

**Short-Time Compensation in the U.S. and California from 2000 to 2022:
A Descriptive Analysis of Program Incidence and Worker Outcomes**

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Abstract

In this paper, we review the recent U.S. experience with Short-Time Compensation (STC) program and use administrative, individual-level data to describe the characteristics and short- and long-term outcomes of claimants of the STC program in California in three downturns since 2000. As a benchmark, we compare the outcomes of STC claimants to workers receiving partial and full UI, two frequently used programs that could in principle deliver similar benefits. While overall use of STC in past downturns was moderate to low compared to other countries, some states saw considerable take up, suggesting the program can be scaled effectively. STC claimants in California had only temporary earnings reductions, high employment rates, and high job stability, suggesting the program effectively supported employment relationships. Individuals receiving partial or full UI benefits had worse outcomes than STC claimants, indicating these programs were not equivalent ways of assisting workers and subsidizing job stability during the Pandemic or in prior downturns. The presence of widespread recall among both partial and full UI claimants suggests potential scope for increasing STC in the future.

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I. Introduction

Short-Time Compensation (STC), or Work Sharing, programs allow firms to avoid layoffs by subsidizing reduction in working hours through temporary prorated benefit payments. In the U.S., STC is an optional program administered by 27 states as part of their Unemployment Insurance (UI) program. The advantage of STC is that it can help maintain valuable employment relationships, prevent costly job displacements, provide continuity in pension and health benefits, and avoid increased recruitment costs and labor market crowding during recoveries.

The STC program has great promise in particular when reductions in economic activities are deemed to be temporary. In the extreme case, it would allow workers to stay at their current employers even if businesses have to shut down most activities such as in the case of a national pandemic. As a result, many OECD countries saw a substantial increase in the use of STC during the COVID-19 Pandemic (henceforth the Pandemic) (OECD, 2020). In contrast, STC in the U.S. during the Pandemic was lower than in the Great Recession, even though several states adopted new STC programs since then (Krolkowski & Weixel, 2020).

Several candidate explanations have been put forth for the low rate of STC usage in the U.S. during the Pandemic and prior downturns. Many employers seem to be unaware of the program in states where it exists (Houseman et al., 2017). In addition, many STC programs were small, and hence insufficiently staffed or automated and struggled to handle larger volumes of claims during the Pandemic. In addition, several temporary programs provided much publicized alternatives to STC during the Pandemic. For example, the Payment Protection Program (PPP) sought to stabilize employment by extending forgivable loans to small businesses that kept workers employed.

In addition, the UI system itself offers two commonly used alternatives that in principle could stabilize worker-firm matches through temporary downturns, and not impose further administrative burden on employers. Laid off workers can receive UI and wait for their firms to rehire them. Such temporary layoff and recall have been a frequent phenomenon in the U.S. labor market before (e.g., Fujita

& Moscarini, 2017) and during the Pandemic (Bell, Hedin, Mannino, et al., 2021). Workers whose hours are cut for economic reasons can receive prorated partial UI benefits. Such partial UI claimants are in a similar position as STC claimants, but they receive a lower income subsidy and may not receive full job benefits. In California, about 5 to 15 percent of UI beneficiaries have received partial UI benefits in the past (Bell et al., 2020).

Little is known about how workers fare and whether worker-firm matches are maintained under STC participation, receipt of full UI benefits with option of recall, and continued employment during receipt of partial UI. Among others, this is due to a lack of data on participants in the STC program in particular, and about UI claimants more generally. As a result, there is insufficient information about which type of workers and firms likely participate in STC, with information usually limited to the industry of employers.

In this paper, we use administrative data from California to provide an in-depth look at workers receiving STC in three major downturns in California since 2000. We use this data to describe the incidence of STC claims by industry, firm size, county, and worker characteristics. We then contrast outcomes of workers under the three different programs STC, full UI, and partial UI, focusing on short- and long-term employment, earnings, job attachment, and industry switching. In addition, we use publicly available data from the U.S. Department of Labor to put the California experience in context of development of STC programs in the U.S. and other states.

Using this approach, we obtain several key descriptive findings.

- While overall use of STC in the United States during the Pandemic was given the temporary expected nature of layoffs, the share of overall benefit claimants was only slightly lower as in the Great Recession. Yet, some states that had an STC program had a substantial share of all unemployment claimants receiving STC during Pandemic or Great Recession, reaching monthly shares of over 40%, suggesting that barriers to STC use can be overcome effectively.

- In California, workers receiving benefits under STC had substantial high attachment to their employers, low rates of leaving their prior industry, and high employment rates in all three major downturns since 2000.
- Compared to STC claimants, partial UI claimants had similarly high employment rates, but lower rates of employer attachment and higher industry mobility in the two years after the claim.
- Both STC and partial UI claimants had substantially higher employment rates, employer attachment, and industry stability than full time UI claimants, who experienced sharp reductions in employment and lasting increases in job and industry instability following layoff.
- STC claimants only experience small temporary reductions in earnings, in contrast to sharp initial earnings losses of partial UI claimants and re-employed full UI claimants. In the aftermath of the Great Recession, all three groups experienced similar moderate declines in overall earnings after two years, driven by both reductions in employment and in earnings while reemployed.²
- During the Pandemic, the rate of recall to the prior employer was higher for partial and full UI claimants than in the Great Recession, but the difference was moderate, leaving partial UI and STC claimants as the more stable groups.

Overall, while ex ante the three options of Short-Time Compensation, partial UI at reduced hours, and temporary layoff with full UI receipt could in principle deliver similar results, the outcomes of workers participating in the three programs vastly differed during the three major downturns in California labor market since 2000.

The apparent advantages of STC and partial UI claimants may partly reflect differences in the type of firms and workers that choose to participate in STC and to maintain ongoing employment during partial UI. Clearly, firms valuing the employment relationship will be more likely to sign up for STC, or otherwise offer their most productive workers part-time work. The findings that full UI participants tend

² This finding may be partly driven by incidence of zero earnings due to inter-state mobility, which can affect the employment development of all three groups.

to fare worse than STC and partial UI recipients also reflects well-known difficulties of laid off workers in the labor market (e.g. Schmieder, von Wachter, & Heining, 2022).

While they cannot be interpreted as causal, the results underscore the possibility that ongoing even temporary employment attachment may be beneficial to workers during recessions. To the very least, they raise the question whether a substantial number of firms do, in reality, reduce workers' hours without applying for STC, leaving workers with lower UI benefits and possibly lower job benefits. The fact that a non-negligible fraction of full UI claimants was recalled to their prior jobs in each downturn since 2000 also suggests that a substantial number of workers and firms remain attached despite layoff.

The considerable use of STC programs among several states during the Great Recession and the Pandemic suggests that scaling STC during recessions is possible. Our findings from California highlight that there may be a potentially large group of workers and firms that may benefit from more information about and possibly participation in the program. Last but not least, our results also underscore the need to obtain causal estimates of the impact of STC participation and to further study the use and outcomes of the partial UI population and of recall after temporary layoff.

Finally, while by nature of the UI program, both partial and full UI claimants have lower employer attachment and lower employment than STC participants, our findings of high rates of recall to the base period employer indicates that the UI program itself (above and beyond the Short-Term Compensation program) helps to maintain worker firm relationships. This is a valuable feature of the UI program that has not received as much attention due to a lack of research, but that our data is able to shed important light on.

II. Institutional Background

Short-time compensation (STC) programs are a form of unemployment insurance intended to provide an alternative to layoffs for businesses facing temporary fluctuations. If a business' production or services have been reduced, they can apply for STC and retain their trained workers at reduced weekly hours and wages, rather than laying off some employees while others remain working full-time. Under

work sharing arrangements, employees continue to receive wages for their hours worked, in addition to a prorated percentage of the UI benefits that they would have been eligible for had they been laid off.

In order to qualify for work sharing, a firm must submit an STC plan for approval to the relevant state agency showing that they have reduced the hours for impacted employees between 10% and 60% and that they will continue to provide health and retirement benefits. Workers are then invited to file a claim for UI benefits. To qualify for prorated UI benefits, workers must have the minimum amount of earnings in a base period such that they would be eligible for regular UI. Earnings in the base period also determine the amount and the duration of benefits. In addition, employees must remain available for full-time work with their STC employer, but may participate in approved workforce training programs.

To understand how benefits are decided and allocated under an STC program, it is necessary to understand how the regular UI system operates. While aspects of the program vary across states, California (CA) can provide a useful example. First, a worker had to be in a job that is covered by the UI system, meaning they are not self-employed or contractors, and they had to be working legally. They had to lose their job through no fault of their own, which means they could not quit their job or be fired for cause. The details of who is eligible based on the type of employment and how they lost their job can be different in other states.

Along with these criteria, they further have to meet CA's monetary eligibility limit on earnings in a base period to be eligible for UI. In CA, the base period is the first four of the last five completed calendar quarters before application to UI. In California, a worker had to earn either: at least \$1,300 in their highest earning quarter, or \$900 in their highest earning quarter and \$1,125 in the whole base period. If they do not meet the criteria in the standard base period, they can use an alternate base period (ABP), which applies the same monetary thresholds to the last four completed calendar quarters. Monetary eligibility limits and whether a worker can use an ABP varies by state.

After workers meet these criteria, they are eligible for UI and receive a weekly benefit amount (WBA) and a potential benefit duration (PBD). In California, the WBA is equal to 50% of weekly wages in the worker's highest earning quarter up to a limit of \$450. This upper limit varies by state with

Massachusetts having an upper limit of \$850 and Louisiana having an upper limit of only \$221. In California, a worker's PBD will be between 14 and 26 weeks, and the maximum PBD in most states is 26 weeks. A more complex formula determines the total amount that can be received, and then the actual duration then depends on how that total amount is distributed over time. In order to continue receiving benefits each week, claimants have to report their work search activities. California does not specify the number or type of work search activities that must be taken, but some states do; for example, Utah requires claimants to report four job search activities each week.

The STC program design in California is different from regular UI in three important ways. First, as noted above, STC claimants are not required to search for work. Second, claimants may be eligible for benefits for up to 52 weeks (20 of the 27 states operating STC programs have a 52 week maximum number of weeks payable, in all cases exceeding the maximum duration available under regular UI).³ Finally, the benefit amount is paid proportionate to the percentage of reduction in hours and wages. For example, an employee who used to earn \$500 working five days per week had their hours and wages cut by 20% due to reduced workplace production. As a result, they are earning \$400 per week and working four days per week. If the worker had been laid off completely, they would have been eligible for \$250 in UI benefits, so under STC, they can receive 20% of \$250, or \$50 in work sharing benefits. Their total weekly wage would then include \$400 from work and \$50 in benefits, a total of \$450 per week.

History of the Short-Time Compensation Program and Changes in Recessions

STC programs have existed in the United States for more than forty years, but they have struggled to scale up. The program started in California in 1978 before receiving permanent federal authorization as part of the Unemployment Compensation Amendments Act of 1992.⁴ While the United States Department

³ Information on how STC program designs vary by state is available in the United States Department of Labor Comparison of State Unemployment Laws 2021:

<https://oui.doleta.gov/unemploy/comparison/2020-2029/comparison2021.asp>.

⁴ STC started in California in response to the enactment of Proposition 13. It was predicted that Proposition 13 would limit state spending because of reduced tax revenues, and as result, there would be large public sector layoffs. The public sector layoffs were not realized, but the private sector used the program. More STC legislative history is available at: <https://sgp.fas.org/crs/misc/R40689.pdf>.

of Labor (U.S. DOL) provides federal guidance, STC programs are voluntarily administered by state governments as part of their unemployment insurance system. Despite the long history, STC use has been limited by administrative and technological challenges, low employer awareness, and weak employer incentives. As of November 2022, only 27 states had permanent, operational STC programs.

The Great Recession renewed interest in STC programs as an alternative to layoffs and a policy to prevent labor market crowding. In February 2012, the federal government enacted the Middle Class Tax Relief and Job Creation Act, which included support for expanding and improving state STC programs. Under this Act, the federal government offered to cover 100% of certain STC costs for three years for states with conforming programs (or states that were able to conform to federal guidance within two and a half years). The federal government also provided up to \$100 million in grants to states who improved implementation, administration, promotion, and enrollment of their STC program. Between 2012 and 2015, twenty-two states received \$266.7 million in federal reimbursements and sixteen states received \$46.1 million in federal grants for STC programs (U.S. Department of Labor, 2016).

In March 2020, the Coronavirus Aid, Relief and Economic Security (CARES) Act expanded federal support of STC as a Pandemic-response tool to mitigate the financial impacts of job loss, help employers retain workers, and prepare to quickly reopen businesses.⁵ Similar to the Middle Class Tax Relief and Job Creation Act, the CARES Act provided 100% reimbursement of STC benefit costs to states with existing STC programs, up to a maximum of 26 weeks. For states without an existing STC program, the CARES Act offered reimbursement for 50% of benefit costs, with employers paying the other half. U.S. DOL allowed states to change their STC programs to enable firms to rehire previously laid off workers on STC. Additionally, the legislation included \$100 million in federal grants for states to implement and improve their STC programs. U.S. DOL clarified that individuals receiving STC payments

⁵ The Families First Coronavirus Response Act signed on March 18, 2020 included support for STC, but the relevant section was repealed and supplanted in the CARES Act on March 27, 2020.

were still entitled to \$600 per week from the Federal Pandemic Unemployment Compensation (FPUC) program for weeks ending on or before July 31, 2020 U.S.⁶

The CARES Act also created multiple new UI programs.⁷ FPUC, also known as Pandemic Additional Compensation (PAC), provided an additional \$600 on top of regular UI benefits between March 29, 2020 and July 25, 2020 and then an additional \$300 between December 27, 2020 and September 4, 2021. The Pandemic Emergency Unemployment Compensation (PEUC) increased benefit durations for regular UI beneficiaries. The Pandemic Unemployment Assistance (PUA) program provided benefits to workers who were not eligible for regular UI benefits because of a lack of or insufficient earnings in covered employment. In addition, the CARES Act fully paid for extended benefits under the states' own Extended Benefit (EB) programs through September 6, 2021, though many states ended their programs prior to that date; the cost of EB is normally split between the federal government and states.⁸

Alternatives to the Short-Time Compensation Program

In general, the same workers that are eligible for UI benefits under STC are eligible for full UI if they have lost their job through no fault of their own, and are willing and able to work. Hence, during a substantial slow-down in business activities – or outright shut down as during the Pandemic – businesses can temporarily lay off workers. Eligible workers can then receive UI benefits, and firms can in principle recall workers. The practice of temporary layoff and recall is frequent in the U.S. labor market (Fujita & Moscarini, 2017).

⁶ During the Pandemic, U.S. DOL issued a series of Unemployment Insurance Program Letters (UIPLs) providing guidance and clarifications on the STC rules, regulations, and implementation. For more information, see UIPL 14-20, UIPL 21-20, UIPL 14-20 Change 1, and UIPL 10-20 Change 2 at: <https://oui.doleta.gov/unemploy/coronavirus/>.

⁷ One concern for businesses during this period was that Pandemic layoffs would drive up their experience rating, or the tax rate at which employers pay into the UI system. Some states chose to carve out Pandemic exceptions, while others did not. More information is available at: <https://taxfoundation.org/unemployment-insurance-tax-hikes-covid19/>.

⁸ In addition to UI program expansions, the Federal Emergency Management Agency (FEMA) received executive authorization to use Disaster Relief Funds in the form of grants to states to supplement the payment of lost wages. More information about the Lost Wages Supplemental Payment Assistance program is available at: <https://www.fema.gov/disaster/coronavirus/governments/supplemental-payments-lost-wages-guidelines>.

Another option for workers and firms during temporary economic slowdowns is partial UI. While most UI claimants do not work and are eligible for full weekly benefits, some claimants continue to earn wages and receive partial UI benefits. Workers may end up with partial benefits due to a reduction of hours at their current employer without a job separation or as a result of a layoff followed by re-employment at less than full-time status. Partial UI claimants may earn income up to a particular threshold before their UI benefits are reduced to zero.⁹ In contrast to STC, however, partial UI recipients typically do not receive their full prorated UI benefits, and they may not keep receiving employer benefits as part-time workers.

In addition to unemployment insurance, at the onset of the Pandemic, the Paycheck Protection Program (PPP) was introduced to stabilize incomes, retain jobs, and assist employers. The program provided low-interest loans of up to \$10 million to businesses with less than 500 employees. The loans were forgivable if businesses maintained employment and wages at almost pre-Pandemic levels for two to six months after they received the loan. While the federal government disbursed about \$800 billion in PPP loans, research on program impacts found that only 23-34% of PPP dollars went to workers who would have otherwise lost their jobs. PPP was a relatively untargeted program and as a result, the distribution of PPP funding tended to be regressive (Autor et al., 2022).

While direct financial support for STC and program take-up increased during the Pandemic recession, the use and magnitude of the main alternative programs addressing income loss were much greater. For example, in response to the Pandemic shock, the number of people applying for and receiving UI benefits jumped dramatically, as did the share of workers eventually recalled to work with their prior employer. In California between April and June 2020, more than 2 million people who were fully separated from their employer claimed UI benefits. The majority of these claimants expected to be

⁹ UI claimants in California who report positive earnings during a week of unemployment receive partial UI benefits. Under partial UI, the greater of \$25, or 25% of reported weekly earnings is “disregarded”, and every dollar of income after that is deducted from the claimants Weekly Benefit Amount (WBA). Thus, if a claimant has a WBA of \$300, and reports \$200 in income for a given week, 25% of that income (\$50, which is greater than \$25) is disregarded, and the other \$150 is deducted from the \$300 WBA. In this scenario, the claimant would receive a UI payment of \$150. An analysis of partial UI and earnings disregard is available at: www.capolicylab.org/wp-content/uploads/2020/07/CPL-Analysis-on-Earnings-Disregard-for-Partial-UI-in-California.pdf.

recalled to their prior employer and, among the 57% of people who were re-employed four quarters later, 60% of them were recalled to that employer (Bell, Hedin, Mannino, et al., 2021). Compared to the 31% of claimants who were recalled to a prior employer a year after entering the UI system in Q4 2018, recall of UI claimants during the COVID-19 Pandemic was much greater (Bell, Hedin, Mannino, et al., 2021).

In addition to substantial temporary layoff and recall, in California the share of certified UI claimants who were paid partial UI benefits doubled from 7% to 14% at the beginning of the Pandemic. Between July 2020 and August 2021, that share dropped from 14% to 9%. Depending on the week, an additional 4-10% of certified UI claimants were denied benefit payments due to excess earnings or return to full-time work over that same period (Bell, Hedin, Mannino, et al., 2021). While not all partial UI recipients or those denied benefits were recalled to their prior employer, the elevated share of partial UI claimants indicates that some worker-firm relationships were maintained.

Despite the substantial use of full UI with recall and partial UI during the Pandemic and prior recessions, it is not necessarily clear that these programs improve outcomes for workers or employers compared to participation in Short-Time Compensation. The question of how workers fared on these three programs is an important unresolved question we turn to in our empirical analysis using California microdata on Short-Time Compensation.

III. Literature on Impact of Short-Time Compensation on Workers and Firms

A relatively nascent literature has explored labor market effects of STC programs, most often focusing on firm-level effects of the policy. Only one paper to our knowledge assesses worker-level outcomes in the context of Italy (Giupponi & Landais, 2022), using as a comparison group workers that are displaced from their firms. Here, we build on this work by comparing STC claimants to similar workers in the partial UI program and workers that were fully on UI. Our framework does not allow us to identify the causal impact of STC or other program participation.

The key identification challenge in understanding labor market effects of STC is that takeup is non-random at both the firm and worker level: firms applying for the policy are often highly distressed;

workers may be selectively chosen within firms based on their productivity or other characteristics. Moreover, since the program provides benefits to weather *temporary* liquidity shortfalls, matching designs based on pre-takeup characteristics are often insufficient as STC firms may be more responsive to demand shocks than other firms.

Two recent high quality papers thus exploit idiosyncratic components of each STC system's administration for identification. Cahuc et al. (2018) leverage local administration of the program in France, which creates geographic variation in both application acceptance delays and knowledge about the program. They find strong positive impacts on firms' employment and survival, particularly among firms facing large demand shocks. Kopp and Siegenthaler (2021) similarly exploit local variation in Swiss STC application acceptances by comparing accepted and rejected STC firms over time (after a propensity score adjustment). In line with earlier evidence, they also find that STC takeup reduces firms' layoff rate and improves firm survival.

However, the usual theoretical justification for STC is to preserve worker-firm relationships during temporary economic shortfalls, rather than maintenance of firm balance sheets. The logic is that firms with insufficient liquidity might be forced to lay off workers during downturns, both displacing workers from jobs and imposing future hiring costs during future economic recovery. Preserving these worker-firm matches can retain substantial value if workers are good fits for a particular employer (Gibbons & Katz, 1992) or if job search frictions make reemployment costly (Diamond, 1982; Mortensen & Pissarides, 1994). Indeed, Lachowska et al (2021 AER) find that over half of displaced workers' long-term earnings losses from the Great Recession are attributable to the severance of valuable worker-firm matches.

To this end, a more recent empirical literature has focused on the effects of STC provision on *workers*. In addition to the previously mentioned STC identification challenge, a worker-level analysis introduces the additional complexity that most major earnings datasets do not separately identify STC participants. For instance, under the German system, workers' social security payments are kept constant and so STC workers cannot be identified in the customary administrative employment data (which are

derived from social security earnings records). Tilly and Niedermeyer (2016) overcome this data issue by using digitized worker-level STC records for the Nuremburg metropolitan area. Compared to the well-known “earnings scar” effects for laid-off workers (e.g., Jacobson, Lalonde, & Sullivan, 1993, Davis and von Wachter 2011, Heining, Schmieder, & von Wachter, and 2022), they find using descriptive event studies that STC participants have no negative long-term effects on earnings. STC participants in their data tend to have long work histories and tenure at their current firm, however, indicating that these earnings differences may not reflect causal effects of STC.

Giupponi and Landais (2022) overcomes the dual data and identification challenges by 1) using detailed Italian employer-employee microdata containing STC takeup, and 2) exploiting plausibly exogenous variation in access within industry and across firm size. They are able to first replicate previous firm-level findings on employment and firm survival, but then additionally show reductions in hours worked per worker. Turning to worker-level outcomes, they find a medium-term earnings scar for affected STC employees, though their labor market trajectories are better than comparable displaced workers. One potential explanation for this difference is that the Italian system studied allows for STC coverage to all firms experiencing economic shocks, regardless of persistence: their sample contains firms undergoing mergers, bankruptcy, and reorganizations as well as temporary shocks.

We see three major open questions from the literature. First, to what extent do the worker-level labor market effects of STC takeup replicate outside of the Italian policy context? Understanding heterogeneity in these treatment effects across labor markets, the business cycle, or economic shock persistence would be helpful in setting optimal policy responses. Second, to what extent are STC workers negatively or positively selected within the firm? This helps understanding the distributional incidence of the program, or assessing the distortions of STC through labor market misallocation. Lastly, how do STC workers’ labor market trajectories compare to other conceptually similar unemployment policies in the United States, such as partial UI or temporary layoff UI payments?

IV. Conceptual Discussion

Arguments in Favor of Short-Time Compensation

There are several arguments traditionally made in favor of using the STC program to support workers and firms during recessions. While employers have to apply to STC, a salient feature of the program is that employers may not fully internalize the value of STC for workers and society as a whole. Another important feature is that STC would be beneficial in the short-run even if workers might be more productive at other firms in the longer-run.

