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Out of Work and Into School:
Labor Market Policies and College Enrollment During the Great Recession

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CESIFO WORKING PAPER NO. 4732
CATEGORY 5: ECONOMICS OF EDUCATION
APRIL 2014

Presented at CESifo Area Conference on The Economics of Education, August/September 2012

CESifo
Center for Economic Studies & Ifo Institute

CESifo *Working Paper No. 4732*

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Abstract

The Great Recession brought large increases in unemployment and college enrollment; we explore how changing labor market conditions affected the decision to enroll, focusing on the role of state-specific dimensions of Unemployment Insurance (UI) policy. We measure the enrollment response to changing economic conditions, comparing eighteen and nineteen year-olds with older individuals likely to have accumulated some labor market experience. We find that individuals in their mid to late-twenties are proportionally more responsive to cyclical variation in economic conditions, and we identify a substantial role of the UI program in determining post-secondary enrollment outcomes. States in which academic post-secondary programs unrelated to a specific occupation are allowable under UI have substantially magnified enrollment responses to local economic conditions. In addition, we provide some of the first evidence that the duration of UI affects a displaced individual's propensity to enroll. These findings identify a substantial overlap between UI policy and post-secondary enrollment decisions, indicating the potential importance of UI in not only providing income but also facilitating investments in skills.

JEL-Code: I230, J640, J650, I380, H530.

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September 9, 2013
Seminar participants at the CESifo Area Conference on the Economics of Education, Harvard Labor Seminar, and the University of Missouri have provided many helpful comments. We are grateful to Jesse Rothstein for helpful suggestions and for sharing his UI benefit duration materials and to Jeffrey Smith for his suggestions and comments on an earlier draft. We thank Nate Pattison for excellent research assistance.

1 Introduction

During the Great Recession, unemployment spiked to a nearly three decade high while post-secondary participation increased substantially; between 2007 and 2009, college enrollment increased from 18.2 million students to 20.4 million students.[1] While much of the research literature has focused on the enrollment response of recent high school graduates to changes in local economic conditions, in recent years many of the new participants in postsecondary education have been somewhat older students, including a number of individuals who have been displaced from the labor market (Kane, 1994; Card and Lemieux, 2001). As a point of reference, college enrollment increased by 7.2% among those 18-23, by 13.7% among those 24-30, and by over 25% among the unemployed between 2007 and 2009 (authors' calculations from the October CPS).[2]

College may become more attractive as the the opportunity cost of enrolling goes down; whether individuals facing a weak economy are able to invest in post-secondary education depends on their capacity to finance college. On one hand, cyclical downturns may be associated with negative income shocks and tightening credit markets which would make it difficult to finance education. On the other hand, access to federal financial aid and income stabilization afforded by the Unemployment Insurance (UI) program may provide opportunities to finance higher education. During the Great Recession, both forces were clearly at play. While credit markets tightened appreciably and there were substantial income shocks, it is also the case that the generosity of federal Pell grants increased and unemployment benefits were extended well beyond the standard 26 weeks. Our analysis of the enrollment response to changing labor market conditions points to a stronger link between unemployment rates and enrollment during the 2008 recession than in prior cyclical downturns.

The substantial enrollment response among the unemployed and job losers suggests an important interaction between post-secondary policies and public programs targeted at the

[1] Digest of Education Statistics (2012), Table 198, http://nces.ed.gov/programs/digest/d12/tables/dt12$_1$98.*asp*.
[2] See Figure 1 for a graphical representation of the increase in enrollment.

unemployed. The extent to which unemployed workers are able to avail themselves of post-secondary educational opportunities is a topic that has not received much attention in economic analyses of student aid or in evaluations of social insurance programs. While there is a full literature in economics studying the effects of UI on the duration of unemployment (see, for example, Meyer, 1990 and Chetty, 2008), the literature on how UI program parameters impact post-secondary enrollment is notably sparse. In 2010, more than 13% of the unemployed aged 20-30 were enrolled in college (authors' calculations from the October CPS). In addition, other workers may enter post-secondary training programs in response to underemployment or as a pathway to labor force reentry.

Given the state-specific program parameters of UI, displaced workers differ markedly in the extent to which higher education programs are "allowed" under state UI regulations. We explore the degree to which this variation in the cost of enrollment drives observed differences in the college enrollment of displaced workers across states. Large increases in benefit duration, like those during the Great Recession, may also affect enrollment by driving down the opportunity cost of enrollment and potentially easing credit constraints.[3] Using this variation, we provide the first evidence that longer benefit durations tend to be associated with a greater propensity for enrollment.

In the next section, we consider the policy initiatives that may mediate the effect of cyclical downturns on the enrollment of displaced or older workers, specifically considering UI benefit durations and state-level variation in approved training. In the third section, we describe the individual-level microdata from the October CPS and the information on UI approved training and UI benefit durations that we link with these data. In section four, we outline our empirical strategy. The fifth section presents results, and the final section concludes.

[3]As noted in a 2010 article, an unemployed female "counted on her unemployment checks to provide a meager income, because the time she spends on her classes don't leave her time to also hold a job." The article goes on to discuss how this particular displaced worker would be forced to drop out as the government had decided not to extend unemployment compensation longer (Gautz 2010).

2 Postsecondary and Labor Market Policies Affecting Enrollment

Presentations of the demand for education often note that transitory changes in economic conditions, such as changes in the unemployment rate or the expected level of earnings, affect the collegiate investment decision by changing the opportunity cost of time spent in college.[4] During periods of high unemployment or recession, the opportunity cost of time is lower, and thus individuals are likely to consider persisting in school. For those already in the labor force, skill acquisition may continue through on-the-job training, apprenticeships, and other training programs.[5] Because cyclical downturns reduce the opportunity cost of time, it is expected that workers shift training investments to relatively slack labor market periods. Moreover, to the extent that the real wage is procyclical (Solon, Barsky and Parker 1994), recessionary conditions would be expected to put upward pressure on enrollment demand.

Yet, such predicted adjustments in enrollment may be limited if potential students are credit constrained. For recent high school graduates, we would expect declining parental resources combined with limited in–school employment prospects to curtail students' capacities to finance post-secondary education.[6] For older individuals, who are not entirely dependent on their parents for financial support, diminished employment prospects and declining value of assets like housing may also adversely impact the capacity to finance college. For displaced workers, the UI program may act as a safety net for those considering additional schooling. Additional weeks of benefits may ease liquidity constraints and allow individuals to invest in high-return degrees. This effect may be

[4] We acknowledge that many students work while in school and that this fraction has increased over time (Scott-Clayton 2012). However, this does not change the expected effect of a slack labor market unless weak labor market conditions prevent individuals from financing enrollment as discussed below.

[5] In one of the few studies focusing on the effects of local economic conditions on education choices outside of high school and college, Lynch (1992) finds some evidence that apprenticeships increase and on-the-job vocational training decreases when the local unemployment rate is high.

[6] Lovenheim (2011) shows that, particularly for relatively low-income families, changes in housing wealth have a substantial effect on enrollment. In contrast, Hilger (2012) demonstrates that parental income has a relatively small negative effect on enrollment using the timing of layoffs.

attenuated in states with more restrictive definitions of approved training.

Whether potential students have the capacity to finance college tuition and associated living expenses during a recession is an important determinant of the potential cyclicality of college enrollment. Given that many potential students are likely to have little accrued savings, the generosity and eligibility requirements of financial aid and labor market policies may have a substantial impact on enrollment decisions.

The period leading up to and during the Great Recession was marked by an increase in federal student aid and a decrease in state support for higher education (Barr and Turner, 2013).[7] The Pell grant program, the foundational means-tested grant aid program funded by the federal government to help low-income students finance undergraduate education, increased in real value (2011 dollars) from $4,675 to $4,859 between 2007-08 and 2008-09 and then increased again with the American Recovery and Reinvestment Act (ARRA) to $5,613 for 2009-10. As a point of note, the real value of the Pell grant increased during the two most recent cyclical downturns while the real value eroded during the downturns of the 1980s. This shift in the cyclicality of student aid may be one factor that accounts for the increase in enrollment during recent cyclical downturns.

