

**Making Their Own Luck:
Education and the Lasting Effects of Early Labor Market Conditions**

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Abstract

A variety of early experiences shape individuals in ways that are later rewarded or punished in the labor market. This paper asks whether early labor market conditions have persistent effects on adult outcomes and whether the impact differs with education. I show that negative shocks to early labor market conditions depress adult wages but that the impact is much reduced for college graduates. Early labor market conditions are quantified using an index of the average unemployment rate in an individual's birth state during the years he likely entered the labor market. A one standard deviation increase in average early labor market unemployment leads to a wage decline of 4-5 percent for workers ages 24-30. Years of education mitigate this effect slightly, but college graduates are more insulated than other education groups, experiencing less than half the average wage loss. Evidence from cohorts observed over time suggests that the losses are permanent for non-college graduates. College graduates generally make up any losses by their mid-thirties, but the rate of convergence differs across cohorts. I argue that college graduates are insulated from negative early labor market shocks, because they are significantly more likely than non-college graduates to move out of their home state if high unemployment rates prevailed there at the time of labor market entry. Aggregate labor supply responses of the two education groups support this. I conclude that college graduates move to better labor markets to start their careers when unemployment in the home state is abnormally high, eliminating wage differentials between college graduates who enter better and worse local labor markets.

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I. Introduction

A variety of early experiences shape individuals in ways that are later rewarded or punished in the labor market. The moment at which a worker starts his career intuitively seems among the most important of these, and the labor market conditions an individual faces when starting out help define this experience. For example, did he have an easy time finding a job or a hard one? Was his starting wage more than he expected or less? Did he find a job doing what he wanted, or did he settle for a substitute? This paper asks whether early labor market conditions have any long-run impact on labor market outcomes and whether this impact differs across education groups. On the one hand, market forces combined with opportunities to change jobs and locations should quickly negate any short-run effects that early labor market conditions have on individual wages or employment. On the other, conditions at the time a worker starts his career might have lasting effects on his occupational trajectory and expectations of future earnings and job availability.

Either channel could lead to significant differences across education groups in the impact of early labor market conditions. More educated individuals might be quicker to recognize and take advantage of arbitrage opportunities concerning their own human capital, resulting in a market for more educated labor with fewer frictions than the market for less educated labor. Education might also reduce an individual's reliance on past experience for gauging future opportunities, leading to weaker behavioral channels through which early labor market experiences affect later outcomes.

To examine the effects of early labor market conditions on adult labor market outcomes, I first match data from the 1980-2000 US Censuses Of Population to data on labor market conditions from the US Bureau of Labor Statistics. I then create an index of labor market conditions an individual likely faced when entering the labor market for the first time. The index equals the average unemployment rate in an individual's state of birth over the years he was ages 18 to 22. I assign each individual the index value associated with his state of birth since state of birth is correlated with the location in which an individual starts work but is exogenous to this decision. I test whether this index affects wages and other labor market outcomes later in an individual's career, and whether the effect differs across education groups. I then examine whether the results are consistent with a model in which education increases geographic mobility, leading more educated workers to make better choices about where to begin their careers.

This paper follows others examining persistent effects of labor market experiences. Recent work by Devereux (2002) shows that local labor market conditions at the time an individual starts work affect that individual's job quality -- as measured by the hourly wage -- five years after entering the labor market. Devereux's work in turn follows a handful of other papers, notably Beaudry and DiNardo (1991) and Ellwood (1982), that examine whether events and conditions early in a worker's career affect his labor market outcomes several years later. These papers reach different conclusions about whether early experiences matter for subsequent labor market outcomes. In one of the first studies in the scarring literature, Ellwood (1982) finds lasting negative effects of early unemployment spells on adult employment and wages; however, he finds no effect of current or lagged local unemployment rates on the probability of adult

employment for males.¹ Devereux and Beaudry and Dinardo find evidence that the unemployment rates workers experience affect their wages later, but they disagree about which unemployment rates matter and why.

I extend the analysis in these earlier papers to allow the impact and persistence of early labor market conditions to differ across education groups. Evidence on the impact of early labor market conditions on later wages can confirm models of wage setting, such as those proposed by Devereux and Beaudry and Dinardo. Testing whether this impact differs with education can offer evidence about whether models of wage setting or models driven by macro factors like labor mobility or different business cycle sensitivity of labor demand are behind the lasting effects of early labor market conditions. Moreover, understanding how education changes the impact of early conditions can inform broader economic theories about what education confers.

I narrow my focus to two education groups: college graduates and non-college graduates. I do this for two reasons. First, the fact that schooling attainment is endogenous to early labor market conditions makes comparisons between education groups problematic when the underlying early labor market experiences can change. However, I find that early labor market conditions are not a significant predictor of college graduation status.² Second, I find it easier to distinguish empirically between different dimensions of a college education. This will allow me to test which aspects of that education are responsible for the different impact that early labor market conditions have on college graduates.

¹ These results are discussed but not reported in Ellwood's paper.

² Better early labor market conditions are associated with with slightly decreased schooling attainment among non-college graduates, but this will only bias my results downwards. These results accord with similar findings by Card and Lemieux (2001).

I find that local labor market conditions at the time of labor market entry have nearly permanent wage impacts. A one standard deviation increase in average early labor market unemployment leads to a wage decline of 4-5 percent among workers ages 24 to 30. In the case of cohorts observed into their forties, this wage loss is only slightly mitigated 20 years later. College graduates are insulated from a large share of these effects. Having a college degree reduces the wage impact of early labor market conditions by at least half in the first few years of a worker's career. Moreover, the wage impacts that college graduates do experience are largely erased by mid-career.

I find that college graduates are significantly more likely than non-college graduates to move out of their birth state if high unemployment rates prevail there at the time of labor market entry. Aggregate labor supply responses of the two education groups show considerable redistribution of college graduates across local labor markets according to conditions prevailing in those markets the time of labor market entry. I conclude that college graduates move to better labor markets to start their careers when unemployment in the home state is abnormally high, eliminating wage differentials between college graduates who enter better and worse local labor markets.

The mobility results support related research into the importance of labor mobility as an adjustment mechanism following shocks to the local economy. Blanchard and Katz (1992) and Borjas, Freeman and Katz (1996) argue for the importance of labor mobility for restoring equilibrium following localized shocks, and other authors have noted differences across

education groups in the responses of mobility and wages to local conditions. Notably, Bound and Holzer (2000) find that the labor supply of skilled workers to an area declines faster than that of unskilled workers following a negative demand shock. They report smaller wage declines among more mobile groups in an area following a demand shock and argue that the movement of more educated workers from low-wage to high-wage areas in the 1980s explains a large part of the relative labor market success of skilled workers during this decade. Blanchflower and Oswald (1995, 1994a, 1994b) also observe that the wages of those with more education are less sensitive than the wages of those with less education to the local unemployment rate.

The next section provides a framework for the results in this paper. In short, I argue that differences in the impact of early labor market conditions across education groups can be explained in two ways. Wage setting models that generate persistent effects of early labor market conditions contain parameters that vary with education. Or, education groups differ in the early labor market conditions to which they are exposed, either through differences in geographic mobility or differences in another macro factor, such as variance in demand for that labor. The data and regression models used in testing parts of the framework are discussed in section three. Section four presents results on the effects of early labor market conditions on later wages, and section five presents evidence on the mobility response of different education groups to early labor market conditions. Section six concludes.

II. Framework

Existing literature has already suggested several mechanisms through which negative shocks to early labor market conditions might have persistent impacts on worker wages. These include explanations in which a persistent wage decline reflects true productivity differences and explanations in which it results from non-rational, behavioral factors. Examples of the former include permanent wage declines due to lost experience, reduced opportunities for on-the-job learning in lower quality jobs (Devereux, 2002), and efficiency wage theory in which workers adjust their productivity according to their wage. Examples of the latter include "wage stigma" in which employers infer productivity from previous wages and contracting models in which wages are sticky into the future as a result of costly contract renegotiation (Beaudry and Dinardo, 1991).

With the exception of Beaudry and Dinardo, these models have abstracted from endogenous individual responses to shocks to early labor market conditions. One of the simplest responses available to individuals facing poor local labor market conditions is migration to a better labor market. In this paper, I first examine whether early labor market conditions affect wages later in a worker's career and whether education changes this effect. I then test whether individuals move away from poor early labor markets following a negative shock and whether education changes this response. This paper does not assess which of these mechanisms is behind persistent wage impacts of early labor market conditions.

Rather, I ask whether individuals endogenously respond to early labor market conditions by moving to better labor markets and whether education increases the likelihood of this response. All of the models suggested above can be extended to generate differential wage impacts of early

labor market conditions across education groups. The empirical facts presented here argue against this as the sole explanation for differences observed across education groups. Cohorts experience large differences in the size and persistence of wage effects due to early labor market conditions. The cohort analysis strongly suggests that differences in geographic mobility explain a large share of the differential wage impact of early labor market conditions. The next stage of this research will examine whether education causally increases mobility.

