunching around notches and the lack of change in separation hazard around subsidy expiry suggest that those making termination decisions either do not take actions based upon the subsidy schedule (agency frictions) or lack the information to respond to it (internal information frictions). However, these tests do not distinguish between these two mechanisms. We conduct two surveys to provide insight on this, finding evidence of both being relevant. The first survey, described in more detail in Section 5.1, asked hiring decision-makers whether knowledge that an applicant was WOTC-eligible would affect their hiring decision. Eighty-two percent reported that it would have no effect, and 47 percent of those respondents stated that this is because "only the company benefits from the WOTC payment", consistent with agency frictions.[55]

We also conducted a second survey targeting individuals who supervise (rather than hire) low-wage workers at firms that utilize WOTC (see Appendix C.2 for details). Respondents were asked whether various factors influence termination decisions. As expected, the dominant determinants were worker productivity (97% state this reason is "very important") and general business conditions (87% state this reason is either "somewhat important" or "very important"). In contrast, 77% reported that WOTC plays either no role (66%) or only a small role (11%) in termination decisions. When asked why WOTC does not factor into these decisions, the most frequently cited reason (85%) was that "managers do not directly benefit from the tax credit (only the company does)", consistent with agency frictions. The next most commonly cited reason (71%) was that "managers often do not know which employees are bringing WOTC money to the company", consistent with internal information frictions.[56] Further consistent with partial internal information

[53]There may be some class of worker infractions where the firm would prefer immediate dismissal rather than continuing to pay a worker to pass the hours threshold, as this has implications for the behavior of their other workers (e.g., theft, violent behavior). However, as long as these are not the only reasons that workers are fired at these hours thresholds, we still expect a response.

[54]Section 4.2 showed a similar pattern at subsidy exhaustion, where the hazard rate of separation does not change when cumulative earnings cross the point at which the subsidy is fully exhausted. If managers incorporated the subsidy into retention decisions, we would expect an increase in the separation hazard once the marginal subsidy falls to zero. The lack of response is found even among firms that heavily utilize the subsidy program or explicitly screen for eligibility (Appendix Figure A18 and Appendix Table A14).

[55]The other two most common reasons for having no effect were concerns about anti-discrimination laws (59%) and that the WOTC payments were too small to affect the decision (26%).

[56]The other most common reason was "the credit is small relative to the cost of hiring and training a new worker"

frictions, survey responses suggest that supervisors frequently do not know whether a worker is generating WOTC tax credits for the company. Just 28% of respondents said supervisors often or always know, while 23% said supervisors sometimes know, 25% said they rarely know, and 25% said they never know.

Among the alternative mechanisms that our data allow us to investigate, our results are most supportive of organizational frictions. Such frictions can be difficult to overcome. Hiring and retention decisions are often delegated to individuals who evaluate workers primarily on operational criteria (e.g., productivity, reliability, team fit), and aligning those individuals' incentives with those of the firm is challenging. For example, tying managerial rewards to subsidy eligibility risks distortions: managers may overweight eligibility relative to expected productivity at the hiring stage, or prefer separation once the subsidy period ends (in order to hire a new eligible worker) even when continued employment would be optimal for the firm. Moreover, a substantial share of cases may be inframarginal. The relevant gain to the firm from altering managerial behavior is only the marginal increase in the tax credit, so bonuses large enough to shift decisions could approach the size of the incremental subsidy itself, leaving little net benefit to the firm. Even for a large program such as WOTC, the expected gains from restructuring internal incentives may be modest relative to costs and risks.

6 Conclusion

A recurring question in labor market policy is whether it is more effective to subsidize workers directly (e.g., through the Earned Income Tax Credit) or use targeted employer-side subsidies that incentivize hiring.[57] There are many attractive features of employer side subsidies: most notably, they operate directly at the hiring margin and encourage firms to consider applicants they might otherwise overlook. Using administrative data to study the largest US employer-side wage subsidy program, and focusing on its largest targeting criterion — receipt of public benefits through SNAP — we do not find that these subsidies meaningfully affect labor market and other related outcomes of targeted workers. This finding is highly consistent across multiple quasi-experimental strategies, where we can rule out even modest effects. Instead, the benefits appear to accrue to firms.

Our results highlight two sets of mechanisms underlying this failure that are broadly relevant but have largely been overlooked in the existing wage subsidy literature. First, an inherent challenge when targeting economically disadvantaged workers is that many of the characteristics used to identify this disadvantage may be sensitive, legally protected, or costly to verify. Firms may therefore be reluctant to screen on these attributes. Our analysis finds that most firms do not collect eligibility information in a way that could affect hiring, citing litigation risk as the main concern. More broadly, our findings demonstrate that the observability of targeting characteristics by employers is key to the design of demand-side wage subsidy programs.

(71%).

[57] This parallels but meaningfully differs from the discussion over whether to insure the risk of separation at the firm or worker-level during economic downturns (Giupponi et al., 2022) by focusing on the hiring margin.

Second, even when subsidy eligibility is observed, we find that firms in our sample still do not respond to wage subsidies. Using a combination of empirical tests and survey data, we find evidence that agency problems and internal information frictions prevent decision-makers from internalizing the subsidy. These organizational frictions are central in canonical theoretical models of the firm, but are largely absent from discussions of employer-side wage subsidies, which typically view firms as unitary profit maximizers. Our results suggest that this abstraction may lead standard models to overstate the extent to which demand-side subsidies translate into labor demand responses.

Turning to the specific case of WOTC, its future is currently a matter of Congressional debate, including a proposed bill that would substantially expand WOTC and more than triple its annual cost (Smucker, 2025; Ernst & Young, 2025). Our results speak directly to the policy choices facing Congress, including whether to reform the program or redirect its funding to alternative programs. Some possibilities for reform include enforcing the requirement that a job applicant's eligibility for WOTC is known to hiring decision-makers prior to extending job offers (Thomson Reuters, 2021) and establishing mechanisms for firms to more easily identify WOTC-eligible candidates (e.g., a streamlined pre-certification process). However, even with reforms, the money spent on WOTC may be more effectively deployed to other forms of support for disadvantaged workers.

Many important questions remain for future research. While SNAP recipients account for the majority of WOTC certifications, targeted wage subsidies may operate differently for target groups whose eligibility is more readily observable (e.g., veterans, individuals with felony convictions). It would also be fruitful to study the effectiveness of pre-certification, in which eligible job applicants present proof of subsidy eligibility to employers. Currently, fewer than 2% of WOTC certifications originate from pre-certifications, but this may help address the observability problem. Finally, our findings also raise questions about the optimal breadth of subsidy targeting. Narrow targeting concentrates resources on the most disadvantaged workers but creates the observability constraints we document, while broader subsidies avoid these frictions at the cost of dilution. Quantifying this tradeoff – and how it depends on labor market conditions and enforcement technology – would provide guidance on the optimal design of hiring subsidies. Answers to these questions would help determine whether the limitations of targeted employer-side wage subsidies that we document can be overcome, or instead reflect more fundamental constraints of the policy instrument.

Tables and Figures

Table 1: Summary statistics

	WOTC applicants	WOTC certified	SNAP sample, 18-39
Panel A: Demographic characteristics			
Age	29.1	28.2	28.7
Male	0.41	0.36	0.35
White	0.59	0.55	0.63
Black	0.37	0.43	0.32
Hispanic	0.10	0.10	0.11
Born in WI	0.62	0.64	0.64
SNAP beneficiary in quarter	0.63	0.77	0.88
Quarterly SNAP benefits, cond. ($)	945.5	1042.6	1012.1
TANF beneficiary in quarter	0.064	0.100	0.064
UI beneficiary in quarter	0.083	0.083	0.065
Felony conviction in quarter	0.012	0.012	0.014
Panel B: Job stints			
Num. quarters with firm	3.50	3.42	3.54
With firm over 3 quarters	0.25	0.24	0.25
Total earnings at job (median)	2771.0	2578.9	2476.6
Total earnings at job (mean)	13563.9	12530.4	14470.1
Starting wage	9.15	9.02	—
Industry: employment services	0.27	0.27	0.22
Industry: restaurants	0.14	0.14	0.13
Industry: retail	0.31	0.31	0.14
Median quarterly employees of firm	1352.8	1304	276.5
Median quarterly payroll of firm	4974766.5	4836772	1176011.9
Applied for WOTC	1	1	0.21
Certified for WOTC	0.55	1	0.17
Total hours: 0-120	0.33	0.35	
Total hours: 120-400	0.23	0.24	
Total hours: 400+	0.43	0.42	
Total hours at job, median	286.7	266.9	
WOTC subsidy ($)	608.5	1097.9	
Firm received max WOTC subsidy	0.18	0.33	
Pre-certified	0.012	0.015	
Unique individual-quarters	640818	354829	10985951
Unique individuals	415828	234557	867916

Note: Table reports summary statistics for individuals in quarters during which: a firm applied for WOTC on their behalf (column 1), a firm received a WOTC certification on their behalf (column 2), or they had received SNAP in 3 of the past 5 months and were age 18-39. Data is from 2005-2019. In Panel A, the likelihood of being a SNAP beneficiary in quarter t is not necessarily 100% in the third column because being in the SNAP sample is based on the past five months prior to the start of the quarter. The value of quarterly SNAP benefits is the benefit amount received by the household, conditional on the household receiving SNAP. All figures in Panel B are conditional on starting a new job stint while meeting the critieria in the column header. Starting wage, total hours worked, WOTC subsidy amount, and related variables are only available for workers with WOTC applications/certifications and are therefore not reported for the SNAP comparison sample in column (3).

Table 2: Effect of WOTC on individual outcomes, DD analysis from SNAP expansion

Panel A: Stacked sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0208***	0.0115***	0.0021	-0.0008	-16.7243	12.5802	0.0001
	(0.0015)	(0.0007)	(0.0039)	(0.0022)	(20.8254)	(8.0823)	(0.0007)
Dep var mean	0.0138	0.0060	0.5488	0.1573	2249.4195	908.3317	0.0153
Observations	527241	527241	527241	527241	527241	527241	527241
Panel B: Age 40 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0148***	0.0073***	0.0101	-0.0023	-15.7549	24.3936*	0.0000
	(0.0012)	(0.0006)	(0.0062)	(0.0032)	(33.6770)	(13.1284)	(0.0012)
Dep var mean	0.0070	0.0037	0.4673	0.1238	2108.6125	845.9018	0.0150
Observations	202636	202636	202636	202636	202636	202636	202636
Panel C: Age 25 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0246***	0.0142***	-0.0035	0.0006	-18.9895	11.8968	0.0001
	(0.0023)	(0.0011)	(0.0050)	(0.0030)	(26.4535)	(10.1544)	(0.0010)
Dep var mean	0.0180	0.0074	0.5991	0.1779	2336.1762	946.7972	0.0155
Observations	324605	324605	324605	324605	324605	324605	324605

Note: Table reports difference-in-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (Equation (2)). Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. Panel A uses both the age-40 and age-25 samples and includes age (in months) fixed effects and year-quarter by age-cutoff sample fixed effects. Panels B and C, which separate the age-40 sample and age-25 sample, respectively, include age (in months) and year-quarter fixed effects. All panels include a control for earnings in the quarter preceding the sample period. The dependent variable mean is the average value of the dependent variable for individuals in the treatment age range prior to 2007. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effect of WOTC on individual outcomes, RD analysis

Panel A: Full sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0100***	-0.0097***	-0.0002	-0.0007	-3.1037	0.8321	0.0000
	(0.0009)	(0.0004)	(0.0020)	(0.0010)	(12.0372)	(4.2601)	(0.0003)
Dep var mean	0.018	0.003	0.469	0.124	2032.539	1025.865	0.011
Bandwidth	1.354	1.585	3.082	2.858	4.272	3.539	4.627
Effective Obs	1052058	1255960	2947210	2782835	4174431	3438705	3999889
Panel B: Age 25 cutoff (1998-2006)							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0079***	-0.0060***	0.0012	-0.0008	4.4106	2.3184	-0.0006
	(0.0028)	(0.0019)	(0.0039)	(0.0024)	(21.3345)	(7.6854)	(0.0010)
Dep var mean	0.015	0.007	0.570	0.193	2164.937	1006.151	0.015
Bandwidth	1.275	1.193	2.198	2.609	2.469	2.682	2.308
Effective Obs	102337	95351	564441	670323	628505	690768	331729
Panel C: Age 40 cutoff (2007-2019)							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0108***	-0.0102***	-0.0001	-0.0007	-6.7245	-2.4194	-0.0000
	(0.0010)	(0.0004)	(0.0022)	(0.0010)	(14.8457)	(5.0939)	(0.0003)
Dep var mean	0.018	0.003	0.422	0.097	1986.687	1031.352	0.010
Bandwidth	1.568	1.904	4.205	3.119	4.051	3.629	5.910
Effective Obs	1065411	1310450	3051764	2237715	2926116	2612025	4333731

Note: Table reports regression discontinuity estimates of the effect of WOTC eligibility using the age-25 and age-40 cutoffs (Equation (3)). Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. The running variable is the distance between the individual's age (in months) at the start of quarter t and the age cutoff for WOTC eligibility (age-25 before 2007 and age-40 in 2007 and afterwards). Panel A exploits both the age-40 and age-25 cutoffs, and Panels B and C exploit separately the age-25 and age-40 cutoffs, respectively. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Effect of WOTC on firm-level outcomes

	WOTC certifications		Hires				Payroll
	Total	Fraction of hires	SNAP (25-39)	Non-SNAP (25-39)	Total	Total (log)	Payroll (log)
Treat x post	1.071***	0.017***	-0.064	-0.227	-0.715	0.005	-0.020
	(0.194)	(0.003)	(0.143)	(0.392)	(2.658)	(0.023)	(0.027)
Dep var mean	2.1362	0.0341	2.7851	8.2130	75.2400	3.3210	6.9735
Observations	40720	39229	40720	40720	40720	39229	39836

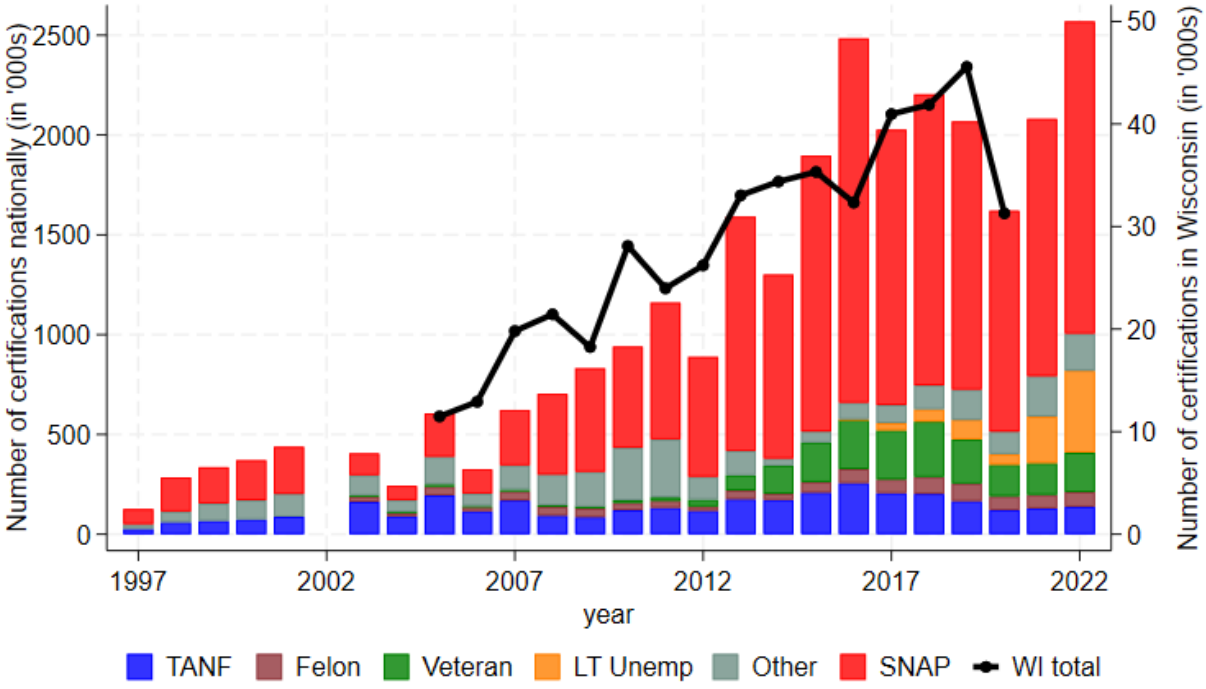
Note: Table reports matched difference-in-differences estimates of the effect of the 2007 SNAP expansion on firm-level outcomes for firms that used WOTC as compared to a matched set of firms that do not utilized WOTC. Column 1 defines the outcome as the number of WOTC certifications, while column 2 defines the outcome as the fraction of hires in the quarter for whom the firm receives a WOTC certification. Column 3 defines the outcome as the the number of hires who are SNAP beneficiaries between the ages of 25 and 39, while column 4 defines the outcome as the the number of hires who are not SNAP beneficiaries and are between the ages of 25 and 39. Column 5 examines the total number of quarterly hires and column 6 studies the log of this value. The outcome in column 7 is the log of total payroll. The data is the same across all columns, and measured at the firm-quarter level. All regressions include firm and quarter fixed effects. Standard errors, in parentheses are clustered at the firm level.

Table 5: Initial job applications for a sample of WOTC-using firms

Panel A: All Applications (N=138)	
Characteristic	(% of applications)
WOTC Screening Questions	21.7
Submit Resume	70.4
Education History	56.6
Past Employment History	69.5
References	11.1
Panel B: Applications with WOTC Screening Questions (N=30)	
Characteristic	(% of applications)
Third party firm handles WOTC data	60.0
WOTC questions state they have no effect on hiring	30.0
WOTC questions state they have no negative impact on hiring	46.7

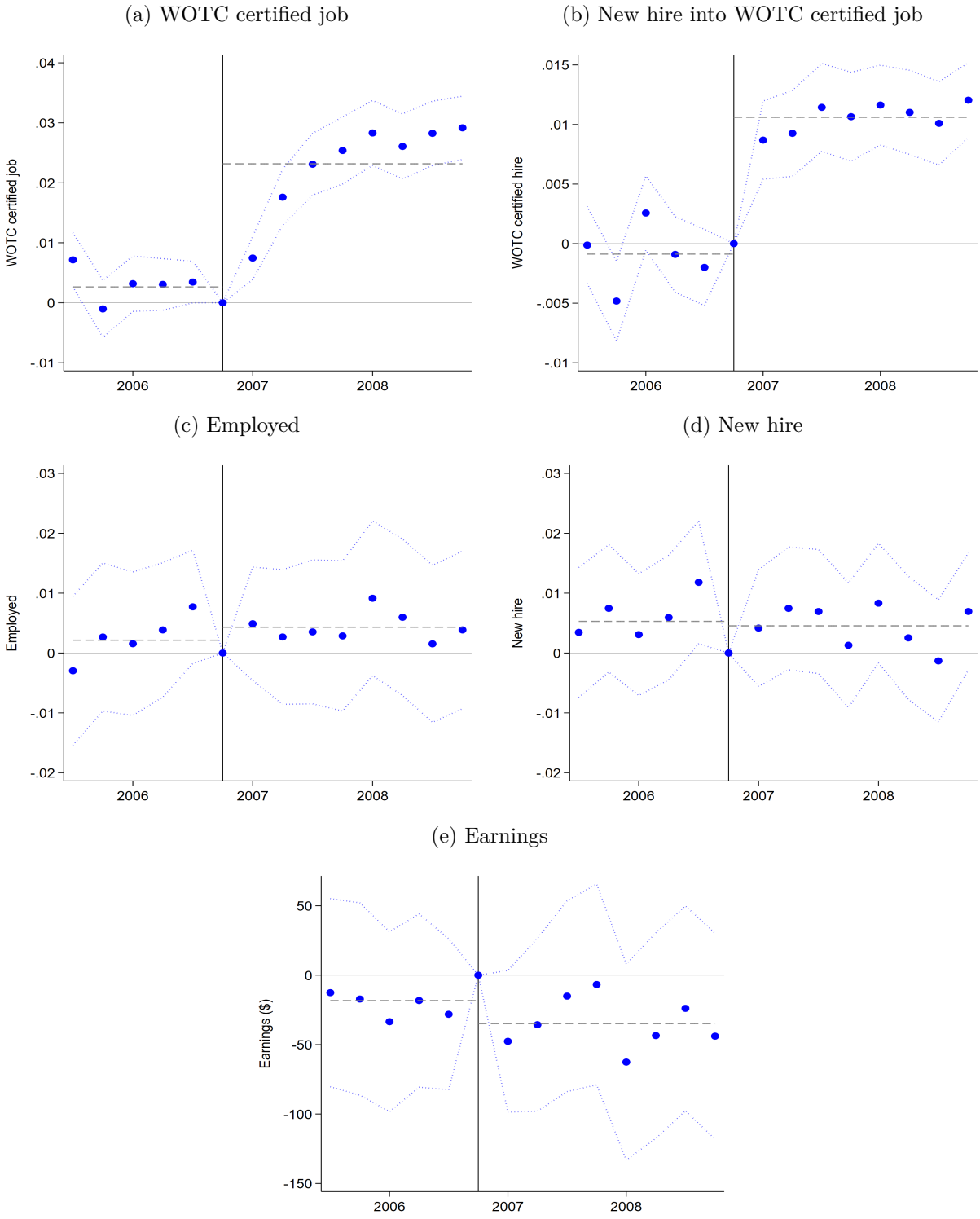
Note: Table reports means of job application characteristics collected from a representative sample of online job applications for WOTC-using firms. Because firms were randomly selected with probability proportionate to WOTC application volume, statistics represent WOTC-application-weighted averages, which is the relevant population for understanding how WOTC applications are processed. Panel A reports statistics for the 138 firms for which we located job applications, while Panel B reports statistics for the 30 firms with WOTC-specific screening questions.

Figure 1: National trends in WOTC certifications



Note: Figure presents the total annual WOTC certifications (by eligibility category) nationally from 1997-2022 using data from Department of Labor (DoL) annual reports for 2003-2022 and Hamersma (2003) for 1997-2001. We were not able to access data for 2002. The DoL reports provide number of certifications by year of *certification* rather than *hiring*. There were temporary WOTC lapses in 2004, 2012, and 2014 during which firms could still receive WOTC subsidies for hires made during those periods, but the certifications were not issued until after the lapsation. This inflates the numbers in 2005, 2013, and 2015 due to displacement from the previous years: e.g., the lapsation between January 1, 2004 and October 4, 2004 displaced certifications from 2004 into 2005. For 1998, 2000, and 2001, we only observe the national totals, so we use the category percentages from the most recent preceding year with data to estimate the breakdowns. For 1997-2001, we only observe TANF and SNAP categories separately, so all others are included in "Other". The black line plots the total annual certifications in Wisconsin using WOTC micro-data between 2005 and 2020 from Wisconsin. This is based on *hiring* date rather than *certification* date, so does not have the issues seen in the national data due to the lag between application and certification during periods of lapsation.

