Why Don't Eligible Firms Claim Hiring Subsidies?
The Role of Job Duration

Sarah Hamersma
University of Florida
this draft: 4/10/06

Abstract

Many firms are qualified to claim federal tax credits for hiring workers who are deemed "disadvantaged" by the government; two current programs are the Work Opportunity Tax Credit (WOTC) and Welfare-to-Work Tax Credit (WtW). However, the fraction of eligible workers claimed by firms is very low, which may reflect low perceived benefits of participation. Benefits are determined both by the total earnings of a worker and the number of hours worked (with higher subsidy rates per hour for those above certain job-duration thresholds). In this paper, I estimate the relationship between a firm's WOTC/WtW participation and the distribution of its eligible workers' job durations. Using unique Wisconsin administrative data to calculate hours worked for WOTC/WtW workers, I find that the distribution of workers across subsidy rates (determined by hours worked) has the expected relationship to participation: firms with a larger fraction of workers exceeding the programs' job-duration thresholds are more likely to claim the WOTC/WtW. However, this does not necessarily imply a causal effect of hours distributions on participation, since participating firms may intentionally increase workers' job durations. I use the discontinuities in WOTC/WtW subsidy levels to assess whether firms increase job durations near the job-duration thresholds, where benefits from influencing hours would be greatest. Participating firms do not seem to respond to the thresholds, perhaps because they are unable to effectively influence workers' job duration on the margin. This suggests that my initial finding of a positive relationship between hours distributions and participation can be interpreted causally: stronger job duration distributions make firms more likely to participate in the tax credit programs.

I. Introduction

For over 30 years, the U.S. government has encouraged the hiring of disadvantaged workers by allowing firms with qualified workers to claim federal tax credits. The Work Opportunity Tax Credit (WOTC) and Welfare-to-Work Tax Credit (WtW) are available to firms that hire certain workers from a number of target groups, such as welfare recipients, young food stamp recipients, young workers from economically depressed areas, and ex-felons. Despite substantial labor market participation by these groups, only a small percentage of firms claim the subsidies for which they qualify. For example, Wisconsin microdata suggest that in the year 2001 alone, employers left an estimated $8 million unclaimed for qualified welfare and food stamp recipients (plus an unknown amount for workers in the other target groups). Since Wisconsin only accounts for about two

percent of the U.S. population (and two percent of all WOTC/WtW certifications), unclaimed benefits nationwide may be worth over $400 million per year. Moreover, low participation in employer subsidy programs is not a new phenomenon, but has persisted for decades in a variety of similar programs.

Why do firms leave these subsidies unclaimed? Possible explanations for this puzzle include lack of information, discomfort with involvement in government programs, or low benefits from participation relative to administrative costs. In this study I examine the merits of the last explanation. In particular, I investigate the potential role of worker "hours requirements," which tightly link subsidy rates to the job duration of qualified employees. Such requirements have been a standard feature of targeted employer tax credit programs since the 1970s. These requirements can limit program benefits and generate uncertainty about the level of benefits to be expected. Specifically, a firm must apply for the tax credits at the time it hires a qualified worker, even though the firm will only be permitted to claim a subsidy if the worker stays with the firm for a certain length of time. This combination of up-front costs and uncertain benefits might discourage some firms from participating. Understanding the potential role of hours requirements in the participation decision may provide needed insight into firms' continually low interest in employer subsidies.

The hours requirements of the WOTC and WtW programs were designed to encourage firms to increase job duration among the disadvantaged. A firm qualifies for a subsidy only if an eligible worker remains employed for at least 120 hours, and the subsidy rate increases if they exceed 400 hours. The WtW requires 400 hours of work. This structure creates a large jump in the subsidy value of workers when they cross one of these thresholds.

In this paper, I estimate the relationship between a firm's WOTC/WtW participation and the distribution of its eligible workers' job durations, which is a key determinant of potential benefits. I use a unique set of Wisconsin administrative data, which links the state's WOTC/WtW job records (containing hourly wage data) to their corresponding Unemployment Insurance records (containing total earnings data). This allows me to conduct the first examination (to my knowledge) of the distribution of job durations for WOTC/WtW workers. I then compare this distribution to an estimate of the hours distribution for other WOTC/WtW-eligible workers whose employers did not apply for the credits.[1] A reasonable explanation for these firms' non-participation may be that

---

[1] I limit this analysis to a (large) subset of the WOTC/WtW-qualified population, namely welfare and food-stamp recipients. Since I do not have WOTC/WtW records for the whole sample (only those with WOTC applications), I do

they would have gained little from the subsidy program. If firms form expectations based on their typical hours distribution, then I expect to see higher participation among firms with stronger distributions, i.e. with more workers in the higher subsidy brackets. Using a probit model in which I control for relevant covariates, I find support for this hypothesis: firms with a larger fraction of workers in the higher brackets are more likely to claim the WOTC/WtW.

Although this relationship is interesting, it does not necessarily imply a causal effect of hours on participation if, as theory would predict, participating firms maximize WOTC/WtW benefits by intentionally increasing workers' job duration (after the participation decision has already been made). Fortunately, the discontinuities in WOTC/WtW subsidy levels allow me to investigate this possible "reverse causality". I do this by examining firms' responses to the particularly strong incentive to increase job durations near the hours thresholds, where benefits from influencing job duration would be greatest. While participating firms have an overall incentive to increase job duration - since the total subsidy increases with each hour worked - firms still face some cost to increasing duration if it does not move a worker into a higher subsidy bracket.[2] In contrast, increases in tenure near the thresholds can provide net benefits to firms, as the change in the subsidy rate more than compensates for the wage costs of a few additional hours of work. Professional tax credit consultants recognize this; for example, one consultant provides firms with "Credit Maximizer" reports that enable companies to "closely monitor all employees eligible for the Work Opportunity Tax Credit that are less than 10 hours away from qualifying for the tax credit."[3] If participating firms can influence job duration on the margin, the hours distribution should contain a dip for hours levels just under each threshold, and a spike just above, indicating that a firm was able to extend the job duration of some workers to take advantage of the higher rate. This type of analysis, using histograms or kernel density estimators, has been used in recent work by Saez (2002) in assessing responses to marginal tax rates and Blundell and Hoynes (2003) in noting responses to an hours-worked requirement for a UK welfare program.

My analysis of participating firms' hours distributions indicates that firms do not respond to the program's incentives for increasing job duration near the hours thresholds. This may be because firms do not take the subsidies into account or because the bulk of separations are driven by quit

not have access to starting wages for every worker. However, I do have their total earnings at the qualified job. I use an imputation strategy to estimate these workers' wages based on characteristics such as industry, education, etc. I then use this imputation combined with their total earnings to estimate their hours worked.

[2] These net costs are the portion of wage costs that are not reimbursed by the subsidy.

[3] See details at http://www.netprofitincrease.com/services_wotc.asp.

behavior. My findings suggest that the difference in job duration distributions across participating and non-participating firms is unlikely to be a result of participation itself, so hours distributions do not appear to be endogenous to participation. I conclude that my initial finding of a positive relationship between hours distributions and participation can be interpreted causally: stronger job duration distributions make firms more likely to participate in the tax credit programs.

This paper proceeds as follows: I begin by describing relevant features of the WOTC and WtW tax credits. I then discuss participation patterns in the WOTC/WtW and the existing research on potential benefits of the credits to firms. After describing my data, I examine the hypothesis that firms' participation in the WOTC/WtW is affected by the hours distribution of their workers. I follow with an investigation of the possible endogeneity of hours in the participation equation by examining firms' responses to the job-duration incentives of the WOTC/WtW near the hours thresholds. I conclude with a summary of the results and their policy implications.