The decision to look at mobility differences as a mechanism for mitigating the effect of early labor market conditions came from obvious empirical evidence that migration has not been practiced equally by all.³ In the United States, college graduates have historically displayed a high level of geographic mobility across local labor markets. Early-career college graduates are nearly twice as likely as high school graduates to reside outside their state of birth.⁴

III. Empirical Methods and Data

The first goal of this paper is to examine whether early labor market conditions have lasting effects on individual economic outcomes. Toward this end, straightforward log wage equations first present evidence on the effect that high local unemployment at the time of labor market entry has on adult wages. The effects of early labor market conditions on adult wages are then

³ This paper is not the first to observe the mobility advantage becomes education. See Greenwood (1976) for a survey. Also, Dahl (2002) and Bound et al. (2001).

⁴ Panel A of figure one shows that this differential has been fairly stable over time for males, despite rising college enrollments. Panel B shows that the mobility differential between all college graduates and all high school graduates has been stable since 1970 and similarly large. Rising mobility rates among college graduates prior to 1970 are due primarily to increasing mobility among female college graduates in the 1940s and again in the 1960s.

allowed to differ across education groups. Specifically, I first run a regression of the following form:

$$\log wage_{isbt} = index_{sb} + index_{sb} * collegegraduate_i + collegegraduate_i + \beta'X_i + \theta_s + \theta_b + \theta_t + collegegraduate_i * (\theta_s + \theta_b) + \varepsilon_{it} \quad (1)$$

where i indexes individuals, s indexes state of birth, b indexes year of birth, and t indexes current year.

Index is a measure of local labor market conditions at the time a worker likely first started work. Construction of the index is described in detail in the next paragraph. *College graduate* is a dummy variable equal to one if individual i has completed four or more years of postsecondary education. The vector X includes controls for race (nonwhite) and gender. Whenever possible, all estimations in the paper also include a full set of fixed effects for state of birth, year of birth, current year and interactions of the *college graduate* dummy with the state of birth and year of birth fixed effects.

The primary variable of interest in these estimations is *index*. The exact timing of labor market entry is flexible, and local unemployment rates may fluctuate considerably from year-to-year. To create a measure that summarizes general local labor market conditions during the period an individual most likely started work, I define *index* to equal the sum of the state unemployment rate in an individual's state of birth during the years he was ages 18 to 22. Specifically,

$$index_{isbt} = \left(\sum_{j=year18}^{year22} u_{sj} \right) / 5 \quad (2)$$

where *year 18* and *year 22* are the years *i* turned 18 and 22, respectively.

The state-level unemployment rates used to compute *index* are those published by the US Bureau of Labor Statistics for 1970 to 2000, called reported state unemployment rates. Three alternate measures of state-level labor market conditions are used as the base in computing *index* to check the robustness of results using reported state unemployment rates. These alternate measures will be described in a later section. Figure 2 plots the average value of *index* for each birth-year cohort. The value of *index* as given in equation three is plotted in the top line. The bottom line in Figure 2 plots the average value of *index* computed over the years an individual was ages 21 to 23. It is possible that the very first job in individual has when entering the labor market is not very relevant for the job he ultimately holds. In this case, the "late" version of *index* might do a better job of capturing local labor market conditions at the time an individual is most likely to hold his first important job. Some results are presented using both versions of *index*.

Aside from *index*, the *college graduate* indicator deserves discussion. Individuals are divided into two education groups, college graduates and non-college graduates with the *college graduate* dummy equal to one for the former group. The exact timing of labor market entry and educational attainment are both potentially endogenous to the local labor market conditions an individual faces during his late teens and early twenties. In results not reported here, exposure to higher values of *index* did not increase an individual's likelihood of graduating from college. Poor early labor market conditions did lead to small increases in educational attainment among non-college graduates, but this small effect only biases the between education group results

toward zero.⁵ The comparison between college graduates and those with less education is interesting because college graduates potentially have greater access to labor markets outside their home state. Whether this greater access is due to higher innate ability, relationships formed at college, or skills learned at college is a question the final section of this paper will discuss. The paper also examines whether results are sensitive to the use of a more continuous educational attainment measure.

Following the wage equation results, the paper then turns to the relationship between early labor market conditions and geographic mobility. Individual level migration decisions are modeled using the following probit regression:

$$prob(mover_{isbt} = 1) = \Phi \left[\begin{array}{l} index_{sb} + index_{sb} * collegegraduate_i + collegegraduate_i + \beta'X_i \\ + \theta_s + \theta_b + \theta_t + collegegraduate_i * (\theta_s + \theta_b) + \varepsilon_{it} \end{array} \right] \quad (3)$$

The *mover* dummy variable is equal to one if an individual is residing outside his state of birth at time *t*. This measure of geographic mobility was chosen to reflect movement between distinct local labor markets. A movement across state boundaries does not always constitute a significant change of location; some metropolitan areas spill across state borders. However, better measures of movement between labor markets, such as moves between noncontiguous counties, are not available in all years or for all individuals in the Census data used here. Computations with CPS data suggest that the mobility differential between college graduates and non-college graduates using a between-counties mobility measure is of the same magnitude to the differential using the between-states measure.

⁵ The author's results are quite similar to those reported in Card and Lemieux (2001).

Individual migration decisions are interesting, but changes in the aggregate labor supply of different education groups to local areas provide a more continuous measure of how migration patterns respond to early labor market conditions. These aggregate changes are arguably the ultimate variable of interest when considering whether geographic mobility is influenced by local labor market conditions. The following equation is estimated to examine changes in aggregate labor supply of different education groups in response to early labor market conditions:

$$\log\left(\frac{n_{jsbt}}{N_{jsb}}\right) = index_{sb} + index_{sb} * collegegraduate_j + timed_{bt} * collegegraduate_j + index_{sb} * timed_{bt} + collegegraduate_j + index_{sb} * timed_{bt} * collegegraduate_j + \theta_s + \theta_b + \theta_t + collegegraduate_j * \theta_s + \varepsilon_{jsbt} \quad (4)$$

Where j indexes the two education groups, and s , b and t index state of birth, year of birth and current year, respectively. N_{jsb} is equal to the total number of state s natives born in year b with group j educational attainment, and n_{jsbt} is the number of those natives residing in their birth state in year t . The variable $timed_{bt}$ is equal to the years since birth cohort b turned 22. The interaction of $timed_{bt}$ with $index_{sb}$ allows rates of out-migration to differ with early labor market conditions. The triple interaction allows this response to differ between college graduates and non-college graduates.

The individual-level microdata used in this paper are from the Integrated Public Use Micro Sample (Ruggles and Sobek, 2003). The microdata is matched to BLS reported state unemployment rates in each individual's state of birth during the years he was ages 18 to 23.

Reliable reported state unemployment rates are not available before 1970, so the oldest birth cohort for which *index* can be computed are those who turned 18 in 1970. (The late version of *index* can be computed for those who turned 18 in 1967.) This limitation on *index* restricts relevant Census data on adult outcomes to the years 1980, 1990 and 2000. The sample drawn from each year consists of noninstitutionalized natives with non-imputed states of birth. In estimating the log wage equation, the sample was further restricted to those with hourly wages of more than one dollar and less than \$100 in constant dollars. The sample was also restricted to wage earners in computing the mobility probits to facilitate comparison with the wage equation results. The sample is generally further restricted by age. This varies throughout the analysis, but the benchmark sample is restricted to those ages 24 to 30 in order to examine the effects of conditions at labor market entry on outcomes of early career adults. If early labor market conditions do in fact influence wages and mobility, the first place to look for these effects is among adults who entered the labor market only a few years ago. Later analysis examines the persistence of these effects using older cohorts. Table 1 presents summary statistics for relevant variables by Census year.

IV. Effects of Early Labor Market Conditions On Later Wages

A. Main results

I first assess whether early labor market conditions affect a worker's wages later in his career by estimating equation one on the sample restricted to 24- to 30-year-old workers. I look at wages before other outcomes because existing theories suggest that early labor market conditions might operate primarily through this channel; the effect of early labor market conditions on other

outcomes is examined later in this section. I restrict the sample to somewhat younger workers because while the effects of early labor market conditions might have some persistence, they may not persist far into a worker's career. It is natural to look at age groups by which a "persistent" effect might first be said to be present. Results later in this section examine how far into a worker's career these effects last.

Results from estimation of equation one are shown in Table 2. Exposure to higher rates of early labor market unemployment significantly lowers wages for the average worker. When the effect of *index* is allowed to differ with college graduation status in column two, the average worker continues to experience lower wages following high early labor market unemployment, but this effect is reduced for more educated workers. The coefficient on *index*college graduate* shows that the impact of early labor market conditions on this age group is reduced by half for college graduates.

