Early Economic Distress and its Effect on Workers' Occupational Characteristics & Human Capital Accumulation [†]

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Abstract

I explore how becoming of age during times of high unemployment rates affects the types of occupations that young adults are employed in during the first decade of their adulthood years. I find that higher unemployment rates faced at age 18 influence young adults to be employed in less productive occupations during early adulthood. Conditions do not affect being employed in a higher or lower paying occupation. In the early ages into adulthood, conditions increase the likelihood of being employed in abstract oriented occupations while decreasing the likelihood of employment in routine or manual oriented occupations. Early conditions have heterogeneous effects on the occupation specific injury rate. At ages 19 through 22 conditions influence young adults to be employed in occupations that are less risky – those that have reductions in reported injury rates. But at later ages conditions influence young adults to be employed in riskier occupations. I end my analysis by exploring if facing a unique recession at different points during the first decade of adulthood differentially impacted the individual specific earnings outcome. I found that for college educated Great Recession cohorts that it was more advantageous for them to face the recession at the time of college graduation rather than at the age of 18. In part what may have attributed to this advantage was that real hourly wages increased during the Great Recession contributing to higher growth in wages for workers who were older during the Great Recessions.

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1 Introduction

Recessions have been widely regarded as the culprit for delays in the career advancement of cohorts who graduate college during them, but less known is if these results generalize for individuals who become of age during them. Furthermore, the consequences that economic conditions have on the quality of jobs that individuals have access to while on the job search process has been understudied. In this paper I explore how becoming of age during times of high unemployment rates impacts the occupation quality of employed young adults. I draw upon the labor market scarring effect literature to inform the econometric approaches that I employ for my main analysis.

I estimate, using OLS regression models, the effect of the early-adulthood unemployment rate on occupation quality measures. I assign the treatment of the early-adulthood unemployment rate to the young adults in my sample at the cohort level and follow the cohorts forward through repeated cross sections. I study individuals between the ages of 19 to 30 who are observed between the years 2000 to 2022 in the American Community Surveys (ACS). I study effects on various occupation quality measures.

First, I study how unemployment rates at the start of adulthood affect working in a low or high paying occupation. Second, I explore how conditions affect working in a more or less productive occupation. Third, I explore effects on the injury rates for the occupations that young adults are employed in. Fourth, I explore how unemployment rates experienced at the age of 18 affect the type of tasks that young adults are required to predominantly carry out in their respective occupation.

Additionally, I explore if high early economic conditions affect the choice of one's college major and/or the choice of obtaining an occupational license. These are important human capital accumulation outcomes that had been previously overlooked in the scarring effect literature. If recessions affect the choice of one's college major or the decision to obtain an occupational license this may lead to different results on the job quality outcomes for college graduates who faced recessions at the start of adulthood compared to young adults who

experienced a recession at the time of their college graduation.

The differences in occupation quality outcomes among college graduates may arise because individuals on the job search at age 18, during an economic downturn, may learn from job adds and thus be better informed on what type of major to specialize in when they enter college. Hershbein and Kahn show that during economic downturns skill requirements in job ads differentially increased in geographical areas that were hit harder by a recession (Hershbein and Kahn 2018). Thus it is likely that searching for a job during recessionary times can better inform young adults on what types of majors to specialize in during their college going years. On the other hand, college graduates facing recessions at the time of college graduation, and not at the age of 18, may find it more difficult to obtain employment in higher quality jobs. That is if they specialized in a low-paying major during their college going years then at the time of facing a recession these young adults will not be able to adjust on their choice of college major. Altonji, Kahn, and Speer show that for young adults who graduate college during recessionary times that those who pursued high-paying majors experienced smaller impacts on most labor market outcomes (Altonji, Kahn, and Speer 2016). Thus it is important to study how, if any, facing high unemployment rates at the start of adulthood also impacts the choice of majors for young adults who obtained a college degree.

It is important to note that the impacts of unemployment rates on the choice of college major will be irrelevant for some individuals as not everyone pursues a college degree. Despite this, it has been shown in Sanchez 2024 that recessions faced at the start of adulthood nudge young adults to further their education beyond just obtaining a high school diploma. Additionally, Khan showed that for college graduates who graduated in a recession that they faced positive probabilities of obtaining a masters degree or higher later in life (Kahn 2010). Sanchez 2024 explored how unemployment rates faced at the age of 18 affected various cumulative college going milestones. In that paper an important human capital accumulation milestone, that can directly affect job quality, was overlooked. That being, the

decision to obtain an occupational license. Blair and Chung show that for workers who have occupational licenses that these licenses shield them from experiencing severe unemployment during recessionary times (Blair and Chung 2024). It is therefore likely that for high school graduates, who chose not to obtain a college degree, that recessions may have nudged them into obtaining an occupational license. During recessionary times high school graduates on the job search may learn from job adds that obtaining an occupational license will suffice in increasing their employment probabilities. These individuals may be attracted to pursue employment in occupations that require an occupational license rather than solely a bachelors degree. For this purpose I additionally analyze how unemployment rates early in life impact the likelihood of obtaining an occupational license during the first decade into adulthood.

If unemployment rates in early adulthood impact the decision to obtain an occupational license might this license aid recessionary cohorts to obtain employment in higher quality jobs? To examine this I interact the occupational license outcome with binary variables characterizing the predominant task performed at one's job. Doing so will help me determine how early economic conditions impact the joint human capital accumulation milestone of obtaining an occupational license and obtaining employment in higher quality occupations. If high economic conditions faced in early adulthood positively impact the likelihood that young adults acquire an occupational license I hypothesize that early conditions may also place young adults who acquired these licenses into higher skilled jobs as compared to their luckier counterparts, likely because the occupational license can serve as a signal of being a higher ability employee. These results may further contribute to the findings by Blair and Chung that individuals who have occupational licenses are not only shielded from experiencing severe unemployment during recessions, but that having this credential provides an advantage of lowering their unemployment likelihoods in occupations that are considered higher tiered.

I find informative and heterogeneous effects on occupation quality and human capital accumulation outcomes.

I find that higher unemployment rates faced at the age of 18 influenced young adults between the ages of 19 through 24 to be employed in less productive occupations, as measured by the hours worked per week of the average worker in the young adult's respective occupation. Additionally, higher early economic conditions do not affect, throughout the first decade into adulthood, being employed in a higher or lower paying occupation. Together, these results give suggestive evidence that, during recessions, managers in highly productive occupations would rather fire workers than lower their wages. I descriptively show that during recessions the share of employed workers in high productive occupations fell by more than the drop in the share of workers in low productive occupations. This suggests that the main set of jobs available for individuals on the job search and who were coming of age during recessionary times were jobs that were less productive.

I find that the unemployment rate faced at age 18 has heterogeneous effects on the occupation specific injury rate. At ages 19 through 22 higher early conditions will influence young adults to be employed in occupations that are less risky – those that have lower reported injury rates. But at ages 23 through 26 early conditions influence young adults to be employed in riskier occupations – those exhibiting higher injury rates. These results highlight the cyclicality of risky jobs available during economic downturns; such as the construction, truck transportation, and manufacturing occupations, and furthermore suggest that growth in employment for young adults in these occupations is delayed much longer than the duration of a recession. Given that results attenuate to zero at ages 27 to 30 my findings suggest job mobility among recessionary cohorts and their preference for more risky jobs, likely because these occupations pay relatively higher wages. Given that risky jobs are less available at the onset of recessions young adults coming of age during recessionary periods may find employment in less risky occupations remain in these occupations during their early years into adulthood, but later in life might find riskier jobs more appealing. Thus during the occupation mobility period at ages 23 to 26, there will be an oversupply of recessionary cohorts in risky occupations, as compared to their luckier counterparts. But by

ages 27 to 30 job mobility among these cohorts may have been fully realized as represented by the null effects of early economic conditions at these ages.

I find counter intuitive results on how early economic conditions affect the types of tasks that young adults predominantly perform in their occupations. At ages 19 through 22, a 1 percentage point increase in the unemployment rate experienced at age 18 increases the likelihood that young adults are in abstract oriented occupations while decreasing the likelihood that they are in routine or manual oriented occupations. The positive effects on working in abstract oriented occupations can indicate that the unemployment rate experienced at age 18 motivates young adults to acquire human capital skills quicker than their luckier counterparts. An avenue for this may be obtaining trade certificates, something that luckier counterparts may not be acquiring. These certificates can accelerate the time at which young adults end up being employed in more abstract leaning occupations.

In this analyses I also investigate how early unemployment rates at different ages changed, if any, the effects on the occupation quality measures. Early conditions experienced at age 18 versus those experienced at age 22 brought about similar effects on the occupation specific hours of work, occupation specific hourly wage, and on the occupation specific incidence rate outcomes. Effects from the unemployment rate faced at the age of 18 attenuated to zero faster than those faced at age 22. I did however observe different effects on predominant occupational tasks performed from early conditions at the age 18 and those faced at age 22. The different effects may indicate that early conditions differentially influence how young adults acquire additional human capital skills. Experiencing recessions at age 18 can motivate young adults to acquire more abstract and cognitive skills faster than their luckier counterparts which can explain why the share of workers in abstract oriented jobs is higher than luckier counterparts even at the end of the first decade into adulthood. On the other hand, experiencing recessions at the time one graduates college may cause more harm than good as these young adults can no longer adjust on the choice of their college major. There is no difference in the share of workers in abstract, routine, or manual leaning occupations from

their luckier counterparts when the unemployment rate at age 22 is utilized as the treatment variable. Suggesting that these young adults will have to face the economic consequences for the major that they chose during their college going years.

The rest of the paper is structured as follows. Section 2 gives an overview of related literature and describes how my study expands upon prior studies on the scarring of recessions. Section 3 describes the occupational quality measures that I construct and study. This section also explores the idea of "scarring" and why early conditions experienced at age 18 are important for my empirical approach. Section 4 describes the data sources and provides some descriptive statistics of the key outcomes. Section 5 presents the empirical framework. Section 6 documents results and robustness checks. In this section I also document effects by race and gender. Section 7 explores if recessions faced at age 22 are more harmful than those faced at age 18 by exploring the effects of early conditions on log individual real hourly wages for only recessionary cohorts. Section 8 concludes.

2 Literature Review

This paper expands upon two literatures. First, my research advances the robust body of work on the "scarring" effects of recessions. This literature has mainly focused on how unemployment rates faced at the time of college graduation affect the labor market outcomes of individuals later in life. (Ellwood 1982); (Oyer 2008); (Kahn 2010); (Genda, Kondo, and Ohta 2010); (Oreopoulos, Von Wachter, and Heisz 2012); (Yagan 2019); (Schwandt and Von Wachter 2019); (Von Wachter 2020); (Kawaguchi and Kondo 2020); (Rothstein 2021); etc. The main outcome variables of interest in these prior works have been employment status, individual log wages, log hours of work, weeks worked per year, employers' firm size and other characteristics, occupation prestige scores, as well as other socioeconomic factors. However, there has been less work on how unemployment rates in early adulthood affect the occupation quality of heavily affected young adults. Oyer's work is an exception to this, he

explores the relationship between macroeconomic conditions at graduation and long-term outcomes for Ph.D. economists (Oyer 2006). However it is unclear of the external validity of his results given that the average worker in the US economy does not have a PhD degree. My paper aims to explore results on occupation quality measures for a typical US workers, i.e. those with less than a PhD degree.

Other work by Kahn (2010) relates to this research paper, Kahn uses an occupation prestige score that quantifies the quality of an occupation. She finds a negative correlation between the unemployment rate and occupation specific prestige score. This means that for young adults who experienced higher unemployment rates at the time of college graduation that they likely ended up working in lower quality occupations. The prestige score that she uses to measure job quality is the Duncan Socioeconomic Index (SEI) which assigns a score to occupations based on forecasted levels of income and education, but it is important to note that income and education are highly correlated with early economic conditions. It is possible that the forecasted measures of the SEI index will be contaminated during recessionary times given that the composition of workers in occupations drastically changes during recessions. If occupations only keep their most educated and highly paid workers during recessions it is likely that the forecasted SEI index will overstate the true prestige score of an occupation. In Kahn's work she also notes limitations in the prestige score. The 2002-2006 observations are not included in her analysis of occupation prestige quality given that these measures are not comparable. I draw and expand upon Kahn's work by constructing different occupation quality measures that are not sensitive to drastically changing during recessionary times because my occupation quality measures are not time varying. Additionally, instead of relying only on the occupation prestige score, that depends solely on income and education forecasts, it would be more advantageous to explore effects on other types of occupation quality measures. To that end, I further explore early condition effects on occupation specific injury rates as well as the likelihood that young adults perform a particular task in their occupation – which best characterizes the occupation skill level. The next section is devoted

to explaining the construction of my occupation quality measures.

Related to measurements of occupation quality are firm quality measures. Von Wachter and authors explore the average payroll of firms, the average firm size, and the average median wage to characterize firm quality. They point out that the effects on earnings losses, labor supply, and wages are accompanied by the changes in the job mobility of scarred cohorts and their employer/firm characteristics (Oreopoulos, Von Wachter, and Heisz 2012); (Von Wachter 2020). Different from these researchers I do not explore how firms or occupations change in their structures during recessionary times rather I mainly seek to understand how recessions change, if any, the types of occupations available during the job search process for cohorts who become of age during them. For this purpose it is important for me to leverage occupation quality measures that are not time varying as my regression results will identify if the types of jobs that are available to scarred cohorts are different than their luckier counterparts. Additionally it is important to note that prior work has been limited to a low number of firms for their analysis. By using numerous occupation quality measures from the ACS, rather than firm specific measures, I am able to provide more precise results, and further contribute to the scarring effect literature, on how unemployment rates early in life impact the career/occupational progressions of individuals.

The second related literature is that exploring the mechanisms that affect the demand for skilled labor in the economy. Substantial work documents that the evolution of technology has lead to the job "polarization" phenomenon which is characterized by increases in employment in high skill and low skill occupations relative to middle skilled occupations (Acemoglu and D. Autor 2011); (D. H. Autor and Dorn 2013); (Altonji, Kahn, and Speer 2014). Although their emphasis is exploring how technological innovations affect the changes in employment in these three skill categories I instead explore how unemployment rates faced at the start of adulthood affect whether or not young adults are employed in either of these three skill groups during the first decade into their adulthood years.

Furthermore, Altonji, Kahn, and Speer (2014) document that the changes in earnings

differentials across field of study are accounted for by changes in the labor market return to skills associated with a major. In their study the authors explore the relative importance of abstract, routine, and manual tasks associated with college majors. These skill groups are related with those studied by Acemoglu and Autor (2011). I follow these prior works to denote abstract oriented occupations as those to be considered high-skilled occupations, routine oriented occupations middle skilled, and manual oriented occupations low-skilled. Rather than analyzing how college majors relate to abstract, routine, and manual tasks/skills I simply explore how early conditions affect the shares of individuals employed in abstract, routine, and manual leaning occupations during the first decade into adulthood. This is different from prior work as the abstract, routine, and manual measures were used as explanatory variables in Altonji, Kahn, and Speer (2014). Furthermore, recall that Hershbein and Kahn 2018 showed that skill requirements in job ads differentially increased in geographical areas that were hit harder by a recession. It is thus important to test if economic conditions impact the share of young adults employed in abstract, routine, or manual leaning occupations.

Given that recessions impact the skill requirements in job adds it too is important to examine how young adults respond on the choice of their college major and further human capital accumulation decisions, such as obtaining occupational licenses; additional outcome variables that I examine in this article.

3 Workers' occupational characteristics & their connections to scarring effects

In this section I give a brief overview of the idea of scarring in the context of affecting one's choice of occupation and thus occupation quality. But first I explain what "scarring" means. In labor market analyses it is widely understood that "'scarring' is defined as the negative long-term effect that unemployment early in one's adult life has on future labor market possibilities in itself" (Nilsen and Reiso 2011). Because early conditions have lasting

effects on labor market outcomes such as being employed and income growth (Von Wachter 2020); (Rothstein 2021); (Altonji, Kahn, and Speer 2016) there is cause to believe that early conditions will also persistently affect the occupation quality that young adults are employed in later in life, likely because occupation quality may be highly correlated with earned income - a variable of primary interest in the scarring effect literature.

During recessions various job sectors, like manufacturing and construction, may be treated with higher dosages of job loss/laying off of workers than other sectors. If this is the case then those on the job search during recessions may only have access to lower quality jobs and may thus start at lower rungs of the income ladder compared to their luckier counterparts. Furthermore, obtaining employment in lower quality occupations may mistakenly impose a label on those employed in these sectors as lower ability workers. Thus if these workers later in life aspire to climb the occupational ladder by seeking employment in higher quality occupations they may be negatively perceived by hiring managers as less desirable. If hiring managers are biased towards these potential employees this will further prolong the length of time that recessionary cohorts remain employed in lower quality occupations. In this paper I thus explore how early economic conditions may impact the occupation quality that young adults are employed in during the first decade into adulthood - as unemployment rates early in life may serve as a proxy for changes in the composition of jobs available to recessionary cohorts while they were on the job search process. Changes in the composition of the types of jobs available during recessionary spells may aid in the interpretations and understanding of the labor market estimates brought forth from prior studies.

Many past studies of scarring have focused on college graduates, and have measured early career conditions by the unemployment rate in the year of college completion or at age 22. For those who do not go to college, however, earlier conditions may be more relevant. I use the unemployment rate at age 18 as my primary measure of early career conditions for all young adults in my sample.

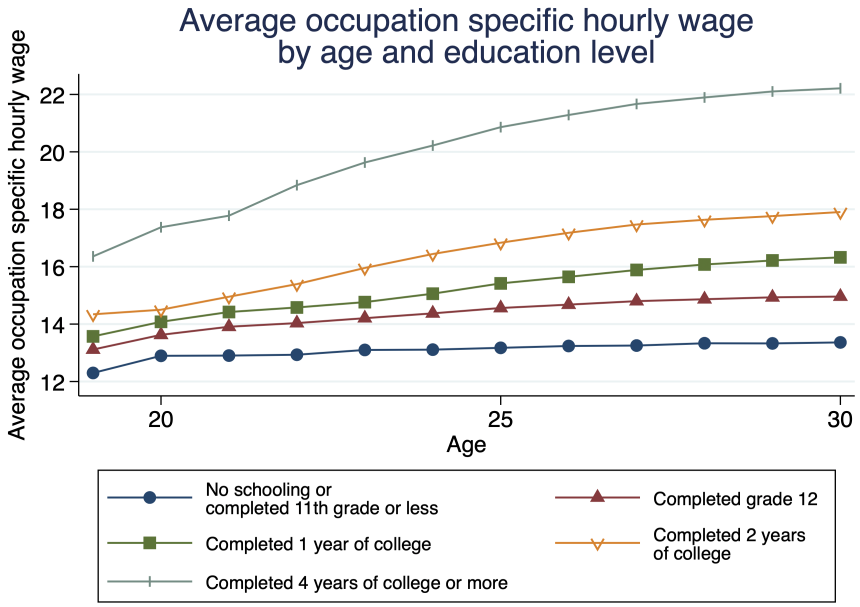
For the purposes of my analysis scarring will be defined as the medium and long-term

effect that the unemployment rate a young adult faced in early adulthood had on the quality of the occupation that he/she was employed in later in life. Occupation quality outcomes will be as follows: being employed in a risky occupation, a higher paid occupation, a more productive occupation, and being employed in a low, middle, or high-skilled occupation.

To estimate the occupation quality measure of being employed in a high paying occupation or working in a more productive job I analyze the log occupation specific hours of work and log occupation specific hourly wages. The occupation specific hours of work reflect the average hours of labor that workers in a specific occupation were employed for. The occupation specific hourly wage reflects the average hourly wage that workers in a specific occupation were compensated.

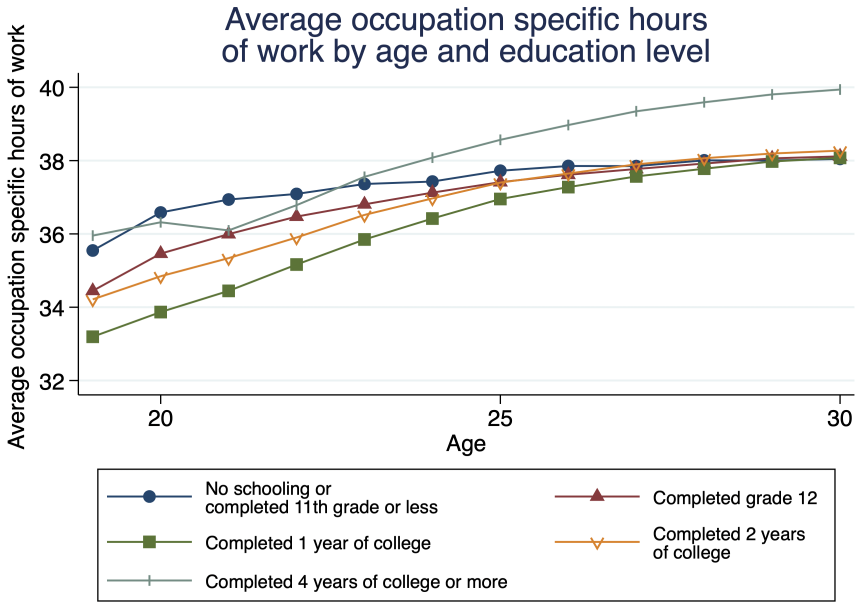
Implicitly it should be understood that the quality of a job is reflective of the education level required for employment in that job. Thus when exploring effects on the occupation quality measures the reader should keep in mind the education levels associated with what it means to be employed in a high quality occupation versus a low quality occupation. For example, figures 1 and 2 demonstrate that higher educated young adults work in occupations that are higher paying and more productive. It is possible that more productive occupations have higher average hours of work because these occupations may require of their workers to devote additional hours of labor to refine or learn skills on the job. Less productive occupations have lower hours of work possibly because these occupations do not need of their workers to engage in lengthy critical thinking to aid them in their occupational output requirements. It it possible that workers who have a bachelors degree or higher are in occupations that require of them to engage in critical thinking skills and development. This may explain why more educated young adults are in occupations where the average worker is employed for longer hours as seen in figure 2.

Figure 1



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the average occupation specific hourly wage by age and education level of the young adults in the main analysis sample. Averages are weighted using ACS sampling weights.

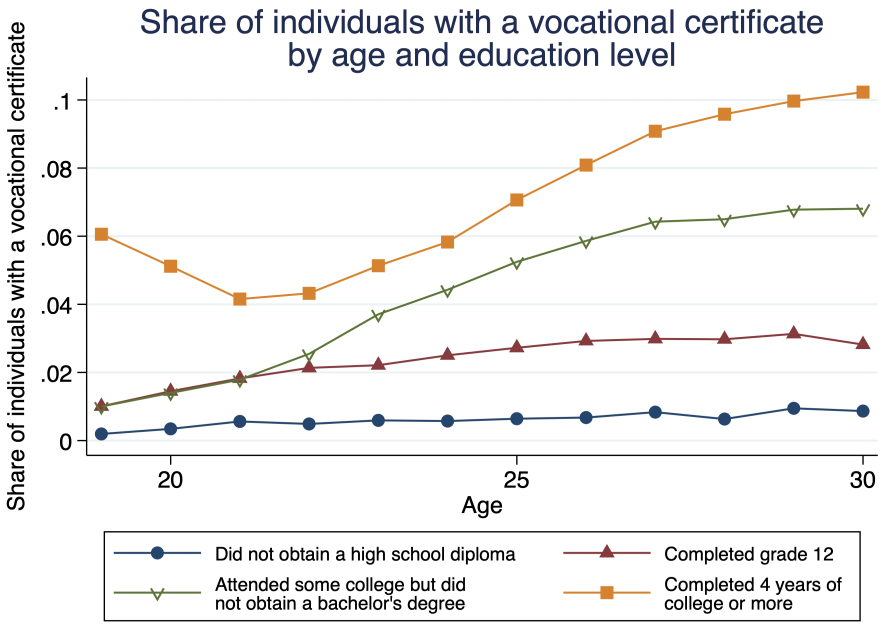
Figure 2



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the average occupation specific hours of work by age and education level of the young adults in the main analysis sample. Averages are weighted using ACS sampling weights.

In Sanchez 2024 increased unemployment rates at the age of 18 induced young adults to enroll into college quicker than their luckier counterparts. This may have aided them to build skills faster and when seeking employment these individuals may have leveraged their current college attendance status to obtain employment in higher quality occupations. But for non-college goers an alternative avenue for obtaining skills faster may have been obtaining trade certificates. Figure 3 documents that by age and education level that some young adults did pursue further human capital accumulation by acquiring trade certificates. Could obtaining a trade certificate have prevented cohorts who became of age during recessionary times from starting at the lower rungs of the occupational ladder? I test this hypothesis by examining how early conditions affected the likelihood of jointly having obtained an occupational license and obtaining employment in a higher quality job - as measured by the task intensity performed. Before testing the joint outcome I also ensure to examine how early conditions first impact the likelihood of obtaining a trade certificate.

Figure 3



Notes: Current Population Surveys (CPS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the share of young adults who obtained a vocational certificate by age and education level. Averages are weighted using CPS sampling weights.

Following prior literature, I explore early economic effects on occupation skill level as measured by performing abstract, routine, or manual tasks in one's occupation (Brendan Price and Price 2013). A task is "routine" if it can be accomplished by machines following explicit programmed rules. Thus routine oriented occupations are to be understood as occupations where human tasks are easily substituted by machines. A task is considered abstract if it has strong complementarities with machines and manual if there are limited opportunities for substitution or complementarities.

Wage and employment distributions are predominantly correlated with occupational tasks. Occupations that predominantly perform abstract tasks are those at the top of the wage distribution, routine in the middle, and manual at the bottom of the wage distribution (Altonji, Kahn, and Speer 2014). Thus working in an occupation that has high quality attributes would be understood as working in an abstract oriented occupation. A low quality occupation would be considered working in a manual oriented occupation.