The standard case for STC is often made for the following economic scenario: (1) A temporary downturn that does not alter workers' expected longer-term productivity at their existing jobs. (2) There are worker-firm specific match products, i.e., existing workers are more productive or valuable for their employer than for other firms. Such 'match' specific values can arise because some of workers' skills can only be used at the current employer, for example if firms provide training to workers in firm-specific operations. Yet, they can also arise if firms incur substantial recruitment costs or costs from unfilled vacancies.

In this case, firms that can freely borrow would keep their workers at reduced working hours, something often referred to as 'labor hoarding', a pattern documented in past downturns. However, if firms face a borrowing constraint, they may choose to let workers go, losing valuable employees. STC provides a stop-gap for these employers to help preserve valuable job attachments.

Yet, even without a liquidity constraint, firms may not fully realize and internalize the value of maintaining job relationships that accrue to workers and society. This can occur for example if workers attach a higher value to the employment relationship than firms. This can arise if search costs for workers are high, if it is difficult to replace firm health care or pension benefits, or if the cost of layoff is substantial. Theory and evidence suggests that it is very difficult for firms and workers to renegotiate wages to incorporate such costs.

STC may also have benefits for the aggregate labor market above and beyond the value to each single employer or worker on the program. This can occur for several reasons. By reducing the number of

job seekers applying for a limited number of jobs in recessions, STC can prevent crowding in the labor market and hence can speed up the economic recovery.¹⁰ Similarly, STC can prevent widespread consumption declines associated with unemployment that can further aggravate the downturn through a negative multiplier effect. It can also help to avoid the social and political repercussions of large-scale layoffs and unemployment. Finally, STC avoids the much debated adverse effect of UI benefit payments on unemployment duration.

Hence, a benevolent social planner concerned with outcomes of workers and the aggregate economy would likely subsidize the takeup of STC benefits in downturns. This is particularly true because the administrative burden and the cost of full-time benefits may make the program less attractive to employers. This has been effectively done by the U.S. government, which paid 100% of STC benefits in the aftermath of the Great Recession and during the Pandemic. It has also occurred in numerous European countries, that among others lowered or waived contributions to social security or unemployment insurance systems.

The main concerns with STC is that it may subsidize part-time work occurring for reasons other than temporary reductions in output and that it risks sustaining unproductive employment relationships. The latter concern is particularly relevant during business cycles that involve a lot of reallocation between employers, sectors, or regions. However, in the presence of labor market crowding and large cost of job loss during recession, deferring some of the reallocation further into the recovery might be beneficial. Moreover, the evidence on the incidence of reallocation during business cycles is mixed, with the majority of job-to-job mobility occurring during expansions.

Short-Time Compensation vs. Partial UI vs. Temporary Layoff

As discussed in Section II, temporary layoff followed by recall, and the receipt of partial UI during involuntary part-time employment is a common phenomenon in the labor market. Compared to

¹⁰ It does so by preventing layoffs and hence job search from the unemployed, but also by preventing increased job search among workers fearing job loss.

STC, these two approaches to handling temporary slowdowns in economic activities involve little paperwork for the employer, and provide some economic support for the worker. The economic support to workers provided under temporary layoff and partial UI is worse than under STC for a given employment reduction, since there is no guarantee that benefits continue to be paid and partial UI benefits are lower for the same reduction in hours. Yet, these shortcomings must be traded off with the cost to employers from participating in the program in terms of administrative burden and benefit payments.

The important question then becomes whether temporary layoffs and partial UI can provide the same benefits of STC discussed in the previous section. Do they preserve worker-firm matches, prevent an increasing rate of costly job displacements and reduce hiring costs and labor market crowding during the economic recovery?¹¹ The answer relies to an important degree on whether temporarily laid off workers expect to be recalled and partially laid off workers expect to have their hours returned to pre-recession levels. Undoubtedly, STC provides a stronger commitment to a future full time relationship even in a scenario such as the Pandemic, when expected recall rose to historic levels, at least in California (Bell et al., 2020).

Another important aspect is whether workers continue to search for other employment options. Existing research documents that many workers search for alternative job opportunities while employed, in particular if they feel they are at risk of unemployment. Not surprisingly, we also know that unemployed workers engage in higher job search than the employed. Hence, it is very likely that workers on temporary layoff or partial UI engage in higher job search activity than employed workers, leading to a reduction in job attachment and increasing mobility across occupations, industries, or regions.

In principle, given the cost of STC, firms that place a high value on their workers are more likely to adopt the program. Similarly, firms whose business outlook is less promising or who place a lower value on steady employment relationships may opt for temporary layoff or partial UI. Such selection would naturally lead to different long-term outcomes between participants in different programs.

¹¹ It is important to note that typically STC programs do not allow a reduction of hours worked to zero, so they are not a substitute for a complete temporary shutdown of business operations. Yet, in most cases firms layoff only part of their workforce, making STC at least in principle a viable option.

However, it is well documented that many employers do not know about the program (Abraham et al., 2017), likely resulting in the observed low enrollment rates in STC. As a result, there are likely a substantial number of workers and firms using temporary or partial UI that might be quite similar to participants in STC. While ultimately an experimental research design is needed to fully control for selection into program type, here we begin to document long-term worker outcomes to assess how workers participating in these different programs have fared during the Pandemic and prior recessions.

V. Data and Methods

V.1 Data and Sample

We use two main data sources for our analysis: public data from the U.S. Department of Labor Employment and Training Administration (U.S. DOL ETA) and California's UI claims microdata, made accessible through a partnership with the state's Employment Development Department (EDD).

The U.S. DOL ETA data contain monthly information about state unemployment insurance claims activities for regular UI, temporary UI supplement programs, and STC.¹² For regular UI, the data include the number and amount of payments for all 50 states, Washington DC, and Puerto Rico between 1971 and 2022. For STC, the data include the number and amount of payments for states with federally approved work sharing programs between 1982 and 2022. We combine the regular UI and STC data to evaluate the relative program size.

The UI claims microdata consist of information collected or produced by EDD in order to process UI claims.¹³ The data contains the universe of UI claims filed in CA on or after January 1, 2000 and includes a variety of claim and person-level information. Key information used in our analysis includes the type of the claim (e.g., whether it is a Short-Time Compensation or UI claim), the claim start date and outcome (eligible or not) of each claim, the date and amount of each payment (in particular the first payment received), and claimant demographics (date of birth, gender, self-reported race/ethnicity). We

¹² DOL ETA 5159 report available at: <https://oui.doleta.gov/unemploy/DataDownloads.asp>.

¹³ The data was processed on site at EDD, and the research team received only aggregated information.

merge this data to quarterly earnings from all covered employment relationships from the UI Base Wage Data. We then merge information of industry of the major employer in the base period before a claim from the Quarterly Census of Employment and Wages (QCEW).

For our descriptive analysis, we start with the universe of initial claims for STC or UI, and for each claim record the quarter of the start of their benefit year.¹⁴ We then keep only individuals that had a first payment in the data, losing roughly 30% of individuals that were either not eligible (e.g., due to insufficient earnings) or that found a job quickly. We classify individuals who file an initial claim for UI benefits as receiving partial UI if they report positive earnings when they certify for receiving benefits for the first time.¹⁵

An important caveat of our analysis is that we can only observe earnings outcomes for individuals that reside in California. Given normal inter-state mobility patterns, we would thus expect a gradual decline in the fraction of individuals with positive earnings in our data. We plan to address this question using additional data on worker address and inter-state mobility in the future.

V.2 Methodology

The goal of the empirical analysis is to describe the short- and longer-term outcomes of workers participating in the STC program, and contrast the findings with the trajectories of workers participating in full and partial UI. The dynamic analysis of outcomes for STC participants is of value in its own right, since this data has not been available in the United States and many other countries. The analysis of outcomes of partial and full UI claimants provides a benchmark for outcomes of workers participating in the default programs for workers facing hours reductions or layoff. Partial UI in particular likely

¹⁴ The beginning of the benefit year (BYB) in California is the first Sunday after the filing of the initial claim.

¹⁵ The base period employer is the main employer of the claimant in the last working quarter before entering the UI program. The main employer is the employer from whom the worker receives the most earnings. Our data do not allow us to observe whether these earnings are from an uninterrupted work spell at the base period employer, only if the worker had any earnings at the base period employer in a quarter (which could arise if a worker worked part-time at another job after layoff and was then recalled). To nevertheless try to assess to what extent partial UI claimants remain attached to their prior employer, we looked at partial UI claimants certifying for benefits for the first time in the first week of a calendar quarter. We find that the majority of these workers' earnings was from the base period employer.

represents the default program for firms and workers that see temporary reduction in economic activity, but where the employer decides not to apply for STC.

Our analysis studies workers that file an initial claim under either STC or UI and that receive at least one payment. We treat the act of filing and receiving a payment as the event of interest. The calendar quarter of the initial claim is also the benchmark quarter for our descriptive event-study figures. Since our main outcome data on earnings is at the quarterly level, we follow the average outcomes of a cohort of individuals filing an initial claim in a given quarter for seven quarters before and 16 quarters after the start of the claim.

Let i denote an individual and let c denote the quarter in which an individual receives the first payment. Let p be the type of benefits they receive, such that p can either be STC, partial UI, or full UI. Finally, let t be the calendar quarter before, and k the difference between the calendar quarter and the start of the benefit payment (such that k ranges from -7 to 16, and that $k=0$ is the quarter of the claim).

Then we use our individual level data to generate a series of average outcomes at the cohort (c), program (p), and distance to filing (k) level:

$$\overline{y}_{cpk} = \frac{1}{N_{cpt}} \sum_{i=1}^{N_{cpt}} y_{icpt}$$

Where N_{cpt} is the number of individuals filing a claim in quarter c in program p and whom we can observe in quarter t . Our main outcomes are the fraction of individuals with positive earnings in a quarter, the average of log quarterly earnings, total quarterly earnings (including zero earnings), the propensity to work at the main base period employer, and the incidence of switching two-digit industry. Since average earnings differ across groups, we also normalize earnings levels to the quarter prior to the claim (i.e., $k=-1$). I.e., we consider $\Delta \overline{y}_{cpk} = \overline{y}_{cpk} - \overline{y}_{cp0}$.

We are interested in several features of the dynamic trajectories we study. First, the pre-claim levels and trends are informative for assessing differences of STC compared to partial and full UI claimants. We are particularly interested in analyzing the trends, since this may indicate whether entering

one or the other claim type and the related outcomes may be driven by ongoing economic conditions by individuals or firms. Second, we are interested in the immediate employment and earnings dynamics after the claim, which will help us to assess the immediate impact the different programs could play. Finally, an important focus will be on the longer-term outcomes 1.5-2 years after initial filing that are indicative of how workers fare in the aftermath of the initial change in employment status and program participation.

In this paper, we study these outcomes for three cohorts for the three major downturns since the start of our sample period in 2000: the 1st quarter of 2001; the 1st quarter of 2009; and the 2nd quarter of 2020. Besides studying the full sample of claimants receiving at least one payment, we also study the subsample of claims originating from the manufacturing industry. Since a majority of STC claims originate from manufacturing in California, this holds constant sector-specific differences.

VI. The U.S. and State Experience with Short-Time Compensation

In this section, we discuss the cyclical pattern of STC use since 2000 in the U.S. as a whole and in those states that had an STC program using public data available from U.S. DOL ETA. We also briefly compare the U.S. experience with that of other OECD countries. Throughout, we use the term STC and Work Sharing interchangeably. We obtain the following main findings.

Key Takeaways

Nationwide patterns of STC use during three major downturns since 2000:

- There was a substantial number of STC claims in states that had the program in each downturn since 2000.
- Relative to the total volume of unemployment insurance claimants, the fraction of STC claimants was low during the Pandemic.
- Based on a comparable definition, the combined rate of STC usage in the states that had an STC program relative to dependent employment was substantially lower than in other OECD countries.

Differences in STC usage by states during major downturns since 2000:

- Among the states with an STC program, there is large variation in the size of the program within and between recessions.
- There were some states that were able to substantially scale STC enrollment during the Pandemic, such as MI, WA, and OR; 25.76% to 41.94%.
- Some states that had high usage in the Great Recession had low usage in the Pandemic, and vice versa.

Short-Time Compensation in the U.S.

Every major economic downturn since 2000 has correlated with a noticeable increase in STC claims in U.S. states that have a work sharing program. For example, as shown in Figure 1, the number of STC claimants peaked at 13,986 during the 2001 Recession and 48,062 in the wake of the Great Recession in 2009. The maximum number of claims during the Pandemic more than tripled the record set during the Great Recession, with more than 161,396 initial STC claimants. However, as a share of total unemployment insurance claims, STC claims during the Pandemic were relatively low. At the peak in 2020, STC claims represented about 4.89% of all UI claims, which was lower than the maximum 6.49% share during the Great Recession.

Short-Time Compensation in Different States

The rate of STC use varied dramatically across states that had an STC program. Figure 2 compares STC claims as a share of all UI claims by state during the Great Recession to that same share during the COVID-19 Pandemic.

States that used work sharing relatively more during the Great Recession were not necessarily the top users during the Pandemic. For example, in 2008-09, Kansas and Rhode Island were the biggest users of work sharing, with STC claims representing 11.04% and 9.42% of all UI claims respectively. However, during the Pandemic, the share in both states dropped below 2% and the top work sharing states were Michigan, Oregon, and Washington with STC shares of 8.23%, 6.51%, and 5.53% respectively. By

contrast, earlier during the Great Recession, STC use in Oregon and Washington hovered around 4%, and Michigan did not have an STC program. With the exception of Oregon and Washington, every state that had a work sharing program during the Great Recession used STC at a lower rate during the Pandemic (as can also be seen in Figure 3).

In both the Great Recession and the Pandemic, STC claimants as a proportion of all UI claimants in California ranked lower than most other states, despite the tenure of work sharing in the state. Out of sixteen states, California's 2.94% STC share in 2008-09 exceeded only Texas, Arizona, Iowa, Maryland, and Florida; and at 0.77% during the Pandemic, it outperformed only Washington DC, Maryland, Florida, Pennsylvania, and Wyoming, out of 27 states total.

As shown in Figure 4 Panel A, even states with relatively high STC use varied in their use between recessions and before the Pandemic. For example, in Oregon and Michigan, the share of STC claimants remained very low or near zero prior to the Pandemic when they were able to scale the program up dramatically. Rhode Island, on the other hand, has maintained a meaningful share of participation in STC programs regardless of being in a recessionary period.

States also varied in their consistency of STC use during the Pandemic period. Figure 4 Panel B shows that STC claims as a share of all UI claims spiked at the beginning of the Pandemic in all high STC-use states except Texas. The magnitude of these spikes, however, differed greatly among states. During the Pandemic onset, the peak STC share of UI claims in Oregon and Michigan were 41.94% and 35.11% respectively, while in New York and Ohio they were 2.44% and 7.05% respectively. The states with high initial STC use saw big drops in use as the Pandemic continued, while states with lower initial peaks tended to have more consistent STC shares over the course of the Pandemic.

Short-Time Compensation in Other OECD Countries

While the United States focused their Pandemic unemployment policy response on UI and PPP, other Organisation for Economic Co-operation and Development (OECD) countries used short-time work (STW) programs as a job retention strategy. STW is an umbrella category for job retention schemes in

which government steps in to cover some or all of the cost of hours not worked or reduced. Short-time compensation, or work sharing, programs are a subset of STW. During the Pandemic, twenty-three out of thirty-eight OECD countries used existing STW programs and 8 others created new STW programs.

Across all STW programs, governments supported lost hourly wages for workers with reduced hours; however, the exact program design varied. For example, the U.S. and Sweden limited the number of hours a person's work could be reduced, spreading the costs of work reduction across the workforce. Most other countries had no restrictions on the number of hours reduced. A small number of countries required firms to furlough their workers, requiring zero hours of work. The majority of OECD countries used STW programs to preserve worker-firm matches, but a small group of countries used wage subsidies instead, providing subsidies for hours worked rather than hours lost.¹⁶

The use of STW programs in OECD spiked dramatically at the beginning of the Pandemic (Figure 5). In France, Switzerland, and Great Britain, more than 30% of dependent employment used STW. In seventeen countries, STW use exceeded 10%. By this metric, the use of STW in the U.S. during the Pandemic was negligible. Most countries expanded their programs by simplifying access, increasing generosity, and extending coverage, in some cases to non-permanent workers. While the use of STW programs by OECD countries had also increased during the Great Recession, the magnitude of take-up at the onset of the Pandemic was unprecedented.

VII. The Characteristics of Short-Time Compensation Recipients in California

In this section, we discuss the cyclical pattern of STC use in California since 2000 using data made accessible through a partnership with the state's Employment Development Department (EDD). These data allow us to present a detailed picture of STC incidence in California, including takeup by industry and claimant demographics. We obtain the following main findings.

Key Takeaways

¹⁶ We will not be reviewing wage subsidies in depth in this paper because their design and user population is meaningfully different from STW. More information on use of wage subsidies during the Pandemic is available at: <https://www.oecd.org/coronavirus/policy-responses/job-retention-schemes-during-the-covid-19-lockdown-and-beyond-0853ba1d/>.

- California had a moderate amount of STC claims during the Great Recession, but STC claims were a low share of total claims during the Pandemic.
- The manufacturing industry disproportionately represents a large share of STC claims and, on average, represented 58.63% of all STC claims since 2000.
- During the Pandemic, the share of STC claims increased from the most affected sectors — wholesale trade, construction, and professional, scientific, and technical services. Consequently, the share of manufacturing claims fell to 35.77% during COVID-19.
- The female share is consistently lower than male shares during all periods of the business cycle but sees increases during recessionary periods. Despite the rise, female shares remain lower than male counterparts.
- Younger workers between the ages of 16 and 24 have consistently low usage in STC claims. Older workers, however, see consistent increases in STC usage, briefly becoming the largest user in 2019 at 35.98%.
- During the Pandemic, counties with higher shares of STC claims among total UI claims had higher incomes and better access to internet broadband. Counties with larger Black and Hispanic populations saw lower shares in STC usage.

Since 2000, use of STC in California has correlated with economic recessions and their aftermath. As shown in Figure 6, STC claims peaked at 5,095 during the 2001 recession, 16,099 during the Great Recession, and 9,730 during the Pandemic. However, STC claims as a share of total UI claims was lowest during the Pandemic despite the scale of the economic interruption. At the highest points in each recession, the proportion of total claims that were STC was 3.49% in 2001, 7.01% in 2009, and —following an initial 1.87% peak in 2020 — 1.94% in 2021. As noted above, STC use in California is low relative to other states and use of STC during the Pandemic was low relative to prior downturns.

The majority of STC claims in California during the Great Recession and the COVID-19 Pandemic came from the manufacturing sector, as demonstrated in Panel A of Figure 7. During both

events, the share of manufacturing sector claims — on average about 58.63% — far exceeded those of other sectors and in the Great Recession, manufacturing had more STC claims than all other sectors combined. The next largest industries by use of work sharing across both recessions were professional, scientific, and technical services, construction, and wholesale trade. Notably, wholesale trade was consistently the second largest user of STC by industry between these recessions, but dropped below other more affected industries during the Pandemic, as seen in Panel B of Figure 7. With the exception of wholesale trade and retail trade, STC claims increased across every sector during the Pandemic, and in particular health care and social assistance.

Since 2000, more than half of all STC claims in California have been made by workers at small businesses and, on average, the share has hovered between 70% and 90% (Figure 8).¹⁷ The share of STC claimants from small employers rose to 79.45% in the wake of the 2001 recession, fell slightly to 76.59% before the Great Recession, then rose to around 80.35% and stayed high over the long economic recovery. At the onset of the Pandemic, the share of STC claimants from small employers dropped to 67.68% as workers from larger firms also experienced work reductions in larger numbers and applied for work sharing benefits.

In Figure 9 and Figure 10, we can observe demographic changes in STC claimants in California. Since 2000, the share of female STC claimants has on average remained lower than 45%, including in the wake of the Great Recession when the share of female STC claimants ranged from around 30-40%. However, the female share of STC claimants increased during the Pandemic, rising from 25.33% before the Pandemic to a peak of 46.31% in June 2020.

STC use by age since 2000 reflects long emerging trends (Figure 10). Over the past two decades, the share of STC claimants aged 25-44 has dropped from almost 55% in 2000 to 42.49% just before the Pandemic. On the other hand, the share of STC claimants 55 years and older has increased from 12.14% in 2000 to 24.7% before the Pandemic. During the Pandemic, workers aged 16 to 44 saw a relative increase in STC use, while older workers saw an initial spike then drop over the Pandemic.

¹⁷ We use the Small Business Administration (SBA) definition for small employer i.e. 500 employees or less.

During the Pandemic, counties that saw higher shares of STC claims among total UI claims were generally more economically advantaged. As shown in Figure 11, counties with relatively high STC use were likely to have better access to broadband and higher household income. Counties with relatively low STC use were likely to have a higher share of individuals with incomes below the federal poverty line and receiving Supplemental Nutrition Assistance Program (SNAP) benefits, higher mortality from COVID-19, more Black and Hispanic residents, and more people in the agriculture sector or not in the labor force.

VIII. Longitudinal Analysis of Worker Outcomes under STC and UI

VIII.1 Comparison of Baseline Characteristics of STC and UI Claimants in California

In this section, we compare the characteristics and experiences of STC, partial UI, and full UI claimants at the baseline before receiving unemployment benefits during the Great Recession and the COVID-19 Pandemic. We analyze the period about two years prior to program entry for the Great Recession cohort starting benefits in the first quarter of 2009 and for the Pandemic cohort starting benefits in the second quarter of 2020. We obtain the following main findings.

Key Takeaways

- In all downturns since 2000, prior to claiming benefits, STC and partial UI claimants had higher employment than full UI claimants. While STC had higher mean earnings than both partial and full UI who had similar mean earnings, there is no indication of different earnings trends as the three groups experienced steady earnings in the two years before the claim.
- STC claimants had also stronger attachment to their base period employer in the two years before the claim, and correspondingly lower rates of industry transition. Job attachment and industry transition rates of partial UI claimants were significantly lower than STC claimants, but higher than full UI claimants.

- These patterns were similar during the Pandemic, with the exception that the average STC claimant had lower prior job attachment and partial UI claimants had higher earnings than full UI claimants prior to their claims.
- Typically, partial and full UI have similar industry distribution of base period employer, with partial UI having higher share in Accommodation and Food and Transportation and Warehousing during the Great Recession, and higher share of Health Care and Social Assistance during the Pandemic.
- Partial UI claimants typically are more likely to be female and older workers than full UI claimants, while STC claimants are even less likely to be female but more likely to be middle-aged and older workers than UI claimants.
- STC claimants were more likely to come from small (<500) employers than full UI and partial UI, which has the lowest share from small employers. This gap shrank during Pandemic during an across-the-board reduction in share from small firms.

In comparing the characteristics and experiences of STC, full, and partial UI claimants prior to claiming benefits during the Great Recession and the Pandemic, we find important similarities and differences which serve as a foundation for our outcomes-related findings below, as well as for possible future research.

Among all UI claimants, STC claimants had the highest employment rate at the baseline, followed by partial UI then full UI claimants, during both the Great Recession and the Pandemic. As shown in Figure 12 and Figure 15, the pre-claim employment rates for STC, partial, and UI claimants were 99.63%, 97.94%, and 91.26% respectively during the Great Recession, and 99.69%, 98.3%, and 90.68% respectively during the Pandemic. While the trends in employment among UI claimants were similar at the baseline for both recessions, full UI claimants experienced less stability in the two years prior to claiming benefits during the Great Recession.