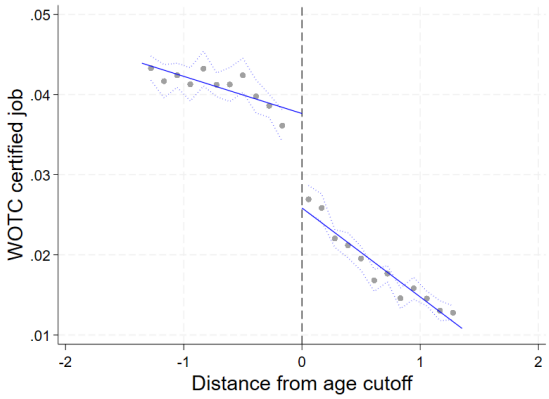
Figure 2: Effect of WOTC on individual outcomes, event study analysis of SNAP expansion



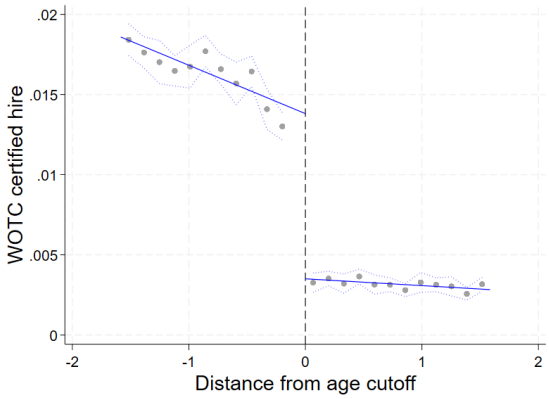
Note: Figures report stacked quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2007 expansion to SNAP recipients aged 25-39 in Equation (1) for employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, and earnings. Controls include age (in months) fixed effects and year-quarter by sample (age-40 versus age-25 sample) fixed effects, as well earnings in the quarter preceding the sample period. Standard errors are clustered at the individual level. Vertical gray solid line denotes the quarter prior to the 2007 expansion date, and the horizontal gray dashed lines report the average of the point estimates before and after that date.

Figure 3: Effect of WOTC on individual outcomes, RD analysis

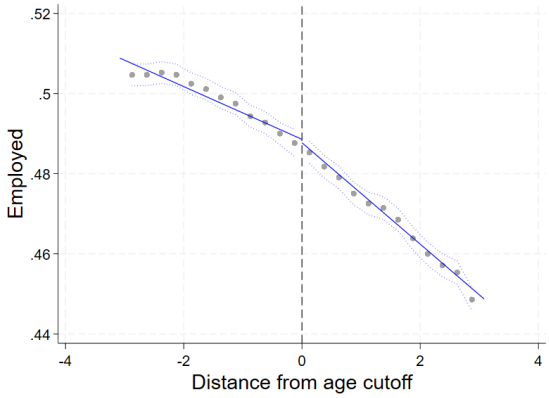
(a) WOTC certified job



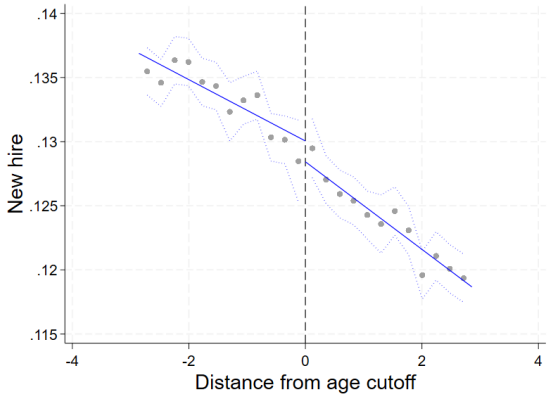
(b) New hire into WOTC certified job



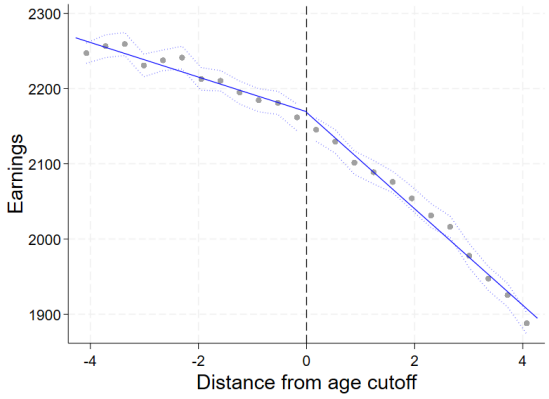
(c) Employed



(d) New hire



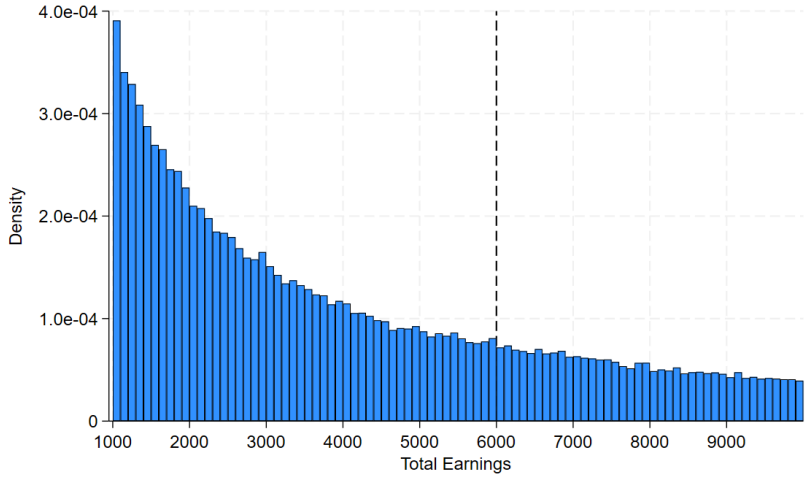
(e) Earnings



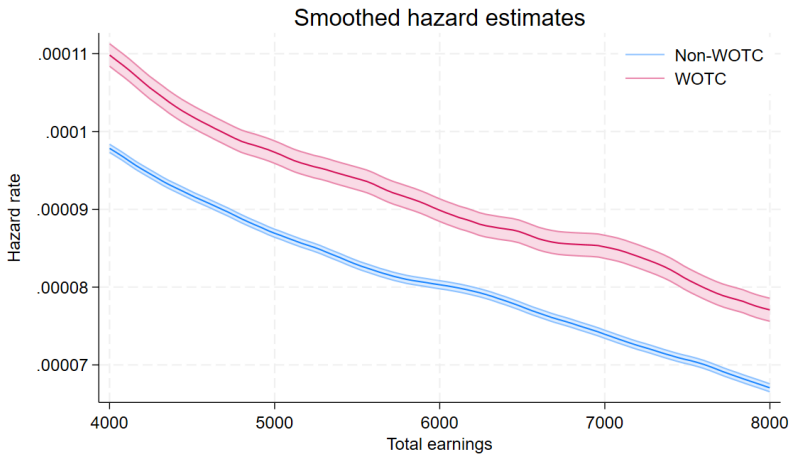
Note: Figures plot estimates of the relationship between individual-level outcomes and the difference between the individual's age and the relevant WOTC age eligibility threshold (gray dots), 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Outcomes include employment in a WOTC-certified job (Panel a), being newly hired into a WOTC-certified job (Panel b), employment (Panel c), being newly hired into a job (Panel d), and earnings (Panel e). Individuals whose age is to the left of the threshold are eligible for WOTC, while those to the right of the threshold are not. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors are clustered at the individual level.

Figure 4: Churning analyses

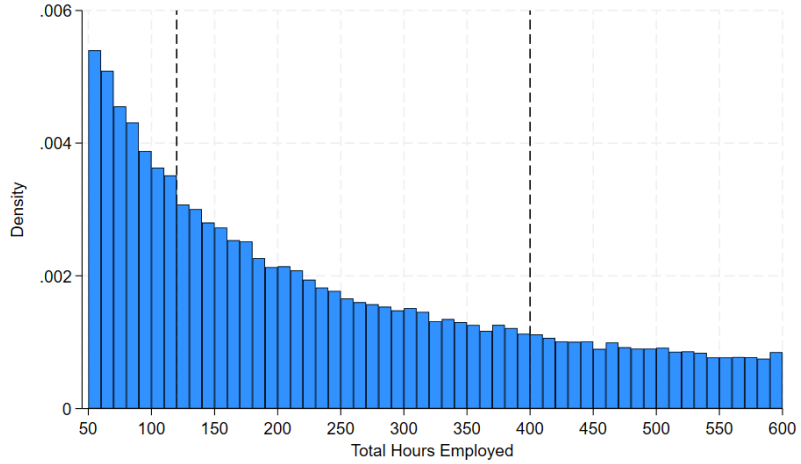
(a) Distribution of earnings for WOTC-certified workers



(b) Hazard rate of separation for WOTC and non-WOTC workers



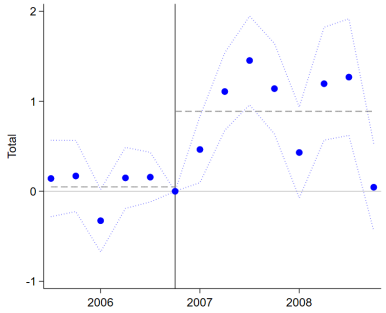
(c) Distribution of hours worked for WOTC-certified workers



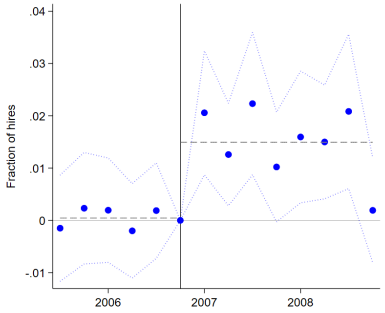
Note: Panel (a) plots the distribution of total earnings prior to separation for workers whose hiring was subsidized by WOTC and who were eligible for WOTC through SNAP receipt. Panel (b) plots estimates and 95% confidence intervals of the hazard rate of separation for job spells that have an associated WOTC application (pink) and those without one (blue), restricting to WOTC-utilizing firms. Panel (c) plots the distribution of hours worked in WOTC-subsidized jobs.

Figure 5: Effect of WOTC on firm-level outcomes

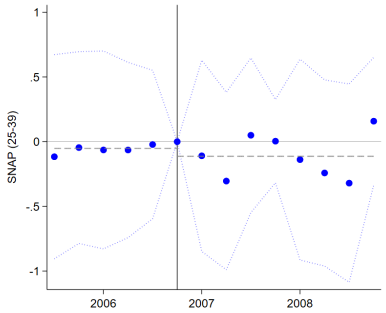
(a) WOTC certifications



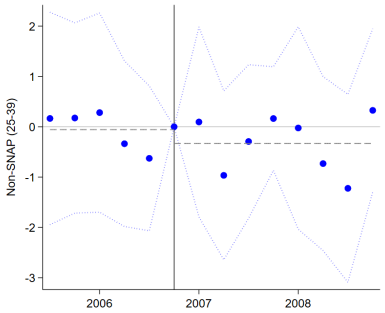
(b) WOTC certifications per hire



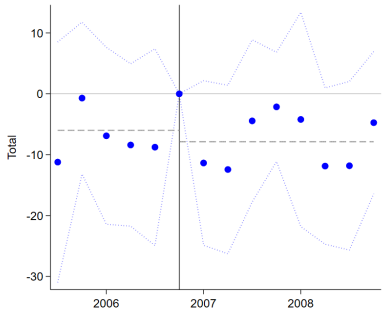
(c) Hires: SNAP, age 25-39



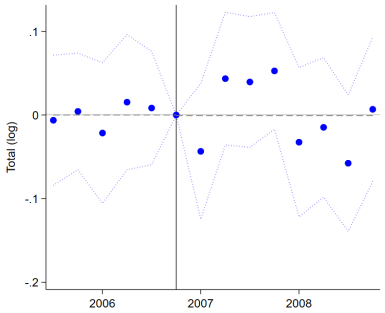
(d) Hires: Non-SNAP, age 25-39



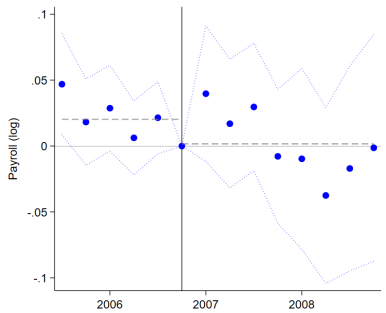
(e) Total hires



(f) Total hires (log)



(g) Payroll (log)



Note: Figure reports quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) of the matched difference-in-differences estimates of the effect of the 2007 SNAP expansion on firm-level outcomes for firms that used WOTC as compared to a matched set of firms that do not utilized WOTC. Panel (a) defines the outcome as the number of WOTC certifications, while Panel (b) defines the outcome as the fraction of hires in the quarter for whom the firm receives a WOTC certification. Panel (c) defines the outcome as the the number of hires who are SNAP beneficiaries between the ages of 25 and 39, while Panel (d) defines the outcome as the the number of hires who are not SNAP beneficiaries and are between the ages of 25 and 39. Panel (e) examines the total number of quarterly hires and Panel (f) studies the log of this value. The outcome in Panel (g) is the log of total payroll. The data is the same across all columns, and measured at the firm-quarter level. All regressions include firm and quarter fixed effects. Standard errors are clustered at the firm level.

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Appendices

A Appendix Tables and Figures

Appendix Table A1: Effect of WOTC on individual outcomes, DD analysis from SNAP expansion (no controls)

Panel A: Stacked sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0209***	0.0115***	0.0050	-0.0006	6.2783	11.9742	0.0000
	(0.0015)	(0.0007)	(0.0043)	(0.0022)	(25.5111)	(8.1083)	(0.0007)
Dep var mean	0.0138	0.0060	0.5488	0.1573	2249.4195	908.3317	0.0153
Observations	527241	527241	527241	527241	527241	527241	527241
Panel B: Age 40 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0147***	0.0073***	0.0018	-0.0032	-82.2326*	22.5206*	0.0001
	(0.0012)	(0.0006)	(0.0070)	(0.0032)	(42.0108)	(13.1278)	(0.0012)
Dep var mean	0.0070	0.0037	0.4673	0.1238	2108.6125	845.9018	0.0150
Observations	202636	202636	202636	202636	202636	202636	202636
Panel C: Age 25 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0247***	0.0142***	0.0071	0.0010	61.6382*	5.3779	-0.0001
	(0.0023)	(0.0011)	(0.0055)	(0.0030)	(32.0817)	(10.3116)	(0.0010)
Dep var mean	0.0180	0.0074	0.5991	0.1779	2336.1762	946.7972	0.0155
Observations	324605	324605	324605	324605	324605	324605	324605

Note: Table reports difference-in-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (Equation (2)), excluding the controls for earnings in the quarter preceding the sample period. Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. Panel A uses both the age-40 and age-25 samples and includes age (in months) fixed effects and year-quarter by sample fixed effects. Panels B and C, which separate the age-40 sample and age-25 sample, respectively, include age (in months) and year-quarter fixed effects. The dependent variable mean is the average value of the dependent variable for individuals in the treatment age range prior to 2007. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A2: Effect of WOTC on individual outcomes among unemployed sample, DD analysis from SNAP expansion

Panel A: Stacked sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0118***	0.0120***	-0.0017	-0.0026	-6.4469	18.9875*	-0.0006
	(0.0009)	(0.0009)	(0.0032)	(0.0030)	(9.4985)	(11.3931)	(0.0011)
Dep var mean	0.0068	0.0070	0.2046	0.1719	407.4676	1046.1615	0.0200
Observations	304498	304498	304498	304498	304498	304498	304498
Panel B: Age 40 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0065***	0.0066***	0.0014	-0.0045	-13.1116	37.3338**	-0.0003
	(0.0007)	(0.0007)	(0.0041)	(0.0037)	(13.5449)	(17.1088)	(0.0016)
Dep var mean	0.0039	0.0042	0.1473	0.1234	322.0835	922.1677	0.0191
Observations	133189	133189	133189	133189	133189	133189	133189
Panel C: Age 25 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treat X Post	0.0158***	0.0160***	-0.0049	-0.0019	-2.7923	7.8639	-0.0008
	(0.0015)	(0.0016)	(0.0047)	(0.0044)	(13.1735)	(15.2351)	(0.0015)
Dep var mean	0.0090	0.0091	0.2462	0.2071	469.2700	1135.9100	0.0207
Observations	171309	171309	171309	171309	171309	171309	171309

Note: Table reports difference-in-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (Equation (2)), restricted to individuals who enter quarter t unemployed, defined as not having any earnings in t from any of the same employer(s) as in $t-1$. Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. Panel A uses both the age-40 and age-25 samples and includes age (in months) fixed effects and year-quarter by sample fixed effects. Panels B and C, which separate the age-40 sample and age-25 sample, respectively, include age (in months) and year-quarter fixed effects. All panels include controls for earnings in the quarter preceding the sample period. The dependent variable mean is the average value of the dependent variable for individuals in the treatment age range prior to 2007. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A3: Effect of WOTC on individual outcomes, triple-differences analysis from SNAP expansion

Panel A: Stacked sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treatment X Post X SNAP	0.0203***	0.0111***	0.0008	-0.0014	-36.6606	9.5545	0.0001
	(0.0015)	(0.0007)	(0.0040)	(0.0023)	(23.4531)	(8.1312)	(0.0007)
Dep var mean	0.0038	0.0016	0.4209	0.0664	3509.6788	94.1580	0.0052
Observations	10659165	10659165	10659165	10659165	10659165	10659165	10659165
Panel B: Age 40 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treatment X Post X SNAP	0.0142***	0.0070***	0.0033	-0.0033	-19.2365	28.2710**	0.0000
	(0.0012)	(0.0006)	(0.0064)	(0.0032)	(38.9758)	(13.1319)	(0.0012)
Dep var mean	0.0007	0.0003	0.4305	0.0422	4782.5802	90.3545	0.0036
Observations	4724736	4724736	4724736	4724736	4724736	4724736	4724736
Panel C: Age 25 cutoff sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
Treatment X Post X SNAP	0.0241***	0.0137***	-0.0039	-0.0006	-45.1180	-2.6182	0.0001
	(0.0023)	(0.0011)	(0.0051)	(0.0031)	(29.0934)	(10.3803)	(0.0010)
Dep var mean	0.0063	0.0027	0.4132	0.0857	2497.7940	97.1816	0.0065
Observations	5934429	5934429	5934429	5934429	5934429	5934429	5934429

Note: Table reports triple-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (pre- vs. post-2007, treated age vs. untreated age, SNAP recipient vs. not a SNAP recipient). Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. Panel A uses both the age-40 and age-25 samples and includes age (in months) by SNAP recipient status by sample fixed effects and year-quarter by SNAP recipient status by sample fixed effects. Panels B and C, which separate the age-40 sample and age-25 sample, respectively, include age (in months) by SNAP recipient status fixed effects and year-quarter by SNAP recipient status fixed effects. The dependent variable mean is the average value of the dependent variable for SNAP recipients in the treatment age range prior to 2007. All panels include controls for earnings in the quarter preceding the sample period. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A4: SNAP usage as a function of WOTC eligibility

	Approach 1: 2007 SNAP Expansion		Approach 2: Regression Discontinuity	
	Age 25 cut-off	Age 40 cut-off	Pre-2007	Post-2007
Treatment X Post	0.00107	0.00112	–	–
	(0.00082)	(0.00077)		
RD_Estimate	–	–	-0.00015	0.00025
			(0.00033)	(0.00043)
Dep var mean	0.0707	0.0553	0.0509	0.0960
Bandwidth			2.9596	3.7248
Effective Obs	5738040	4391950	21496548	30303913

Note: Table tests whether the presence of WOTC changes the composition of SNAP recipients. In 2007, individuals aged 25-39 became eligible to have their wage subsidized through WOTC if they were SNAP recipients. Column (1) follows the difference-in-differences specification from Equation (2) to test whether individuals aged 25-26 became more likely to be SNAP recipients in 2007 relative to individuals aged 22.75-24.75 (always eligible). Column (2) repeats this for individuals aged 37.75-39.75 (newly eligible) relative to individuals aged 42-44 (never eligible). Columns (3) and (4) provide regression discontinuity estimates testing whether SNAP receipt varies discontinuously across the SNAP age threshold for WOTC eligibility, e.g., whether an individual is more likely to apply for and receive SNAP benefits if they are of an age where this could convey WOTC eligibility (age 25 prior to 2007, in column 3 and age 40 in 2007 and afterwards, in column 4). The running variable is the distance between the individual's age (in months) at the start of quarter t and the age cutoff for WOTC eligibility. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2014). Standard errors, in parentheses, are clustered at the individual level.

Appendix Table A5: Balance on pre-determined characteristics, RD analysis

	Demographics		Employed		Earnings	
	Female (=1)	Black (=1)	(t-1)	(t-2)	(t-1)	(t-2)
RD_Estimate	0.0012	-0.0004	-0.0006	0.0002	3.8123	7.8239
	(0.0021)	(0.0021)	(0.0020)	(0.0020)	(11.7246)	(11.3883)
Dep var mean	0.6540	0.3054	0.4833	0.4779	1972.7684	1857.3763
Bandwidth	2.5335	4.1067	3.2818	3.0561	4.3648	4.2236
Effective Obs	2453543	4000381	3045416	2794327	4057170	3878363

Note: Table reports stacked regression discontinuity estimates testing whether pre-determined covariates vary discontinuously across the SNAP age threshold for WOTC eligibility. The sample is the same as in Table 3 (individuals who received SNAP for three of the previous five months at the start of the quarter). Outcomes include whether the individual is female, whether the individual is Black, whether the individual was employed in quarter $t-1$, whether the individual was employed in quarter $t-2$, and earnings in $t-1$ and $t-2$. The running variable is the distance between the individual's age (in months) at the start of quarter t and the age cutoff for WOTC eligibility (age 25 before 2007 and age 40 in 2007 and afterwards). Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2014). Standard errors, in parentheses, are clustered at the individual level.