II.   The Work Opportunity and Welfare-to-Work Tax Credits

The Work Opportunity Tax Credit was introduced in 1996 and can be claimed by any for-profit firms that hire workers from a variety of targeted disadvantaged groups. The similar Welfare-to-Work Tax Credit was introduced in 1997 and applies only to long-term welfare recipients. Both credits have been reauthorized multiple times.[4] For a firm to claim the WOTC, which is available for one year, an eligible employee must work at least 120 hours to qualify the firm for a 25 percent subsidy and at least 400 hours for a 40 percent subsidy. The WtW requires 400 hours of work to obtain a 35 percent subsidy, and allows a second year of subsidy at a 50 percent rate. These tax credits are subject to a per-worker cap, set at $2400 per WOTC worker (for one year only) and $8500 per WtW worker (total for two years).[5] Those who qualify for the WtW automatically qualify for the WOTC as well, which requires less welfare receipt than the WtW. Firms can apply for certification for both credits when they hire a long-term welfare recipient, but are permitted to claim only one (which they can choose *ex post* based on whichever is more advantageous). The WOTC is

---

[4] The WOTC was initially introduced as part of the Small Business Job Protection Act of 1996 (P.L. 104-188). The WtW was introduced as part of the Taxpayer Relief Act of 1997 (P.L. 105-34). Both programs were most recently reauthorized in the Working Families Tax Relief Act of 2004 (P.L. 108-311) and will expire in December 2005.

[5] A study by the GAO (2001) suggests that only a very small portion of WOTC workers reach the maximum credit, and that firms do not appear to dismiss these workers when they reach this maximum credit (as we might expect based on the incentives of the program). I can confirm that a similarly small portion of my sample achieves the maximum credit; given the small size of this group and the evidence from GAO (2001), I do not spend time addressing this aspect of the program's incentives in this study.

4

usually more generous than the WtW in the first year, and only a small fraction of workers continue work into a second year, so the WtW is claimed much less frequently.[6] For simplicity, I refer to the pair of programs as "WOTC" in cases where the distinction between the programs is unimportant..

The WOTC is essentially a reformed version of the Targeted Jobs Tax Credit (TJTC). The TJTC began in 1978 and was allowed to expire in 1994 after a report from the Office of the Inspector General indicated little success in improving labor market outcomes for the targeted groups (OIG, 1994). A key distinction between the TJTC and the WOTC is a difference in hours requirements.[7] When it expired, the TJTC had a single 120-hour threshold and a 40 percent subsidy rate. When the WOTC was introduced in 1996, it maintained the single-rate system, but made it less generous by reducing the rate to 35 percent and requiring at least 400 hours of work (in an effort to encourage longer job tenure).[8] However, in the reauthorization process just a year later, there were important revisions to the hours requirements. A new "lower level" (25 percent) subsidy bracket was introduced for workers who were employed for at least 120 hours, and the subsidy rate for the higher bracket (400 hours +) was increased to its current level of 40 percent.[9] Figure 1 illustrates this schedule of potential benefits to a firm in the case of a worker earning $6 per hour (a typical wage for Wisconsin WOTC workers).
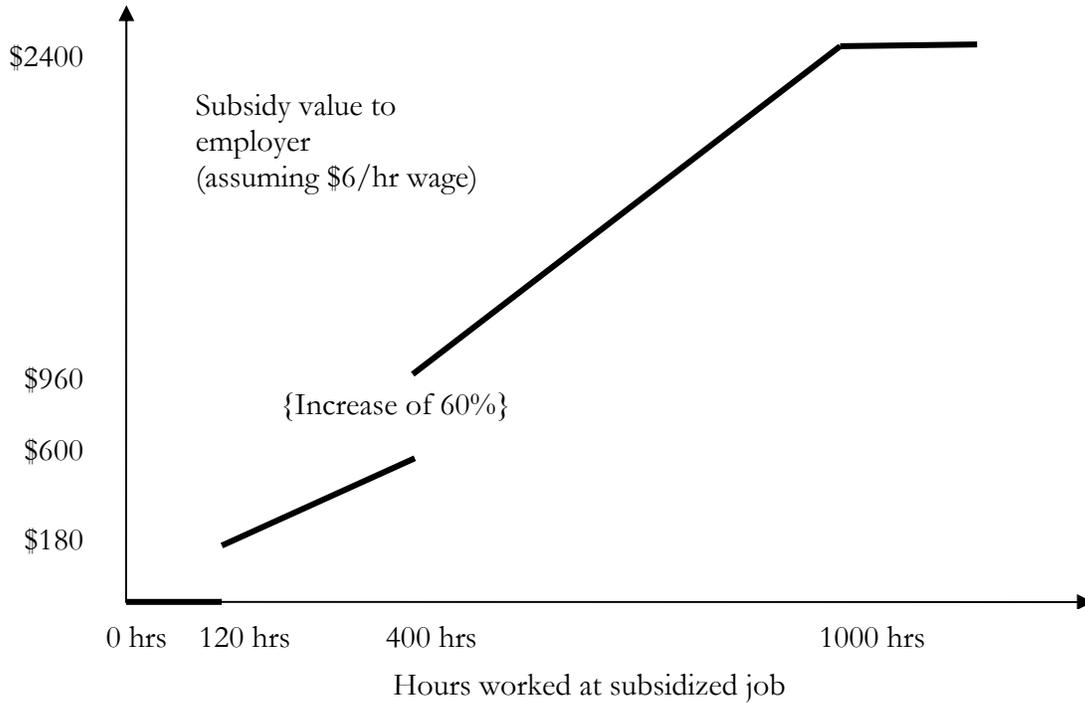
---

[6] The WtW is only potentially more valuable to the firm than the WOTC in the first year if a worker has enough earnings to reach the maximum WOTC subsidy ($6000 in earnings, for the maximum $2400 credit) and continues to generate additional earnings. This is because the WtW maximum credit is higher, at $3500 (applying to up to $10,000 in earnings), even though its subsidy rate is lower (35% rather than 40%). In every case for workers below this threshold, the WOTC is more valuable to the firm, since the subsidy rate is higher and there is a subsidy available for 120-399 hours of work (for which no WtW credit would be given). Unfortunately, it is not possible to identify which subsidy was claimed by a given firm for a particular worker. However, the average government spending per WtW certification granted is only about $325 (Hamersma, 2003), which suggests that the vast majority of WtW certifications do not get claimed under WtW, but are instead claimed under WOTC or not at all.

[7] Other differences between the programs are discussed in Hamersma (2003).

[8] The program also allowed "180 days of employment" as an alternative to the 400-hour requirement. I focus on the hours requirements rather than the "number of days" requirements. This is in primarily because the hours requirement would in most cases be met prior to the days requirement (making the days requirement non-binding) and also because my data allow me to estimate hours of work but not number of days employed.

[9] This change is found in the Taxpayer Relief Act of 1997, which also introduced the WtW. The WtW has a different kind of two-tier structure: the 400-hour requirement must be met for any subsidy to be given, and the subsidy rate is 35% in the first year and 50% in the second year.

Figure 1: WOTC Subsidy Structure

The incentives created by this structure are a key issue in this study and will be discussed in the analysis of firms' participation decisions.

The rationale for the change to a two-tier structure was stated clearly by Senator Lincoln Chafee:

> This is necessary because many employers were finding it difficult to retain these employees for…400 hours, and as a result were losing the benefits of the tax credit. In many cases the employers were spending the money to train the employees only to have them leave shortly thereafter for higher paying jobs. Without some reward for their efforts, employers were simply dropping their programs. (143 Congressional Record S 8415)

It is noteworthy that at the time this policy change was introduced, there was already concern that hours requirements may discourage firms from participating in the program. However, no research has been undertaken to investigate this issue.