In the two years prior to claiming benefits during both recessions, all three groups of claimants experienced relatively steady earnings; however, the level of earnings varied. During the Great Recession, average quarterly earnings for STC claimants hovered around \$12,000. That number rose to around \$16,000 for STC claimants before the Pandemic, as seen in Figure 13 and Figure 16. For full and partial UI claimants, average quarterly earnings hovered around \$8,000 at the baseline for both recessions. However, baseline average earnings for full UI claimants slightly exceeded those of partial UI claimants during the Great Recession; those positions flipped in the lead-up to the Pandemic.

Figure 14 and Figure 17 underscore the worker-firm relationship among STC claimants, as compared to full and partial claimants. For both recessions, STC claimants had stronger attachment to their base period employer than full and partial UI claimants in the two years before the claim, and correspondingly lower rates of industry transition; however, for the Pandemic, the average STC claimant had lower prior job attachment and greater industry transition than for the Great Recession.

While the manufacturing sector was heavily represented among STC claimants during both the Great Recession and the Pandemic, the sectors with the highest density among full and partial UI claimants changed significantly between the two recessions. During the Great Recession, 67.15% of STC claimants worked in manufacturing, the most represented industry, followed by professional, scientific, and technology services at 9.04%. Among full and partial UI claimants, the distribution was relatively more even, with the highest representations in manufacturing and construction. As shown in Table 1, around 15% of full and partial UI claimants had worked in manufacturing and around 13% in construction. During the Pandemic, the share of STC claimants coming from manufacturing was 36.5%, still the most represented industry but almost half as large as during the Great Recession. The next two largest industries by share for STC claimants were health care and social assistance and professional, scientific, and technology services, both at around 10% (Table 2). Pre-Pandemic, the most represented industries among full and partial UI claimants were health care and social assistance (around 11% for full UI and 18% for partial UI), accommodation and food services (around 13% for full and partial UI), and retail trade (around 13% for full and partial UI).

For both recessions, partial UI claimants were more likely to be female than STC and full UI claimants, and among all groups, workers aged 25-44 made up the greatest share of claimants (as shown in Table 3 and Table 4). The share of young STC claimants, aged 16-24, was low at around 5% during both recessions, but the share of young full and partial UI claimants almost doubled between the Great Recession and the Pandemic. The share of older workers (55 years and above) was higher among STC claimants than full and partial UI claimants during both recessions, but in particular, they represented more than a quarter of STC claimants during the Pandemic. Table 3 and Table 4 also show that STC claimants were more likely to come from firms with 500 or less employees than full and partial UI claimants during both recessions, although the share dropped from 72.69% to 67.26% between the Great Recession and the Pandemic.

VIII.2 Outcomes for STC and UI Claimants After Program Entry During Great Recession

In this section, we compare the experiences of STC, partial UI, and full UI claimants both before and after receiving unemployment benefits during the Great Recession, in particular the period about two years prior to and four years after program entry for the cohort with BYBs in the first quarter of 2009. This analysis allows us to observe relative differences among claimants prior to UI entry, as well as how outcomes varied by group over time. We obtain the following main findings.

Key Takeaways

- For both STC and partial UI claims, the employment rate at program entry is stable and high, but then gradually declines. While the longer-term decline is similar, employment stability among STC is higher than partial UI for about two years. In contrast, full UI claimants experience a steep and prolonged reduction in employment lasting over three years.
- Both partial and full UI claimants experience a sharp decline in earnings upon reemployment of similar magnitudes. In contrast, STC recipients experience a more moderate decline in earnings at program entry lasting six to nine months. After a temporary recovery, longer run earnings among

employed STC claimants decline by 10-15%, comparable to long-run losses experienced by full and partial UI claimants.

- As a result of medium-term reduction in employment and earnings as reemployed, total earnings (including zeros) decline compared to the pre-claim baseline for all groups over the long run. Since reductions in employment and earnings for STC claimants wrt baseline are somewhat higher, they have higher long-term overall earnings reductions than partial UI claimants wrt baseline.
- STC claimants have substantially higher job stability, with 80% remaining at their baseline employer two years after program entry. In contrast, a bit less than 50% of partial and 20% of full UI claimants are at their baseline employer after two years
- Among claimants employed after program entry, STC claimants change industries at lower rates, with 85.55% remaining in their baseline industry two years after program entry. By contrast, 32.46% of partial and 51.24% of full UI claimants changed industries within two years.

Our comparison of STC, partial, and full UI benefits during the Great Recession finds that STC claimants have more favorable outcomes on average than partial and full UI claimants. While this can be attributed in part to STC claimants starting from a stronger economic position, as well as the inherent design of the work sharing program, our findings suggest that STC provided more stability in the longer run during the Great Recession.

The employment rate dropped among all UI claimants who started receiving benefits in the first quarter of 2009 after they entered the UI system; however, the magnitude of the drop varied by program, as shown in Figure 12. For both STC and partial UI claims, the employment rate at program entry was stable and high at over 95% employment. After program entry, the employment rate for STC and partial UI claimants gradually declined, leveling off around 70-80% within three years. While the rate of decline was similar for STC and partial UI claimants, employment stability among STC claimants remained

higher than partial UI claimants. In contrast, full UI claimants experienced a steep and prolonged reduction in employment lasting over three years.

Among claimants employed after receiving benefits, partial and full UI claimants experienced a sharp initial decline in earnings while STC claimants experienced a more moderate decline (Figure 12). After a temporary recovery, longer run earnings among employed STC claimants declined by 10-15%, comparable to long-run losses experienced by full and partial UI claimants. Among all claimants (including those with no earnings after program entry), full UI claimants saw an initial \$6,659 drop in earnings on average, whereas the reduction in earnings was \$3,213 and \$3,468 for both partial and STC claimants respectively, as seen in Figure 13. While earnings for full UI claimants recovered slightly from their initial drop within four years, all UI claimants experienced reduced earnings in the longer run relative to their baseline.

Figure 14 shows that STC claimants had higher employer and industry stability than full and partial UI claimants during the Great Recession. One year after program entry, the share of STC claimants who were employed at their base period employer was more than three times as great as full UI claimants, a trend that continued over three years even as the absolute shares of claimants working with base employers declined across all programs. Partial UI claimants were employed at their base employer more than fully separated employees claiming full UI, but meaningfully less than STC claimants. STC claimants also changed industries at lower rates, with 85.55% remaining in their baseline industry two years after program entry. By contrast, 32.46% of partial and 51.24% of full UI claimants changed industries within two years.

VIII.3 Outcomes for STC and UI Claimants After Program Entry During Pandemic

In this section, we compare the experiences of STC, partial UI, and full UI claimants both before and after receiving unemployment benefits during the COVID-19 Pandemic, in particular the period about two years prior to and a year and a half after program entry for the cohort with BYBs starting in the

second quarter of 2020. This analysis allows us to observe relative differences among claimants prior to UI entry, as well as how outcomes varied by group over time. We obtain the following main findings.

Key Takeaways

- Again, STC and partial UI have more stable employment at program entry than full UI claimants. However, STC claimants appeared to have a somewhat bigger advantage compared to partial UI claimants over the first two years than during the Great Recession.
- STC claimants have small, temporary earnings losses, while both partial and full UI experience sharp temporary losses. In contrast to Great Recession, all claimants experience earnings increases wrt baseline after about 1-1.5 years, with full UI claimants experiencing the largest increases.
- Together, losses in employment and earnings lead to total earnings losses (including zeros) that are non-negligible compared to baseline and last about 1.5 years for all groups, with STC overall faring somewhat better than full and partial UI, which have the same medium-term outcome.
- Recall for partial and full UI claimants during the Pandemic was higher than during the Great Recession. For example, after 1.5 years, the recall rate among those reemployed was 55.59% (30.75%) in the Pandemic and 58.04% (47.93%) in the Great Recession for partial (full) UI claimants. In contrast, STC claimants ended up staying at their employer at a slightly lower rate.
- Similar to the Great Recession, STC claimants change industries at lower rates than partial and full UI. In contrast to the Great Recession, relatively fewer full UI claimants switched industries after one year.

Our comparison of STC, partial, and full UI benefits during the Pandemic finds that the Pandemic shock led to a drop in employment and earnings, but relative to the Great Recession, most UI claimants fared better.

Similar to the Great Recession, STC and partial UI claimants had higher rates of employment at program entry than full UI claimants. At the onset of the Pandemic, the employment rate dropped steeply

from 90.69% to 58.31% among full UI claimants, moderately from 98.3% to 85.57% among partial UI claimants, and remained flat for STC claimants, as shown in Figure 15. After an initial drop, the employment rate increased over the next two years for full UI claimants, while it declined slightly for partial UI and STC claimants who had weathered the initial shock more successfully. Across STC, partial, and full UI, the employment rate six quarters after program entry during the Pandemic was similar to or greater than that same point during the Great Recession (see Figure 12).

Earnings recovered more quickly and completely during the Pandemic than in the Great Recession. During the Pandemic, employed STC claimants experienced a small, temporary earnings loss, a drop of around 17.49%. Among partial and full UI claimants, the earnings loss was steeper at 44.1% and 33.04% respectively (Figure 15). For around a year and half after program entry, all UI claimants experienced reduced earnings; at the lowest point, partial and full UI claimants were earning around \$3,479 and \$3,668 less per quarter and STC claimants were earning \$2,664 less per quarter on average. However, within two years, average earnings among all claimants either matched or exceeded their baseline, as shown in Figure 16. STC claimants continued to earn more than full and partial UI claimants, as they did at the baseline.

Figure 17 shows that UI claimants experienced less employer and industry churn during the Pandemic than during the Great Recession. The share of STC claimants working for their base period employer during the Pandemic was similar to the Great Recession, but recall to a prior employer was higher for partial and full UI claimants. In the Great Recession, the recall rate after one and a half years was 30.75% for full UI claimants and 55.59% for partial claimants. At that same point during the Pandemic, the recall rate was 47.93% for full UI claimants and 58.04% for partial claimants. The higher recall rate during the Pandemic also in part explains lower industry churn. Full UI claimants changed industries at a relatively higher rate than partial UI and STC claimants during the Pandemic, but less than they had during the Great Recession.

VIII.4 Robustness

While we do not discuss the event study patterns during the 2001 recession in the main body of the text, the results are shown in Appendix B. Without going into detail, the patterns broadly confirm the experiences of Short-Time Compensation claimants during the Great Recession. Similarly, the relative experience of STC, partial UI, and full UI claimants is again similar in the 2001 recession. This confirms that the patterns we uncovered during the Great Recession and the Pandemic also held in the more moderate 2001 downturn.

We pursued several preliminary robustness checks to our main findings. First, as mentioned above, we re-drew our main event study figures for employment, earnings, and job mobility for claimants from the Manufacturing sector. We did this to obtain a group of unemployment insurance claimants that are more comparable to STC claimants, who are predominantly from Manufacturing in California . These results are shown in Appendix D and confirm our main findings.

Finally, we replicated our main event study results for an alternative definition of partial UI receipt. Instead of classifying unemployment insurance claimants as partial UI recipients if they worked when they certify for receiving benefits for the first time, we considered a broader measure. We first calculated the share of partial payments in the first 26 calendar weeks after entering the UI. We then classified individual claimants as being partial UI claimants for the purpose of the event study figures if at least 20% of their UI payments were partial during that period. These results are shown in Appendix E and again confirm our main findings.

IX. Conclusion

Much has been said about the potential value of STC as a program to help stabilize employment relationships and avoid labor market crowding in recessions and during the Pandemic. Yet, little is known about which workers and firms use the STC program in the U.S. and their long-term outcomes. This is particularly interesting because frequently used alternative approaches such as temporary layoff or partial UI could in principle yield comparable outcomes for workers, firms, and the labor market.

In this paper, we have first reviewed the U.S. experience with Short-Time Compensation during the Pandemic and compared it to the Great Recession. We then used administrative, individual-level data to characterize claimants of the Short-Time Compensation program in California in three downturns since 2000. Using the longitudinal nature of the data, we also analyzed the employment, earnings, and job mobility outcomes of STC claimants before and after entry into the program, and compared them to the short- and longer-term outcomes of claimants following receipt of full or partial UI benefits.

The U.S. had a comparable share of STC claimants among all claims to the UI system in the Pandemic compared to the Great Recessions, even though more states had STC programs in place. The comparatively low use of STC compared to other countries could be due to lack of information about the program or difficulties in program administration. Yet, our finding that some states had substantial STC usage in the Great Recession and the Pandemic suggests that the program can be effectively scaled to cover a large number of claims in a short period of time.

The results based on California data suggest that the STC program successfully prevents more than temporary earnings reductions and helps to maintain high employment rates and high job stability among participating workers. Our findings that workers receiving STC benefits on average had very different outcomes than individuals receiving partial or full UI benefits imply that these programs were not equivalent ways of assisting workers and subsidizing job stability during the Pandemic or in prior downturns. Future research needs to establish to what degree the difference in outcomes can be interpreted as the causal effect of the STC program.

Our finding that a large fraction of partial UI recipients continues to work at their prior employer and that full UI participants experience substantial rates of recall in California suggests that there may be a substantial number of workers and firms that may be candidates for the STC program. Understanding why employers have not applied to the program, and engaging in low-cost outreach activities may be effective strategies to increase program take up and improve worker outcomes.

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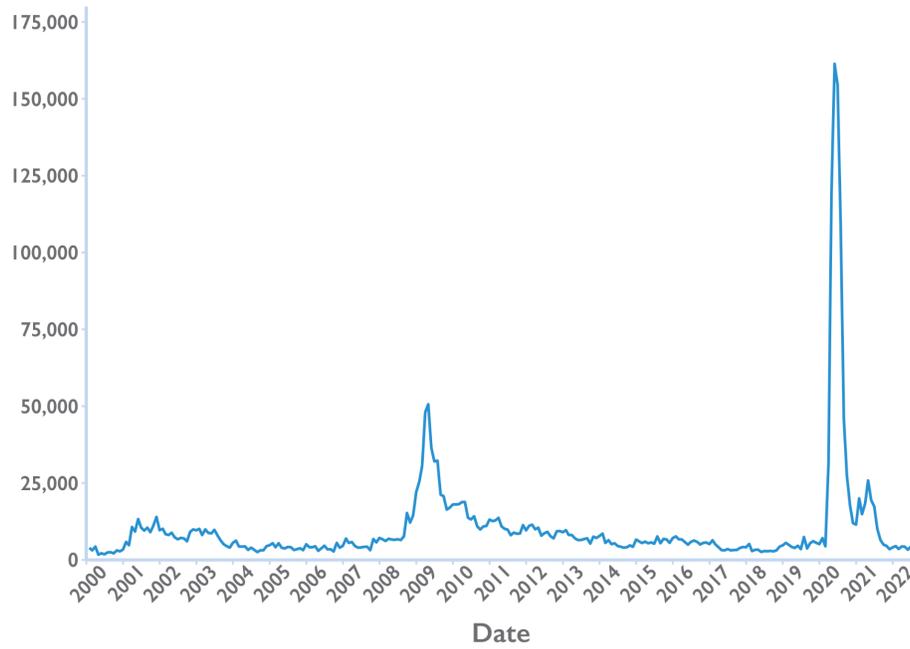
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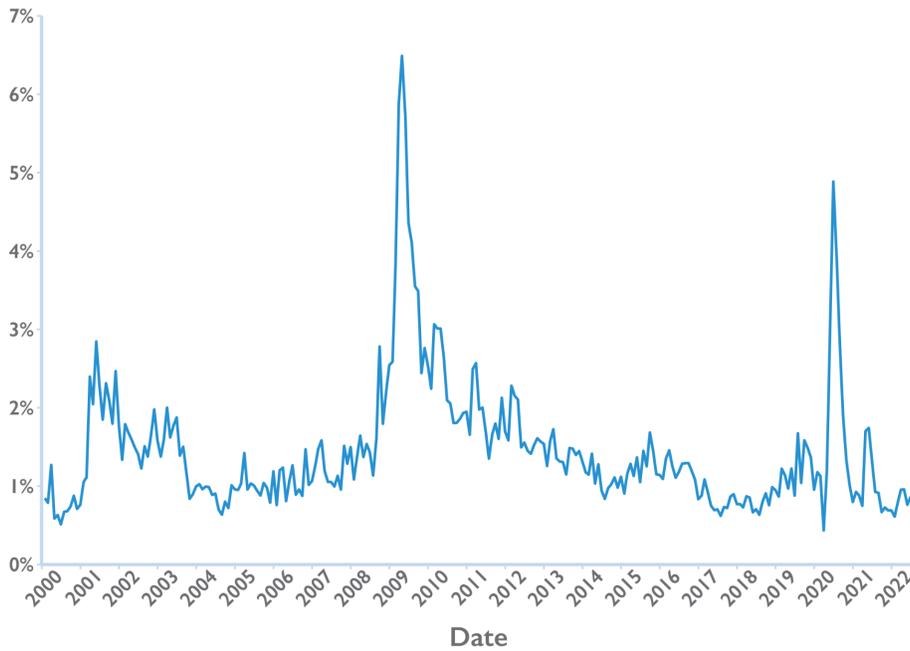
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Figure 1: Nationwide Initial Claims for Short-Time Compensation from 2000-2022

Panel A: Monthly Number of Initial Short-Time Compensation Claims



Panel B: Monthly Initial Claims for Short-Time Compensation as a Share of All UI Initial Claims

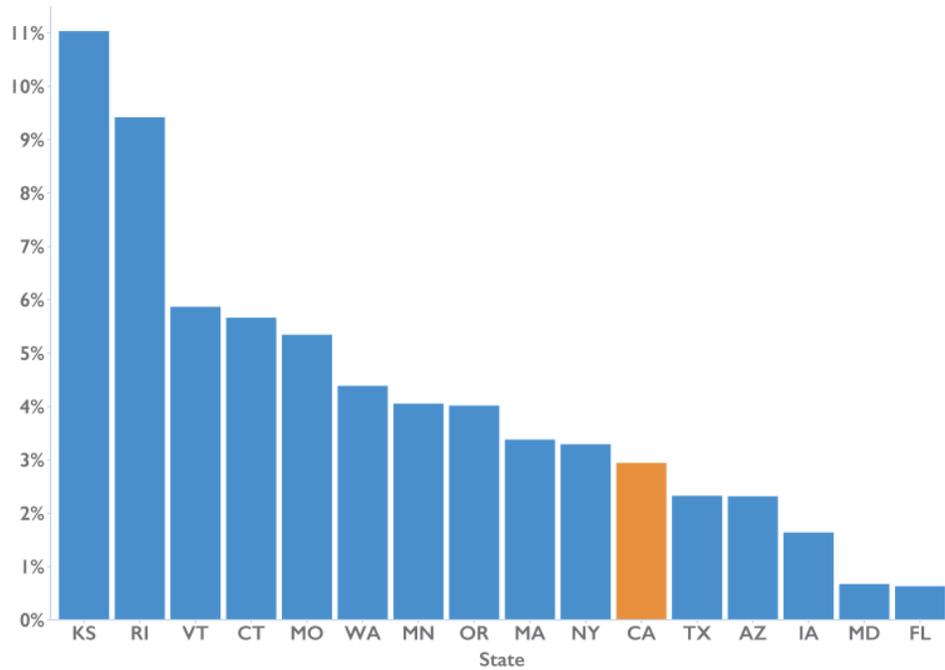


Notes: Only includes states with Short-Time Compensation programs in the relevant month.

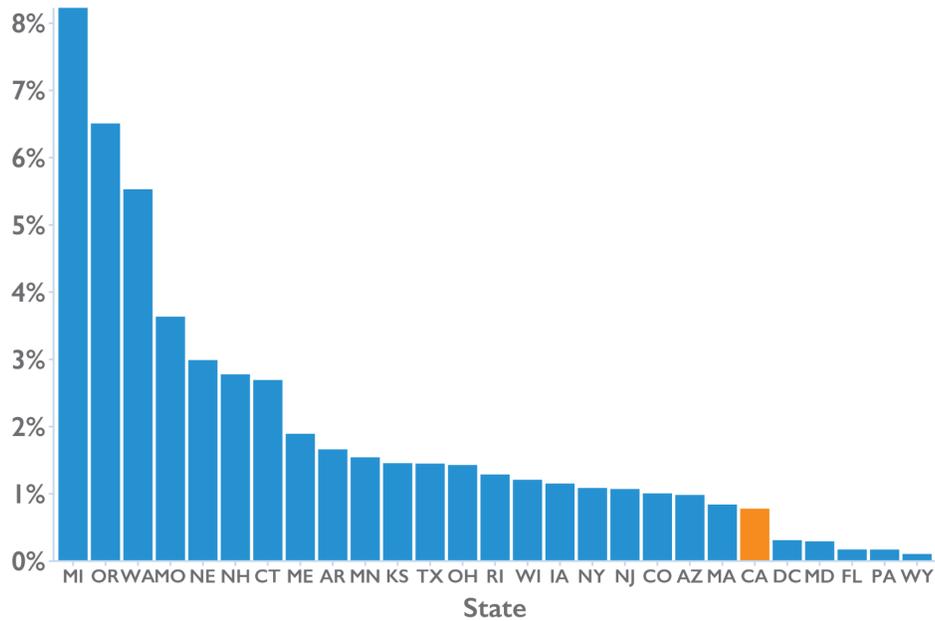
Source: ETA Series AR and AW 5159

Figure 2: Short-Time Compensation (STC) Use Relative to All Initial Claims (IC) by States

Panel A: Share of STC Claims Among All IC Claims During the Great Recession 2008-09



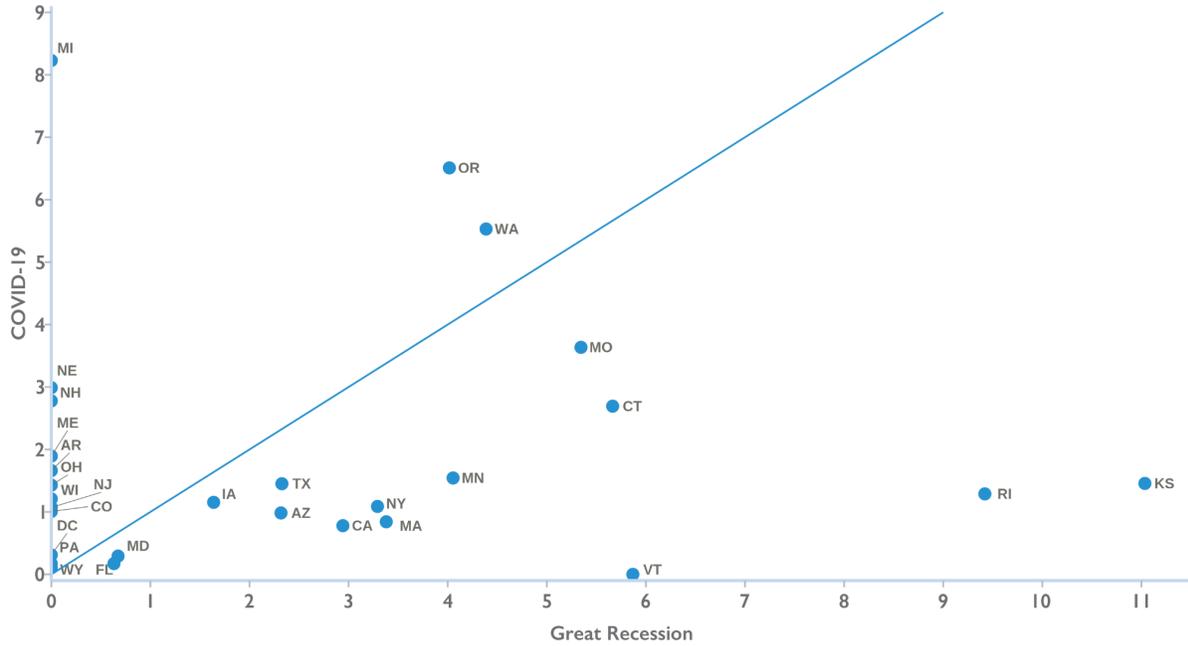
Panel B: Share of STC Claims Among All IC Claims During COVID-19 Pandemic 2020-22



Notes: Only includes states with Short-Time Compensation programs in the relevant year.