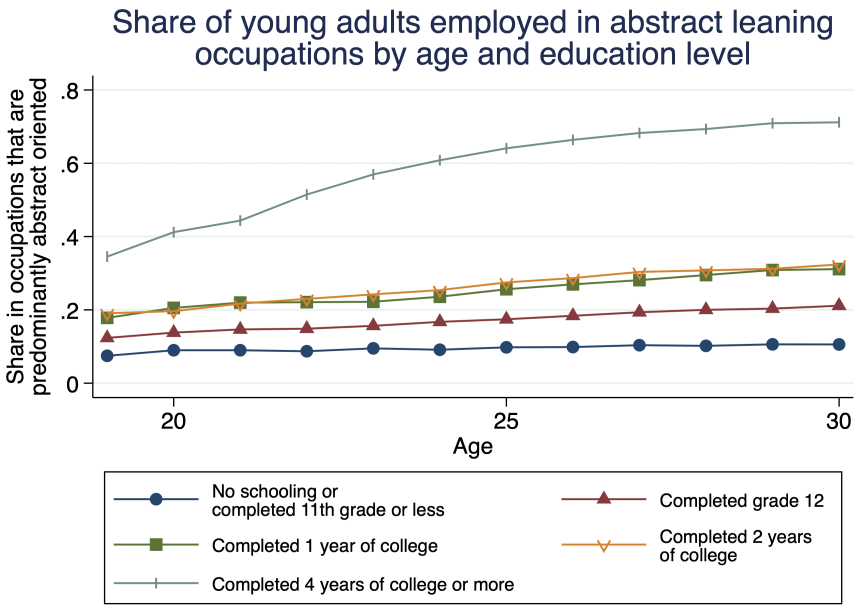
These occupational skill levels can also be reflective of the education level required to predominantly carry out one of the three tasks at one's primary occupation. Figures 4 through 6 document the share of young adults employed in the three occupation skill quality measures that I study. The figures document the share of young adults employed in abstract, routine, and manual leaning occupations by age and education level.

As young adults aged, climbing the occupational skill ladder was more prevalent among young adults who completed 4 years of college or more. For example, in the early ages into adulthood the share of employed college educated individuals was highest in the routine leaning sector, but that share dropped by roughly 60% by the time that young adults reached the age of 30. The drop in this sector was attributed to the roughly 60% increase in the share of college educated young adults employed in the abstract leaning sector by the age of 30. No other educational group experienced this level of up-skilling throughout the first decade into adulthood.

Given that high early conditions accelerated the college going behavior of young adults,

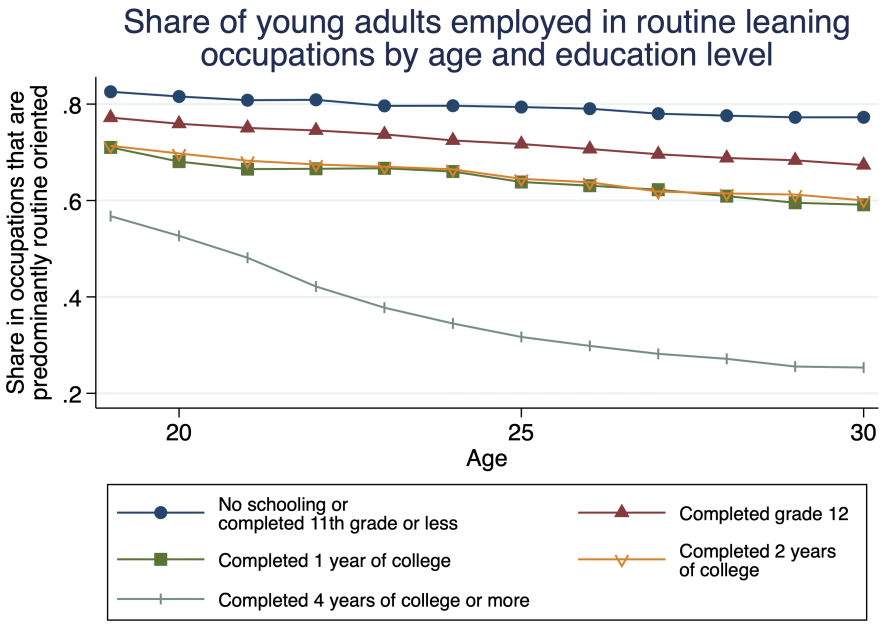
as shown by Sanchez 2024, it is also profitable to determine if early economic conditions also accelerated the occupational up-skilling of young adults.

Figure 4



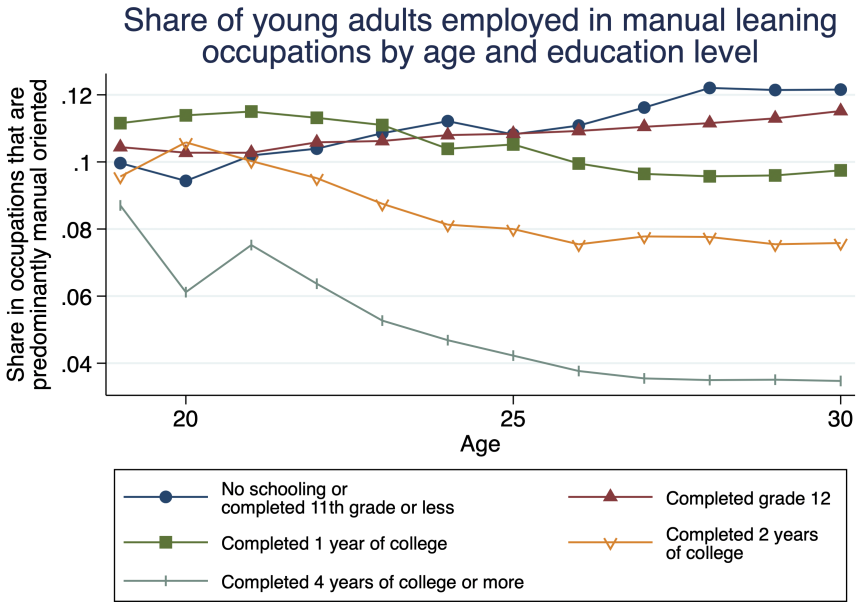
Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the share of young adults employed in abstract leaning occupations by age and education level. I use David Autor and David Dorn's (2013) task intensity measures to identify the predominant occupational task for the individuals in my sample. Averages are weighted using ACS sampling weights.

Figure 5



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the share of young adults employed in routine leaning occupations by age and education level. I use David Autor and David Dorn's (2013) task intensity measures to identify the predominant occupational task for the individuals in my sample. Averages are weighted using ACS sampling weights.

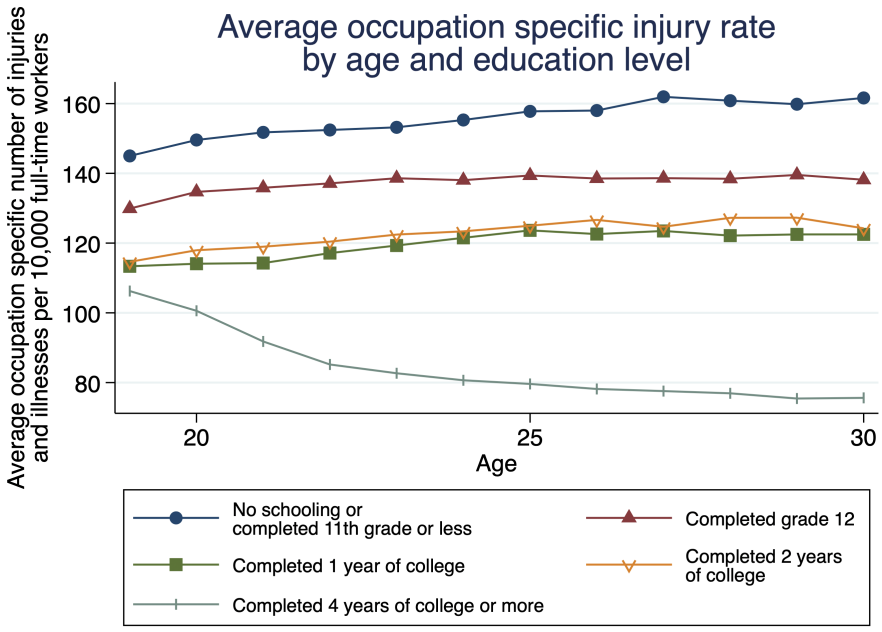
Figure 6



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the share of young adults employed in manual leaning occupations by age and education level. I use David Autor and David Dorn's (2013) task intensity measures to identify the predominant occupational task for the individuals in my sample. Averages are weighted using ACS sampling weights.

The last occupation quality measure that I study is occupation specific injury rates. It is well known that lower educated individuals are overrepresented in occupations and industries with higher injury and fatality rates (Orrenius and Zavodny 2013);(Sparber and Zavodny 2022). Figure 7 graphically demonstrates this statistic. However, recessions may impede employment in riskier occupations. Charles, Hurst, and Notowidigdo (2018) show that individuals were cyclically sensitive to working in the construction sector during the burst of the housing bubble, a sector that predominantly reports high cases of workers experiencing injuries on the job (Charles, Hurst, and Notowidigdo 2018). If recessions influence riskier occupations to shut down all together it is possible that these occupations may never recover to pre-recession employment levels or that during the recovery period these occupations may hire individuals who have had less time being unemployed. These two possibilities may mean that heavily scarred individuals may simply have a different choice set of the types of occupations they can and can not obtain employment in when they are in the job search process.

Figure 7



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the Bureau of Labor Statistics (BLS) average occupation specific injury rate by age and education level of the young adults in the main analysis sample. Averages are weighted using ACS sampling weights.

4 Data

I use repeated cross sectional data from the American Community Surveys (ACS), provided through IPUMS (Ruggles, Sarah, Ronald, Megan, and Matthew 2022), to construct a synthetic panel. The main sample for my analysis consists of individuals born between 1970 to 2003, who are between the ages 19 to 30 when observed in the time period of 2000 to 2022. Given the large birth year gap in the cohorts in my sample, I am able to study effects of the four recent recessions in the U.S. economy. I restrict my sample to only include individuals who are currently employed at the time of being surveyed. I only analyze employed individuals because I am interested in exploring effects on occupation quality at the time of employment. To this sample I merge state level unemployment rates data from the Bureau of Labor Statistic (BLS) spanning the years 1976 to 2022. This merging allows me to assign each individual in the sample his/her early economic condition as well as their respective contemporaneous unemployment rate.

My main emphasis in this paper is on the effect of early conditions on characteristics of the occupation that an individual is employed in at each later age. To construct occupation specific characteristic variables I utilize three datasets. First, I measure the average hourly wage in each occupation across all observations in my sample, pooling all years and cohorts, and treat this as a measure of the occupation wage level. Note that each individual in my sample who is working in the same occupation will have the exact same occupation specific hourly wage regardless of the year that they are surveyed in. Their individual hourly wage will be different, but the occupation specific hourly wage will be the same for all individuals who work in the same OCC code. I follow this same approach to measure the average weekly hours for workers in each occupation. Thus every individual who works in the same occupation will have an identical average hours of work that were provided to that occupation regardless if the hours that they themselves provided is above or below this occupation specific number. In the Appendix figure 19 further shows histograms of the individual hours of work that workers in my sample provide and a histogram for the

occupation specific hours of work measure.

Second, to identify which jobs perform tasks that are predominantly abstract, routine, or manual I utilize Autor and Dorn's task intensity measures and merge these measures to the main sample (D. H. Autor and Dorn 2013). I call an occupation "abstract" if the Autor and Dorn abstract measure is greater than the routine and manual measures. I follow the same approach to identify "routine" and "manual" occupations. Thus, I treat each occupation as belonging to exactly one of the three categories.

Finally, I leverage the BLS' Survey of Occupational Injuries and Illnesses Data to identify the injury rate for each occupation in 2021-2022. I merge these rates, using the OCCSOC code, to the main analysis sample.[2] While the BLS provides various injury and illness measures I utilize the annualized incidence rate for nonfatal occupational injuries and illnesses involving days away from work. This rate accounts for occupation size.

The outcome variables of interest are 1) the log of the average occupation specific usual hours of work that workers in that occupation provide, 2) the log of the average occupation specific hourly wage that workers in that occupation earn, 3) three different dummy variables indicating the probability of being in a job that is abstract, routine, or manual, and 4) the log of the occupation specific injury rate. These outcomes will be used to determine if individuals who faced higher unemployment rates at age 18 were later employed in occupations that were riskier, lower paying, more productive, and strenuous - as measured by the occupation specific task performed.

Table 1 shows summary statistics for my main ACS sample. Table 2 provides summary statistics for the main occupation quality measures which will be the outcomes of my regressions. Note that, while many labor market scarring papers focus on college graduates, I do not limit the sample based on years of education. However, in the appendix I do present

[2] "The incidence rates represent the number of injuries and illnesses per 10,000 full-time workers and were calculated as (N/EH) x 20,000,000, where N = number of injuries and illnesses during the reference period, EH = total hours worked by all employees during the reference period, and 20,000,000 = base for 10,000 equivalent full-time workers (working 40 hours per week, 50 weeks per year)"–Source: Bureau of Labor Statistics, U.S. Department of Labor, Survey of Occupational Injuries and Illnesses, in cooperation with participating state agencies.

results for a college and a non-college sample.

Table 1

Summary Statistics for Main Analysis Sample

Variable	N	Mean	SD	Min	Max
Female	5616931	.49	.5	0	1
White	5616931	.65	.48	0	1
Has a bachelor's or more	5616931	.29	.46	0	1
Is Employed	5616931	1	0	1	1
Is a Full-time Worker	5616931	.65	.48	0	1
Usual hours worked per week	5616931	37	12	1	99
Weeks worked last year	5616931	45	13	1	52
Hourly wage	5616931	17	57	0	37500
Year	5616931	2013	5.9	2000	2022
Birth Year	5616931	1988	6.8	1970	2003
Year at age 18	5616931	2006	6.8	1988	2021
Age	5616931	25	3.4	19	30
Unemployment Rate (State, %)	5616931	5.9	2.2	2	14
Unemployment Rate at Age 18 (State, %)	5616931	6	2.1	2.1	14

Notes: Summary statistics relate to the main analysis sample, consisting of individuals aged 19-30. Statistics are weighted using ACS sampling weights.

Table 2

Summary Statistics for Main Analysis Sample – Outcome Variables

Variable	N	Mean	SD	Min	Max
Log (Annualized incidence rates for nonfatal occupational injuries and illnesses involving days away from work) – OCCSOC Specific Rate	4461826	4.3	1.2	-1.6	7.4
Tasks in occupation currently working in are predominantly abstract	5318159	.34	.47	0	1
Tasks in occupation currently working in are predominantly routine	5318159	.58	.49	0	1
Tasks in occupation currently working in are predominantly manual	5318159	.083	.28	0	1
(Mean) Occupation specific usual hours worked per week	5616931	37	5.1	17	73
Log ((Mean) Occupation specific usual hours worked per week)	5616931	3.6	.14	2.9	4.3
Occupation specific hourly wage	5616931	17	6.4	.84	79
Log (Occupation specific hourly wage)	5616931	2.8	.33	-.17	4.4

Notes: Summary statistics relate to the main analysis sample, consisting of individuals aged 19-30. Statistics are weighted using ACS sampling weights.

4.1 Data Limitations

There are some limitations to the ACS and BLS data for the purposes of my analysis. First, the BLS injury rate data comes from a new survey that is administered biannually. The initial estimates are for the years 2021 to 2022. I assign all individuals in my sample the 2021-2022 occupation specific injury rate even if they were surveyed before 2021. Certain occupations may have exhibited more or less injuries in the years prior to 2021. Using the 2021-2022 injury rate measure for all of the individuals in my sample may provide a downward bias on the true effect of how early economic conditions affects the occupation specific injury rate if occupations prior to 2021 may have exhibited a higher injury rate than what was reported for the years available. Additionally, although the BLS adjusts for occupation employment size in the injury rate measure they do not publish the rate for occupations whose employee head count is too small. Note that I was only able to match roughly 80% of my sample with occupation specific injury rates. It is possible that 20% of my sample may be individuals in occupations whose injury rate is high but I just do not have the data for them due to them being in smaller occupations. This would create further bias to my estimates if smaller occupations exhibit really high injury rates and they are just not being accounted for.

Second, the Autor and Dorn task intensity measure dataset does not provide a measure for every occupation. I am able to match up to 95.75% of my sample to their respective task intensity measures, so for these purposes I am not concerned that the excluded occupations may drastically change my results. But the exclusion of these measures for some occupations is worth mentioning.

5 Empirical Framework

In order to determine how early economic conditions affect worker's occupational characteristics/quality I employ the following regression model:

$$\mathbf{Y}_{i,s,c,a,t} = \sum_{a=19}^{30} \beta_a D_a * UR_{s,(c+18)} + \rho \mathbf{X}_i + \gamma_a + \psi_c + \delta_s + \zeta_t + \pi_{s,t} + \epsilon_{i,s,c,a,t} \quad (1)$$

Where $\mathbf{Y}_{i,s,c,a,t}$ represents the outcome variable (e.g., the log of the occupation specific hourly wage) of person i from birth cohort c observed in year t at age $a \equiv t - c$ living in state s.

The key economic variable of interest is $UR_{s,(c+18)}$ which represents the state unemployment rate for individual i for when he/she was an 18 year old. The age-18 unemployment rate may have different effects on outcomes at different ages. To capture this, I interact $UR_{s,(c+18)}$ with a full set of indicators D_a for each age from 19 through 30. The specification also includes main effects for age (γ_a), as well as fixed effects for cohort (ψ_c), state of residence (δ_s), and calendar year (ζ_t). Since early economic conditions are measured at the state-by-year level, I further add a fixed effect for the state-year combination ($\pi_{s,t}$). This absorbs any effect of economic conditions in the year t that outcomes are measured, and ensures that the long-term effect coefficients β_a do not capture any association between these contemporaneous conditions and those at age 18.

This empirical approach allows me to compare individuals of the same ages, surveyed in different years and residing in different states, that experienced varying levels of entry unemployment rates when they began their young adulthood trajectories. Thus one should interpret the coefficient term β_a to be the change in the $\mathbf{Y}_{i,s,c,a,t}$ probability/log points for individuals of age a experiencing varying levels of entry unemployment rate conditions when they turned 18, holding constant age patterns, contemporaneous conditions at time t in state s, and permanent cohort differences.

The fixed effects absorb many forms of heterogeneity. However, I control in addition for the share employed at the cohort-state-age level, gender, and race in $\mathbf{X}_i$. Standard errors are clustered at the state level to account for unmodeled common influences that might affect state labor markets but are not captured by the state fixed effects or the interaction of state and year fixed effects.

Note that equation (1) includes full sets of indicators for cohorts, ages, and times. It is well known that these are not all separately identified, because age equals time minus cohort. An additional linear restriction is required. The year effects for 2000 and 2022 are normalized to zero. Doing this normalization ensures that the estimated year coefficient for these years is zero. Note that these are nuisance parameters and the normalization does not affect the coefficients of interest. Normalizing other year effects provides identical coefficient results as those from the regression estimates were the 2000 and 2022 year effects had been normalized.

My main specifications assume that age, time, and cohort effects are additively separable. But because cohorts exposed during the COVID-19 crises are observed only at age 19 and 20, the cohort indicators are strongly collinear with the indicators for ages 19 and 20 and the indicators for years 2021, and 2022, which will make separating out each effect difficult. To address any sensitivity to this, I re-estimated my regression dropping all cohorts exposed to the COVID-19 recession. Doing this made little difference to my main results.

6 Empirical Results

6.1 Impact On Occupation Specific Hourly Wage & Occupation Specific Hours Worked

The top panel of Figure 8 shows effects on log average occupation specific hours worked. The blue coefficients correspond to the $\beta'_a s$ in regression 1. The negative, and at times significant, effects at ages 19 to 24 indicate that, conditional on being employed, young adults who faced higher unemployment rates at age 18 worked in occupations that on average offered workers lower hours of work compared to their luckier counterparts.

The largest effect is experienced two years after entering into adulthood. A 1 percentage point increase in the unemployment rate at age 18 is associated with roughly a reduction of .001 log points in the occupation specific hours of work that young adult i is working in.

In the context of a large recession, this translates to a decrease of roughly .0085 percent in the occupation specific hours of work per week that workers provide to the occupation that young adult i is working in at age 20. This means a reduction of roughly 20 minutes a week. This is not economically significant for the individual, but when we think about this effect on aggregate productivity my estimates indicate that the occupations that scarred cohorts were employed in were less productive by roughly 17 hours of labor a year per worker. Multiplying these forgone hours by the number of 20 year olds who faced the highest unemployment rates at the start of their adulthood trajectories will certainly yield an economically significant aggregate result. At the start of adulthood, the negative effects of being employed in less productive occupations can in part contribute to the loss in individual log annual hours of work of heavily scarred individuals that were well documented by (Altonji, Kahn, and Speer 2016).

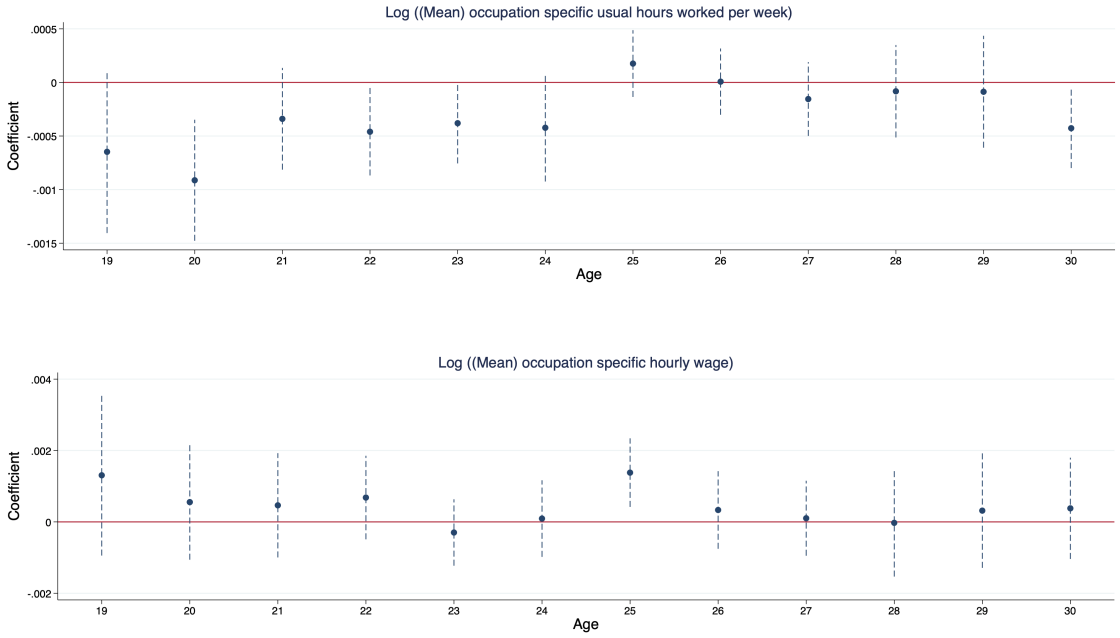
In the top panel of Figure 8 we see that at ages 25 and onward there is no difference in the types of productive occupations that heavily affected cohorts worked in in comparison to their luckier counterparts. A possible explanation may be that more heavily affected cohorts may have transferred at later ages to working for more productive occupations that provided them more hours of work. Thus these workers will have transferred into "higher quality" occupations.

The bottom panel of Figure 8 shows effects on log average occupation specific hourly wage. Interestingly, effects are zero or nearly zero throughout the first decade into adulthood. This means that on the occupation specific hourly wage margin, it appears that young adults who faced high unemployment rates when they became of age do not get matched to lower paying occupations as compared to their counterparts.

Overall, my results indicate that in the early ages into adulthood, young adults get matched to lower quality occupations, but only based off of working in occupations that are less productive. It is possible that for young adults who become of age during recessionary times, and who are able to acquire employment in their emerging adulthood years, that

the types of occupations available to them, while on the job search process, were in nature different than the occupations available to luckier cohorts. I am not able to distinguish between preferences for working in less productive occupations from options of only having less productive occupations as the only choice available for employment, but the lack of diversity of productive occupations available during recessions may be what is driving heavily affected cohorts to be employed in less productive occupations during their early years into adulthood. I descriptively explore this in the next subsection by showing changes in the employment shares of high productive occupations and low productive occupations during recessionary periods.

Figure 8



Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The top and bottom panels are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The top panel shows coefficient estimates ($\beta'_a s$) from regression 1 where the outcome variable is the log of the average occupation specific hours of work that individuals in that occupation supply. The bottom panel shows coefficient estimates where the outcome variable is the log of the average occupation specific hourly wage.