III. WOTC Participation and its Potential Benefits to Firms

Some particular features of the administrative process for claiming the WOTC may affect firms' willingness to participate. First, the application is quite simple, and is the same for both tax credits. This paperwork is less burdensome than that under the TJTC, and state offices or firms' tax consultants (rather than the firms themselves) often do much of the documentation of workers' eligibility. This improvement was intended to promote higher levels of participation than those under the TJTC. Second, the process is designed to explicitly encourage the marginal hiring of workers who might not otherwise be hired; this is reflected in a requirement that the initial eligibility assessment be filled out on or before the date of hire.[10] This, too, is a reaction to concerns about the TJTC, through which firms could apply for subsidies for any of their currently eligible workers (rather than new hires only), resulting in little effect on hiring (Lorenz, 1995). Thus, while the paperwork is not particularly burdensome, firms must apply quite early in the work relationship. This means firms must pay their costs of participation "up front" – both by learning how to implement the program overall (fixed costs) and by filling out each worker's paperwork at the time of hire (marginal costs). The benefits of participation are determined later, via the job duration and earnings of certified workers.

The evidence on participation in the WOTC indicates that the vast majority of eligible workers are not claimed by their employers for the subsidies. Hamersma (2003) estimates the number of WOTC-eligible workers in the food-stamp and welfare target groups nationally (counting only those who obtained a job while eligible) and compares these estimates to the number of WOTC certifications granted for these groups. Participation rates in 1999 are estimated to be between 1 percent and 17 percent for food stamp youth, and a bit higher (10 percent to 32 percent) for welfare recipients.[11] These represented increases from the first year of available data examined in the paper (1997), and perhaps increases relative to the TJTC, for which estimates ranged from less than 5 percent to about 10 percent (see O'Neill, 1982; Christensen, 1984; and Katz, 1998). However, the estimated levels remain inexplicably low given the high levels of potential subsidy – up to $2400 per WOTC worker – and the fairly low participation costs.

---

[10] This form is IRS 8850, or the "Pre-Screening Notice." It requires the worker to fill in basic information (name, etc.) and to check a box if they think they may qualify for one of the listed target groups. If the worker checks a box indicating potential eligibility, a second one-page form (ETA 9061) must be submitted with additional documentation.
[11] Bounds are reported instead of point estimates due to substantial missing data that were alternately imputed in "conservative" and "liberal" ways to get the widest possible range of estimates consistent with the data.

A variety of explanations have been proposed for employers' lack of participation in the WOTC and similar programs. In studies of the TJTC, researchers suggested that information costs were a main reason for firms' lack of participation (Bishop and Kang, 1991). Given that many states now have program descriptions and forms available on their websites (as does the federal government) this reason is less compelling now than in the past. Other researchers have emphasized the role of worker stigma (see, for example, Dickert-Conlin and Holtz-Eakin, 2000); however, under the WOTC, workers do not need to initiate discussion of their eligibility as they did under some forms of the TJTC. It is possible that some workers choose not to fill out the WOTC form enclosed in their job application (or to fill it out dishonestly) due to stigma. It is not clear whether this concern would induce *firms* to decide not to participate at all in the program. Finally, some have argued that firms are simply uncomfortable with involvement in government programs, perhaps because they believe they may become more susceptible to audits or other government intervention. This discomfort would have to be significant to generate such low interest in a program that has the potential to provide substantial tax relief.

Perhaps the most plausible explanation for low participation is that firms hiring eligible workers choose not to participate because the benefits of participating simply do not exceed the costs. Note that the "costs" here are limited to the administrative costs of participation, since these firms will bear any additional costs of hiring a disadvantaged worker (such as extra training, etc.) regardless of whether they claim the WOTC. These administrative costs are not likely to exceed the potential benefit of $2400 per-worker WOTC subsidy; however, the maximum benefit is not necessarily the relevant comparison. Based on the total federal tax costs of the program relative to the number of certified workers, Hamersma (2003) estimated average WOTC returns of about $1000 per worker in the year 2000. Some employers seem to be aware of the potential for limited returns. In a survey of 101 temporary help services firms, Hamersma and Heinrich (2005) found that 26 of the 73 firms that had heard of the WOTC or WtW did not participate. Several indicated that they did not have enough eligible workers, and a few indicated that workers' job duration was too short to make participation worthwhile. The remainder of this paper investigates how the limits on subsidies for short-tenure jobs may affect firms' WOTC participation decisions.

IV.   Description and Summary of Data

There is no direct source of job duration data for any past or current employer subsidy participants. This is probably an important reason that there have not been any studies on their hours distributions. In the case of the WOTC, the Department of Labor (DOL) administers the certification for the programs, handling employer applications and certifying workers' disadvantaged status, but it does not collect data on job duration following certification. Instead, the IRS is charged with enforcing the hours requirements when firms claim the tax credits. The form that employers submit to the IRS is very brief, reporting only the total dollar value for which they are claiming each subsidy rate.[12] It follows that even merged DOL and IRS data would not provide information on individuals' job duration, despite the important role it plays in determining benefits.

I have assembled unique merged data from the state of Wisconsin that allow me to examine the hours worked by subsidy-certified individuals for the first time. The state WOTC database for late 1998 through early 2003 supplies information from all WOTC and WtW applications, including each worker's Social Security Number (SSN), target group (ex. welfare, food stamps), occupation, job start date, employer identification number, and starting wage. I merge these data to the state's Unemployment Insurance (UI) employment records for 1995-2004 by individual SSN. The UI records provide quarterly earnings data, industry, and employer identification numbers. By matching the employer identification numbers to the WOTC records, I can identify the WOTC job in the UI data. I then calculate the job duration at this firm (in hours) by dividing total UI earnings by the starting wage given in the WOTC record.[13]

Summary statistics for the Wisconsin WOTC population are provided in Table 1. The majority of WOTC-certified workers are either welfare recipients or food stamp recipients. Note that though there are many WtW certifications, employers may ultimately claim the WOTC for these workers instead if it is more advantageous (which is often the case). This means the WOTC hours thresholds are still potentially relevant, so I treat long-term recipients as regular WOTC certifications for purposes of my analysis. Table 1 also reports that over 60 percent of all certified workers earn less than $7.00 per hour, which is likely related to their often poor educational backgrounds or lack

---

[12] The relevant forms are IRS 5884 for the WOTC and IRS 8861 for the WtW.
[13] All of these data were generously provided by the Wisconsin Department of Workforce Development, in conjunction with the University of Wisconsin's Institute for Research on Poverty (IRP). The employer identifiers in the UI data are based on a different system than those in the WOTC data, so I obtained a "matching" file for these identifiers from IRP that allows me to link the appropriate job records.

of job experience. The workers also have occupations that typically pay fairly low wages, with over two-thirds of them working jobs classified as "service" or "clerical and sales." The jobs are often in the retail, accommodation, or food services industries; these industries have been vocal supporters of the WOTC program. Note that a small portion of workers appear more than once in the table; there is one record per person-job, which is the unit of observation throughout this study.

Table 1: Descriptive Statistics for WOTC-Certified Workers, 1999-2002

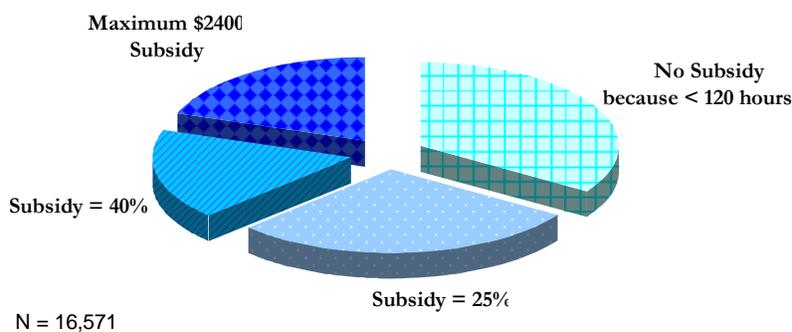Sample: All WOTC certifications in WI for jobs starting in 1999-2002