The age range that defines early labor market conditions as embodied in *index* was chosen somewhat arbitrarily. Most workers first enter the labor force between the ages of 18 and 22, but it is not clear that a worker's very first job has the most influence on his subsequent labor market outcomes. Columns three and four test robustness of the results in columns one and two to using an index computed over a slightly later age range, ages 21 to 23, during which a worker is more likely to have held his first "important" job. This adjustment leaves the coefficients in columns one and two nearly unchanged. There is a high degree of correlation between the values of *index* computed over the two age ranges, evident in Figure 2, so one cannot favor one age range over the other on the basis of this result. Since the purpose of this paper is not to determine the

precise window during which the most relevant early labor market experiences occur, remaining estimates use *index* as computed in equation two with the understanding that shifting the age range yields similar results.

Is the impact of early labor market conditions reduced only for college graduates? Or does more education generally reduce their effects? The estimation in column five of Table 2 answers this question by further disaggregating the education grouping into dropouts, high school graduates, some college (defined here as any educational attainment beyond 12th grade but short of a four-year B.A.), and college graduates. Dropouts are the omitted educational category in this estimation. Coefficients on the interactions of *index* with the educational dummies show that dropouts and high school graduates suffer nearly identical wage losses in the face of poor early labor market conditions. The losses are somewhat mitigated for individuals with some college education, but this group still only experiences half the gains that accrue to college graduates.

Are these wage effects large or small? Using the standard deviations of *index* reported in Table 1, the coefficients in column two of Table 2 translate into a wage loss of 3-4 percent for a one standard deviation increase in the value of *index*. The coefficients in column four imply a slightly larger wage loss of 4-5 percent when using the late version of *index*. In both cases, college graduates regain about half these losses. When one considers that the white-nonwhite wage differential reported in Table 2 is equal to 5-6 percent of wages, the average wage losses seem fairly large. However, relative to a college premium of 33%, a loss (gain) of 1.5-2% for college graduates looks small. An additional test of the significance of these results will come when their persistence is examined over time.

B. Robustness of main wage equation results

The reported unemployment rate is more volatile over space and time than many other series that summarize economic conditions. To test the sensitivity of the main results to the use of this measure, Table 3 repeats the baseline analysis in column one of Table 2 using alternate measures of labor market conditions as the base for computing *index*. The first alternate measure substitutes the state insured unemployment rate for the reported unemployment rate as the base in *index*. The former is the unemployment rate in a state among workers covered by unemployment insurance. State insured unemployment rates tend to be several points lower than the reported unemployment rate and are less volatile over time. Figure 3 shows that *index* computed using the state insured unemployment rate is broadly similar in shape to *index* as computed in Figure 2, although the variance is greatly reduced. The second alternative substitutes residuals from a regression of relative state employment on a set of state fixed effects and state specific time trends for the reported unemployment rate. Figure 4 shows that, as expected, *index* as computed with this base averages close to zero in each year. A third alternative substitutes deviations of state employment levels from the level predicted by multiplying state employment in the preceding year by the national growth rate in employment for that year. Figure 5 shows that *index* computed in this way again averages close to zero in each year, but employment tends to fall below expectation for younger cohorts and to exceed expectation for older cohorts.

For comparison purposes, column one from Table 2 is reproduced in column one of Table 3.

Column two shows that *index* computed with the state insured unemployment rate does well in

reproducing the baseline wage equation estimates. The coefficients on *index* and *index*college graduate* are significant and in the same direction as those in Table 2. By this measure, however, college graduates appear to regain only about a third of the wage losses associated with poor early labor market conditions. Using the residual-based index, point estimates on *index* and the interaction are the same size and direction as those in Table 2, but they are not significant. Column four shows that the wages of non-college graduates are significantly higher if their birth state experienced an employment boom during their labor market entry years. The coefficient on the interaction shows that the wages of college graduates increase by only half as much by this measure. In general, the main results from Table 2 are quite robust to using a number of different measures of early labor market conditions. The remaining analysis will focus on *index* computed as the sum of reported state unemployment rates over the years an individual was ages 18 to 22.

If poor early labor market conditions lower worker wages, some workers will exit the labor force as their wage falls below their reservation wage. This selection problem reduces the education group differential shown in Table 2 if the workers most likely to drop out are the lowest earners in the group of non-college graduates. To test the severity of this selection problem, I examine how the effect of *index* changes when different outcomes are used as the dependent variable and when changes are made to the estimating sample.

A direct test of the selection hypothesis appears in column five of Table 4; the probability of employment at later ages is not affected by early labor market conditions, thus changes in labor

force participation are not likely to bias the wage equation results.⁶ Additional columns in Table 5 show that the differential impact of early labor market conditions across education groups is the same regardless of gender and is robust to including wage earners who fail to meet the \$1-\$100 hourly wage restriction. High values of early labor market unemployment led to small but significant reductions in labor supply as measured by total weeks worked for non-college graduates but not for college graduates. Given the small effects of early labor market conditions on total labor supply, it is not surprising that using log total income as the dependent variable yields coefficient estimates for *index* and the interaction very similar to those when log hourly wages are used. In summary, by the time workers reach their late twenties, the impact of early labor market conditions is confined to hourly wages.

The state unemployment rate may be a crude measure of the actual labor market conditions facing a given worker. If workers from different education groups are not perfectly substitutable, then wages should be more sensitive to unemployment among the worker's own education group than unemployment among workers in the state in general. For this reason, worker mobility decisions might be more sensitive to labor market conditions facing a worker's own education group. As a final robustness check, the analysis in Table 2 was repeated using education group-specific state unemployment rates estimated from the CPS Basic Surveys for 1978-1999. Results are not shown here, but the conclusions from Table 2 were unchanged after this adjustment.

⁶ This accords with Ellwood's unreported finding for a similar test in his 1982 paper.

C. Persistence of differentials over time: Results from cohorts

The results so far show that early labor market conditions affect adult wages several years after labor market entry. I next examine the long-run persistence of wage losses due to a poor early labor market. Table 5 first presents pooled cross-section results for older age groups.⁷ The estimates for 24 to 28-year-olds are presented in column one on the coefficients on *index* and the interaction match those in Table 2. The differential effects of early labor market conditions across education groups are similar for the 34 to 38-year-olds and the 44 to 48-year-olds. A look at the effects of early labor market conditions within particular cohorts over time, however, shows that the differential is not stable across cohorts or within a cohort over time.

Table 6 follows three synthetic cohorts of individuals ages 24 to 28 spaced 10 years apart. The age restriction to 24 to 28-year-olds retains most individuals who were in the pooled regressions in Table 2 while ensuring that youth unemployment rate measures are available for all individuals in all census years. Following this age group over time assesses the persistence of the effects in Table 2 more directly. The organization of Table 4 is such that each set of *index* and interaction coefficients is from a separate regression. The results in Table 6 reveal the substantially different experience of the 1980 cohort. These workers entered the labor market in the mid-to late seventies. The coefficients on *index* and the interaction in the upper left-hand cell of Table 6 show the college graduates in this cohort suffered significantly *more* than non-college graduates who faced similarly poor early labor market conditions. The expected pattern of coefficients did not emerge for this group until they reached their forties. This was not the case for the other two cohorts in Table 6. For both the 1990 and 2000 cohorts, poor early labor market conditions significantly lowered wages for 24 to 28-year-olds, while college graduates

⁷ The sample is further restricted to ages 24 to 28 for comparability with the cohorts in Table 6.

regained one third to one half of that. In the case of the 1990 cohort, the negative impact of early labor market conditions was still present for non-college graduates into their thirties. The impact on non-college graduates remained unmitigated, while it had disappeared for college graduates.

How anomalous was the experience of the 1980 cohort? This question can be answered by looking further back in time, but doing so requires shifting to slightly different data sources. As mentioned above, the state reported unemployment rates used to compute *index* only extend back to 1970. State insured unemployment rates, used as a robustness check in Table 3, extend back to 1947. Table 3 showed that using state insured unemployment rates as the base in *index* yields similar results to those obtained with state reported unemployment rates. I use *index* computed with state insured unemployment rates to extend the analysis of Table 6 back to the 1960 cohort. The sample for this analysis is further restricted to full-time, full-year workers, since precise data on weeks and hours worked is not available in some earlier census years.⁸

Table 7 shows that the short answer to the question in the previous paragraph is "very." The 1980 cohort is the only one in which college graduates experienced greater wage losses from early labor market conditions than non-college graduates. In general, non-college graduates experience wage declines when faced with poor early labor market conditions that persist into their thirties and forties. College graduates in their twenties have already made up large shares of these losses, and make up all of them by their thirties. In some cases, college graduates who started out in poor early labor markets appear to experience a net gain over non-college graduates. This story holds up well for all cohorts in Table 7 with the exceptions of the 1960 and

⁸ Full-time is defined as 40 or more hours per week. Full-year is defined as 50 or more weeks per year.

