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Short-time compensation as a tool to mitigate job loss? Evidence on the US experience during the recent recession

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Short-Time Compensation as a Tool to Mitigate Job Loss? Evidence on the U.S. Experience during the Recent Recession*

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ABSTRACT

During the recent recession, workers were eligible for UI benefits only if they were laid off in most states. At the start of the recent recession only 17 states offered short-time compensation (STC)—pro-rated unemployment benefits for workers whose hours are temporarily reduced for economic reasons. The severity of the recession, however, has sparked interest in STC as a tool for mitigating unemployment during downturns. New federal legislation enacted in 2012 will encourage more states to adopt STC programs and will promote greater use of work sharing among all states. In this paper we review arguments concerning the desirability of expanding STC programs in the United States and present new evidence on the use of these programs during the recent recession. Our evidence indicates that jobs saved as a consequence of STC could have been significant in sectors like manufacturing that made extensive use of the program. We conclude, however, that, with the possible exception of Rhode Island, the overall scale of the STC program operating in the 17 states was too small to have substantially mitigated the aggregate job losses these states experienced in the recent recession. Expansion of the program within STC states as well as to states without the program is necessary for STC to be an effective counter-cyclical tool in the future.

JEL Classification Codes: J65, J08, J20

Key Words: short-time compensation, work sharing, unemployment insurance, manufacturing

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Short-Time Compensation as a Tool to Mitigate Job Loss? Evidence on the U.S. Experience during the Recent Recession

During the recent recession, the United States and other developed countries experienced economic dislocations on a scale not seen in decades. Between December 2007 and December 2009, U.S. nonfarm payroll employment fell by nearly 8.4 million jobs, and the number of unemployed U.S. workers rose from 7.7 million to 15.3 million people. Widespread joblessness and the well-documented negative effects it has had on American families and their communities have prompted interest in policies that would encourage work-sharing in lieu of layoffs during future economic downturns.

During the recession, unemployment insurance (UI) rules in the majority of U.S. states discouraged the use of work sharing. In most states, workers were eligible for UI benefits only if they were laid off. A large body of research shows that the U.S. unemployment insurance system has effectively subsidized layoffs, causing employers to rely too much on layoffs and too little on work sharing to achieve hours reductions during recessions. At the start of the recent recession only 17 states offered short-time compensation (STC)—pro-rated unemployment benefits for workers whose hours are temporarily reduced for economic reasons—and take-up of these benefits was extremely low during prior recessions.

The severity of the recent recession, however, sparked significantly greater use of short-time compensation in states that already had STC programs, and an additional six states have implemented STC programs since 2007. As part of the Middle Class Tax Relief and Job Creation Act of 2012, Congress passed legislation to encourage more states to adopt STC programs and to promote greater use of work-sharing in those states. Analysis indicates that the short-time compensation programs operating in other developed countries—where short-time

compensation has long been available and used extensively—played a significant role in mitigating layoffs by encouraging greater use of work-sharing during the recent economic crisis (OECD 2010a).

An important empirical question is the extent to which, by encouraging hours reductions, an expansion of STC programs similarly could prevent employment losses during future recessions in the United States. In this paper we review arguments concerning the desirability of expanding STC programs in the United States and present new evidence on the use of these programs during the recent recession. STC take-up rates in several U.S. states were comparable in recent years to take-up rates in Canada and the take-up rate in Rhode Island was considerably higher. STC use tends to be concentrated in manufacturing. Comparing the adjustment of manufacturing production employment and hours in STC and non-STC states during the recession, we find that manufacturers in STC states generally relied relatively more on hours reductions and relatively less on employment reductions to adjust total hours worked. If it can be assumed that the availability of STC benefits was responsible for the relatively greater reliance on hours adjustments in those states and that the reduction in total hours would have been the same in the absence of STC, this evidence implies that in a number of states STC programs saved jobs during the recession. Consistent with this finding, the states that had relatively large numbers of full-time equivalent of workers on STC tended to be the same states that relied more heavily on cutting average hours to reduce manufacturing labor input during the recession. Although our data do not permit us to test the employment effects of STC directly, the collection of indirect evidence presented in this paper suggests that there may have been significant effects in at least some of the states' manufacturing sectors.

SHOULD WORK-SHARING BE ENCOURAGED?

There are both efficiency and equity arguments for STC programs that encourage the use of work sharing in lieu of layoffs during recessions. Unemployment insurance taxes levied on employers are experience-rated: Employers with more layoffs—and hence employers whose employees draw more from their state’s unemployment insurance fund—pay higher UI taxes. This experience rating, however, is incomplete. Although employers are ultimately liable for reimbursing the state UI trust fund for the cost of benefits received by laid-off employees under the experience rating system operating in most states, employer repayment normally is spread out over a number of years, states do not charge interest on the balances employers owe, and thus the system effectively subsidizes the cost of layoffs.¹ In addition, states set minimum and maximum rates, and for employers at these minimum or maximum rates, the cost of an additional layoff may be very low or zero. At the same time, workers, particularly those who have greater seniority and hence are less likely to be affected by layoffs, are apt to oppose work sharing if they cannot access UI benefits to help compensate for their income loss. Imperfect experience rating in the UI system coupled with the absence of pro-rated UI benefits for work sharing has long been argued to skew the choice between hours and employment reductions during recessions, encouraging too much reliance on layoffs (see, for example, Anderson and Meyer 1993, 2000; Card and Levine 1994; Feldstein 1976; and Topel 1984).