Source: ETA Series AW and AR 5159

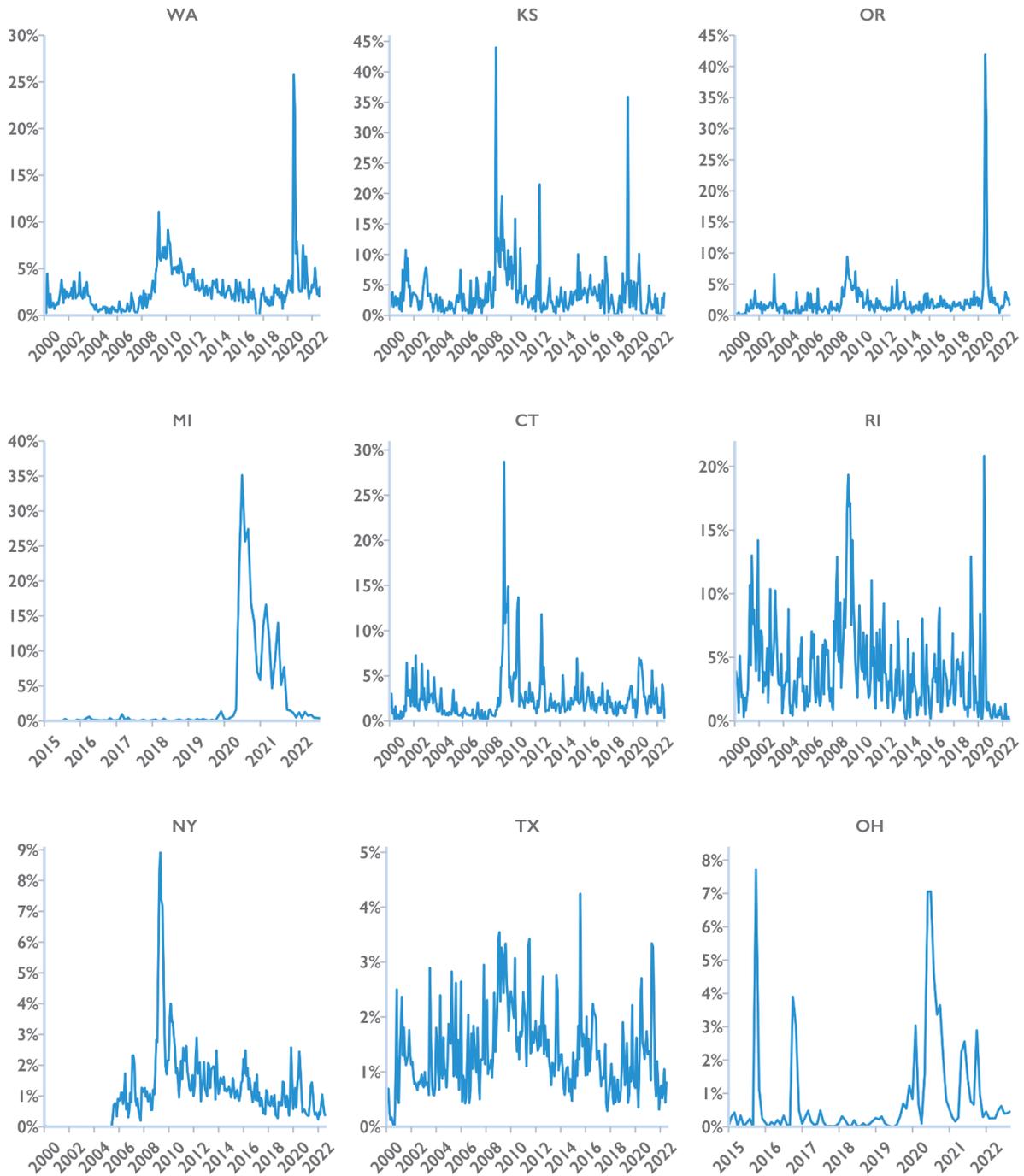
Figure 3: Short-Time Compensation Claims as a Share of Unemployment Initial During COVID-19 Pandemic vs. Great Recession



*Notes: States on the vertical axis did not have an STC program during the Great Recession.
Source: ETA Series AW and AR 5159*

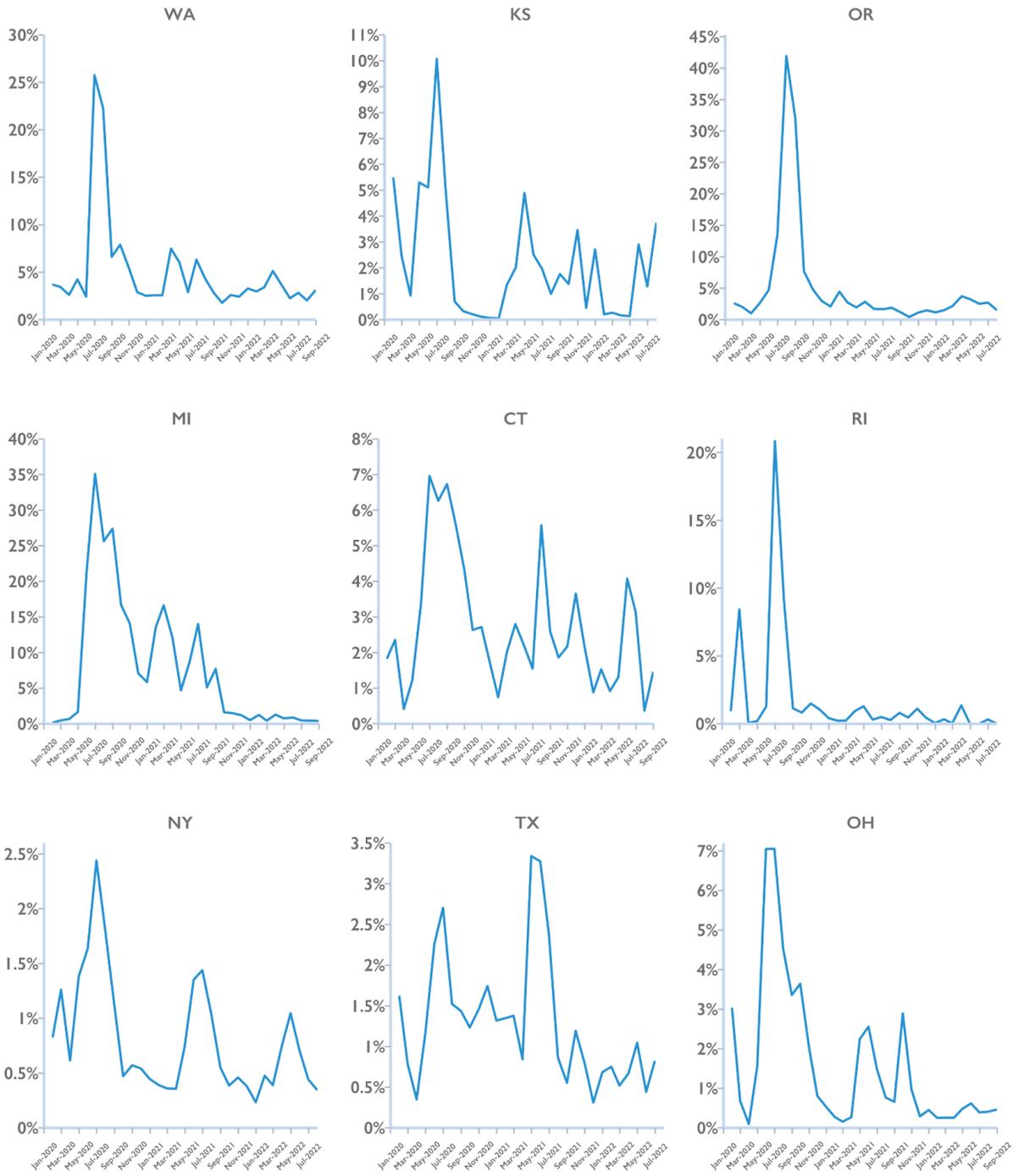
Figure 4: Short-Time Compensation Claims as a Share of Unemployment Initial Among Selected states with High Shares or Large Populations

Panel A: Years 2000 (or year program was launched) to 2022



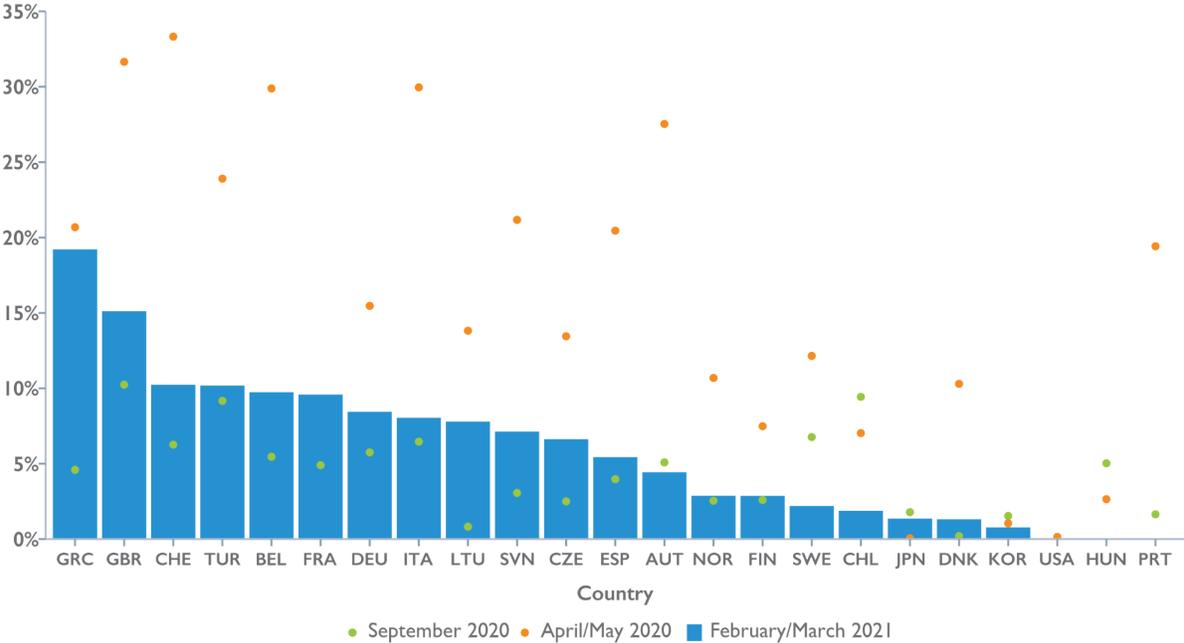
Source: ETA Series AW and AR 5159

Panel B: Pandemic Period



Source: ETA Series AW and AR 5159

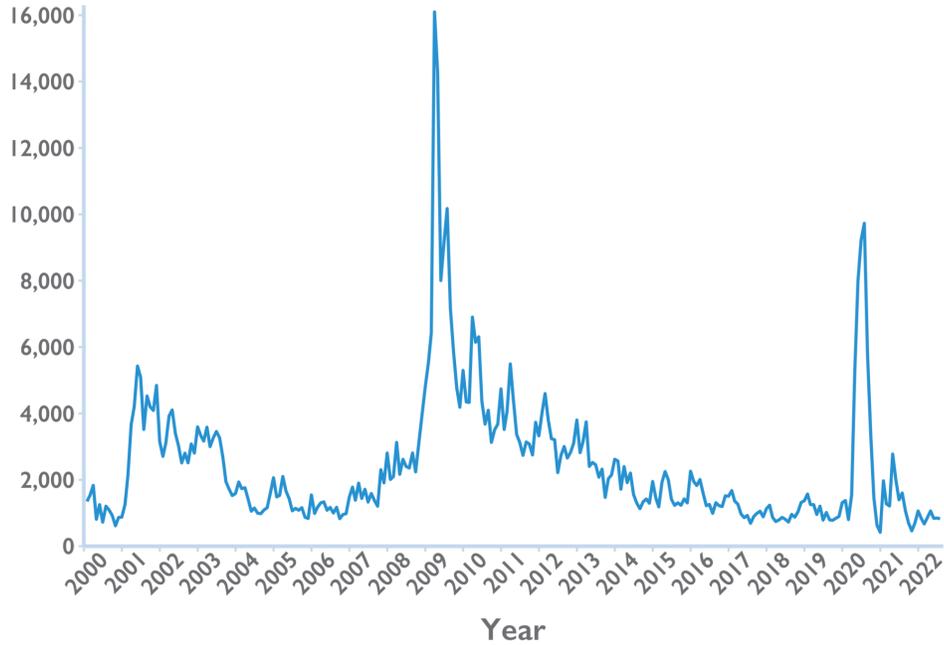
Figure 5: Percent of Individuals Participating in Short-Term Work Programs Among Dependent Employment in OECD Countries During the COVID-19 Pandemic



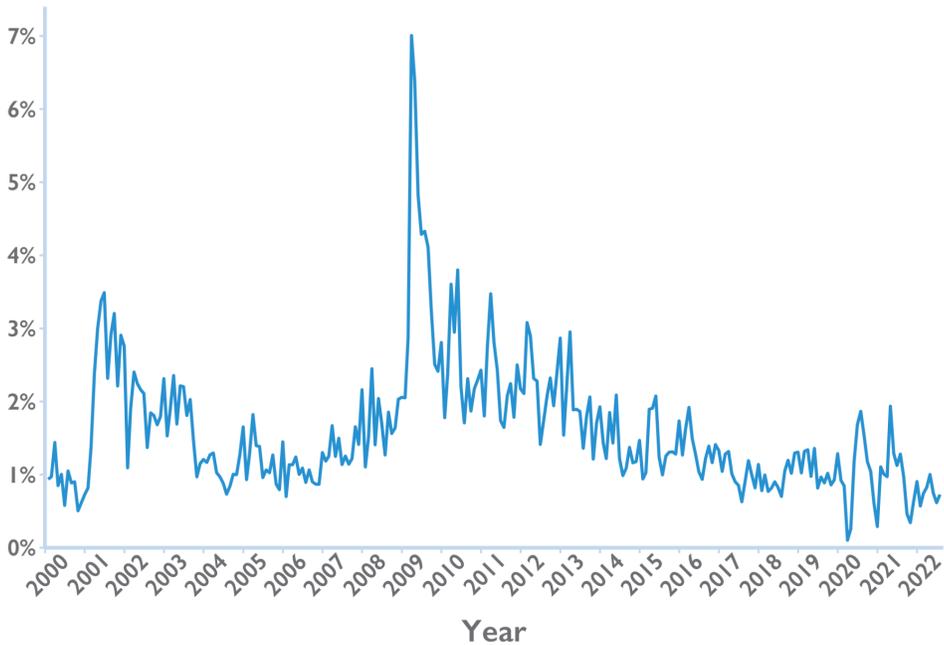
Notes: Dependent employment refers to workers that are salaried employees. Short-time work is an umbrella category for job retention schemes in which government steps in to cover some or all of the cost of hours not worked or reduced. For the U.S., the denominator includes dependent employment in states that had STC programs. US numbers were recalculated and are as follows: April/May 2020 is 0.15%, September 2020 is 0.027%, and February/March 2021 is 0.031%
Source: Figure 2.2 (OECD, 2021) and Current Population Survey

Figure 6: Evolution of Initial Claims for Short-Time Compensation since 2000 for California

Panel A: Monthly Number of Short-Time Compensation Initial Claims



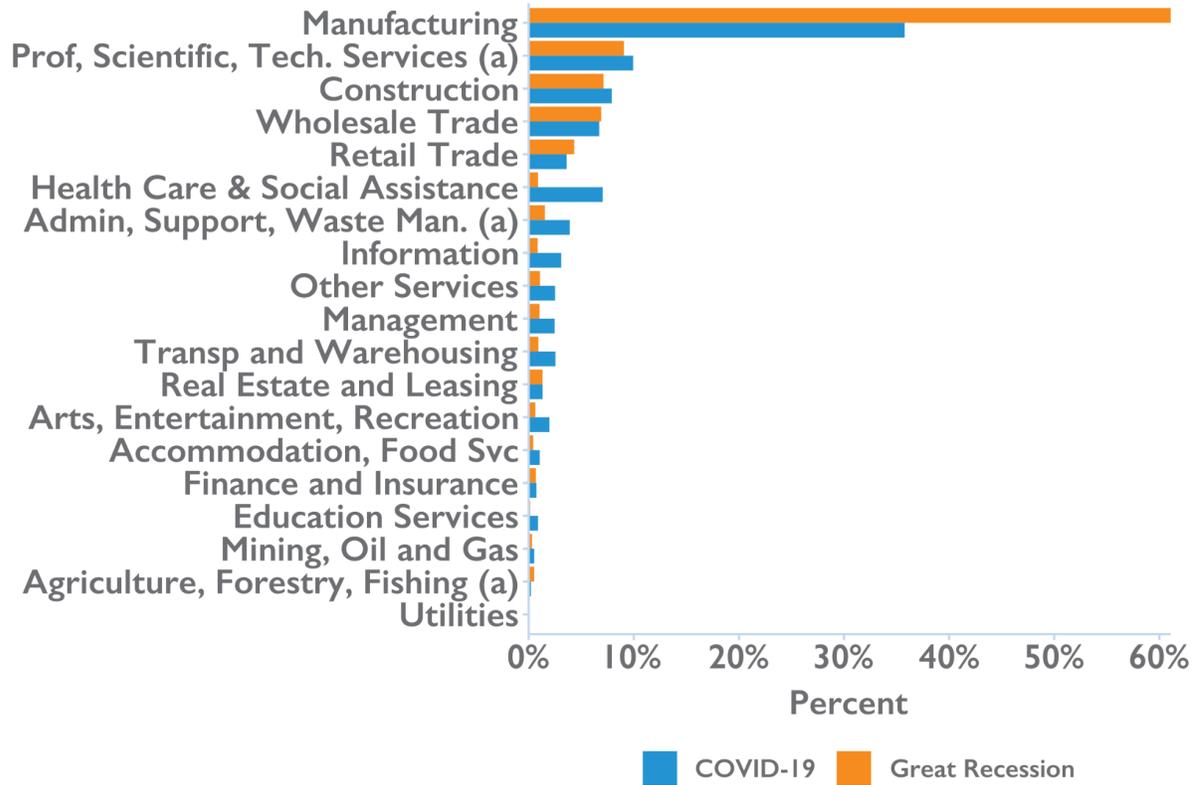
Panel B: Share of Short-Time Compensation Initial Claims Among all Initial Claims



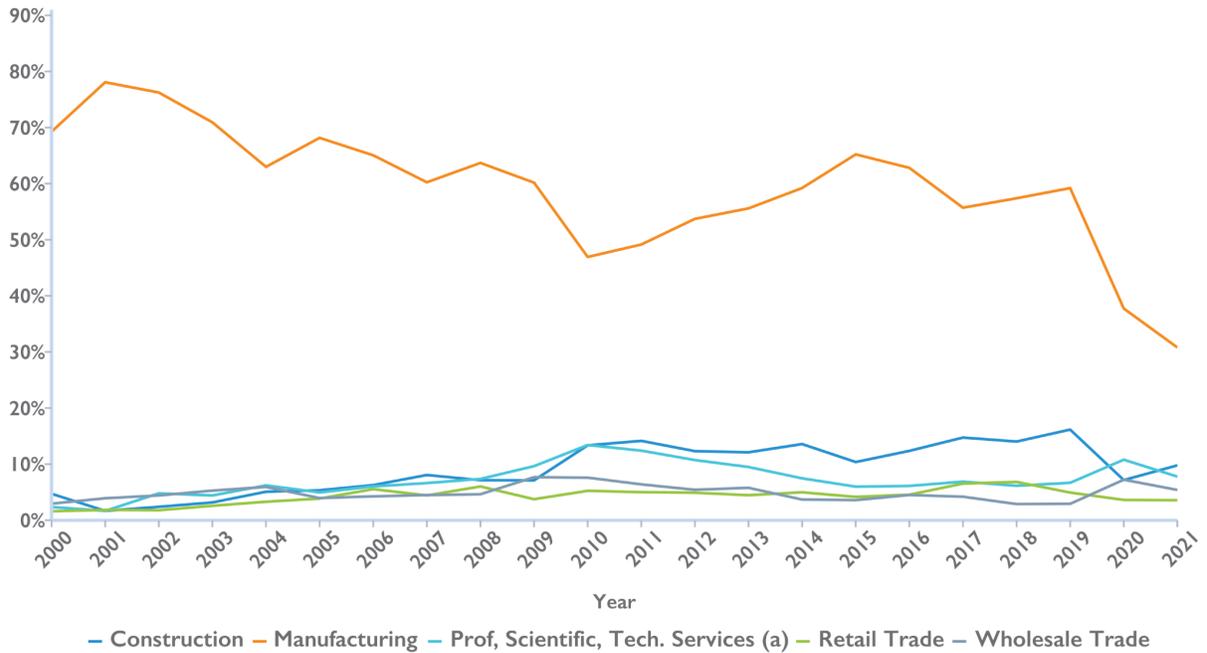
Source: ETA Series AW and AR 5159.

Figure 7: Share of Industry Among Short-Time Compensation Claimants in California

Panel A: Industry Shares in Great Recession 2008-09 and COVID-19 Pandemic 2020-21



Panel B: Annual Share of Top Industries Among Short-Time Compensation Claimants



Notes: The figures display the share of industry groups among paid claimants whose start of claim begins during the respective episode (Panel A) or year (Panel B). Industry of the main employer prior to layoff was obtained from the Quarterly Census of Employment and Wages according to the North American Industrial Classification Systems. Appendix C shows the monthly version of this figure.

(a) Full Names of Sectors: Administrative Support, Waste Management, and Remediation. Agriculture, Forestry, Fishing, and Hunting. Professional, Scientific, and Technical Services.