1980 cohorts. Little can be said about the experience of the 1960s cohort; in this case, the data have little power.

The balance of the within-cohort evidence supports a finding of negative wage impacts of poor early labor market conditions that are mitigated for college graduates. The cohort analysis strongly suggests that the differential impact of early labor market conditions across education groups persists late into a worker's career and perhaps even expands over time, although the timing of these effects may differ significantly for particular cohorts.

V. Effects of Early Labor Market Conditions on Geographic Mobility

From the results in Section IV, I conclude that local labor market conditions at the time an individual starts work influence his wages several years into his career. The size and persistence of these wage effects change dramatically with education. For workers who lack a college degree, the effect is a permanent shift in the level of the wage profile, but college graduates experience smaller initial wage effects that last only into the medium-term of their careers. These differences would be expected if college graduates are more likely to move to new labor markets to start their careers when faced with poor local conditions at home. This section examines whether college graduates do in fact respond to poor early labor market conditions by moving out of their home state.

A. Individual level results

I first examine whether the index that predicted wage differences according to early labor market experience also predicts individual mobility decisions. Table 8 repeats the analysis of Table 2 in the form of probit regressions with the *mover* dummy as the dependent variable. Estimates using the late version of *index* are not repeated. Column one shows that individuals who experienced poor early labor markets in their states of birth are more likely to reside outside their home states in their early career years. However, the inclusion of the interaction *index*college graduate* in column two shows that this effect is weak for the average worker while it is significantly positive for college graduates. Column three shows that the coefficients on the interaction of *index* and the college graduate dummy remains significant at the 10% level when the education grouping is further disaggregated into the four categories used in Table 2. Only college graduates differentially respond to poor early labor market conditions by moving out of their home states. Also note the large increase in mobility associated with a college degree in column three. Increased geographic mobility is not linear in educational attainment in these estimates. The coefficient on *index*college graduate* in the mobility probit implies a one standard deviation increase in *index* would add 1.2% to the probability that a college graduate resides outside his state of birth. This amounts to nearly 10% of the college graduate-non-college graduate mobility differential, based on the coefficient on the *college graduate* dummy. The magnitude should also be considered in relation to the unemployment rate in a typical year. If only 6% of workers are typically unemployed, then out-migration of an additional 1.2% of college graduates could have a large effect on the equilibrium wage.

B. Aggregate Labor Supply Changes

Individual migration decisions are interesting, but changes in the aggregate labor supply of different education groups to local areas provide a more continuous measure of how migration patterns respond to early labor market conditions. Table 11 examines how the share of a birth cohort residing in the birth state changes with the local labor market conditions that cohort faced when starting work. [Author's note: Table numbers after 8 are not consecutive in this draft.] Columns one and two estimate equation four using a sample of all adults ages 18 to 55 and a subsample of those who had positive annual earnings, respectively.⁹ In both samples, the coefficient on *index* is positive and significant, but the coefficient on the interaction of *index* and *college graduate* shows that college graduates who faced poor early labor market conditions in their home states migrate away from them. Interestingly, the coefficient on *index* indicates that non-college graduates who faced poor early labor markets are more likely to remain in their birth states than other cohorts from the same birth state who experienced better early labor market conditions. The positive coefficient on the interaction of *index* and *timed* and the negative coefficient on the triple interaction imply that these between-education group differences in labor supply response widen over time.

Columns three through five estimate equation four separately for the three cohorts from Table 4. In this case, the samples are restricted to wage earners, but results are similar when estimates are performed using all individuals in these age groups. Across cohort differences are again apparent. The labor supply response of college graduates in the 1980 cohort differs noticeably from the later two cohorts. In particular, the coefficient on *index*college graduate* is large and negative for the 1990 cohort but is almost exactly zero for the 1980 cohort. This coefficient is

⁹ The regressions are weighted by state population in all three census years.

also negative for the 2000 cohort.¹⁰ Differential time trends in the labor supply response between education groups are not significant in the cohort estimates. However, the difference in the *index*college graduate* coefficients between the 1980 and 1990 cohorts is striking, especially in light of the insignificant level effects of *index* in both cohorts. The estimates imply that college graduates in the 1990 cohort decreased their labor supply to areas with poor early labor market conditions almost immediately upon entering the labor market, while those from the 1980 cohort displayed no labor supply response, even after several years in the labor market.

A second check on the importance of mobility for workers in different education groups is to examine whether their respective wages respond to local or to national labor market conditions. This test is also of interest because state unemployment rates move with the national unemployment rate, so it is natural to ask whether national conditions in one's early labor market years have more explanatory power than local conditions. The estimates in Table 12 address these questions. Column one estimates a wage equation similar to the baseline specification in Table 2 using the national-based index. The baseline specification had to be modified because the index computed in this way does not vary within birth cohorts. Regressions in Table 12 still contain a full set of birth-state fixed effects, year fixed effects, plus interactions of the college graduate dummy with the birth-state and year dummies and a set of 13 industry of current employment dummies. The birth-year dummies are excluded, but controls for cohort size at the national and state levels are included instead. The sample in in Table 12 is all 24 to 30-year-old wage earners in the 1980, 1990 and 2000 IPUMS.

¹⁰ The coefficient estimates for the 2000 cohort are generally not significant, probably because it is only observed in one census year.

Results in column one show that the effect of higher national unemployment rates at the time of labor market entry is negative for the average worker. Again, college graduates are insulated from that loss; the coefficient indicates college graduates experience a small wage gain when they enter the labor market in a period of higher national unemployment. The coefficient on the national-based *index* alone is not significant, but the estimate is in the right direction and of a plausible size. The analogous mobility probit regression (not shown) indicates that early national labor market conditions have no effect on geographic mobility for either education group.

The regression in column two includes both the national-based and the state-based indices. Wage equation coefficients on the state-based index and interaction are significant and almost identical to those in Table 2. It is disconcerting that the coefficient estimate on the national-based index is now positive and significant. Intuitively, however, college graduates do not fare differently with respect to the wage effect of early national labor market conditions. [The positive coefficients on log state cohort size are also perplexing.] The analogous mobility probit (again not shown) indicates that the relatively greater mobility response of college graduates to poor early local labor market conditions remains when the national-based index is added to the probit. Interestingly, poor national labor market conditions at the start of work depress mobility equally for all workers; college graduates display no mobility advantage during aggregate downturns.

A final step in the mobility argument asks whether mobility itself is important or whether college graduates are simply more likely to move to high wage areas. To assess the importance of the locations college graduates ultimately chose, I added a full set of fixed effects for current state of

residence to the wage equations in Table 2. The differential impact of early labor market conditions remained unchanged. I conclude that smaller impact of early labor market conditions for college graduates are not generated by migration to high wage areas per se.

V. PRELIMINARY: Is the Mobility Advantage of College Graduates the Result of Unobservables or Learned Skills?

If college "teaches" individuals to be mobile, then going away to college might be an important component of that instruction. Historically, states vary widely in the share of their college-educated natives that obtain their degrees out-of-state. If college graduates do in fact learn to be mobile at college and going away to college enhances this learning, then on average college graduates from states with high out-of-state college-going rates should fare even better than college graduates from states with high in-state college-going rates when faced with poor early labor market conditions. Exploiting natural variation in the rates of out-of-state college attendance will test whether college graduates who should have learned more mobility skills do better than college graduates who have learned less of them.

Data from the Department of Education Residence and Migration Surveys were used to rank states according to the share of full-time freshmen attending school out-of-state. The ranking was performed separately for four regions of the United States: the Northeast, the South, the Midwest/West and the Pacific regions.¹¹ There is a large regional component to out-of-state college attendance shares; the region-specific ranking makes the treatment and control groups

¹¹ The comparison fails to produce interesting results when all 50 states are ranked according to their out-of-state college going shares and the comparison is made at the national level -- i.e. between college graduates from states with the highest out-of-state college going shares and college graduates from states with the lower shares.

more comparable. The triple interaction in the Table 13 regressions test whether college graduates from the highest out-of-state college-going states in their region fare better than other college graduates in their region when faced with poor early labor market outcomes. Note that in this analysis *index* is a weighted average within the region of the birth-state, birth-year values of the index in equation two.

The first column classifies states as high out-of-state college-going states if the fraction of their freshmen attending college out-of-state is above the median for their region in the 1981 Residence and Migration Survey.¹² The second column uses the 75th percentile of the region's out-of-state college attendance shares rather than the median as the cut off for classifying states as high out-of-state college-going states.