Avoiding excessive layoffs during recessions has potential benefits for both employers and workers. For the employer, work-sharing may be a means of retaining valued employees during a temporary downturn. Workers who are laid off may take jobs elsewhere, meaning that

¹Currently, 18 states use a so-called benefit-ratio formula for computing UI tax rates. Under this funding mechanism it is possible that states will not recover benefits charges from employers at the maximum UI tax rate, thus further subsidizing layoffs in these cases.

any investments the firm and the worker have made in these workers' job skills are lost. This may be an especially important consideration when workers are highly skilled and would be costly to replace when demand rebounds. To the extent that workers care about the well-being of their colleagues or view an employer's efforts to avoid layoffs as a signal concerning their own job security, work sharing may have a positive effect on employee morale and productivity as well.

Work sharing is also appealing on equity grounds. Work sharing spreads the burden of a recession across a larger number of workers rather than concentrating that burden on the minority of workers who lose their jobs. A substantial body of research has shown that job losers experience significant and persistent problems, including earnings losses, health problems and other adverse outcomes (see, for example, Jacobsen, LaLonde and Sullivan 1993; Stevens 1997; Sullivan and von Wachter 2009; and von Wachter 2010). Keeping workers on the job with their current employers during a recession may be a way to avoid or lessen these adverse impacts. In addition, by mitigating layoffs, STC benefits may reduce adverse spillover effects on local communities that otherwise would be called upon to serve individuals who have lost incomes, health insurance, and pension benefits.

Even when STC is available, employers will not always find it in their interest to implement work-sharing plans in lieu of layoffs during recessions. Because wages represent only a fraction of employees' total compensation, employers may save less money by reducing hours through work sharing than by achieving the same reduction in hours through layoffs. Under the new federal law, employers filing for STC benefits on behalf of employees would be required to maintain any health or retirement benefits for these employees while they are on reduced hours. Because those who are laid off tend to be less senior, however, the wage savings associated with

hours reductions could be greater in the work-sharing case (Abraham and Medoff 1984, Vroman and Brusentsev 2009). Another potential drawback of work sharing from the employer's perspective is that reducing the hours and compensation of workers across the board could induce the most productive workers to quit to pursue other opportunities; with layoffs, in contrast, the employer may be able to be more selective about who is let go. While concern about differential attrition of more productive workers may be justified during normal economic times, this seems unlikely to be a significant problem during recessionary periods when job opportunities are scarce and quit rates are low. Although the provision in the new federal law requiring employers to maintain any health or retirement benefits for employees on STC may deter some employers from using STC, the legislation also provides some short-term financial incentives for employers to try work sharing, with the federal government paying 50 to 100 percent of the cost of STC benefits over the next two to three years, depending on whether the state has an approved STC law.²

It also should be acknowledged that the use of work sharing is not always desirable from society's perspective. Perhaps the most compelling argument against work sharing is that using short-time compensation to keep workers with their current employers may impede needed reallocations from declining to growing enterprises and sectors (OECD 2010a). Workers who are still employed at a declining enterprise, even on a reduced work schedule, may delay seeking alternative employment.³ During recessionary periods, however, firms seeking to hire likely will have little difficulty attracting new recruits and concerns about the effect of STC on the pace of

²After the transition period specified in the law, the cost of work sharing benefits to employers will depend on how the applicable state law is written.

³Partly addressing this concern, the new federal legislation governing STC programs stipulates that participating employees may participate in training programs, including programs funded through the Workforce Investment Act, to improve their job skills. By enhancing their skills, such training could help prepare them for alternative employment.

economic reallocation arguably have less force than other considerations. There is reason, however, to be more cautious about encouraging the use of work sharing during periods of stronger economic activity.

A final concern is that drawing STC benefits may reduce UI benefits available should the worker subsequently be laid off from the job. In other countries, drawing STC payments typically has no effect on workers' subsequent eligibility for UI benefits. In the United States, however, STC benefits count against workers' total benefit eligibility. A worker who drew STC benefits pro-rated at 50 percent of the full benefit level for 20 weeks, for example, would have 10 fewer weeks of benefit eligibility available should they then be laid off.

OTHER COUNTRIES' EXPERIENCE WITH SHORT-TIME COMPENSATION PROGRAMS

In contrast to the United States, where there has been little use of formal STC programs, work sharing long has been institutionalized in other Western developed countries. In Germany, for example, STC was incorporated into the unemployment insurance system in the 1920s, and many other countries' STC programs also have existed for decades.

Under the various laws concerning short-time compensation in these countries, employers generally must file a plan in order for benefits to be paid to their employees. Some but not all countries require a minimum reduction in hours under an approved STC plan; the maximum permissible hours reduction may be as high as 100 percent, meaning that it is possible for work-sharing to take the form of temporary layoffs. The maximum length of STC plans also varies, but durations of up to a year are not uncommon. During the recent recession, many countries extended the permissible length of STC plans (OECD 2010a). In Germany, for example, the maximum length for a work-sharing plan was extended from 6 months to 24

months for applications submitted in the second half of 2009 and to 18 months for applications submitted in 2010 (Crimmann and Wiessner 2009, ILO 2010). Germany also took steps to reduce the fixed costs of keeping a worker on the payroll, temporarily subsidizing required social security contributions in order to make work sharing more attractive (ILO 2010).