	Percent in Category
Target Group	*N = 17,048*
Welfare (WOTC only)	9.9
WtW (or both WOTC and WtW)	24.8
Veteran	1.6
Ex-felon	9.5
High Risk Youth (EZ/EC)	13.5
Vocational Rehabilitation	9.2
Summer Youth	1.4
SSI	9.0
Food Stamp Youth (18-24)	21.1
Starting Wage	*N = 16,958*
< Minimum Wage	2.3
$5.15 - $5.99	24.1
$6.00 - $6.99	35.7
$7.00 - $7.99	17.2
$8.00 - $8.99	12.7
$9.00 and up	8.1
Occupational Category (WOTC record)	*N = 16,976*
Service	35.3
Clerical and Sales	32.8
Professional/Technical/Managerial	9.5
Machine Trades	1.4
Processing	0.7
Structural	0.6
Farm/Forestry/Fishery	0.6
Other	19.2
Industry of Firm (UI record)	*N = 16,891*
Retail Trade	38.5
Accommodation/Food Services	20.0
Admin/Support/Waste Mgmt.	19.7
Health Care/Social Assistance	8.7
Manufacturing	5.0
Transportation/Warehousing	3.5
Other	4.6

Table Notes: The total number of worker-jobs in the WOTC records for this time period is 20,577. Of these, 725 (about 3.5%) did not have any UI records in 1999-2004 (including 27 whose records had not been requested from UI), and

about 13% of the remainder did not successfully match with a UI record for the WOTC job (either there was no UI record indicating the employer listed in the WOTC record or no record in the appropriate quarter that could be identified as the WOTC job). The resulting sample, used for this table, contains 17,281 observations. These reflect the records of 14,181 distinct individuals, some of whom had more than one WOTC record during 1999-2002. Separate sample sizes are given for each variable since some records have missing data for some variables. I do not use the available partial-year WOTC data from 1998 or 2003 because it is incomplete. Wage categories are nominal.

The distribution of WOTC workers across different subsidy rates is of primary interest for this study. The estimated distribution from my data is shown in Figure 2. Workers are categorized based on their estimated hours of work, which I obtain by dividing their total first-year earnings at the job by their starting wage (coded as the midpoint of their reported wage category).[14] Over one-third of certified workers have less than 120 hours of employment, failing to qualify their employer for the WOTC. Another 29 percent of workers qualify only for the lower subsidy rate of 25 percent of wages because they do not meet the 400-hour threshold. Only a little over one-third of workers reach the highest subsidy rate, and only about half of them qualify for the maximum subsidy of $2400. The wide variance in workers' hours, resulting in similarly wide variance across subsidy categories, confirms that job tenure is a primary determinant of subsidy returns. A firm's ability to influence or predict workers' job duration may play an important role in determining its participation in the WOTC.

Figure 2: The Distribution of Workers Across Subsidy Levels

Maximum $2400 Subsidy

No Subsidy because < 120 hours

Subsidy = 40%

Subsidy = 25%

N = 16,571

---

[14] I drop those that are coded as "less than the minimum wage," since I do not know their wage range and most are in the service industry, suggesting that they may work for tips which I cannot observe. For those who report wages "$9.00 or greater" I impute a wage of $10 per hour. Estimates are not sensitive to the chosen imputation (even a much higher imputation of $12 per hour results in less than a 0.5% change in the size of each category). I also effectively assume that the starting wage continues to be the wage throughout employment, which is probably true for most workers in the sample since their total earnings at their WOTC job are quite small (i.e. tenure was short, so raises seem unlikely). By making this assumption, I overestimate tenure for those whose hourly wage increased over time.

In order to examine firms' participation decisions, I also need data on job duration of WOTC-eligible workers at firms that do not claim the credits. I use Wisconsin's public assistance database, called Client Assistance for Re-employment and Economic Support (CARES), to create a large sample of workers who received welfare or food stamp benefits between 1998 and 2001. These workers' records allow me to identify their WOTC eligibility via welfare or food stamps during July 1999-December 2001.[15] I limit my sample to eligible workers and then link these workers' records to the WOTC files in order to determine which of them were certified. Note that this sample does not include every certified worker, since some were certified due to their membership in other target groups (such as ex-felons) and some were certified through the welfare or food stamp target groups but do not appear eligible according to the records available to me.[16] (Further discussion of this issue, and a detailed description of the data construction, can be found in the Appendix). By using data only for those who appear eligible, I ensure that both the certified and uncertified workers in the sample have similar public assistance records. My sample of eligible workers contains 35,004 person-jobs, of which 2,622 were WOTC-certified.

V. How Does Job Duration at WOTC-Participating Firms Compare to that at Non-Participating Firms?

If eligible non-participants in the WOTC are firms with relatively low worker job duration, and thus low potential benefits, this could help explain the puzzle of low participation rates. However, an association between job durations and participation may also reflect differing firm behavior *after* the participation decision. I use the Wisconsin data to test for a relationship between job duration and firms' participation in the WOTC, and then investigate the direction of causality.

There is an important limitation of the wage data for eligible but uncertified workers: since most of them do not have WOTC records to provide wage data, only their total earnings from the UI data are available. In order to estimate job duration, I need to impute wages for this group. I do this by first estimating a standard log wage regression using demographic and job characteristics of

---

[15] I cannot assess eligibility in the first 18 months of data, because I need to be able to look back 18 months in order to assess eligibility for the welfare group, which requires receipt in 9 of the last 18 months. The first month in which I can do this is July 1999.

[16] The welfare and food stamp target groups are among the largest of the WOTC target groups (while the WtW includes only welfare recipients). The welfare target group consists of those with at least 9 months of welfare receipt in the 18 months prior to their job start. The food stamp group consists of workers aged 18-24 who have received food stamps for at least the last 6 months (or at least 3 of the last 5 months but are now ineligible). I focus my analysis on these groups to the exclusion of the other target groups (such as ex-felons and low-income veterans) because data are not available for other groups.

the subsample for which wages are available. Note that although the wage data are measured with error (since they are imputed from categories), this error is in the dependent variable and so it is unlikely to bias the results, though it will make estimates less efficient. I use the estimated coefficients from this regression, shown in Table 2, to predict wages for the portion of the sample without wage data.[17]

Table 2: Results of Log Wage Regression

Dependent Variable: ln(wage)

Variable	Coefficient	t-statistic
Demographics:		
Female	-0.010	-0.99
Black	-0.013	-1.59
Hispanic	-0.013	-0.95
Other Race (Non-white)	-0.013	-1.41
Age	0.011	3.12
Age squared	-0.0002	-3.09
GED	-0.003	-0.29
High School Diploma	0.011	1.87
Some College	-0.002	-0.14
Firm Characteristics:		
County Avg. # Workers per Firm (by Industry)	0.001	1.22
Firm Headquarters in WI (1 = yes, 0 = no)	-0.090	-15.59
Industry Indicators:		
Administrative and Support and Waste Management	0.182	12.12
Finance and Insurance	0.517	3.93
Health Care and Social Assistance	0.299	20.10
Information	0.045	0.86
Management of Companies and Enterprises	0.400	5.29
Manufacturing	0.167	2.56
Real Estate and Rental and Leasing	-0.050	-1.33
Retail Trade	0.051	6.13
Transportation and Warehousing	0.271	13.13
Wholesale Trade	-0.073	-2.35

Notes: N = 2,535 worker-jobs. Adjusted R-squared =0.4040. There are 2,622 worker-jobs with wage data, but 87 are dropped from the regression due to missing data on region, education, or industry. These 87 are retained throughout the following analysis, though, because the purpose of this regression is to generate imputations (their wage data do not need to be imputed, since

---

[17]Some of the workers without wage data will not be able to receive imputations this way. Some of them, for instance, work in industries that do not employ anyone for whom I have wage data. Out of a potential pool of 32,382 worker-jobs without wage data, there are 1,901 for whom I cannot impute wages because they are in one of these industries. Similarly, I drop an additional 33 worker-jobs without wage data who have college degrees (or more), because no worker with wage data has a college degree. In addition, 1,369 worker-jobs without wage data are missing at least one variable in the regression, so I am also unable to impute wages for them and they are dropped. In total, I drop 3,303 worker-jobs, resulting in a sample of 29,079 worker-jobs with imputed wages.

they are directly available). The omitted industry category is "Accommodation and Food Services," the omitted educational category is "Less than high school," and the omitted race is "White." Region and quarter dummies are also included but not reported.