The coefficients on *index* and the interaction of *index* and college graduate in both regressions are similar to those in Table 2. High levels of unemployment in an individual's region during his years of labor market entry significantly lower his wages several years into his career. College graduates avoid a large portion of these wage losses. However, the coefficient on the interaction of high out-of-state college-going status with *index*college graduate* shows that college graduates from the states were completely insulated from these wage losses.

¹² States are classified using only the 1981 survey. The surveys were performed in other years, so it is possible to update the rankings on something close to an annual basis. Persistence in the ranking is likely to be extremely high, however, so results would likely remain unchanged and state for more than one survey were used.

VI. Conclusion

This paper asked whether early labor market conditions affect college graduates and non-college graduates differently. I constructed an index of early labor market conditions equal to the average unemployment rate in an individual's state of birth over the years he was ages 18 to 22.

This index summarizes the conditions individuals likely faced when entering the labor market for the first time and assigns these conditions to individuals on the basis of an exogenous factor: their state of birth. Relying primarily on 20 years of US Census Data from the 1980, 1990 and 2000 IPUMS extracts, I examine the impact of this index on individual wages over the career, geographic mobility decisions, and local labor supply. I allow the effect of early labor market conditions on all these outcomes to change with education.

This paper concludes that early labor market conditions affect adult wages. A one standard deviation increase in the exposure to high early labor market unemployment, as measured by the index constructed in section two, leads to a wage decline of approximately four percent.

Moreover, these wage losses persist far into a worker's career. Evidence from birth cohorts observed for 20 years after labor market entry suggest that they may in fact be permanent.

College graduates are largely insulated from these losses. In the early years of their careers, college graduates experience only about half the wage declines of non-college graduates. By their mid- to late-thirties, college graduates make up for any losses that result from poor starting conditions.

Mobility responses differ across education groups in a manner consistent with the idea that college graduates are more likely to move away from poor early labor markets to better ones. College graduates are significantly more likely than non-college graduates to reside outside their state of birth if high unemployment rates prevailed in that state at the time of labor market entry. This differential mobility response is apparent very early in worker's careers. Estimates of changes in aggregate labor supply of state natives show a strong negative response on the part of college graduates when faced with a poor state labor market at the time of labor market entry. This paper concludes that college graduates move to better labor markets to start their careers when the home state market is in a high unemployment period.

Finally, this paper raises a more difficult question. What is it about college graduates that makes them so much more geographically mobile than those with less education? The answer depends on the nature of geographic mobility and skill specificity. If mobility is a distinct skill, separate from human capital, that happens to be learned at college, then college graduates escape poor local labor markets and their negative effects because they possess greater skill along this mobility dimension than do those with less education. This would imply that secondary education institutions might help students who don't plan to go to college acquire the mobility skills that their peers will learn at college.

On the other hand, mobility might be a result of the types of skills college graduates possess. Perhaps at the time of labor market entry, college graduates possess very flexible and verifiable human capital that could be applied to a range of jobs in a range of locations. This would allow them to choose the best market for their skills when they begin work, avoiding the negative

effects of starting to work in a poor local labor market. Those with less education might be constrained geographically if their human capital is less flexible (due to locally specialized vocational programs, for example) or less verifiable to those outside the community. In this case, secondary education institutions also have a role to play in expanding the geographic labor market options of those who don't plan to go to college. High schools should focus on developing more flexible skills, not on satisfying demand by local businesses for workers with a certain skill, and on establishing credentialing systems that are transportable across labor markets. The final section of this paper begins to address the question of which of these two mechanisms is at work.

Economists are showing increased interest in the roles that luck and timing play in determining labor market success. This paper adds to that small but growing literature by providing strong evidence that the effects of initial conditions differ across education groups. The paper argues that different rates of geographic mobility are responsible for the different effects that early labor market conditions have on wages across education groups. The mobility findings have implications for research on how local economies adjust after shocks. Areas with more educated workers or that have experienced a shock primarily to sectors employing more educated workers will recover faster, and thus are less in need of transfers from less affected areas. The paper also finds that local labor market conditions at the time an individual first starts work have long-lasting effects, especially for the less educated. This is of interest to those studying wage setting and earnings advancement across jobs. The finding also implies that far from being a "trial and error period," the start of a worker's career is a critical juncture at which education policymakers can exert important influence. Finally, this paper touches on the questions of whether and when

workers can transport their human capital across local markets. The questions are not answered definitively here, but the evidence that is presented takes a step toward disentangling the roles of skill and education in labor market outcomes.

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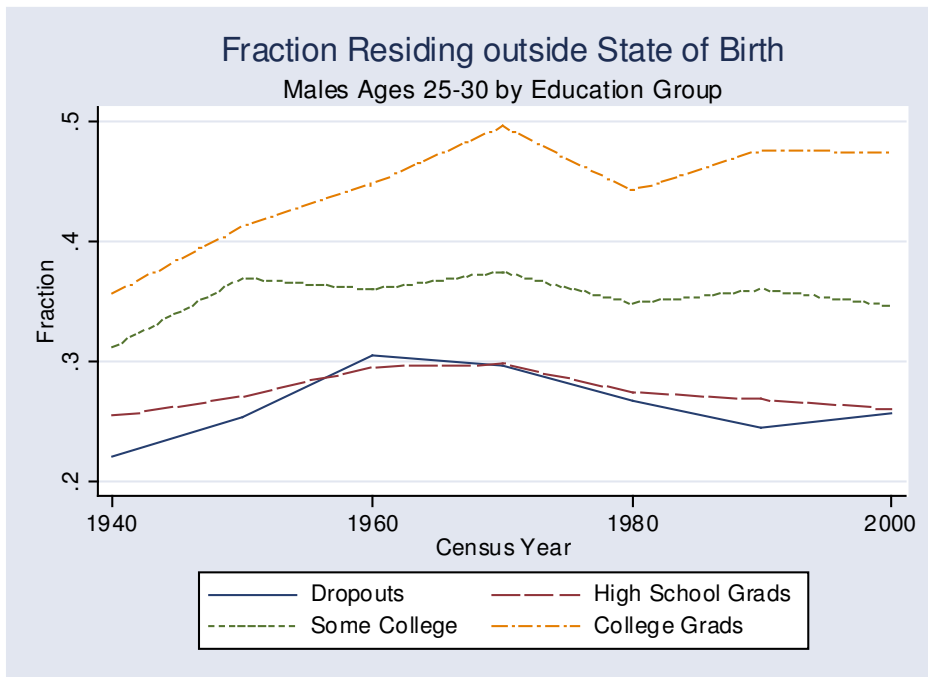


Figure 1A. Fraction residing outside state of birth by educational attainment. Male US natives ages 25 to 30. Source: 1940 to 1990 IPUMS.

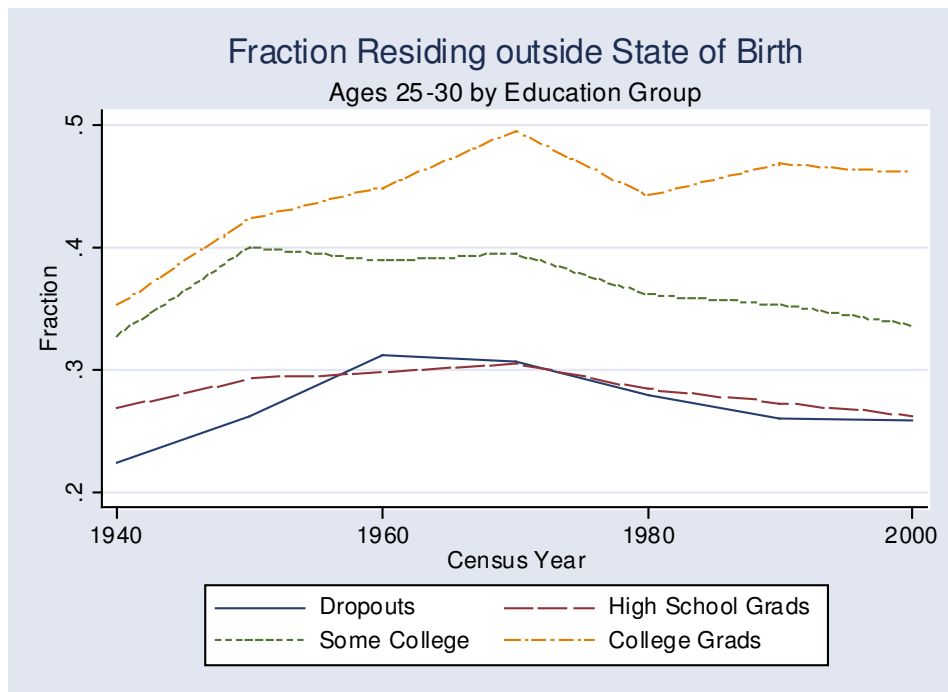


Figure 1B. Fraction residing outside state of birth by educational attainment. All US natives ages 25 to 30. Source: 1940 to 1990 IPUMS.