During recessions, German companies have been much more likely than U.S. companies to adjust workers' hours rather than engage in layoffs. Studies of cross-country differences in adjustment practices have documented the important role that STC can play in supporting work-sharing arrangements during recessions (Abraham and Houseman 1993, 1994). An OECD analysis concludes that short-time work programs helped to preserve jobs during the recent recession. The impact of these programs was particularly significant in Germany and Japan, where OECD (2010a) estimates that they preserved about 200,000 and 400,000 permanent jobs, respectively.

EXPERIENCE WITH SHORT-TIME COMPENSATION IN THE UNITED STATES

In contrast to Europe, where the role of work sharing was built in to the design of countries' unemployment insurance systems as they developed, in the United States policy to encourage work sharing largely fell into disfavor by the mid 1930s (Nemirow 1984). Labor historians link the decline in the use of work sharing during recessions—and companies' increased use of layoffs—to the introduction of our current system of unemployment insurance in the 1930s. During the deep recession of 1974-75, however, interest in work sharing as a policy option was revived and several states subsequently passed laws to permit workers on reduced work schedules to collect partial UI benefits.

Following passage of California's short-time compensation law in 1978, another 18 states implemented STC programs as part of their unemployment insurance systems, though two states later rescinded or abandoned these policies and no state added a permanent STC program between 1994 and 2009. David Balducchi and Stephen Wandner (2008) attribute this policy stalemate to the "administrative muddle" created by a lack of leadership in the federal government. In 1992, questions were raised about the federal law that enables states to adopt STC programs, creating uncertainty about what states are and are not allowed to do. The onset of severe recession in 2008 sparked renewed interest in work-sharing programs, however, and an additional six states plus the District of Columbia have since passed STC laws. Moreover, Title II, Section D of the Middle Class Tax Relief and Job Creation Act of 2012 addresses the problems in the earlier federal law and actively promotes the adoption and use of STC programs in states. The basic idea behind STC programs is that, rather than being eligible for UI benefits only when laid off, workers whose employers submit approved work sharing plans may collect UI benefits that are pro-rated according to the reduction in their hours. An employer who might otherwise have laid off 10 workers, for example, instead could submit a plan under which the same reduction in hours was achieved by having 50 workers reduce their hours by 20 percent (for example, for those on a five-day-a-week schedule, cutting back to four days a week). Employees working a reduced schedule then would be eligible to receive 20 percent of the UI benefit to which they would have been entitled if laid off entirely.

Under the new federal law, state agencies must require employers requesting STC to submit a written plan detailing how work-sharing will be implemented and the estimated number of jobs saved. Short-time compensation program may be used for workers whose hours have been reduced by at least 10 percent up to a maximum determined by state law, though not to

exceed 60 percent. In existing state STC programs, the maximum permissible period for an approved short-time plan generally varies from 6 months to 12 months, with Iowa law allowing plans as long as 24 months. Several states restrict STC eligibility to full-time employees. For the most part, benefits paid to workers on STC have the same effect on employers' UI tax rates as benefits paid to laid off workers. From the perspective of the worker, STC benefits paid count against total benefit eligibility should the worker subsequently be laid off.

In the past, where state STC programs existed, they typically were not widely advertised. Further, the procedures that employers had to follow to put workers on short-time benefits tended to be more cumbersome than those for just laying workers off, potentially discouraging use. In part for these reasons, STC usage rates in the United States generally have been low. To increase use, the new federal law provides federal assistance and guidance in developing and implementing STC programs, and federal grants to promote STC use among employers and support enrollment efforts. Notably, under the new law the federal government will fund 100 percent of STC benefits costs for up to three years for states with approved STC programs, and 50 percent of benefits costs for up to two years for states without approved plans.⁴

USE OF SHORT-TIME COMPENSATION IN THE UNITED STATES DURING THE RECENT RECESSION

While interest in short-time compensation programs always has been somewhat cyclical, the use of STC programs during the recent recession substantially exceeded that in prior recessions. Not only was the absolute level of use higher relative to that in past recessions,

⁴ The law stipulates that federal reimbursement for STC payments for any individual during a benefit year will not exceed the equivalent of 26 weeks of benefits had that individual been fully unemployed.

reflecting the severity of this recession, but the use of STC relative to regular unemployment insurance also was notably higher.

For the 17 states that have administered STC programs since the 1990s, Table 1 displays STC weeks claimed as a percent of regular unemployment insurance weeks claimed during each of the last three recessions. STC weeks claimed are adjusted to full-time equivalents (FTEs) to make them comparable to weeks claimed under the regular UI program. For instance, suppose that a company utilizes its state's STC program to reduce the hours of 100 employees from 40 to 32 hours per week, representing a 20 percent reduction in hours worked. These workers would represent 100 STC weeks of benefits per calendar week, but the FTE equivalent would be 20 weeks of benefit claims ($100 \text{ employees} \times 0.2$).⁵ The annual FTE of STC weeks claimed did not reach 1 percent of regular UI weeks claimed in any state during the 1991-1992 recession and, in 2001-2001, exceeded 1 percent of regular UI weeks claimed in only two states, Rhode Island and Vermont. In 2009, however, the FTE weeks claimed for STC exceeded 1 percent of regular UI weeks claimed in 10 of the 17 states offering STC, and in Rhode Island they exceeded 4 percent of regular UI weeks claimed.