Appendix Table A6: Effect of WOTC on individual outcomes among unemployed sample, RD analysis

Panel A: Full sample							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0094***	-0.0108***	0.0008	0.0004	4.4435	-1.4682	-0.0001
	(0.0004)	(0.0005)	(0.0015)	(0.0013)	(4.9398)	(5.8701)	(0.0004)
Dep var mean	0.003	0.003	0.151	0.126	333.487	1135.288	0.014
Bandwidth	2.159	2.147	2.592	2.672	2.444	3.510	4.471
Effective Obs	1022585	1022585	1552567	1602980	1450598	2109348	2362483
Panel B: Age 25 cutoff (1997-2006)							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0089***	-0.0086***	-0.0009	-0.0002	-2.0195	3.3656	-0.0010
	(0.0019)	(0.0024)	(0.0033)	(0.0031)	(9.5933)	(10.7880)	(0.0016)
Dep var mean	0.006	0.008	0.254	0.222	508.083	1197.885	0.020
Bandwidth	1.787	1.548	2.909	3.138	2.947	3.101	2.281
Effective Obs	76567	65655	426329	461858	438208	461858	182393
Panel C: Age 40 cutoff (2007-2019)							
	WOTC certified job	WOTC certified hire	Employed	New hire	Earnings	Public benefit (amt)	Convicted
RD_Estimate	-0.0094***	-0.0108***	0.0012	0.0003	5.1002	-4.2548	-0.0001
	(0.0004)	(0.0004)	(0.0015)	(0.0013)	(4.9809)	(6.8718)	(0.0004)
Dep var mean	0.002	0.003	0.116	0.092	269.716	1111.432	0.013
Bandwidth	2.453	2.585	2.809	2.962	3.038	3.704	5.094
Effective Obs	1085064	1162364	1239692	1316675	1355817	1666465	2338938

Note: Table reports regression discontinuity estimates of the effect of WOTC eligibility using the age-25 and age-40 cutoffs (Equation (3)), restricted to individuals who enter quarter t unemployed, defined as not having any earnings in t from any of the same employer(s) as in $t-1$. Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. The running variable is the distance between the individual's age (in months) at the start of quarter t and the age cutoff for WOTC eligibility (age 25 before 2007 and age 40 in 2007 and afterwards). Panel A exploits both the age-40 and age-25 cutoffs, and Panels B and C exploit separately the age-25 and age-40 cutoffs, respectively. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A7: Placebo RD analysis of the effect of WOTC on individual outcomes

	(1) WOTC certified job	(2) WOTC certified hire	(3) Employed	(4) New hire	(5) Earnings	(6) Public benefit (amt)	(7) Convicted
RD_Estimate	-0.0016	-0.0006	-0.0020	0.0001	-10.4453	-1.6621	0.0002
	(0.0010)	(0.0004)	(0.0018)	(0.0010)	(10.2166)	(3.6804)	(0.0003)
Dep var mean	0.0665	0.0257	0.5435	0.1557	2191.3618	1028.8860	0.0149
Bandwidth	2.7186	3.3757	2.6191	2.5547	2.5506	2.5347	3.7565
Effective Obs	2764889	3412276	3040328	2946658	2946658	2946658	3981643

Note: Table reports regression discontinuity estimates of the effect of WOTC eligibility (Equation (3)), but using placebo age cutoffs: age 40 before 2007 and age 25 for 2007 and afterwards. We omit the first three quarters of 2007 because firms appear to still be adjusting to the change in age eligibility criteria over that period (Panel (a) of Figure 2). Outcomes include effects on employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. The running variable is the distance between the individual's age (in months) at the start of quarter t and the placebo age cutoff for WOTC eligibility. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A8: Effect of WOTC on hiring and employment outcomes by firm type, DD analysis from SNAP expansion

Panel A: Employed					
	Top 50 firm	Highly attentive firm	Explicitly screen	Staffing firm	High comp industry
Treat X Post	-0.0018	0.0015	-0.0017	-0.0000	0.0048
	(0.0023)	(0.0019)	(0.0014)	(0.0021)	(0.0037)
Dep var mean	0.0846	0.0558	0.0258	0.0775	0.2491
Observations	527241	527241	527241	527241	527241
Panel B: New hire					
	Top 50 firm	Highly attentive firm	Explicitly screen	Staffing firm	High comp industry
Treat X Post	0.0011	0.0000	-0.0001	0.0012	-0.0013
	(0.0009)	(0.0008)	(0.0004)	(0.0011)	(0.0015)
Dep var mean	0.0236	0.0180	0.0044	0.0336	0.0652
Observations	527241	527241	527241	527241	527241

Note: Table reports stacked difference-in-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (Equation (2)). The outcomes are being employed in the quarter at the type of firm denoted in the column header (Panel A) and being newly hired in the quarter at the type of firm denoted in the column header (Panel B). The types of firms include the 50 firms that are the heaviest users of WOTC (column 1), firms that have a WOTC application rate among eligible hires above the 75^{th} percentile (column 2), firms that explicitly ask WOTC questions in initial job applications (column 3), employment services firms (column 4), and firms in highly competitive industries (column 5). Controls include age (in months) fixed effects, year-quarter by sample fixed effects, and earnings in the quarter preceding the sample period. The dependent variable mean is the average value of the dependent variable for individuals in the treatment age range prior to 2007. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A9: Effect of WOTC on employment and hiring by firm type, RD analysis

Panel A: Employed					
	Top 50 firm	Highly attentive firm	Explicitly screen	Staffing firm	High comp industry
RD_Estimate	0.0000	0.0004	0.0002	0.0003	-0.0013
	(0.0009)	(0.0007)	(0.0005)	(0.0009)	(0.0016)
Dep var mean	0.064	0.035	0.016	0.070	0.217
Bandwidth	3.686	3.576	4.120	3.832	4.002
Effective Obs	3601745	3438705	4010680	3684042	3929298
Panel B: New hire					
	Top 50 firm	Highly attentive firm	Explicitly screen	Staffing firm	High comp industry
RD_Estimate	0.0002	0.0001	0.0001	0.0002	0.0001
	(0.0004)	(0.0003)	(0.0001)	(0.0005)	(0.0006)
Dep var mean	0.018	0.010	0.003	0.028	0.051
Bandwidth	2.296	2.609	3.301	3.168	3.646
Effective Obs	2204601	2535660	3193002	3110432	3520309

Note: Table reports stacked regression discontinuity estimates of the effect of WOTC eligibility using the age-25 and age-40 cutoffs (Equation (3)). The outcomes are employment in the quarter at the type of firm denoted in the column header (Panel A) and being newly hired in the quarter at the type of firm denoted in the column header (Panel B). The types of firms include the 50 firms that are the heaviest users of WOTC (column 1), firms that have a WOTC application rate among eligible hires above the 75^{th} percentile (column 2), firms that explicitly ask WOTC questions in initial job applications (column 3), employment services firms (column 4), and firms in highly competitive industries (column 5). Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2014). Standard errors, in parentheses, are clustered at the individual level.

Appendix Table A10: Effect of WOTC on labor market outcomes by individual characteristics, DD analysis from SNAP expansion

	Black		Female		Past conviction	
	Employed	New hire	Employed	New hire	Employed	New hire
Treat x post	0.0013	0.0003	0.0011	0.0005	0.0002	-0.0017
	(0.005)	(0.003)	(0.007)	(0.004)	(0.004)	(0.002)
Treat x post X inter.	0.0049	-0.0020	0.0010	-0.0020	0.0118	0.0056
	(0.008)	(0.005)	(0.009)	(0.005)	(0.010)	(0.007)
Dep var mean	0.5230	0.1544	0.5228	0.1544	0.5228	0.1544
Observations	526583	526583	527241	527241	527241	527241

Note: Table reports stacked difference-in-differences estimates of effects of WOTC eligibility using the 2007 expansion to SNAP recipients, interacted with individual characteristics (a modification of Equation (2)). Columns (1)-(2) examine heterogeneity by whether the individual is black, columns (3)-(4) examine heterogeneity by whether the individual is female, and columns (5)-(6) examine heterogeneity by whether the individual has a past criminal conviction. Within each grouping, the outcomes are employment in the quarter, being newly hired in the quarter, and quarterly earnings. Controls include fixed effects for the full set of interactions between age (in months), treatment status, and the relevant interaction variable as well as between age (in months), quarter-year, and the interaction variable. The dependent variable mean is the average value of the dependent variable for individuals in the treatment age range prior to 2007. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A11: Effect of WOTC on employment and hiring by individual characteristics

Panel A: Employed						
	Race		Gender		Past conviction	
	Black	Non-black	Female	Male	Yes	No
RD_Estimate	0.0001	-0.0011	0.0013	-0.0020	0.0012	0.0001
	(0.0035)	(0.0023)	(0.0025)	(0.0030)	(0.0042)	(0.0022)
Dep var mean	0.465	0.465	0.500	0.394	0.356	0.492
Bandwidth	3.653	3.728	3.035	5.359	4.284	2.843
Effective Obs	1,077,393	2,490,163	1,953,968	1,793,276	756,916	2,284,982
Panel B: New hire						
	Race		Gender		Past conviction	
	Black	Non-black	Female	Male	Yes	No
RD_Estimate	-0.0019	-0.0001	-0.0001	-0.0017	-0.0022	-0.0005
	(0.0019)	(0.0012)	(0.0013)	(0.0017)	(0.0020)	(0.0011)
Dep var mean	0.145	0.114	0.131	0.110	0.115	0.125
Bandwidth	3.068	2.726	2.777	2.858	4.113	2.826
Effective Obs	902,147	1,810,147	1,791,604	937,173	725,794	2,217,935

Note: Table reports regression discontinuity estimates for labor market outcomes by individual characteristics. Panel A examines whether the individual is employed, dividing the sample by the individual's race (columns 1 and 2), gender (columns 3 and 4), and having a past criminal conviction (columns 5 and 6). Panel B focuses on the same set of outcomes, but examines whether that the individual is newly hired. The running variable is distance between the individual's age and the age cutoff for WOTC eligibility (age 25 before 2007 and age 40 in 2007 and afterwards). Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors are clustered at the individual level. Standard errors are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table A12: Differences between Treated and Untreated Matched Firms

Variable	Treated mean	Untreated mean	Difference	p-value
Avg quarterly wage bill (ln)	6.992	6.987	.004	.961
			(.082)	
Avg quarterly hires (ln)	3.465	3.467	-.002	.979
			(.076)	
Share hires: SNAP recipients 25-39	.038	.038	0	1
			(.002)	
Avg quarterly workers	516.306	663.491	-147.185	.285
			(137.709)	
Average WOTC usage (NAICS 4 digit)	.037	.035	.002	.617
			(.004)	

Note: Table reports mean firm-level outcomes for the treated and untreated firms (columns 1 and 2, respectively), as well as average differences between the two and standard error (column 3) and the p-value of this difference (column 4) from the matched difference-in-differences analysis of the effect of the 2007 SNAP expansion. The first two variables are the log of average quarterly wage bill and number of hires. The third is the share of hires by the firm who are SNAP recipients aged 25-39. The fourth and fifth variables are not ones that we explicitly match on: the average number of unique workers employed by the firm in the quarter, and the fraction of firms in the industry (NAICS 4 digit) that are WOTC users. All variables are averages of the eight quarters prior to the 2007 SNAP expansion.

Appendix Table A13: Effect of WOTC expiration on the hazard rate of separation from employment

	(1) Hazard model	(2) Hazard model	(3) Hazard model
Post X WOTC	-0.0277	-0.0222	-0.0142
	(0.0244)	(0.0173)	(0.0122)
Earnings	-0.0027***	-0.0014***	-0.0008***
	(0.0000)	(0.0000)	(0.0000)
Post	1.4441***	1.3310***	1.2850***
	(0.0109)	(0.0077)	(0.0055)
Post X Earnings	-0.0024***	-0.0008***	-0.0002***
	(0.0000)	(0.0000)	(0.0000)
WOTC	0.0090	0.0040	-0.0108
	(0.0195)	(0.0135)	(0.0091)
Earnings X WOTC X Post	0.0001**	0.0001***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Earnings X WOTC	0.0000	0.0000	-0.0000*
	(0.0000)	(0.0000)	(0.0000)
Lower bound	5000	4000	2000
Upper bound	7000	8000	10000
Observations	696590	779176	885725

Note: Table estimates a parametric exponential hazard model of employment, testing whether the hazard rate of separation increases for WOTC workers relative to non-WOTC workers around $6000 in earnings (when the WOTC subsidy expires). We focus on job stints at firms who submitted at least one WOTC application in the quarter of hire so that we are comparing workers at comparable firms. We also restrict to workers aged 18 to 39 at time of hiring to maintain comparability of age with WOTC hires, and to employment stints in 2007 and after when the WOTC application micro-data is higher quality. The full model allows the hazard rate of separation to change over the employment stint ($Earnings$), change differentially for WOTC and non-WOTC workers over time ($WOTCXEarnings$), change at $6000 ($Post$), and change for both WOTC/non-WOTC workers after reaching $6000 in earnings ($PostXEarnings$, $PostXWOTCXEarnings$). We are interested in whether it changes *differentially* at $6000 in earnings ($PostXWOTC$) for WOTC relative to non-WOTC workers, consistent with firms responding to subsidy expiry for WOTC workers. For robustness, we estimate this within three different bandwidths around $6000.

Appendix Table A14: Effect of WOTC expiration on the hazard rate of separation from employment, by firm type and over time

	(1) Top 50 firm	(2) Highly attentive firm	(3) Explicitly screen	(4) Staffing firm	(5) High comp industry
Post X WOTC	-0.0094	-0.0260	-0.0284	-0.0274	-0.0109
	(0.0261)	(0.0258)	(0.0549)	(0.0319)	(0.0360)
Lower bound	4000	4000	4000	4000	4000
Upper bound	8000	8000	8000	8000	8000
Observations	377887	444585	104673	260944	250320

Note: Table estimates a parametric exponential hazard model of employment, testing whether the hazard rate of separation increases for WOTC workers relative to non-WOTC workers around $6000 in earnings (when the WOTC subsidy expires). We focus on job stints at firms who submitted at least one WOTC application in the quarter of hire so that we are comparing workers at comparable firms. We also restrict to workers aged 18 to 39 at time of hiring to maintain comparability of age with WOTC hires, and to employment stints in 2007 and after when the WOTC application micro-data is higher quality. The full model allows the hazard rate of separation to change over the employment stint ($Earnings$), change differentially for WOTC and non-WOTC workers over time ($WOTCXEarnings$), change at $6000 ($Post$), and change for both WOTC/non-WOTC workers after reaching $6000 in earnings ($PostXEarnings$, $PostXWOTCXEarnings$). We are interested in whether it changes *differentially* at $6000 in earnings ($PostXWOTC$) for WOTC relative to non-WOTC workers, consistent with firms responding to subsidy expiry for WOTC workers. We provide the estimates for ($PostXWOTC$) while looking within particular types of firms and time intervals.

Appendix Table A15: Language about use of Work Opportunity Tax Credit on job applications

Company	**Job Application Text**
Company 1	"The information you provide is collected by a third party unrelated to the company and will not be shared with anyone at the company until after you have accepted an offer of employment."
Companies 2–5	"The information you provide will be used solely by [third party] to determine your eligibility under the tax credit program and this employer's eligibility to obtain tax credits. [Third party]'s determinations as to tax credit eligibility will not affect the consideration of your application for employment by this employer. All information you provide will be kept confidential by [third party]. Your answers to the survey questions will not be shared with this employer."
Companies 6–8	"The information you supply will be used by this company to complete its federal and state tax returns and in no way will negatively impact any hiring decision. Your responses to the questions are voluntary and will be confidential to the employer's management and federal, state, and local agencies."
Company 9	"The information that you give will be used to determine the company's eligibility for these programs and will in no way negatively impact any hiring, retention, or promotion decisions."
Companies 10–11	"We ask that you answer the following questions to help determine our company's eligibility for this tax credit should we choose to hire you. Your answer will be kept confidential and will not be used as a condition for employment."
Company 12	"We guarantee that your answers to these questions will not affect your eligibility for employment nor any benefits you or your family may currently be receiving."
Company 13	"Your responses are voluntary and may assist members of targeted groups in securing employment. Your answers will be kept strictly confidential and will not adversely affect your employment opportunity."
Company 14–16	"All answers will be kept strictly confidential and will not adversely affect your employment opportunity."
Companies 17–20	"The screening is administered by an independent tax consulting firm on behalf of the organization. To assist, please respond as requested below. Your answers will not negatively impact consideration of your application for employment, and your participation is highly encouraged. The information provided is used solely to determine your eligibility for the tax credit program(s)."
Company 21	"The information you supply will be used by or on behalf of this company to complete its federal and/or state tax returns and may assist members of targeted groups in securing employment. Your responses to the question are voluntary and will be confidential to this company's management and third-party service providers, federal, state, and local agencies, and other third parties as necessary to determine eligibility."
Company 22	"As a step in your application process, we ask that you provide a preliminary response to us relating to potential qualifications for the Work Opportunity Tax Credit. [Company 22] participates in this program which helps us obtain federal incentives for hiring and retaining individuals from certain targeted groups into our workforce. We welcome you to participate in this screening by checking the box below if you believe any of the statements below relate to you."
Company 23	"The information you provide will not be shared with [Company 23] but used solely by [third party] to determine [Company 23]'s eligibility to obtain tax credits."
Company 24	"The information will be used for the employer's tax return and will not negatively affect any hiring decision. Your answers to these questions will be kept confidential."
Company 25	"Please take a moment to complete this brief, voluntary questionnaire related to [Company 25]'s participation in the federal work opportunity tax credit (WOTC) program. Click here to access the questionnaire (note: this link will redirect you to our WOTC vendor's website to complete the questionnaire.) We kindly ask all applicants to complete this questionnaire. Rest assured, your responses are confidential and will only be used in connection with the WOTC program."

Note: Table reports language related to WOTC on job applications for the random sample of employers in Section 5. All names of companies and third party processors have been removed. Companies are grouped in cases where multiple companies have exactly the same language, which typically occurs when multiple firms employ the same third party agency to process WOTC applications. Five firms did not have language describing to applicants how they would use the collected data.

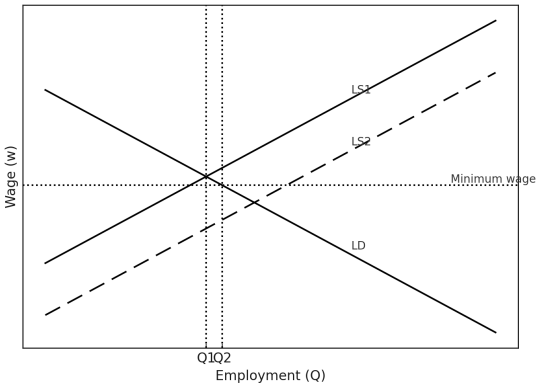
Appendix Table A16: Effect of WOTC on employment and hiring among screening firms, by firm type

Panel A: DiD estimates on labor market outcomes at screening firms				
	Top 50 firm		High attentiveness firm	
	New hire	Employed	New hire	Employed
Treat X Post	-0.0000	-0.0008	-0.0002	-0.0013
	(0.0004)	(0.0013)	(0.0003)	(0.0012)
Dep var mean	0.0038	0.0201	0.0027	0.0164
Observations	504104	504104	504104	504104
Panel B: RDD estimates on labor market outcomes at screening firms				
	Top 50 firm		High attentiveness firm	
	New hire	Employed	New hire	Employed
RD_Estimate	0.0001	-0.0000	0.0001	-0.0001
	(0.0001)	(0.0004)	(0.0001)	(0.0004)
Dep var mean	0.001	0.010	0.002	0.011
Bandwidth	4.586	4.910	4.130	4.693
Effective Obs	4316680	4550985	3847469	4394464

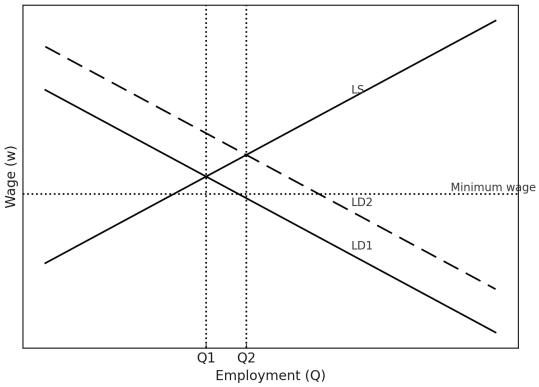
Note: Table reports estimates of the effect of WOTC eligibility on hiring and employment at types of firms that screen for WOTC on their job applications. Panel A reports the difference-in-differences estimates of the effect of WOTC eligibility using the 2007 expansion to SNAP recipients (Equation (2)). Panel B reports stacked regression discontinuity estimates of the effect of WOTC eligibility using the age-25 and age-40 cutoffs (Equation (3)). We restrict to the set of firms that explicitly ask WOTC questions in initial job applications, and then examine hiring among the subset of these firms that are the 50 firms that are the heaviest users of WOTC (columns 1 and 2) and have a WOTC certification success rate among eligible hires above the 75^{th} percentile (columns 3 and 4).The outcomes are being newly hired in the quarter at the type of firm denoted in the column header (odd columns) and employment in the quarter at the type of firm denoted in the column header (even columns). Standard errors (in parentheses) are clustered at the individual level.

Appendix Figure A1: Relative effects of worker-side and employer-side wage subsidies with a binding minimum wage

(a) Worker-side wage subsidy

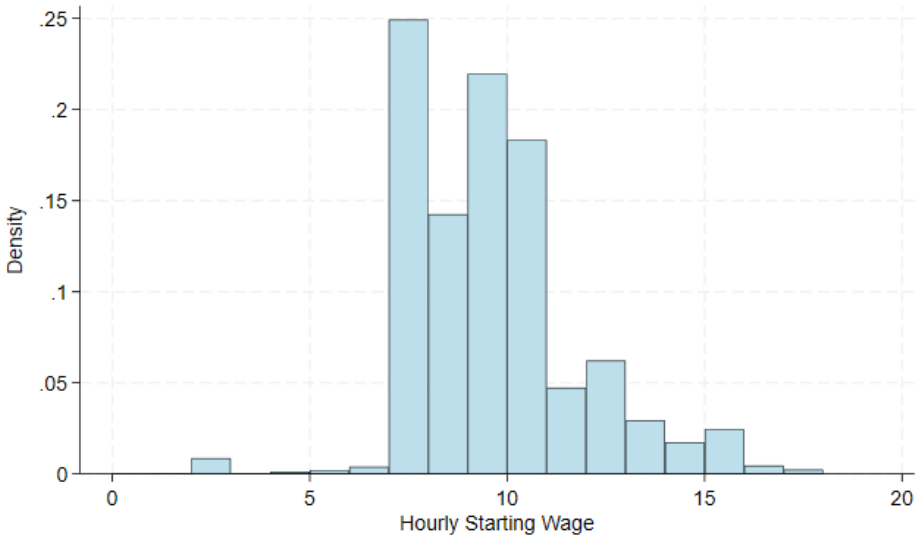


(b) Employer-side wage subsidy



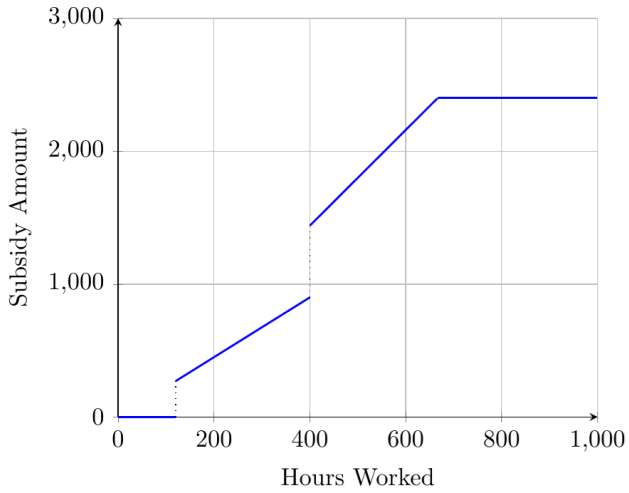
Note: Figures plot the predicted response to worker-side and employer-side wage subsidies in a perfectly competitive low wage labor market with the prevailing wage near the minimum wage. Panel (a) plots the predicted employment response to a worker-side subsidy that shifts down the labor supply curve from LS1 to LS2 (employment shifts from Q1 to Q2 in the left figure), while Panel (b) plots the predicted employment response to an equivalent employer-side subsidy that shifts up the labor demand curve from LD1 to LD2 (employment shifts from Q1 to Q2 in the right figure, where this is a larger shift than the left figure).