6.1.1 Potential mechanisms

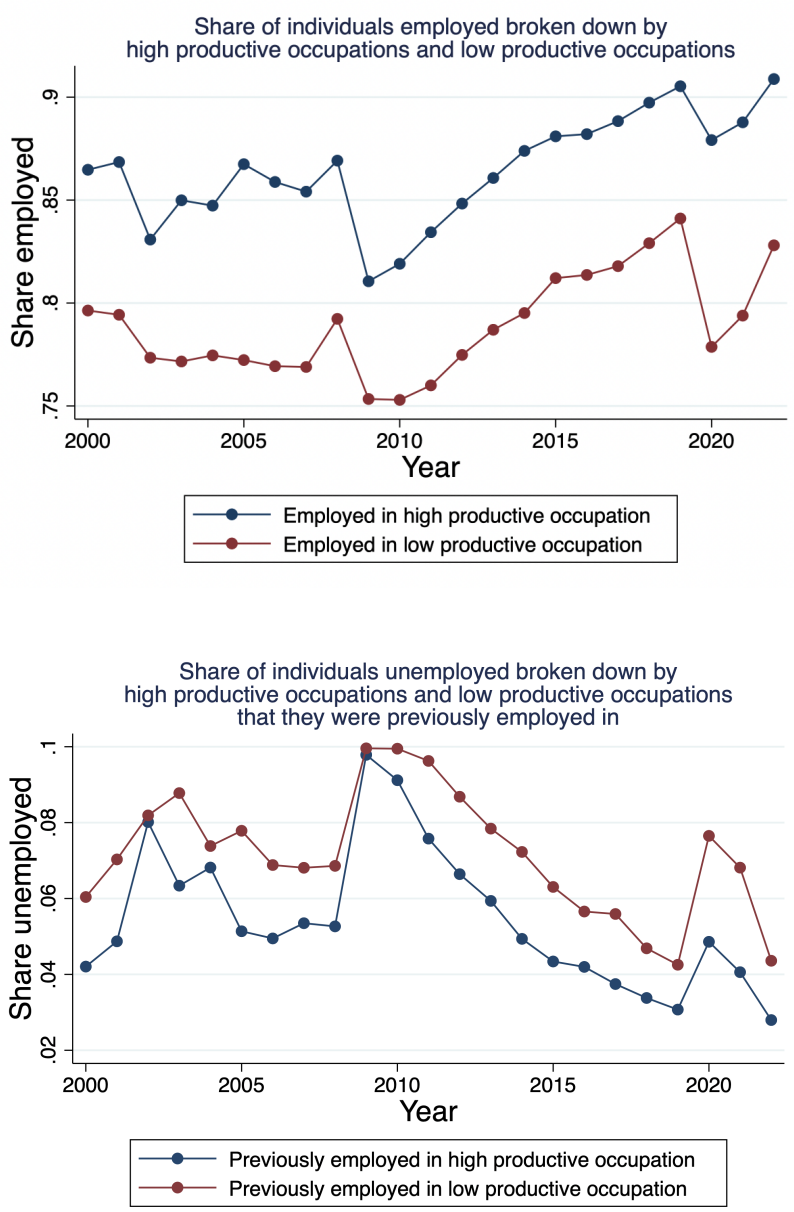
A potential mechanism that can be driving the results as to why more heavily affected cohorts are employed in less productive occupations may be that during recessionary times the occupations that fire workers tend to be the most productive ones. Figure 9 documents this by showing time series graphs of the share of young adults employed and unemployed in high productive occupations and low productive occupations. The time series for the unemployed shares was constructed by utilizing the occupation in which each unemployed young adult was previously employed in. The key takeaway from the graphs in Figure 9 is that during the Great Recession high productive occupations experienced larger drops in the share of their employed workers than less productive occupations. Similarly the share of young adults who were unemployed grew the most for individuals who previously worked in high productive occupations. Therefore, it is clear that during recessionary times young adults on the job search process had limited choices on the types of jobs they could apply to.

These graphs show that the jobs that are available, during recessions, in higher numbers are the less productive ones. Thus recessionary cohorts likely resorted to obtaining employment is less productive occupations not because of preference but rather because those were the only occupations available to them. Since these cohorts started their occupational trajectory in less productive occupations it is likely that they will continue to work in these occupations years after the economy has fully recovered. This may better explain the persistent negative coefficients on the log occupation specific hours of work outcome at ages 19 through 24.

Figure 10 further documents that during recessionary times it appears that high productive occupations increased the demand for older workers, further constraining younger workers from obtaining employment in high productive occupations. Figure 10 can also aid in the understanding of results from Kahn's work that documents that during economic downturns skill requirements in job ads differentially increased in geographical areas that

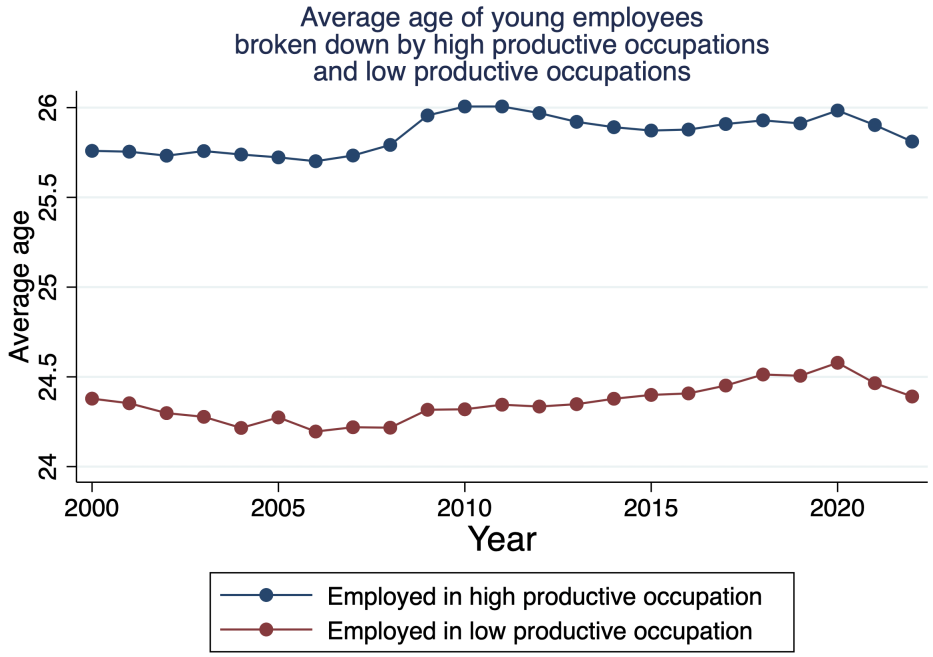
were hit harder by a recession (Hershbein and Kahn 2018). Skill is positively correlated with age thus for these reasons it is possible that younger workers looked less appealing to hiring managers in high productive occupations.

Figure 9



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. Note that these statistics are not constructed from my main analyses sample as I need information on unemployment and out of the labor force status of young adults to construct the share of employed young adults. The top panel documents the share of young adults who are employed in high and low productive occupations from 2000 to 2022. An occupation is identified as a high productive occupation if the average worker in that specific occupation works more than 39.99 hours of work each week. The bottom panel documents the share of young adults who are unemployed. The share of young adults unemployed is broken down by the productivity status of the prior occupation in which they worked in before becoming unemployed. Averages are weighted using ACS sampling weights.

Figure 10



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022 from my main analysis sample. The graph documents the average age of young adults who are employed in high and low productive occupations from 2000 to 2022. An occupation is identified as a high productive occupation if the average worker in that specific occupation works more than 39.99 hours of work each week. Averages are weighted using ACS sampling weights.

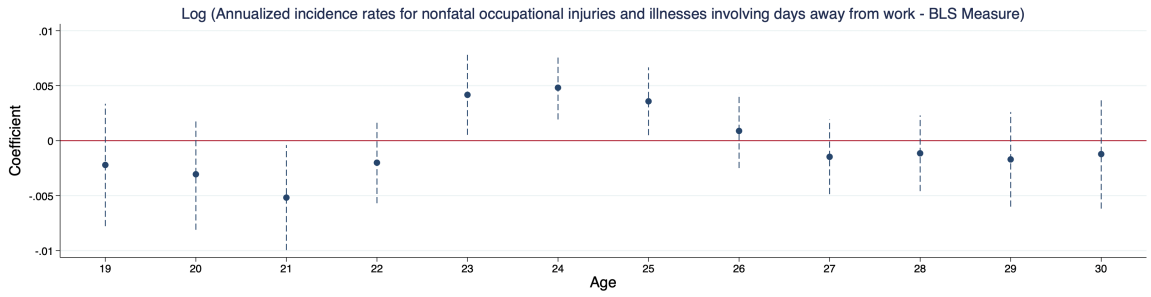
6.2 Impact on Occupation Specific Incidence Rate

Figure 11 shows effects on log annualized occupation specific injury rates. Having a high unemployment rate at age 18 induces young adults to be employed in less risky occupations compared to their luckier counterparts between the ages of 19 to 22. At age 21 a 1 percentage point increase in the unemployment rate faced at age 18 is associated with a reduction of .0049 percent in the occupation specific injury rate. Effects however become positive and significant at ages 23 to 25 on working in a riskier occupation. Effects at ages 26 and after attenuate to zero.

A potential explanation for the heterogeneous effects on occupation specific injury rates may yet again reflect the "scarring" of the cyclicality of jobs available at the time that one becomes of age. It is possible that during recessionary times that the occupations that have higher injury rates may be the occupations that are the most cyclical, and thus these occupations may be the ones that exhibit the largest contractions in the number of workers that they employ. Thus, for young adults who became of age when the economy was experiencing high unemployment rates, obtaining employment in more risky occupations may just as well have been avoided during the early ages into adulthood simply because risky occupations were not in the hiring market. If it took riskier occupations a couple of years to recover to their pre-recession hiring behaviors this can explain the negative effects of the early economic conditions on the log occupation specific injury rates at ages 19 to 22.

Additionally, as mentioned previously, Hurst and authors show that individuals are cyclically sensitive to working in the construction sector during the boom and bust of the housing bubble (Charles, Hurst, and Notowidigdo 2018), effects of which are captured in the time fixed effects. This may indicate that the number of construction or manufacturing jobs available, which are occupations that are more physically demanding and more prone to experiencing occupational injuries, may have been limited to those becoming of age during recessionary times. When the economy began recovering there was likely an adjustment period for these types of occupations to regain their pre-recession employment numbers and

Figure 11



Notes: Results are based on the specification presented in equation 1. The regression uses data from the ACS from 2000 to 2022 for individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. The figure shows coefficients from regressing log occupation specific injury rates on the unemployment rate at the start of adulthood interacted with age dummies.

during the adjustment period it may have taken longer for 19 to 21 year olds to obtain employment in these professions. For example, consider the young adult who found it difficult to obtain employment in the construction sector at age 18, when he became of age. The decreased supply of risky jobs (e.g. construction/manufacturing) may have lead the young adult into other occupational roles, jobs that may have been less prone to experiencing injuries. This young adult was instead able to obtain employment in a less risky occupation at the age of 18. It is possible that the young adult continued his employment in this less risky occupation during the first years into adulthood until the construction sector recovered. If years later the construction sector (more risky occupation), or others of the like, were able to readjust on their pre-recession hiring behaviors then at that point for more heavily affected young adults who saw these types of jobs as more appealing they may have thus transitioned into these occupations later in their emerging adulthood years, at ages 23 to 25. This can be an intuition that can explain the heterogeneous results in Figure 11.

Towards the tail ends of reaching the first decade into adulthood, ages 27 to 30, effects have attenuated to zero. These latter effects indicate that working conditions are not significantly different between young adults who experienced high unemployment rates at the start of adulthood and their luckier counterparts. My results indicate differences in working conditions only in the first half of the decade into adulthood, ages 19 to 25. This may mean

that unluckier cohorts start at jobs that are less desirable to them but that as they age they are able to transition to the jobs that are more attracted to them. Thus by the time they have made their occupational transitions they have landed employment in jobs where luckier cohorts also work in. These transitions may explain why results attenuate to zero during the ages of 27 to 30.

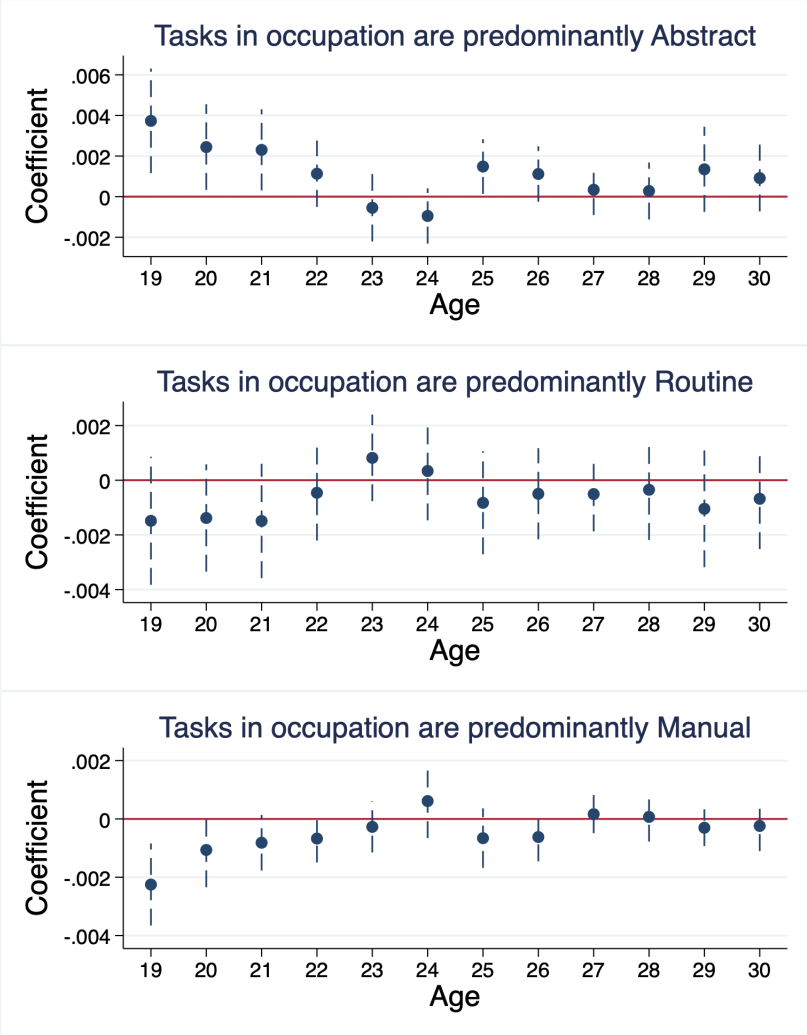
6.3 Impact On Being Employed in Occupations that Require Tasks to be Predominantly Abstract, Routine, or Manual

Given that at the start of adulthood the average young adult lacks the sufficient human capital to be employed in very skilled occupations, one would expect that the early economic conditions result in a negative or zero effect in working in abstract occupations at the initial ages of entering into adulthood. Contrary to this logic, Figure 12 demonstrates counter intuitive results. The β_a coefficients in the top panel reflect effects on the probability of working in an abstract leaning occupation. The β_a coefficients in the middle panel reflect effects on the probability of working in a routine leaning occupation, meaning that most of the tasks performed in individual i's occupation are routine in nature. Finally, the β_a coefficients in the bottom panel reflect effects on the probability of working in a manual oriented occupation.

The top panel of Figure 12 demonstrates counter intuitive results as in the early ages into adulthood young adults, experiencing high unemployment rates at the start of adulthood, appear to be employed in more abstract oriented occupations while facing negative effects on being employed in less skilled occupations- routine and manual. A potential explanation may be that the unemployment rate at age 18 can quickly influence young adults into acquiring higher human capital skills, either by going to trade school, obtaining a trade certificate, or even enrolling in college sooner than they otherwise would–results of which are documented in Sanchez 2024. For example, consider a young adult who becomes of age when the unemployment rate is high and this young adult is on the job search at age 18. While on the job search he/she may notice that occupations demand higher skills for the types of jobs he/she may desire. Additionally, he/she may notice in job adds that these desired jobs also pay well. Thus, it is possible that the labor market conditions that the young adult experiences at age 18–like the unemployment rate may influence how he/she adjusts on their human capital accumulation behaviors in the earlier years into adulthood. Unlike prior literature my results indicate and suggest that workers do not have obsolete

skills when fired during recessions, but rather recessions serve as a stimulant for workers to pursue additional skills that will aid in future job employability in higher skilled occupations.

Figure 12



Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. Results are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The figures show coefficient estimates for three different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom panel).

In the early ages into adulthood, being employed in abstract oriented occupations is offset by negative effects on being employed in routine and manual oriented occupations

(the middle and bottom panel of Figure 12). The negative effects on being employed in routine and manual occupations may reflect the scarring of the cyclicality of the types of jobs available for more heavily affected cohorts at the time that they become of age. Hurst and authors show that individuals are cyclically sensitive to working in the construction sector (routine oriented) during the boom and bust of the housing bubble (Charles, Hurst, and Notowidigdo 2018). The cyclicality of working in the construction sector, and the like, are captured by the time fixed effects. But the "scarring" of this cyclicality are captured in the β_a's.

My results suggest that the pace of hiring for routine and manual occupations is likely slowed as a result of recessionary shocks. This means that the workers who suffer more during the post-recession recovery years are the less educated workers as these types of workers make up the largest shares of the routine and manual leaning sectors as indicated by Figures 5 and 6. Furthermore, research on the COVID recession showed that employment for workers in the lowest wage quintile were still 20 percent lower relative to the pre-COVID recession employment levels even months after the economy had begun its employment recovery journey (Cajner, Crane, Decker, Grigsby, Hamins-Puertolas, Hurst, Kurz, and Yildirmaz 2020). Given that the positive coefficients on working in abstract leaning occupations during the early ages into adulthood are offset by negative effects in working in routine and manual occupations this may indicate that lower skilled individuals who would have worked in routine and manual sectors may have been induced to pursue additional human capital skills to obtain employment in higher skilled occupations as captured by being employed in an abstract job.

In the second half of the first decade into adulthood effects of the early economic condition on employment in abstract, routine, or manual leaning occupations for the most part have attenuated to zero. There are only noticeable significant effects on working in abstract oriented occupations at age 25. At age 25 a 1 percentage point increase in the unemployment rate experienced at age 18 raises the probability of working in an abstract job by roughly

.002. This is offset by lowering the probability of working in a routine or manual job by .001 each at that age. In the later ages there are no significant differences in occupational tasks performed for heavily impacted cohorts and their luckier counterparts.

6.4 Impact on obtaining an occupational license

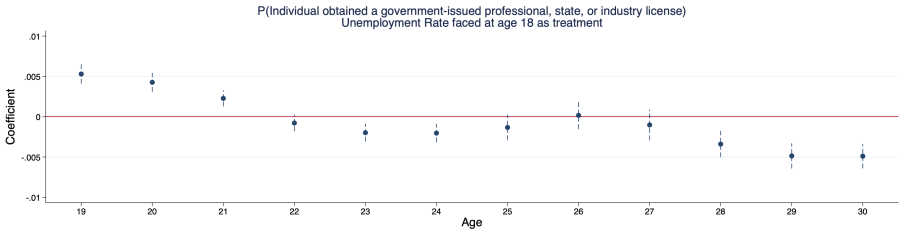
The prior results have demonstrated that recessions can serve as a stimulant for individuals to pursue additional skills that can aid them to being employed in abstract occupations. To test this hypothesis I re-run regression (1) estimating early economic effects on new outcome variables. First I explore how early conditions impact the decision to obtain an occupational license. I then test how early conditions impact the joint decision of working in an abstract oriented occupation while having obtained an occupational license. I also test the joint outcome on manual and routine occupations.

It is important to examine effects on obtaining occupational licenses for several reasons. 1) occupational licenses on average take less than 3 years, some only take 6-months, to acquire. Undertaking training in trade programs do not lead young adults who acquired these occupational certificates to also obtain a bachelors degree, but they do however provide them a certificate that they can use as a skill signal while on the job search. This may explain why early conditions accelerate the time at which recessionary cohorts are matched to occupations that are predominantly abstract leaning. 2) If young adults are on the job-search process during recessionary times and they learn through job adds of the increased demand for higher skills they may research the avenues for obtaining the necessary human capital skills to land employment in occupations that are higher paying. During their research on the avenues for obtaining additional skills recessionary cohorts may find the occupational licensing route attractive due to learning that obtaining a trade program certificate is sufficient for employment in some occupations that are high paying. For example, dental hygienists, electricians, and web developers, which are occupations that only require occupational licenses for employment, on average pay higher wages than history, theology and religion, or liberal arts oriented careers, which historically have required bachelors degree for employment in these fields. Young adults entering into their adulthood years may thus find trade programs more appealing because of the higher pay and likely because one can get these specializations faster than a bachelors degree.

Researchers have shown that occupational licenses do provide access to better quality occupations (Blair and Chung 2024); (Gittleman, Klee, and Kleiner 2018); (Koumenta and Pagliero 2019); (Blair and Chung 2019). It is thus important to determine if early economic conditions motivated young adults to pursue occupational licenses and if these economic conditions did impact the acquiring of this credential how then, if any, did early economic conditions influence the joint decision of using these credentials for employment in abstract occupations?

Figure 13 shows strong positive effects on obtaining an occupational license at ages 19 through 21. This means that there was a greater share of recessionary cohorts who obtained occupational licenses earlier in their adult life than their luckier counterparts. As young adults aged results later show that luckier cohorts followed suit by also obtaining occupational licenses in greater numbers. Towards the tail ends of the first decade into adulthood cohorts who experienced lower unemployment rates at the age of 18 had outnumbered the share of unluckier cohorts who had seen occupational licenses as more appealing earlier into their adulthood years. These results together with the positive effect of working in abstract jobs from Figure 12 suggest that heavily affected cohorts who were on the job search at ages 18-19, while facing a recession, may have used their credentials to obtain employment in more abstract leaning occupations during the early ages into adulthood. To test this hypothesis I now turn to exploring early economic effects on joint outcomes of being employed in an abstract leaning occupation while having obtained an occupational license.

Figure 13



Notes: Results are based on the specification presented in equation 1. The regression uses data from the CPS from 2000 to 2022 for individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. The figure shows coefficients from regressing a binary variable equal to one if the individual obtained a vocational certificate on the unemployment rate at the start of adulthood interacted with age dummies. Note that this sample includes individuals who are unemployed, employed, and out of the labor force. The outcome is an educational attainment variable and thus I utilized the entire sample of 19-30 year olds in the CPS surveys regardless of their employment status.

6.5 Impact on joint outcomes: working in abstract, routine, or manual jobs and having obtained an occupational license

Figure 14 shows effects on the joint decision of working in an abstract oriented job while having obtained an occupational license (top panel). Having a high unemployment rate at age 18 positively and significantly influenced the joint decision of matching the human capital skill, as measured through obtaining a trade certificate, to employment in abstract leaning occupations during the early ages, 19-21, into adulthood. Results from the middle panel further indicate that early conditions also helped young adults who had obtained a trade certificate to land employment early into their adulthood years in routine oriented occupations, which are occupations that are higher in skill than manual jobs.

My results suggest that high early conditions not only made pursuing trade certificates more attractive but also jointly influenced scarred cohorts to land employment in higher quality occupations as compared to their luckier counterparts, likely because their new credential was able to signal to employers that they were higher skilled workers. The top and middle panel show evidence of this. At ages 19 to 21 there is a greater share of recessionary workers with trade certificates employed in abstract and routine jobs as compared to cohorts who experienced lower unemployment rates at the start of adulthood. This suggests that under severe economic downturns some young adults turn to faster methods, via the trade certificate route, that highlight their skill level to future employers. This may explain why cohorts who experienced high unemployment rates early into their adulthood years were able to be employed faster in better quality occupations (abstract and routine) by signaling that they were occupationally certified workers.

The last panel demonstrates that the early conditions do not bring about differences in being an occupational certified worker and being employed in low quality jobs as compared to luckier cohorts.

Overall high early economic conditions only positively impact the joint decision of being a holder of a trade certificate and being employed in higher quality occupations at ages 19

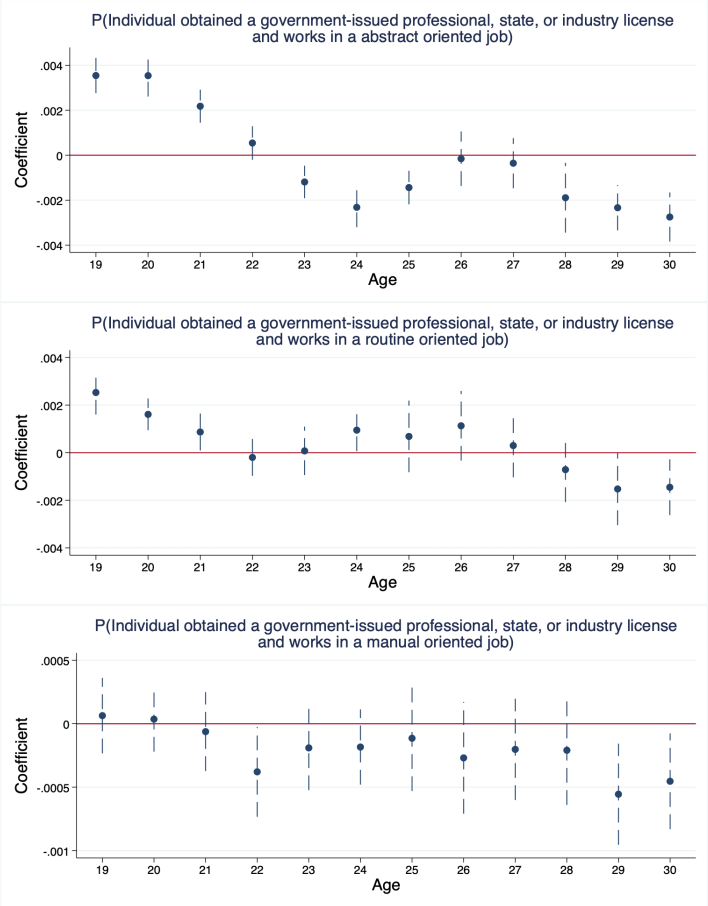
through 21, but not towards the tail ends of the first decade into adulthood. A possibility may be that luckier cohorts who obtained trade certificates may have also obtained additional credentials that unluckier cohorts may have not acquired. For example, if unluckier cohorts were anxious to get skills faster by just solely obtaining a trade certificate they may have forgone the future occupational benefits that completing a bachelors degree may have granted them. In Sanchez 2024 it was shown that towards the tails ends into the first decade into adulthood that luckier cohorts were able to complete their bachelors degrees in higher numbers as compared with unluckier cohorts who faced high unemployment rates at the start of adulthood.

Recall that Figure 3 demonstrates that the highest share of young adults that are holders of trade certificates are also college graduates. Thus the positive and significant effects at ages 19 through 21 from the top and middle panels of Figure 14 may be highlighting the non-college educated young adults while at the tail ends, at ages 28 to 30, the estimates may be highlighting the college educated young adults who happen to also have a trade certificate, but it may be that this pool of workers is smaller in number than luckier cohorts. Therefore results toward the tail ends of the first decade into adulthood indicate that there is a greater share of cohorts who faced lower unemployment rates at the start of adulthood who at later ages, 28-30, worked in higher quality jobs and were occupationally certified as compared to their unluckier counterparts.