Table 2 reports benefits paid under STC as a percent of regular UI benefits for the 17 STC states. Because work-sharing plans are more likely to include more highly paid senior workers and because a significant share of regular UI benefit claims are rejected as ineligible, we might expect STC benefits as a share of regular UI benefits to be somewhat larger than STC full-time-equivalent weeks claimed as a share of regular UI weeks claimed, and this seems to be

⁵ As part of the administrative reporting to the federal government during this period, states with STC programs were asked to compute full time equivalents for both STC initial claims and STC weeks claimed. In a number of cases, however, these data items were missing. In cases where the FTE for weeks claimed was not reported, we multiplied STC weeks claimed by the average ratio of FTE weeks claimed to weeks claimed in the proximate months. In cases where FTE weeks claimed data were completely missing, we multiplied STC weeks claimed by the ratio of FTE initial weeks to initial claims. For Texas, no FTE information was available, and we assume a flat 20 percent reduction in hours.

borne out in the data. Still, in past recessions, STC benefits rarely exceeded one percent of regular UI benefits. In 2009, however, STC benefits amounted to one percent or more of regular UI benefits for 11 of the 16 states for which data are available. Notably, in Rhode Island, STC benefits were close to 10 percent of regular UI benefits in 2009.

While STC use in states with such programs reached record levels in 2009, data compiled by the OECD suggest that the levels of STC use in these states remains relatively low by international standards. Table 3 shows “take-up” rates of short-time compensation programs in selected countries from 2007 to 2009. The take-up rate of 3.17 percent for German employees in 2009, for example, implies that on average 3.17 percent of all German workers were on state-sponsored work-sharing plans during that year. The rate of 0.22 percent for the U.S. STC states in 2009 is the lowest rate reported, although it is only slightly lower than the rate for Canada.⁶

The second panel in Table 3 shows the take-up rate of STC in the manufacturing sector. STC programs are used disproportionately by manufacturing employers in all of the countries for which data are reported. Most notable are Belgium, Germany, and Ireland where, on average, 17 percent, 12 percent, and 10 percent of the countries’ manufacturing workforces, respectively, were on STC programs in 2009.

Data on STC use by industry are not collected systematically in the United States, but available evidence suggests that manufacturers account for the majority of STC program use here as well. A study conducted in California following the recession of the early 2000s, for example, found that 62 percent of firms using the state’s work-sharing plans were in

⁶The data for the United States were collected in a special questionnaire administered by the European Commission and OECD and reported in OECD 2010b. Using data supplied by the Employment and Training Administration, we report in Table 4 figures somewhat lower than those reported by OECD. Details of the methodology used by the OECD to calculate the U.S. take-up rates have not been published, but the aggregate rate appears to have been computed as a simple average of the component state take-up rates. This would overstate the importance of high-use but small states such as Rhode Island. The figures we report in Table 4 are weighted to account for differences in employment levels across STC states.

manufacturing, compared to just 11 percent of firms covered by the state's UI system (MaCurdy, Pearce and Kihlthau 2004). A special tabulation of Oregon's data shows that 55 percent and 43 percent of the STC plans operating in January 2009 and January 2010, respectively, were in manufacturing. Because manufacturing plants tend to be relatively large establishments, it is likely that even higher shares of STC participants were employed in that sector. STC administrators in Connecticut and Rhode Island also reported to us that manufacturers were the principal users of their programs, though specific figures were not provided.

Although overall use of short-time compensation is relatively low in the United States, there is considerable variation in take-up rates among the 17 states with such programs. Table 4 displays the take-up rates among private sector employees in 2007, 2008, and 2009 by state. By 2009 the participation in work-sharing programs in several states was comparable to the level found in Canada. And the take-up rate in Rhode Island, while considerably below that found in the high-use work-sharing countries such as Belgium, Germany, and Italy, was on a par with the take-up rates in European countries such as France and the Netherlands. Moreover, the take-up rates in manufacturing are quite likely to have been considerably higher. The second panel of Table 4 shows the average annual take-up rates for manufacturing production workers under the assumption that these workers account for all STC use in the state. These figures represent an upper bound estimate of the average percent of manufacturing production workers participating in STC programs in the indicated state and year. Even if manufacturing production workers accounted for just half of STC use each of these states, the manufacturing take-up rate would have been quite sizable in several states, most notably in Rhode Island.

POTENTIAL EFFECTS OF STC ON THE ADJUSTMENT OF PRODUCTION EMPLOYMENT IN MANUFACTURING

The descriptive evidence presented above indicates that in some states with STC programs use was moderately high in the recent recession. Further, given the concentration of STC usage in the manufacturing sector, any impacts on employment adjustment would most likely be manifested there. In this section, we look for evidence of such effects.

As discussed above, STC programs affect the relative attractiveness to workers and firms of achieving reductions in labor input through work sharing rather than through layoffs in response to a cyclical or otherwise temporary decline in demand. Consider the following identity:

$$L \equiv TH_t \equiv E_t \times AH_t$$

Labor input (L) is defined as total worker hours (TH) and equals the number of workers (E) multiplied by the average hours worked per worker (AH) in any time period t . Taking logarithms of each side of the equation, the change in labor input between period t and period $t-1$ may be decomposed into the change in employment levels and the change in average hours:

$$(1) \quad \ln TH_t - \ln TH_{t-1} \equiv (\ln E_t - \ln E_{t-1}) + (\ln AH_t - \ln AH_{t-1})$$

All else the same, we would expect that firms in states with STC would rely relatively more on average hours adjustment and relatively less on adjustment of employment levels during recessions—as companies put workers on STC—and during the early stages of recovery—as STC plans expire and employees resume working regular hours.