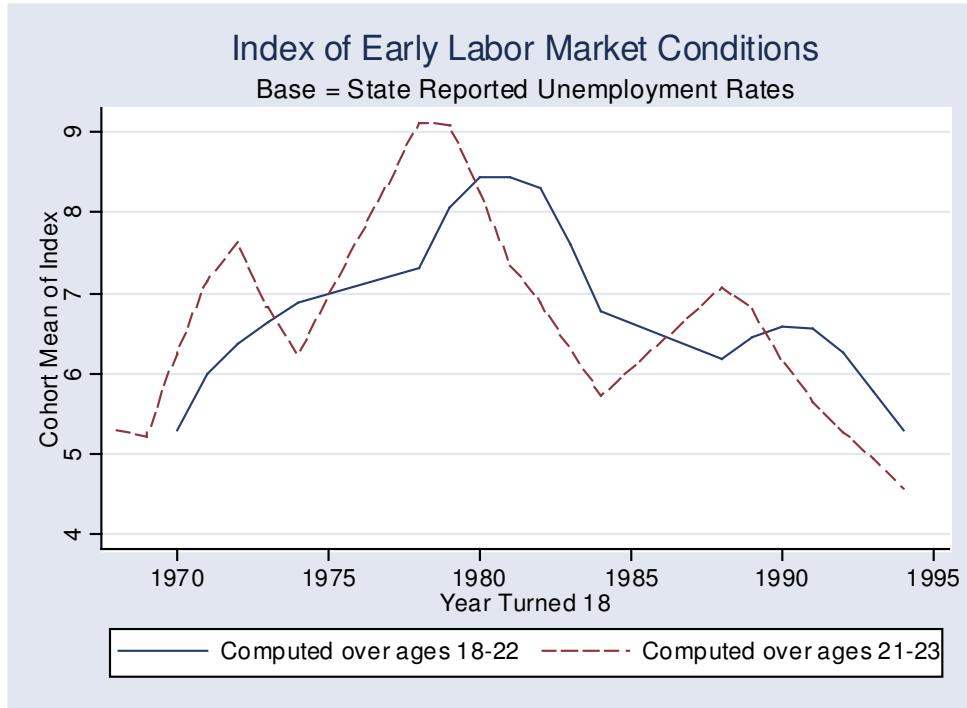


Figure 2. Index of early labor market conditions computed as in Equation 2. Sources: 1980 to 2000 IPUMS. Reported unemployment rates from US Bureau of Labor Statistics for 1978-2000 and from Katz and Blanchard (1992) for 1970-1977.

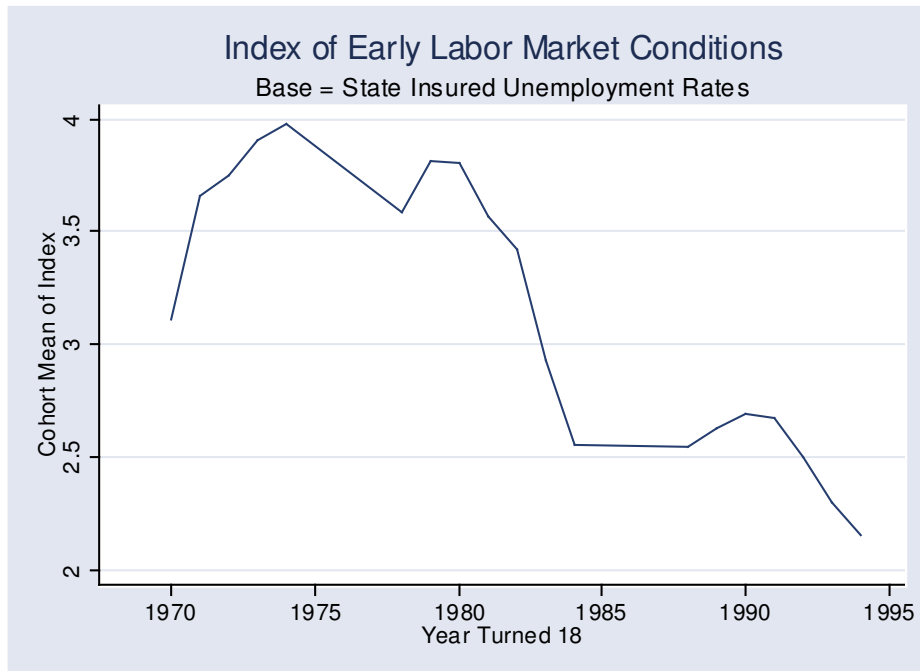


Figure 3. Index of early labor market conditions computed as in Equation 2 substituting state insured unemployment rates. Sources: 1980 to 2000 IPUMS. State insured unemployment rates from Katz and Blanchard (1992) for 1950-1993 and from US Department of Labor for 1994-2000.

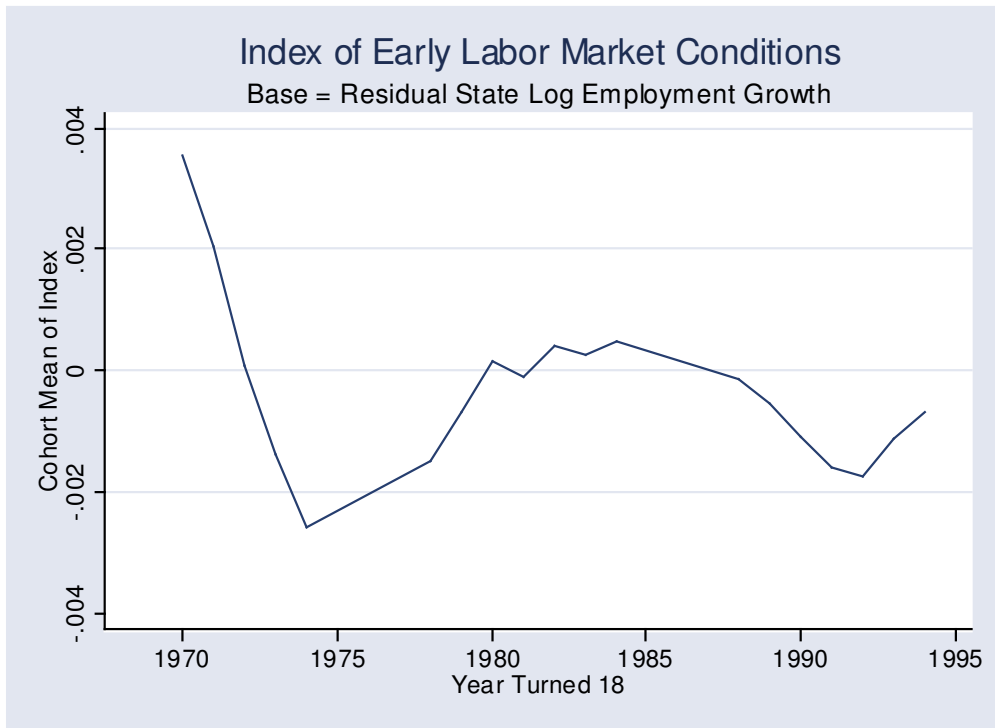


Figure 4. Index of early labor market conditions computed as in Equation 2 substituting residuals from regression of log relative employment. Regression described in text. Sources: 1980 to 2000 IPUMS. Annual state employment totals from US Bureau of Labor Statistics for 1970-2000.

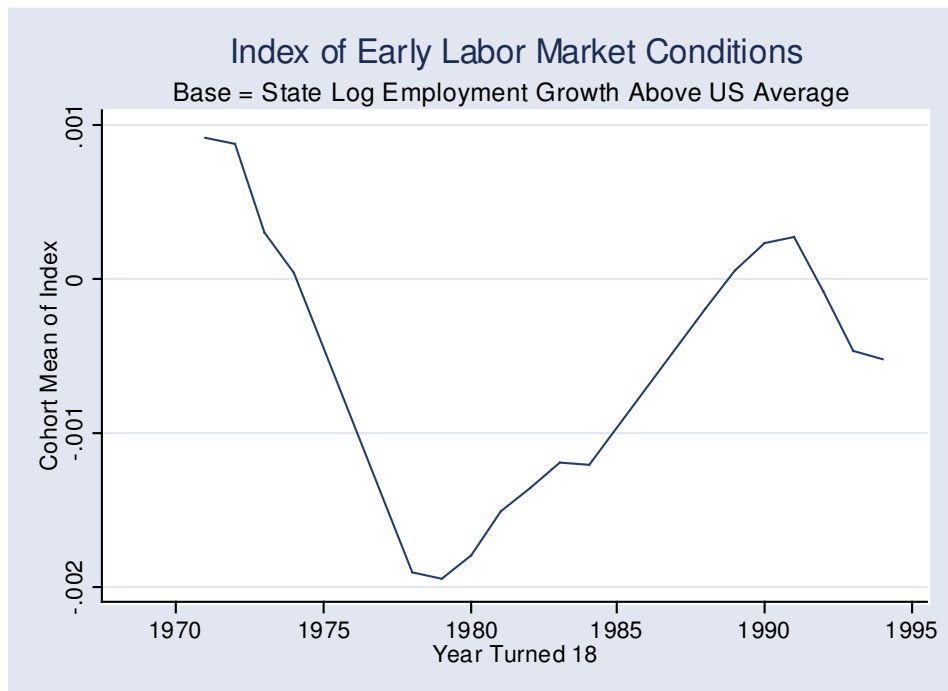


Figure 5. Index of early labor market conditions computed as in Equation 2 substituting difference between actual state employment in year t and state employment in year t-1 times national employment growth rate between t and t-