Given that college graduates who also obtained trade certificates may be driving the bulk of the results towards the tail ends of the first decade into adulthood a follow-up question would be could recessions early in life also impact the choice of one's college major? If they do, may this also explain why a lower share of unluckier trade certificate holders work in higher quality occupations towards the tail ends of the first decade into adulthood? Perhaps high early conditions cause young adults that are occupationally trained to specialize in college majors that will have lower returns in earnings at the occupations that they end up being employed in, thus reflecting working for lower quality occupations? In the next

section, I now turn to exploring how early economic conditions impact the choice of one's college major.

Figure 14



Notes: Results are based on the specification presented in equation 1. The regression uses data from the CPS from 2000 to 2022 for employed individuals aged 19 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The figures show coefficient estimates for three different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract and the individual obtained a vocational certificate (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine and the individual obtained a vocational certificate (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual and the individual obtained a vocational certificate (bottom panel).

6.6 Impact on choice of college major

Not only can early conditions experienced at age 18 motivate young adults to pursue trade certificates, but for those who go to college conditions can also influence their choice of college major. If conditions influence the choice of college major this can also serve as an explanation for the heterogeneous effects on occupation quality measures later in life.

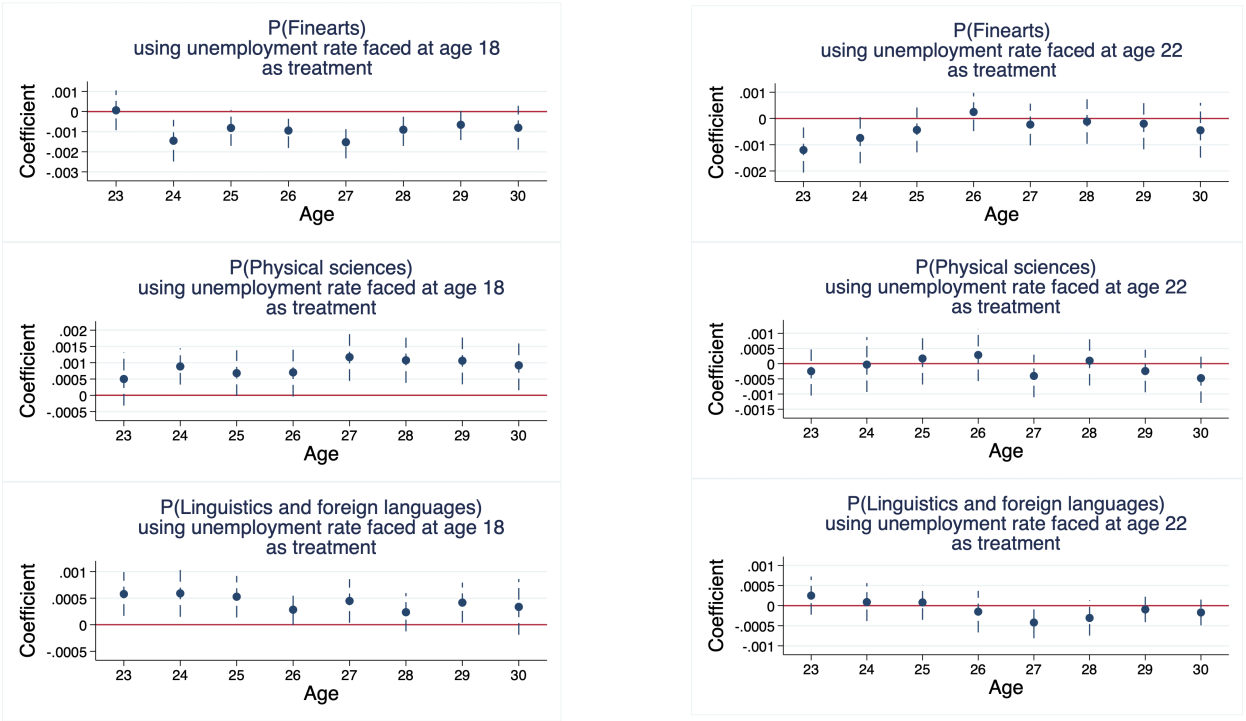
I re-run regression (1) where the outcome variables are dummy variables for the type of college major that a young adult specialized in. The main difference from prior outcomes is that for these outcomes of interest I analyze effects of early conditions on individuals aged 23 through 30 given that the typical college graduation age is roughly at age 22, thus I would not expect to see early economic effects on choice of major at ages 18 to 22. As usual, I utilize the unemployment rate faced at age 18 as the treatment variable, but to show that early conditions right at the typical time of college graduation should not affect the degree of choice I also provide results using conditions faced at age 22.

Figure 15 shows results of the probability of obtaining a fine arts degree (top panels), a physical sciences (middle panels), or a linguistics (bottom panels) undergraduate degree. In the appendix I provide results for all the college majors available in the data set used for analysis. Note that effects using the unemployment rate at age 22 are zero as expected given that the majority of young adults have already graduated from college by this age thus conditions at time of college graduation should not impact the choice of one's college major.

The key take away from the estimates in these graphs is that recessions faced at the start of adulthood (age 18) do indeed shape the academic trajectory of young adults, but only for a small number of college majors. Early economic effects on the majority of the college majors in my dataset were null throughout the first decade into adulthood. Fine arts, physical sciences, and linguistics are the only college majors that show evidence that unemployment rates experienced at the age of 18 impact wether young adults choose to specialize in these subjects. The middle panel shows that early conditions serve as a stimulant not only for young adults to pursue additional human capital skills but demonstrate that young adults

are influenced to specialize in a college major that historically has higher wage returns in the labor market. However, since the majority of all other majors have null effects one can not conclude that early conditions at the age of 18 cause young adults to specialize in more favorable majors that may aid them in being employed in higher quality jobs later in life.

Figure 15



Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

6.7 Demographic Results

Impacts of the unemployment rate faced at the start of adulthood on occupational quality measures by demographic groups are presented in the appendix, figures 23 through 29. I present results by gender and by race. Overall, across all of these demographic categories I demonstrate that these effects are similar to the patterns observed in my main specifications. Additionally, there is no meaningful variation in point estimates across gender and race groups. Although some groups have estimates higher than their respective comparison group, all of their confidence intervals overlap one another, so I can not conclude that early conditions differentially affect some groups more than others.

6.8 Robustness

6.8.1 Alternate Early Economic Condition

Figures 31 to 47 report the scarring effects from estimating equation (1) using various ages for the early economic condition. Results are robust to my benchmark specifications. All of the effects, regardless of what age is used for the early condition (e.g. 19-23), overlap the confidence intervals. Effects from these robustness specifications are significant earlier in age than those found using age 18 and effects tend to last roughly until age 26. Using the average early condition from ages 18 through 23 yet again provides results that are robust to those observed in my benchmark specification.

There may be concerns that young adults can move away from home later than when they enter into adulthood. For this reason using the state of birth as the early economic condition match may be more appropriate. I re-run regression (1) specifications but using the state of birth for the early economic condition, the state of birth fixed effect, the state of birth-by-time fixed effect, and clustering standard errors at the state of birth level. Results are again robust to those in my benchmark specification. Here effects are lower in magnitude but all effects lie within the confidence intervals of my main specification.

6.8.2 Age - Birth Year Balanced Panels

A concern when conducting research on synthetic cohort panels is that one may not be able to consistently observe the same cohorts through time. So it may be unclear if changes in point estimates are driven by changes in cohorts observed at various ages and not necessarily that one is comparing consistent cohorts across the ages that I observe individuals. For example, those becoming of age during the COVID-19 Pandemic are only observed at ages 19 and 20. If these young adults have the highest unemployment rates from all the cohorts observed at ages 19 and 20 my results will be biased upward only reflecting the COVID 19 cohorts. But because I am not able to observe these cohorts at age 21 and onward, it will be unclear to me if the effects in age 20 are worth comparing to effects at age 21 partly because different cohorts will be driving the different results. To get around this I re-run my main specifications on balanced panels. I present results in the appendix.

Figures 48 to 50 present results on the occupation quality measures for a sample that has been balanced at the age and birth-year groups. The main sample of analysis consists of individuals aged 19 to 30 who were born between 1981 to 1992. Results for the most part have similar patterns as those in my main analysis. There are a few interesting results to point out though.

In the top panel of figure 48 notice that all coefficients on log occupation specific hours of work are now negative. Whereas in the main sample effects had attenuated to zero by age 26 and onward. Additionally, all, but two, of the coefficients on the log occupation specific hourly wage outcome are also negative, bottom panel of figure 48. Whereas in the main sample only one coefficient was negative. Regarding effects on log occupation injury rates, notice that effects are positive from ages 23 through 30, figure 49. This means that a 1 unit increase in the unemployment rate faced at age 18 will lead young adults to be employed in occupations that have a higher occupation specific injury rate than their luckier counterparts. In the main sample only three coefficients were positive and statistically significant for this outcome.

It is important to note that the cohorts in this new balanced sample, at the age and birth-year group, turned 18 between 1999 and 2010. 1999 through 2010 was a time period where the economy experienced huge variation in unemployment rates. Given that some of the cohorts in this sample experienced high early conditions – predominantly those brought about by the Great Recession, we can better understand why some of the coefficients on certain outcomes changed to being all negative (occupation specific hours worked/ hourly wages). Since I can observe these cohorts all throughout the ages of 19 to 30 it is likely that the cohorts exposed to the Great Recession are the folks that are driving the changes in the coefficients from those observed with the unbalanced synthetic panel that I used in my main analysis. Although some of the coefficients have changed all confidence intervals between the two samples overlap thus the overall pattern of results remain consistent with the results from the main analysis sample.

6.8.3 Alternative measures for occupation specific hours of work and hourly wage

Depending on my outcome of interest there may be concerns that certain outcomes are actually reflecting the early economic effects on individual labor market outcomes, as shown by (Von Wachter 2020); (Rothstein 2021); (Altonji, Kahn, and Speer 2016), rather than effects on the occupation specific outcomes. Since we already know that high early conditions impact the number of hours and hourly wages that scarred cohorts work and earn, when we calculate the occupation specific hourly wage and occupation specific hours of work the measures may be biased downward since scarred cohorts work less and their hourly wages are lower. This would be true if a large portion of my cohorts were cohorts who became of age during a recession. To address this concern I recalculated the occupation specific hours of work and hourly wage measures. I measured the average hourly wage in each occupation across the observations in my sample, pooling all years and **non**-recessionary cohorts, and treated this as a measure of the occupation specific hourly wage. I then assigned

this new occupation specific hourly wage measure, matching the respective occupations, to the scarred cohorts from my original sample. I followed the same approach for reconstructing the occupation specific hours of work measure. Finally, I re-ran regression (1) and found that using the new outcome measures did not alter the main results. Overall results are robust to using different measures for the occupation specific hours of work and hourly wage outcomes.

7 Is it worse to face a recession at age 22 or 18?

The analysis above has utilized data from cohorts who became of age between 1988 to 2021. Thus effects on my outcomes of interest rely on capturing the change in outcomes for individuals of age α who experienced varying levels of entry unemployment rate conditions when they turned 18 regardless of whether that time period was a recession or not. I now turn to exploring whether facing recessions at the start of adulthood, age 18, or at the time of college graduation, age 22, provide significantly different results. To explore this I will need to leverage data for cohorts who either became of age during a recession or faced a recession at the age of 22, all other cohorts will be dropped from my main sample. More precisely in this section, I explore if facing a recession at age 22 is worse than facing a recession at age 18? Therefore, I only examine individuals who faced recessions either at the age of 18 or 22 with the focus of estimating if facing a recession later in life (age 22), as opposed to earlier (age 18) in ones adulthood years, negatively affected labor market outcomes.

The motivation for exploring if facing a recession at the age of 22 is worse than facing a recession at the age of 18 stems from the results on the analysis above, primarily the result on choice of college major. Given that high unemployment rates at age 18 significantly impact the choice of ones college major this may plausibly better equip college educated young adults to land better jobs during their first decade into their adulthood years; perhaps because these young adults adapted to choosing majors that provided them with skill-sets that the labor

market would continue to demand in recessionary and non-recessionary times. It is likely that in response to facing recessions at the age of 18 that young adults may have been nudged to specialize in recessionary proof majors. In contrast, young adults who faced recessions at the age of 22 may not have anticipated the need to use economic conditions to inform their degree of choice likely because they may have perceived to experience healthy economic conditions not only while going through their college going years, but also at the time of their graduation.

Since economic conditions faced at age 22 did not have significant effects on the choice of college major, this may mean that for young adults who graduated during a recession that they would have to face not only the economic consequences of market conditions but also face the negative returns to the college major that they chose to specialize in while going through college. To test this hypothesis I estimate the effect of facing a recession at the age of 22 on log real hourly wages for recessionary cohorts [3]. This analysis is different from Altonji, Kahn, and Speer as the economists estimate the effect of a high paying major on earnings whereas I simply estimate the effect of facing a recession later in life on log individual earnings (Altonji, Kahn, and Speer 2016). Although my regression specifications do not control for college major, if effects on facing a recession later in life do negatively impact log individual earnings this may mean that cohorts who faced recessions at age 22, rather than age 18, are facing the economic consequences of their chosen majors.

In order to compare log real hourly wages for cohorts who faced a recession at the age 18 or the age of 22 I will need to compare real hourly wages from ages 23 and onward. To ensure that my estimates for regressions at different ages are not biased due to facing multiple recessions in the first decade into adulthood I need to first analyze cohorts who only faced one recession during the first 10 years of their adulthood years. The Great Recession and the early 1990s recession are perfect cohorts for analysis given that these cohorts were not negatively impacted by another recession until after a decade into adulthood. For example

[3] I convert all of the hourly wages in my main analysis sample to 2008 dollars

the Great Recession years were from 2008 to 2009 the next recession after this one did not occur until 2019 during the COVID-pandemic. This allows me to compare the real hourly wage effect, say at age 23, for individuals who faced the Great Recession at age 22 to those who faced the same recession, but faced it at the age of 18. Thus the estimate on the Great Recession dummy at age 22 will truly just capture the change in log hourly wages at age 23 due to facing the recession later in life as opposed to earlier.

Given that the survey year in my dataset peaks at 2019, so as not to use COVID recessionary years, I only estimate log real hourly wage effects at ages 23 until age 29 this is due to the fact that for cohorts who faced the Great Recession at the age of 18 the minimum age that they were by year 2019 was 29 years of age. I now turn to describing my empirical approach.

7.1 Great Recession Cohorts

In order to determine how experiencing the Great Recession at age 22, compared to facing it at age 18, impacted log real hourly wages I employ the following regression model:

$$\mathbf{ln(realhourly)}_{i,s} = \beta_1 GreatReAt22_i + \rho \mathbf{X}_i + \delta_s + \epsilon_{i,s} \tag{2}$$

Where $\mathbf{ln(realhourly)}_{i,s}$ represents the real hourly wage of person i living in state s.

The key economic variable of interest is $GreatReAt22_i$ which represents a dummy indicator if individual i faced the Great Recession at age 22. The specification also includes main effects for state of residence (δ_s). In addition, I control for the years since experiencing the Great Recession, gender, race, the share of young adults who are employed at the cohort-state-age level, the contemporaneous unemployment rate, and the unemployment rates faced at age 18 (UR_{18}) and 22 (UR_{22}) in $\mathbf{X}_i$. Standard errors are clustered at the state level to account for unmodeled common influences that might affect state labor markets but are not captured by the state fixed effects.

I separately run this regression model for each age of the cohorts in my sample. Thus since I am estimating effects from ages 23 to 29 I employ this regression model seven times to ensure that I am only comparing real log hourly wages only for individuals of the same ages.

This empirical approach allows me to compare individuals of the same ages, surveyed in different years and residing in different states, that experienced the Great Recession at different points in time. Thus one should interpret the coefficient term β_1 to be the change in real log hourly wages for individuals of the same age experiencing the Great Recession later in life, age 22, as opposed to 18, holding constant contemporaneous conditions in state s.

Due to the fact that there are major differences in real hourly wages by highest level of education completed I run my regressions for a not college educated group and for individuals who completed at least one year of college or more. I hypothesize that effects for the non college educated group will be null. Since these individuals never went to college I expect that the timing of when they faced the Great Recession should not impact their real hourly wages because these individuals were likely never nudged to further their human capital accumulation.

For the college educated group I expect that estimates for log hourly wages will be lower for individuals who faced the Great Recession at age 22 since they likely will face a penalty of the type of major that they chose to major in when entering the labor market in a depressed time as opposed to entering their college going years during a depressed market. Those entering their college going years during a depressed market likely were more judicious in choosing majors that would reward them higher wages at the time of college graduation.

7.1.1 Great Recession Cohorts Empirical Results

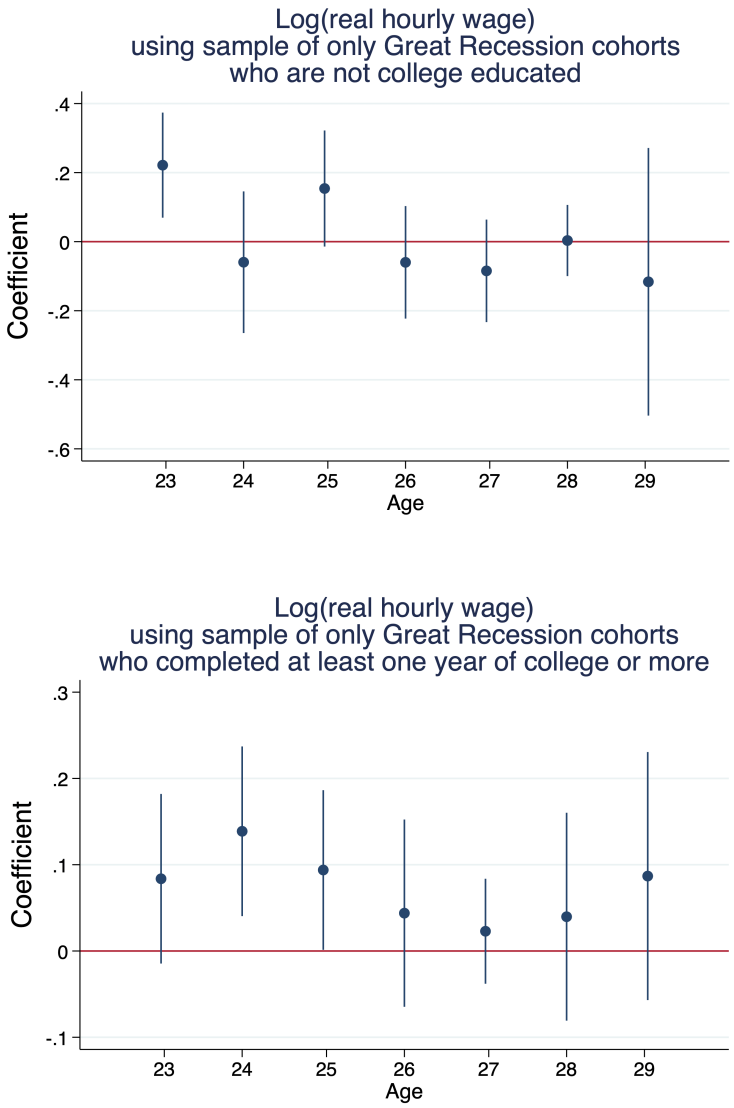
The top panel of Figure 16 shows effects on log real hourly wages for non-college educated Great Recession cohorts. As was hypothesized, for the most part effects are null for all ages.

Only at the age of 23 are effects on facing the Great Recession at age 22 positive and statistically significant. This may likely reflect that for the 23 year olds who faced the Great Recession at 22 that those who remained employed at 23 may have been the workers who had more tenure in their employed occupations, and likely had experienced healthy wage growth in their earnings prior to the Great Recession. For the employed young adults who faced the recession at age 18 they likely started their occupational trajectory at a very low earnings occupation and by age 23 they may have not yet climbed up enough in the hourly wage ladder to have similar earnings as the counterparts who faced the recession at 22. Perhaps for cohorts who faced the recession at age 18 and did obtain employment they may have just gotten offered the state minimum wages and by age 23 they may have experienced very little wage growth. It is important to note that between July 23, 2007, and July 24, 2009, the federal minimum wage rose from $5.15 to $7.25 per hour, but this increase in the federal minimum wage may have not been large enough as the wage growth experienced by more tenured workers who likely were already earning wages higher than the minimum wage. This plausibility provides a great avenue for further research. Overall, the top panel of Figure 16 suggests null effects on log hourly wages for the time period that individuals faced the Great Recession.

The bottom panel of Figure 16 shows effects on log real hourly wages for college educated Great Recession cohorts. Contrary to my hypothesis, effects are all positive from ages 23 through 29, and significant at ages 24 and 25. Young adults who faced the Great Recession at age 22 had higher unemployment rates at age 23 than the young adults who experienced the Great Recession at age 18 since unemployment rates by the time that these individuals turned age 23 had nearly reached pre Great Recession levels. Why then are log real hourly wage effects higher for individuals who faced the Great Recession at age 22, all throughout the ages of 23 to 29?

One possibility may be the use of efficiency wages. Given that during recessions there are a large number of individuals looking for work firms may have been more selective on who to

Figure 16



Notes: Results are based on the specification presented in equation 2. Each coefficient corresponds to a paramater from one separate regression for each age. In total the top and bottom panels report coefficient results for 7 different regressions. The regressions use data from the ACS from 2009 to 2019 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing log individual specific real hourly wages on a dummy variable representing if the young adult faced the Great recession at age 22. Each regression further includes controls for years since the young adult experienced the Great recession, race, gender, share employed at the cohort-age-state level, the unemployment rate faced at age 18 and 22, and a control for the contemporaneous unemployment rate. The regressions include a fixed effect for the state level that each young adult resides in. The top panel provides results for a sample of young adults who had not attended college at the time that they were surveyed. The bottom panel provides results for a sample of young adults who attended at least one year of college or more at the time that they were surveyed.

employ. They may have employed the college kids who came from higher ranked universities regardless if these individuals chose a recessionary proof college major. To attract higher ability college graduates, during the recession, firms likely used efficiency wages to prevent future poaching. This may potentially explain the positive effects on log hourly wages for the college educated group who experienced the Great Recession at the time of graduation rather than at the time at which they started their adulthood trajectory.

Another possibility as to why real hourly wages are higher for college educated cohorts who faced the Great Recession at age 22, as opposed to facing it at the age of 18, can be attributed to the procyclicality of real hourly wages as documented by Elsby, Shin, and Solon (Elsby, Shin, and Solon 2016). Among their findings, the economists show that the Great Recession had a particularly large effect on real hourly wages for U.S. women. In Figure 17 I document the average real hourly wage, measured in 2008 dollars, for employed young adults who worked in high or low paying occupations from 2000 to 2022.

Confirming observations by Elsby, Shin, and Solon I show that real hourly wages increased during the Great Recession between the years 2008 and 2009. In addition, I show that during these years real hourly wages also increased for workers who worked both in low or high paying occupations. Figure 17 suggests that for college educated Great Recession cohorts it was more advantageous for them to face the recession at the time of college graduation rather than at the age of 18. For example when comparing the real hourly wage for college educated 23 year olds my specification estimates the difference in real hourly wages in years 2009-2010, for cohorts who faced the recession at age 22, to the hourly wages in years 2013-2014, for cohorts who faced the recession at age 18. From the graph it is clear that real hourly wages were higher in 2009-2010 relative to those in 2013-2014. This means that among the college educated Great Recession cohorts those facing the Great Recession at age 22 had higher real hourly starting salaries in comparison to those who faced it at age 18. But why then do real hourly wages continue to be positive from ages 24 and onward for those who faced the Great Recession at age 22?

A possibility can be that since those facing the Great Recession at 22 had higher starting real hourly wages that as they aged their wage growth continued to be higher than the cohorts who faced the recession at the age of 18. Additionally, if college graduates were able to obtain employment at a high paying occupation during the Great Recession, not only do they have higher starting salaries because real wages overall were higher in say 2009-2010 relative to those in 2013-2014, but also because landing a job in a high paying occupation, as opposed to a low paying one, may further contribute to faster wage growth as the individual ages.

Figure 17



Notes: American Community Surveys (ACS), data are for individuals, who completed at least one year of college or more, are 19 to 30 years old, who are observed between 2000 and 2019 from my main analysis sample. The graph documents the average real hourly wage, measured in 2008 dollars, for employed young adults who work in high or low paying occupations from 2000 to 2022. An occupation is identified as a high paying occupation if the average worker in that specific occupation earns more than $17.89 per hour. $17.89 is the mean occupation specific hourly wage for the workers in my sample. Thus any worker in an occupation that pays their average worker more than this hourly wage is considered to be a worker employed in a high paying occupation. Averages are weighted using ACS analytic sampling weights.

Overall it appears that it is actually worse to face a recession at the age of 18 for college graduates, even if young adults judiciously choose better majors as a result of the Great Recession. It is thus important to further explore how facing the exact same recession earlier

in life as opposed to later impacts other upward labor mobility outcomes of college graduates, their marriage, residential, fertility decisions, and their long-term health outcomes. Different from prior literature, who utilize recessionary cohorts and non-recessionary cohorts for their analysis, examining these outcomes would shed light on how timing of the age at which young adults experience identical recessionary traumas affect long-term outcomes. Further research would need to explore if efficiency wages are indeed the driver behind the higher real hourly wages for young adults who faced the Great Recession at age 22. A way to test this could be analyzing the share of individuals who faced the Great Recession at the age of 22 that obtained jobs in a high paying occupation as opposed to a low paying one, and then determine if there is a difference in these shares for young adults who experienced the Great Recession at the start of adulthood.

7.2 Early 1990s Recession Cohorts

Do we observe similar results for the Early 1990s recessionary cohorts as those brought about from the Great Recession cohorts? For the non-college educated group yes. On the other hand, estimates for the college educated group are all nearly zero, which are different from those observed from the Great Recession cohorts. Results can be found in the Appendix from Figure 53. Findings on the early 1990s recession may suggest that there may be different attributes of recessions that matter more for wage growth. Perhaps the length of the recession may determine how important economic conditions are for wage growth? The length of the early 1990s recession was only 8 months while the Great Recession lasted roughly 19 months. Furthermore, during the early 1990s recession, the minimum wage in the United States increased from $3.80 per hour to $4.25 per hour between April 1, 1990, and April 1, 1991. This was just a 45 cent per hour increase during this period, but during the Great Recession the growth in the minimum wage was $2.10 per hour. Effects on log real hourly wages may be null due to the quick recovery from the 1990s recession and due to the small increase in the minimum wage, which may have also slowed wage growth for

workers earning higher wages.