We test this prediction formally, using state-level data on manufacturing production worker employment and production worker average weekly hours over the period 2005 to 2009. The data we analyze are monthly, not-seasonally-adjusted numbers from the Current

Employment Statistics (CES) program of the Bureau of Labor Statistics.⁷ The published data are incomplete for a number of states, but in most of these instances we were able to obtain unpublished monthly figures from BLS. For several states the available data were incomplete or contained clear discontinuities in either the production worker employment or average production worker hours series, and so were dropped from our data set. Our analysis is based on data for 45 states, including all 17 states with STC plans operating during the recession, plus Puerto Rico.⁸

We use these data to estimate the following pair of equations:

$$(2) \quad \Delta \ln AH_{it} = \alpha_1 + \alpha_2 \Delta \ln TH_{it} * D_{it}^{0607} + \alpha_3 \Delta \ln TH_{it} * D_{it}^{0809} + \beta_{1j} \Delta \ln TH_{it} * D_{it}^{0607} * STC_{jt} + \beta_{2j} \Delta \ln TH_{it} * D_{it}^{0809} * STC_{jt} + \gamma_i S_i + \delta_t D_t + \varepsilon_{it}$$

$$(3) \quad \Delta \ln E_{it} = \alpha'_1 + \alpha'_2 \Delta \ln TH_{it} * D_{it}^{0607} + \alpha'_3 \Delta \ln TH_{it} * D_{it}^{0809} + \beta'_{1j} \Delta \ln TH_{it} * D_{it}^{0607} * STC_{jt} + \beta'_{2j} \Delta \ln TH_{it} * D_{it}^{0809} * STC_{jt} + \gamma'_i S_i + \delta'_t D_t + \varepsilon'_{it}$$

In the model, the subscripts i and t index state and time, and j indexes the subset of 17 states with STC programs. Production worker total hours are computed as the product of production worker employment and average weekly hours. Employment and hours data are not seasonally adjusted, and changes in the log of production worker employment, average hours, and total hours are computed as year-on-year changes (e.g., the log of Rhode Island's production worker employment in January 2006 less the corresponding value for January 2005). Thus, with data beginning in 2005, we are able to compute the change in the employment and hours

⁷ BLS has published data on average weekly hours for all workers in manufacturing only since 2007, and for this reason we estimate our models with data on production workers. Production workers account for a little over 70 percent of manufacturing employment nationwide.

⁸ Delaware, Oklahoma, Pennsylvania, Tennessee, and Wyoming were dropped from our data owing to missing or anomalous data.

variables for the period 2006 forward. Each model also includes a full set of state, S_i , and time (year-month), D_t , dummy variables. State controls capture cross-state differences in employment trends that might be influenced by the industry composition of the state's manufacturing sector or other factors. Controls for time period will capture general trends in manufacturing employment, reflecting productivity growth, shifts in the locus of production, and other factors, as well as cyclical factors that may influence the share of employment in total hours adjustment.

The specifications we estimate allow for a different composition of total hours adjustment in the pre-recession period of 2006 and 2007 (as captured by the indicator variable, D^{0607}) than in the recession period of 2008 and 2009 (as captured by the indicator variable D^{0809} for both STC and non-STC states. We expect that employers will rely more on average hours adjustment and correspondingly less on employment adjustment to reduce total hours worked in states with STC programs during the recession years and thus that the estimated β_{2j} coefficients will be positive while the β'_{2j} coefficients will be negative. Because average hours, employment, and total hours are related by the identity shown in equation (1), the following relationships between the estimated coefficients in equations (2) and (3) hold by construction: $\alpha_1 + \alpha'_1 = 1$, $\alpha_2 + \alpha'_2 = 1$, and for each STC state, j , $\beta_{1j} + \beta'_{1j} = 0$ and $\beta_{2j} + \beta'_{2j} = 0$.

Table 5 reports selected coefficients from our estimates of equation 3. Because the coefficient estimates from equation 2 are of identical magnitude and opposite in sign to those of equation 3, we only report one set of results in the table. Robust standard errors, clustered on state, are in parentheses. The results are broadly consistent with our expectation that manufacturing establishments in STC states rely relatively more on average hours adjustment and relatively less on the adjustment of employment levels to achieve hours reductions as

compared to manufacturers in non-STC states.⁹ The coefficients on the STC state interactions with change in hours and recession period are negative and significant for eight out of the seventeen STC states, and in no cases are these coefficients significantly positive. It is notable that this pattern is not evident in the pre-recession period; instead, if anything, the coefficients on the STC state interactions for the earlier period are significantly positive, indicating that companies in these states relied more heavily on adjusting employment levels than on adjusting average hours to alter labor input in the years prior to the recession.

While the results in Table 5 are consistent with STC programs having a significant effect in some states on the choice between adjusting average worker hours versus employment levels to reduce labor, they are not definitive. To partially address the issue of causality, we consider whether the take-up of STC in these states was sufficiently large to explain the observed differences in the composition of total hours adjustment during the recession.

We first estimate the full-time equivalent number of individuals on short-time in each participating state and month. To do so, we use data reported by states on weeks of benefits paid and adjust these numbers so that they reflect the average reduction in total hours during the month. For instance, if a state paid 430 weeks of STC benefits in a month to workers whose hours were reduced by 20 percent, the FTE weeks paid would be 86 (430×0.2).¹⁰ To compute the average number of FTE persons on STC during the month, we divide this number by 4.3 (the

⁹ The year-to-year changes in total hours for 2007-2008 are generally negative; less than 20 percent of the state-month changes in production worker hours were positive. The changes in total hours in 2008-2009 were nearly all negative; only 4 state-month changes in this year were positive, three in Alaska and one in Washington state.