Appendix Figure A2: Starting hourly wage for WOTC-certified workers



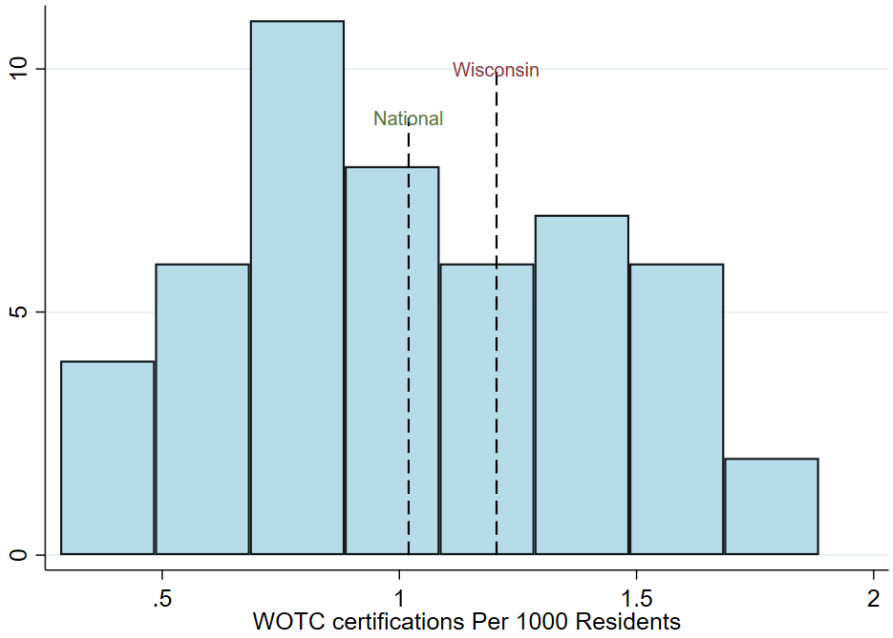
Note: Figure reports the distribution of the starting hourly wage for workers in WOTC-certified jobs in Wisconsin between 2009-2020.

Appendix Figure A3: Example WOTC subsidy schedule



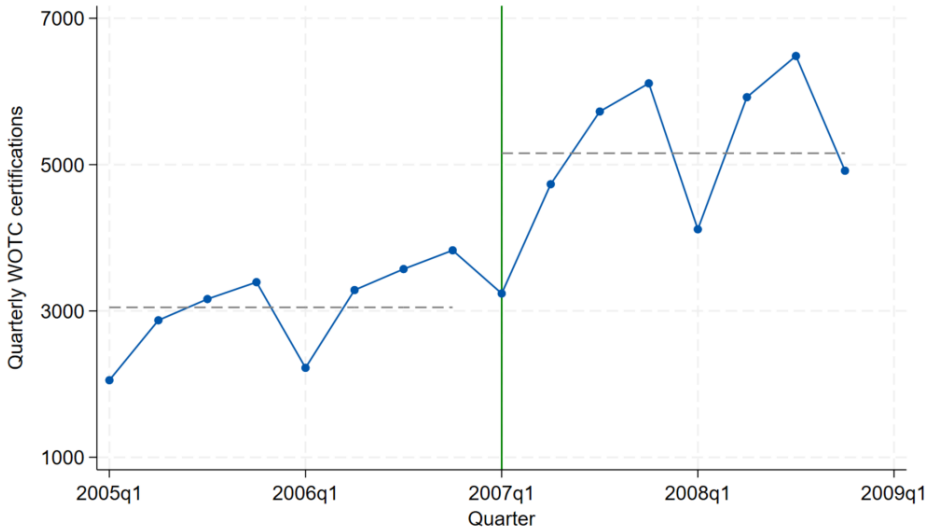
Note: Figure reports the subsidy amount by hours worked for a worker earning $9 per hour (median hourly wage of WOTC workers in our sample). For the first 120 hours, the subsidy does not pay anything. The subsidy then pays 25% of total wages for hours 120 to 400 and 40% of total wages for more than 400 hours, up to a cap of $2400 in subsidy.

Appendix Figure A4: Quarterly WOTC certifications by state (per 1000 residents)



Note: Figure reports the distribution of average quarterly WOTC certifications per 1000 residents by state using 2003-2022 data from Department of Labor reports. The vertical dashed lines indicate the average certifications in Wisconsin as well as averaged across all 50 states.

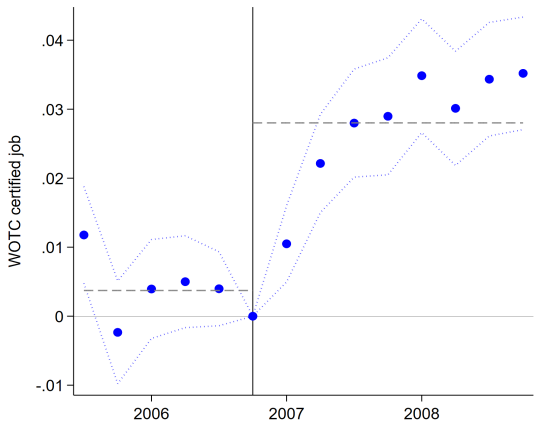
Appendix Figure A5: Quarterly WOTC certifications in Wisconsin, 2005-2008



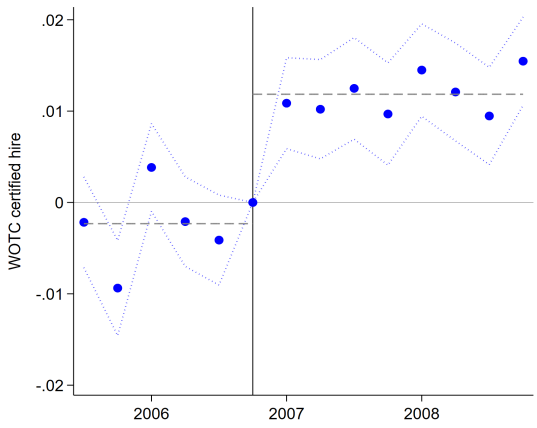
Note: Figure reports total WOTC certifications in Wisconsin by quarter of application from 2005-2009. Gray dashed horizontal lines denote average quarterly certificates over 2005-2006 and 2007-2008.

Appendix Figure A6: Effect of WOTC on individual outcomes, event study analysis of SNAP expansion (age-25 sample)

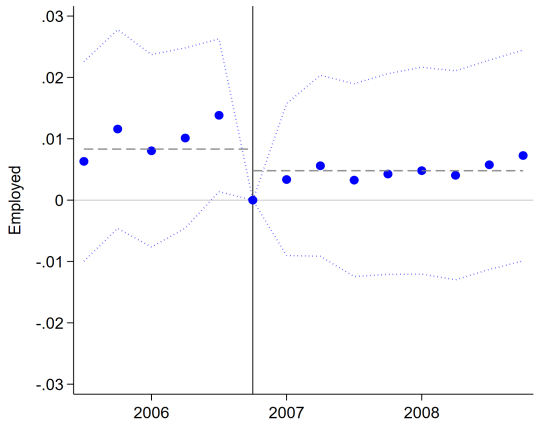
(a) WOTC certified job



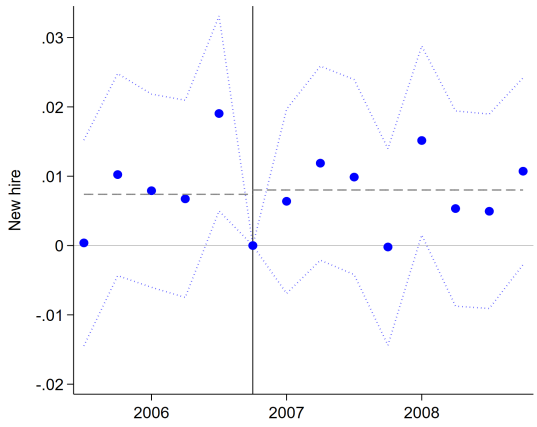
(b) New hire into WOTC certified job



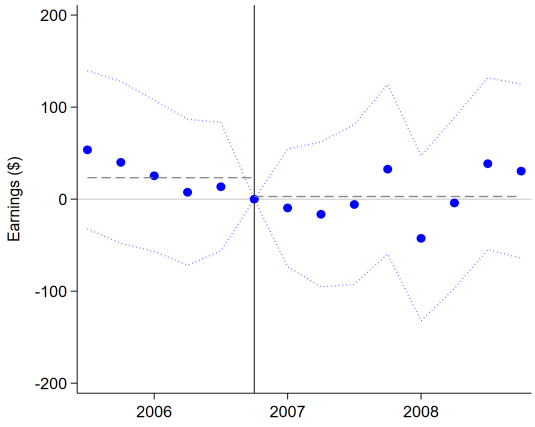
(c) Employed



(d) New hire



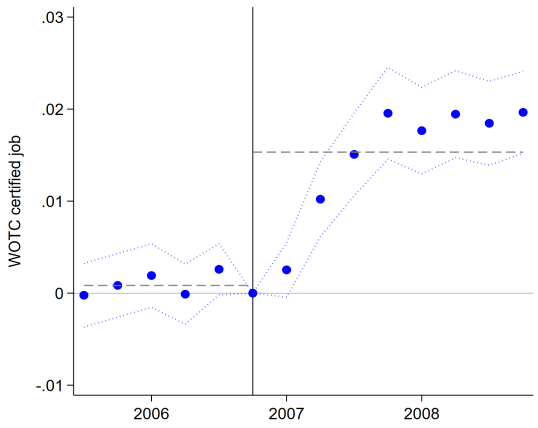
(e) Earnings



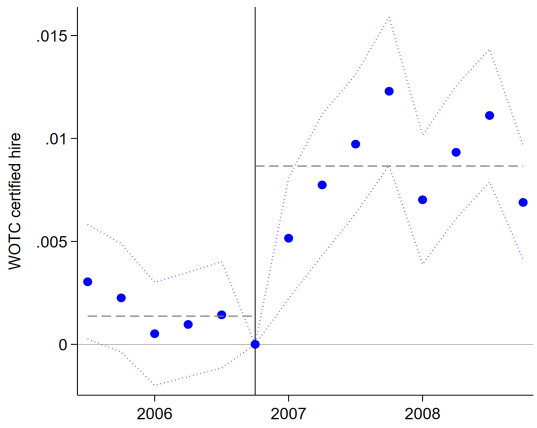
Note: Figures report quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2007 expansion to SNAP recipients aged 25-39 in Equation (1) for employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, and earnings. Sample is individuals who received SNAP in 3 of the last 5 months and who are around the age-25 cutoff. Controls include age (in months) fixed effects, year-quarter fixed effects, and earnings in the quarter preceding the sample period. Standard errors clustered at the individual level. Vertical gray solid line denotes the quarter prior to the 2007 expansion date, and the horizontal gray dashed lines report the average of the point estimates before and after that date.

Appendix Figure A7: Effect of WOTC on individual outcomes, event study analysis of SNAP expansion (age 40 sample)

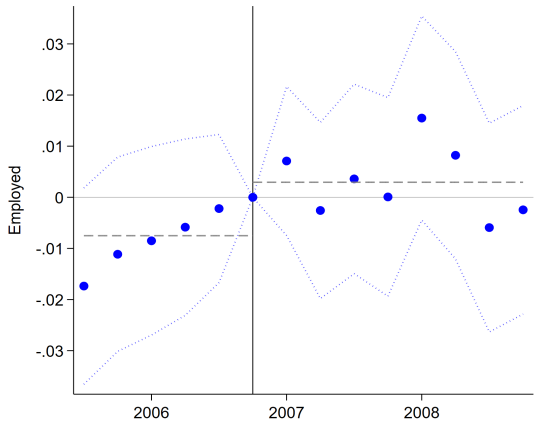
(a) WOTC certified job



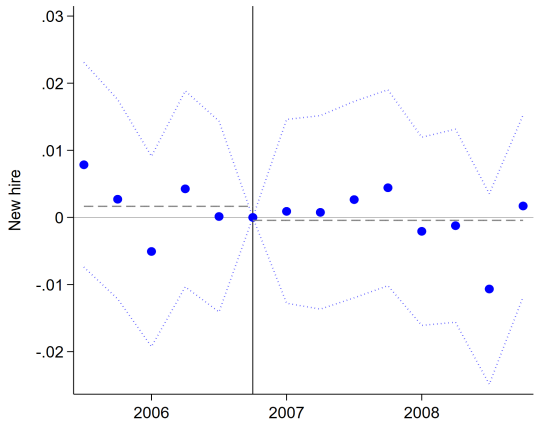
(b) New hire into WOTC certified job



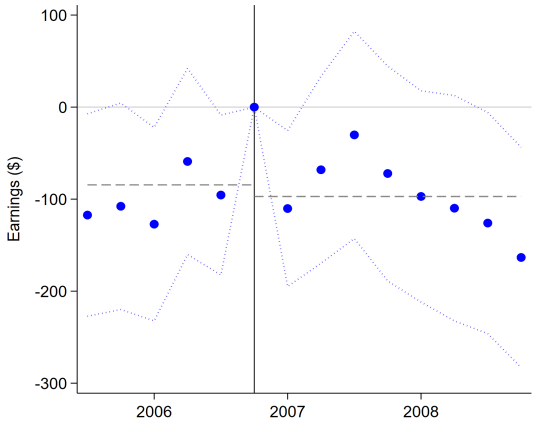
(c) Employed



(d) New hire

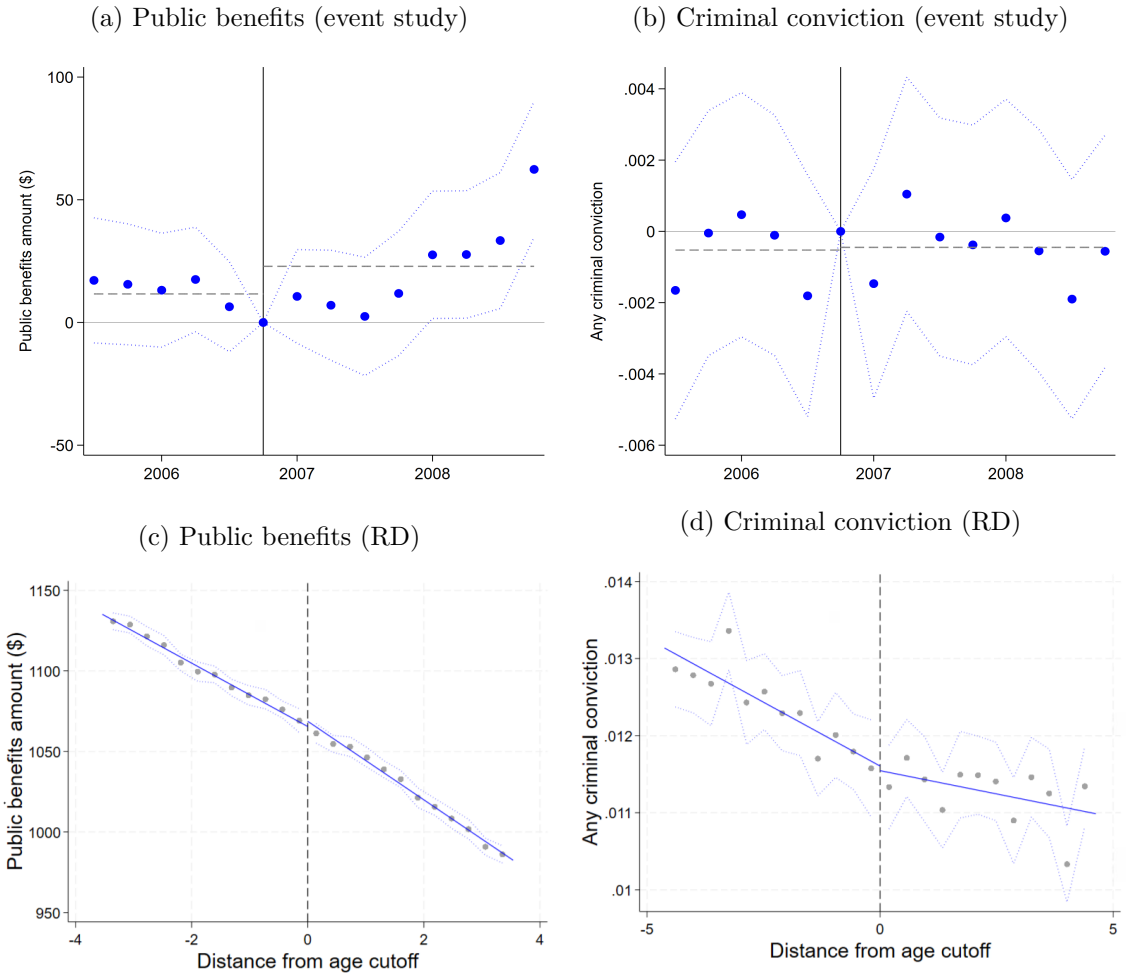


(e) Earnings



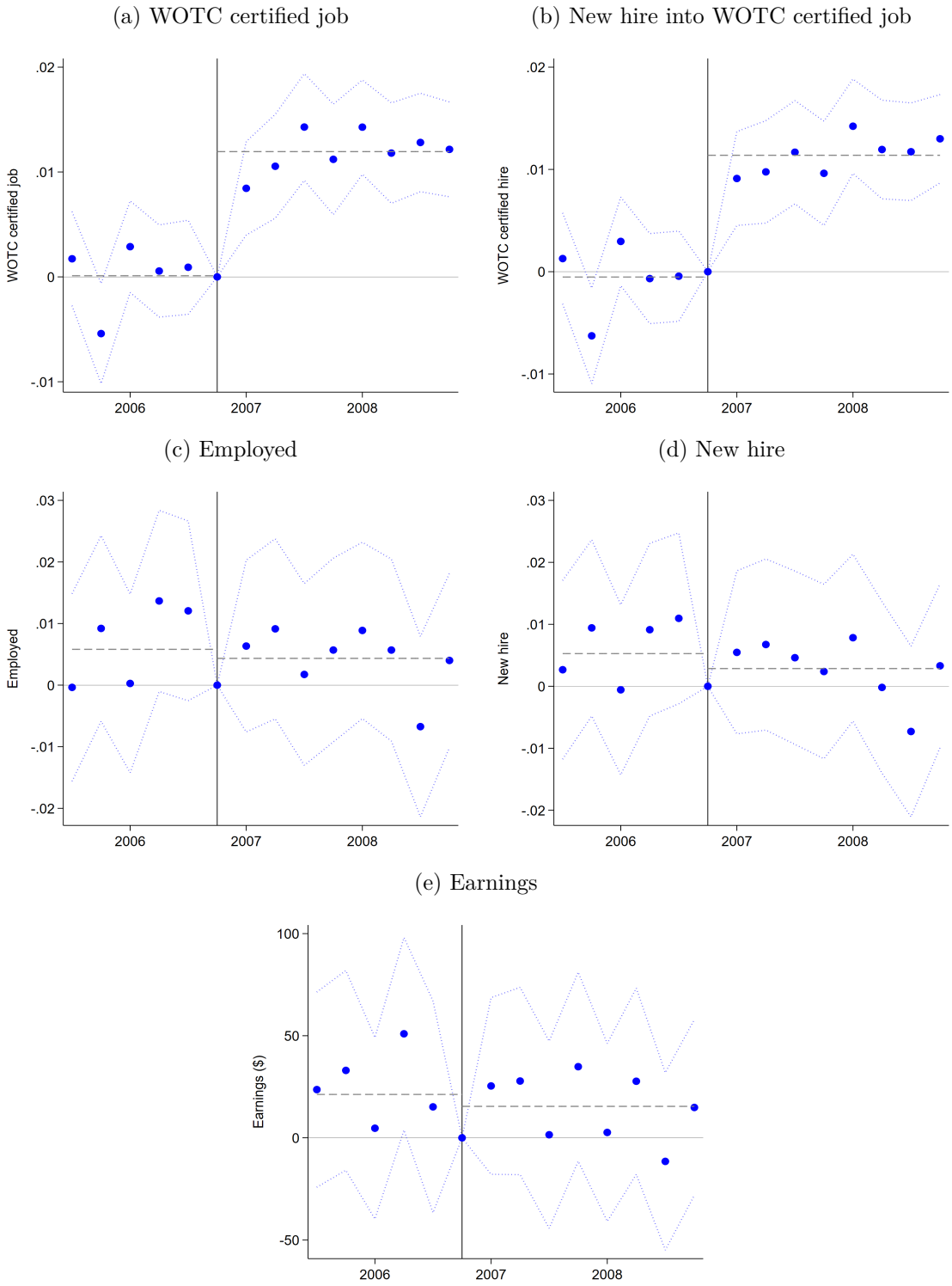
Note: Figures report quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2007 expansion to SNAP recipients aged 25-39 in Equation (1) for employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, and earnings. Sample is individuals who received SNAP in 3 of the last 5 months and who are around the age-40 cutoff. Controls include age (in months) fixed effects, year-quarter fixed effects, and earnings in the quarter preceding the sample period. Standard errors clustered at the individual level. Vertical gray solid line denotes the quarter prior to the 2007 expansion date, and the horizontal gray dashed lines report the average of the point estimates before and after that date.

Appendix Figure A8: Effect of WOTC on public benefits usage and criminal convictions



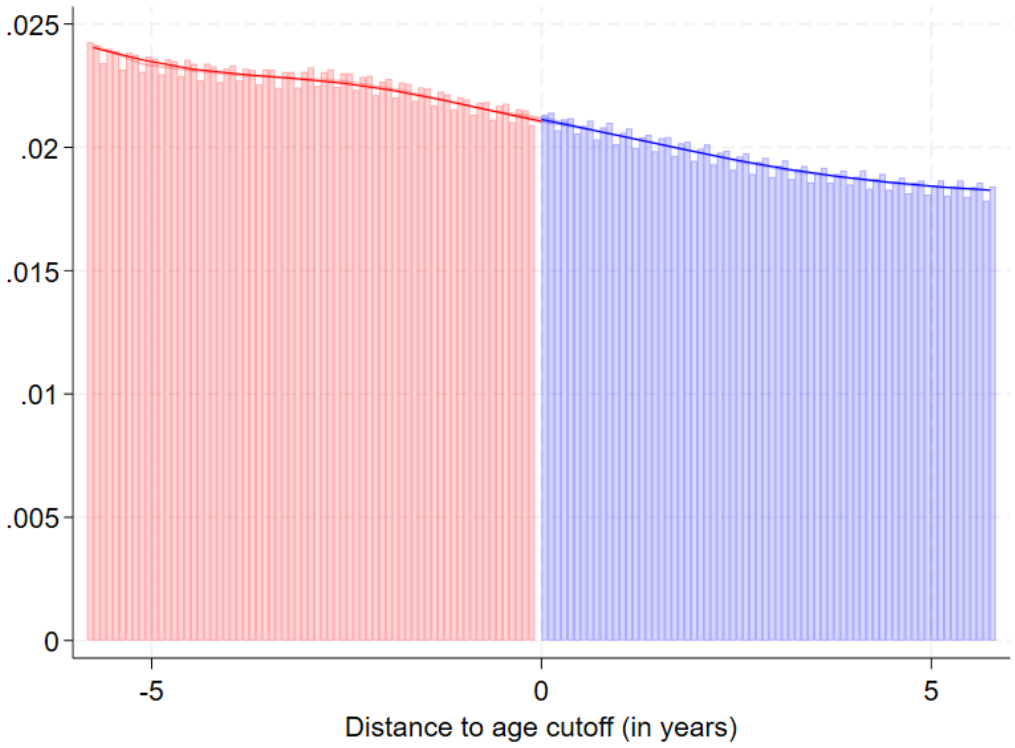
Note: Figures report the effects of WOTC eligibility on public benefits receipt in the quarter (dollar value of three forms of public benefits: TANF, unemployment insurance, and SNAP) and being convicted of a criminal offense in the quarter. Panels (a) and (b) report stacked event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2007 expansion to SNAP recipients aged 25-39 in Equation (1). Controls include monthly age fixed effects, year-quarter by sample fixed effects (where the sample is either the age-40 or age-25 sample), and earnings in the quarter preceding the sample period. Vertical gray solid line denotes the quarter prior to the 2007 expansion date, and the horizontal gray dashed lines report the average point estimates before and after that date. Panels (c) and (d) plot stacked estimates of the relationship between these outcomes and the difference between the individual's age and the relevant WOTC age eligibility threshold (gray dots), 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Individuals whose age is to the left of the threshold are eligible for WOTC, while those to the right of the threshold are not. Each specification uses a linear polynomial, trinagular kernel, and MSE-optimal bandwidth estimated following Cattaneo et al. (2020). Standard errors clustered at the individual level for all figures.