In this section I have demonstrated that facing the Great Recession at the age of 22 was economically better than facing it earlier in life. While facing the early 1990s recession at age 22, as opposed to at the start of adulthood, had no significant effects on log real hourly wages. When analyzing various recessions together, rather than simply studying the effects of a single recession on wages, what then are the estimates on real hourly wages? I turn to the next subsection exploring if facing any recession at the age of 22 differentially affects log real hourly wages.

7.3 Early 1990s, Early 2000s, and Great Recession Cohorts

To test if facing any recession at age 22 differentially affects log real hourly wages I employ the following empirical strategy.

$$\mathbf{ln(realhourly)}_{i,s} = \beta_1 RecessionAt22_i + \rho \mathbf{X}_i + \delta_s + \epsilon_{i,s} \tag{3}$$

Notice that this regression is almost similar as that characterized in equation (2) the only difference has been that the $GreatReAt22_i$ dummy variable has now been replaced with $RecessionAt22_i$ dummy variable. Furthermore, in $\mathbf{X}_i$ I control for the years since experiencing each cohorts respective recession [4], gender, race, the share of young adults who are employed at the cohort-state-age level, the contemporaneous unemployment rate, and the unemployment rates faced at age 18 (UR_{18}) and 22 (UR_{22}). Similarly from the previous approach I separately run this regression model for each age of the cohorts in my sample, and since I am focused on comparing how facing a recession at the age of 22 impacts the real log hourly wage for recessionary cohorts I estimate results for ages 23 and onward.

The analysis in this section includes cohorts from the early 1990s, early 2000s, and the

[4]For example for cohorts who faced the Great Recession the years since facing the Great Recession would be calculated as current survey year minus 2009. For cohorts who faced the early 1990s recession the years since facing the recession would be calculated as current survey year minus 1991. This process would be repeated for all the recessionary cohorts in my sample utilizing the corresponding recession that they faced in the early years into their adulthood.

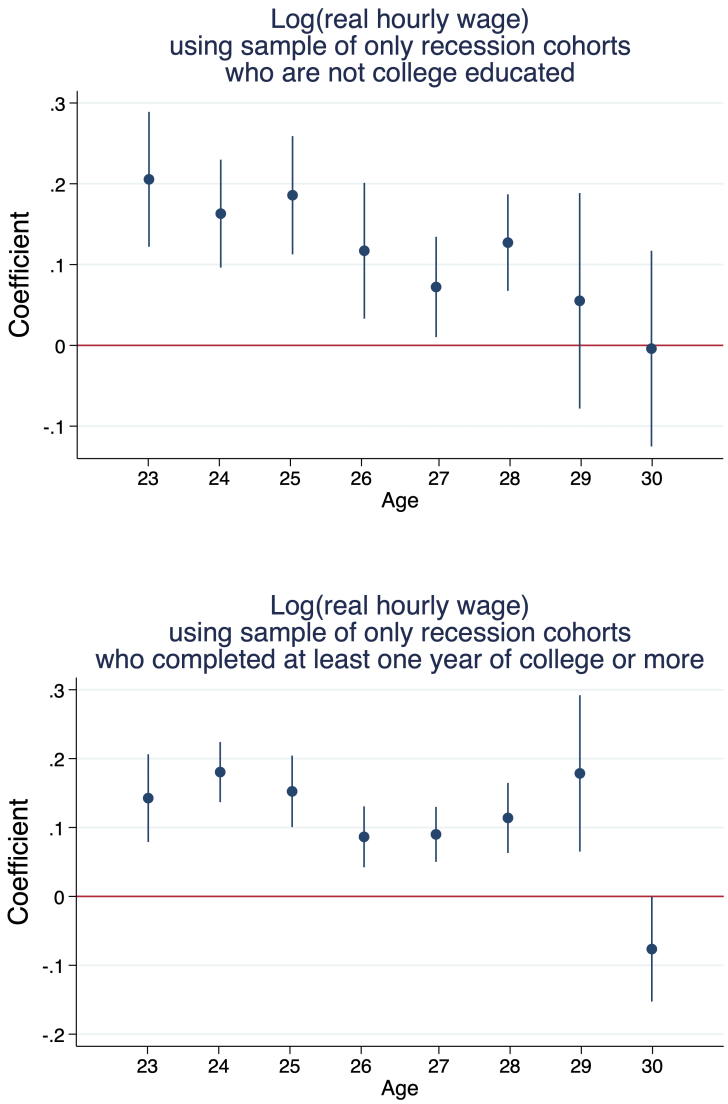
Great Recession cohorts. The cohorts from the early 1990s and the Great Recession did not experience any other recession through the first decade into their adulthood years, but the early 2000s cohort did.

To address the concerns that the early 2000s cohorts may experience twice the negative impact on their log real hourly wages, due to facing two recessions in the first decade into their adulthood years, I drop certain age groups from this particular recessionary cohort. Dropping various age groups allows me to be able to analyze the impact of facing only one recession on the real hourly wage outcome. For individuals who faced the early 2000s recession at the age of 18 I keep age groups from 23 through age 24 since at the age of 25 these individuals are also shocked with the Great Recession. For individuals who faced the early 2000s recession at the age of 22 I keep age groups from 23 through age 28 since at the age of 29 these individuals are also shocked with the Great Recession. Thus when estimating how facing any recession at the age of 22 on real hourly wages earned at the age of 23, and so on, one should not be concerned that the estimates may be biased due to effects of multiple recessions experienced during the first decade into adulthood. Results are presented in Figure 18.

The top panel of Figure 18 shows effects on log real hourly wages for non-college educated recessionary cohorts. Different for just Great Recession cohorts estimates are positive and statistically significant from ages 23 to 28. These results suggest that for non college educated employed workers that facing recessions at the age of 22 is economically better than facing recessions at earlier ages (e.g. age 18). Log real hourly wages are higher at ages 23 to 28 for young adults who faced a recession at age 22 in comparison to their counterparts who faced a recession at the age 18.

The intuition of these positive results for non college workers is similar as before. For cohorts who faced a recession at age 18 and did obtain employment they may have just gotten offered the state minimum wages and by age 23 they may have experienced very little wage growth. The most recent changes to the federal minimum wage occurred during

Figure 18



Notes: Results are based on the specification presented in equation 2. Each coefficient corresponds to a paramater from one separate regression for each age. In total the top and bottom panels report coefficient results for 8 different regressions. The regressions use data from the ACS from 2000 to 2019 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing log individual specific real hourly wages on a dummy variable representing if the young adult faced a recession in young adulthood at age 22. Each regression further includes controls for years since the young adult experienced a recession, race, gender, share employed at the cohort-age-state level, the unemployment rate faced at age 18 and 22, and a control for the contemporaneous unemployment rate. The regressions include a fixed effect for the state level that each young adult resides in. The top panel provides results for a sample of young adults who had not attended college at the time that they were surveyed. The bottom panel provides results for a sample of young adults who attended at least one year of college or more at the time that they were surveyed.

recessionary times leading these cohorts to experience wage growth, but in reality they were still at the lowest rungs of the income ladder. Additionally, since real hourly wages do not grow by much, for non-college educated workers, during the post-recession recovery years it is likely that by the ages of 23 to 28 that real hourly wages may have experienced scant increases from the new minimum wage levels that 18 year olds had obtained during the recessionary years. This may explain why estimates, between the ages of 23 to 28, on log real hourly wages are positive and significant for cohorts who faced a recession at the age of 22 as opposed to the age of 18.

Furthermore, for an individual who is becoming of age during a recessionary spell not only is starting at the lowest rungs of the income ladder a detriment to wage growth later in life, but the nature of the type of occupation that he/she is employed in can also be a detriment to the career progression of recessionary cohorts. Earlier in this analysis (figure 10) I descriptively showed that during recessionary periods that the average age of workers in high and low productive occupations increases. For example, the average age of workers in low productive occupations during 2007 was roughly 24.3 years of age while the average age of workers in high productive occupations was a little over 25.5 years. During the Great Recession the average age of workers in low productive occupations slightly increased to 24.4 but for workers in high productive occupations the average age had increased to 26 years of age, nearly a two year gap in the demographics of the types of workers in these occupations. Thus at the time of recessionary periods occupational managers may 1) be firing their youngest workers or 2) all together just not be hiring 18 year olds. This suggests that an employed 22 year old who is experiencing a recession has a lower probability of getting fired than an 18 year old who is also experiencing the same recession.

Estimates on log real hourly wages, for non-college educated workers who experienced recessions at the age of 22, may be positive and significant between the ages of 23 to 28 because 1) they were less likely to get fired compared to an 18 year old and 2) if they were employed at the age of 22 at that age they were likely already earning more than the

minimum wage thus the wage growth they would have experienced later in life would have always caused them to have higher earnings than their counterparts. Due to the increased demand for older workers, non-college educated individuals who faced recessions at the age of 18 would likely have to wait to get their first job during the economic recovery years, which would mean the time at which they would start their job could have been at the age of 22 or even 23, and with no prior work experience yet again their starting wage may have been those at the lowest rungs of the hourly wage ladder as their low earnings may have been tied to obtaining employment at a low productive occupation as a first job. Overall, the top panel of Figure 18 suggests that for non-college educated workers there is a positive wage premium for facing a recession later in life as opposed to earlier. This means that for within recessionary cohorts the career progressions are more grim for individuals who face recessions at the time at which they start their young adulthood trajectory as opposed to facing recessions later in life.

The bottom panel of Figure 18 shows effects on log real hourly wages for college educated recessionary cohorts. Yet again contrary to my hypothesis, effects are all positive and significant from ages 23 through 29. A plausibility for the persistent positive effects may be the use of efficiency wages. To attract higher ability students, during recessionary times, firms likely used efficiency wages for young adults graduating from higher tiered universities to prevent future poaching. For cohorts who faced recessions at age 18 efficiency wages may not have been offered to them when they entered the labor market upon graduating college likely because economic conditions were healthier. If efficiency wages were offered to cohorts facing a recession at the time of college graduation, but not to cohorts who entered their college going years during the recession, this can explain the positive estimates on real hourly wages, between the ages of 23 to 29.

The use of efficiency wages for college graduates during recessionary spells may be tied to the fact that during recessions the skill requirements for workers increases (Hershbein and Kahn 2018). Brad Hershbein and Lisa Kahn show positive and significant effects on firms

requiring higher cognitive skills and computer skills immediately after the Great Recession recovery years, but for some skill measures coefficients–although still significant are less positive as the years progress. The less positive coefficients on skill requirements as the years progress suggests that the skill requirements for individuals who faced a recession at the age of 18, who went on to obtain a college degree, were more slack at the time of their job search than for individuals at the age of 22 who graduated college at the time of a recession.

Even though recessions may have nudged young adults who were entering college at age 18 to pursue recessionary proof majors the fact that firms placed immediate emphasis on increasing their skill requirements during economic downturns suggests that cohorts graduating from college during recessionary times received the immediate wage premium/efficiency wage for having had obtained the new skills employers were demanding. Whereas for young adults who started their college going years during a recessionary spell, by the time of their college graduation due to firms emphasizing less that their new employees have very high skill requirements those who obtained employment likely were rewarded less in hourly real wages. This indicates that for cohorts facing a recession at the age of 22, rather than the age of 18, their starting hourly real wage may have been at a higher rung than their counterparts. If this is the case this can explain the positive coefficients at ages 23-29. Furthermore, starting at a higher rung in the hourly wage ladder may mean that at later ages those facing recessions at 22 also experienced faster wage growth during the first decade into adulthood.

Another possibility that can explain positive coefficients on log real hourly wages at ages 23-29 may be that for individuals who remained employed during recessionary spells the fear of loosing their jobs may have nudged them to work more, or become more productive, reflecting higher real wages. Thus one would expect higher real hourly wages, at age 23 and so forth, for cohorts experiencing a recession at the age of 22 as opposed to 18. For cohorts experiencing the recession at age 18 the fear of what may happen to their occupational well being may have lessened by the time these individuals are age 23 and older. Since the economic trauma is more recent for cohorts experiencing the recession at age 22 the fear of

what may happen to their job prospects may be higher thus these individuals may be more productive reflecting the higher real hourly wages. Since by ages 23 and onward economic conditions had alleviated for college educated cohorts who experienced recessions at the age of 18 these particular cohorts may have lowered their productivity effort, thus they likely experienced slower wage growth.

Although in my main data set I am not able to measure productivity for cohorts facing recessions at different points in time this is worth mentioning for future research. If I had a panel data on individuals who experienced recessions early in their adulthood I would be able to test this hypothesis by examining how often individuals get promoted at the same occupation at which they worked for when they experienced a recessionary spell. Overall it appears that it is actually worse to face a recession at the age of 18 as opposed to age 22 for both non-college and college educated recessionary cohorts.

7.3.1 Robustness: Alternate Specification Controlling for Great Recession Cohorts

Since the sample to estimate regressions from equation (3) consist of cohorts who are observed between the years of 2000 to 2022 it may likely be that the Great Recession cohorts are predominantly driving the bulk of my results since the majority of this cohort is between the ages of 23 to 30 during this time period. Thus it may be unclear if I'm actually comparing Great recessionary cohorts with other uniquely different recessionary cohorts. To address this concern I additionally control for a dummy variable representing if each individual in my sample experienced the Great Recession during the early years into their adulthood. Corresponding results are presented in Appendix Figure 52.

Results for the college educated group have slightly decreased, but overall are robust to estimates from the bottom panel of Figure 18. On the other hand, with the added control results from the non-college educated sample have almost all nearly attenuated to zero at ages 26 to 30. This shows that non-college educated Great Recessionary cohorts had an

additional hourly wage premium compared to the early 1990s and early 2000s recessionary cohorts. The additional wage premium for the Great Recession cohorts may come from the fact that the greatest change to the minimum wage came during the Great Recession with an increase of $1.40 between 2007 to 2009. The minimum wage did not increase during the early 2000s recession, and during the early 1990s recession the growth in the minimum wage was only 45 cents. Due to the large change in the minimum wage during the Great Recession not only did Great Recession cohorts have a positive wage premium at the time of the recession but the increase in the minimum wage may have further aided this cohort to experience faster wage growth at later ages, perhaps because higher wages may have nudged them to become more productive. Growth in productivity may have contributed to faster wage growth for the Great Recession cohorts, compared to the 1990s and 2000s recessionary cohorts, at later ages due to the promotions that the Great Recession cohorts may have experienced during the first decade into their adulthood years. Slow growth, or no growth at all, in the minimum wage for the 1990s and 2000s recessionary cohorts suggests that these cohorts rarely experienced frequent promotions during the first decade into their adulthood years.

Given that results changed for non-college grads after controlling for the Great Recession dummy this can indicate that it may be important to study labor market and social outcomes for recessionary cohorts individually rather than comparing them to other cohorts who either did not face any recessions in early adulthood or simply were shocked with different economic traumas. Analyzing additional labor market and social outcomes for specific recessionary cohorts may help uncover what aspects of recessions matter more for career progression.

8 Conclusion

In this article I have explored how becoming of age during times of high unemployment rates affects the types of jobs that young adults are employed in during the first decade into adulthood by estimating early economic effects on occupation quality measures. I study individuals between the ages of 19 to 30 who are observed between the years 2000 to 2022. I study effects on various occupation quality measures. First, I study how early economic conditions affect working in a low or high paying occupation. I am able to explore this by analyzing effects on the log average hourly wage that workers in young adult i's occupation earn. Second, I follow the same approach for analyzing effects on working in a more or less productive occupation measured by the number of hours of labor that workers provide to the occupation that young adult i is employed in. Third, I explore how conditions affect the type of skill/task that young adults are required to predominantly carry out in the occupation that they are employed in. I do so by determining effects on the probabilities of working in a predominantly abstract, routine, or manual oriented occupation. Finally, I explore effects on the injury rates for the occupations that young adults are employed in. Exploring effects on this outcome allowed me to determine if young adults who experienced high unemployment rates at age 18 were induced to be employed in more risky occupations compared to their luckier counterparts. I find informative and heterogeneous effects on these occupation quality outcomes.

I find that higher unemployment rates faced at age 18 will influence young adults to be employed in less productive occupations between the ages of 19 through 24, effects of which attenuated to zero thereafter. Additionally, higher early conditions do not affect, throughout the first decade into adulthood, being employed in a higher or lower paying occupation.

I found counter intuitive results on how early economic conditions affect the types of skills that young adults predominantly perform in their occupations. At ages 19 through 22, a 1 percentage point increase in the unemployment rate experienced at age 18 increased the likelihood that young adults were employed in abstract oriented occupations while de-

creasing the likelihood that they were employed in routine or manual oriented occupations. The positive effects on working in abstract oriented occupations can indicate that high unemployment rates experienced at age 18 motivated young adults to acquire human capital skills quicker than their luckier counterparts. An avenue for this may have been obtaining trade certificates, something that luckier counterparts might not have pursued. These certificates can accelerate the time at which recessionary cohorts ended up being employed in more abstract leaning occupations. Results of which I also confirmed by examining effects on obtaining a trade certificate.

I found that the unemployment rates faced at age 18 had heterogeneous effects on the occupation specific injury rate. At ages 19 through 22 higher early conditions influenced young adults to be employed in occupations that were less risky – those that reported lower injury rates. But at ages 23 through 26 early conditions influenced young adults to be employed in riskier occupations – those exhibiting higher injury rates. Effects thereafter attenuated to zero.

I ended my analysis by exploring if facing a unique recession at different points during the first decade of adulthood differentially impacted the individual specific earnings outcome. I found that for college educated Great Recession cohorts that it was more advantageous for them to face the recession at the time of college graduation rather than at the age of 18. In part what may have attributed to this advantage was that real hourly wages increased during the Great Recession between the years 2008 and 2009 for workers who worked both in low and high paying occupations. Since those facing the Great Recession at 22 had higher starting real hourly wages, as compared to young adults who faced a recession at age 18, as these cohorts aged their wage growth continued to be higher than the cohorts who faced the recession at the age of 18 likely because for the 18 year old recessionary cohorts their starting wages may have been lower due to their minimal occupational skills thus reflecting a slower pace of climbing the earnings ladder.

In conclusion, this paper brings about further areas and questions worth researching.

First, there is none, to my knowledge, or little research exploring how early conditions affect if individuals are employed in occupations that only pay them the state minimum wage. This has perhaps been overlooked because college graduates have been the primary focus group on previous studies. Looking at these populations will help give further clarity on how economic conditions, if any, contribute to inequality. Second, prior research has studied how conditions affect the firm size that heavily affected cohorts work in. A parallel to this would be to investigate how early conditions affect the occupation size (i.e. the number of workers by occupation OCC ACS codes) that heavily affected cohorts end up working in. Estimates on the occupation size, rather than type of firm employed at, may help uncover which occupations are vulnerable to future extinction. Third, testing how perception of being a low ability worker due to starting employment in lower quality occupations may help economists understand if recessionary conditions bring about discrimination tendencies in the hiring process.

Fourth, given that recessions early in life made pursuing trade certificates more appealing a question for future research may be if college tuition costs increased during recessionary periods, and if so did this influence the decision to acquire trade certificates rather than obtaining a bachelors degree for cohorts with high early conditions? Fifth, since labor supply during recessions dramatically increases this gives employers more market power on being choosier with who they hire thus it would be advantageous to explore the characteristics of workers who obtained employment during recessionary periods. Doing so may reveal if employers hire more workers from higher ranked universities as opposed to workers from lower ranked colleges thus further contributing to social inequality. Lastly, since early economic effects were heterogeneous on working in higher or lower productive occupations it is fruitful to study if these effects are a result of workers choosing to be less productive during recessionary times or if the nature of the occupations available for employment during recessionary periods just happen to be the less productive ones. Clearly, there are further topics and more narrow population groups to study in the already robust scarring effect literature.

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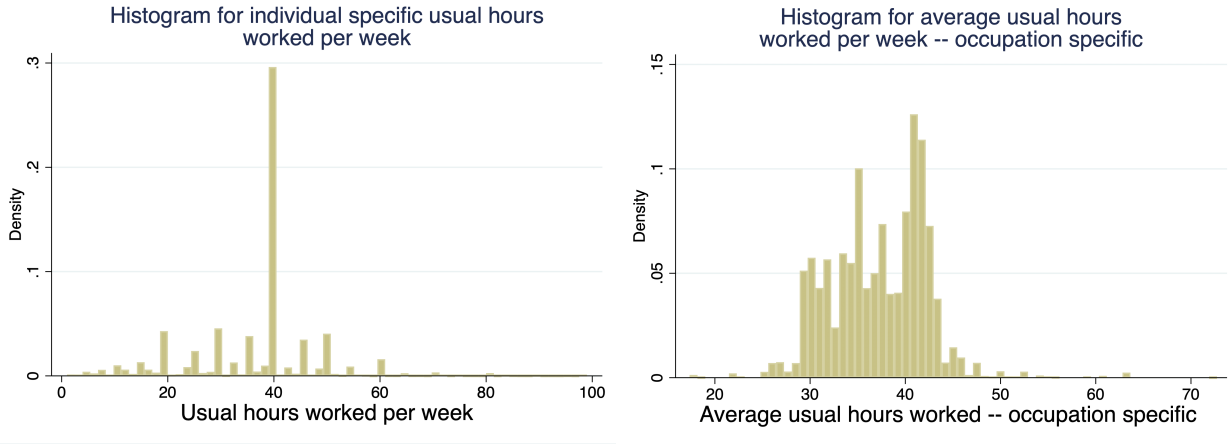
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Appendix Figures

Summary Statistic Graphs

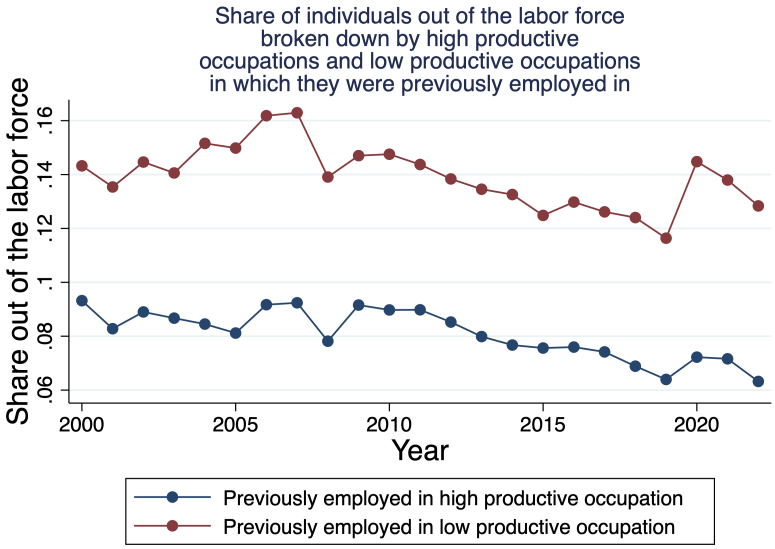
Figure 19



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022 from my main analysis sample. The left panel shows a histogram documenting the usual hours of work that each individual in my sample worked per week. The right panel shows a histogram documenting the average hours of work of the typical worker for each occupation that the individuals in my sample work in.

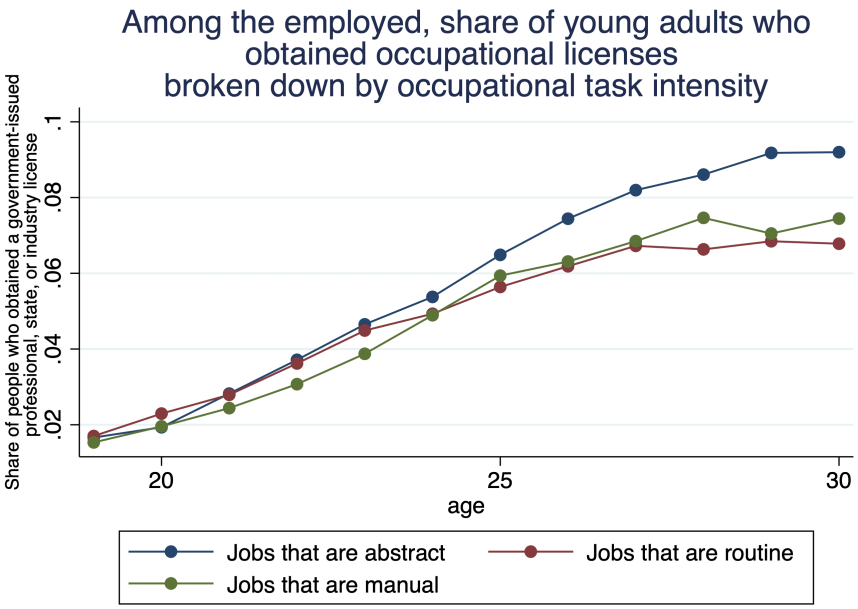
Demographic Graphs

Figure 20



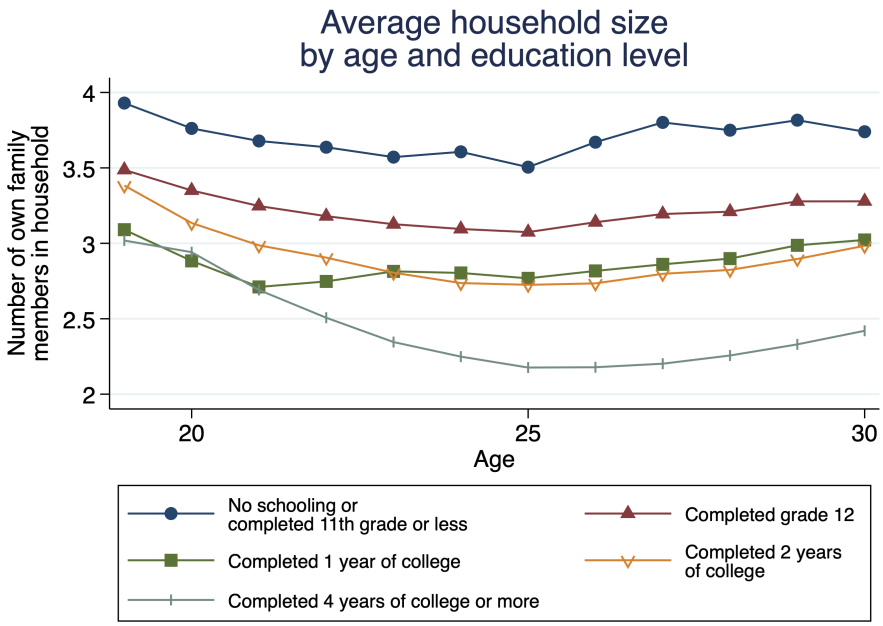
Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. Note that these statistics are not constructed from my main analyses sample as I need information on unemployment and out of the labor force status of young adults to construct the appropriate labor force participation measurements. The figure documents the share of young adults who are out of the labor force. The share of young adults out of the labor force is broken down by the productivity status of the prior occupation in which they worked in before leaving the labor force. Averages are weighted using ACS sampling weights.