¹⁰ States report full-time equivalents for STC initial weeks claimed and for STC weeks claimed, but not for STC weeks paid. To adjust STC weeks paid, we multiply these figures by the ratio of FTE weeks claimed to weeks claimed in the month, or in instances where that data item is missing, by the ratio of FTE initial weeks claimed to initial weeks claimed. All FTE data were missing for Texas, and we assumed a ratio of 0.2 or 20 percent reduction in weekly hours.

average number of weeks in a month). In our numerical example, this would yield an estimate that 20 FTE persons on average were on short-time during the month.

Table 6 presents the average weekly FTE persons on STC in aggregate and by state for the years 2008 and 2009. Under the assumption that, in the absence of STC programs, employers would have laid off workers to achieve an equivalent reduction in total hours, these FTE figures represent potential jobs saved. In 2008 the weekly FTE persons on STC in the 17 states averaged about 4,500. In 2009, that figure increased five-fold with an FTE equivalent of about 22,000 workers on STC per week.

To place these figures in perspective with overall job losses, we also report them as a percent of the reduction of all private sector employment and as a percent of the reduction in manufacturing production employment from the previous year. Specifically, for each state we compute the average weekly FTE workers on STC in a month divided by the corresponding year-over-year employment changes in the month. For the 17 states combined, the average FTE of persons on STC in 2009 represented less than one percent of average private sector employment declines from 2008 to 2009, but nearly five percent of the declines in manufacturing production jobs over that period. The absolute and relative size of STC programs was considerably higher in some states. If, as available evidence suggests, manufacturers accounted for a majority of the use of STC programs, then the effect on manufacturing production worker employment may have been sizable in some states. Rhode Island and Connecticut—where in 2009 the average FTE of persons on STC expressed as a percent of declines in manufacturing production worker employment amounted to 22 percent and 16 percent, respectively—particularly stand out.¹¹

¹¹ As a further check on the plausibility of the hypothesis that STC significantly affected labor adjustment patterns of manufacturers in some states, we constructed a hypothetical production employment series for STC

What accounts for the unusually high per-worker use of STC in Rhode Island?

According to the STC program administrator in Rhode Island, strong commitment to the program within the state and active outreach to businesses were critical.¹² In addition to publicizing the STC option via its website and pamphlets, the Rhode Island Department of Labor and Training issued periodic press releases highlighting companies that had successfully used STC to avoid layoffs. The business services division of the department actively identified companies that might be good candidates for the program and promoted it to these companies. The state's small size likely was an important factor too. States typically do not have regional offices and consequently tend to have weaker contacts with businesses located a significant distance from the state capitol, thus impeding state governments' ability to proactively identify businesses that potentially would benefit from work sharing.

Had STC programs existed in all states and been used as intensively in all of them as in Rhode Island during the recent recession, back-of-the-envelope calculations suggest that the effect on U.S. employment could have been substantial. According to our estimates, the STC take-up rate in Rhode Island was about five times as large as the take-up rate in all STC states combined and, given that the 17 STC states account for about half of payroll employment nationwide, introducing STC programs in the remaining states could have doubled their effect.

Had all states been like Rhode Island in their use of short-time compensation, the average

states and re-estimated equation (3) using the new series. Specifically, using monthly STC data reported by the states, we computed monthly FTE persons on STC for the years 2005 to 2009 and subtracted it from actual production worker employment. In using FTE persons on STC as a measure of potential jobs saved in manufacturing, we assume that manufacturers account for all STC use and that the presence or absence of an STC program does not affect the extent to which employers adjust total labor hours. As expected, the coefficients on the STC state interactions with total hours change and recession period generally became less negative, implying that in the absence of STC programs there could have been significantly greater reliance on employment reductions to reduce labor input. The change in the coefficient estimate was generally large and significant in states with the greatest utilization of STC programs, including Connecticut, Massachusetts, New York, and Rhode Island.

¹² This information is based on an interview with Kathy Catanzaro, who heads the STC program in Rhode Island.

number of full-time-equivalent workers on STC in 2009 would have been approximately ten times as large as the number actually observed—in the vicinity of 220,000 FTEs rather than 22,000 FTEs. And had the average take-up rate been similar to that in Germany or Italy in 2009 rather than in Rhode Island, which still was modest by international standards, the average number of full-time-equivalent workers on STC would have approached one million. In other words, with STC usage at European levels, as many as one in eight of the roughly 8 million jobs lost during the recession could potentially have been saved.

CONCLUSION

Although the usage of short-time compensation programs by U.S. employers has been low by international standards, interest in these programs has grown: Among states with STC programs, weeks paid relative to regular UI benefit weeks paid was generally higher in the recent recession than in previous recessions; several states have enacted STC programs since the onset of the last recession; and new Federal legislation will facilitate the expansion of STC programs to other states and generally promote the use of work-sharing as an alternative to layoff. With respect to the last, the notably high STC usage in Rhode Island, a state that has been unusually active in publicizing and promoting its STC program, hints that increasing the visibility of the STC programs in other states could raise overall usage considerably.