Appendix Figure A9: Effect of WOTC on individual outcomes, event study analysis of SNAP expansion (unemployed sample)



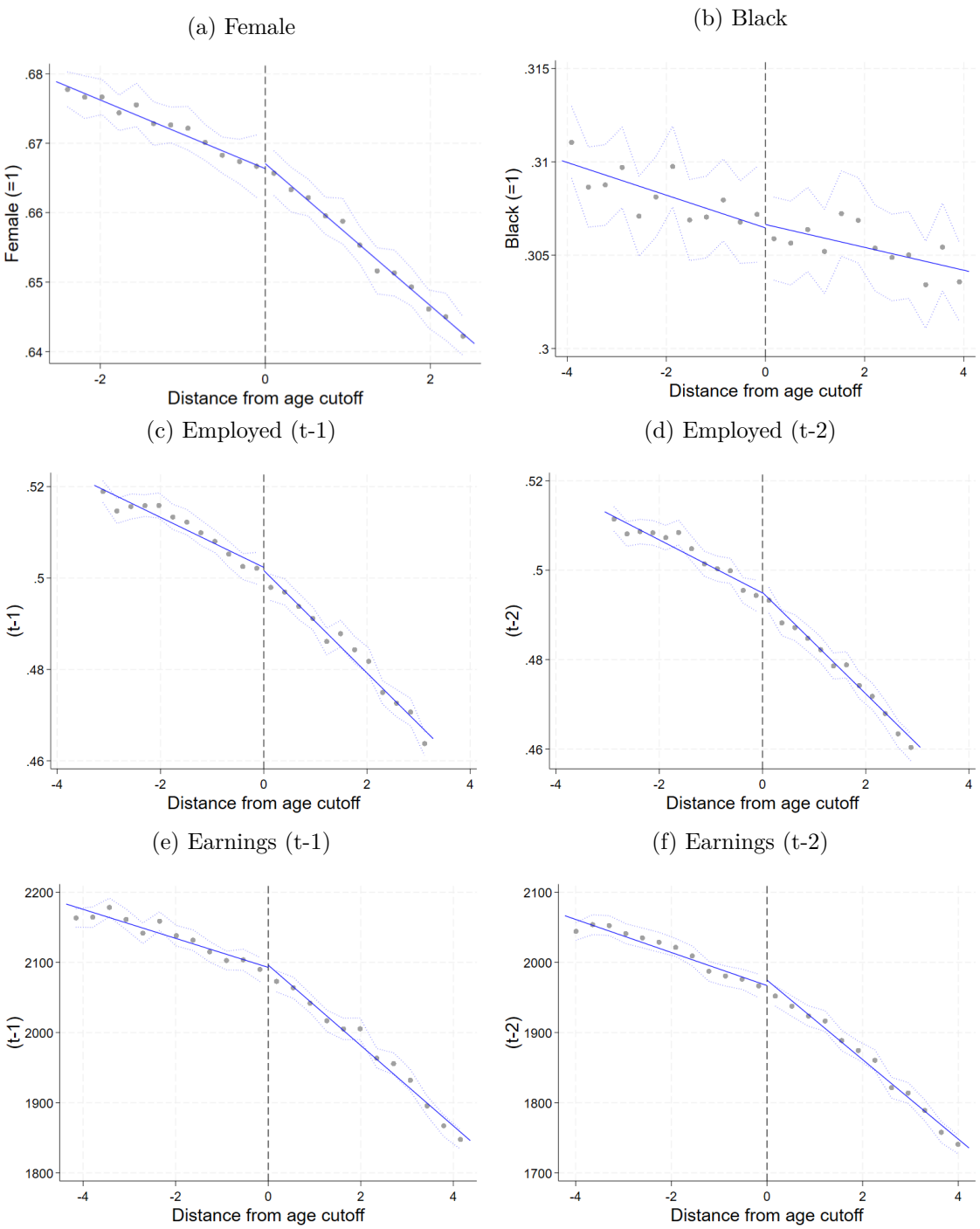
Note: Figures report quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2007 expansion to SNAP recipients aged 25-39 in Equation (1) for employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, and earnings. Sample is individuals who entered the quarter unemployed, received SNAP in 3 of the last 5 months, and are around the age-25 or age-40 cutoff. Controls include age (in months) fixed effects, year-quarter fixed effects, and earnings in the quarter preceding the sample period. Standard errors clustered at the individual level. Vertical gray solid line denotes the quarter prior to the 2007 expansion date, and the horizontal gray dashed lines report the average of the point estimates before and after that date.

Appendix Figure A10: Distribution of the running variable, RD analysis



Note: Figure plots the stacked age distribution for individuals who have received SNAP for at least three of the past five months preceding the start of a given quarter. It provides a histogram around the relevant threshold (lighter bars) and non-parametric regression lines for each half of the distribution (darker lines) to test for a discontinuity in population density around the threshold (Cattaneo et al., 2020).

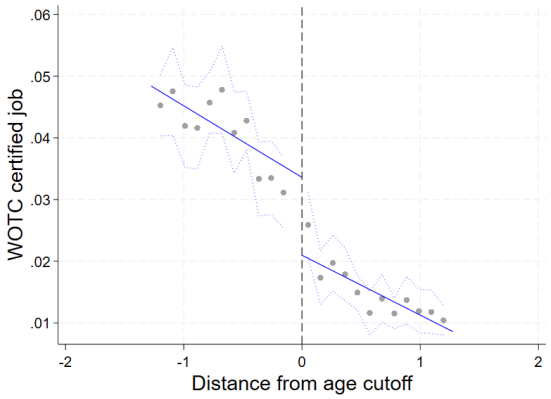
Appendix Figure A11: Balance on pre-determined characteristics, RD analysis



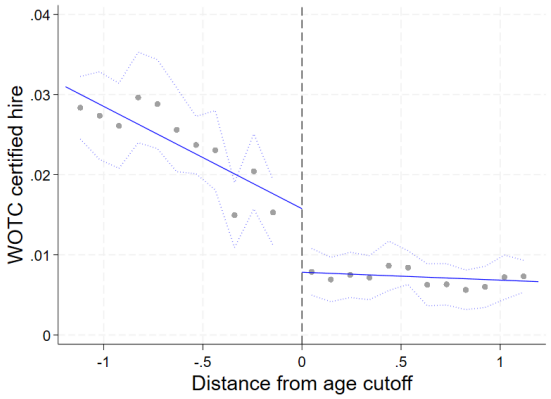
Note: Figures plot estimates of the relationship between various pre-determined characteristics of individual and the running (age relative to the cutoff) variable (gray dots), 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Characteristics include whether the individual is employed in quarter $t-1$, whether the individual is employed in quarter $t-2$, earnings in quarter $t-1$, earnings in quarter $t-2$, whether the individual is female, and whether the individual is Black. Each specification uses a linear polynomial, trinagular kernel, and MSE-optimal bandwidth estimated following Cattaneo et al. (2020). Standard errors clustered at the individual level.

Appendix Figure A12: Effect of WOTC on individual outcomes, RD analysis (Pre-2007 sample)

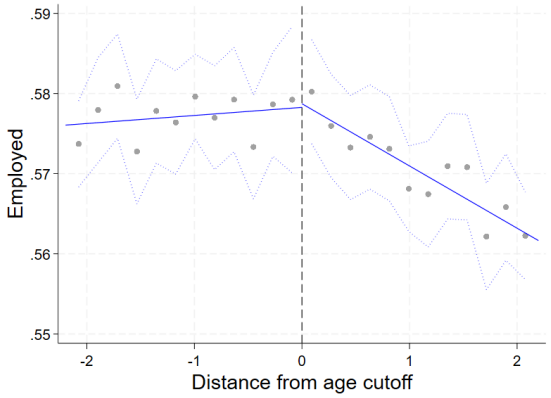
(a) WOTC certified job



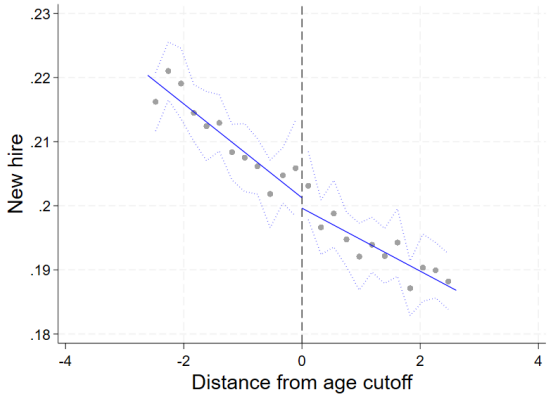
(b) New hire into WOTC certified job



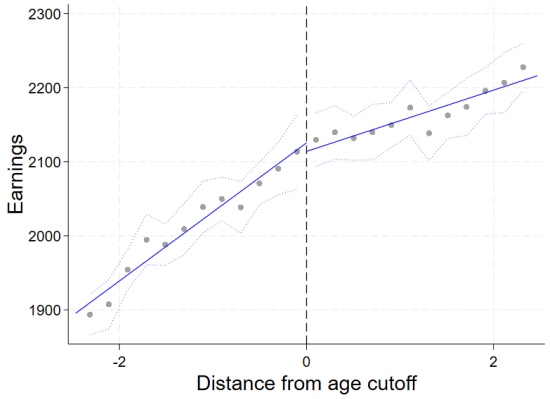
(c) Employed



(d) New hire



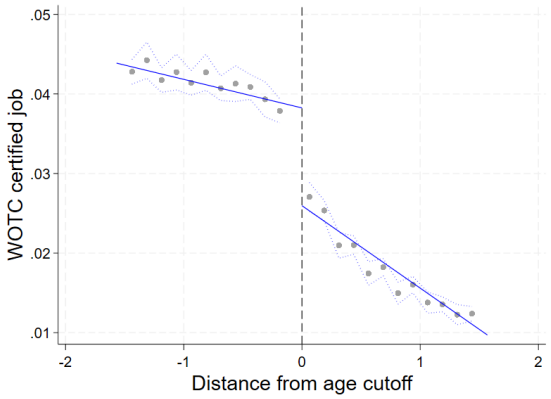
(e) Earnings



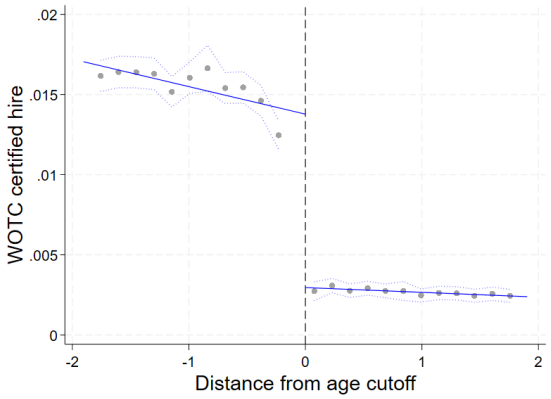
Note: Figures plot estimates of the relationship between individual-level outcomes and the difference between the individual's age and the age 25 WOTC eligibility threshold (gray dots) in the sample through the fourth quarter of 2006, 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Outcomes include employment in a WOTC-certified job (Panel a), being newly hired into a WOTC-certified job (Panel b), employment (Panel c), being newly hired into a job (Panel d), and earnings (Panel e). Sample is individuals who entered the quarter unemployed, received SNAP in 3 of the last 5 months, and are around the age-25 or age-40 cutoff. Individuals whose age is to the left of the threshold are eligible for WOTC, while those to the right of the threshold are not. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors are clustered at the individual level.

Appendix Figure A13: Effect of WOTC on individual outcomes, RD analysis (Post-2007 sample)

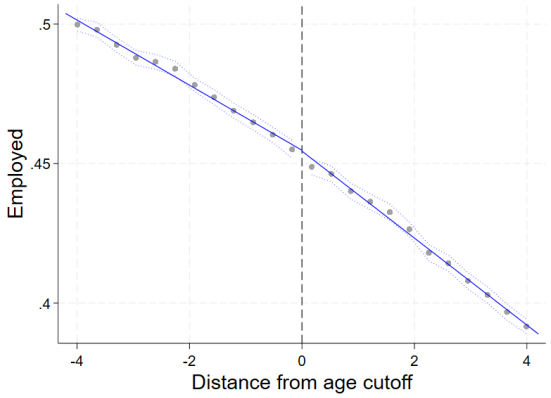
(a) WOTC certified job



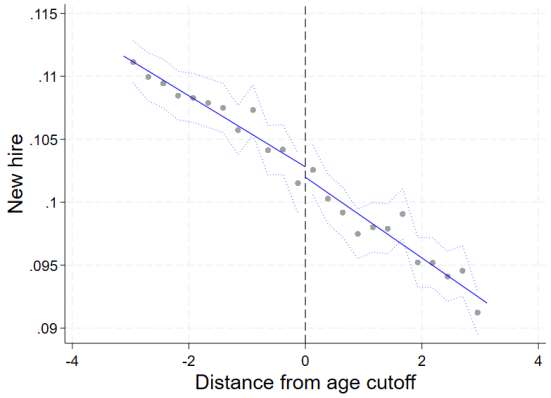
(b) New hire into WOTC certified job



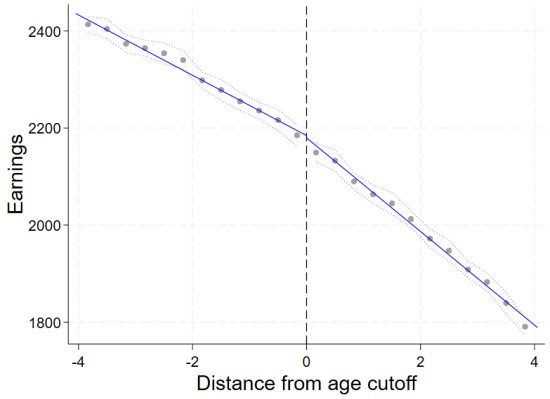
(c) Employed



(d) New hire



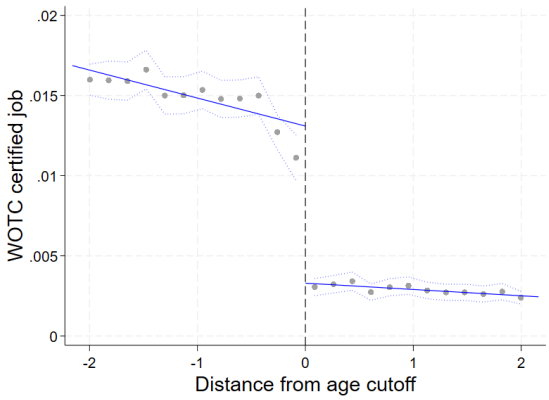
(e) Earnings



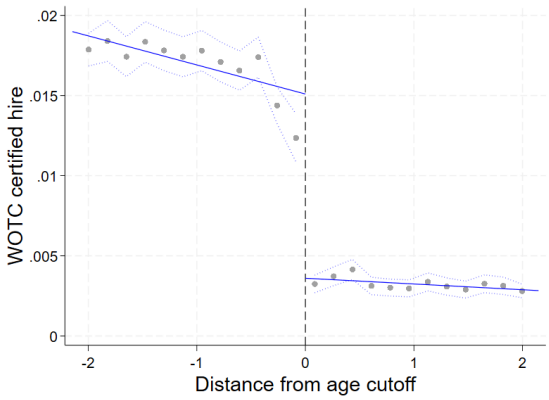
Note: Figures plot estimates of the relationship between individual-level outcomes and the difference between the individual's age and the age 40 WOTC eligibility threshold (gray dots) in the sample of data from the first quarter of 2007 through end of 2019, 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Outcomes include employment in a WOTC-certified job (Panel a), being newly hired into a WOTC-certified job (Panel b), employment (Panel c), being newly hired into a job (Panel d), and earnings (Panel e). Sample is individuals who entered the quarter unemployed, received SNAP in 3 of the last 5 months, and are around the age-25 or age-40 cutoff. Individuals whose age is to the left of the threshold are eligible for WOTC, while those to the right of the threshold are not. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors are clustered at the individual level.

Appendix Figure A14: Effect of WOTC on individual outcomes, RD analysis (unemployed sample)

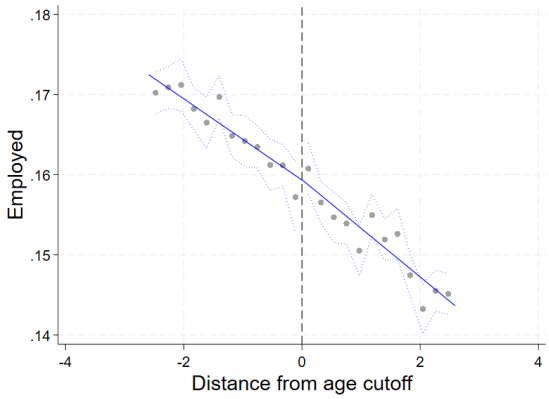
(a) WOTC certified job



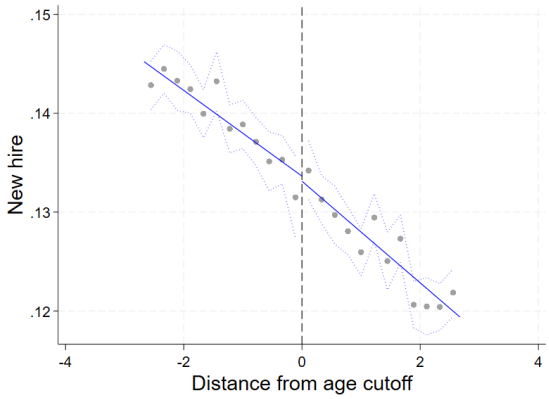
(b) New hire into WOTC certified job



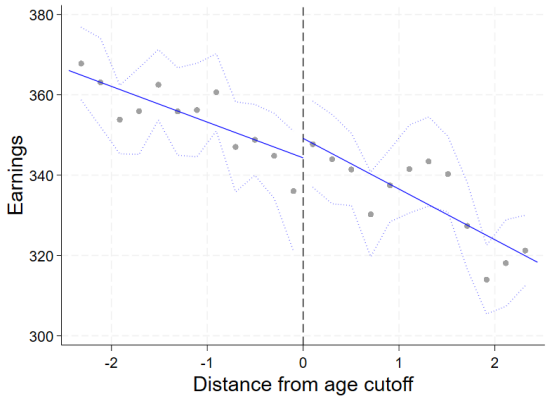
(c) Employed



(d) New hire



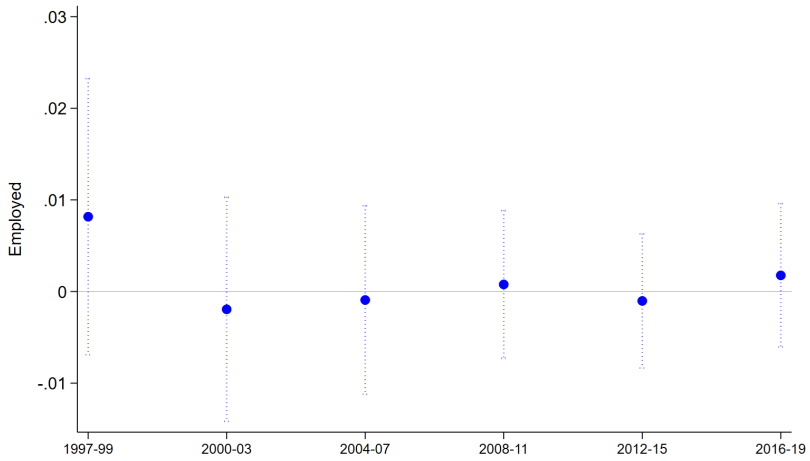
(e) Earnings



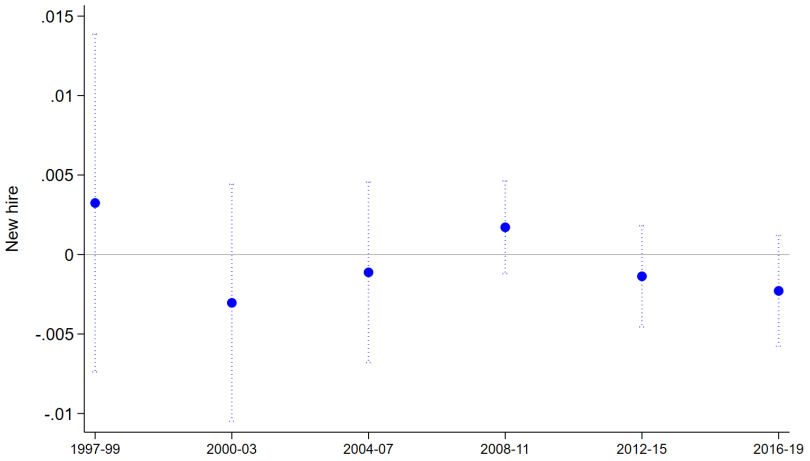
Note: Figures plot estimates of the relationship between individual-level outcomes and the difference between the individual's age and the relevant WOTC age eligibility threshold (gray dots), 95% confidence intervals (small dotted blue lines), and fitted lines below and above the age cutoff (in solid blue). Outcomes include employment in a WOTC-certified job (Panel a), being newly hired into a WOTC-certified job (Panel b), employment (Panel c), being newly hired into a job (Panel d), and earnings (Panel e). Sample is individuals who entered the quarter unemployed, received SNAP in 3 of the last 5 months, and are around the age-25 or age-40 cutoff. Individuals whose age is to the left of the threshold are eligible for WOTC, while those to the right of the threshold are not. Each specification uses a linear polynomial, triangular kernel, and MSE-optimal bandwidth estimated following Calonico et al. (2017). Standard errors are clustered at the individual level.