2.1 Labor Market Policies Affecting Enrollment

While it is common to focus on student aid policies as a primary determinant of college enrollment, labor market policies – including UI – play a pivotal role in determining how and whether displaced workers engage in post-secondary training. There is growing evidence that displaced workers benefit from training, with high-quality collegiate-level programs often having the largest impact on future earnings (Jacobson, Lalonde and Sullivan, 2005 and 2011). Because UI program parameters are determined mainly at the state level, different states not only have different benefit levels (determining replacement

[7] Pell grant and Stafford loans levels both were increased around the onset of the recession while state appropriations to higher education were reduced dramatically. We find that a one percentage point increase in the unemployment rate leads to a three percentage point reduction in appropriations per student. Public schools appear to have made up revenue with one and two percent tuition increases at community colleges and 4-year universities, respectively, in response to a one point increase in the unemployment rate (results available from authors).

ratios and other work incentives) but also employ varying criteria for the determination of eligible training.[8] While virtually any undergraduate program would qualify in some states (e.g., Delaware or California), other states limit qualified training to a much narrower set of explicitly vocational programs (e.g., Alabama or South Carolina). Appendix Table A1 illustrates this variation in more detail, indicating which states approve academic courses not leading to a specific occupation and which approve some 4-year post-secondary programs.

Beyond variation across states in qualifying training, the expected length of UI coverage likely impacts decisions to pursue post-secondary training. With an extended UI benefit duration, an individual can plan a training investment with reduced concerns about credit constraints impeding his or her capacity to finish the program. While one would generally be concerned that the extension of benefits is correlated with other local economic conditions, there is also a substantial "haphazard" component to the roll-out of extended benefits (Rothstein 2011). Laws predating the Great Recession generally provided 26 weeks of benefits with an additional 20 weeks of Extended Benefits (EB) in high unemployment circumstances. Beginning in June 2008, a relatively ad hoc set of Congressional authorizations eventually raised statutory maximum benefit durations as high as 99 weeks for displaced workers in some states (Rothstein 2011). Emergency Unemployment Compensation (EUC), which provided these additional benefits at the federal level, added a series of benefit tiers in November 2008 and November 2009. These tiers, triggered by a state's unemployment rate rising above certain levels, resulted in additional weeks of benefits.[9] In addition, the ARRA provided funding for EB. This led to a number of states altering their participation and trigger decisions for EB. Combining EUC (up to 53 weeks) and EB (up to 20 weeks) with regular benefits (usually 26 weeks), statutory benefit durations were extended to as long as 99 weeks in a number of states.

[8] Eligible training rules determine whether a beneficiary would be allowed to enroll in college or job skills training while also receiving benefits.

[9] See Table 1 of Rothstein (2011) which demonstrates how the number of tiers and weeks available evolved over time.

This institutional information on UI program variation at the state level leads to the following predictions about enrollment behavior. A first hypothesis is that individuals in states with relatively broad classifications of "approved" post-secondary programs will demonstrate somewhat greater enrollment responses to increases in unemployment rates. Training approval effectively lowers the cost of a particular program by allowing a displaced worker to enroll without losing benefits. This allows more UI recipients to be able to identify a positive return collegiate program (relative to a non-collegiate program) and causes more job losers to pursue UI given the opportunity to acquire post-secondary training while receiving benefits. A second hypothesis is that longer durations of UI, ceteris paribus, will increase the likelihood of enrollment with stronger responses in states with more open definitions of "approved" post-secondary programs.

During the period of the Great Recession, Congress also expanded the funds available through the Workforce Investment Act (WIA) program, essentially doubling the level of federal support through the ARRA. While a portion of WIA funds are allocated to training, the traditional focus of the program was to get individuals back to work, placing more emphasis on job search assistance. Even as a somewhat increased emphasis has been placed on training in recent years, a relatively small share of WIA recipients receive training.[10] Because so few WIA recipients are in degree credit programs, we expect the true effect of WIA on college enrollment is very modest.[11]

[10] In 2010, only 290,098 of 1,985,222 (14.6%) adult or dislocated WIA recipients received training and nearly 50% of those who received training completed a License, Credential, or Certificate. As only 3.1% of adult or dislocated WIA training participants (and 0.4% of all WIA adult or dislocated enrollees) received a Pell grant, we infer that participation in degree credit enrollment is quite modest (authors calculations using information contained in the PY 2010 WIA Summary Report for Adults and the PY 2010 WIA Summary Report for Dislocated Workers).

[11] Even as we focus on degree-granting enrollment, our estimates may include the effects of changing WIA parameters to some degree due to misclassification of vocational and other short-term enrollment. Evaluating a separate WIA effect on enrollment is made difficult by the degree of program determination and differentiation that occurs at the local level and a lack of data, both of which hinder quantification and evaluation of the effects of variation in program features (Card, Kluve, and Weber, 2010 and Heinrich et al, 2009).

3 Data

To investigate the effect of labor market contractions and associated policies on enrollment, we use data from the October Education Supplement to the Current Population Survey (CPS). We combine these data with information collected on state variation in approved training as well as UI benefit duration data.

We use the October Education Supplement to the CPS as it is the only large scale micro-level dataset to pose enrollment questions to a broad range of ages on an annual basis over the time frame of our study.[12] This allows for an examination of the recent cyclical downturn and the ensuing policy responses on older non-traditional individuals.

The October CPS also contains basic labor force information including employment status, the reason an individual is unemployed, and unemployment durations. However, as noted by Rothstein (2011), the CPS does not indicate whether an individual is actually eligible for or receiving unemployment benefits. We proxy for eligibility using the self-reported reason for unemployment, classifying job losers and individuals on layoff as UI eligible, while job leavers, entrants, and re-entrants are considered non-eligible.[13] We present basic statistics for unemployed individuals in Table 2, separating the sample by enrollment status. On average, unemployed enrolled individuals are younger (21.5 vs. 23.7), more likely to be female, and less likely to be a minority. They also have generally been unemployed for fewer weeks (18.2 vs. 22.2). Among job losers, the disparity in age (23.2 and 24.9) and unemployment duration (20.2 vs. 20.7) is smaller, suggesting that much of the difference in mean age and unemployment duration between enrolled and non-enrolled individuals is driven by young "new entrants" and "re-entrants".

The nature of the employment status and unemployment duration variables leads to

[12] The ACS did not survey individuals living in group quarters (e.g., dorms) until 2006. Furthermore, we are unable to determine when in the year an individual is enrolled without access to restricted data. In other CPS months, the enrollment question is limited to those 24 and younger.

[13] As discussed later, and in Rothstein (2011), there is likely misclassification here resulting in some individuals classified as non-UI eligible being eligible and vice-versa. Furthermore, our classification will likely overstate eligibility on average as we are unable to condition on employment and earnings eligibility criteria. This should bias our estimates of the effect of changing benefit durations towards zero.

misclassification concerns. As these data are self-reported and the variable definitions are not transparent to respondents, there is likely some degree of misclassification, introducing measurement error. We view this issue as relatively minor because we are primarily interested in the effects of benefit duration on the enrollment decision rather than changes in employment status over time.[14]

We match the data with information on state-approved UI training policies derived from correspondence with state employment commissions, state websites, and a National Association of State Workforce Agencies survey (NASWA 2010). Appendix Table A1 summarizes the variation in state policies, with some states approving a wide variety of post-secondary enrollment and others prohibiting most or all enrollment at academic institutions. As illustrated in Figure 2, approval of academic courses not related to a particular occupation varies both across and within regions of the country. States which allow academic courses not leading to a specific occupation include traditionally liberal California and Massachusetts alongside conservative Texas, Georgia, and North Carolina. Similarly, unreceptive states include liberal Maryland and Washington as well as conservative-leaning Virginia, Louisiana, and Mississippi.

We also match individuals in the October CPS to two measures of benefit durations provided to UI eligible individuals: (1) the number of weeks of benefits available to them upon becoming unemployed, and (2) the number of weeks available during August of the year in which they are interviewed. We derive the number of weeks of benefits available from detailed information on Extended Unemployment Compensation (EUC) and Extended Benefit (EB) benefits at a state-week level (see Rothstein (2011) for further discussion of this process). As illustrated in Figure 3, the EUC and EB triggers resulted in meaningful levels of variation across and within states over time.

[14]One additional limitation of the CPS data is that it is not feasible to measure persistence in enrollment or post-enrollment outcomes. Because the CPS limits questions about college enrollment to those ages 24 and younger outside the month of October, we are unable to use the rotation structure to track persistence or month-to-month enrollment. Similarly, with only October to October repeated observations per individual, we are limited in our capacity to observe long-term outcomes such as employment or wages.

4 Estimation Strategy

Our analysis begins with the measurement of the college enrollment response to cyclical variation in the labor market conditions at the state level. State variation in the unemployment rate reflects the observation that cyclical contractions have, historically, varied markedly across states. Significantly, states are also the important unit of policy variation in parameters of the UI program; we focus on how variation in two parameters of the UI system affects college enrollment. First, we examine how the rules regarding UI receipt and approved training affect the college enrollment decision; individuals in states with higher-education friendly UI training rules face a substantially lower cost of enrollment. Second, we explore whether the duration of UI benefits, which potentially ease credit constraints, affects the propensity of displaced workers to enroll. We are interested in how variation in state and federal labor market policies, which effectively shifts the cost of enrollment, attenuates or intensifies the enrollment effect of labor market contractions for unemployed individuals.