The regression results demonstrate the importance of industry for predicting wages. Industry provides much of the explanatory power of the regression, and the coefficients reveal a reasonable pattern: management and finance/insurance are associated with the highest wages, followed by health care/social assistance and transportation/warehousing. The omitted category of accommodation/food services is one of the lowest-paying industries. Firms that are headquartered in Wisconsin (likely the smaller firms in the sample) also tend to pay lower wages than those headquartered elsewhere. The individual worker demographics do not provide much additional explanatory power when the other variables (including geographic and time indicators) are taken into account. Overall, the explanatory power (adjusted R^2 = .404) is reasonable for a wage regression.

Using these coefficients to impute wages to those without wage data is appropriate if there are no systematic differences between the groups with and without wage data. However, most of those with wage data were WOTC certified (some had only applications), and most of those without wage data were not WOTC certified. If there is a WOTC wage premium due to the subsidy passing through to WOTC workers, the imputed wages may be too high for the (mostly uncertified) group with missing wage data. For this reason, I have repeated all of the analysis that follows using imputed wages that are 10 percent lower than the regression predictions.[18] The results of my job duration analysis do not change substantially, primarily because relatively few of the workers' hours are near the WOTC thresholds, so the categorization of WOTC subsidy rates is quite robust.

These imputations make it possible to compare the job duration distributions of WOTC-participating and non-participating firms. It is easy to define a non-participating firm as a firm that did not apply for the WOTC during my period of interest. Defining a "participating" firm is less obvious, because some firms participate only for a small fraction of the workers that are eligible at their firm during this time period.   This is surprising given the anecdotal evidence that participating firms include WOTC forms in every application or hiring packet.[19] The reasons for this may include

---

[18] Hamersma (2005) reports an average WOTC earnings premium of about $120 per quarter, on a base of average quarterly earnings of about $1200. This is the basis for a 10% adjustment in my estimates when I take into account the WOTC premium.
[19] For example, some of the larger firms requesting the WOTC in Wisconsin asked the WOTC office to stop sending paper rejections for all of their (many) applications on behalf of unqualified workers; this suggests that some employers

changes in the firm's WOTC policies over time, differences in participation across different physical branch locations within a company, or selective WOTC application (i.e. applications are submitted only for certain workers). The distribution of the fraction of eligible workers claimed (after the firm began participating in the program) is reported in Figure 1A of the Appendix. The comparisons below define "participating" firms as those that applied for WOTC for at least 20% of their eligible workers (in my sample) after they began participating in the program.[20] I drop observations from firms that have positive participation below 20%. Results are similar for thresholds of 30% and 40%.[21] I also drop firms with fewer than 10 eligible workers in my sample, to focus attention on firms that could have non-trivial gains from participation.

Based on the estimated hours distributions shown in Figure 3, firms that participate in the WOTC tend to have workers with longer tenure. It is particularly noticeable that a substantially higher fraction of workers at non-participating firms have tenure less than 120 hours, the threshold for WOTC benefits. About 55 percent of workers at non-participating firms do not qualify for any benefits, while in participating firms the fraction is only 46 percent. The median tenure is 139 hours in participating firms and only 95 hours in non-participating firms. Some of the difference may be related to employment at temporary help services (THS) firms, where job duration tends to be short. Almost 20 percent of the nonparticipating firms are THS, and these firms employ 36 percent of the workers at nonparticipating firms. In contrast, less than 14 percent of participating firms (and about 20 percent of workers at participating firms) are in the THS industry.[22] This difference underscores the important of considering industry differences when assessing the participation decision.
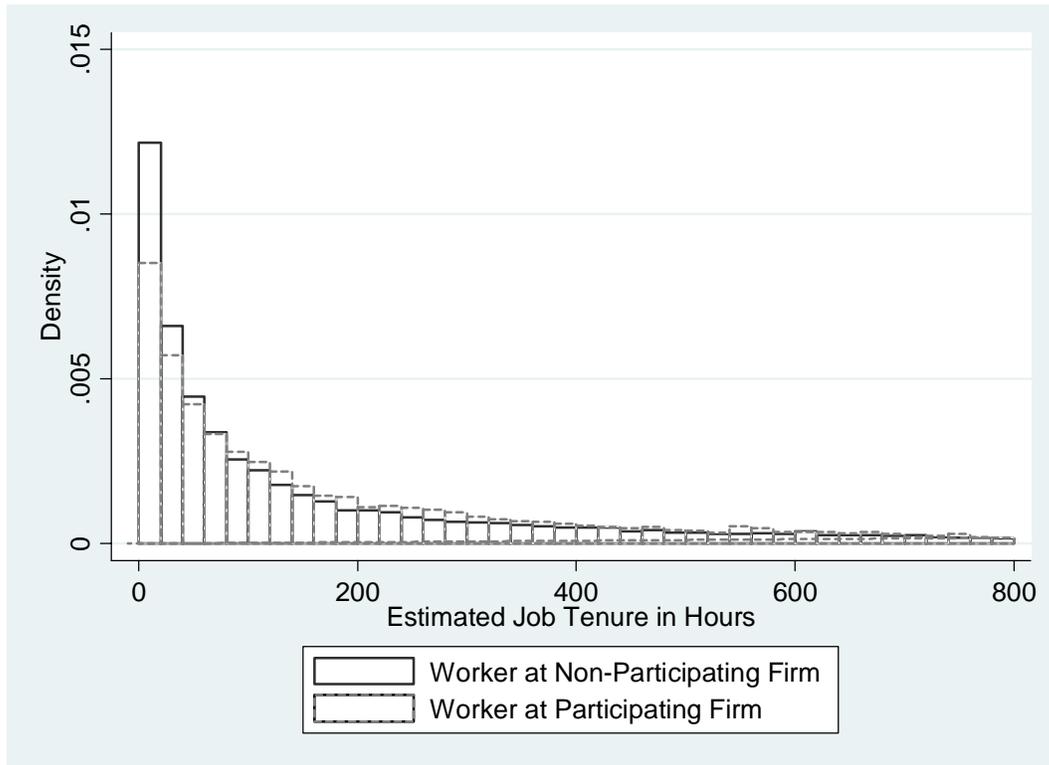
---

do not limit WOTC paperwork to those anticipated to be eligible. In addition, some large employers that post application packets online can be seen to include the WOTC Pre-Screening Notice in the packet of materials.

[20] Since the sample covers a 2.5 year span of time, some firms start participating partway through the sample period. They may mistakenly appear to participate at a very low level if I divide total applications by total eligible workers during the sample period. Instead, I evaluate participation relative to the number of eligible workers *after* the firm begins participating. Out of 656 firms in the sample with at least 10 eligible workers in 7/99-12/01, there are 493 with no participation (19,315 workers), 38 with less than 20% participation (3,428 workers), and 125 with greater than 20% participation (8,958 workers).

[21] I also find that a firm's probability of participating in the WOTC/WtW increases with the hours distribution of its workers under alternative participation definitions of 10%, 30%, and 40%.

[22] For more discussion of the interaction between the WOTC/WtW and the THS industry, see Hamersma and Heinrich (2005).

Figure 3: Estimated Hours Distributions, by Firm's Participation Status

Notes: N = 24,568 workers. I include only workers with less than 800 total hours at firm in order to make the left end of the distribution more easily viewed; this includes about 87% of workers in my sample of 28,273. All firms in the sample have at least 10 eligible workers during 7/99-12/01. These distributions include one data point for every worker, and workers are categorized according to whether their firm participates in WOTC. Firms that applied for the WOTC for fewer than 20% of their eligible workers are not included in the estimates.

A firm's job duration distribution may affect its participation decision through its effect on potential WOTC tax credits. I use workers' earnings and estimated job duration to estimate the tax credit for which each worker qualifies. By adding these up for each firm, I can examine each firm's potential tax credits and then consider how participation might depend on this value. I find that participating firms are more likely to qualify for larger tax credits. The mean credit that could be claimed by participating firms is over $43,000 while the mean for non-participating firms is about $21,500. The medians are lower, at $23,400 for participating firms and $13,900 for non-participants. There is further evidence that firms' potential returns are systematically correlated with participation in Table 3, which categorizes firms by their potential tax credits and reports the fraction of firms that participate in the WOTC.