Figure 21



Notes: Current Population Surveys (CPS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the share of young adults who obtained a vocational certificate by age and occupational task level. Averages are weighted using CPS sampling weights

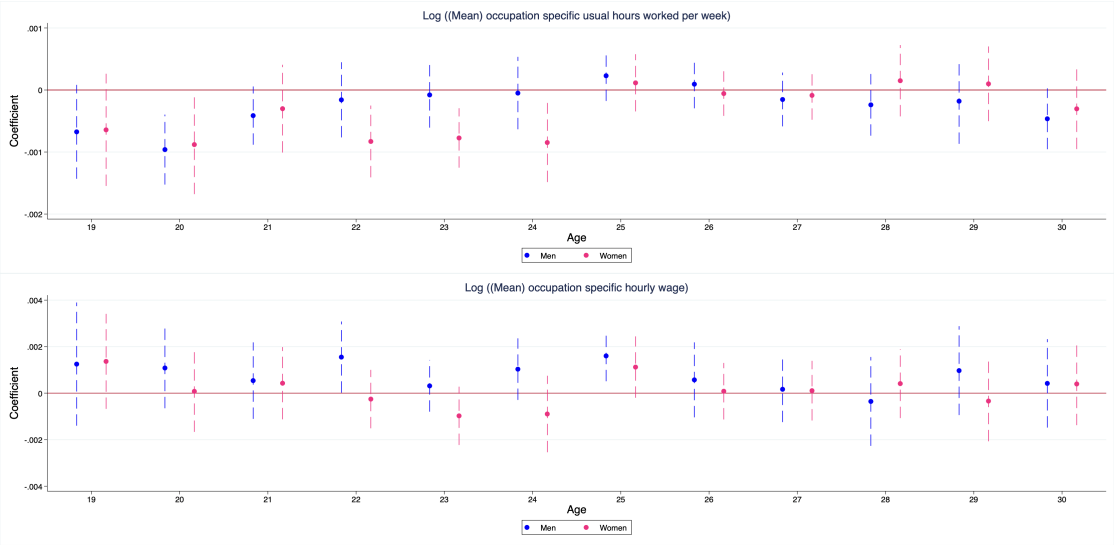
Figure 22



Notes: American Community Surveys (ACS), data are for individuals that are 19 to 30 years old who are observed between 2000 and 2022. The figure documents the average household size among the employed young adults in my main analysis sample. The statistics are broken down by age and education level. Averages are weighted using ACS sampling weights.

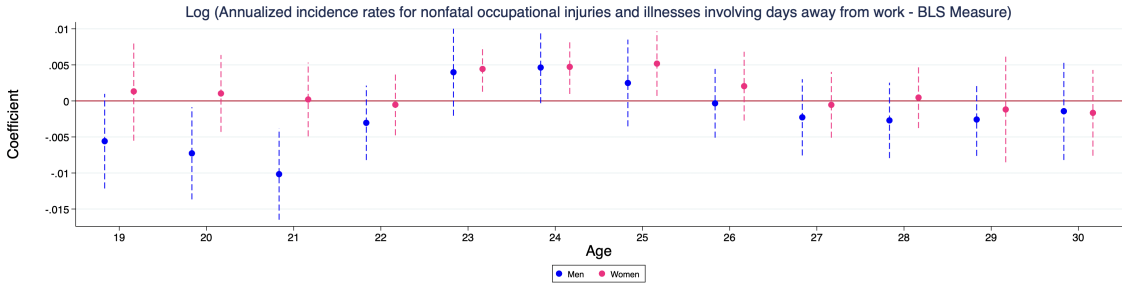
Results by Gender

Figure 23



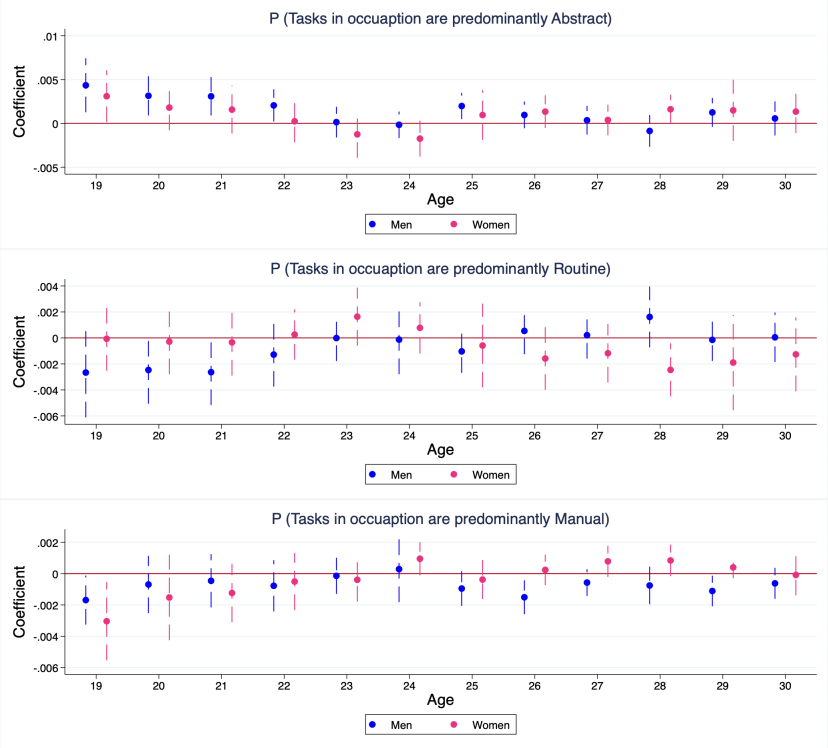
Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The top and bottom panels are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The top panel shows coefficient estimates ($\beta'_a s$) from regression 1 where the outcome variable is the log of the average occupation specific hours of work that individuals in that occupation supply. The bottom panel shows coefficient estimates where the outcome variable is the log of the average occupation specific hourly wage. These results are separated by gender. Where blue coefficients represent estimates for men while the pink coefficients represent estimates for women.

Figure 24



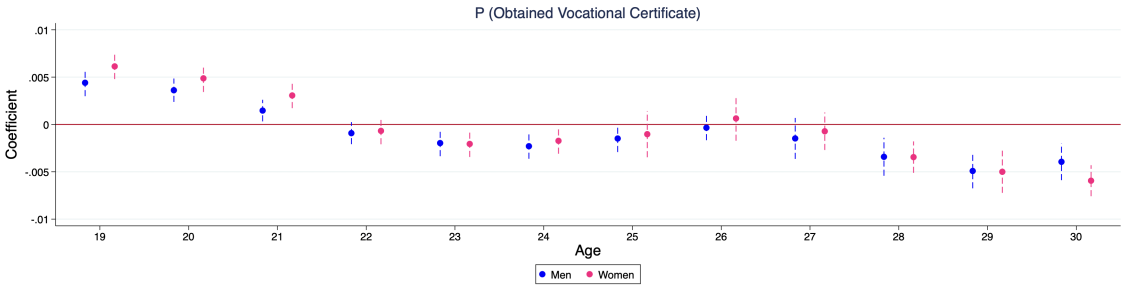
Notes: Results are based on the specification presented in equation 1. The regression uses data from the ACS from 2000 to 2022 for individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. Results are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The figure shows coefficients from regressing log occupation specific injury rates on the unemployment rate at the start of adulthood interacted with age dummies. These results are separated by gender. Where blue coefficients represent estimates for men while the pink coefficients represent estimates for women.

Figure 25



Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. Results are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The figures show coefficient estimates for six different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom panel). These results are separated by gender. Where blue coefficients represent estimates for men while the pink coefficients represent estimates for women.

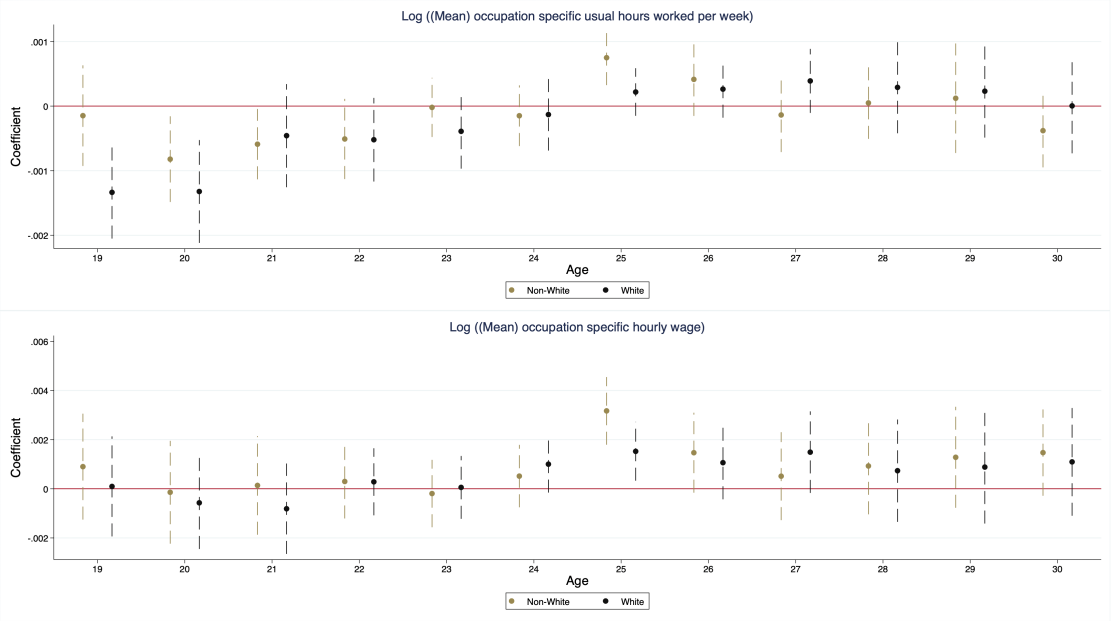
Figure 26



Notes: Results are based on the specification presented in equation 1. The regression uses data from the CPS from 2000 to 2022 for individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. The figure shows coefficients from regressing a binary variable equal to one if the individual obtained a vocational certificate on the unemployment rate at the start of adulthood interacted with age dummies. Note that this sample includes individuals who are unemployed, employed, and out of the labor force. The outcome is an educational attainment variable and thus I utilized the entire sample of 19-30 year olds in the CPS surveys regardless of their employment status. These results are separated by gender. Where blue coefficients represent estimates for men while the pink coefficients represent estimates for women.

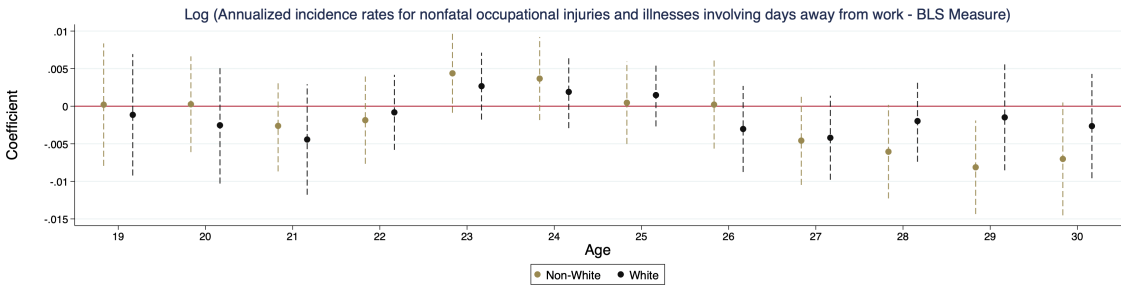
8.1 Results by Race

Figure 27



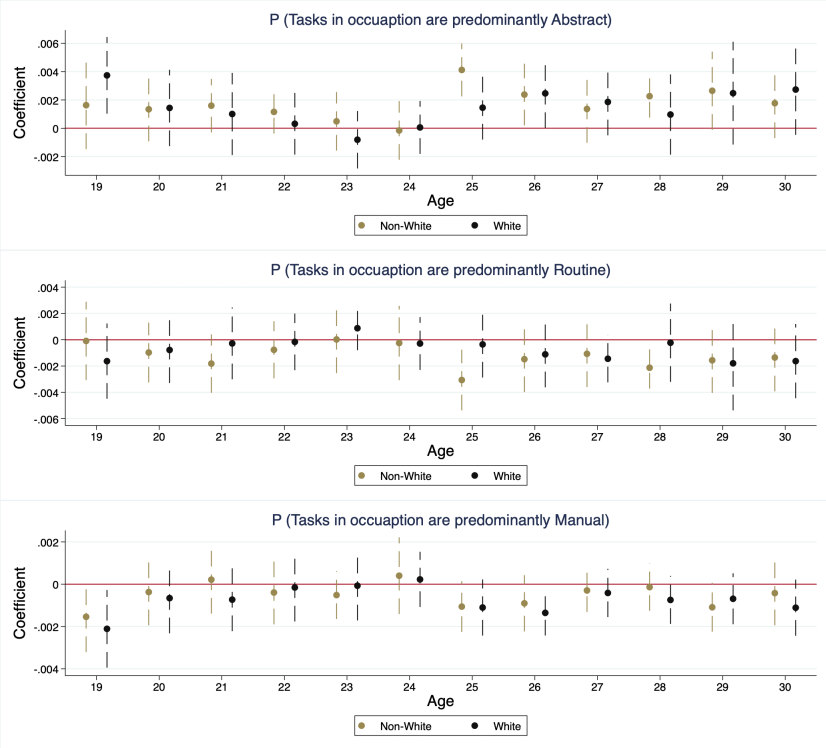
Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The top and bottom panels are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The top panel shows coefficient estimates ($\beta_a's$) from regression 1 where the outcome variable is the log of the average occupation specific hours of work that individuals in that occupation supply. The bottom panel shows coefficient estimates where the outcome variable is the log of the average occupation specific hourly wage. These results are separated by race. Where the black coefficients represent results for white individuals while the brown coefficients represent all others.

Figure 28



Notes: Results are based on the specification presented in equation 1. The regression uses data from the ACS from 2000 to 2022 for individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. Results are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The figure shows coefficients from regressing log occupation specific injury rates on the unemployment rate at the start of adulthood interacted with age dummies. These results are separated by race. Where the black coefficients represent results for white individuals while the brown coefficients represent all others.

Figure 29

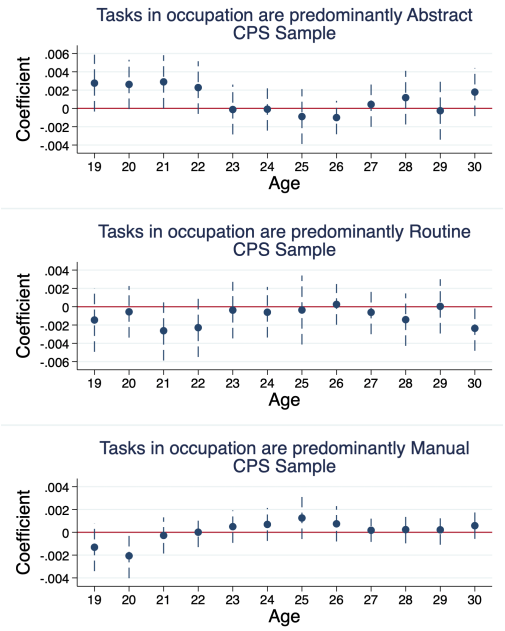


Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. Results are based on the main sample of all 19 to 30 year olds observed between 2000 to 2022. The figures show coefficient estimates for six different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom panel). These results are separated by race. Where the black coefficients represent results for white individuals while the brown coefficients represent all others.

9 Robustness Graphs

9.1 Alternate Sample

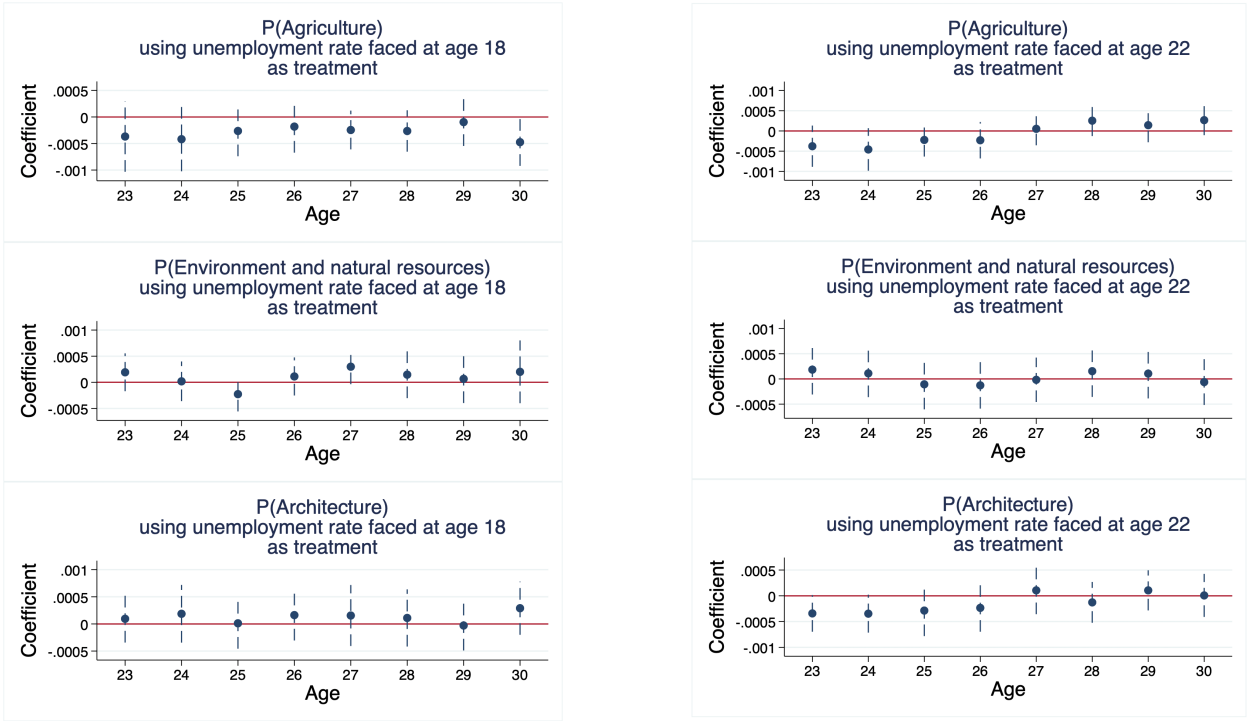
Figure 30



Notes: Results are based on the specification presented in equation (1) but on a CPS sample from 2000 to 2022 for employed individuals aged 19 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The figures show coefficient estimates for three different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom panel).

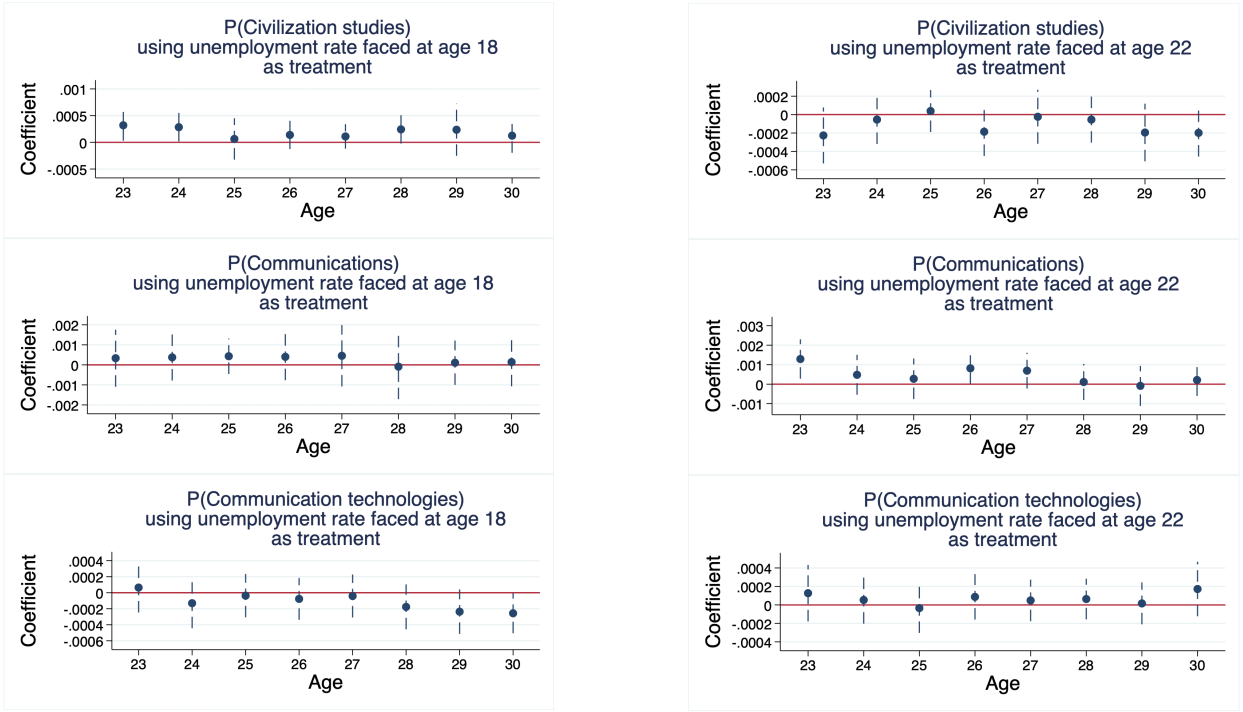
9.2 Alternate Early Economic Condition

Figure 31



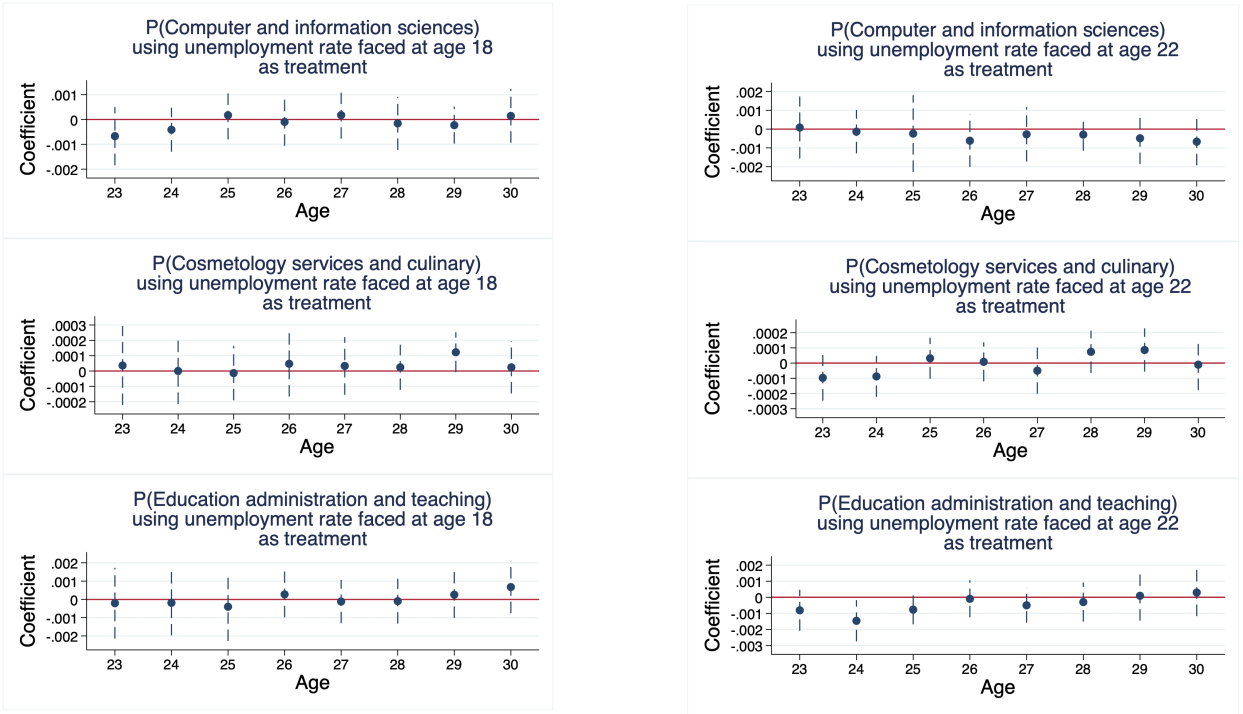
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 32