4.1 Overall Enrollment and the Labor Market

Our initial empirical work addresses the overall college enrollment sensitivity to changes in local economic conditions, as measured by the state unemployment rate. Our basic specification considers:

$$E_{ist} = \beta_1 X_{ist} + \alpha_s + \lambda_t + \beta_2 UR_{st} + \epsilon_{ist} \tag{1}$$

We ask how increases in the unemployment rate impact enrollment at time t in state s, conditioning on individual covariates, state fixed effects, and year fixed effects. We estimate this basic specification with individual level data from the CPS. We also consider the extent to which cyclical effects on enrollment vary by age, focusing on the effects on

older non-traditional students.

4.2 Approved Training Policies and the Unemployment-Enrollment Link

In order to examine the effect of UI approved training policies on enrollment, we combine the basic specification above with cross-state variation in pre-existing UI training policies in an effort to more closely examine the enrollment impact for the population of displaced workers. We expect policies that reduces the cost of schooling for unemployed individuals to magnify the unemployment-enrollment link. As unemployment rose dramatically during the Great Recession, one would expect to find a stronger relationship between unemployment and enrollment in states that are more receptive of academic training for the unemployed. We examine this interaction using state approval of "academic courses not leading to a specific occupation" in the following specification:

$$E_{ist} = \beta_1 X_{ist} + \alpha_s + \lambda_t + \beta_2 UR_{st} + \beta_3 UR_{st} * A_s + \epsilon_{ist} \tag{2}$$

The coefficient of interest β_3 indicates the degree to which higher unemployment rates result in different enrollment responses in states with UI training policies that are more supportive of academic training ($A_s = 1$).[15]

Functionally, this is akin to a difference-in-differences (DD) approach. State fixed effects control for pre-existing differences in enrollment patterns. Year fixed effects control for state-invariant changes over time. We then compare how changes in unemployment rates affect enrollment propensities in states receptive to academic training with those that are not.[16] As in the standard DD approach, if there are other unobserved factors affecting

[15] As indicated in Table A1, there is a small degree of variation in A_s over time. However, we are unable to estimate effects off of this variation as only two states indicated changes in receptivity to academic training from before the Recovery Act to after.

[16] A second approach, comparing the enrollment of displaced workers in states that approved of academic training and those that do not, yields insignificant results but a positive point estimate, suggesting that college enrollment for displaced workers is higher in states that allow UI recipients to pursue academic coursework. However, this difference could be driven by constant differences across states in terms of factors that make college enrollment more or less

receptive states differently than unreceptive states (at the same time as the unemployment rate rises), we will attribute the corresponding difference in the cyclical trends of the two groups of states incorrectly to the pre-existing UI policies.[17]

4.3 Unemployment Insurance Durations and Enrollment

We next turn to a second parameter of UI, benefit durations, in our exploration of the intersection of college enrollment and active labor market policies. While not specifically intended to promote human capital investments, expansions in UI benefit durations may make schooling more appealing by both reducing the opportunity cost of enrollment and easing credit constraints. We examine how enrollment probabilities of unemployed individuals change as the duration of benefits available to those eligible for UI increases. As changes in state policies, rollout of the EUC program, and unemployment triggers generate most within-state variation in benefit durations, we argue that after appropriately controlling for local labor market conditions, the changes in benefit durations are plausibly exogenous.

Following the framework above, we consider enrollment among the unemployed as a function of benefit availability, D_{ist}:

$$E_{ijt} = \beta_1 X_{ijt} + \alpha_s + \lambda_t + P_z(UR_{st}; \delta) + \beta_2 D_{ist} + \epsilon_{itj} \tag{3}$$

We control for variation in local labor market conditions using a flexible function $P_z(UR_{st}; \delta)$ of the unemployment rate. Here, δ is a vector of coefficients on various polynomials of the unemployment rate. The coefficient on the total weeks of benefits available to an unemployed individual β_2 indicates how further weeks of benefits influence

appealing.

[17] We address this concern with a specification check using individuals unlikely to be affected by variation in UI approved training. We find no effect for this group. However, concern remains that the variable we are measuring is correlated with an overall preference for additional training during cyclical downturns; we interpret the results with this caution in mind.

an unemployed individual's propensity to enroll. We use two measures of D_{ist}: (1) the number of weeks available to an individual during the week that they became unemployed, (2) the number of weeks available to individuals during August of the year in which they were interviewed in October.

As discussed previously (and in Rothstein 2011), it is crucial to control for local labor market conditions as the level of benefits covaries with the unemployment rate. We control for these conditions using a flexible function of the state-year unemployment rate $P_z(UR_{st};\delta)$, including UR_{st} as a linear, quadratic, and cubic term in different specifications.[18] Remaining variation in D_{ist} comes from the staggered rollout of the EUC, the triggering on and off of benefit tiers, and state decisions about participation in the optional EB program.[19] For those considering enrolling in college, additional weeks of benefits are more valuable in states with more flexible approved training enrollment policies. In order to capture this, we estimate specifications after separating the sample by A_s.

There are some threats to the validity of our general strategy. First, as a weaker local labor market (higher UR_{st}) lowers the opportunity cost of enrolling, a failure to fully capture this effect might be picked up in the estimates of the impact of longer benefit durations, which are correlated with local labor market conditions.[20] In order to mitigate these concerns, we estimate a large number of specifications which flexibly control for local labor market conditions. We also conduct a specification check by examining the benefit duration response among (1) unemployed non job-losers and, (2) the full sample excluding job losers, two groups that should not be affected by benefit extensions.

An additional concern is that individuals who are enrolled in school may be more likely to report being unemployed if they are receiving UI benefits. Potential selection into reported unemployment would bias in favor of finding a positive effect of UI benefit

[18] We also consider semi-parametric approximations to $P_z(UR_{st};\delta)$.

[19] For further details on the nature of the rollouts of these program see Rothstein (2011).

[20] While decreased opportunity costs make enrolling more appealing, negative income shocks could bring credit constraints into play for many individuals, making the overall effect of local labor market conditions on enrollment ambiguous.

extensions on enrollment. We explore this concern further in the results section.

5 Empirical Results

To motivate our analysis, Figure 1 presents the trend in the national enrollment rate for the population ages 18-30 and the unemployment rate over time, with the bottom panel showing the detrended enrollment series. The vertical lines in the figure show the periods of recession, as defined by the NBER. While there is a secular trend in enrollments, it is also clear that conditional on a parametric trend, enrollment tends to move in the same direction as the unemployment rate. As illustrated in the figure, this relationship appears to grow stronger over time (the correlation between detrended enrollment and the unemployment rate is significantly higher in more recent periods). Recognizing the substantial within state variation in labor market conditions over time, we begin by measuring the post-secondary enrollment response to cyclical variation. We find that the countercyclical link between state level unemployment and enrollment is somewhat stronger during the Great Recession than in earlier periods. We then examine the potential complementarity between UI policy and post-secondary participation. We begin by examining the interaction of UI approved training receptivity and college enrollment. Our strategy relies on the assumption that in two states experiencing equivalent labor market contractions, the state that is more accepting of college enrollment for displaced workers will experience higher college enrollment. Our results suggest an important role for approved training policies in determining enrollment. We next examine the extent to which benefit durations affect an individual's propensity to enroll. Leveraging variation generated by state and federal laws, and associated UI benefit triggers, we find that increased benefit durations have a strong effect on the college enrollment of displaced workers. Furthermore, a back of the envelope calculation suggests that UI benefit extensions accounted for nearly forty percent of the countercyclical enrollment effect for 20-30 year old individuals.

5.1 Enrollment and State Labor Markets

We begin by leveraging the large variation in labor market contractions across states during the Great Recession. While the unemployment rate jumped from 6.5% to 10.1% between 2008 and 2009 in Ohio, it only rose from 3.1% to 4.1% in North Dakota. Thus, we examine the extent to which states with larger cyclical shocks experienced larger enrollment responses. We first consider enrollment behavior measured from individual micro data over more than three decades, beginning in the late 1970s.[21] We then examine the enrollment response in the years leading up to and including the Great Recession.