Appendix Figure A15: Effect of WOTC eligibility on employment and hiring across years, RD analysis

(a) Employment

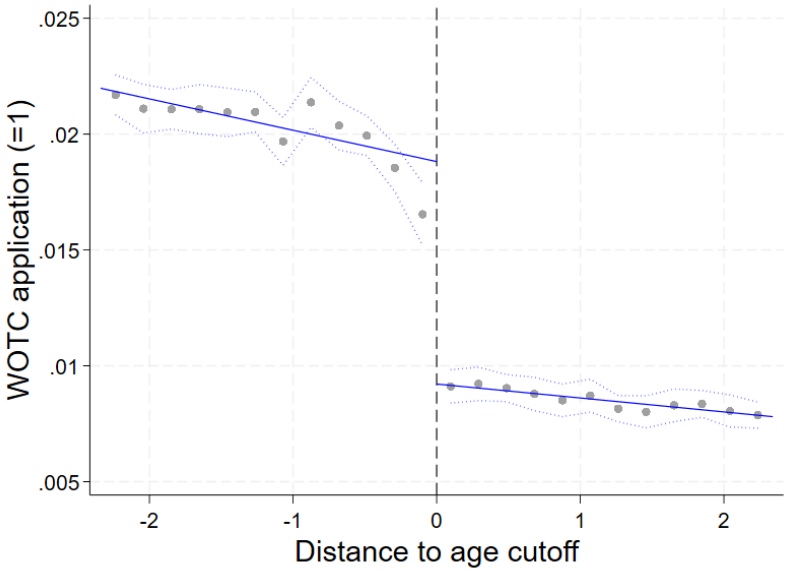


(b) New hire



Note: Figures plot regression coefficients (large blue dots) and 95% confidence intervals (small dotted bars) from a RD regression with the running variable equal to the difference between the individual's age and the relevant WOTC age eligibility threshold. Outcomes are quarterly employment (Panel a) and being newly hired into a job (Panel b), restricted to the relevant set of years denoted on the y-axis. The specifications follow the same RD approach as in Equation (3), restricted to the relevant set of years.

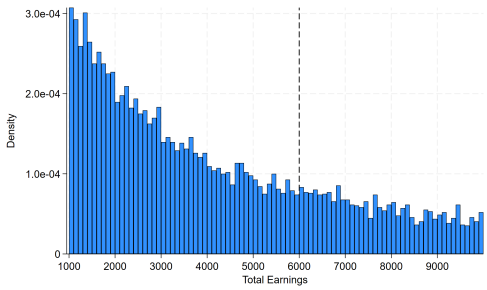
Appendix Figure A16: Effect of WOTC eligibility on WOTC applications



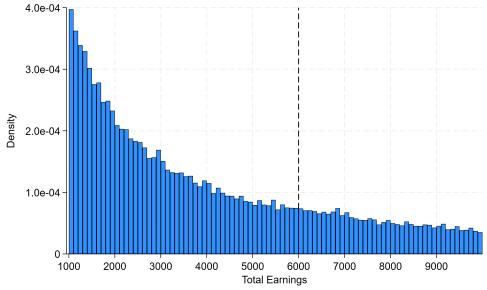
Note: This figure plots the relationship between whether an individual is hired into a job with an associated WOTC application and the difference between the individual's age and the relevant WOTC age eligibility threshold.

Appendix Figure A17: Distributions of total earnings for WOTC-certified workers, by firm characteristics and years

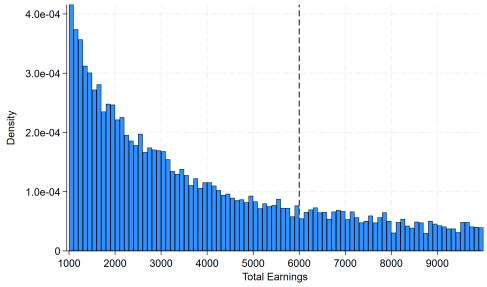
(a) WOTC screening firm



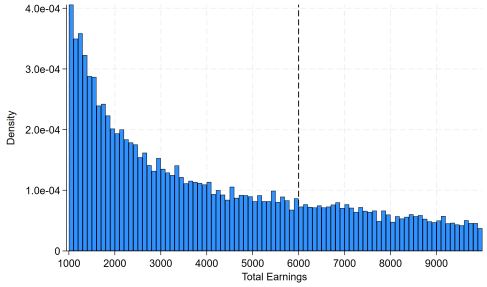
(b) Top 50 WOTC firm



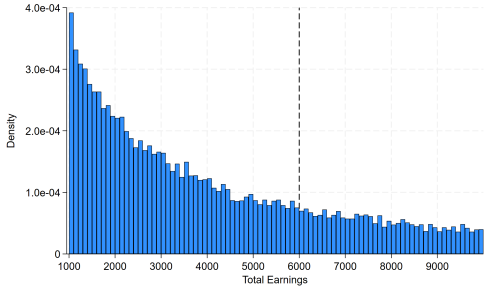
(c) WOTC high attentiveness firm



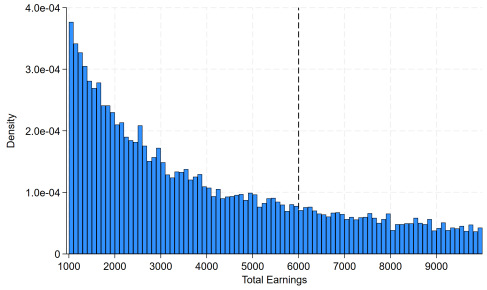
(d) Staffing firm



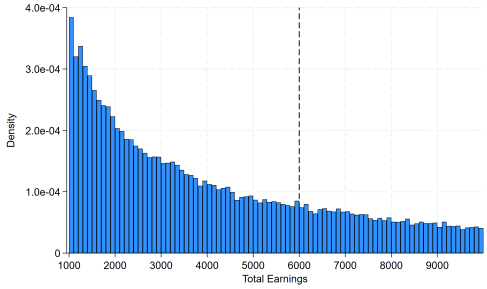
(e) Highly competitive industries



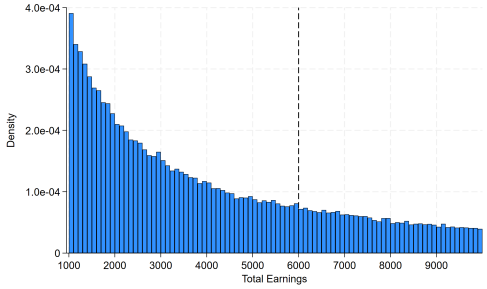
(f) 2008 to 2011



(g) 2012 to 2015



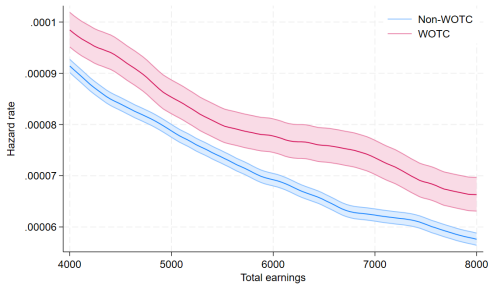
(h) 2016 to 2019



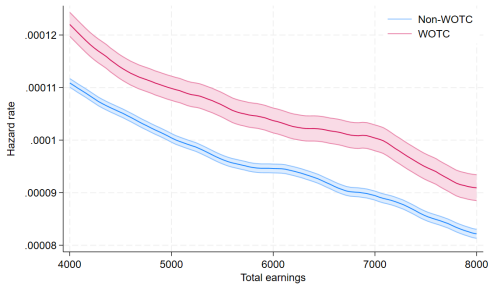
Note: Figures plot the distribution of total earnings prior to separation for workers whose hiring was subsidized by WOTC and who were eligible for WOTC through SNAP receipt. Panel (a) plots this for workers at firms known to ask WOTC questions on job applications, Panel (b) plots this for workers at the 50 firms that most heavily use WOTC, Panel (c) plots this for workers at WOTC-utilizing firms that are in the top quartile in terms of applying to WOTC for WOTC-eligible hires, Panel (d) plots this for workers at employment services firms (i.e., NAICS 5613), Panel (e) plots this for workers in highly competitive industries, and Panels (f) to (h) plot this for years 2008-2011, 2012-2015, and 2016 to 2019, respectively, across all firms.

Appendix Figure A18: Hazard analysis of separation, by firm characteristics and years

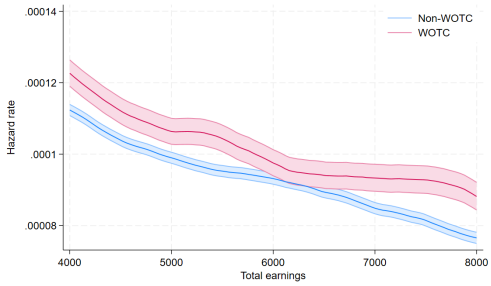
(a) WOTC screening firm



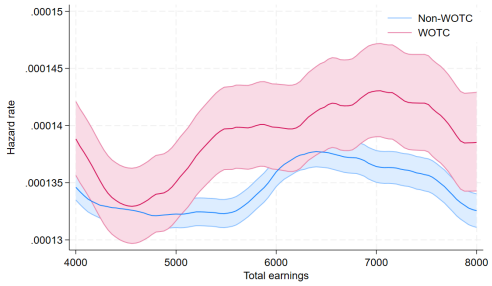
(b) Top 50 WOTC firm



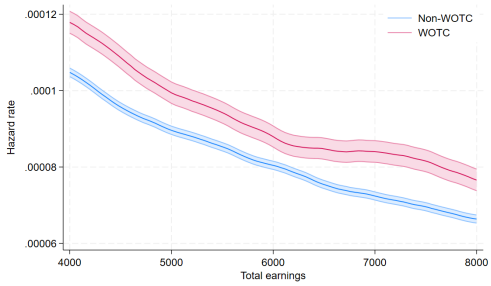
(c) WOTC high attentiveness firm



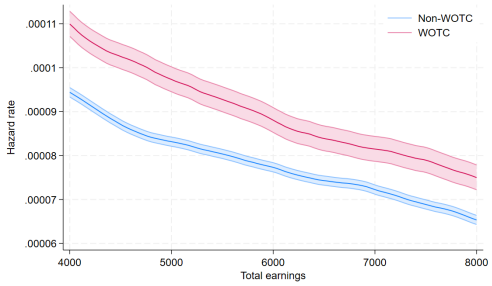
(d) Staffing firm



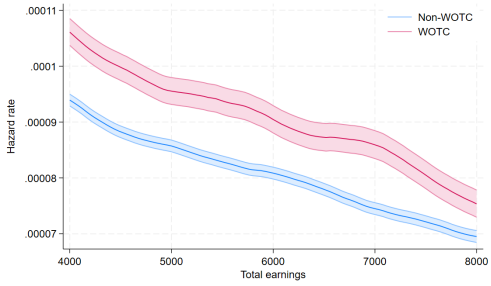
(e) Highly competitive industries



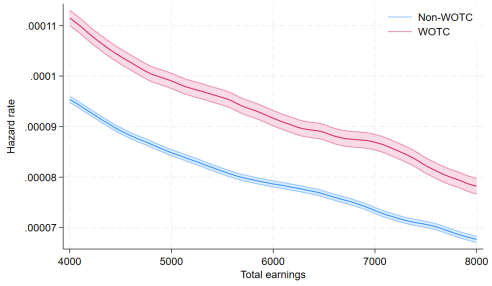
(f) 2008 to 2011



(g) 2012 to 2015



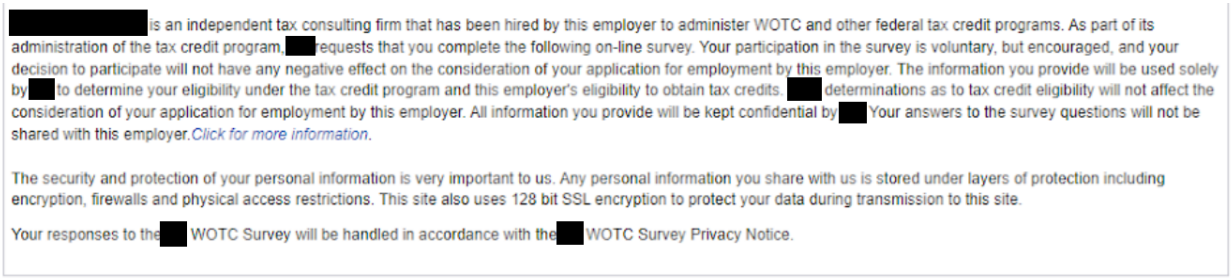
(h) 2016 to 2019



Note: Figures plot the hazard rate of separation for workers at WOTC using firms. It plots this by the total earnings in the job separately for workers with an associated WOTC application and those with no associated application.

Appendix Figure A19: Examples of WOTC information collection on job applications

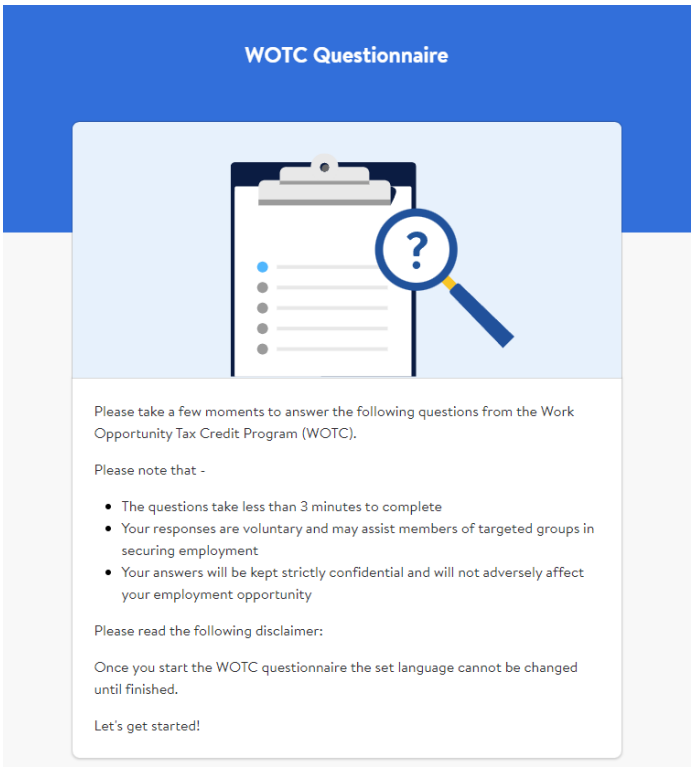
(a) Example of third-party WOTC screening


[redacted] is an independent tax consulting firm that has been hired by this employer to administer WOTC and other federal tax credit programs. As part of its administration of the tax credit program, [redacted] requests that you complete the following on-line survey. Your participation in the survey is voluntary, but encouraged, and your decision to participate will not have any negative effect on the consideration of your application for employment by this employer. The information you provide will be used solely by [redacted] to determine your eligibility under the tax credit program and this employer's eligibility to obtain tax credits. [redacted] determinations as to tax credit eligibility will not affect the consideration of your application for employment by this employer. All information you provide will be kept confidential by [redacted] Your answers to the survey questions will not be shared with this employer. *Click for more information.*

The security and protection of your personal information is very important to us. Any personal information you share with us is stored under layers of protection including encryption, firewalls and physical access restrictions. This site also uses 128 bit SSL encryption to protect your data during transmission to this site.

Your responses to the [redacted] WOTC Survey will be handled in accordance with the [redacted] WOTC Survey Privacy Notice.

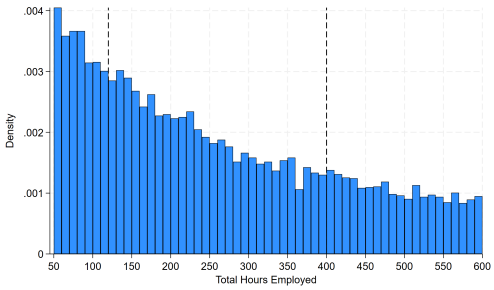
(b) Example of direct screening by the company



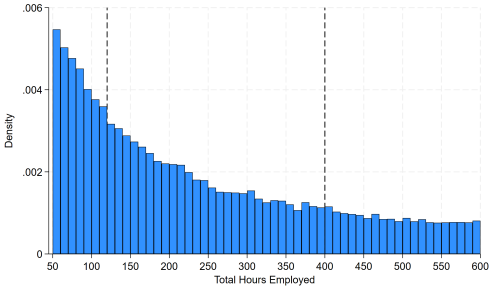
Note: This figure contains images from job applications that include WOTC screening questions.

Appendix Figure A20: Distributions of total hours worked for WOTC-certified workers, by firm characteristics and years

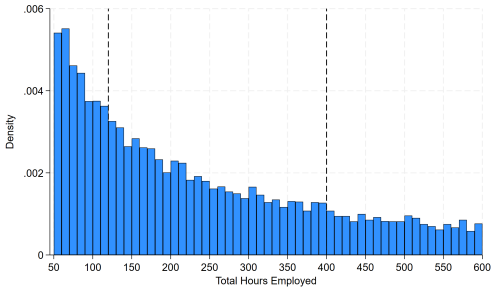
(a) WOTC screening firm



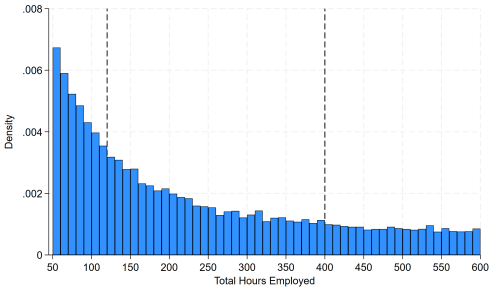
(b) Top 50 WOTC firm



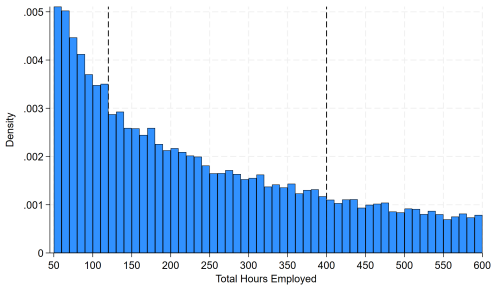
(c) WOTC high attentiveness firm



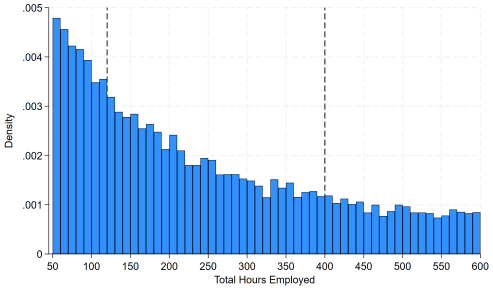
(d) Staffing firm



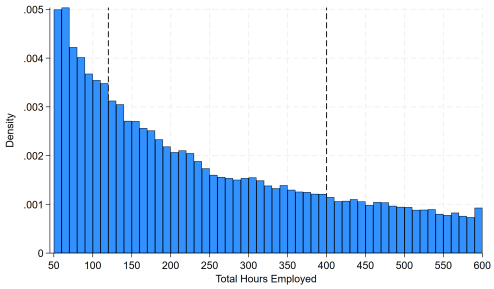
(e) Highly competitive industries



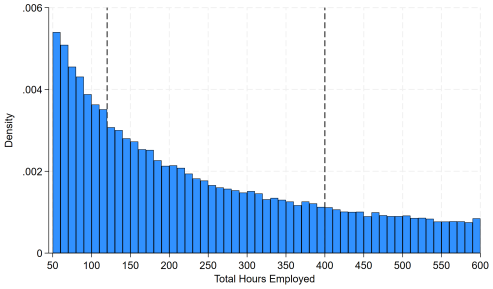
(f) 2008 to 2011



(g) 2012 to 2015



(h) 2016 to 2019



Note: Figures plot the distribution of total hours worked prior to separation for workers whose hiring was subsidized by WOTC and who were eligible for WOTC through SNAP receipt. Panel (a) plots this for workers at firms known to ask WOTC questions on job applications, Panel (b) plots this for workers at the 50 firms that most heavily use WOTC, Panel (c) plots this for workers at WOTC-utilizing firms that are in the top quartile in terms of applying to WOTC for WOTC-eligible hires, Panel (d) plots this for workers at employment services firms (i.e., NAICS 5613), Panel (e) plots this for workers in highly competitive industries, and Panels (f) through (h) plot this for different years.

B Decomposing the growth of WOTC

The number of workers whose wages are subsidized by WOTC grew from approximately 400,000 individuals in 2000 to over 2.5 million in 2022. Figure 1 shows that most of this growth came between 2008 and 2015 and was driven by the SNAP target group. To further decompose the reasons for this massive growth, we leverage individual-level data on all WOTC applications in the state of Wisconsin between 2005 and 2019, a dataset described in greater detail in Section 2.2. We match this to employer-employee earnings records, as well as TANF, SNAP, and criminal justice records to measure which new hires were potentially eligible for WOTC subsidies. The expansion could be the result of: (i) an increased number of hires who were eligible for WOTC; (ii) firms becoming more likely to apply for WOTC subsidies for a given hire, such as if screening technology improves; or (iii) greater success in the application process, such as a higher fraction of applications being accepted.

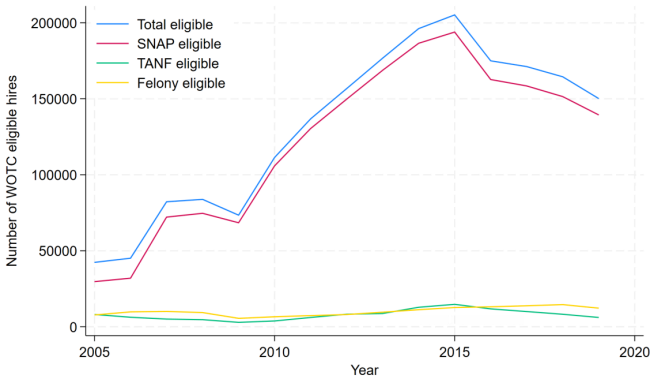
Panel (a) of Appendix Figure A21 plots the total number of new hires who are potentially eligible for WOTC over time as a result of the three eligibility criteria that are observable in our data – SNAP receipt, TANF receipt, and having a recent felony conviction – which account for over three-quarters of WOTC subsidized hires. Over the main period of expansion from 2008 to 2015, there was a tripling in the number of hires who qualified for WOTC. This is almost entirely driven by SNAP, and is explained by the expansions in SNAP receipt resulting from broadened eligibility criteria and the Great Recession.

Second, we match employment stints to WOTC micro-data to check what fraction of eligible hires have an associated WOTC application, and plot this as the pink line in Panel (b). The fraction of eligible hires for whom firms apply for WOTC also increased meaningfully from around 11% in 2007 to over 16% in 2015, though this is less important than the increase in eligibility. Note that this is the fraction of *all* hires who would be WOTC eligible, including hires at firms that do not engage with the WOTC program. Among hires at a firm that has previously filed a WOTC application, applications are filed for around 40% of WOTC-eligible hires, without much change in this rate over the study period, and so this rise is driven by a roughly linear increase in the number of firms filing for WOTC. Panel (b) also plots the fraction of all applications that result in a certification (blue line). Application success rates are fairly steady, and so do not explain the change.