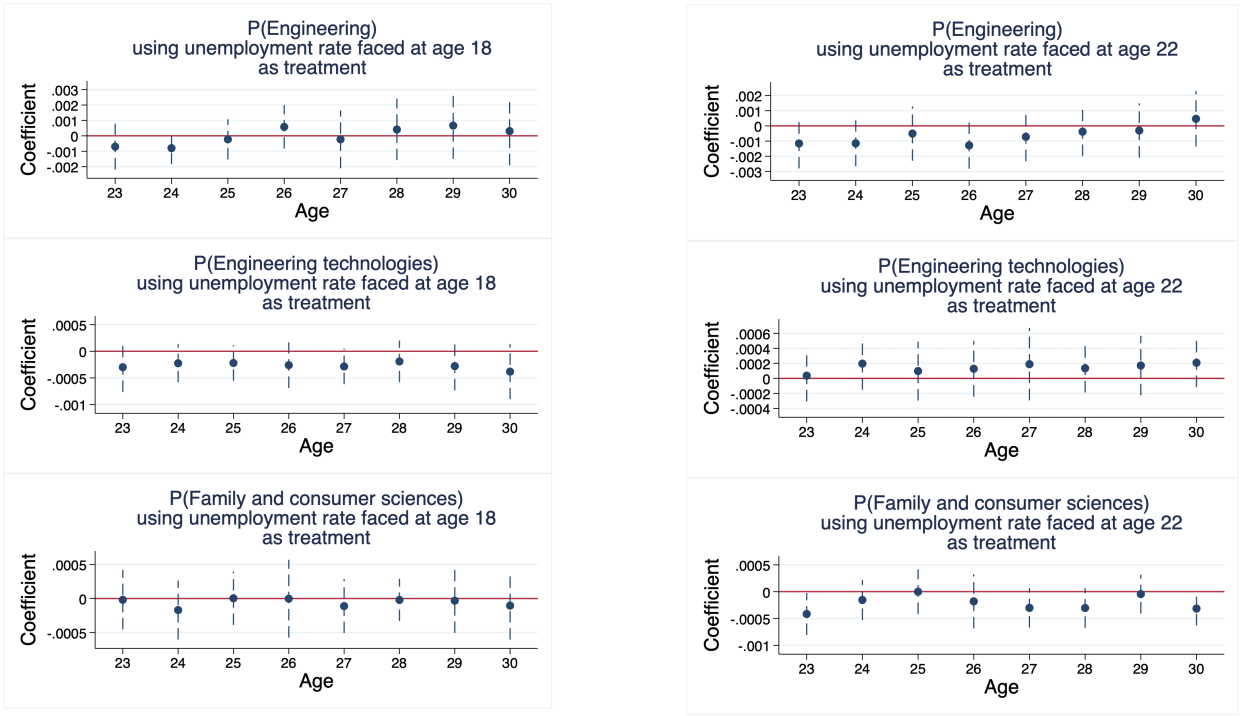
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 33



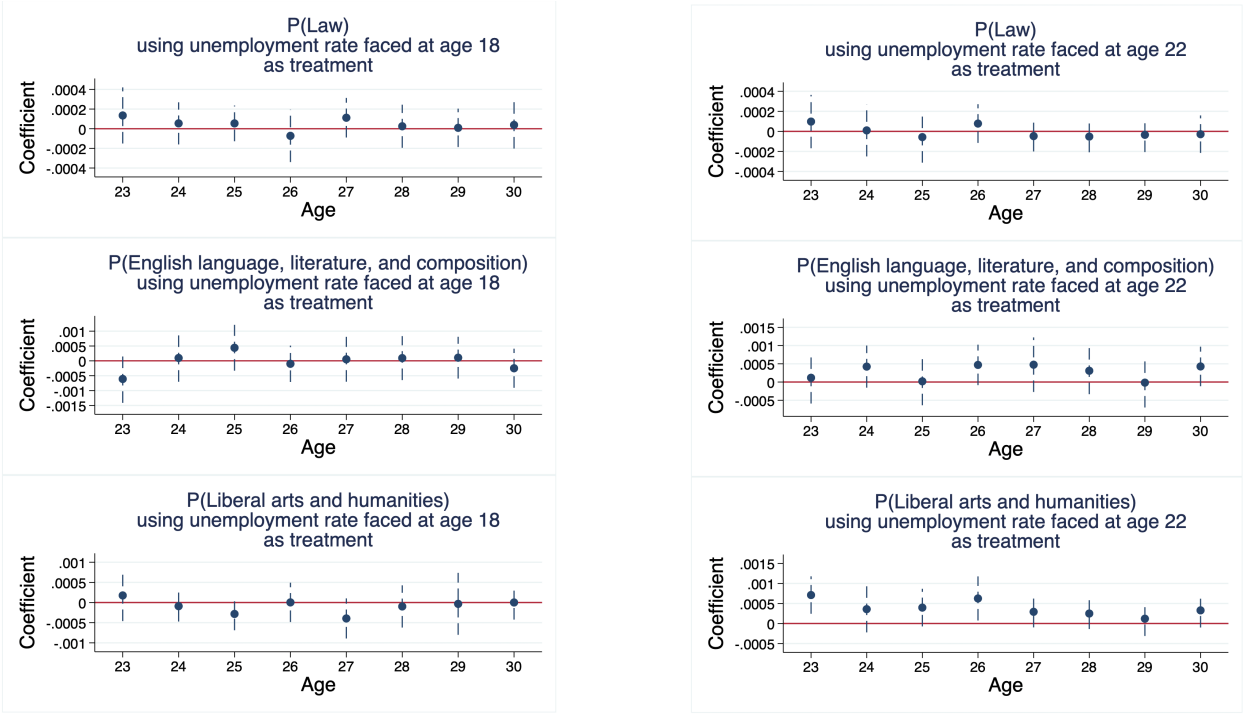
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 34



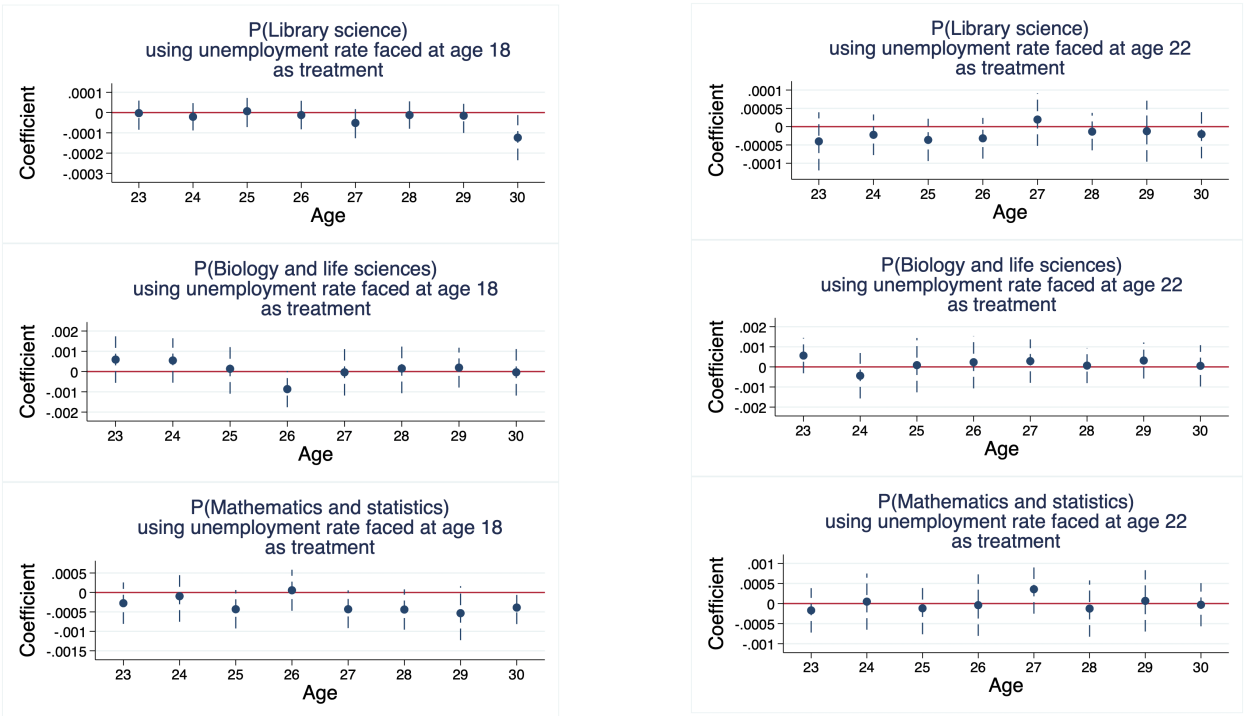
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 35



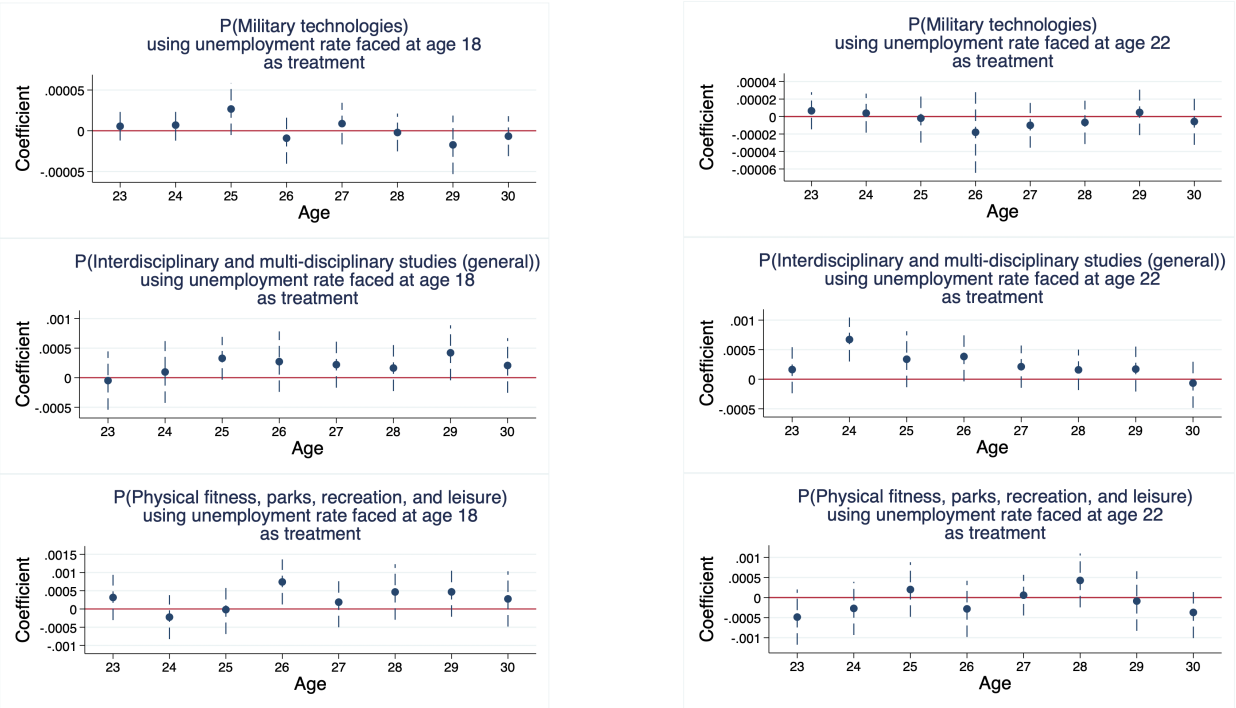
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 36



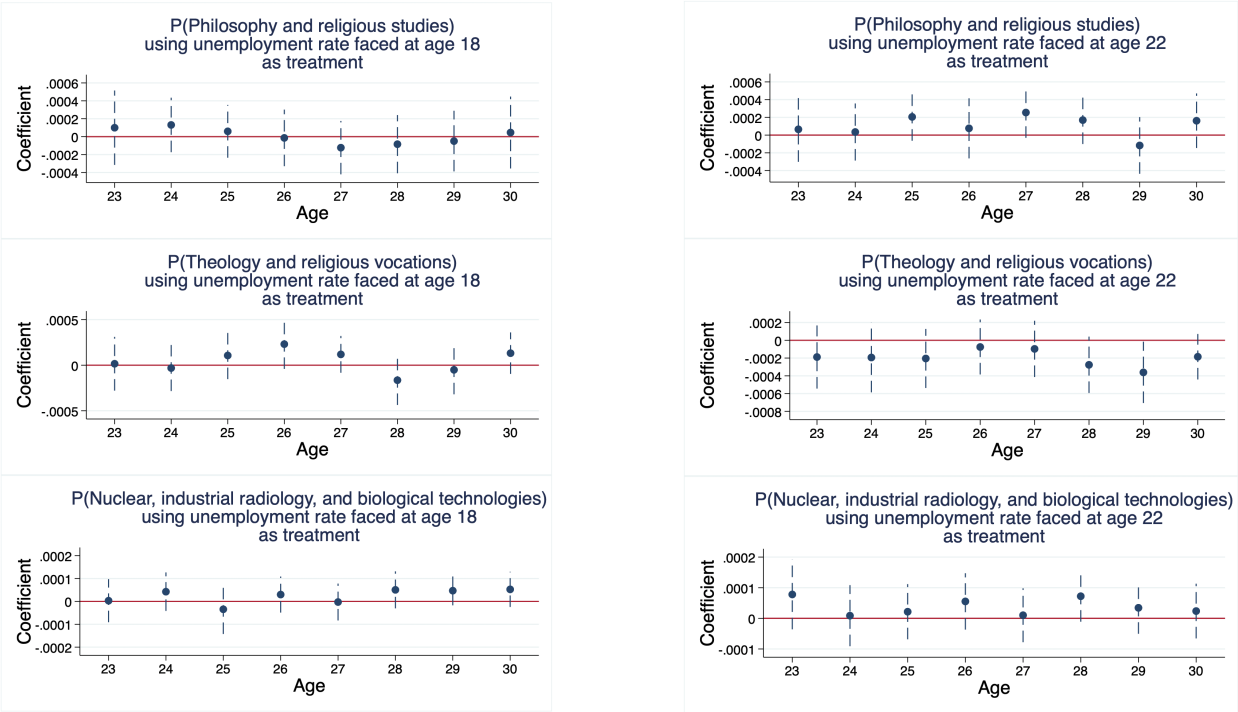
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 37



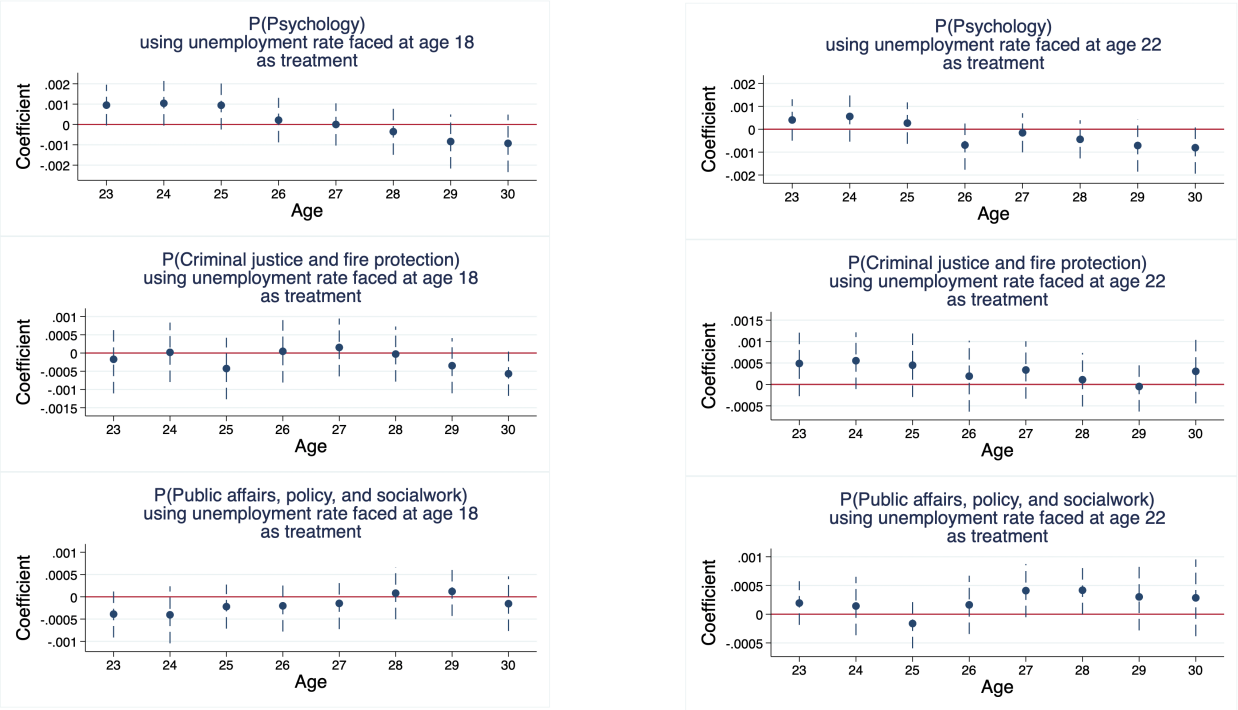
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 38



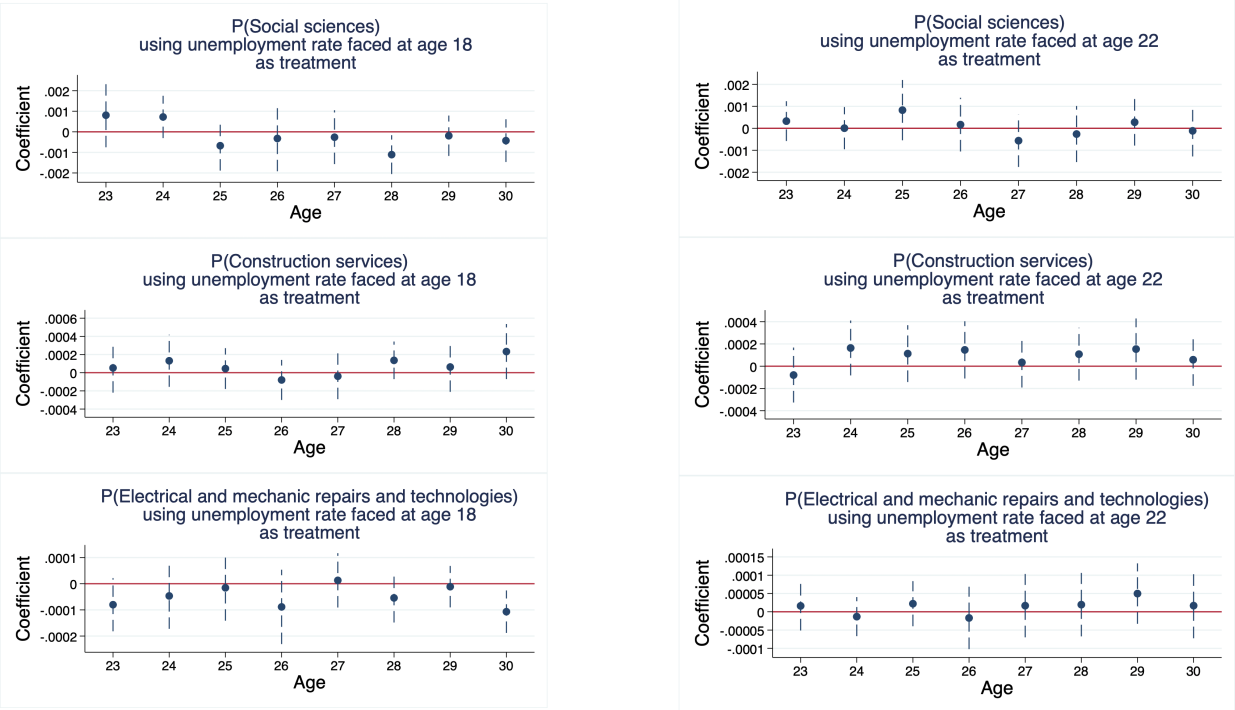
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 39



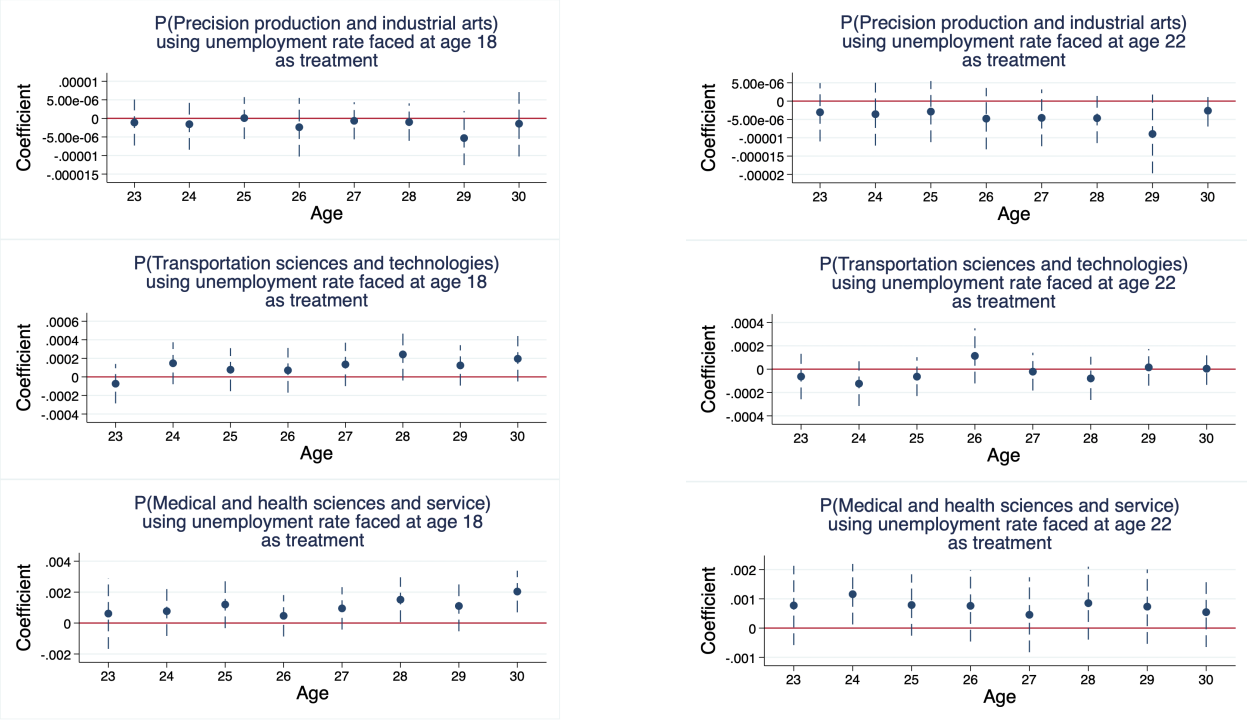
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 40



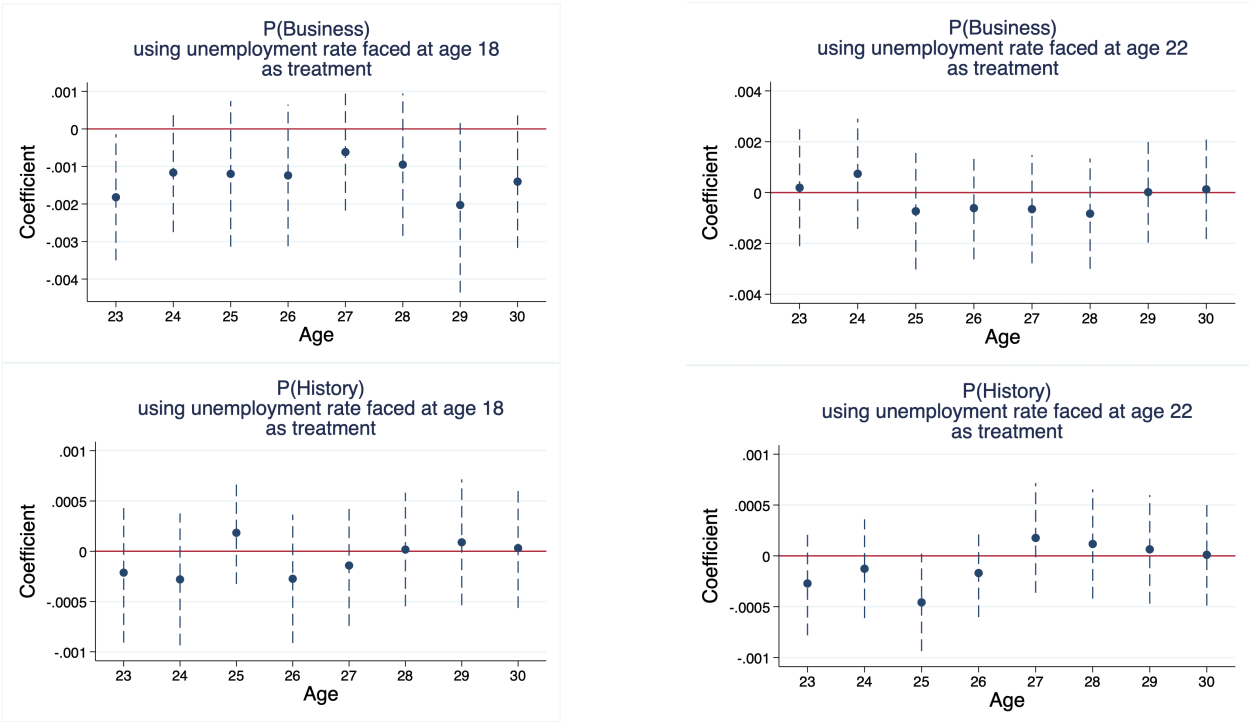
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 41