Table 3: Fraction of Firms that Participate in WOTC, by Firm's Potential Tax Credit

potential credit:	less than $5,000	$5,000-$10,000	$10,000-$20,000	$20,000-$30,000	$30,000-$50,000	$50,000-$100,000	$100,000 or more
number of firms	85	117	164	90	57	46	21
fraction:							
participants	15	13	14	21	33	34	58
non-participants	85	87	86	79	67	66	42

Note: N = 618 firms (493 non-participants and 125 participants). All firms in sample have at least 10 eligible workers during 7/99-12/01. Firms that applied for the WOTC at some point but did so for fewer than 20% of their eligible workers after that point are not included in the estimates. The intervals listed are closed on the left and open on the right.

It is clear that firms with larger gains are more likely to participate, while those with small gains are very unlikely.

Firms' participation does not appear to respond to potential credits until their total is over $20,000, after which participation increases with potential benefits. This may provide some insight into the perceived fixed costs of participation. These fixed costs include learning about the program and establishing a system for submitting applications. The vast majority of firms in Wisconsin use tax consultants, and these consultants may also charge a fixed fee for processing a firm's claims; however, some anecdotal evidence on consultant fees suggests that they are typically a commission payment based on the value of credits claimed.[23] While overall fixed costs seem fairly limited, it appears that many firms only consider participating if these costs can be spread over a large number of qualified workers.

It is possible that this strong relationship between potential tax credits and participation in the WOTC would exist even without an hours requirement that differentiates subsidy rates; for instance, higher potential tax credits at participating firms may simply be due to a larger number of eligible workers or higher wages. In order to disentangle these effects, I estimate a participation equation in which I include an indicator for the number of eligible workers at each firm, the average wage paid by the firm to these eligible workers, and a set of variables representing the distribution of workers across the four hours-threshold categories (less than 120 hours, 120 to 399 hours, over 400 hours but below maximum subsidy, and maximum subsidy). This combination controls for the

---

[23] One consulting company, TaxBreak, states: "TaxBreak works for you on a contingency fee basis. If you do not recover monies through our tax credit and recovery services, we do not get paid." (http://www.psapayroll.com/taxbreak_home.html). David Loney, a tax consultant who was convicted of inflating tax credit claims, also received "a commission based on the dollar value of the WOTC and WtW tax credits he obtained for his clients." (http://www.oig.dol.gov/public/media/dloney.html).

multiple factors influencing potential tax credits, with the advantage of allowing estimates of the distinct importance of the job duration of WOTC-eligible workers in the participation decisions of their employers. I estimate these effects of job duration on participation using a probit equation in which I also control for industry, region, and the dispersion of the firm (as proxied by the number of counties in which they have sample employees). Table 4 reports the key results.

Table 4: Results of Participation Probit with Hours Distribution

Dependent Variable: Firm Participates in WOTC

Variable	Marginal Effect	z-statistic	Sample Mean
% of workers with 120-399 hours work	.0019	1.20	24.9
% of workers with 400+ hours work, not max	.0055	3.24	13.5
% of workers qualifying for max subsidy	.0028	2.16	17.1
# eligible workers at firm	.0004	1.68	44.0
average wage paid by firm to sample workers	.1596	3.31	7.19

Notes: N = 613 firms. The 5 additional firms that were in Table 3 had either missing regressors or no variation in participation within their region or industry. Pseudo R-squared = .178. Omitted Category: Percent of workers with < 120 hours of work. Industry and regional indicators, as well the number of counties represented in the firm's workforce (a measure of dispersion), are also included in the estimation. Firm is labeled as a non-participant if none of its eligible hires are claimed and as a participant if it submits applications for at least 20% of its eligible hires after its first application. (Those firms with participation below 20% are not included in the sample.) The fraction of participating firms in this sample is 20.1%. Under alternative participation definitions of 10%, 30%, and 40% the coefficients on the hours variables are fairly similar: the first ranges from .0018 to .0020 (never statistically significant), the second ranges from .0030 to .0048 (with z-statistic always $\geq$ 2), and the third ranges from .0022 to .0031 (with z-statistic always $\geq$ 1.65).

The results in Table 4 underscore the strong relationship between a firm's job duration distribution and its participation in the WOTC. The marginal effects suggest that a firm's probability of participating is higher when its hours distribution is more heavily concentrated in the WOTC-qualifying range. The effect is largest and most precisely estimated for the percent of workers with more than 400 hours of work: for every two percentage-point increase in this variable (relative to the "less than 120 hour" category), the probability of firms' participation in the WOTC increases by one percentage point. Since the raw participation rate of firms in the sample is only 20.1 percent, this represents a meaningful change. The number of eligible workers is also important, as the estimates suggest that the addition of 100 eligible workers is associated with a 4 percentage-point increase in a firm's probability of participating in the WOTC. The average wage is positively associated with participation as well.   Thus it appears that all of the contributors to potential tax

credits – including the number of eligible workers, their wages, and the distribution of their hours – are positively related to firms' participation.

VI.   Reverse Causality: Do Firms Increase their WOTC Benefits by Influencing Job Duration?

To conclude that different job duration distributions have a *causal* impact on firms' participation decisions, I need to establish that firms' job duration distributions are exogenous to participation. This is not at all obvious, since one might expect WOTC-participating firms to improve their hours distributions in response to the program's incentives. The established difference in hours distributions across participating and non-participating firms would then be a result of the program itself *ex post*, and not necessarily a factor in the participation decision *ex ante*. In many situations, it would not be possible to distinguish between these possibilities; however, the discontinuity created by the subsidy brackets provides an opportunity to investigate this issue.

Since WOTC workers are widely distributed across the three subsidy brackets, it makes sense to consider the role of the firm in affecting their subsidy rates through influencing job duration. Figure 1 illustrated that a firm can benefit greatly from retaining the worker a bit longer if they are just below the 120-hour or 400-hour threshold. For example, at $6 per hour, a worker at the 399-hour mark qualifies the firm for about $600, while the same worker who remains for the 400th hour qualifies the firm for almost $1000 (a 60% increase in benefits). Firms can even benefit by keeping a worker for a substantial amount of extra time to reach the threshold: if a worker had been at the firm for only 340 hours, the firm would still be better off financially if it retained the worker until the 400th hour.[24] This calculation does not even include the added value of any production accomplished by the worker in the extra 60 hours of work.

It is clear that there are strong incentives for firms to influence job duration of their WOTC workers, especially since the costs of participating in the program are sunk. However, there is not any evidence of overall improvements in average job duration (measured in quarters of work) due to WOTC participation (Hamersma, 2005). It is possible, though, that even without increasing average

---

[24] For the 340-hour case, wages are $2040 with a subsidy of $510, for net costs of $1530. For the 400-hour case, wages are $2400 with a subsidy of $960, for net costs of $1440. My estimated costs here only include wages; I abstract away from any other per-hour costs of employing the worker. However, the same general pattern exists if these costs are included.

job duration substantially firms may still react to the incentives to increase tenure near the thresholds, where the marginal subsidy benefits are largest.
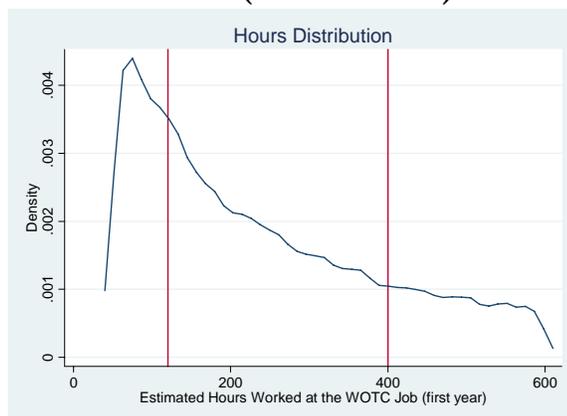
I test for this behavior using an estimate of the hours distribution of the whole population of WOTC workers in Wisconsin during 1999-2002. If firms are increasing job duration near the hours thresholds, there should be a dip in the distribution just below these thresholds and a spike just above them, indicating that people who would have left with job durations just below the thresholds were kept for the extra hours needed to receive the increased subsidy. I use a kernel density estimator to check the distribution for these features. This method is used by Saez (2002) in assessing responses to marginal tax rates, for which he finds little evidence. However, using a similar technique, Blundell and Hoynes (2003) find evidence of substantial responses to an hours-worked requirement for a UK welfare program.