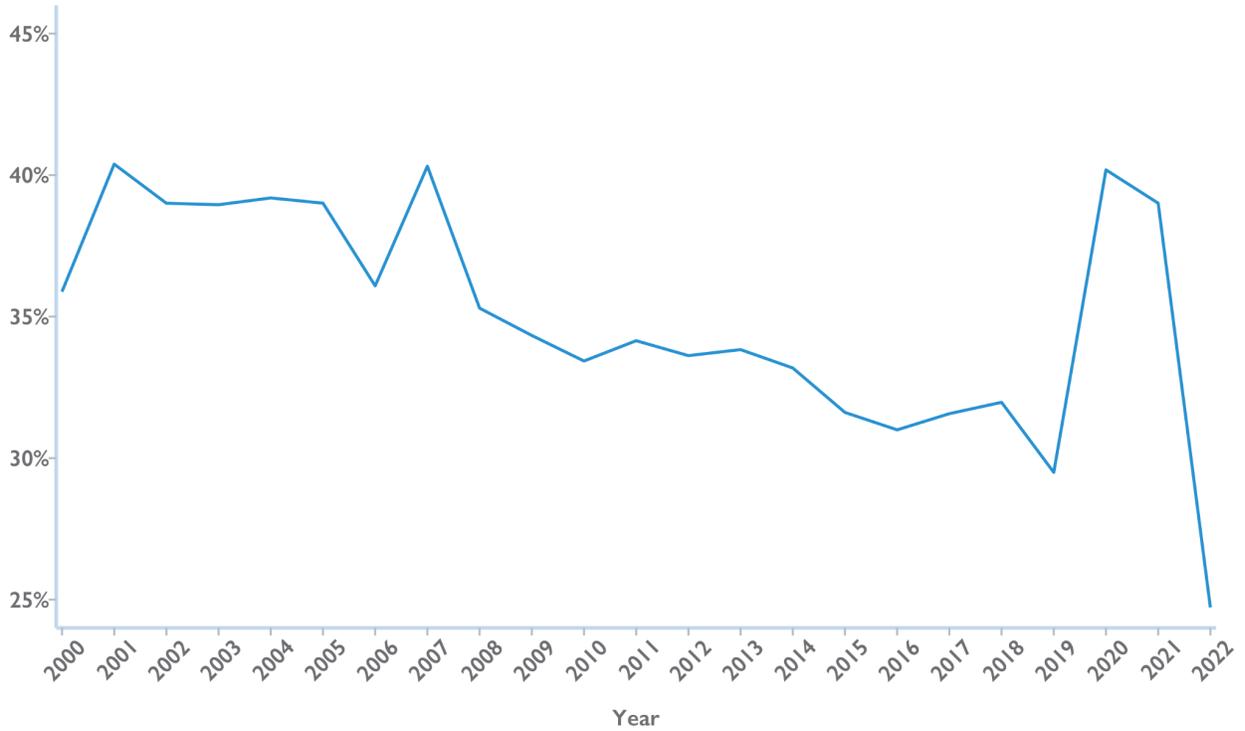
Source: Based on tabulated data from the Employment Development Department.

Figure 8: Annual Share of Claimants From Small Employers Among Short-Time Compensation Claimants in California 2000-22



*Notes: The figure displays the share of paid claimants whose start of claim begins in the respective calendar year who worked at small employers prior to the claim. Small employers include establishments with 500 employees or fewer as defined by the Small Business Administration. Data is annual.
Source: Based on tabulated data from the Employment Development Department.*

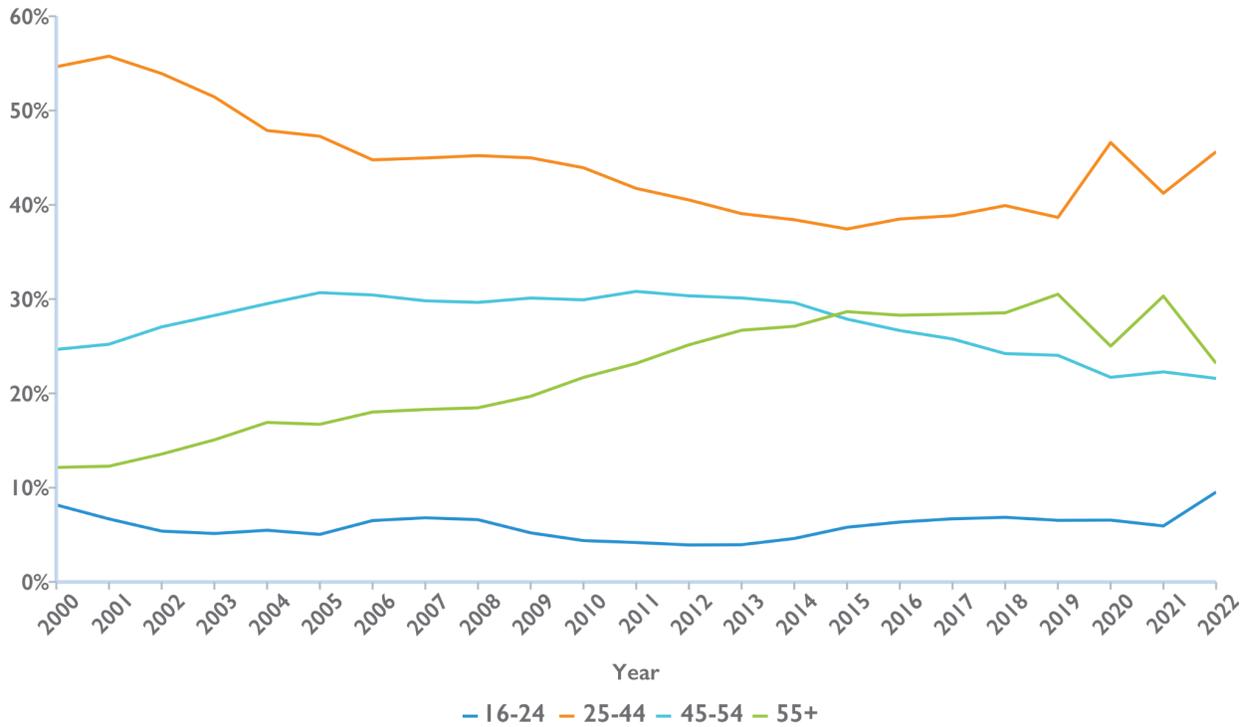
Figure 9: Annual Share of Female Workers Among Short-Time Compensation Claimants in California 2000-2022



Notes: The figure displays the share of paid claimants whose start of claim begins in the respective calendar year who were female.

Source: Based on tabulated data from the Employment Development Department.

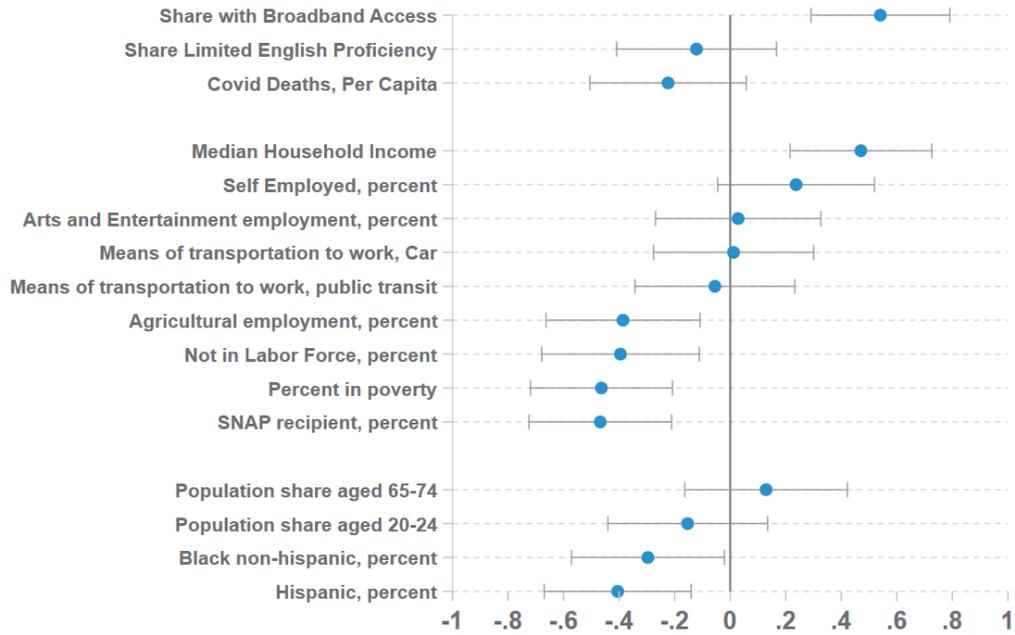
Figure 10: Annual Share of Age Group Among Short-Time Compensation Claimants in California 2000-2022



Notes: The figure displays the share of paid claimants whose start of claim begins in the respective calendar year by age groups at the time of the start of the claim.

Source: Based on tabulated data from the Employment Development Department.

Figure 11: Correlation Between County Characteristics and Short-Time Compensation as a Share of Unemployment Initial Claims in California 2020

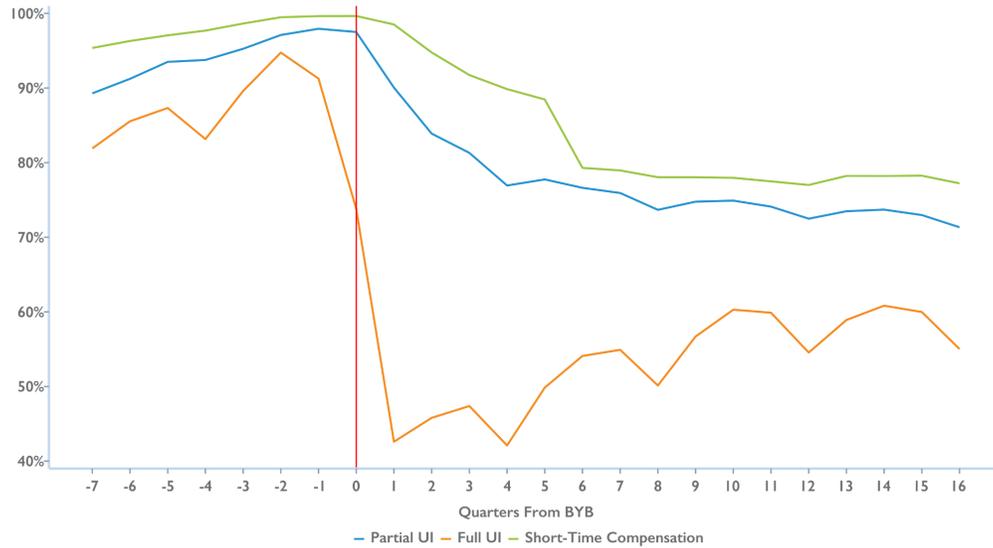


Notes: Each dot represents the correlation between the covariate and the STC share among all initial claims in 2020.

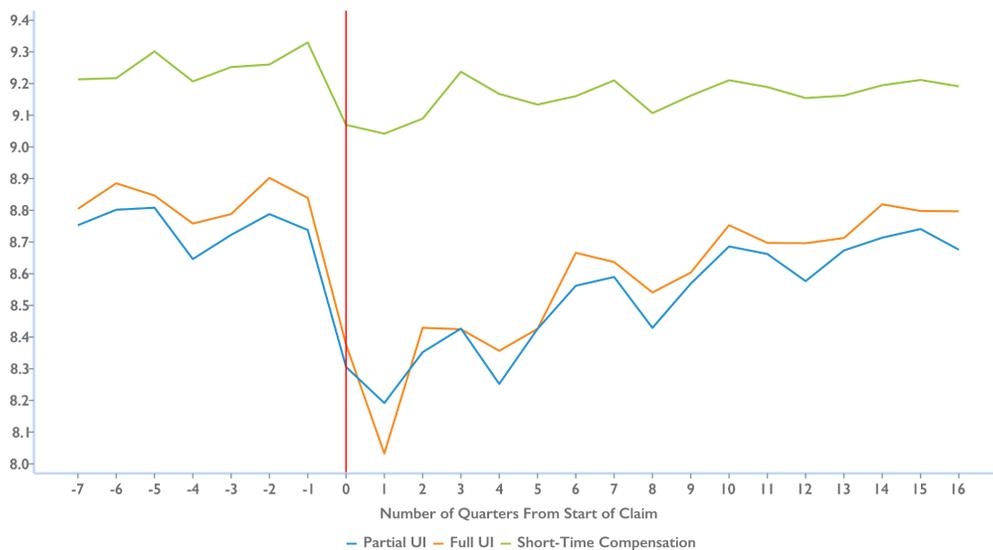
Source: County characteristics are obtained from the American Community Survey. STC as a share of all initial claims based on tabulated data from the Employment Development Department.

Figure 12: Employment and Earnings Among the Employed for Claimants Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 1st Quarter of 2009 (Great Recession)

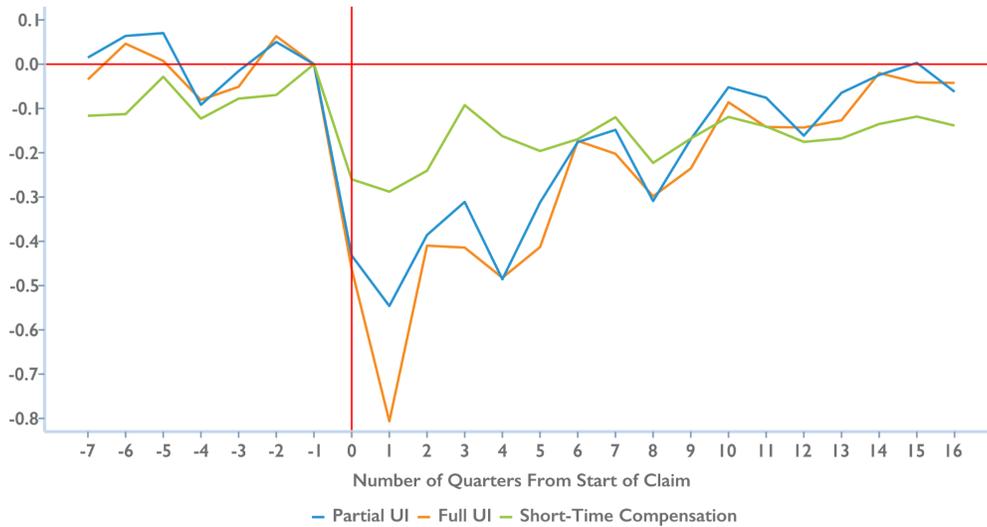
Panel A: Percent Employed Per Calendar Quarter



Panel B: Log Quarterly Earnings Among those Employed



Panel C: Difference in Log Quarterly Earnings Among those Employed Relative to Earnings One Quarter before Claim

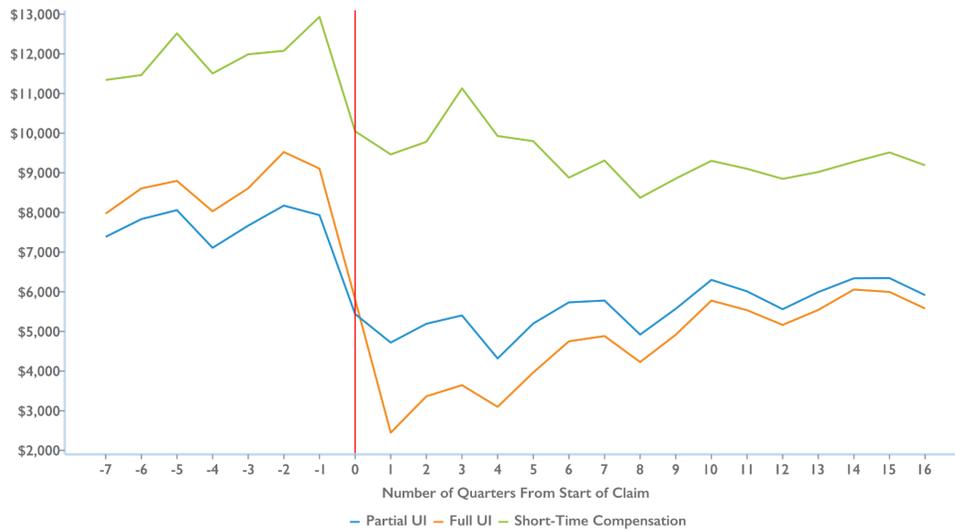


Notes: The figure displays the fraction employed in a quarter and the average of log quarterly earnings among paid claimants whose start of claim begins in the 1st quarter of 2009. Employment is defined as having positive quarterly earnings by a covered employer in California in a calendar quarter. Earnings refers to earnings from all employers in a given quarter.

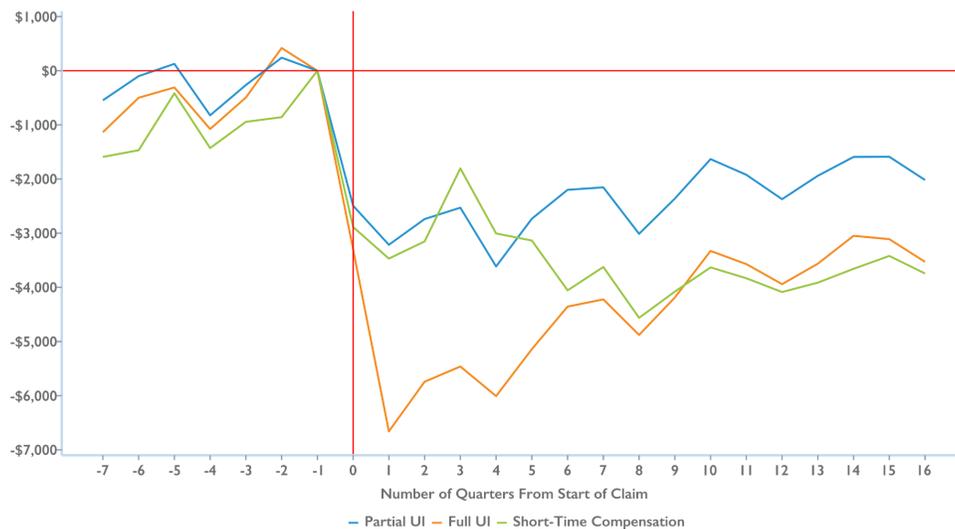
Source: Based on tabulated data from the Employment Development Department.

Figure 13: Earnings Before and After Start of Short-Time Compensation or UI Claim, 1st Quarter of 2009 (Great Recession, Includes Zero Earnings)

Panel A: Average Quarterly Earnings



Panel B: Difference in Average Quarterly Earnings Relative to Earnings One Quarter before Claim

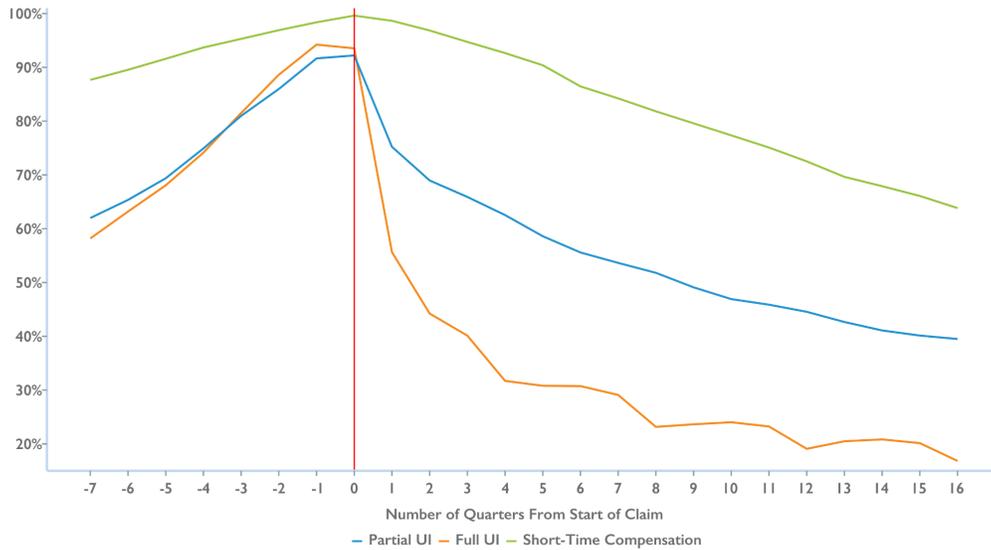


Notes: The figure displays average quarterly earnings (treating missing earnings as zero) among paid claimants whose start of claim begins in the 1st quarter of 2009. To deal with outliers in Panel A and B, earnings above the 98th percentile of the earnings distribution in a quarter are replaced with the value at the 98th percentile (i.e., they are winsorized).

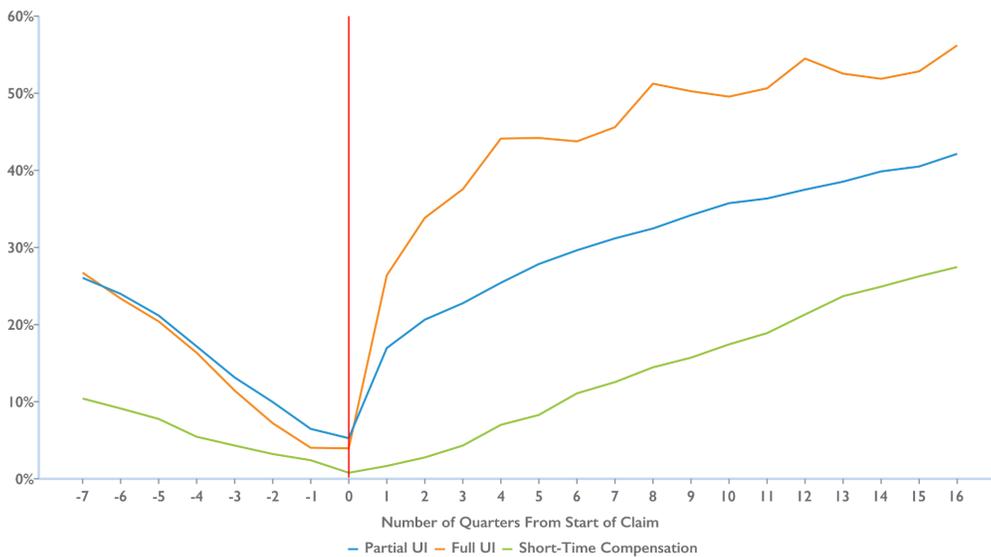
Source: Based on tabulated data from the Employment Development Department.

Figure 14: Recall Rate and Fraction Changing Industry Among Employed Workers Before and After Start of STC or UI Claim, 1st Quarter of 2009 (Great Recession)

Panel A: Percent Employed at Major Base Period Employer



Panel B: Percent Changing Industry Relative to Industry of Major Base Period Employer

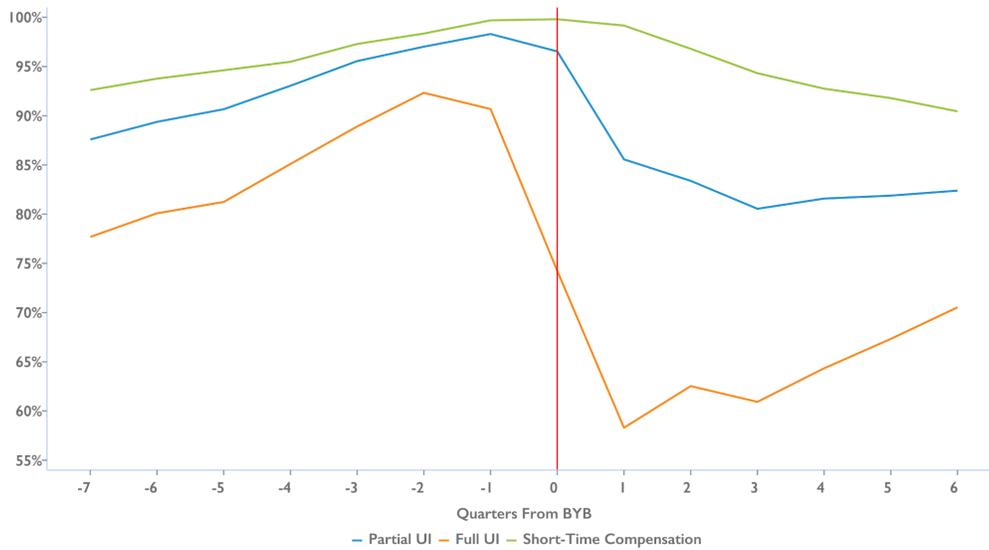


Note: The figure displays the percent employed at their base period employer (Panel A) and the percent leaving the industry of their base period employer (Panel B) among paid claimants whose start of claim begins in the 1st quarter of 2009. The base period employer is the main employer of the claimant in the base period before entering the UI program. Industries refer to two digit NAICS sectors.