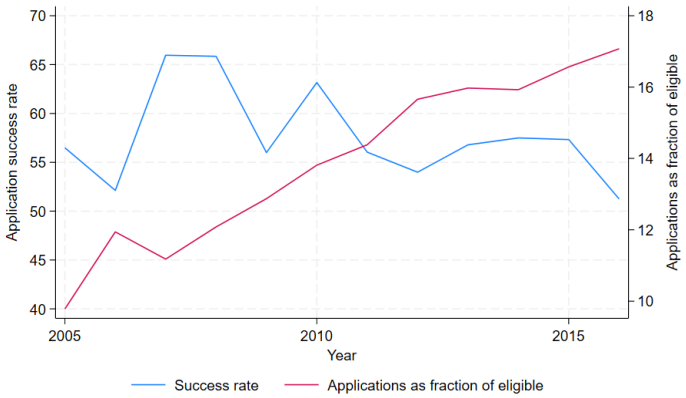
We thus conclude that the growth of WOTC is mostly due to an increase in the number of hires who are eligible. Increases in the application rate plays a meaningful, but more modest role, while changes in application success do not appear to matter. Consistent with this, Panel (c) uses data from the Current Population Survey to estimate the fraction of individuals below the poverty line who would be eligible for WOTC if hired into a new job. This number expands sharply after the 2007 expansion in WOTC eligibility, and after 2010, ranges from 36 to 47% of all adults between 18 to 40 who are below the poverty line.

Appendix Figure A21: Changes in WOTC over time

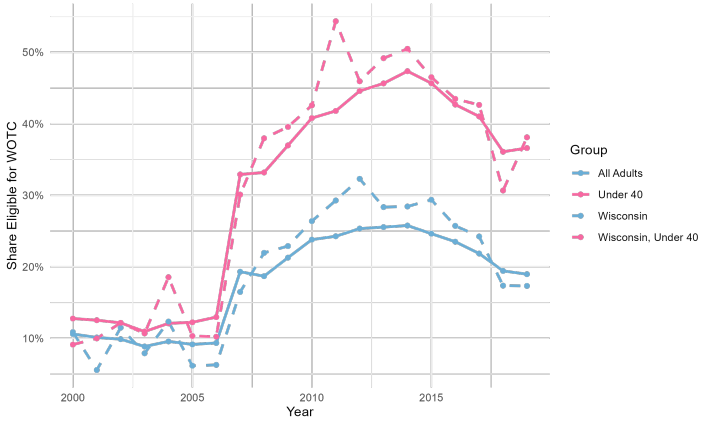
(a) Hires eligible for WOTC in Wisconsin



(b) Firm application behavior in Wisconsin



(c) Share of indiv. below poverty line eligible for WOTC



Note: Panel (a) reports the total number of new hires in Wisconsin in a given year who are eligible for WOTC due to participation in SNAP or TANF, or due to a recent felony conviction (blue line). It also plots this separately for SNAP (pink), TANF (green), and felony conviction (yellow). Panel (b) reports the fraction of WOTC applications that are successfully converted to certifications in a given year (blue line) as well as the fraction of eligible hires for whom firms apply for WOTC in a given year (pink line). Panel (c) uses data from the Current Population Survey to estimate the fraction of individuals below the federal poverty line who would be eligible for WOTC if hired into a new job, estimated separately for all adults (blue solid line), adults under age 40 (pink solid line), all adults in Wisconsin (blue dashed line), and all adults under age 40 in Wisconsin (pink dashed line). Estimates are based on CPS data on unemployment, veteran status, and receipt of SNAP, TANF, and SSI. This leaves out those who may be eligible for other reasons (e.g., felony conviction in the previous year). Combined, these omitted categories typically account for around 10-20% of certifications, meaning the estimates in the figure are likely lower bounds on the true eligibility fraction.

C Data collection details

C.1 Job application details

To learn about the hiring processes of WOTC-using firms, we searched for their online job applications and recorded the information they collect. We used data from FOIA requests to the Wisconsin Department of Workforce Development, which provide the total number of WOTC applications and certifications by firm between 2018 and 2020 (Corwin, 2022),[58] and drew a random sample of firms using probability proportionate to size sampling, with sampling probability based on the number of WOTC applications that the firm had filed over this period.

This generated a sample of 179 firms for which we attempted to locate job applications. When multiple positions were available, we selected the one most likely to hire WOTC-eligible workers, based on posted wage, required skills, or other job attributes. We were able to locate job applications for 77% of these firms, which jointly account for 53% of all WOTC certifications in Wisconsin over the time period. We recorded data on characteristics of the job application process, including any information that the firm collected that may be related to WOTC.[59]

Our main variables of interest in this analysis were whether the firm collected any information related to WOTC, whether this was collected by the firm itself or a third party firm (e.g., a payroll processor or independent tax consulting firm), and whether the job application had any language about how the data would be used. We record that the data was collected by a third party firm only if this was explicitly stated or the data was clearly recorded by an identifiable third party (e.g., the application takes the applicant to the third party firm's website to record WOTC information). We further coded whether the application makes statements about how the WOTC information will be used and the nature of such statements; see Appendix Table A15 for the text from each application.[60]

After completing this process, we decided to run a new analysis testing whether there is a response to WOTC among the set of firms who explicitly screen for WOTC-eligibility on their job applications. To increase statistical power, we considered an additional 60 firms (and were able to find applications for WOTC-relevant jobs for 45). Rather than drawing a new random sample, we selected the firms that had submitted the largest number of WOTC applications among those not already included in our earlier random sample, in order to maximize statistical power. With these firms added, our job-application data cover firms accounting for 62.6% of all WOTC applications in the state. IRP staff then created a flag within the WADC data infrastructure indicating whether a firm screens for WOTC eligibility on its job applications and collects this information directly (as opposed to relying on third-party processors who may not share it with hiring decision-makers). This allowed us to measure whether an individual was hired by one of these firms while preserving firm anonymity.

[58] It was not possible to select firms using the data in our main analysis, as it is anonymized and so researchers using it do not have access to the identity of particular firms.

[59] As an internal check of data quality, we randomly selected 30 firms to assign to different RAs. Cross-checks indicate a high rate of data quality, where, for example, we find that they agree in 97% of cases on whether the job application contained screening questions related to WOTC.

[60] Although our job application data come from 2025, application practices appear highly persistent: among 15 firms for which another study collected data on job applications from 2020-2021 (Rieke et al., 2021), we find that 14 used the same approach to collecting WOTC information in both periods.

C.2 Survey details

To better understand why most firms do not collect WOTC eligibility information, we conducted online Qualtrics surveys through the Prolific platform, which allows pre-screening of respondents based on their answers to an existing Prolific question bank.

C.2.1 Hiring decision-maker survey

Following Agan et al. (2024), who similarly conducted a survey of hiring decision-makers using Prolific, we selected Prolific participants who were age 25-100, based in the United States, and answered "Yes" to the question "Do you have any experience in making hiring decisions?".[61] We then conducted further screening within our survey based on whether respondents worked in firms that participated in WOTC.

The survey asked respondents about the hiring process at their firm, the industry they worked in, and their past hiring experience. We also asked detailed questions about their firm's use of WOTC, including whether and how they screen for eligibility, with a particular focus on the rationale for not conducting explicit screening among firms that nevertheless receive WOTC subsidies. Identifying respondents with the relevant experience was challenging, since only a subset of Prolific participants have hiring responsibilities, and only some of their firms use WOTC. Our final sample consists of 65 respondents whose firms received WOTC subsidies but did not screen for eligibility during hiring. Respondents were compensated at an average rate of $30 per hour.

C.2.2 Manager survey

Following the survey of hiring decision-makers, we conducted a separate survey of individuals who manage low wage workers at firms that participate in WOTC. We pre-screened to Prolific participants who were age 25-100, based in the United States, and worked at a for-profit company "in a position of leadership".[62] We then conducted further screening within our survey based on whether respondents worked with low wage workers in firms that participated in WOTC.

The survey focused on WOTC practices at their firm. We asked detailed questions about their firm's use of WOTC, including who at the firm is involved with or knows about WOTC, what factors go into the decision to retain workers, and the extent to which WOTC affects those decisions. We also asked for their perceptions of the reasons why WOTC may not affect retention decisions. Respondents were given a simple knowledge check of how WOTC works — asking whether firms receive a lump sum payment for hiring WOTC-eligible workers or is it based on the number of hours that they work in the firm — and those who answered incorrectly or stated that they did not know were dropped. Identifying respondents with the relevant experience was challenging, since only a subset of Prolific participants have management responsibilities, and only some of their firms

[61] We conducted three rounds of surveys, with the addition of a few more questions based on feedback we received in seminars. In the third round of the survey, we also restricted to respondents with at least a 99% approval rate on their previous Prolific surveys and who were willing to record audio and video to reduce the likelihood that responses came from AI bots. However, responses were similar across survey rounds, so we do not think this was a major problem even in the earlier rounds.

[62] We also restricted to respondents with at least a 99% approval rate on their previous Prolific surveys and who were willing to record audio and video to reduce the likelihood that responses came from AI bots.

use WOTC. Our final analysis sample consists of 62 respondents. Respondents were compensated at an average rate of $23 per hour.

D Additional Analysis

D.1 Estimating employment effect using a firm-level "adopters" design

Section 4.1 conducted a firm-level analysis exploiting the expansion of WOTC eligibility to a new age group of SNAP recipients. This appendix conducts a similar firm-level analysis but exploits a different source of variation: the staggered timing of firms' initial engagement with the WOTC program. Using an event-study framework centered on the date of each firm's initial WOTC application ("adoption"), we track how firms' hiring behavior evolves as they begin applying for and receiving WOTC subsidies. Understanding these dynamics is helpful as a robustness check for interpreting the worker-level results as well as understanding how firms interact with WOTC and considering possible program reforms. For example, it may take time for firms to adjust hiring practices after they submit their first WOTC application, which could mute estimated effects in the worker-level empirical approaches. Alternatively, it could be that effects arise immediately after adoption while WOTC is most salient to hiring decision-makers, but fade away quickly for most firms. Either scenario carries distinct policy implications: the former points to adjustment frictions, while the latter suggests that increasing salience of WOTC to hiring decision-makers is critical.

In particular, we test whether adopting firms increase hiring of eligible workers (SNAP recipients just below the age-40 cutoff) relative to ineligible ones (SNAP recipients just above age 40), as compared to firms that we observe adopting WOTC in the future (not-yet-adopting firms). This triple-differences style specification leverages variation across firms, time, and eligibility status of hires. By focusing on the *relative* hiring of two highly similar groups of workers, we isolate changes attributable to WOTC adoption rather than other contemporaneous shifts in firm behavior (e.g., firms may tend to adopt WOTC during a period of expansion of the firm's workforce). The identifying assumption is that, at the time of adoption, WOTC-adopting firms do not experience differential shocks to their demand for SNAP recipients just below age 40 relative to those just above age 40 as compared to not-yet-adopting firms.[63]

We compute the average treatment effect on the treated (ATT) for firms at each year relative to adoption by implementing an event-study specification following Callaway and Sant'Anna (2021).[64] The estimating equation is given by:

$$y_{f,t}^{38-39} - y_{f,t}^{40-41} = \alpha_f + \lambda_t + \sum_{\ell \neq -1} \delta_\ell D_{f,t}^{\ell} + \varepsilon_{f,t} \tag{5}$$

where the left-hand side measures, for firm f in year t, the difference in an outcome related to

[63]The main identification threat would be if firms adopted WOTC due to an unrelated increase in demand for SNAP recipients just under age 40. This would bias our estimates upward, i.e., towards finding a hiring effect. Since we estimate precise null effects, this does not appear to be an issue. Appendix D.2 also presents evidence that firms view SNAP-recipient workers just above and below age 40 as close substitutes.

[64]This analysis aggregates the data to the year-level so that the method of Callaway and Sant'Anna (2021) can be implemented, as quarterly data generates too many comparison groups.

SNAP recipients aged 38 or 39 (i.e., eligible for WOTC) minus the same outcome related to SNAP recipients aged 40 or 41 (i.e., just ineligible for WOTC): for example, the difference between the number of hires of SNAP recipients aged 38 to 39 and number of hires of SNAP recipients aged 40 to 41. α_f and λ_t denote firm and year fixed effects, respectively. The variable $D^{\ell}_{f,t}$ is an indicator that equals one if t is ℓ years relative to the adoption year of firm f, and zero otherwise.[65] The coefficients δ_ℓ represent the dynamic average treatment effects at each period relative to adoption, capturing the evolution of the policy's impact. Standard errors are clustered at the firm level. We then estimate an overall effect that aggregates across the five years before and after adoption.

We begin by examining how WOTC adoption affects a firm's receipt of WOTC subsidies over time. In Panel (a) of Appendix Figure A22 (and column (1) of Appendix Table A17), we define the dependent variable as the number of WOTC certifications that firm f receives for applications filed in year t for SNAP recipients aged 38 or 39 at the time of hiring (i.e., eligible for WOTC) minus the number of WOTC certifications for SNAP recipients aged 40 or 41 (i.e., just ineligible for WOTC). Panel (c) (and column (3)) repeats this analysis using SNAP recipients aged 35 to 39 as the eligible group and those aged 40 to 44 as the ineligible group, which improves statistical power and tests robustness to a wider age band than in our worker-level designs.[66] In both specifications, firms show a sharp and sustained increase in (relative) certifications after adoption, with little evidence of subsequent decline: for example, the estimate in column (3) of Appendix Table A17 implies an average of 0.31 more certifications for SNAP workers aged 35-39 versus aged 40-44 annually after adoption. This confirms that adoption leads to a real reduction in the effective cost of hiring eligible workers relative to ineligible ones.

We then turn to whether this reduction in labor costs via WOTC subsidization translates into greater hiring of eligible workers. Panel (b) of Appendix Figure A22 defines the outcome as the number of hires by firm f in year t who are receiving SNAP and are aged 38 or 39 at the time of hiring (eligible) minus the number of hires who receive SNAP and are aged 40 or 41 (ineligible). Panel (d) of Appendix Figure A22 repeats the analysis with the broader 35-39 versus 40-44 comparison. In both cases, we find no evidence of increased hiring of eligible workers despite the economic incentive to do so. Columns (2) and (4) of Appendix Table A17 report aggregated ATT estimates, which are small and precisely estimated relative to the difference in certifications between these groups. These results reinforce the evidence from Section 3: WOTC-adopting firms do not adjust their hiring behavior towards eligible workers in response to the subsidy.

To test whether firms respond by favoring all SNAP recipients, we modify our firm-level approach to compare how firm hiring of SNAP recipients evolves relative to hiring of non-SNAP

[65] The WOTC micro-data begins in 2005, so we cannot observe whether a firm applied prior to that year. To mitigate this, we define adopters as firms whose first observed application occurs in 2007 or later – i.e., firms with no WOTC activity between 2005 and 2006 – since the absence of earlier applications makes it likely that 2007 was their true adoption date.

[66] Using a wider age band is more credible in the firm-level analysis than in the individual analysis in Section 3.1 because the identifying assumptions operate at the firm level rather than the individual level. For example, it is more plausible that an individual firm's demand for 35-39 and 40-44 year-old workers follows similar trends around the time of adoption than that 35-39 and 40-44 year-old workers are on the same labor market trajectories.

recipients around the time of WOTC adoption by the firm. Following Equation (5), we estimate:

$$y_{f,t}^{S} - y_{f,t}^{NS} = \alpha_f + \lambda_t + \sum_{\ell \neq -1} \delta_\ell D_{f,t}^{\ell} + \varepsilon_{f,t} \tag{6}$$

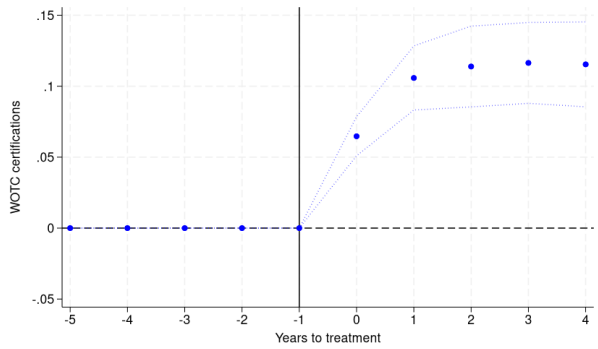
where the left-hand side measures, for firm f in year t, the difference in an outcome related to SNAP recipients aged 18-39 (i.e., the WOTC eligible ages after the 2007 expansion; denoted by the S superscript) minus the same outcome related to non-SNAP recipients ages 18-39 (denoted by the NS superscript). For example, the outcome might be the difference in the number of hires of SNAP versus non-SNAP recipients in these age ranges. The identifying assumption is that adopting firms do not experience differential shocks to their demand for SNAP workers relative to non-SNAP workers compared with not-yet-adopting firms at the time of adoption. The main identification challenge is that non-SNAP recipients tend to have much higher skill profiles than SNAP recipients, and firm demand for high- and low-skill labor may evolve differently around the time of adoption. To address this, we restrict the non-SNAP group to workers whose skill profiles more closely resemble those of current SNAP recipients: individuals who received SNAP benefits at some point in the previous five years but not in the past year.[67] The interpretation of the coefficients is the same as in Equation (5), and we again follow Callaway and Sant'Anna (2021) to compute the ATT for firms in each year relative to adoption.

Panel (f) of Appendix Figure A22 and column (6) of Appendix Table A17 report the results. Pre-trends are flat, indicating parallel trajectories in the difference between SNAP and non-SNAP hiring prior to adoption. Following adoption, firms' demand for SNAP workers relative to non-SNAP workers remains unchanged, despite the sharp relative increase in WOTC certifications for SNAP hires (Panel (e), column (5)). Overall, these findings indicate that the lack of hiring response in our earlier results is not driven by firms misunderstanding WOTC eligibility rules or relying on coarser hiring heuristics such as SNAP status.

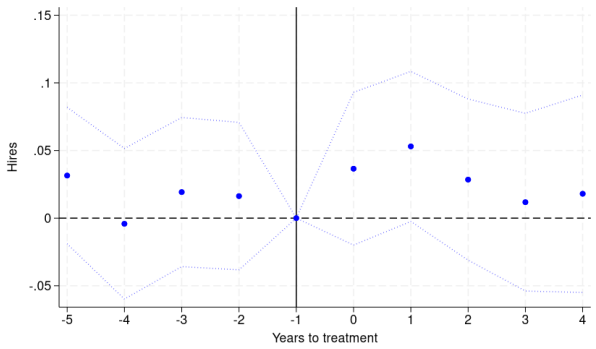
[67] Differences in individual economic trajectories — for example, non-SNAP recipients having longer employment histories or being on a more positive economic trajectory — are not a concern, since identification rests on *firm* demand for these two groups at the time of adoption rather than on their individual labor-market trends. The main identification threat would be if firms adopt WOTC precisely when planning to expand their hiring of SNAP recipients relative to non-SNAP recipients, which would bias the estimates upward. We find no evidence of an increase in SNAP hiring, suggesting this is not a major concern.

Appendix Figure A22: Effect of WOTC on firm-level outcomes

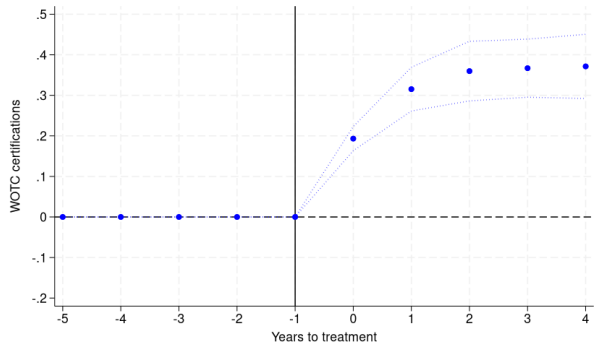
(a) Diff in WOTC certs, SNAP 38-39 vs SNAP 40-41



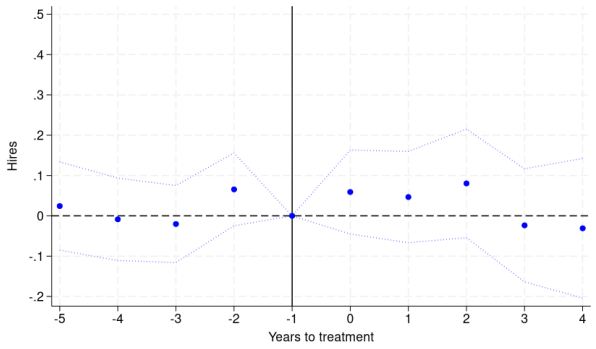
(b) Diff in hires, SNAP 38-39 vs SNAP 40-41



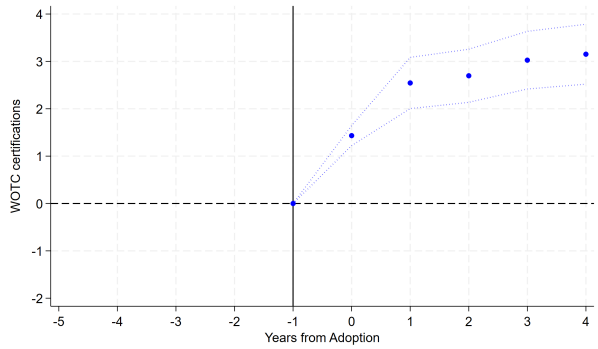
(c) Diff in WOTC certs, SNAP 35-39 vs SNAP 40-44



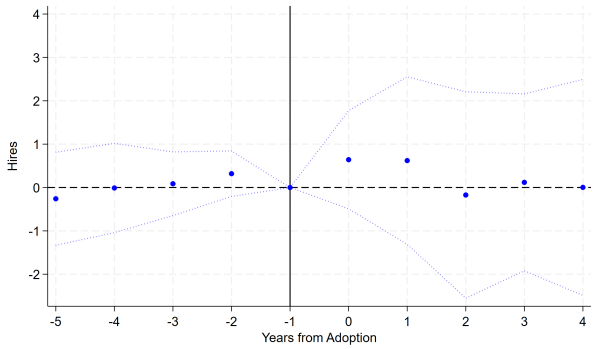
(d) Diff in hires, SNAP 35-39 vs SNAP 40-44



(e) Diff in WOTC certs, SNAP 18-39 vs non-SNAP 18-39



(f) Diff in hires, SNAP 18-39 vs non-SNAP 18-39



Note: Figure reports annual event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) of the staggered firm-level adoption of WOTC (Equation (5)) on utilization of WOTC and hiring, following Callaway and Sant'Anna (2021). Panel (a) defines the outcome as the difference between the number of WOTC certifications for hires who are SNAP beneficiaries aged 38 or 39 (i.e., just eligible for WOTC) and WOTC certifications for hires who are SNAP beneficiaries aged 40 or 41 (i.e., just ineligible for WOTC). Panel (b) defines the outcome as the difference in the number of hires who are SNAP beneficiaries aged 38 or 39 and SNAP beneficiaries aged 40 or 41. Panels (c) and (d) define the analogous outcomes using SNAP recipients aged 35 to 39 as the eligible group and those aged 40 to 44 as the ineligible group. Panels (e) and (f) define the analogous outcomes using SNAP recipients aged 18 to 39 as the eligible group and non-SNAP recipients aged 18 to 39 as the ineligible group. The data is same across all columns, and measured at the firm-year level. All panels include firm and year fixed effects. Standard errors are clustered at the firm level.