Table 3 presents regressions of individual enrollment status from the October CPS on covariates including age, race, and sex along with state and year fixed effects. The columns of Table 3 show different periods of observation, ranging from the long horizon of 1977 to 2011 to only recent years. The rows of the table correspond to specifications differentiated by age, with the first row showing enrollment over the broad age range from 18–30, while subsequent rows show enrollment for 18–19, 20–23, and 24–30.[22]

Starting with the long horizon in Table 3, we find that the aggregate cyclical effect is quite weak – occasionally statistically different from zero and on the order of a tenth of a percentage point per point change in the unemployment rate. Focusing on variation leading up to and during the most recent cyclical downturn (2004-2011) suggests a very different dynamic.[23] Both overall and for specific age groups, we find convincing evidence of countercyclical human capital investments. We have explored the sensitivity of our results to different periods of analysis and compared our results to those in Card and Lemieux (2001) who find only a weak countercyclical link between college enrollment and state unemployment rates for the period 1968–1996; see Appendix B for full details including estimates that employ a specification nearly identical to that used by Card and Lemieux.

[21] We begin our analysis in 1977 when the CPS began identifying all 50 states and the District of Columbia.

[22] The youngest age category (18–19) approximates first-time college students (Card and Lemieux 2001). We separate the 20–23 and 24–30 individuals based on the age rules for financial aid status. Individuals turning 24 before January 1 of the year they apply for aid are considered "independent" students.

[23] See Appendix Figure A1 for a presentation of the estimated cyclicality of enrollment over time using rolling nine-year windows.

Notably, while there is a substantial effect of rising unemployment on enrollment for the 18-19 age group (a 5 percentage point rise is predicted to increase the enrollment rate by about 9.5% or 4.7 percentage points), the proportional effects are much larger for older students; for those ages 20-23 and 24-30, a 5 percentage point increase in the state unemployment rate is associated with a 13% percent (4.6 percentage point) and a 21% (1.6 percentage point) increase in enrollment, respectively. As the average individual in these groups has substantial work experience, variation in labor market policies, and particularly UI policies, may play a substantial role in mediating the enrollment-unemployment link.

5.2 Approved Training Policies and the Unemployment-Enrollment Link

Marked differences across states in the regulations that determine whether college-level courses are "approved training" should impact within-state cyclicality in enrollment. States that approve post-secondary training for the unemployed impose a lower cost of enrollment on individuals, who are able to maintain UI benefits, relative to states that do not approve similar training.

We find that changes in state labor market conditions have a strong effect on enrollment in states that are receptive to academic training.[24] The estimates indicate that the enrollment effect in states that approve academic courses not directly related to training is more than twice as large as that in states that do not (Table 4). In these pro post-secondary training states, an increase in the unemployment rate of one point is associated with a third to a half percentage point increase in enrollment, more than twice the effect in less training-friendly states over the recent period.[25] This effect is strongest for older individuals (24-30), who are more likely to be eligible for UI benefits.[26]

Concern remains, however, that states that approve academic training for individuals on UI are systematically different from states that do not in such a way that cyclical

[24] We exclude individuals aged 18-19 as they are unlikely to have been employed long enough to receive UI benefits.

[25] Our classification of state policies is derived from correspondence with state workforce agencies and a 2009 survey of state workforce agencies. Agencies were asked about pre-ARRA and post-ARRA policies; our estimates assume that a state's pre-ARRA classification was unchanged over the recent period (NASWA 2010).

[26] The estimated effect is robust to altering the start year in either direction.

shocks in the states that approve academic training result in larger enrollment impacts separate of this policy difference.[27] As a falsification exercise, we explore the enrollment response of individuals aged 18 and 19 in Table 4B. These individuals are likely to be affected by other state policies or differences that drive an enrollment-unemployment rate link, but unlikely to be affected by variation in UI approved training rules. We generally see the same one percentage point effect of the unemployment rate (as in Table 3), but there is no difference in the effect in examining states that approve academic coursework for those on UI, with extremely small and sometimes negative point estimates.

5.3 Unemployment Insurance and Enrollment

Increases in UI benefit durations have the potential to ease credit constraints and allow individuals to take advantage of opportunities to retool. We consider two specifications of benefit durations; in the first approach we measure the benefit at the time an individual becomes unemployed. Because our data measure enrollment during the fall, we also estimate specifications using the level of benefits available during the summer prior to an individual's October interview.[28]

Panel A of Table 5 contains estimates of the effect of the benefit duration available in August on whether or not an individual is enrolled in October. Here, the sample is restricted to job losers, the portion of the unemployed more likely to be eligible for UI benefits. The estimate in column 1 indicates that an increase in the duration of UI benefits by ten weeks increases the probability of enrollment by a little over 2 percentage points – over 20 percent. Adding quadratic and cubic controls for the unemployment rate in columns 2 and 3 does little to effect the point estimate, perhaps increasing it slightly. The estimates are similarly robust to the inclusion of the UI replacement rate, individual covariates, controls for unemployment duration, and state-specific linear trends.

[27] For example, such a threat would exist if tuition policy changes were systematically different in states that approved academic training.

[28] Specifically we present estimates using the benefit levels available during August of the summer prior to the individual's October interview. This has the added benefit of allowing us to conduct falsification checks on groups of individuals whose unemployment start date is endogenous or unknown.

Panel B presents equivalent estimates from our preferred specification, using the benefit duration available to individuals at the point when they became unemployed. We combine employment status and unemployment duration information to generate the week in which an individual became unemployed; we then link these data with the number of weeks available and labor market conditions at that point. Estimates are similar to, but somewhat smaller than, those presented in Panel A, with a ten-week benefit extension increasing the probability of enrollment by just over a percentage point.[29]

5.3.1 Robustness Checks and Addressing Concerns

As additional robustness checks, we present estimates using the insured unemployment rate and transformations of overall state employment as alternate controls for labor market conditions (Table 5B). The results remain stable across all of these specifications. In Table 6, we present similar estimates for groups that should not be affected by benefit extensions. In the top panel, we present results for non job losers, including job leavers, entrants, and reentrants. These unemployed individuals are substantially less likely to be eligible for UI benefits and thus should be minimally affected by benefit extensions. Our results are consistent with this expectation with all point estimates small and insignificant. In the bottom panel, we present similar estimates for all individuals in the sample, excluding job losers. We again find no effect across all specifications.[30]

A potential threat to the validity of our results concerns the degree to which individuals who are enrolled are more likely to indicate that they are unemployed if they are receiving UI benefits. If this selection effect is significant, it would bias the estimates in the direction we observe. We take two approaches to address this concern. First, we present results that interact UI benefit durations with an indicator variable for whether an

[29] Both sets of results are robust to varying the sample start or end date by a year.

[30] We do not present analogous results for Panel B of Table 5 as individuals that are not unemployed do not have an unemployment duration. Similarly, for unemployed non job losers, the start of an unemployment spell for the sample of job leavers, entrants, and reentrants is endogenous; however, we have run this specification and the estimates are negative in sign. One potential explanation for this result is that the increased college-going of displaced workers has decreased labor supply, making college enrollment relatively less appealing.

individual has been unemployed for longer than 26 weeks. As all states provided at least 26 weeks of benefits during this time period, there should be no selection effect for individuals unemployed fewer than 26 weeks. If selection is driving the results in Table 5, we would expect to see the main effect disappear and be picked up by the interaction term. Results in Appendix Table A3 suggest that this is not the case.

Our second approach to estimating the degree to which this selection is operating is to examine the distribution of unemployment durations for individuals enrolled in college. If enrolled individuals are likely to change their unemployment status based on benefit receipt, we should see a cliff in the distribution around benefit exhaustion. Figure A2 presents these distributions and demonstrates that there is no evidence of a discontinuity at the point of benefit exhaustion. More formally, we implement the McCrary Density test, finding no significant differences in the density of unemployment durations around the point of likely benefit exhaustion (McCrary 2008). These results suggest that selection of enrolled individuals into reported unemployment is not driving the results.

5.3.2 Interaction of Approved Training Policies and UI Benefit Durations

Finally, we estimate our UI duration effect separately for states that do or do not approve academic coursework unrelated to an eventual occupation for individuals receiving UI (Table 7). Panel A again shows results using weeks of unemployment benefits from August and Panel B shows results using weeks of unemployment benefits at the beginning of the unemployment spell. Although not statistically distinguishable in Panel A, as expected, the effect of additional weeks of UI benefits is larger in states that are more supportive of academic training. The results from our preferred specification, in Panel B, suggest that the effect is much stronger in states that approve academic coursework.[31]

Combined, these results support the argument that UI benefits may play an important role for displaced workers in reducing the cost of investing in additional human capital. While we are unable to distinguish this effect empirically, it is likely that a portion of the

[31] These results are generally robust to the specifications used in Table 5.

enrollment effect is driven by an easing of credit constraints that would otherwise make enrollment infeasible.