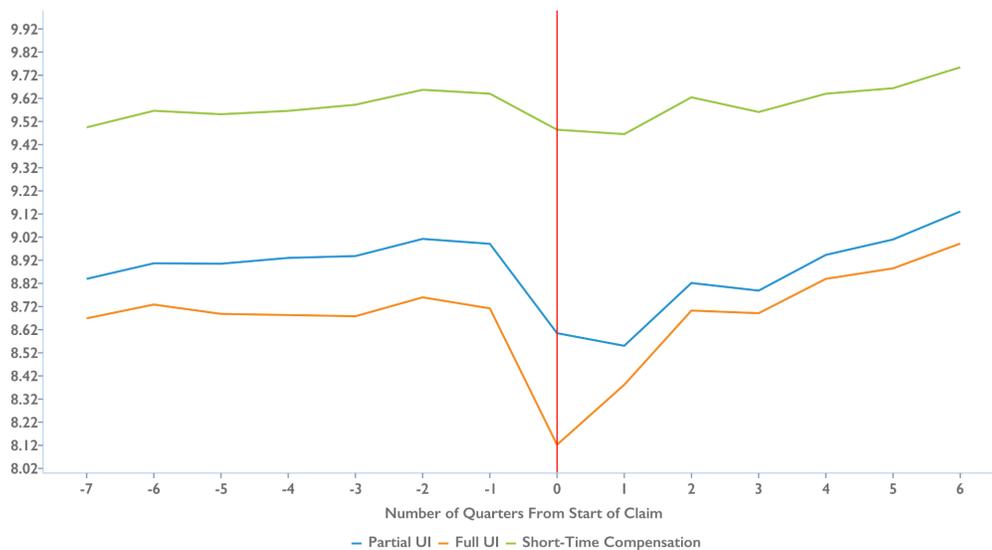
Source: Based on tabulated data from the Employment Development Department.

Figure 15: Employment and Earnings Among the Employed for Claimants Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 2nd Quarter of 2020 (COVID-19 Pandemic)

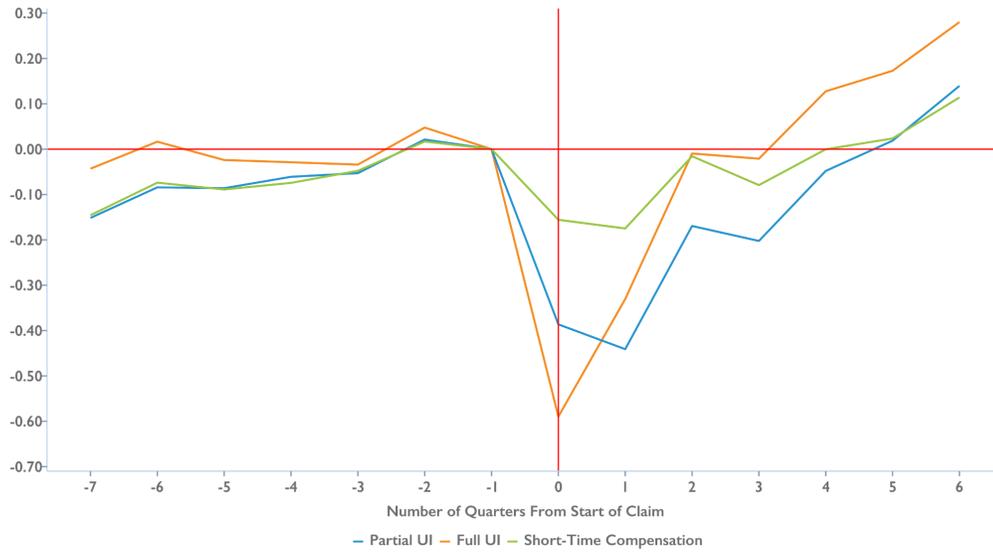
Panel A: Percent Employed Per Calendar Quarter



Panel B: Log Quarterly Earnings Among those Employed



Panel C: Difference in Log Quarterly Earnings Among those Employed Relative to Earnings One Quarter before Claim

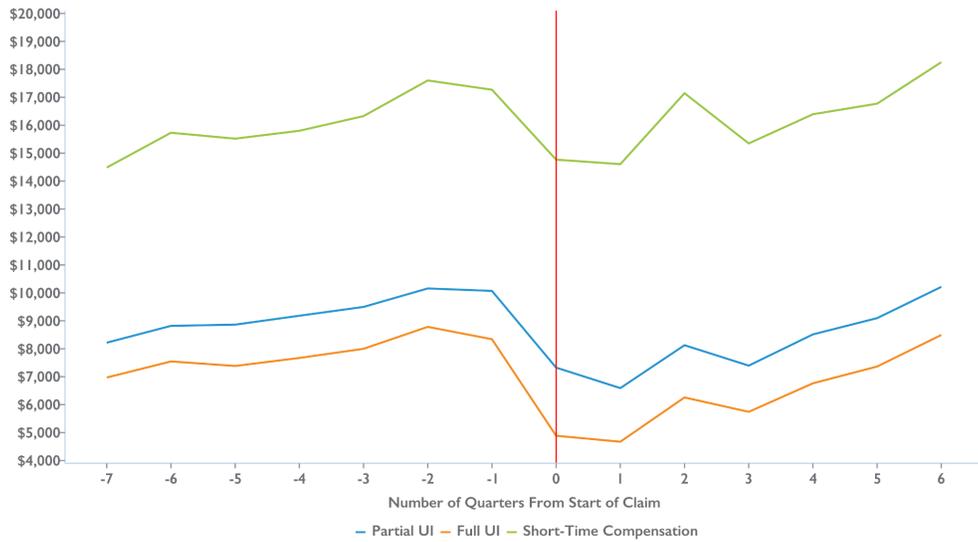


Notes: The figure displays the fraction employed in a quarter and the average of log quarterly earnings among paid claimants whose start of claim begins in the 2nd quarter of 2020. Employment is defined as having positive quarterly earnings by a covered employer in California in a calendar quarter. Earnings refers to earnings from all employers in a given quarter.

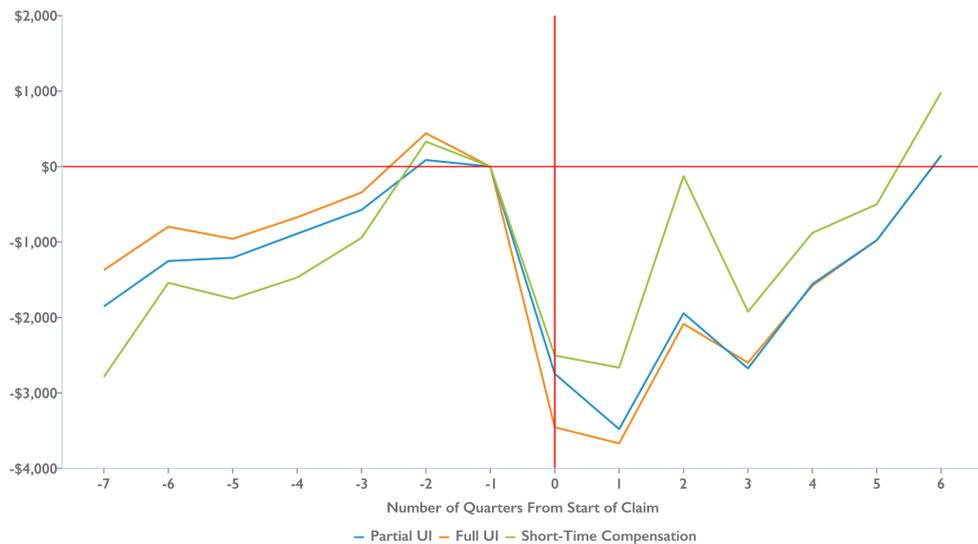
Source: Based on tabulated data from the Employment Development Department.

Figure 16: Earnings Before and After Start of Short-Time Compensation or UI Claim, 2nd Quarter of 2020 (COVID-19 Pandemic, Includes Zero Earnings)

Panel A: Average Quarterly Earnings



Panel B: Difference in Avg. Qrt. Earnings Relative to Earnings One Quarter before Claim

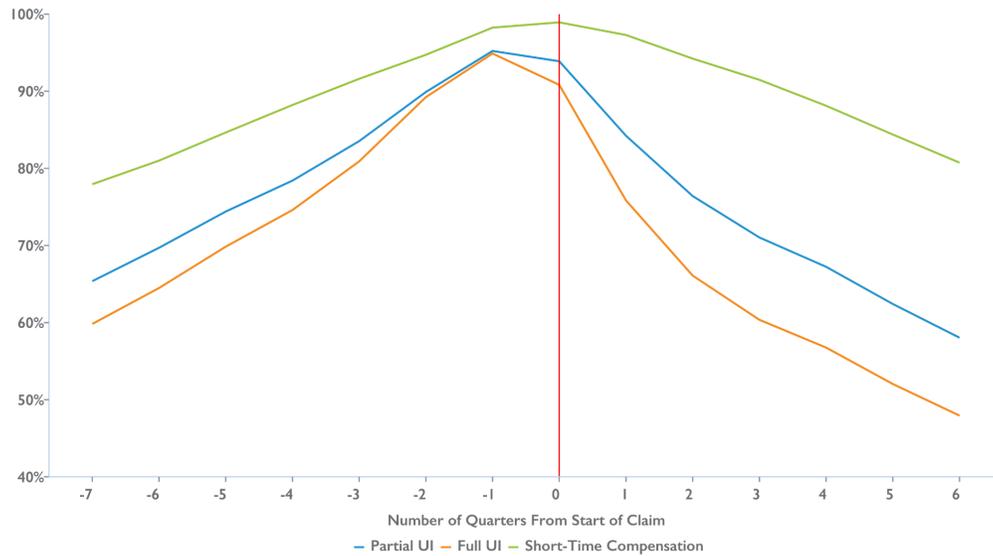


Notes: The figure displays average quarterly earnings (treating missing earnings as zero) among paid claimants whose start of claim begins in the 1st quarter of 2009. To deal with outliers, earnings above the 98th percentile of the earnings distribution in a quarter are replaced with the value at the 98th percentile (i.e., they are winsorized).

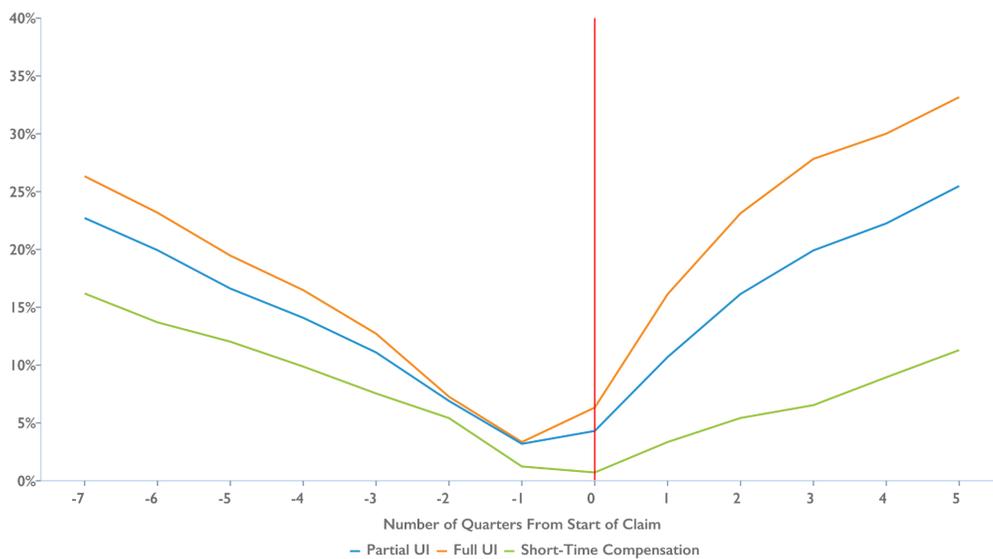
Source: Based on tabulated data from the Employment Development Department.

Figure 17: Recall Rate and Fraction Changing Industry Among Employed Workers Before and After Start of STC or UI Claim, 2nd Quarter of 2020 (COVID-19 Pandemic)

Panel A: Percent Recalled to Major Base Period Employer



Panel B: Percent Changing Industry Relative to Industry of Major Base Period Employer



The figure displays the percent employed at their base period employer (Panel A) and the percent leaving the industry of their base period employer (Panel B) among paid claimants whose start of claim begins in the 1st quarter of 2009. The base period employer is the main employer of the claimant in the base period before entering the UI program. Industries refer to two digit NAICS sectors.

Source: Based on tabulated data from the Employment Development Department.

Table 1: Share of Unemployment Claims by Industries Among STC, Partial UI, and Full UI Claimants, 1st Quarter of 2009

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Manufacturing	67.15	13.18	12.7
Prof, Scientific, Tech. Services (a)	9.04	5.5	8.42
Wholesale Trade	7.02	3.09	4.95
Construction	6.04	14.36	15.14
Retail Trade	4.03	10.85	9.08
Admin, Support, Waste Man. (a)	1.07	8.75	9.62
Real Estate and Leasing	1.04	1.59	1.68
Other Services	0.88	4.12	3.02
Transp and Warehousing	0.85	6.8	3.23
Information	0.65	2.58	3.51
Health Care and Social Assistance	0.34	4.32	3.4
Finance and Insurance	0.28	1.34	3.3
Management	0.28	0.35	0.76
Accommodation, Food Svc	0.25	10.44	3.73
Mining, Oil and Gas	0.18	0.4	0.43
Agriculture, Forestry, Fishing (a)	0.15	2.23	7.56
Education Services	0.13	2.73	1.28
Arts, Entertainment, Recreation	0.05	2.09	1.15
Public Admin	0	1.03	1
Utilities	0	0.06	0.13
N	34702	44614	476655

Notes: The table displays the share of industry groups among paid claimants whose start of claim begins during the 1st quarter of 2009. Industry of the main employer prior to layoff was obtained from the Quarterly Census of Employment and Wages according to the North American Industrial Classification Systems. Number of observations (N) does not include individuals with missing industry information (a) Full Names of Sectors: Administrative Support, Waste Management, and Remediation. Agriculture, Forestry, Fishing, and Hunting. Professional, Scientific, and Technical Services. Total ignores unreported industries.

Source: Based on tabulated data from the Employment Development Department.

Table 2: Share of Unemployment Claims by Industry Among STC, Partial UI, and Full UI Claimants, 2nd Quarter of 2020

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Manufacturing	36.5	6.37	6.22
Health Care and Social Assistance	10.05	17.51	10.57
Prof, Scientific, Tech. Services (a)	10.01	5.02	4.92
Wholesale Trade	7.55	3.97	3.51
Information	6.62	2.41	2.84
Construction	4.63	2.5	4.91
Management	4.55	0.74	0.51
Other Services	3.3	3.44	4.37
Admin, Support, Waste Man. (a)	3.2	5.93	8.11
Retail Trade	2.8	12.73	13.79
Transp and Warehousing	2.17	5.76	4.02
Real Estate and Leasing	1.59	1.59	1.59
Arts, Entertainment, Recreation	1.47	5.02	4.71
Education Services	1.15	7.09	6.23
Accommodation, Food Svc	0.86	13.49	13.33
Finance and Insurance	0.81	1.43	1.14
Agriculture, Forestry, Fishing (a)	0.09	0.57	1.65
Public Admin	0	1.22	0.92
Mining, Oil and Gas	0	0.13	0.13
Utilities	0	0.04	0.07
N	23301	232505	1658650

Notes: The table displays the share of industry groups among paid claimants whose start of claim begins during the second quarter of 2020. Industry of the main employer prior to layoff was obtained from the Quarterly Census of Employment and Wages according to the North American Industrial Classification Systems. Number of observations (N) does not include individuals with missing industry information (a) Full Names of Sectors: Administrative Support, Waste Management, and Remediation. Agriculture, Forestry, Fishing, and Hunting. Professional, Scientific, and Technical Services. Total ignores unreported industries.

Source: Based on tabulated data from the Employment Development Department.

Table 3: Share of Unemployment Insurance Claims by Demographic Characteristics Among STC, Partial UI, and Full UI Claimants, 1st Quarter of 2009

	Short-Term Compensation (1)	Partial UI (2)	Full Time UI (3)
Gender			
Female	33.02	42.09	37.35
Age Group			
16-24	5.09	10.29	12.93
25-44	45.76	48.07	48.25
45-54	29.87	25.6	23.2
55+	19.27	16.02	15.58
Firm Size			
1-500	72.69	59.32	63.76
501+	26.56	36.19	30.04
N	34906	46561	506558

Notes: The table displays the share of demographic groups among paid claimants whose start of claim begins in the first quarter of 2009. Number of observations (N) does not include individuals with missing demographic information.

Source: Based on tabulated data from the Employment Development Department.

Table 4: Share of Unemployment Insurance Claims by Demographic Characteristics Among STC, Partial UI, and Full UI Claimants, 2nd Quarter of 2020

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Gender			
Female	42.21	57.97	50.72
Age Group			
16-24	5.63	18.47	23.71
25-44	47.06	48.35	44.29
45-54	21.71	15.47	14.88
55+	25.54	17.68	17.03
Firm Size			
1-500	67.26	49.77	53.15
501+	32.12	47.09	40.08
N	23937	239779	1773266

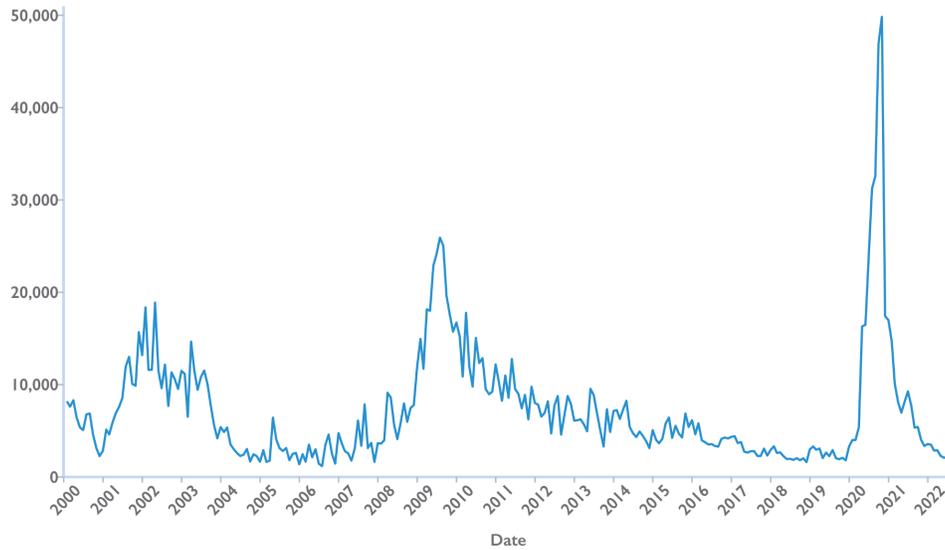
Notes: The table displays the share of demographic groups among paid claimants whose start of claim begins in the second quarter of 2020. Number of observations (N) does not include individuals with missing demographic information.

Source: Based on tabulated data from the Employment Development Department.

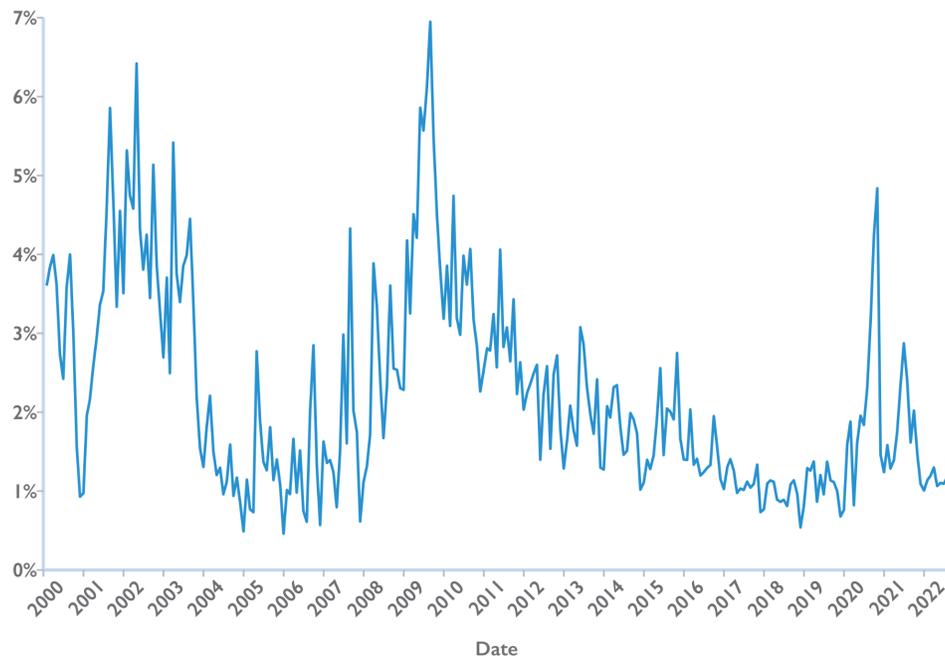
APPENDIX

Appendix A: Nationwide Continuing Claims for Short-Time Compensation from 2000-2022

Panel A: Monthly Number of Continuing Claims for STC in the U.S. 2000 to 2020



Panel B: Monthly Continuing Claims for Short-Time Compensation as a Share of All UI Continuing Claims



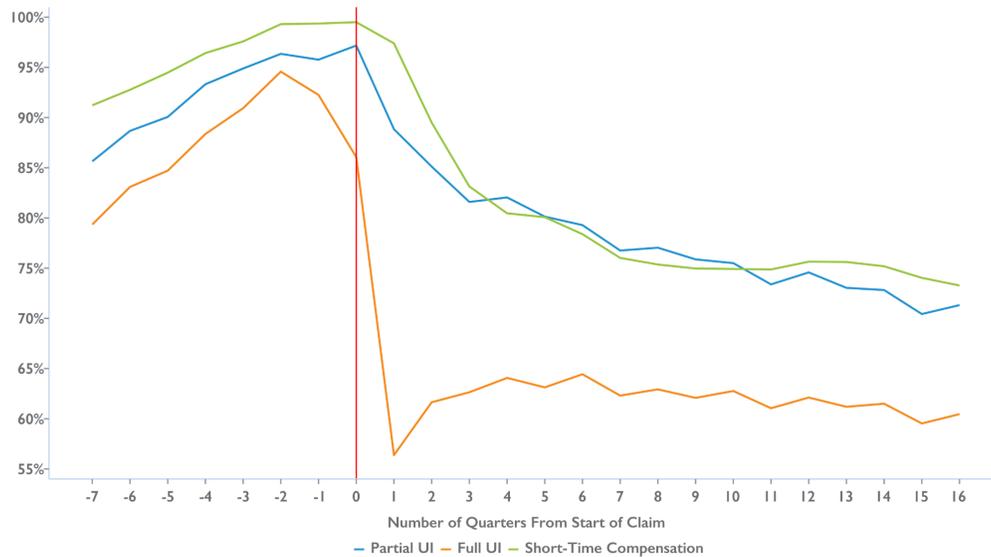
Notes: Only includes states with Short-Time Compensation programs in the relevant month.