Appendix Table A17: Effect of WOTC on firm-level outcomes

	38–39 SNAP vs 40–41 SNAP		35–39 SNAP vs 40–44 SNAP		18–39 SNAP vs 18–39 Non-SNAP	
	Diff. in WOTC certs.	Diff. in hires	Diff. in WOTC certs.	Diff. in hires	Diff. in WOTC certs.	Diff. in hires
ATT	0.100***	0.024	0.310***	0.026	2.460***	0.184
	(0.008)	(0.020)	(0.023)	(0.041)	(0.200)	(0.575)
Observations	51884	51884	51884	51884	51884	51884

Note: Table reports difference-in-differences estimates of the staggered firm-level adoption of WOTC on hiring and utilization of WOTC (i.e., the difference-in-differences version of Equation (5)), following Callaway and Sant'Anna (2021). "ATT" denotes the average treatment on the treated effect of adopting WOTC. Column 1 defines the outcome as the difference between the number of WOTC certifications for hires who are SNAP beneficiaries aged 38 or 39 (i.e., just eligible for WOTC) and WOTC certifications for hires who are SNAP beneficiaries aged 40 or 41 (i.e., just ineligible for WOTC). Column 2 defines the outcome as the difference in the number of hires who are SNAP beneficiaries aged 38 or 39 and SNAP beneficiaries aged 40 or 41. Columns 3 and 4 define the analogous outcomes using SNAP recipients aged 35 to 39 as the eligible group and those aged 40 to 44 as the ineligible group. Columns 5 and 6 define the analogous outcomes using SNAP recipients aged 18 to 39 as the eligible group and non-SNAP recipients aged 18 to 39 as the ineligible group. The data is the same across all columns, and measured at the firm-year level. All regressions include firm and year fixed effects. Standard errors, in parentheses are clustered at the firm level.

D.2 Substitutability of WOTC eligible and ineligible workers

Section 5 considers whether our findings can be reconciled with a standard competitive model, which would require perfectly inelastic labor demand for WOTC-eligible workers and thus imply that eligible and ineligible workers are non-substitutable. This assumption is implausible given that our empirical designs compare nearly identical groups, such as SNAP recipients just above and below an age cutoff. We nonetheless test this explanation empirically using hiring responses to worker exits (Jäger and Heining, 2022). The idea is straightforward: if WOTC-eligible workers are not substitutable with other types of workers (implying perfectly inelastic demand for their services), then their exit should trigger replacement by another WOTC-eligible worker, as opposed to hiring other types of workers. For each firm, we measure the number of exiting workers in a given quarter t who received SNAP and were between the ages of 37.75-39.75 at the time of hiring (eligible exits), as well as those who received SNAP and were between the ages of 42-44 (ineligible exits). Columns (1) and (2) of Appendix Table A18 report how the number of WOTC-eligible hires (SNAP recipients aged 37.75-39.75) in quarter t is related to these exit variables, while columns (3) and (4) report analogous estimates for ineligible hires (SNAP recipients aged 42-44). All regressions include quarter and firm fixed effects; columns (2) and (4) additionally include fixed effects for the total number of exits in the quarter from the firm to account for firm-level shocks to separation and hiring. If the two groups of workers are close substitutes, we would expect similar coefficients in both specifications, i.e., that firms can replace an exiting 37.75-39.75 SNAP recipient with either a 37.75-39.75 or 42-44 year old SNAP recipient (or other types of workers). Consistent with this substitutability, the coefficients on "Eligible Exits" are quite similar across specifications, implying that perfectly inelastic demand is unlikely to explain our findings.

Appendix Table A18: Substitutability of WOTC-eligible and ineligible SNAP beneficiaries

	(1) Eligible hires	(2) Eligible hires	(3) Ineligible hires	(4) Ineligible hires
Eligible exits	0.124***	0.084***	0.107***	0.086***
	(0.025)	(0.013)	(0.020)	(0.011)
Ineligible exits	0.151***	0.114***	0.119***	0.087***
	(0.026)	(0.014)	(0.027)	(0.013)
Firm FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs	Yes	Yes	Yes	Yes
Total Exits FEs	No	Yes	No	Yes
Observations	615668	615264	615668	615264

Note: Table reports estimates from firm-level regressions of the number of quarterly hires a firm made on the number of quarterly exits from the firm. Columns 1 and 2 examine the number of hires of individuals who are between ages 37.75-39.75 and received SNAP benefits for at least 3 of the past 5 months (hires that are eligible for WOTC), while columns 3 and 4 examine hires of those between ages of 42-44 and received SNAP benefits for at least 3 of the past 5 months (hires that are ineligible for WOTC). In both cases, the dependent variable is regressed on the number of exits from the firm in that quarter of individuals with those characteristics. All specifications include fixed effects for firm and year-quarter. Columns 2 and 4 include additional fixed effects for the total number of exits from the firm in that quarter. Standard errors, in parentheses, are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.3 Estimating the extent of stigma

Firms may interpret subsidy eligibility itself as a negative signal of worker productivity. If this is the case, then the effect of the subsidy may be muted because any positive benefit that the firm gets is offset by this negative signal of the worker's productivity. While this mechanism is difficult to isolate, this section presents a test of the relevance of stigma.

Our test exploits the fact that WOTC adoption increases a firm's exposure to information about whether job applicants receive SNAP benefits. After adopting WOTC, firms begin collecting eligibility information through the application or onboarding process. However, while this means that SNAP status may be observed for SNAP recipients aged 40 and above, they do not generate subsidies for the firm. Thus for these workers, SNAP receipt is purely an informational signal with no financial benefit to the firm. If firms view SNAP receipt as a negative signal of productivity, increased awareness of applicants' SNAP status after adoption should lead to reduced hiring of these ineligible SNAP recipients.

To test this, we use a matched difference-in-differences framework and follow the approach in Appendix D.1. In particular, we compare firms that adopt WOTC to a matched set of firms that do not around the time of adoption, and investigate whether hiring behavior changes among the adopting firm.[68] Here, the outcome is the difference between the number of hires at the firm who are SNAP recipients aged 40-42 and the number of non-SNAP hires aged 40-42 in a given quarter. By taking the difference in the number of similar age hires, we remove firm-level trends in hiring of

[68]This differs slightly from Appendix D.1, which uses the approach of Callaway and Sant'Anna (2021) with not-yet-adopter firms as the comparison group. For this analysis, there are not enough not-yet-adopter firms to serve as a comparison group, so we use the matched difference-in-difference design. The matching variables and process are the same as in section 4, where we match over the 8 quarters prior to adoption for each adopting firm. We then construct a a stacked event study around the adoption episodes.

workers in this age range that are unrelated to SNAP status. If stigma were operative, we would expect that adopting firms reduce their hiring of SNAP recipients relative to non-SNAP workers in this age group after they begin engaging with WOTC.

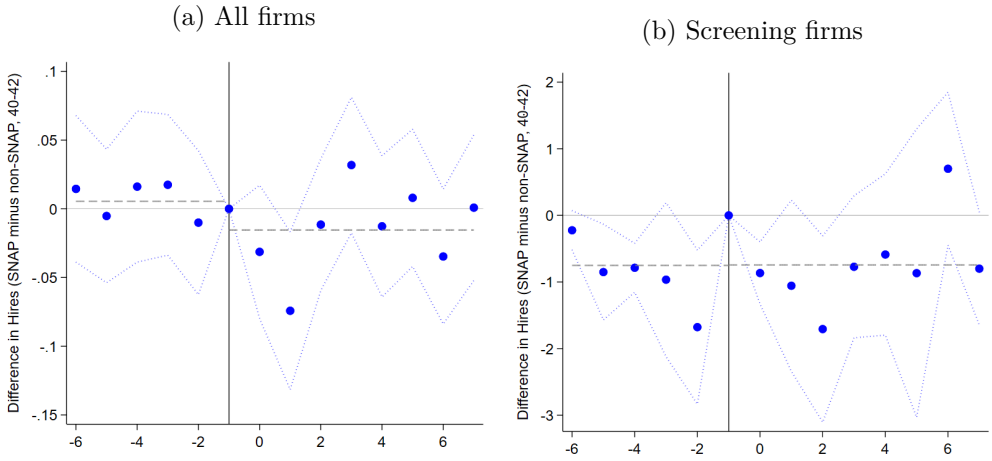
Column (1) of Appendix Table A19 and Panel (a) of Appendix Figure A23 report results for all WOTC-using firms: the estimated coefficient is small and statistically indistinguishable from zero, with no differential trend before or after adoption. Column (2) and Panel (b) repeat the analysis restricting to firms that internally screen for WOTC eligibility on their job applications after adoption—i.e., those most likely to observe applicants' SNAP status—and again find a point estimate close to zero with no change in hiring. These results suggest that firms do not penalize SNAP recipients in hiring by interpreting SNAP receipt as a negative signal, which is perhaps unsurprising given that SNAP recipients make up a sizable fraction of the low-wage labor market. However, stigma may play a more meaningful role for other WOTC eligibility groups, such as TANF recipients or individuals with a felony conviction.

Appendix Table A19: Matched DiD analysis on effect of SNAP adoption on hiring of ineligible SNAP recipients relative to non-SNAP recipients

	All firms	Screening firms
Post X Treatment	-0.012	0.026
	(0.012)	(0.154)
Observations	179554	1437

Note: Table reports matched difference-in-differences estimates of the effect of WOTC adoption on firms' hiring of SNAP recipients aged 40-42. The outcome variable is the difference between the number of hires at the firm in quarter t who are SNAP recipients aged 40-42 and the number of hires who are non-SNAP recipients aged 40-42. Column (1) includes all firms that adopted WOTC during the sample period, compared to a matched set of observationally similar firms that did not adopt WOTC over the same period. Column (2) restricts the sample to WOTC-adopting firms that explicitly screen for WOTC eligibility on their job applications. All regressions include firm and year-quarter fixed effects. Standard errors, in parentheses, are clustered at the firm level.

Appendix Figure A23: Matched DiD analysis on effect of SNAP adoption on hiring of ineligible SNAP recipients relative to non-SNAP recipients



Note: Figure reports quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the matched difference-in-differences analysis of WOTC adoption on hiring of SNAP recipients aged 40-42 relative to non-SNAP recipients aged 40-42. Panel (a) includes all WOTC-adopting firms; Panel (b) restricts to firms that explicitly screen for WOTC eligibility on job applications. Horizontal gray dashed lines report the average of the point estimates before and after adoption. Standard errors clustered at the firm level.

D.4 Effects of reducing WOTC application costs

The analysis in Section 3 examined the effect of expanding eligibility for wage subsidies under WOTC. This section analyzes a reduction in the cost to firms of filing for WOTC through the introduction of electronic filing (eWOTC), which occurred in June 2017. The blue line in Appendix Figure A24 shows, using quarterly state-level WOTC application data from the US Department of Labor, that this led to a massive increase in the number of WOTC applications.To check that this increase was not driven by aggregate changes to labor markets at this time, the black line shows the number of quarterly WOTC applications in the neighboring state of Minnesota, which did not adopt eWOTC at this time. Although the two are similar prior to June 2017 in both levels and trends, applications increased markedly and persistently in Wisconsin following its implementation of eWOTC. We examine whether this increase also caused increases in employment and earnings of eligible SNAP recipients relative to ineligible ones.

We adopt the same event study specification as in Equation (1), but around June 2017 rather than January 2007. We again define our treatment and control group as individuals receiving SNAP in at least three of the past five months who were slightly younger and slightly older than 40 (i.e., aged 37.75 to 39.75 and 42.0 to 44.0, respectively). This specification estimates a fundamentally different treatment effect in that it picks up the effect of participation costs to the firm (as opposed to the effect of the existence of a subsidy for a particular worker). The policy may induce responses among a different set of firms, and so have a potentially different effect on employment. This is particularly relevant for policy since one of the most commonly cited reasons for low uptake of WOTC is the cost of filing (Hunt et al., 2018). This analysis measures whether the natural policy response to this problem – lowering those costs – has desirable effects. Our findings also serve as a policy evaluation of the consequences of switching to electronic filing, which is relevant to other

states considering this.

Appendix Figure A25 and Appendix Table A20 analyze the effect of electronic filing on the same set of outcomes as in Section 3.1. Similarly, we find no evidence of effects on labor market outcomes (panels (c)-(e) and columns 3-5), public assistance usage (column 6), or criminal activity (column 7), despite an effect on WOTC certifications (panels (a) and (b) and columns 1 and 2). This provides further evidence against the efficacy of wage subsides for promoting employment among this population, as well as suggesting that one policy idea for improving WOTC – lowering access costs – does not appear to achieve desired outcomes; instead, it just makes it easier for firms to collect the subsidies.

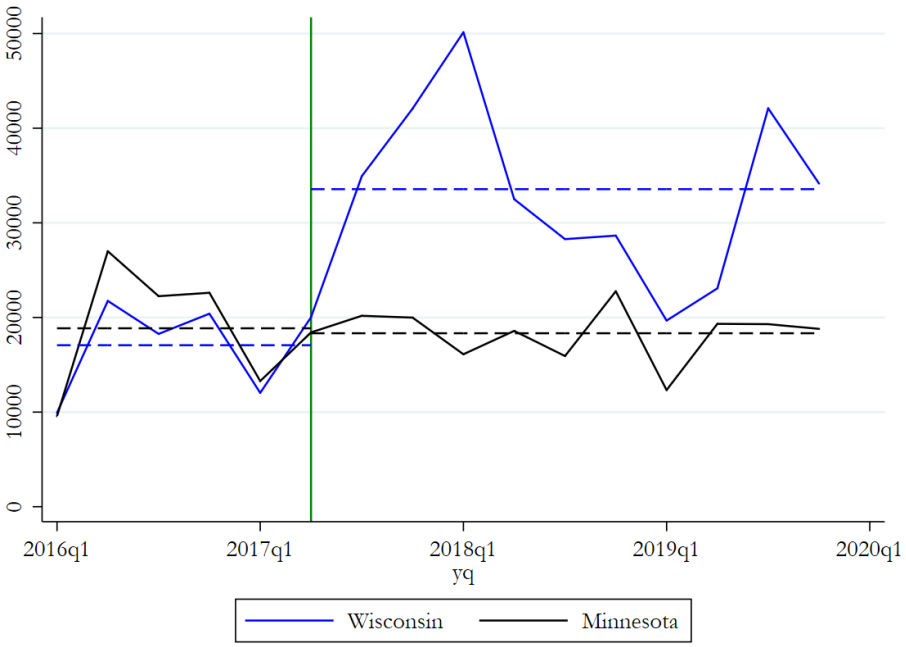
This analysis also sheds light on a potential mechanism for why WOTC may not influence hiring decisions. One possibility is that firms interpret subsidy eligibility as a negative signal of productivity. If the perceived stigma associated with WOTC eligibility exactly offsets the financial value of the subsidy, then firms would have no incentive to alter hiring. As discussed in Section 5, such a knife-edge case is unlikely given the massive changes in the profile of WOTC eligible workers over time. Moreover, the introduction of electronic filing reduced the cost of claiming WOTC by making applications substantially easier, thereby increasing the net value of the subsidy. If the prior absence of hiring effects reflected a precise offset between subsidy value and perceived stigma, then lowering application costs should have shifted the balance and increased hiring of eligible workers. In practice, we find no such response. The lack of hiring effects following electronic filing is therefore inconsistent with stigma perfectly off-setting the value of the subsidy.

Appendix Table A20: Effect of eWOTC on individual outcomes, DD analysis from eWOTC implementation

	(1) WOTC certified job	(2) WOTC certified hire	(3) Employed	(4) New hire	(5) Earnings	(6) Public benefit (amt)	(7) Convicted
Treat x post	0.0058***	0.0044***	0.0036	0.0031	5.9414	-4.2877	-0.0001
	(0.0018)	(0.0007)	(0.0045)	(0.0023)	(26.5080)	(8.2216)	(0.0007)
Dep var mean	0.0141	0.0041	0.4306	0.1032	2065.3648	761.4534	0.0089
Observations	391985	391985	391985	391985	391985	391985	391985

Note: Table reports difference-in-differences estimates from the 2017 implementation of electronic filing of WOTC applications. Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, earnings, the dollar amount of public benefits (from SNAP, TANF, and UI), and having a criminal conviction. Controls include age (in months) fixed effects, year-quarter fixed effects, and a control for earnings in the quarter preceding the sample period. Standard errors, in parentheses, are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

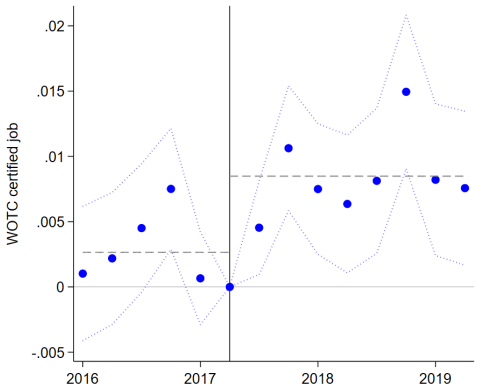
Appendix Figure A24: Quarterly WOTC applications in Wisconsin and Minnesota, 2016-2019



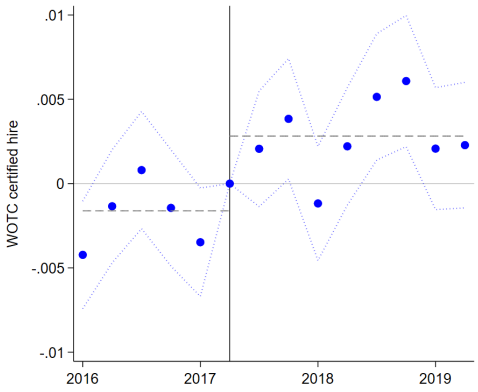
Note: Figure reports total WOTC applications in Wisconsin and Minnesota by quarter of application from 2016-2019 using Department of Labor WOTC data. The vertical green line indicates the date of e-filing adoption in Wisconsin.

Appendix Figure A25: Effect of eWOTC on individual outcomes, event study analysis of eWOTC implementation

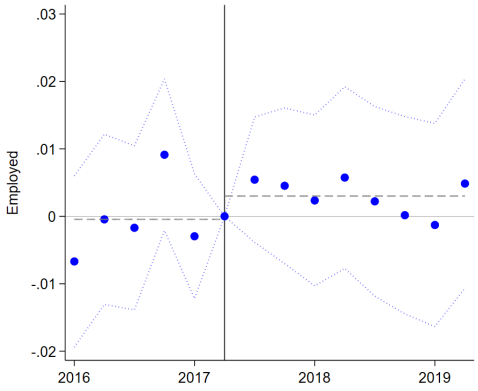
(a) WOTC certified job



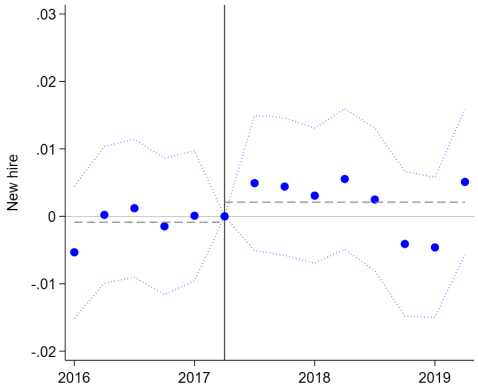
(b) New hire into WOTC certified job



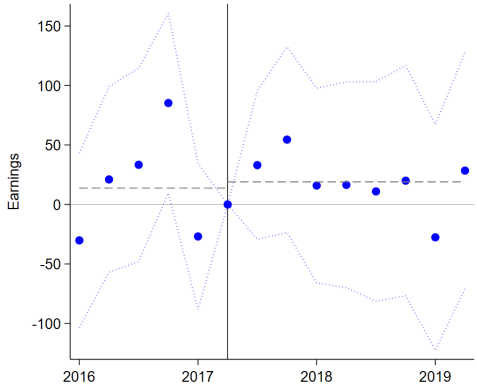
(c) Employed



(d) New hire



(e) Earnings



Note: Figures report quarterly event study estimates (large blue dots) and 95% confidence intervals (small dotted blue lines) from the 2017 implementation of electronic filing of WOTC applications. Outcomes include employment in a WOTC-certified job, being newly hired into a WOTC-certified job, employment, being newly hired into a job, and earnings. Controls include age (in months) fixed effects, year-quarter fixed effects, and earnings in the quarter preceding the sample period. Standard errors are clustered at the individual level. Vertical gray solid line denotes the quarter prior to the 2017 expansion date, and the horizontal gray dashed lines report the average of the point estimates before and after that date.

D.5 Audit study analysis

The absence of explicit WOTC screening does not imply zero effects. Hiring managers could still respond to observable characteristics correlated with eligibility, such as age, even without knowing applicants actual WOTC status. This is particularly relevant in low-skill and entry-level jobs, where SNAP receipt is common. To test this, we re-purpose audit study data from Kline et al. (2024), which submitted more than 83,000 fictitious job applications to entry-level positions in large U.S. firms while randomizing applicant characteristics such as age (assigned from a uniform distribution between ages 20-62). This design allows us to test whether firms respond differently to applicants just above versus below age 40, the WOTC eligibility cutoff for SNAP recipients after 2007. The replication data also provide the name of each firm to which an application was sent. We match these names to FOIA-based administrative data on WOTC applications filed by firms between 2018 and 2020 (Corwin, 2022), which enables us to separate WOTC-using firms from non-users.

Column (1) of Appendix Table A21 restricts to the set of applications to firms who use WOTC and runs a similar regression discontinuity framework as in Section 3.2. This tests whether the likelihood of a callback is higher for applicants whose randomized age places them within the WOTC eligibility cutoff, and does not find a statistically significant response. Column (2) replicates this analysis for non-WOTC firms to verify that no other policies generate discontinuities at the same age threshold, while column (3) differences the two sets of estimates in a differences-in-discontinuities design, again finding no evidence of an effect. Columns (4) and (5) further restrict the sample in column (1) to WOTC-using firms and applicants whose other randomized characteristics could be interpreted by firms as signaling a higher likelihood of SNAP receipt: lacking a college degree and race. Again, we find no differential callback rates related to plausible WOTC eligibility. Taken with the evidence from Section 5, these results suggest that firms do not incorporate WOTC eligibility into hiring either explicitly (via direct screening questions) or implicitly (via correlates of eligibility).

Appendix Table A21: Audit study analysis

	Type of firm		Diff-in-RD	Applicant type (WOTC firms)	
	WOTC firm	Non-WOTC firm	.	Black	Non-college
RD_Estimate	-0.038	0.011	-0.049	-0.054	-0.026
	(0.029)	(0.038)	(0.048)	(0.034)	(0.032)
Dep var mean	0.241	0.242		0.241	0.242
Bandwidth	7.627	8.070		6.657	7.547
Effective Obs	19946	12755		8627	10227

Note: Table reanalyzes audit study data from Kline et al. (2024), which randomized applicant characteristics, including age, and include firm identifiers in their replication data. We link this data with FOIAed WOTC data from 2018-2020 (Corwin, 2022) using firm identifiers and apply the same regression discontinuity design as in Section 3.2 to test whether call-back rates vary by applicant age around the WOTC eligibility threshold (age 40). In columns (1) and (2), we classify firms as WOTC users or non-users using FOIA data on WOTC applications from 2018-2020 (Corwin, 2022), and estimate the specification separately for each group. Column (3) presents the difference between the two, following a differences-in-discontinuities approach. Columns (4) and (5) restrict the sample to WOTC-using firms and focus on applicants who may be more likely perceived as SNAP recipients: Black applicants and those without a college degree.