1. Sources: 1980 to 2000 IPUMS. Annual state employment totals from US Bureau of Labor Statistics for 1970-2000.

Table 1: IPUMS Sample Means by Year

	1980	1990	2000
Age	26.887	27.121	27.147
Female	0.456	0.480	0.493
Non-white	0.129	0.118	0.195
College graduate	0.247	0.233	0.286
Birth year	1953	1963	1973
Mover dummy	0.343	0.335	0.333
Hourly wage	7.813 [5.886]	7.540 [5.382]	7.967 [6.193]
Log hourly Wage	1.890 [0.558]	1.853 [0.570]	1.901 [0.571]
Index	6.255 [1.479]	7.843 [1.817]	6.151 [1.160]
Index 21 to 23	6.393 [1.631]	7.573 [2.205]	5.828 [1.420]
N obs	190658	200024	172654

Notes: Data from 1980, 1990, and 2000 IPUMS. Sample is non-institutionalized native wage earners ages 24-30. Index construction is described in text. Data for index from BLS and Lawrence Katz.

Table 2: Effect of Early Labor Market Conditions on Wages

Dependent Variable: log wages

	[1]	[2]	[3]	[4]	[5]
Index	-0.02105 [0.00353]**	-0.02354 [0.00390]**			-0.03145 [0.00477]**
Index x college graduate		0.01018 [0.00276]**			
Index 21 to 23			-0.01952 [0.00312]**	-0.02185 [0.00344]**	
Index 21 to 23 x college graduate				0.00936 [0.00245]**	
Collge Grad	0.34582 [0.00931]**	0.3462 [0.02891]**	0.32057 [0.00763]**	0.26191 [0.01503]**	
Non-white	-0.0588 [0.00750]**	-0.05875 [0.00751]**	-0.05513 [0.00709]**	-0.05508 [0.00710]**	-0.05299 [0.00727]**
Female	-0.19399 [0.00758]**	-0.19398 [0.00758]**	-0.20369 [0.00776]**	-0.20369 [0.00776]**	-0.20335 [0.00762]**
High School Grad					0.10701 [0.01553]**
Some College					0.17438 [0.01729]**
Collge Grad					0.45615 [0.03208]**
Index x HS Grad					0.0061 [0.00222]**
Index x Some College					0.01127 [0.00264]**
Index x College Grad					0.01807 [0.00333]**
Constant	2.00863 [0.01836]**	2.02617 [0.02122]**	2.05674 [0.01579]**	2.0711 [0.01781]**	1.93208 [0.02695]**
N obs	505219	505219	555966	555966	505219
R-squared	0.13	0.13	0.13	0.13	0.14

Notes: Data are from IPUMS and BLS. Sample is 24-30 year old native wage earners. Wages are in 1982-1984 dollars. Data from census years 1980, 1990, 2000.

All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth and year of birth dummies.

Index construction described in text. Coefficient estimates from OLS regressions.

Robust standard errors clustered on state of birth. *significant at 5%**significant at 1%

Table 3: Alternative Measures of Labor Market Conditions

Dependent variable: log hourly wages

Index base:	Reported Unemp. Rate	State Insured Unemp. Rate	Deviation from Relative Emp. Trend	Deviaton from Predicted Emp.
	[1]	[2]	[3]	[4]
Index	-0.02354 [0.00390]**	-0.03731 [0.00916]**	-0.30232 [0.19410]	0.34768 [0.06024]**
Index x college graduate	0.01018 [0.00276]**	0.0139 [0.00563]*	0.1876 [0.10887]	-0.15229 [0.05260]**
N obs.	505219	505742	505742	480059
R-squared	0.13	0.13	0.13	0.13

Notes: State insured unemployment rates from Lawrence Katz and Department of Labor. Coefficients not shown also include college graduate, female, and non-white dummies. Coefficients from OLS regressions. State employment levels are from BLS. All index constructions described in text. All other data notes from Table 2 apply.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

Table 4: Alternative Samples and Outcomes

Dependent Variable:	log wage	log wage	log total income	weeks worked last year	employed	log total income	weeks worked last year
Sample:	Males Wage Earners	Females Wage Earners	All	All	All	Wage Earners	Wage Earners
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Index	-0.02655 [0.00428]**	-0.01933 [0.00382]**	-0.02731 [0.00501]**	-0.14446 [0.05912]*	-0.0004 [0.00107]	-0.02823 [0.00485]**	-0.05664 [0.02915]
Index x College graduate	0.01203 [0.00396]**	0.00706 [0.00254]**	0.00973 [0.00489]	0.00197 [0.06133]	-0.00093 [0.00188]	0.099 [0.00454]*	-0.04272 [0.04983]
College graduate	0.15363 [0.03511]**	0.48311 [0.02924]**	0.30191 [0.03207]**	4.48118 [0.46800]**	0.17484 [0.01090]**	0.49967 [0.05030]**	3.07807 [0.55574]**
Non-white	-0.1004 [0.00864]**	-0.02125 [0.00767]**	-0.16968 [0.01505]**	-4.33775 [0.36451]**	-0.08726 [0.00701]**	-0.15538 [0.01379]**	-1.90914 [0.17989]**
Female			-0.49151 [0.01426]**	-9.16692 [0.24483]**	-0.16828 [0.00408]**	-0.48384 [0.01451]**	-3.53379 [0.14342]**
Constant	2.12549 [0.02479]**	1.70927 [0.02362]**	9.45455 [0.02783]**	40.61537 [0.48736]**		9.51145 [0.02650]**	45.80504 [0.24435]**
N-obs	263076	242143	511503	609795	609795	505219	505219
R-squared	0.09	0.14	0.13	0.09		0.14	0.04

Notes: Data are from IPUMS and BLS. Sample is 24-30 year old non-institutionalized natives in columns 3-5. Sample restricted as noted in other columns. Data from census years 1980, 1990, 2000. Coefficient estimates from OLS regressions except [5] which is implied probabilities from probit. Wages are in 1982-1984 dollars. All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth and year of birth dummies.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

Table 5: Effect of Early Labor Market Conditions on Wages Over Time

Dependent Variable: Log wages

Age sample:	24-28	34-38	44-48
	[1]	[2]	[3]
Index	-0.02976 [0.00352]**	-0.00161 [0.00212]	-0.01198 [0.00562]*
Index x college graduate	0.0225 [0.00351]**	0.01207 [0.00322]**	0.02006 [0.00518]**
College graduate	0.17385 [0.02713]**	0.43716 [0.02635]**	0.3849 [0.03055]**
Non-white	-0.05111 [0.00756]**	-0.08282 [0.00826]**	-0.0811 [0.00832]**
Female	-0.19007 [0.00771]**	-0.29384 [0.00572]**	-0.30977 [0.00457]**
Constant	2.05334 [0.01765]**	2.00208 [0.02075]**	2.22328 [0.02836]**
N obs	390109	281334	138751
R-squared	0.11	0.19	0.19

Notes: Data are from IPUMS and BLS. Sample is non-institutionalized native wage earners. Any restrictions shown in column headings. Wages are in 1982-1984 dollars. Data from census years 1980, 1990, 2000. Coefficient estimates from OLS regressions. All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth dummies.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

Table 6: Impact of Early Labor Market Experiences within a Cohort

Dependent Variable: log wages

Census Year:		1980	1990	2000
24-28 year olds	Index	0.00504 [0.00473]	-0.00773 [0.00442]	-0.01639 [0.00766]*
	Index x college grad	-0.04526 [0.00539]**	0.03937 [0.00495]**	0.05067 [0.00925]**
34-38 year olds	Index		0.00576 [0.00666]	-0.00809 [0.00306]*
	Index x college grad		-0.01358 [0.00737]	0.01794 [0.00442]**
44-48 year olds	Index			-0.01198 [0.00562]*
	Index x college grad			0.02006 [0.00518]**

Notes: Data are from IPUMS census years 1980, 1990, and 2000 and BLS. Each set of coefficients from a regression on a sample restricted to ages and year shown.

All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth dummies.