Source: ETA Series AR and AW 5159

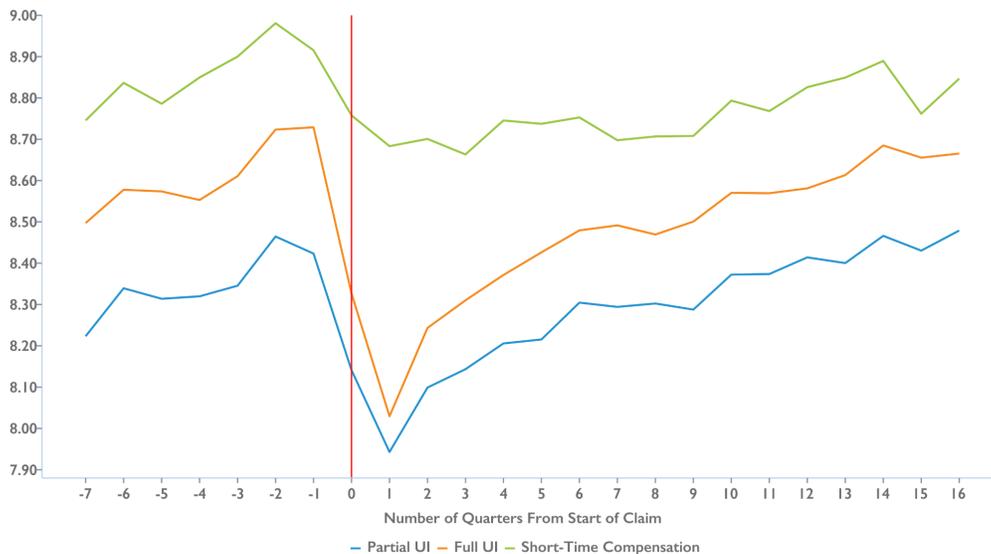
Appendix B: Event Study Figures for 2001 Recession¹⁸

Figure B1: Employment and Earnings Among the Employed for Claimants Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 2nd Quarter of 2001 (2001 Recession)

Panel A: Percent Employed Per Calendar Quarter

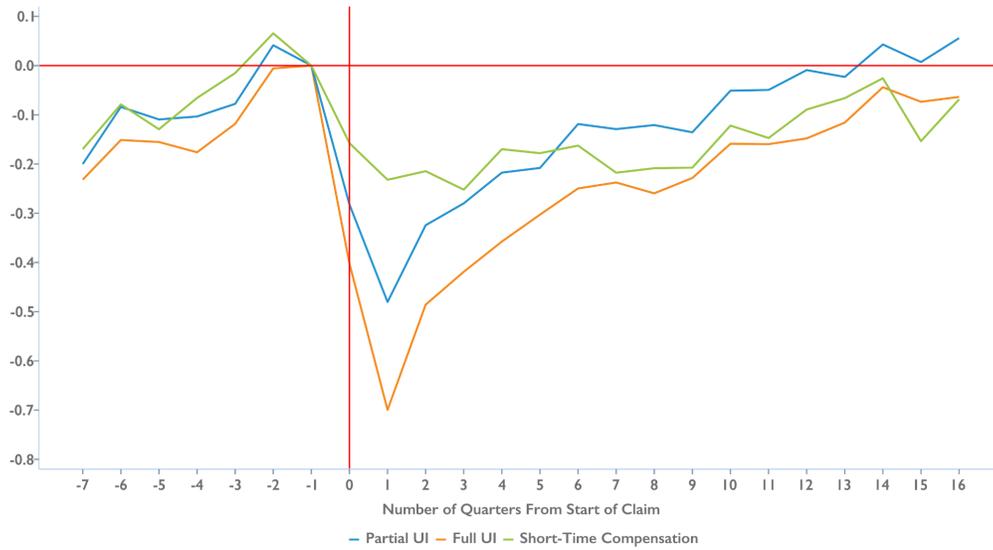


Panel B: Log Quarterly Earnings Among those Employed



¹⁸ For detailed notes refer to the corresponding figure in the main text.

Panel C: Difference in Log Quarterly Earnings Among those Employed Relative to Earnings One Quarter before Claim

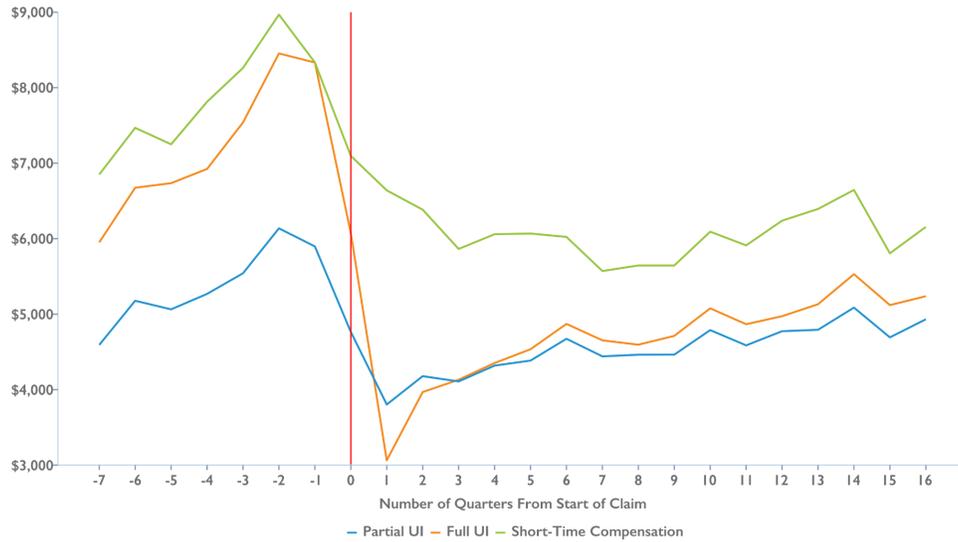


Notes: Employment is defined as having positive quarterly earnings by a covered employer in a calendar quarter.

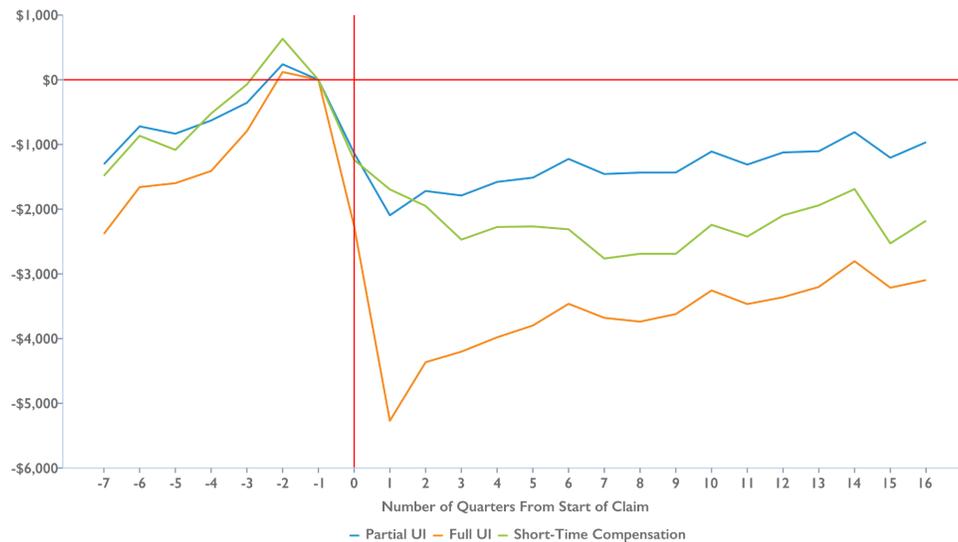
Source: Based on tabulated data from the Employment Development Department.

Figure B2: Earnings Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 2nd Quarter of 2001 (2001 Recession, Includes Zero Earnings)

Panel A: Average Quarterly Earnings



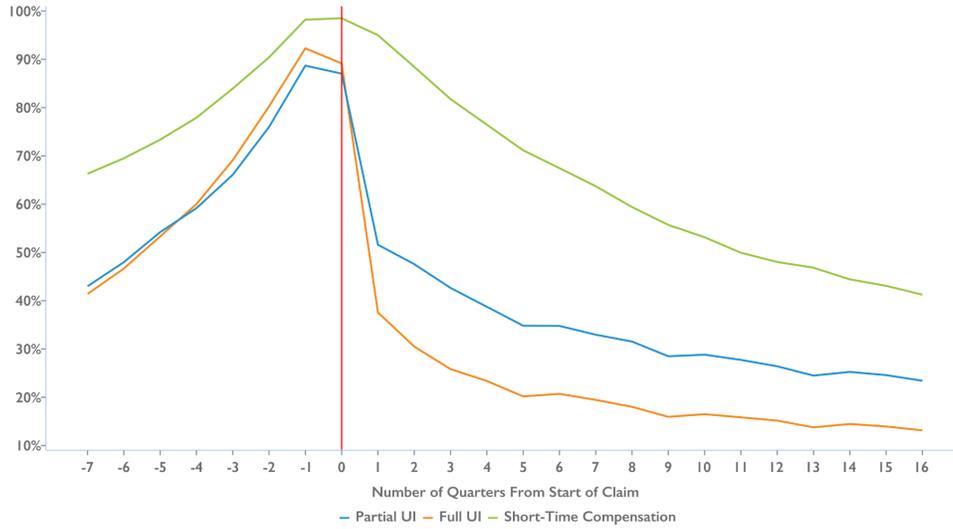
Panel B: Difference in Average Quarterly Earnings Relative to Earnings One Quarter before Claims



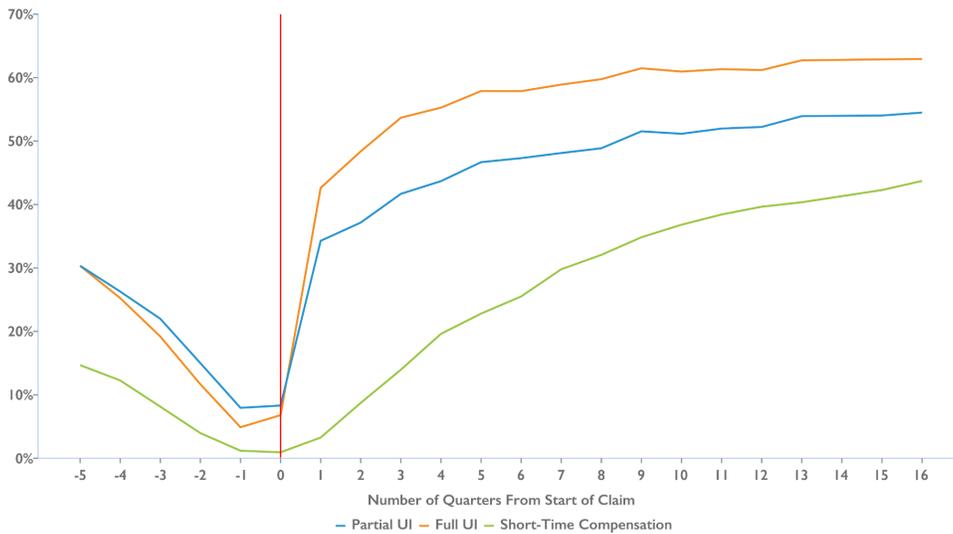
Notes: To deal with outliers in Panel A and B, earnings above the 98th percentile of the earnings distribution in a quarter are replaced with the value at the 98th percentile (i.e., they are winsorized). Source: Based on tabulated data from the Employment Development Department.

Figure B3: Recall Rate and Fraction Changing Industry Among Employed Workers Before and After Start of STC or UI Claim, 2nd Quarter of 2001 (2001 Recession)

Panel A: Percent Recalled to Major Base Period Employer



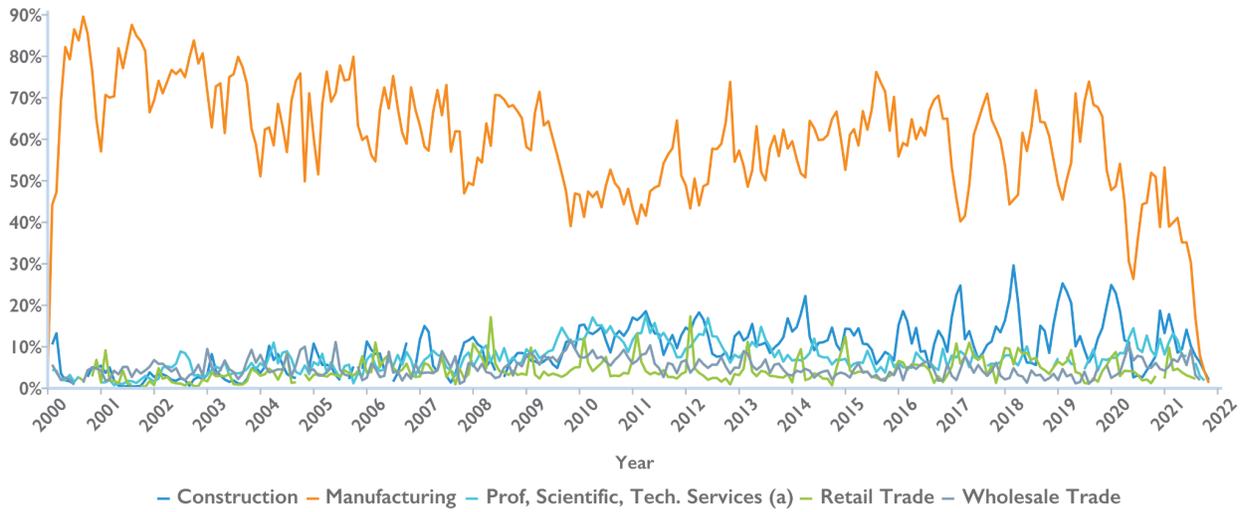
Panel B: Percent Changing Industry Relative to Industry of Major Base Period Employer



Notes: The base period employer is the main employer of the claimant in the base period before entering the UI program. Industries refer to two digit NAICS sectors.

Source: Based on tabulated data from the Employment Development Department.

Appendix C: Monthly Share of Top Industries Among Short-Time Compensation Claimants



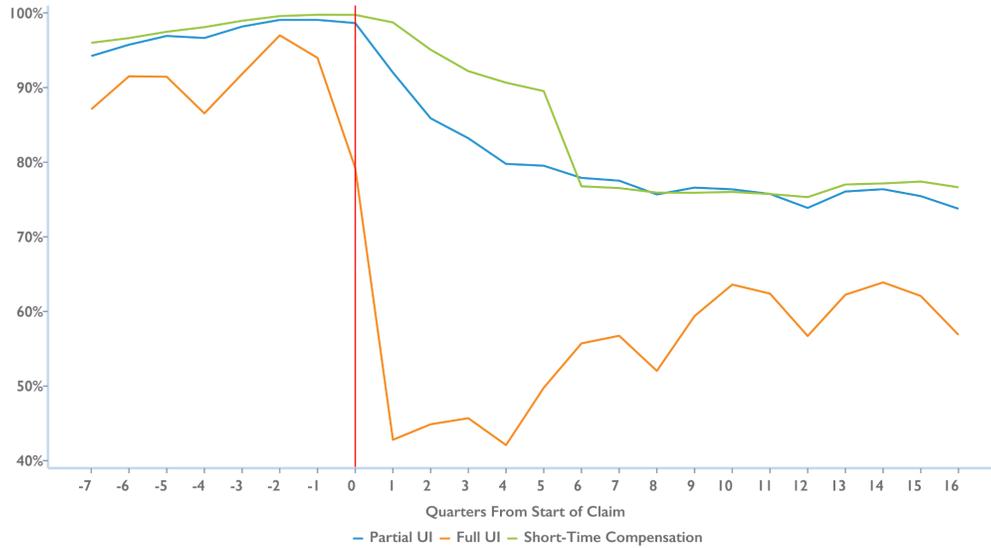
Notes: Industries refer to two digit NAICS sectors. (a) Full Names of Sector: Professional, Scientific, and Technical Services.

Source: Based on tabulated data from the Employment Development Department.

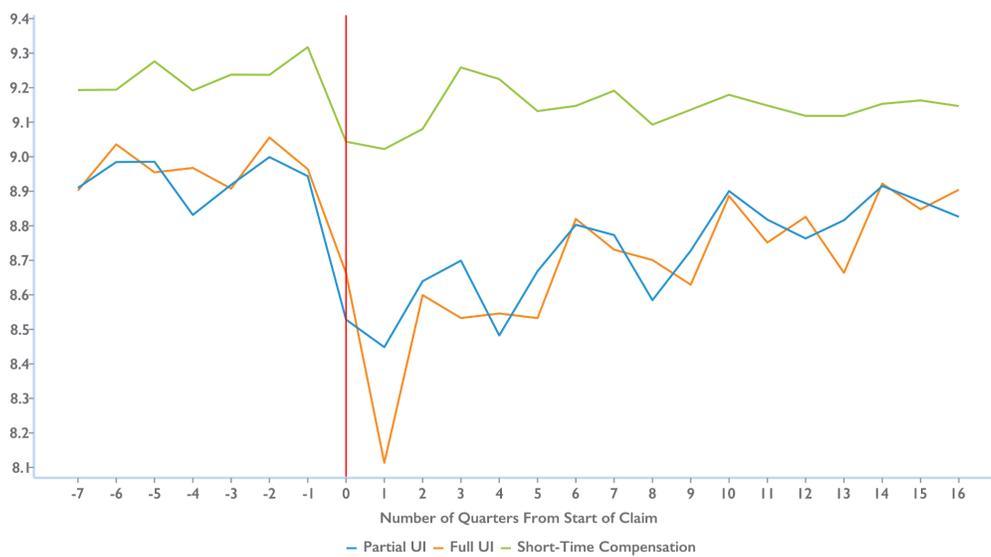
Appendix D: Event Study Figures for California Manufacturing Workers

Figure D1: Employment and Earnings Among the Employed for Claimants Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 1st Quarter of 2009

Panel A: Percent Employed Per Calendar Quarter



Panel B: Log Quarterly Earnings Among those Employed



Panel C: Difference in Log Quarterly Earnings Among those Employed Relative to Earnings One Quarter before Claim

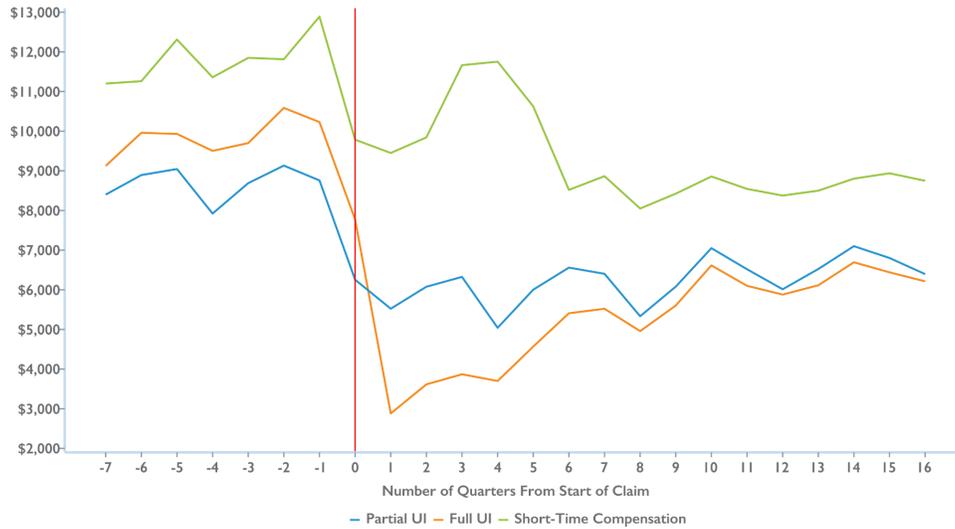


Notes: Employment is defined as having positive quarterly earnings by a covered employer in California in a calendar quarter. Manufacturing workers are from 1st quarter of 2009.

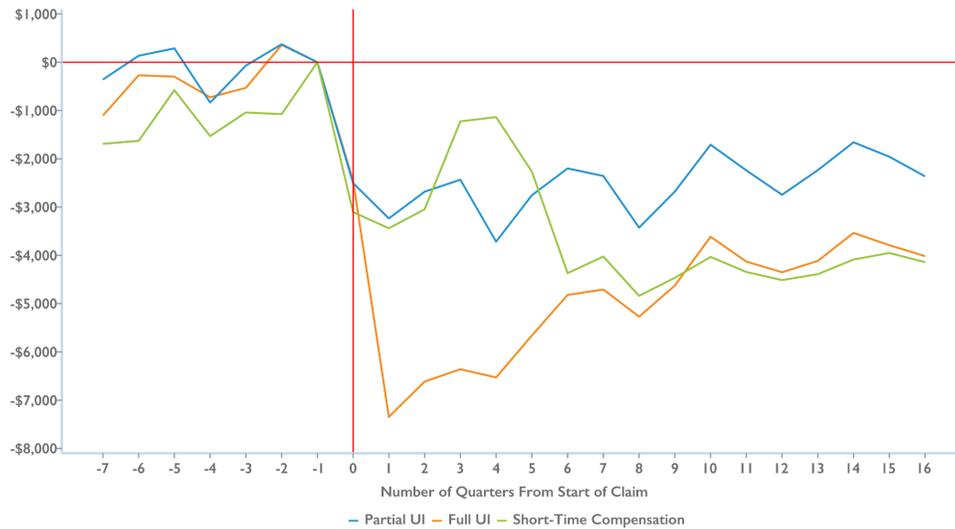
Source: Based on tabulated data from the Employment Development Department.

Figure D2: Earnings Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 1st Quarter of 2009 (Includes Zero Earnings)

Panel A: Average Quarterly Earnings



Panel B: Difference in Average Quarterly Earnings Relative to Earnings One Quarter before Claim

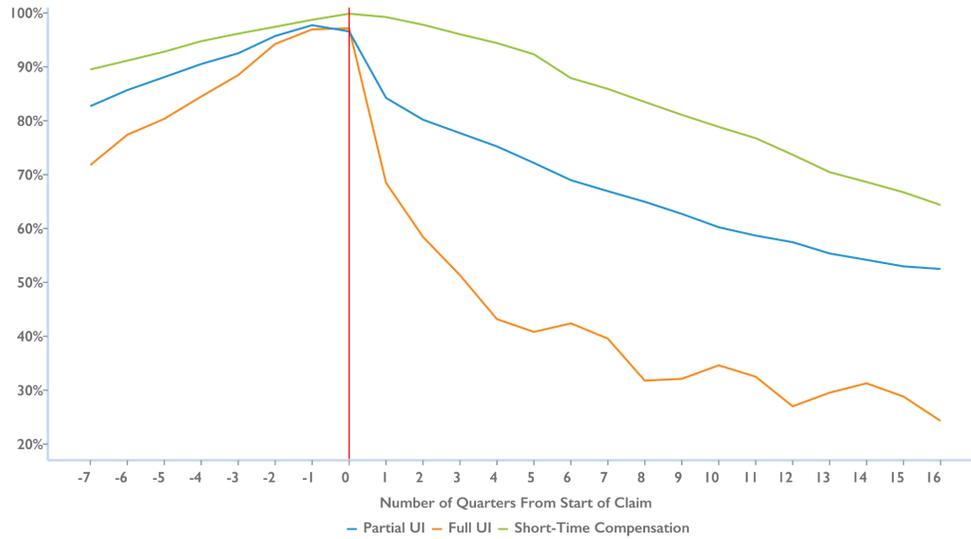


Notes: To deal with outliers in Panel A and B, earnings above the 98th percentile of the earnings distribution in a quarter are replaced with the value at the 98th percentile (i.e., they are winsorized). Manufacturing workers are from 1st quarter of 2009.