While not constituting definite proof, the cross-state analysis we have carried out suggests that STC programs may alter the pattern of adjustment during economic downturns. During the recent economic crisis, manufacturing employers in STC states generally relied more on the adjustment of average hours and less on the adjustment of employment levels than did manufacturing employers in non-STC states. Further, the magnitude of the differences between

STC and non-STC states is consistent with the actual levels of STC usage observed. Provided that STC did not affect the magnitude of overall adjustment during the downturn but only its composition, this suggests that the response of manufacturing employment to declining labor demand was smaller in STC than in non-STC states. On balance, our evidence indicates that jobs saved as a consequence of STC could have been significant in sectors like manufacturing that made extensive use of the program. With the possible exception of Rhode Island, however, the overall scale of the STC program operating in the 17 states was too small to have substantially mitigated the aggregate job losses these states experienced in the recent severe recession. Expansion of the program within STC states as well as to states without the program would be necessary for STC to be an effective counter-cyclical tool in the future.

We believe that extending the availability of STC programs to all states and taking the necessary steps to familiarize employers with these programs could provide a valuable additional tool in the arsenal available for responding to economic downturns. More research is needed, however, to understand the extent to which STC programs actually mitigate job losses and blunt the impact of recessions on businesses, workers, and communities.

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Table 1 Full-time Equivalent of STC Weeks Claimed as a Percent of Regular UI Weeks Claimed, Selected Years

Year	1991	1992	2001	2002	2008	2009	2010
Arizona	na	0.2	0.6	0.2	0.2	0.5	0.3
Arkansas	0.1	0.1	na	na	na	na	0.1
California	0.5	0.7	0.4	0.5	0.4	1.1	1.0
Connecticut	na		0.4	0.5	0.2	1.6	0.8
Florida	0.2	0.2	0.1	0.1	0.0	0.2	0.2
Iowa	0.1	0.0	0.0	0.2	na	1.1	0.5
Kansas	0.7	0.7	0.9	0.5	3.2	2.6	1.4
Maryland	0.2	0.1	na	na	na	0.2	0.2
Massachusetts	na	0.1	0.1	0.4	0.1	0.8	0.3
Minnesota	na	na	0.3	0.5	0.2	0.8	0.4
Missouri	0.0	0.3	0.8	0.5	0.8	1.6	0.9
New York	na		0.5	0.4	0.2	1.1	0.7
Oregon	0.1	0.1	0.2	0.2	0.2	1.0	0.7
Rhode Island	0.0	0.6	1.4	1.4	1.8	4.2	3.0
Texas	0.1	0.1	0.4	0.2	0.3	0.4	0.3
Vermont	na	0.1	1.0	1.3	0.7	1.5	0.8
Washington	0.1	0.1	0.3	0.3	0.5	1.3	1.6

NOTE: na = not available.

SOURCE: Authors' calculations based on data from the Employment and Training Administration, U.S. Department of Labor.

Table 2 STC Benefits Paid as a Percent of Regular UI Benefits Paid, Selected Years

Year	1991	1992	2001	2002	2008	2009	2010
Arizona	0.4	0.6	0.7	0.4	0.3	0.6	0.5
Arkansas	0.2	0.7	0.0	0.0	0.5	1.0	0.2
California	0.6	0.6	0.7	0.8	0.7	1.6	1.9
Connecticut	0.0	0.0	0.5	0.6	0.2	2.0	1.6
Florida	0.2	0.2	0.1	0.1	0.1	0.2	0.2
Iowa	0.2	0.2	0.0	0.2	0.0	1.4	0.7
Kansas	0.8	0.7	1.0	0.5	3.7	3.0	1.3
Maryland	na	na	na	na	na	na	0.2
Massachusetts	0.0	0.1	0.2	0.5	0.1	0.9	0.4
Minnesota	0.0	0.0	0.3	0.5	0.2	1.0	0.5
Missouri	0.4	0.4	0.9	0.6	0.9	1.9	1.0
New York	0.3	0.5	0.5	0.4	0.2	1.0	0.5
Oregon	0.1	0.2	0.3	0.3	0.4	1.5	1.2
Rhode Island	0.0	0.7	1.8	1.6	1.7	9.8	3.5
Texas	0.1	0.1	0.1	0.1	0.4	0.5	0.4
Vermont	0.0	0.1	1.3	1.7	0.9	2.1	0.9
Washington	0.1	0.2	0.4	0.3	0.6	1.6	1.9

NOTE: na = not available.

SOURCE: Authors' calculations based on data from the Employment and Training Administration, U.S. Department of Labor.

Table 3 Take-up Rates of Work-sharing Programs, 2007-2009, Selected Countries*

	<u>All Employees</u>			<u>Manufacturing</u>		
	2007	2008	2009	2007	2008	2009
Austria	0.00	0.03	0.63	0.00	0.17	3.41
Belgium	3.22	3.53	5.60	6.44	7.36	16.99
Canada	0.02	0.03	0.34	na	na	na
Czech Republic	na	0.61	1.44	na	1.59	4.49
Finland	0.36	0.47	1.67	na	0.59	2.69
France	0.34	0.31	0.83	na	0.53	3.61
Germany	0.08	0.17	3.17	0.17	0.53	12.06
Ireland	na	0.17	1.03	na	0.48	1.34
Italy	0.64	0.78	3.29	1.75	2.29	9.95
Netherlands	na	0.20	0.75	na	1.39	5.01
United States*	0.04	0.07	0.22	na	na	na

NOTE: na = not available. *Take-up rate for the United States is computed for the subset of states with short-time compensation programs. These data were provided as a special tabulation in an EC-OECD questionnaire.

SOURCE: OECD 2010b, Table 1.A6.2, Table 1.A6.3.