The estimated hours distribution for WOTC workers is shown in Figures 4A and 4B. The two figures present the same data - estimated hours for workers between 50 hours and 600 hours - but they differ in the amount of data smoothing.[25] In Figure 4A, the data are only slightly smoothed from their original form, creating a jagged pattern; in Figure 4B they are oversmoothed to reveal broader patterns (at the expense of losing detailed features of the distribution). The two vertical lines on each graph mark the WOTC thresholds. Based on Figure 4A, there is no irregularity near the 120-hour threshold, but potentially a small dip-and-spike pattern near the 400-hour threshold. The more smoothed distribution in Figure 4B does not suggest any patterns near the thresholds.

Figure 4A: Hours Distribution (undersmoothed)   **Figure 4B: Hours Distribution (oversmoothed)**
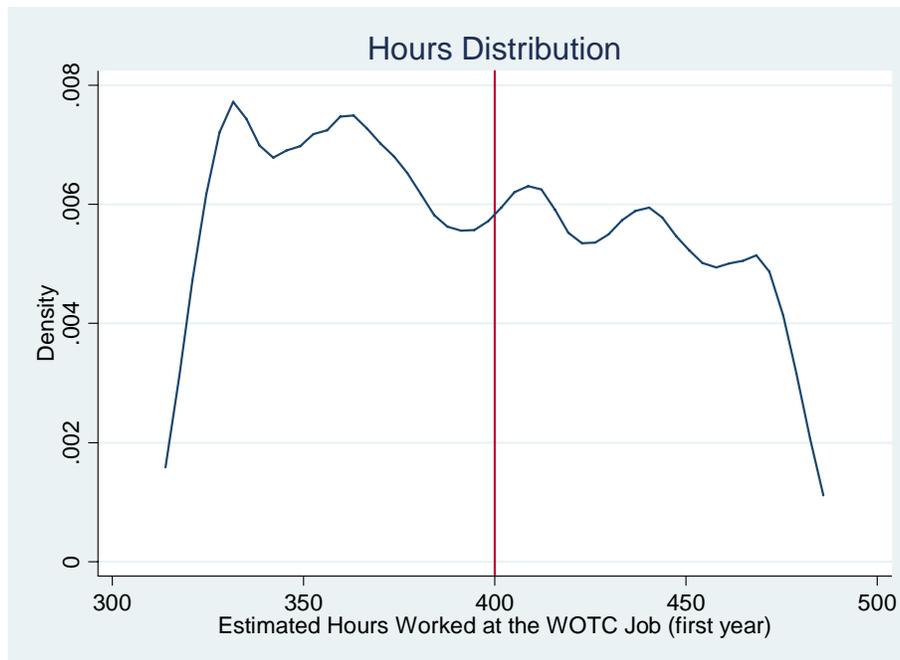
Notes: N = 8,908 (those with estimated hours between 50 and 600). Figure 4A uses a bandwidth of 4 and Figure 4B uses a bandwidth of 10. Both use an Epanechnikov kernel.

---

[25] The literature on optimal choice of smoothing parameters continues to evolve. Because there are many ways of selecting a potentially appropriate bandwidth, I choose the conservative strategy of looking at a wide range of bandwidth choices to see if any of them suggest that firms are responding to the subsidy.

To look more closely at the potential irregularity near the 400-hour threshold, I plot a narrower slice of this distribution in Figure 5, examining only those with tenure between 320 and 480 hours. This "close-up" seems to provide some support for the hypothesis that firms may be retaining workers up to the 400-hour mark who would otherwise have left 10 to 20 hours earlier. However, the pattern is weak enough that this graph is also consistent with no response by employer; a similar small dip-and-spike pattern also occurs in other parts of the distribution where no relevant thresholds are crossed, so it may merely reflect random fluctuations. In fact, if the graph is smoothed much, the pattern near the 400-hour threshold disappears.

Figure 5: Hours Distribution Near the 400-Hour WOTC Threshold

Notes: N = 1,587 (those with estimated hours between 320 and 480).
Figure 5 uses a bandwidth of 6 with an Epanechnikov kernel. Different bandwidths influence the smoothness of the distribution, but do not substantially change the pattern. Similarly, the estimated distribution is not particularly sensitive to the choice of the hours range (in this case, 320-480).

This analysis of the distribution of WOTC workers' hours of work does not suggest substantial intervention by employers to maximize credits. There are several possible reasons for this result. First, firms may not have the ability to influence job duration on the margin, perhaps because many of the job separations in this population are quits.[26] Second, managers may not be

---

[26] Unfortunately, the reason for each job separation is not available in my data.

constantly aware of the number of hours worked by their WOTC workers, so they may not be able to take this into account when making decisions about scheduling or firing a marginal worker. Third, even if hours are known, firms may not educate managers on the hours-related incentives created by the WOTC program. Finally, managers may be unaware of which workers are WOTC-certified. This seems particularly likely if the subsidy program is administered through an outside tax consultant, which is the case for most WOTC-participating firms in Wisconsin. In any case, firms may be less responsive to hours requirements than policy makers expected.

Since firms do not respond significantly to WOTC hours thresholds, it is unlikely that the hours distribution of workers in a given firm is strongly influenced by the firm's WOTC participation. This suggests that the hours distribution was not endogenous in the participation equation estimated in the previous section. Based on this finding, I conclude that the positive relationship found earlier between job duration and WOTC participation primarily reflects a causal link going in only one direction: firms' job duration distributions are a factor *ex ante* in their decisions about WOTC participation.

However, despite the positive effects of longer job durations on firms' WOTC participation, it remains remarkable that participation is still so low. Based on Table 3, even among those firms qualifying for over $100,000 in tax credits, nearly one-half still do not participate. It is possible that some of them are unable to participate due to their tax status, which I am unable to identify (they may be public or non-profit, or may lack tax liability).[27] However, this seems unlikely to apply to most firms. There may instead be a lack of knowledge of the program. In that case, it might be in states' interest to promote the program to employers more aggressively (since the costs are borne by the federal government). In any case, the data confirm that participation appears to depend meaningfully on potential benefits, which in turn depend significantly on job durations, even if these are not the only factors determining this choice.

VII.   Conclusion

This study provides the first available evidence on the relationship between workers' job duration distributions and firms' willingness to participate in employer subsidy programs that have

---

[27] About 9 percent of private employment is in the nonprofit sector in the East North Central Census Region (IL, IN, MI, OH, and WI). Nationally, almost 90 percent of these jobs are in the health care, social services, or education sectors (Salamon and Sokolowski, 2005).

hours requirements. In comparison to firms that participate in the WOTC subsidy program, I find that non-participating firms tend to have fewer workers who have surpassed the 120-hour and 400-hour thresholds that define increases in the WOTC subsidy rate. I estimate a participation equation at the firm level and find that, even controlling for the number of eligible workers, firms are more likely to participate if a larger percentage of their workers are in the higher subsidy brackets. I investigate whether the job durations in this equation (reflected in the subsidy brackets) might be endogenous, since their correlation to participation may reflect firms' attempts to improve job durations after choosing to participate. There is no evidence of firms responding to the subsidy incentives by trying to influence job duration. Specifically, participating firms do not appear to respond to the strongest job-duration incentives of the WOTC, which occur near the hours thresholds and could result in large increases in the subsidy for small increases in tenure. Since firms do not appear to respond to these crucial points, job duration might not be easily affected by these firms. This suggests that job duration is plausibly exogenous in the participation equation. I conclude that workers' job duration distribution has a causal impact on firms' participation in the WOTC, most likely because of its significant effect on potential benefits due to widely varying subsidy rates created by the program's hours requirements.