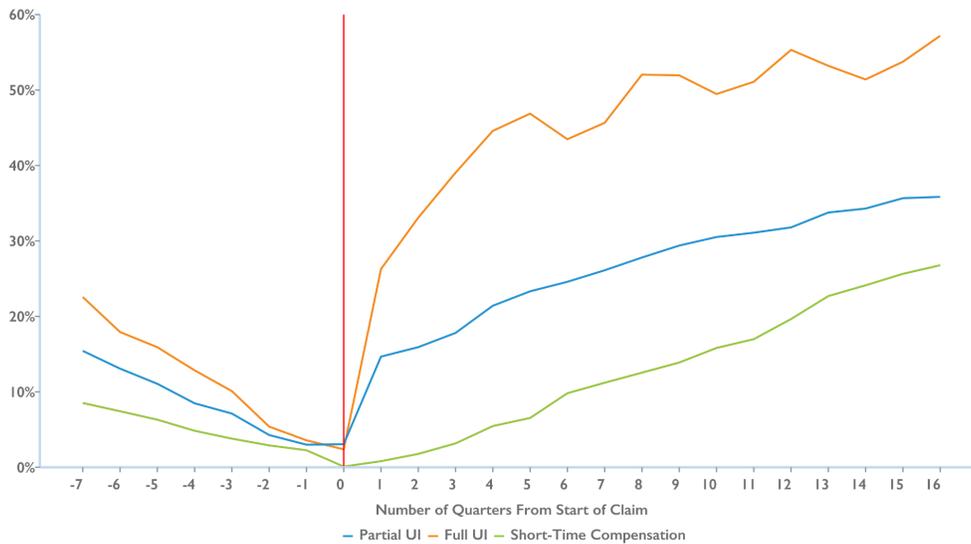
Source: Based on tabulated data from the Employment Development Department.

Figure D3: Recall Rate and Fraction Changing Industry Among Employed Workers Before and After Start of STC or UI Claim, 1st Quarter of 2009

Panel A: Percent Employed at Major Base Period Employer



Panel B: Percent Changing Industry Relative to Industry of Major Base Period Employer



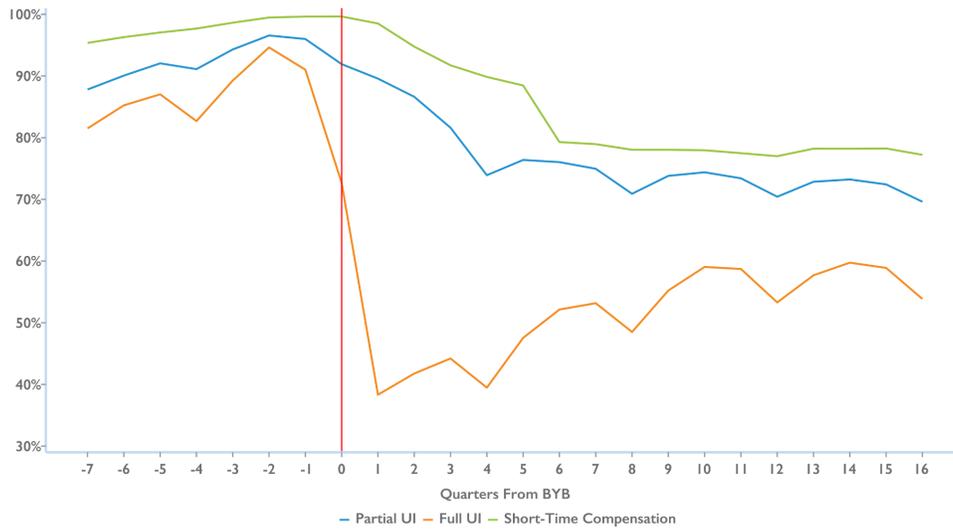
Notes: The base period employer is the main employer of the claimant in the base period before entering the UI program. Industries refer to two digit NAICS sectors. Manufacturing workers are from 1st quarter of 2009.

Source: Based on tabulated data from the Employment Development Department.

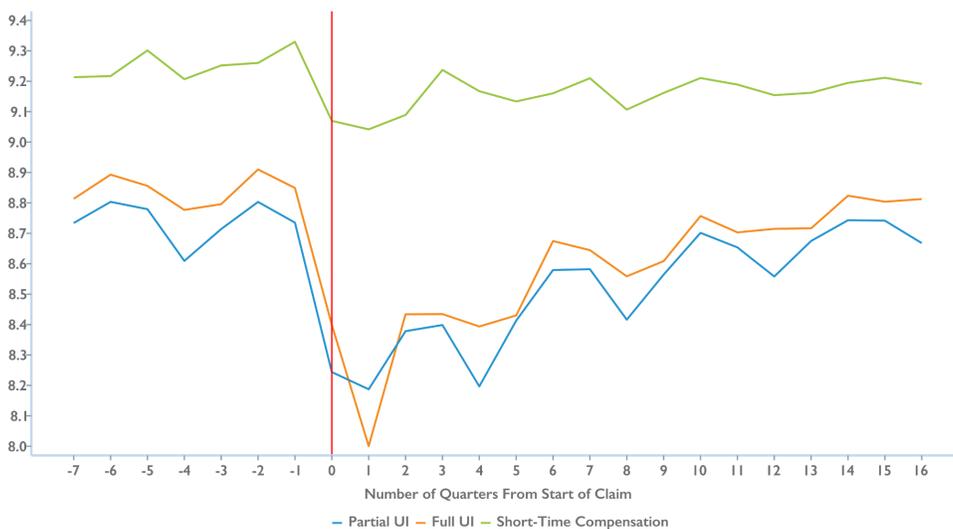
Appendix E: Event Study Figures for Alternative Partial UI Definition

Figure E1: Employment and Earnings Among the Employed for Claimants Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 1st Quarter of 2009

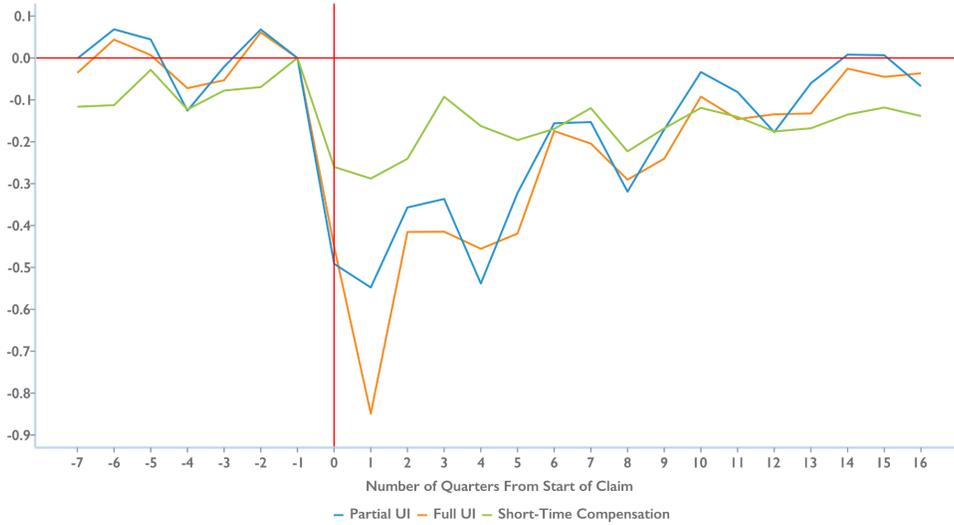
Panel A: Percent Employed Per Calendar Quarter



Panel B: Log Quarterly Earnings Among those Employed



Panel C: Difference in Log Quarterly Earnings Among those Employed Relative to Earnings One Quarter before Claim

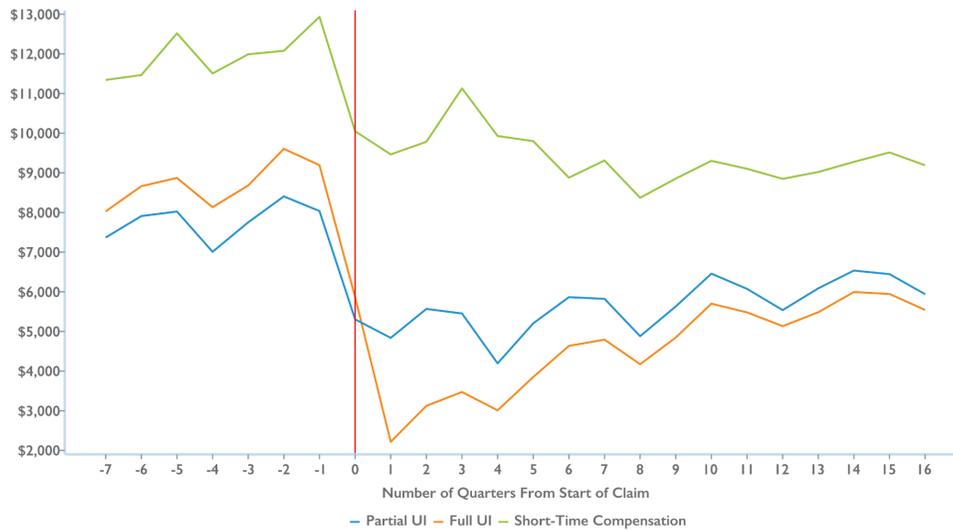


Notes: Employment is defined as having positive quarterly earnings by a covered employer in a calendar quarter. In the alternative definition of partial UI a claimant is categorized as 'partial UI' when 20% of the claimant's payments in the first 26 calendar weeks after entering the UI were partial.

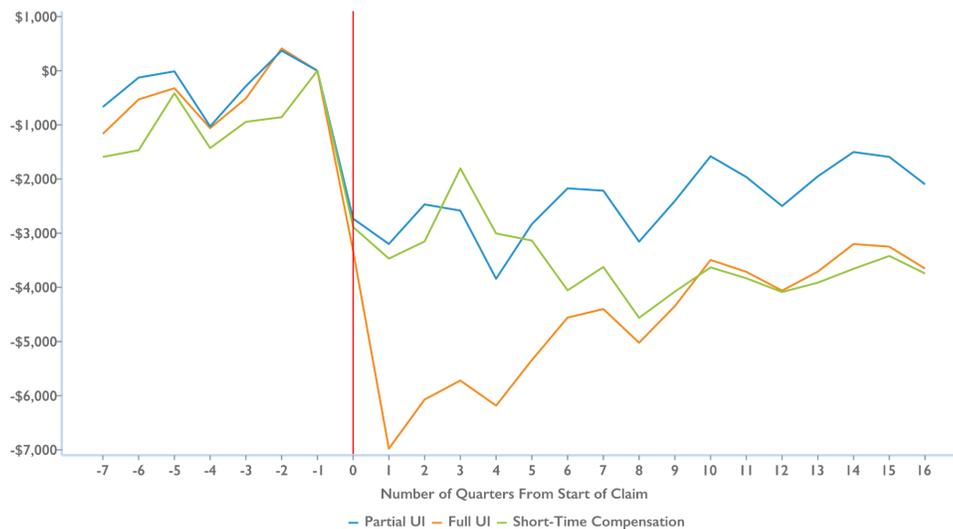
Source: Based on tabulated data from the Employment Development Department.

Figure E2: Earnings Before and After Start of Short-Time Compensation or Unemployment Insurance Claim, 1st Quarter of 2009 (Includes Zero Earnings)

Panel A: Average Quarterly Earnings



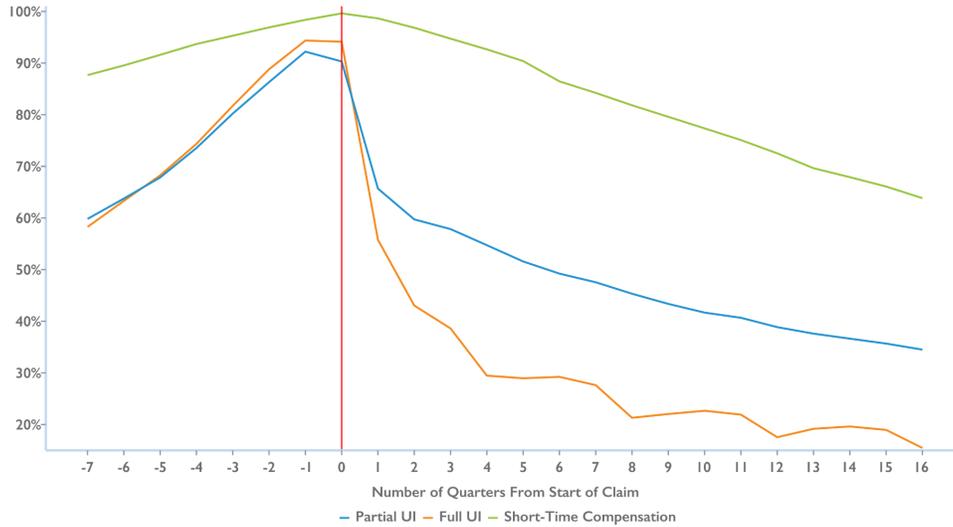
Panel B: Difference in Average Quarterly Earnings Relative to Earnings One Quarter before Claim



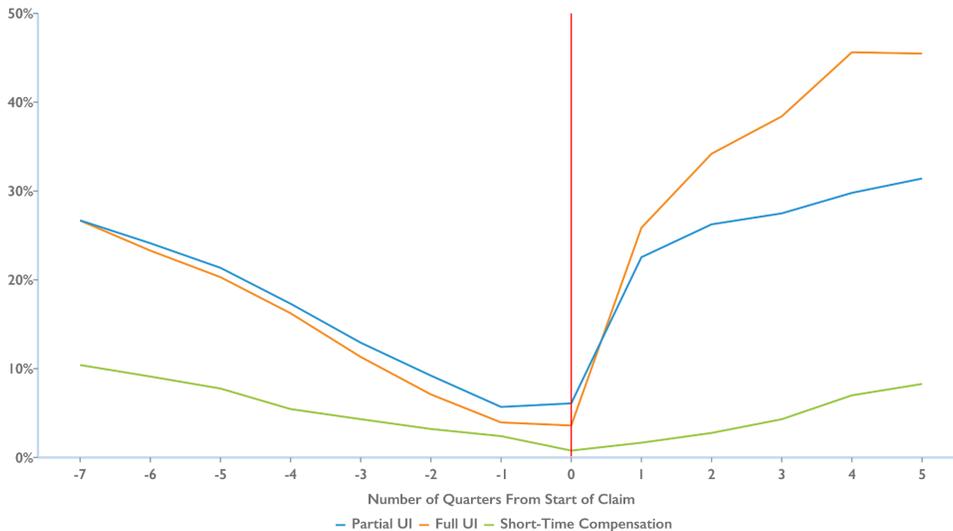
Notes: To deal with outliers in Panel A and B, earnings above the 98th percentile of the earnings distribution in a quarter are replaced with the value at the 98th percentile (i.e., they are winsorized). Alternative partial UI is defined when 20% of claimant's payments were partial. Source: Based on tabulated data from the Employment Development Department.

Figure E3: Recall Rate and Fraction Changing Industry Among Employed Workers Before and After Start of STC or UI Claim, 1st Quarter of 2009

Panel A: Percent Employed at Major Base Period Employer



Panel B: Percent Changing Industry Relative to Industry of Major Base Period Employer



Notes: The base period employer is the main employer of the claimant in the base period before entering the UI program. Industries refer to two digit NAICS sectors. Alternative partial UI is defined when 20% of claimant's payments were partial.

Source: Based on tabulated data from the Employment Development Department.

Appendix F: Share of Short-Term Unemployment Claims and Partial Unemployment Claims Among Paid Unemployment Claims (Continuing Claims) in California

Figure F1: Quarterly Fraction among All Paid (STC and UI) Claims

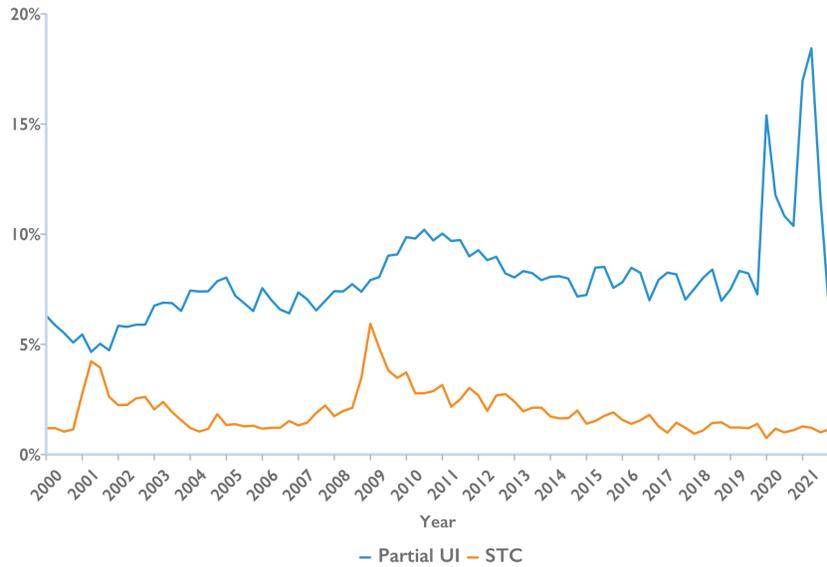
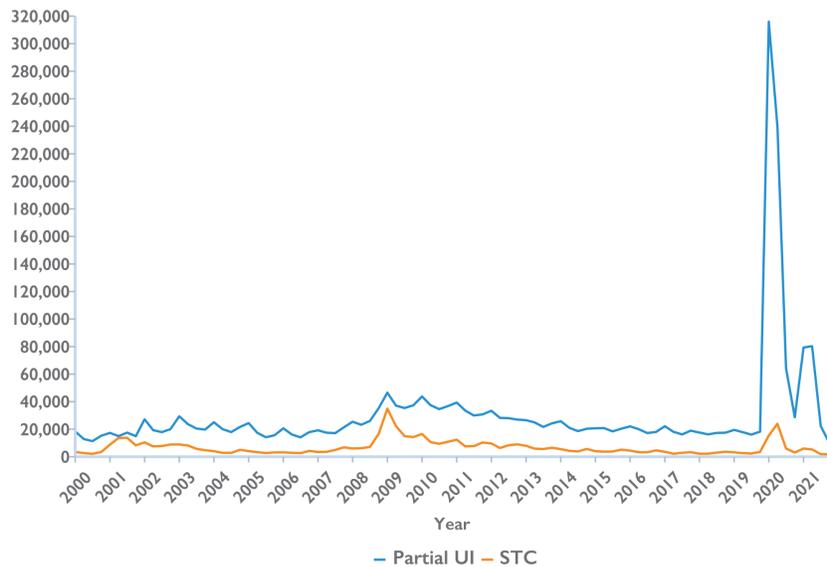


Figure F2: Quarterly Number of Claims



Notes: Partial unemployment refers to claims where the first payment receives less than a claimant's full amount due to employment. Source: Based on tabulated data from the Employment Development Department.

Appendix G: Share of Unemployment Claims During Economic Downturns

Table G1: Share of Unemployment Claims by Industry for Great Recession

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Manufacturing	64.11	11.48	10.75
Prof, Scientific, Tech. Services (a)	8.67	5.44	7.8
Construction	6.91	14.51	14.6
Wholesale Trade	6.53	2.91	4.37
Retail Trade	4.64	9.48	8.62
Real Estate and Leasing	1.52	1.43	1.7
Admin, Support, Waste Man. (a)	1.31	9.5	9.65
Transp and Warehousing	0.9	5.78	3.13
Other Services	0.88	4.72	3.28
Health Care and Social Assistance	0.7	4.98	4.13
Information	0.67	3.15	4
Finance and Insurance	0.65	1.59	3.88
Management	0.65	0.39	0.7
Accommodation, Food Svc	0.38	9.2	3.84
Mining, Oil and Gas	0.37	0.22	0.24
Arts, Entertainment, Recreation	0.28	2.23	1.43
Agriculture, Forestry, Fishing (a)	0.16	2.67	7.51
Education Services	0.15	4.22	2.56
Public Admin	0	1.06	1.02
Utilities	0	0.08	0.16
N	89679	181276	2062422

Notes: The table displays the share of industry groups among paid claimants whose start of claim begins during the Great Recession. Great Recession period refers to NBER's business cycle definition. Industry of the main employer prior to layoff was obtained from the Quarterly Census of Employment and Wages according to the North American Industrial Classification Systems. Number of observations (N) does not include individuals with missing industry information

(a) Full Names of Sectors: Administrative Support, Waste Management, and Remediation. Agriculture, Forestry, Fishing, and Hunting. Professional, Scientific, and Technical Services. Total ignores unreported industries.

Source: Based on tabulated data from the Employment Development Department.

Table G2: Share of Unemployment Claims by Demographics for COVID-19 Pandemic

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Manufacturing	38.49	6.24	6.04
Prof, Scientific, Tech. Services (a)	11.05	4.82	4.77
Health Care and Social Assistance	8.19	16.62	10.85
Wholesale Trade	7.48	3.63	3.36
Construction	6.18	3.64	5.59
Information	4.21	2.27	2.71
Admin, Support, Waste Man. (a)	3.55	5.4	7.6
Retail Trade	3.29	13.08	12.33
Management	3.07	0.58	0.45
Other Services	2.93	3.88	4.8
Transp and Warehousing	2.91	4.35	3.67
Arts, Entertainment, Recreation	2.25	4.78	4.28
Real Estate and Leasing	1.42	1.68	1.58
Education Services	1.33	5.05	5.26
Accommodation, Food Svc	1.07	18.1	16.1
Finance and Insurance	0.79	1.22	1.09
Mining, Oil and Gas	0.79	0.1	0.1
Agriculture, Forestry, Fishing (a)	0.21	0.74	2.23
Public Admin	0.15	0.99	0.8
Utilities	0	0.05	0.07
N	45434	607006	3735860

Notes: The table displays the share of industry groups among paid claimants whose start of claim begins during the COVID-19 Pandemic. The date range for COVID-19 Pandemic is between 3/2020 - 12/2020. Industry of the main employer prior to layoff was obtained from the Quarterly Census of Employment and Wages according to the North American Industrial Classification Systems. Number of observations (N) does not include individuals with missing industry information

(a) Full Names of Sectors: Administrative Support, Waste Management, and Remediation. Agriculture, Forestry, Fishing, and Hunting. Professional, Scientific, and Technical Services. Total ignores unreported industries.

Source: Based on tabulated data from the Employment Development Department.

Table G3: Share of Unemployment Claims by Demographics for Great Recession

	Short-Term Compensation	Partial UI	Full Time UI
	(1)	(2)	(3)
Gender			
Female	34.65	45.09	39.15
Age Group			
16-24	5.43	9.96	12.67
25-44	45.11	48.22	48.76
45-54	30.11	25.81	23.16
55+	19.33	15.98	15.38
Firm Size			
1-10	4.82	12.52	13.39
11-50	24.8	17.22	18.02
51-100	15.3	8.85	9.42
101-500	32.35	18.98	20.73
501-1000	7.62	7.92	7.78
1000+	14.55	29.48	23.97
N	90150	190742	2208839

Notes: The table displays the share of demographic groups among paid claimants whose start of claim begins during the Great Recession. Great Recession period refers to NBER's business cycle definition. Number of observations (N) does not include individuals with missing demographic information. Source: Based on tabulated data from the Employment Development Department.

Table G4: Share of Unemployment Claims by Demographics for COVID-19 Pandemic

	Short-Term Compensation (1)	Partial UI (2)	Full Time UI (3)
Gender			
Female	41.17	58.75	50.62
Age Group			
16-24	6.16	17.14	21.01
25-44	46.38	49.65	46.12
45-54	21.78	15.39	15.39
55+	25.62	17.78	17.41
Firm Size			
1-10	6.25	11.95	15.31
11-50	25.11	18.17	18.21
51-100	14.65	8.14	7.87
101-500	30.97	18.2	16.82
501-1000	12.87	8.18	6.87
1000+	9.45	32.28	28.16
N	45725	624446	3988186

Notes: The table displays the share of demographic groups among paid claimants whose start of claim begins during the COVID-19 Pandemic. The date range for COVID-19 Pandemic is between 3/2020 - 12/2020. Number of observations (N) does not include individuals with missing demographic information.

Source: Based on tabulated data from the Employment Development Department.