Table 4 Take-up Rates of Short-time Compensation Programs by State, 2007-2009
(average percent of employees covered by STC in indicated year)*

	All Private Sector Employees			Upper Bound Estimates of Take-up Rates Among Manufacturing Production Workers		
	2007	2008	2009	2007	2008	2009
Arizona	0.01	0.02	0.11	0.24	0.41	2.01
Arkansas	0.00	0.04	0.10	0.01	0.25	0.70
California	0.04	0.06	0.25	0.60	1.01	4.55
Connecticut	0.02	0.03	0.39	0.23	0.35	5.27
Florida	0.00	0.01	0.03	0.04	0.12	0.91
Iowa	0.00	0.00	0.18	0.00	0.00	1.54
Kansas	0.02	0.17	0.39	0.15	1.44	3.69
Maryland	na	0.02	0.03	na	0.38	0.75
Massachusetts	0.01	0.02	0.18	0.15	0.26	2.95
Minnesota	0.01	0.02	0.18	0.14	0.24	2.12
Missouri	0.04	0.07	0.25	0.48	0.77	3.16
New York	0.01	0.01	0.14	0.19	0.28	2.99
Oregon	0.01	0.03	0.31	0.13	0.29	3.44
Rhode Island	0.11	0.24	0.86	1.38	3.17	12.35
Texas	0.01	0.02	0.06	0.15	0.26	0.86
Vermont	0.11	0.09	0.37	1.01	0.88	4.01
Washington	0.01	0.04	0.29	0.15	0.61	4.27
All STC States	0.02	0.03	0.17	0.26	0.50	2.74

NOTE: na = not available. *Take-up rate of short-time compensation is the average percent of private-sector employees in the state participating in the state's STC program during the indicated year. The aggregate figures are computed as employment-weighted averages of the 17 states and differ slightly from the figures reported for the United States by OECD and reproduced in Table 3. (See fn. 3 in text for further discussion.) The upper-bound estimate of take-up rates for manufacturing production workers assumes manufacturing production workers account for all STC use.

SOURCE: Authors' calculations based on STC program data supplied by the U.S. Department of Labor, Employment and Training Administration.

Table 5 Cross-state Differences in the Composition of Total Hours Adjustment among Manufacturing Production Workers

Dependent variable: $\Delta \ln$ production emp			
$\Delta \ln$ total hours \times pre-recession indicator		0.27**	
		(0.09)	
$\Delta \ln$ total hours \times recession indicator		0.47**	
		(0.10)	
$\Delta \ln$ total hours \times Pre-recession indicator \times state		$\Delta \ln$ total hours \times Recession indicator \times state	
Arizona	0.70**	Arizona	-0.09~
	(0.08)		(0.05)
Arkansas	-0.05	Arkansas	-0.20**
	(0.08)		(0.04)
California	0.51**	California	-0.01
	(0.10)		(0.05)
Connecticut	0.35~	Connecticut	-0.30**
	(0.18)		(0.04)
Florida	0.44**	Florida	0.06
	(0.07)		(0.05)
Iowa	-0.05	Iowa	-0.09~
	(0.11)		(0.05)
Kansas	-0.30**	Kansas	0.03
	(0.09)		(0.06)
Maryland	1.04**	Maryland	-0.14
	(0.20)		(0.09)
Massachusetts	0.05	Massachusetts	-0.15**
	(0.24)		(0.05)
Minnesota	-0.13~	Minnesota	0.06
	(0.08)		(0.05)
Missouri	0.04	Missouri	-0.04
	(0.11)		(0.04)
New York	-0.13~	New York	-0.20**
	(0.07)		(0.04)
Oregon	0.12~	Oregon	0.04
	(0.07)		(0.06)
Rhode Island	0.36**	Rhode Island	-0.09*
	(0.12)		(0.05)
Texas	0.33**	Texas	-0.15*
	(0.07)		(0.06)
Vermont	0.50**	Vermont	0.04
	(0.13)		(0.06)
Washington	0.45**	Washington	-0.04
	(0.05)		(0.08)
Constant		-0.00	
		(0.00)	
Observations		2,184	

NOTE: The table reports selected coefficients from equation (3) in the text. A full set of 46 state dummy variables and year-month time dummy variables also were included in the regression. Robust standard errors clustered on state are reported in parentheses. The symbol “~” indicates $p < 0.1$, “*” indicates $p < 0.05$, and “**” indicates $p < 0.01$.

Table 6 Average Weekly FTE Persons on STC by State, 2008 and 2009

State	2008	2009		
	Number	Number	As % change in private sector employment	As % change in manuf production employment
All STC States	4,486	22,050	-0.73	-4.87
Arizona	107	476	-0.26	-4.00
Arkansas	76	188	-0.47	-1.11
California	1,578	6,578	-0.75	-6.78
Connecticut	78	1,420	-2.09	-16.34
Florida	71	368	-0.08	-0.92
Iowa	na	560	-1.17	-3.05
Kansas	604	1,063	-2.21	-6.36
Maryland	na	180	-0.21	-4.36
Massachusetts	114	1,123	-0.96	-6.03
Minnesota	105	795	-0.72	-2.25
Missouri	407	1,425	-1.32	-5.96
New York	319	3,045	-1.24	-7.51
Oregon	86	963	-0.89	-4.41
Rhode Island	257	887	-4.14	-22.88
Texas	345	1,022	-0.3	-1.47
Vermont	55	198	-1.85	-5.14
Washington	286	1,760	-1.29	-8.29

NOTE: na = not available.

SOURCE: Authors' calculations based on STC program data supplied by the U.S. Department of Labor, Employment and Training Administration.