A lingering question concerns the degree to which UI benefit extensions contributed to the observed cyclicality of enrollment. We combine estimates of the change in benefit duration as a result of a one point increase in the unemployment rate with the fraction of unemployed individuals that are displaced and the effect size from Table 5 to provide an estimate.[32] This simple calculation suggests that nearly forty percent of the observed cyclical effect for 20-30 year olds is accounted for by UI benefit extensions.[33]

6 Conclusion

Our analysis of the college enrollment response during the Great Recession and the years leading up to it shows an unambiguous and substantial link between adverse local economic conditions, as measured by the state unemployment rate, and college enrollment. These effects are particularly strong for individuals somewhat older than the traditional college student. We explore the degree to which labor market policies contribute to and interact with this effect.

Focusing on post-secondary access for displaced workers, we find that policy differences among states in the extent to which college course work is a recognized form of training have a substantial effect on enrollment responses to cyclical downturns. Because such differences are broadly "fixed" over time, we are not able to fully distinguish the effects of the policy per se. Rather, we examine how this policy variation magnifies the enrollment effect of labor market contractions. We find that the states with policies favoring post-secondary access for displaced workers unambiguously experienced larger enrollment

[32] We use our preferred estimate from Panel B of Table 5 (.012/10) multiplied by the effect of an unemployment rate change on benefits (4.0) multiplied by the fraction of unemployed individuals that are displaced (0.4) to generate an estimate of the portion of the effect driven by benefit extensions (.0019). Dividing this by the specification (1) estimate for 20–30 year olds (.005) generates our estimate of 37 percent.

[33] While not the focus of this paper, it is interesting to note that the increasing cyclicality observed in Figure A1 coincides with increases in maximum benefit durations in the early 2000s and, to a greater extent, during the Great Recession.

responses to the recent downturn. Furthermore, this differential response is not observed among younger individuals who are unlikely to be affected by this policy variation.

Turning to another parameter of the UI system, we find that UI benefit durations play a similar role in affecting the cost of enrollment. The duration of unemployment benefits available has a substantial impact on enrollment propensities, with an additional 10 weeks of benefits increasing enrollment likelihoods by just over 1 percentage point, implying a relative adjustment of just under 15%. Our results suggest that "active labor market policies," including UI and job training programs, are potentially quite intertwined with post-secondary policies. Whether the demonstrated responsiveness of enrollment to benefit generosity complements the objective of helping workers invest in skills that improve long-term labor market outcomes is an important question for future work.

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7 Appendix A: Data and Methods

A. October CPS

We use the October CPS (Education Supplement) from 1977 through 2011. We restrict the sample to individuals age 18 to 30 and focus on college enrollment unless otherwise noted. We do not condition on high school graduation which is likely also affected by changing labor market conditions.

B. Unemployment Classifications and Benefit Duration Assignment

We classify unemployed individuals as job losers based on their reason for unemployment. Individuals who lost their job or are on layoff are considered job losers, while job leavers, new-entrants, and re-entrants are classified as non-job losers. We assign expected UI benefit durations D_{isym} for an individual i displaced in state s in year y and month m using two assignment rules:

1. We use the number of months available to an individual in state s in August of the year y in which an individual is interviewed in October: $D_{isym} = D_{isy\mathbf{Aug}}$

2. We use the number of months available to an individual in state s in month m of the year y in which an individual became unemployed. We calculate this month and year using the survey response information on unemployment duration.

We use three measures of state labor market conditions: the BLS unemployment rate, the insured unemployment rate, and CES employment figures. For specification (1) we use the measure of labor market conditions in August of the year y in which an individual is interviewed in October. For specification (2) we use the measure of labor market conditions in the month and year in which an individual became unemployed.

C. Data for Appendix B: Specification Check

In Appendix B, we present the results from a specification check using the methodology in Card and Lemieux (2001). For this specification, we obtained tuition data on comprehensive colleges and universities from the Washington State Higher Education

Coordinating Board.[34] We also produced cohort size estimates using data from the 1960, 1970, 1980, 1990, and 2000 censuses as well as the 2010 ACS. We follow Card and Lemieux's methodology to create smoothed estimates of cohort size by year of birth and state of birth. Specifically, we regress the log of the observed number of individuals for each state and year of birth on a cubic in age and cohort by year of birth fixed effects and then use these estimates to create smoothed cohort sizes by year and state of birth.

8 Appendix B: Specification Check

Using micro data from the Census and CPS files, prior empirical analyses of the educational investments of youth show a large effect of the unemployment rate on high school graduation, a modest effect on college enrollment, and no effect on college degree attainment (Kane, 1994; Card and Lemieux, 2001).[35] These analyses typically take advantage of within-state variation over time in the unemployment rate, as well as other measures such as state tuition and cohort size.

Yet, those most likely to seek postsecondary training in response to cyclical shocks may be outside the set defined as traditional college students. Thus, it is not surprising that analyses that include somewhat older students find a larger countercyclical link with college enrollment. Furthermore, college enrollment of older students has increased in quantitative significance over the last four decades. While during the early 1970s the vast majority of students enrolled in college as undergraduates were between the ages of 18 and 23 (in 1970, 74% of enrolled students were between the ages of 18 and 21), recent data show that only about 54% of undergraduate students are of traditional college age.[36] To this end, focusing on recent high school graduates may miss part of the enrollment response to cyclical shocks.

[34]This information is available for all but four states. Following Card and Lemieux, for the remaining four states (Alaska, Hawaii, Delaware, and Wyoming), we substitute the tuition data for universities.

[35]Using data from the UK, Clark (2011) finds that with measures of the youth labor market as the key explanatory variables, local labor market conditions have a substantial impact on the post-compulsory enrollment decisions of girls and boys.

[36]Source: U.S. Census Bureau, Current Population Survey. Table A-7. College Enrollment of Students 14 Years Old and Over, by Type of College, Attendance Status, Age, and Gender: October 1970 to 2010, http://www.census.gov/hhes/school/data/cps/historical/index.html.

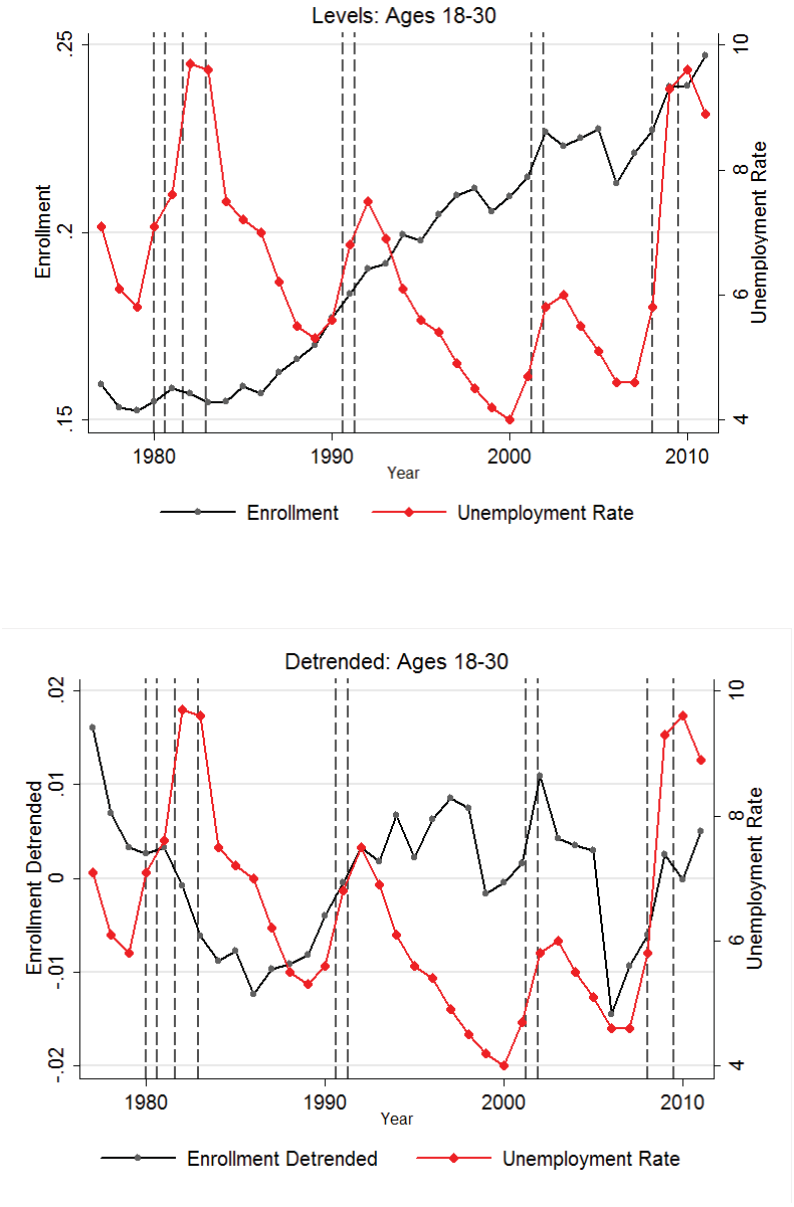
While not the focus of this paper, we do present a brief set of results analogous to those produced for a much earlier period in Card and Lemieux (2001), who find only a weak countercyclical link between college enrollment and state unemployment rates for the period 1968–1996.[37] Card and Lemieux regress state-by-year enrollment shares on the unemployment rate, the log of cohort size, the log of tuition, share female, share non-white, and state and year fixed-effects.