If policy makers hope to increase participation in the program, they may need to consider the potentially discouraging role of hours requirements. However, there were important reasons for these requirements in the original design of the program: policy makers hesitated to encourage employment that does not last very long and thus may not contribute to long-run improvements in the labor market outcomes of the disadvantaged.[28] Both of these considerations will be relevant to the discussion as Congress considers reauthorization.

---

[28] In fact, evidence regarding the effects of the subsidy on worker outcomes (such as wages) suggests that the program generates only limited improvements even when firms do participate (Hamersma, 2005).

References

Bishop, John H. and Suk Kang. "Applying for Entitlements: Employers and the Targeted
Jobs Tax Credit." *Journal of Policy Analysis and Management* 10 (Winter 1991):
24-45.

Blundell, Richard and Hilary Hoynes. "Has 'In-Work' Benefit Reform Helped the Labour Market?"
Forthcoming in *Seeking a Premier League Economy*, Richard Blundell, David Card and Richard Freeman, editors.
University of Chicago Press.

Christensen, Sandra. The Targeted Jobs Tax Credit. Staff Memorandum. Washington,
D.C.: Congressional Budget Office, May, (1984).

Dickert-Conlin, Stacy and Douglas Holtz-Eakin. "Employee-Based Versus Employer-Based
subsidies to Low-Wage Workers: A Public Finance Perspective." In Finding Jobs: Work and Welfare Reform,
edited by David Card and Rebecca Blank. New York: Russell Sage Foundation, (2000): 262-295.

Hamersma, Sarah. "An Evaluation of the Work Opportunity Tax Credit: Participation
Rates and Employment Effects." *National Tax Journal* 56 (2003): 725-738.

Hamersma, Sarah. "The Effects of an Employer Subsidy on Employment Outcomes: A Study of the Work
Opportunity and Welfare to Work Tax Credits." Institute for Research on Poverty Discussion Paper 1303-05
(July 2005).

Hamersma, Sarah and Carolyn Heinrich. "Temporary Help Service Firms' Use of Employer Tax
Credits: Implications for Disadvantaged Workers' Labor Market Outcomes." Working Paper (October 2005).

Katz, Lawrence F. "Wage Subsidies for the Disadvantaged." In Generating Jobs: How
to Increase Demand for Less-Skilled Workers, edited by Richard B. Freeman and
Peter Gottschalk. New York: Russell Sage Foundation, (1998).

Lorenz, Edward C. "TJTC and the Promise and Reality of Redistributive Vouchering and Tax Credit Policy."
Journal of Policy Analysis and Management 14 (Spring 1995):270-290.

O'Neill, Dave M. "Employment Tax Credit Programs: The Effects of Socioeconomic
Targeting Provisions." *Journal of Human Resources* 17 (Summer 1982): 449-59.

Saez, Emmanuel. "Do Taxpayers Bunch at Kink Points?" Working Paper, No. 7366, National Bureau of
Economic Research, (1999). Updated April 2002.

Salamon, Lester M. and S. Wojciech Sokolowski. "Nonprofit organizations: new insights from
QCEW data." *Monthly Labor Review* (September 2005): 19-26.

U.S. Department of Labor. Office of the Inspector General. Targeted Jobs Tax Credit:
Employment Inducement or Employer Windfall? August, 1994.

U.S. Congress. Joint Economic Committee. "The Welfare-to-Work Tax Credit." Joint Economic
Committee Report, March 1997.

Appendix

Description of Sample Assembly for Table 1:

The total number of worker-jobs in the WOTC records in 1999-2002 is 20,577. The sample is adjusted in the following ways:

A few of these were missing from my UI data request.
* DROP 27 records

- Remaining: N = 20,550

Some workers in the WOTC records had no UI records at all in 1999-2004.
* DROP 698 records

- Remaining: N = 19,852

Some workers had records in UI but none during the appropriate quarter or with the appropriate employer
* DROP 305 records

- Remaining: N = 19,547

Some workers had records in UI in the correct quarter, but they were either labeled as a different employer or had multiple jobs so that it was impossible to match to the WOTC job
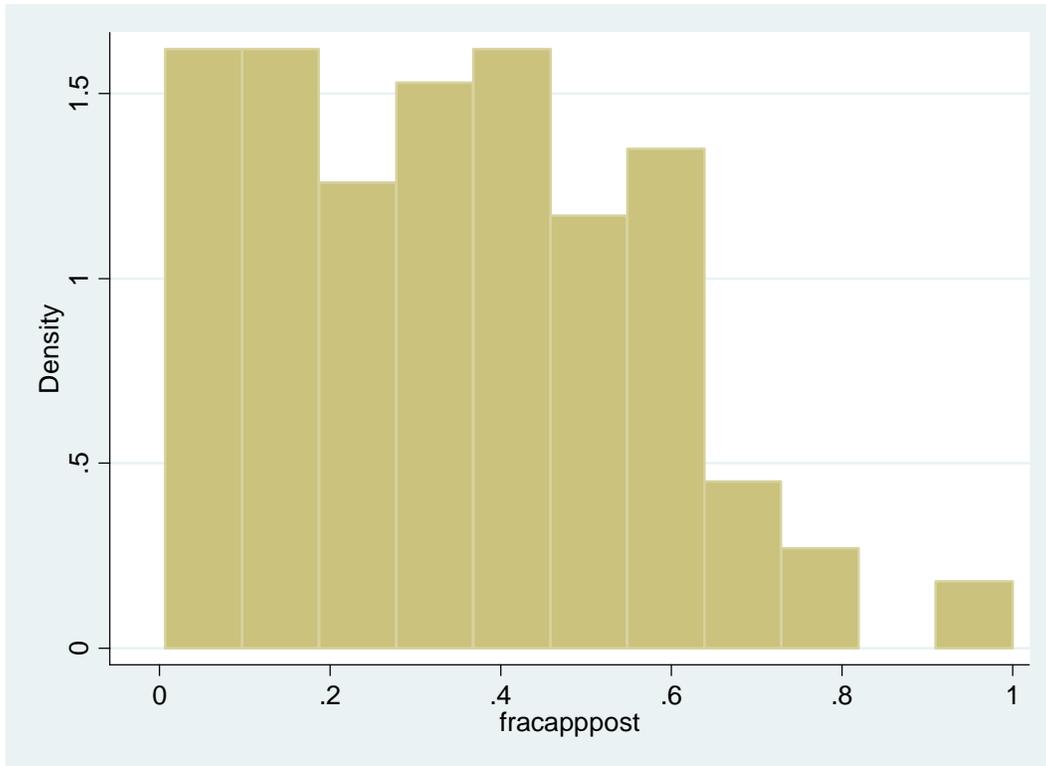* DROP 1739

- Remaining: N = 17,808

Some workers had a record matching the correct employer, but the job start date reported in WOTC was more than 1 quarter away from the job start date reported in UI
* DROP 527 records

- **Final Sample for Table 1: N = 17,281**

Description of Sample Assembly for Figure 2:   *** IN PROGRESS ***

Figure 1A: Distribution of the Fraction of Eligible Workers Claimed
(unit of observation is the firm)

Sample: 163 firms with at least 10 WOTC-eligible workers that applied for the WOTC at least once. (The other 493 firms in the sample with at least 10 eligible workers did not claim the WOTC at all.) The label "fracapppost" is the fraction of eligible workers for which the firm applied for the WOTC/WtW, out of all eligible workers hired *after* the first WOTC/WtW application was submitted. This sample aggregates the individuals used in Figure 2, who began a job for which they were WOTC eligible during 7/99-12/01.