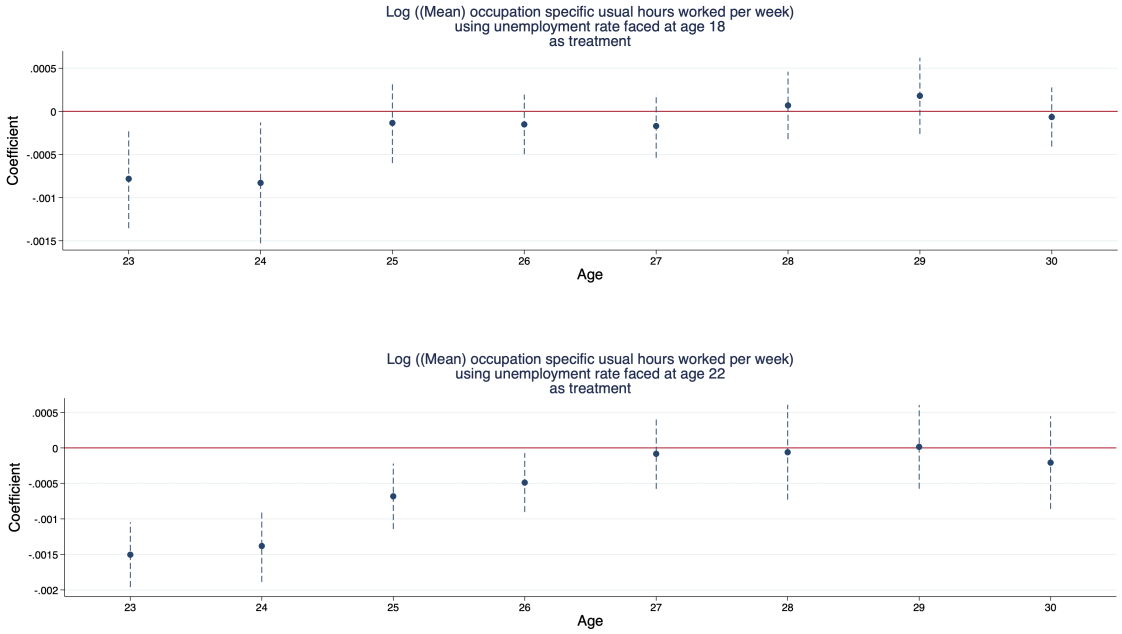
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 42



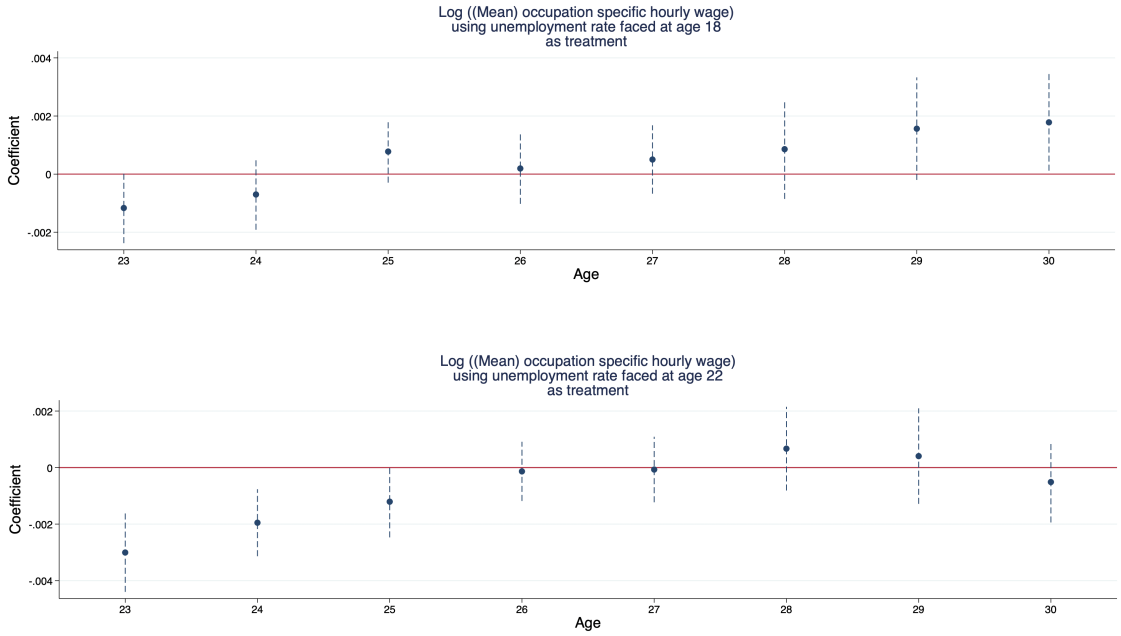
Notes: Results are based on the specification presented in equation 1. The regressions use data from the ACS from 2009 to 2022 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing binary variables representing the field in which young adults received a Bachelor's degree in on the unemployment rate at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. The outcome is a college specific variable and thus I utilized a college educated sample of 23-30 year olds in the ACS surveys regardless of their employment status. The regressions do not include a control for the share employed at the cohort-state-age level.

Figure 43



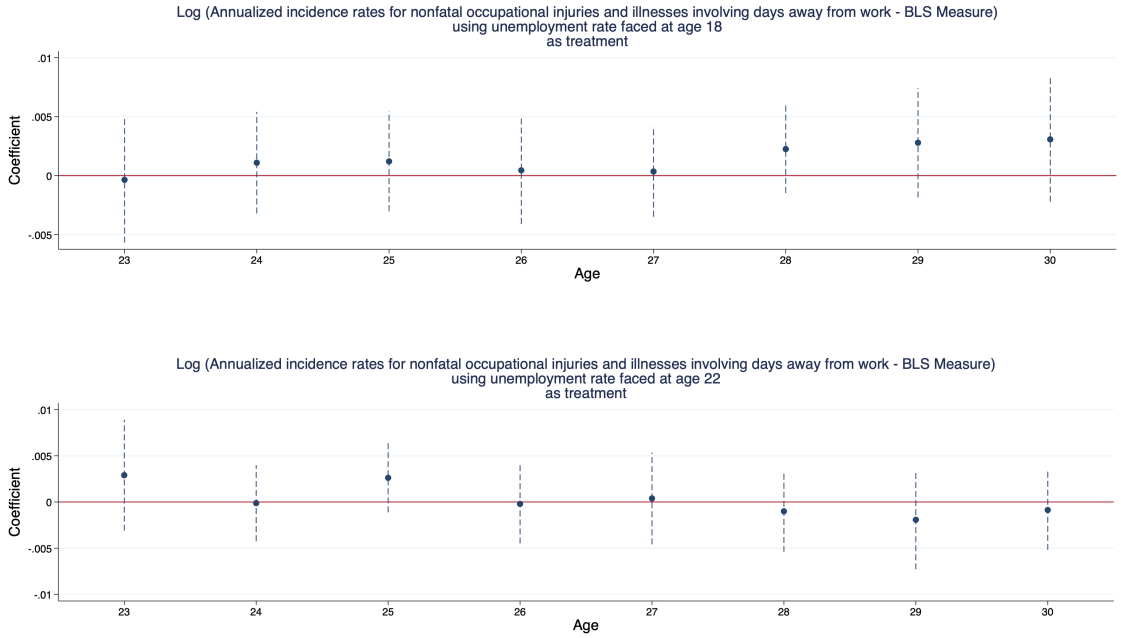
Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing the log of the average occupation specific hours of work that individuals in that occupation supply on the unemployment rate at the start of adulthood (top panel) and at age 22 (bottom panel) interacted with age dummies. To ensure adequate comparisons, the top and bottom panels are based on a sample of 23 to 30 year olds observed between 2000 to 2022.

Figure 44



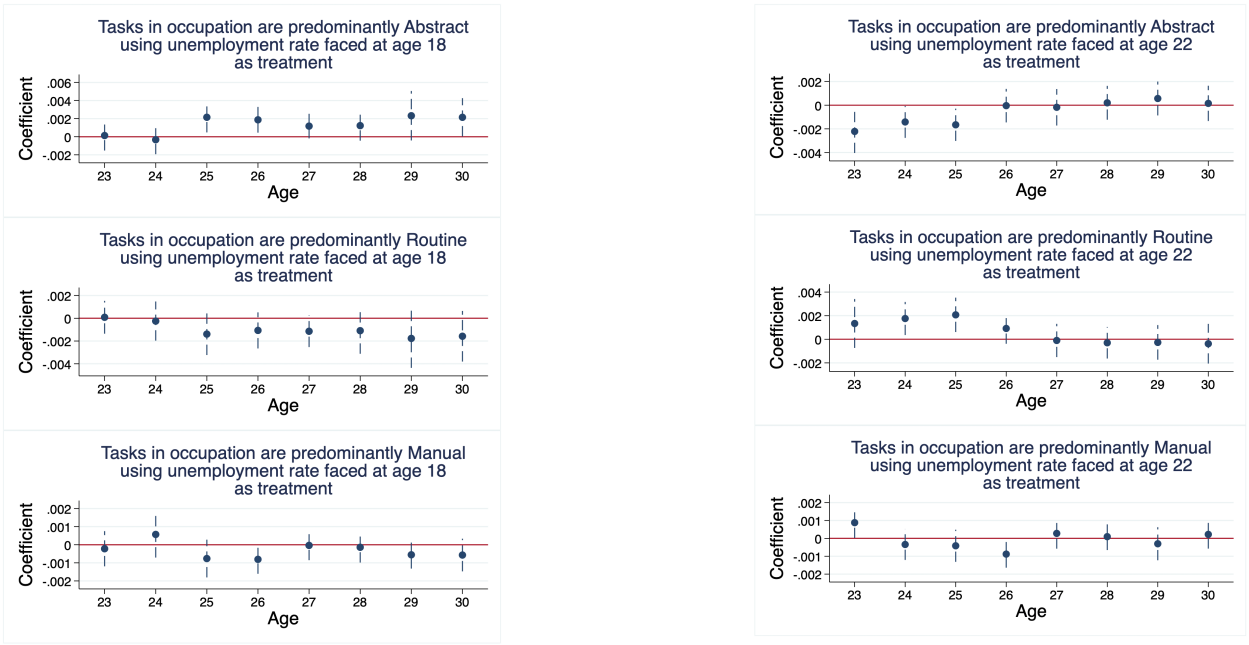
Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing the log of the average occupation specific hourly wage on the unemployment rate at the start of adulthood (top panel) and at age 22 (bottom panel) interacted with age dummies. To ensure adequate comparisons, the top and bottom panels are based on a sample of 23 to 30 year olds observed between 2000 to 2022.

Figure 45



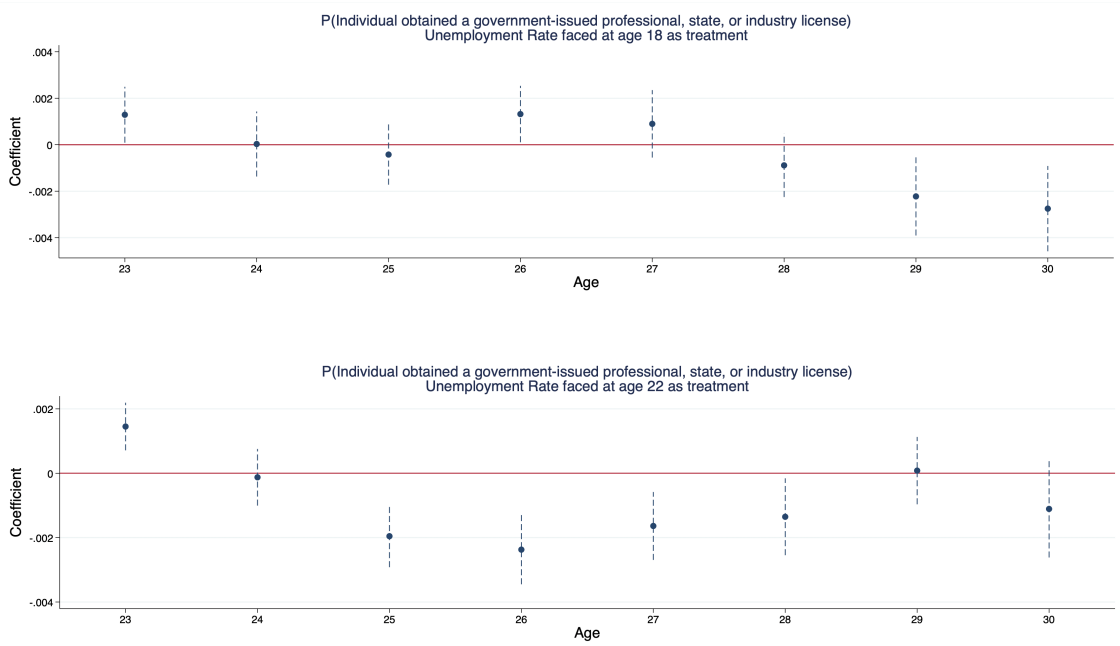
Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing the log occupation specific injury rates on the unemployment rate at the start of adulthood (top panel) and at age 22 (bottom panel) interacted with age dummies. To ensure adequate comparisons, the top and bottom panels are based on a sample of 23 to 30 year olds observed between 2000 to 2022.

Figure 46



Notes: Results are based on the specification presented in equation 1, using data from the ACS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood (left panels) and at age 22 (right panels) interacted with age dummies. To ensure adequate comparisons, the left and right panels are based on a sample of 23 to 30 year olds observed between 2000 to 2022. The figures show coefficient estimates for six different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top left and right panels), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle left and right panels), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom left and right panels).

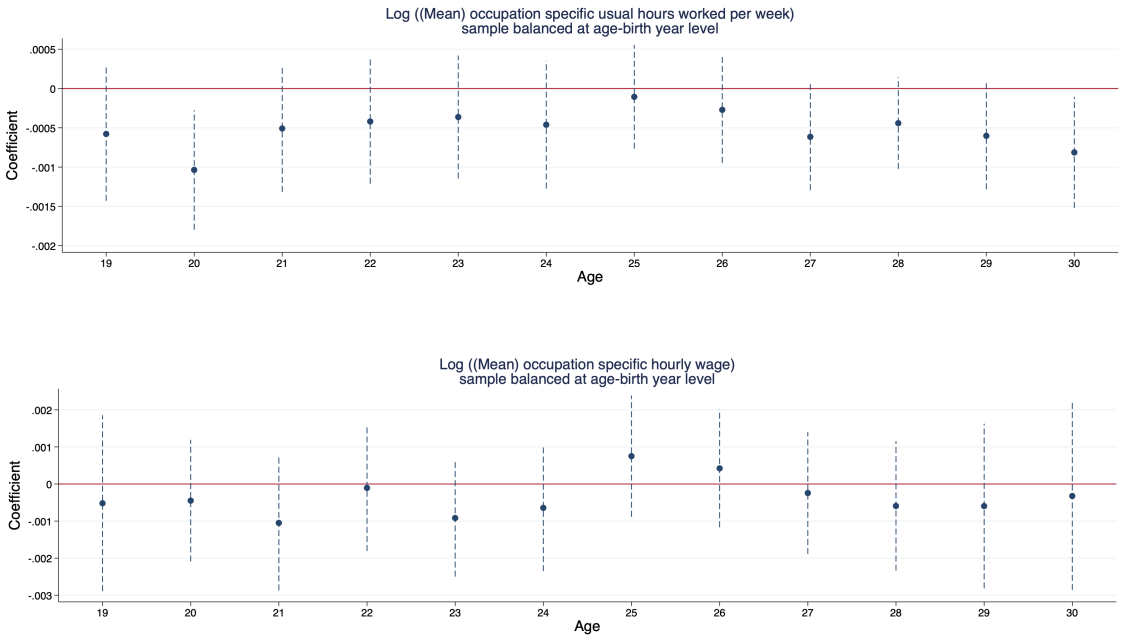
Figure 47



Notes: Results are based on the specification presented in equation 1, using data from the CPS from 2000 to 2022. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing a binary variable equal to one if the individual obtained a vocational certificate on the unemployment rate at the start of adulthood (top panel) and at age 22 (bottom panel) interacted with age dummies. To ensure adequate comparisons, the top and bottom panels are based on a CPS sample of 23 to 30 year olds observed between 2000 to 2022. Note that this sample includes individuals who are unemployed, employed, and out of the labor force. The outcome is an educational attainment variable and thus I utilized the entire sample of 23-30 year olds in the CPS surveys regardless of their employment status.

9.3 Age and Birth-Year Balanced Panels

Figure 48



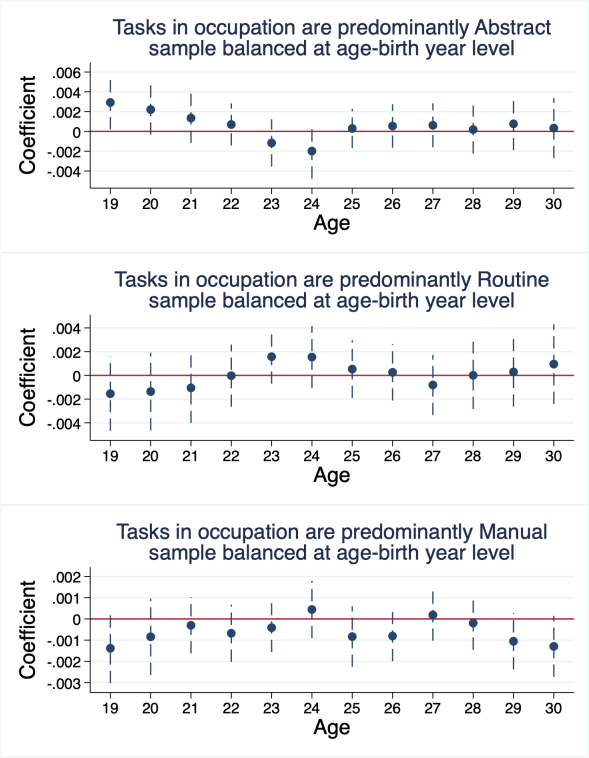
Notes: Results are based on the specification presented in equation 1. I restrict the sample to a balanced panel of age and birth year cohorts. The resulting sample are individuals aged 19 to 30 who were born between 1981 to 1992. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies. The top panel shows coefficient estimates ($\beta'_a s$) from regression 1 where the outcome variable is the log of the average occupation specific hours of work that individuals in that occupation supply. The bottom panel shows coefficient estimates where the outcome variable is the log of the average occupation specific hourly wage.

Figure 49



Notes: Results are based on the specification presented in equation 1. I restrict the sample to a balanced panel of age and birth year cohorts. The resulting sample are individuals aged 19 to 30 who were born between 1981 to 1992. The figure shows coefficients and confidence intervals clustered at the state level. The figure shows coefficients from regressing log occupation specific injury rates on the unemployment rate at the start of adulthood interacted with age dummies.

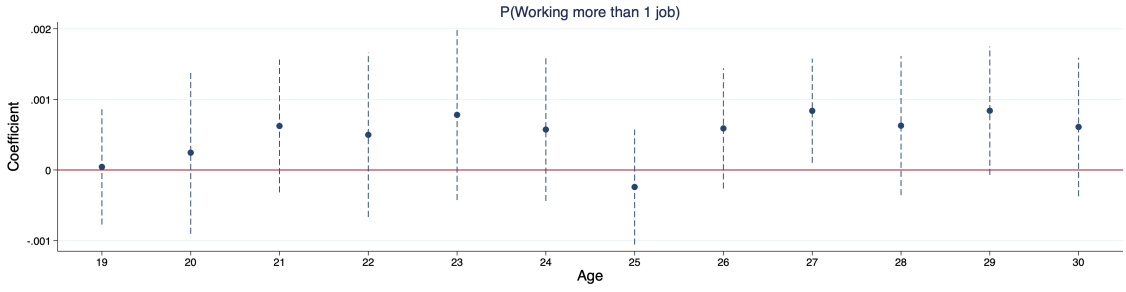
Figure 50



Notes: Results are based on the specification presented in equation 1. I restrict the sample to a balanced panel of age and birth year cohorts. The resulting sample are individuals aged 19 to 30 who were born between 1981 to 1992. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing specified outcome variables on unemployment rates at the start of adulthood interacted with age dummies.The figures show coefficient estimates for three different regressions where the outcomes are 1) binary variable equal to one if the predominant tasks in one's occupation are abstract (top panel), 2) binary variable equal to one if the predominant tasks in one's occupation are routine (middle panel), and 3) binary variable equal to one if the predominant tasks in one's occupation are manual (bottom panel).

9.4 Early economic effects on working multiple jobs

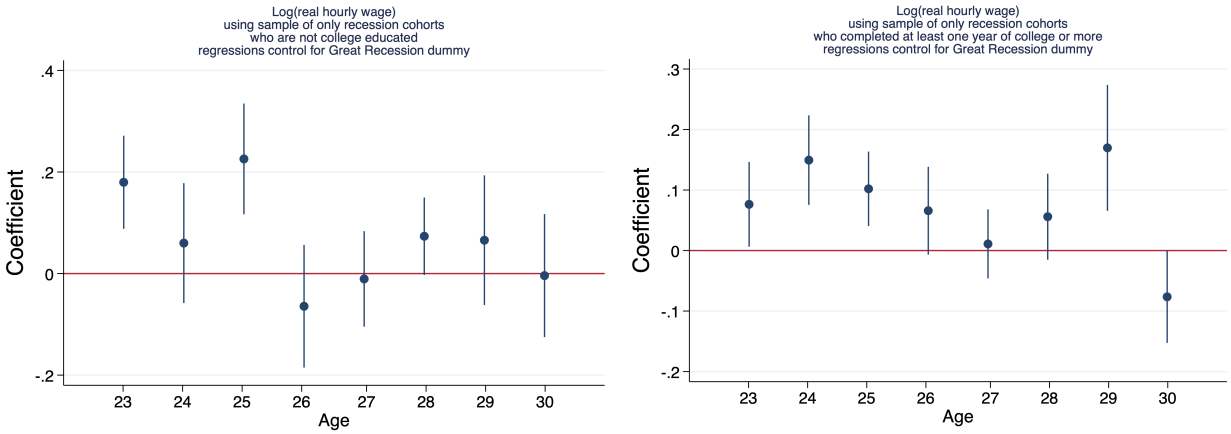
Figure 51



Notes: Results are based on the specification presented in equation 1. The regression uses data from the CPS from 2000 to 2022 for employed individuals aged 19 to 30. The figure shows coefficients and confidence intervals clustered at the state level. The figure shows coefficients from regressing a binary variable equal to one if the individual works more than one job on the unemployment rate at the start of adulthood interacted with age dummies.

9.5 Early 1990s, early 2000s, and Great Recession cohorts with added control for Great Recession cohorts

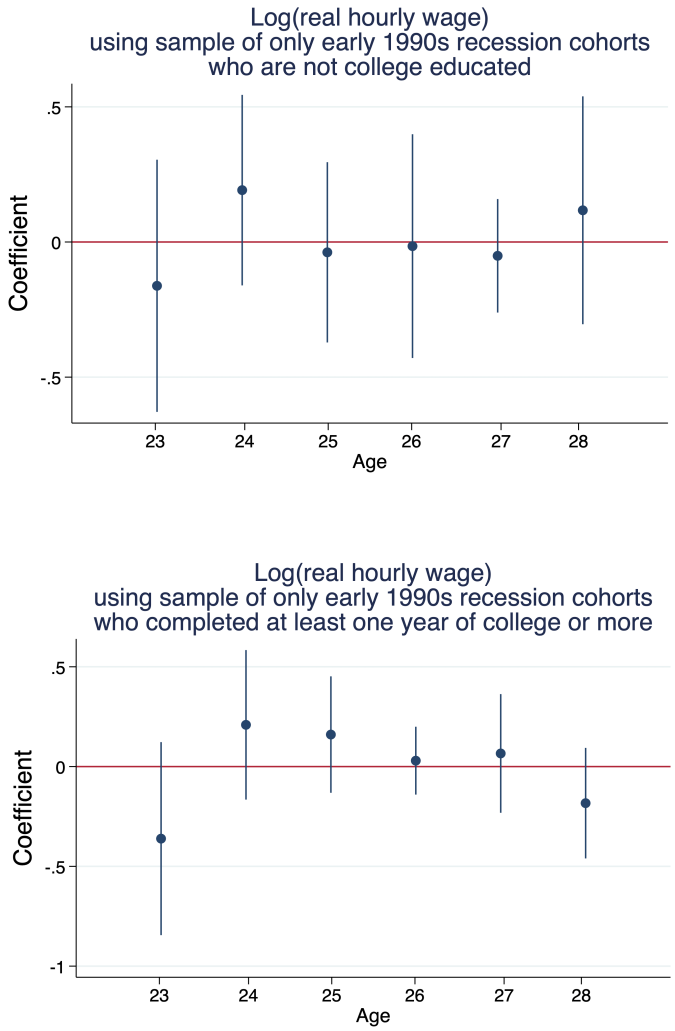
Figure 52



Notes: Results are based on the specification presented in equation 2 where the Great Recession dummy has now been switched to a Recession At 22 dummy variable. Each coefficient corresponds to a paramater from one separate regression for each age. In total the left and right panels report coefficient results for 8 different regressions. The regressions use data from the ACS from 2000 to 2019 for individuals aged 23 to 30. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing log individual specific real hourly wages on a dummy variable representing if the young adult faced a recession in young adulthood at age 22. Each regression further includes controls for years since the young adult experienced a recession, race, gender, share employed at the cohort-age-state level, the unemployment rate faced at age 18 and 22, and a control for the contemporaneous unemployment rate. The regressions include a fixed effect for the state level that each young adult resides in. The left panel provides results for a sample of young adults who had not attended college at the time that they were surveyed. The right panel provides results for a sample of young adults who attended at least one year of college or more at the time that they were surveyed. The only difference from the panels in this figure from the prior figure is that an additional dummy variable was included as a control variable. That being, a dummy variable identifying cohorts who faced the Great Recession in early adulthood.

9.6 CPS sample

Figure 53



Notes: Results are based on the specification presented in equation 2 where the Great Recession dummy has now been switched to an Early 1990s dummy variable. Each coefficient corresponds to a paramater from one separate regression for each age. In total the top and bottom panels report coefficient results for 6 different regressions. The regressions use data from the CPS from 1991 to 2000 for individuals aged 23 to 28. The figures show coefficients and confidence intervals clustered at the state level. The figures show coefficients from regressing log individual specific real hourly wages on a dummy variable representing if the young adult faced the Early 1990s recession at age 22. Each regression further includes controls for years since the young adult experienced the Early 1990s recession, race, gender, the unemployment rate faced at age 18 and 22, and a control for the contemporaneous unemployment rate. The regressions include a fixed effect for the state level that each young adult resides in. The top panel provides results for a sample of young adults who had not attended college at the time that they were surveyed. The bottom panel provides results for a sample of young adults who attended at least one year of college or more at the time that they were surveyed.