In Table A2, we present results comparable to those in Table 3, but using a nearly identical specification to that employed by Card and Lemieux.[38] The results are similar to those in Table 3 with a slightly stronger countercyclical enrollment effect over the period from 1977-2011. We have also produced estimates analogous to those used to produce Figure A1 and find that they are qualitatively similar (results available from authors upon request).

[37] We were unable to obtain Card and Lemieux's code, but were able to closely replicate their results.

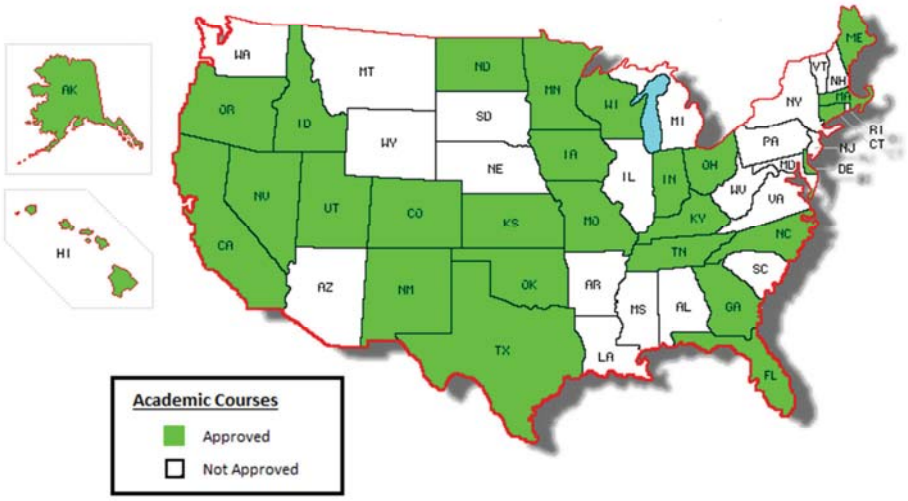
[38] We use the BLS unemployment rates in place of the March/October CPS generated unemployment rate averages used by Card and Lemieux.

Figure 1: College Enrollment Rate by Year



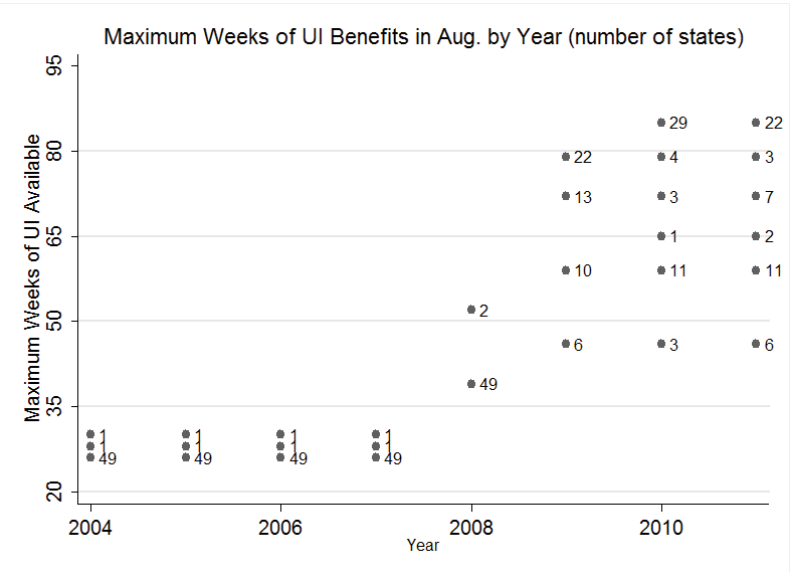
Note: Fraction enrolled calculated as the (weighted) proportion of individuals 18-30 enrolled during October of each year using the October CPS. All detrended enrollment series depict residuals from a specification using a linear trend (results are similar using a quadratic or cubic specification).

Figure 2: State Approved Training for UI recipients



Note: Indicates state response to the question "Academic courses not leading to a specific occupation allowed as approved training?" Data obtained from correspondence with state employment commissions, state websites, and a National Association of State Workforce Agencies survey (NASWA 2010).

Figure 3: Variation in Maximum UI Benefit Duration (Aug.)



Note: The figure presents the distribution of states by maximum weeks of UI benefits available in August of each year, by year (see Appendix A and Rothstein (2011) for additional information).

Table 1

College Enrollment by Age and Unemployment Status: 2004-2011

	All		Age(18-19)		Age(20-23)		Age(24-30)	
Year	All	Unemp.	All	Unemp.	All	Unemp.	All	Unemp.
2004	22.5%	16.9%	47.7%	27.6%	34.6%	21.5%	8.3%	7.1%
2005	22.8%	16.1%	49.3%	25.9%	35.9%	18.5%	7.8%	9.5%
2006	21.3%	13.1%	46.3%	20.4%	34.4%	16.2%	7.4%	7.2%
2007	22.1%	12.9%	48.7%	22.6%	34.1%	16.3%	8.1%	5.8%
2008	**22.7%**	**13.8%**	**48.3%**	**26.5%**	**35.6%**	**17.3%**	**8.5%**	**5.7%**
2009	23.9%	16.4%	49.8%	30.3%	37.5%	19.5%	9.3%	8.8%
2010	23.9%	17.5%	50.8%	33.4%	37.1%	21.8%	9.3%	8.7%
2011	24.7%	16.8%	50.0%	31.3%	38.6%	20.1%	9.7%	9.4%
N	177,313	12,253	27,533	2,573	53,186	4,165	96,594	5,515

Note: Bolded row indicates first sample interviewed after the official start of the Great Recession. All includes individuals aged 18-30. Averages calculated using October CPS weights.

Table 2

Average Characteristics of Unemployed by Enrollment Status: 2004-2011

	All		Job Losers		Non-Job Losers	
Characteristic	Enrolled	Not Enrolled	Enrolled	Not Enrolled	Enrolled	Not Enrolled
Age	21.50	23.72	23.18	24.85	21.10	22.91
Male	0.49	0.58	0.47	0.65	0.49	0.51
Black	0.20	0.25	0.21	0.23	0.20	0.26
Hispanic	0.15	0.21	0.13	0.22	0.15	0.20
Unemp. Duration	18.23	22.20	20.21	20.72	18.33	23.75

Note: Unemployment duration is measured in weeks. Includes 12,253 unemployed individuals aged 18-30 from October CPS years 2004-2011. Averages calculated using CPS weights. Job Losers defined as those who lost their job or were laid off. Non-Job Losers defined as those who are job leavers, re-entrants, or new entrants.

Table 3

Estimates of Effect of Unemployment Rate on College Enrollment

Sample	Mean (DV)	1977-2011	1977-2011	2004-2011
All				
UNEMP. RATE (UR)	0.14	0.0004	0.0013**	0.0062***
		(0.0007)	(0.0006)	(0.0014)
Ages: 18-19				
UNEMP. RATE (UR)	0.49	-0.0013	-0.0004	0.0094**
		(0.0017)	(0.0016)	(0.0039)
Ages: 20-23				
UNEMP. RATE (UR)	0.36	0.00054	0.0023**	0.0093**
		(0.0012)	(0.0011)	(0.0037)
Ages: 24-30				
UNEMP. RATE (UR)	0.09	0.0006	0.0011**	0.0033***
		(0.0005)	(0.0006)	(0.0012)
State Trends		No	Yes	No

Note: All specifications include year and state fixed effects as well as indicator variables for sex, race, and age. All ages includes individuals aged 18-30. Means presented for 2004-2011. Corresponding means for 1977-2011 are .12, .43, .30, and .07 respectively. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table 4

Unemployment Rate and Enrollment by State Policy: 2004-2011

Variable	All	Ages: 20-23	Ages: 24-30
UNEMP. RATE (UR)	0.0020	0.0085	0.0001
	(0.0028)	(0.0057)	(0.0016)
*UR*ACADEMICS APP*	0.0034*	0.0002	0.0033***
	(0.0019)	(0.0038)	(0.0012)
N	149,780	53,186	96,594