Wages are in 1982-1984 dollars. Coefficients not shown also include college graduate, female, and non-white dummies. Coefficients from OLS regressions.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

**Table 7: Impact of Early Labor Market Experiences within a Cohort:
IUR Index, Full-time full-year workers**

Dependent Variable: log wages

Census Year:		1960	1970	1980	1990	2000
24-28 year olds	Index	-0.00327 [0.00853]	-0.01314 [0.00786]	0.00556 [0.00586]	-0.02243 [0.00467]**	-0.0062 [0.02883]
	Index x college grad	0.01038 [0.01969]	0.03079 [0.00780]**	-0.04979 [0.00899]**	0.07127 [0.01162]**	0.11798 [0.02218]**
34-38 year olds	Index		0.00194 [0.00628]	0.00236 [0.00797]	0.00672 [0.00778]	-0.01456 [0.00460]**
	Index x college grad		-0.00763 [0.01614]	0.02783 [0.00866]**	-0.01003 [0.00970]	0.04032 [0.00800]**
44-48 year olds	Index			-0.00128 [0.00803]	-0.00146 [0.00694]	-0.00312 [0.00821]
	Index x college grad			-0.01684 [0.01523]	0.01692 [0.00694]*	0.02826 [0.00866]**

Notes: Data are from IPUMS, Department of Labor, and Lawrence Katz. Sample is restricted to full-time, full-year workers of ages and in year shown.

Wages are in 1982-1984 dollars. Data from census years 1960, 1970, 1980, 1990, 2000.

All regressions contain same additional unreported covariates as in Table 6. Coefficient estimates from OLS regressions.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

Table 8: Effect of Early Labor Market Conditions on Mobility

Dependent Variable: Mover dummy

	[1]	[2]	[3]
Index	0.00547 [0.00161]**	0.00356 [0.00213]	0.00129 [0.00456]
Index x college graduate		0.0073 [0.00298]*	
Collge Grad	0.16866 [0.00758]**	0.10722 [0.02904]**	
Non-white	-0.01938 [0.01663]	-0.01934 [0.01662]	-0.01758 [0.01677]
Female	-0.00091 [0.00154]	-0.00091 [0.00154]	-0.00431 [0.00167]**
High School Grad			-0.01701 [0.02212]
Some College			0.04798 [0.02926]
Collge Grad			0.11613 [0.04222]**
Index x HS Grad			0.00185 [0.00317]
Index x Some College			0.00296 [0.00481]
Index x College Grad			0.00955+ [0.00522]
N obs	505219	505219	505219

Notes: Data are from IPUMS and BLS. Sample is 24-30 year old native wage earners. Data from census years 1980, 1990, 2000.

All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth and year of birth dummies. Estimates are implied probabilities from probit regressions.

Robust standard errors clustered on state of birth.

+significant at 10%

*significant at 5%

**significant at 1%

Table 11: Effect of Early Labor Market Conditions on Aggregate Labor Supply

Dependent Variable: Log (fraction natives residing in birth state) *jsbt*

	[1]	[2]	[3]	[4]	[5]
Index	0.01614 [0.00375]**	0.02301 [0.00827]**	0.01732 [0.01009]	-0.0027 [0.00799]	-0.00532 [0.01359]
Index x College grad	-0.04843 [0.01690]**	-0.10929 [0.03169]**	0.001 [0.01330]	-0.02987 [0.00830]**	-0.00297 [0.01916]
Index x College grad x years since 22	-0.00522 [0.00169]**	-0.009 [0.00266]**	-0.0014 [0.00086]	0.00073 [0.00080]	-0.00381 [0.00351]
College grad	-0.36096 [0.11804]**	-0.08648 [0.20496]	-0.39577 [0.07932]**	-0.14147 [0.07370]	-0.1602 [0.10479]
College grad x years since 22	-0.00756 [0.01100]	0.0025 [0.01630]	-0.00484 [0.00492]	-0.02773 [0.00725]**	0.0346 [0.02567]
Index x years since 22	0.00231 [0.00030]**	0.00237 [0.00032]**	0.00187 [0.00064]**	-0.00163 [0.00054]**	0.00012 [0.00135]
N obs	2872754	2938379	745734	524894	278770
R-squared	0.57	0.5	0.73	0.77	0.88

Notes: Data are from IPUMS and BLS. Sample is 18-55 year old non-institutionalized natives in columns 1 and 2; and to 24-28 year old wage earners in 1980, 1990, and 2000 in columns 3, 4 and 5, respectively. Wages are in 1982-1984 dollars. Data from census years 1980, 1990, 2000. All regressions contain dummies for state of birth, year of birth, and year plus interactions of college graduate with state of birth dummies.

Robust standard errors clustered on state of birth.

*significant at 5%

**significant at 1%

Table 12: National versus Local Early Labor Market Conditions

Dependent Variable: Log Wage

	[1]	[2]
National-based Index	-0.00217 [0.00338]	0.01852 [0.00400]**
Local-based Index	0.00946 [0.00305]**	-0.02048 [0.00335]**
National Index x college grad		-0.00117 [0.00458]
Local Index x college grad		0.01095 [0.00320]**
Age	0.23417 [0.02573]**	0.23333 [0.02391]**
Age-squared	-0.00378 [0.00049]**	-0.00376 [0.00045]**
College graduate	0.19408 [0.02034]**	0.18221 [0.02036]**
Non-white	-0.04862 [0.00621]**	-0.04761 [0.00643]**
Female	-0.1694 [0.00596]**	-0.16944 [0.00596]**
Married	0.07179 [0.00163]**	0.07207 [0.00163]**
Log cohort size	-0.00818 [0.01995]	0.01202 [0.02123]
Log state cohort size	0.14346 [0.02874]**	0.10017 [0.02400]**
Constant	-2.82506 [0.58099]**	-2.87502 [0.55874]**
N obs	505742	505219
R-squared	0.16	0.16

Notes: Data are from IPUMS 1980, 1990, and 2000 U.S. Census data and BLS. Sample is the same as in Table 2. All regressions include dummies for birth state and data year plus interactions of college graduate with state of birth. Dummies for 13 industry categories of current employment were also included. Coefficient estimators from OLS regressions. Robust standard errors are clustered on birth state.

*significant at 5%; **significant at 1%

Table 13: Effect of Early Labor Market Conditions on Adult Wages by Out-of-State College Going Propensity

Dependent variable: Log wage

	Baseline	[1]	[2]	[3]	[4]	[5]
Index	-0.02733 [0.00352]**	-0.02404 [0.00394]**	-0.02505 [0.00388]**	-0.0055 [0.00288]	-0.0034 [0.00532]	-0.01013 [0.00480]*
Index x college grad	0.02274 [0.00333]**	0.01252 [0.00378]**	0.0136 [0.00342]**	0.0128 [0.00562]*	-0.02013 [0.00489]**	0.01549 [0.00937]
College grad	0.19136 [0.02637]**	0.21746 [0.02440]**	0.21023 [0.02204]**	0.24792 [0.05295]**	0.3037 [0.03430]**	0.25481 [0.05446]**
nonwhite	-0.05957 [0.00726]**	-0.06108 [0.00741]**	-0.06106 [0.00743]**	-0.09603 [0.01026]**	-0.03098 [0.00731]**	-0.05205 [0.00869]**
female	-0.19319 [0.00764]**	-0.193 [0.00763]**	-0.19301 [0.00763]**	-0.18603 [0.00641]**	-0.25462 [0.01175]**	-0.15459 [0.00742]**
Index x College grad x High OOS		0.00655 [0.00618]	0.01169 [0.00862]	-0.00002 [0.00834]	0.01554 [0.00674]*	0.01518 [0.01271]
College grad x High OOS		-0.04219 [0.04131]	-0.0685 [0.06074]	-0.00649 [0.07125]	-0.10495 [0.04502]*	-0.09476 [0.07756]
Index x High OOS		-0.00522 [0.00381]	-0.00932 [0.00609]	0.00831 [0.00356]*	-0.00315 [0.00526]	-0.00268 [0.00817]
Constant	2.0287 [0.01910]**	2.0136 [0.02273]**	2.02142 [0.02187]**	1.86464 [0.03070]**	1.82304 [0.03127]**	1.86902 [0.03249]**
Observations	505219	505219	505219	197284	137451	170484
R-squared	0.13	0.12	0.12	0.15	0.1	0.13

Notes: Sample in columns baseline, [1] and [2] is all non-institutionalized natives ages 24-30 from 1980, 1990, and 2000 IPUMS.

Samples in columns [3], [4], and [5] restricted to 24-30 year olds in 1980, 1990 and 2000, respectively. All regressions contain dummies for state and year of birth.

Estimates are coefficients from OLS regressions. Construction of OOS from 1981 Department of Education Residence & Migration Survey is described in text.

Robust standard errors clustered on birth state.

* significant at 5%; ** significant at 1%