Note: "Academics App" is a binary variable indicating whether "academic courses not leading to a specific occupation [are] allowed as approved training." All specifications include year and state fixed effects as well as indicator variables for sex, race, and age. All includes individuals aged 20-30 in the October CPS. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table 4B

Unemployment Rate and Enrollment by State Policy: 2004-2011

Variable	Ages: 18-19
UNEMP. RATE (UR)	0.0132**
	(0.0059)
*UR*ACADEMICS APP*	-0.0023
	(0.0046)
N	27,533

Note: "Academics App" is a binary variable indicating whether "academic courses not leading to a specific occupation [are] allowed as approved training." All specifications include year and state fixed effects as well as indicator variables for sex, race, and age. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table 5

Impact of Weeks of UI Benefits on Enrollment of Job Losers: 2004-2011

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Benefits Weeks / 10	0.0254***	0.0233**	0.0271***	0.0237**	0.0235***	0.0246*	0.0205**	0.0278***
	(0.0091)	(0.0091)	(0.0095)	(0.0090)	(0.0086)	(0.0129)	(0.0087)	(0.0098)
Panel B								
Benefits Weeks / 10	0.0116**	0.0125**	0.0126**	0.0129**	0.0150***	0.0115	0.0176**	0.0163***
	(0.0051)	(0.0052)	(0.0053)	(0.0051)	(0.0051)	(0.0074)	(0.0074)	(0.0058)
Unemployment Rate	Linear	Quad	Cubic	Quad	Quad	Quad	Quad	Linear
UI Replacement Rate				Y				
Individual Covariates					Y	Y	Y	Y
State by Year Trends						Y		
Unemp. Duration							Y	
Semiparametric UR Control								Y

Note: Panel A uses the weeks of benefits available to an individual in August of the year in which they are interviewed in October. Panel B uses the number of weeks of benefits available at the point they became unemployed. All specifications include year and state fixed effects. Individual covariates include age, sex, and race indicator variables, and following Rothstein (2011), unemployment duration controls include a quadratic in unemployment duration, the log of unemployment duration, and an indicator variable for individuals unemployed for a week or less. The semiparametric UR control includes indicator variables for each point of the rounded unemployment rate. Sample restricted to displaced unemployed individuals aged 20-30 from October CPS (2004-2010). Sample sizes are 3,421 and 3,385 for Panels A and B respectively. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table 5B

Impact of Weeks of UI Benefits on Enrollment of Job Losers: 2004-2011

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Benefits Weeks / 10	0.0208**	0.0218***	0.0195**	0.0208**	0.0184**	0.0207**
	(0.0082)	(0.0080)	(0.0081)	(0.0085)	(0.0078)	(0.0086)
Panel B						
Benefits Weeks / 10	0.0090**	0.0090**	0.0085*	0.0092**	0.0081*	0.0092**
	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0044)
Insured Unem. Rate	Linear	Quad	Cubic	Y		
Individual Covariates	Y	Y	Y	Y	Y	Y
Semiparametric IUR Control				Y		
Log Employment					Y	
Log Δ Employment						Y

Note: Panel A uses the weeks of benefits available to an individual in August of the year in which they are interviewed in October. Panel B uses the number of weeks of benefits available at the point they became unemployed. All specifications include year and state fixed effects. Individual covariates include age, sex, and race indicator variables. The semiparametric IUR control includes indicator variables for each point of the rounded insured unemployment rate. Sample restricted to displaced unemployed individuals aged 20-30 from October CPS (2004-2010). Sample sizes are 3,421 and 3,385 for Panels A and B respectively. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table 6

Impact of Weeks of UI Benefits on Enrollment of Unaffected Groups: 2004-2011

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Non Job Loser Unemp.							
Benefits Weeks / 10	-0.0018	0.0049	0.0094	0.005	0.0022	0.015	0.0037
	(0.0109)	(0.0119)	(0.0123)	(0.0120)	(0.0111)	(0.0139)	(0.0103)
All But Job Losers							
Benefits Weeks / 10	-0.0029	-0.0026	-0.0006	-0.0026	-0.0023	-0.0013	-0.0017
	(0.0027)	(0.0030)	(0.0031)	(0.0029)	(0.0027)	(0.0033)	(0.0026)
Unemployment Rate	Linear	Quad	Cubic	Quad	Quad	Quad	Linear
UI Replacement Rate				Y			
Individual Covariates					Y	Y	Y
State by Year Trends						Y	
Semiparametric UR Control							Y

Note: Both panels use the weeks of benefits available to an individual in August of the year in which they are interviewed in October. The top panel focuses on unemployed individuals that are not job losers (ie, job leavers, entrants, and new entrants) and has a sample size of 5,247. The bottom panel contains all individuals, excluding job losers, and has a sample size of 159,705. All specifications include year and state fixed effects. Individual covariates include age, sex, and race indicator variables, and following Rothstein (2011), unemployment duration controls include a quadratic in unemployment duration, the log of unemployment duration, and an indicator variable for individuals unemployed for a week or less. The semiparametric UR control includes indicator variables for each point of the rounded unemployment rate. Sample restricted to individuals aged 20-30 from the October CPS. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

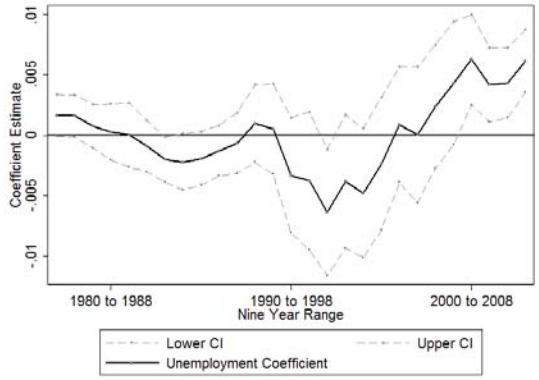
Table 7

Impact of Weeks of UI Benefits on Enrollment of Job Losers: 2004-2011
By State UI Academic Coursework Approval

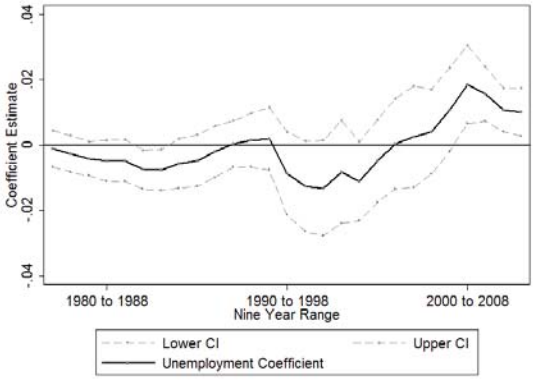
	APPROVED	NOT APPROVED
Panel A		
Benefits Weeks / 10	0.0282*	0.0199
	(0.0160)	(0.0126)
N	2,228	1,193
Panel B		
Benefits Weeks / 10	0.0150**	0.0093
	(0.0060)	(0.0107)
N	2,208	1,177

Note: "Approved" or "Not Approved" indicates whether "academic courses not leading to a specific occupation [are] allowed as approved training."Panel A uses the weeks of benefits available to an individual in August of the year in which they are interviewed in October. Panel B uses the number of weeks of benefits available at the point they became unemployed. All specifications include year and state fixed effects; age, race, and sex indicators; and the unemployment rate and its square. Sample restricted to displaced unemployed individuals aged 20-30 from October CPS (2004-2010). Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

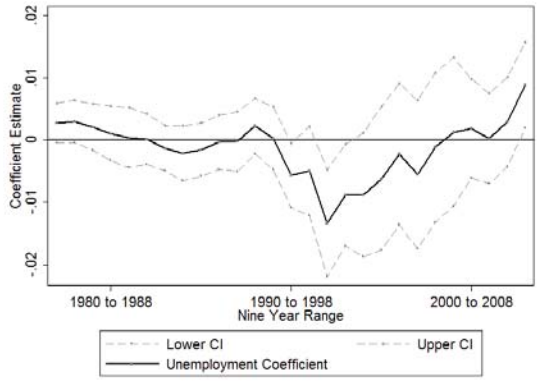
Figure A1: Effect of Unemployment Rate on College Enrollment Over Time



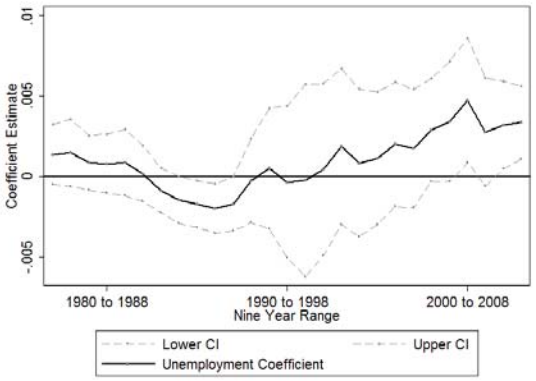
Panel A: Ages 18 to 30



Panel B: Ages 18 to 19



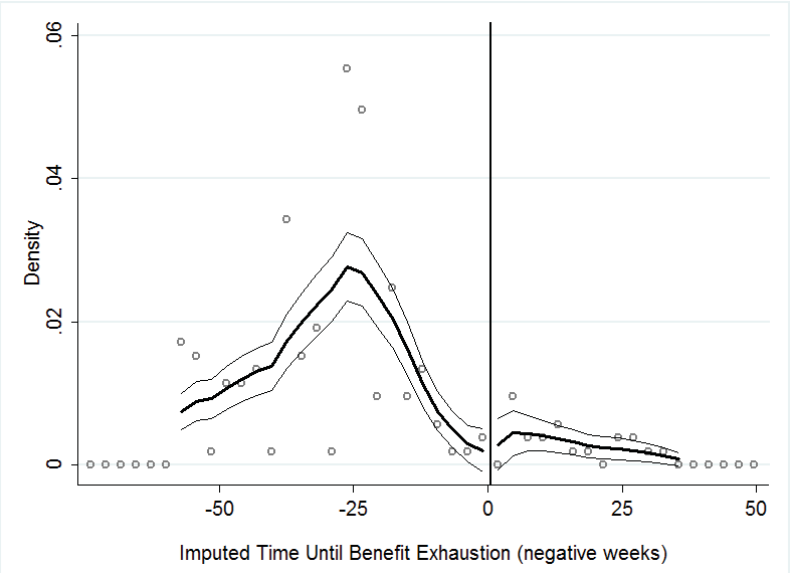
Panel C: Ages 20 to 23



Panel D: Ages 24 to 30

Note: Each data point in each figure represents the coefficient on the unemployment rate from specification (1) using a particular nine year sample window. All specifications include year and state fixed effects as well as indicator variables for sex, race, and age.

Figure A2: Distribution of Imputed Time Until Benefit Exhaustion



Panel A: Job Losers Enrolled in College

Note: The figure presents the density of the negative of imputed time until benefit exhaustion in weeks (calculated as weeks of benefits available at the beginning of unemployment minus an individual's unemployment duration). Distributions are restricted to 60 weeks on either side of benefit exhaustion. Dark solid lines are fitted using local linear regression (95% confidence intervals are in grey) on each side of benefit exhaustion. The discontinuity estimate (log difference) is .154 (se 1.340).

Table A1

Variation in State Policies

State	Academic Courses Approved?	Some Four-Year Post-Secondary Programs Approved?	More Generous after Recovery Act?
Alabama	No	No	No
Alaska	Yes	Yes	No
Arizona	No	No	No
Arkansas	No	No	No
California	Yes	Yes	Yes
Colorado	Yes	Yes	No
Connecticut	Yes	Yes	No
Delaware	Yes	No	No
DC	Yes	Yes	Yes
Florida	Yes	Yes	No
Georgia	Yes	Yes	No
Hawaii	Yes	Yes	No
Idaho	Yes	Yes	Yes
Illinois	No	No	No
Indiana	Yes	Yes	No
Iowa	Yes	Yes	No
Kansas	Yes	No	No
Kentucky	Yes	Yes	Yes
Louisiana	No	No	No
Maine	Yes	Yes	Yes
Maryland	No	No	No
Massachusetts	Yes	Yes	Yes
Michigan	No[1]	No[2]	Yes
Minnesota	Yes	No	No
Mississippi	No	No	No
Missouri	Yes	Yes	Yes
Montana	No	Yes	Yes
Nebraska	No	No	No
Nevada	Yes	No	No
New Hampshire	No	No	No
New Jersey	No	?[3]	?[3]
New Mexico	Yes	Yes	No
New York	No	Yes	No
North Carolina	Yes	No	No
North Dakota	Yes	No	No
Ohio	Yes	Yes	Yes

Oklahoma	Yes	Yes	Yes
Oregon	Yes	Yes	Yes
Pennsylvania	No	?[3]	Yes
Rhode Island	No[1]	No[2]	Yes
South Carolina	No	No	No
South Dakota	No	Yes	No
Tennessee	Yes	Yes	No
Texas	Yes	Yes	Yes
Utah	Yes	No[2]	Yes
Vermont	No	No[2]	Yes
Virginia	No	No	No
Washington	No	No	Yes
West Virginia	No	Yes	Yes
Wisconsin	Yes	No	Yes
Wyoming	No	Yes	No

[1] Policy changed to allow "some" academic training following ARRA.

[2] Policy changed to allow some four-year programs following ARRA.

[3] Answer missing from NASWA survey or not conclusive from correspondence.

Note: "Academic Courses Approved?" indicates whether "academic courses not leading to a specific occupation [are] allowed as approved training." Information for all states other than Hawaii and New Jersey obtained from the National Assocation of State Workforce Agencies "Survey on Pell Grants and Approved Training for UI" (NASWA 2010). Policies in place before and after the American Reinvestment and Recovery Act unless otherwise noted. Information for Hawaii and New Jersey (and partial information for Pennsylvania) obtained via state employment commission websites and correspondence with employment commissions.

Table A2

Estimates of Effect of Unemployment Rate on College Enrollment
Card and Lemieux (2001) Specification

Sample	1977-2011	1977-2011	2004-2011
All			
UNEMP. RATE (UR)	0.0020***	0.0019**	0.0064***
	(0.0007)	(0.0008)	(0.0022)
Ages: 18-19			
UNEMP. RATE (UR)	0.0003	0.0009	0.0083*
	(0.0015)	(0.0016)	(0.0050)
Ages: 20-23			
UNEMP. RATE (UR)	0.0021**	0.0025**	0.0103***
	(0.0010)	(0.0011)	(0.0037)
Ages: 24-30			
UNEMP. RATE (UR)	0.0017***	0.0020***	0.0042**
	(0.0005)	(0.0005)	(0.0017)
State Trends	No	Yes	No

Note: All specifications include year and state fixed effects as well as controls for the fraction of nonwhites, the fraction of males, and the average age of the group. Models are fitted by weighted OLS, using the number of observations in the state-year cell as a weight. Cohort size is estimated number of people born in the state in the indicated age group, based on data from the 1960, 1970, 1980, 1990, and 2000 censuses as well as the 2010 ACS. Tuition is the average amount of tuition and fees for comprehensive state colleges and universities (see Appendix A for additional information). All ages includes individuals age 18-30. Standard errors are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

Table A3

Impact of Weeks of UI Benefits on Enrollment of Job Losers: 2004-2011
Specification Check for Selection Effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Benefits Weeks / 10	0.0239**	0.0220**	0.0257**	0.0222**	0.0216**	0.0227*	0.0192**	0.0261**
	(0.0093)	(0.0093)	(0.0097)	(0.0092)	(0.0088)	(0.0132)	(0.0089)	(0.0102)
*(Duration > 26)*BW / 10*	0.0039	0.0038	0.0038	0.0041	0.0049	0.0059	0.0035	0.0046
	(0.0042)	(0.0042)	(0.0042)	(0.0043)	(0.0042)	(0.0042)	(0.0042)	(0.0042)
Panel B								
Benefits Weeks / 10	0.0170***	0.0180***	0.0185***	0.0180***	0.0186***	0.0144	0.0187**	0.0209**
	(0.0061)	(0.0064)	(0.0065)	(0.0064)	(0.0067)	(0.0098)	(0.0076)	(0.0078)
*(Duration > 26)*BW / 10*	-0.0007	-0.0014	-0.0014	-0.001	-0.0008	0.0004	-0.0016	-0.0012
	(0.0034)	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0034)	(0.0036)	(0.0037)
Unemployment Rate	Linear	Quad	Cubic	Quad	Quad	Quad	Quad	Linear
UI Replacement Rate				Y				
Individual Covariates					Y	Y	Y	Y
State by Year Trends						Y		
Unemp. Duration							Y	
Semiparametric UR Control								Y

Note: Panel A uses the weeks of benefits available to an individual in August of the year in which they are interviewed in October. Panel B uses the number of weeks of benefits available at the point they became unemployed. All specifications include year and state fixed effects. Individual covariates include age, sex, and race indicator variables and, following Rothstein (2011), unemployment duration controls include a quadratic in unemployment duration, the log of unemployment duration, and an indicator variable for individuals unemployed for a week or less. The semiparametric UR control includes indicator variables for each point of the rounded unemployment rate. Sample restricted to displaced unemployed individuals aged 20-30 from October CPS (2004-2010). Sample sizes are 3,421 and 3,385 for Panels A and B respectively. Robust standard errors clustered at the state level are in parentheses. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.