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Who Suffers During Recessions?[†]

Hilary Hoynes, Douglas L. Miller, and Jessamyn Schaller

The Great Recession generated large reductions in employment, earnings, and income for workers and families in the United States. The seasonally adjusted unemployment rate increased from 5 percent in December 2007 to 9.5 percent in June 2009, the start and end of the recession according to the National Bureau of Economic Research (NBER, at ⟨http://www.nber.org/cycles.html⟩). From 2007 to 2010, median real family income fell by 6 percent and the poverty rate increased from 12.5 percent to 15.1 percent (DeNavas-Walt, Proctor, and Smith 2011). The recovery since June 2009 has been slow relative to historical averages. In the more than two and a half years since the official start of the recovery, the unemployment rate has fallen by just over a percentage point, reaching 8.3 percent in February 2012. The effects of the Great Recession, however, are not experienced equally by all workers. National statistics can obscure dramatic differences in the severity of the cyclical impacts for different groups. For example, men experienced significantly larger job loss in the Great Recession compared to women, but during the recovery, male employment is picking up more rapidly (Kochhar 2011).

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[†] To access the Appendix, visit
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We begin this paper with an overview of cyclical fluctuations in unemployment rates and employment from 1979 through 2011. Using national time-series data, we compare the Great Recession to earlier recessions in terms of its severity, duration, and subsequent recovery. We then go on to use individual-level data from January 1979 through December 2011 from the Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) to measure and illustrate how unemployment and employment have changed in the Great Recession for persons of different ages, educational attainment, race, and gender. After establishing the basic descriptive findings, we estimate a state panel data model to measure the responsiveness of different groups to the state-month unemployment rate. The labor market outcomes we analyze are the groups' employment and unemployment.

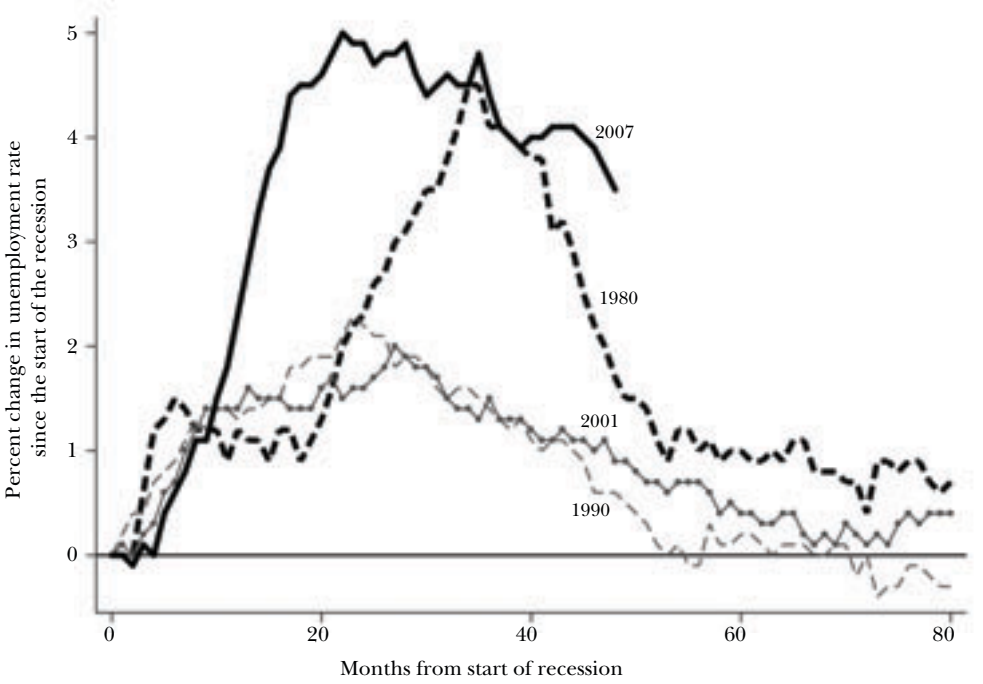
Our findings are summarized as follows: First, the labor market decline in the Great Recession is both deeper and longer than the early 1980s recession. Second, the impacts of the Great Recession have been felt most strongly for men, black and Hispanic workers, youth, and low-education workers. Third, these dramatic differences in the cyclicality across demographic groups are remarkably stable across three decades of time and across recessionary periods versus expansionary periods. Fourth, the differences across demographic groups during the 2007 recession are explained to a large extent by variation in the groups' exposure to cycles across industry-occupation.

Our study builds on a large existing literature in labor economics and macroeconomics on how business cycles affect outcomes for workers and families, including our own prior work (Bitler and Hoynes 2010; Hoynes 2000; Hines, Hoynes, and Krueger 2001; Stevens, Miller, Page, and Filipski 2011). Our study makes several contributions to this existing literature. First, our primary focus is identifying differences in the cyclicality across demographic groups. Second, we present the results of statistical tests for differences in the cyclicality both across groups (for a given time period) and over time (for a given group). Third, by using data through the end of 2011, we highlight the results for the Great Recession and compare them to the early 1980s recession. Finally, we compare the recovery periods following the two most severe recessions in our time frame: the recession(s) of the earlier 1980s (counted as one recession) and the 2007–09 recession.

Overview of Labor Market Fluctuations Since 1979

The U.S. economy from 1979 to 2011 has seen five recessions: six months from January 1980 to July 1980; 16 months from July 1981 to November 1982; eight months from July 1990 to March 1991; eight months from March 2001 to November 2001; and 19 months from December 2007 to June 2009. We follow a common practice of combining the back-to-back 1980 and 1981 recessions, and the graphs therefore compare four cycles, designated by the starting years of the recessions as 1980, 1990, 2001, and 2007. To put the labor market dimension of these recessions in context, consider Figures 1 and 2. Following the standard definitions, the percent

Figure 1
U.S. Seasonally Adjusted Unemployment Rate, Months since Peak

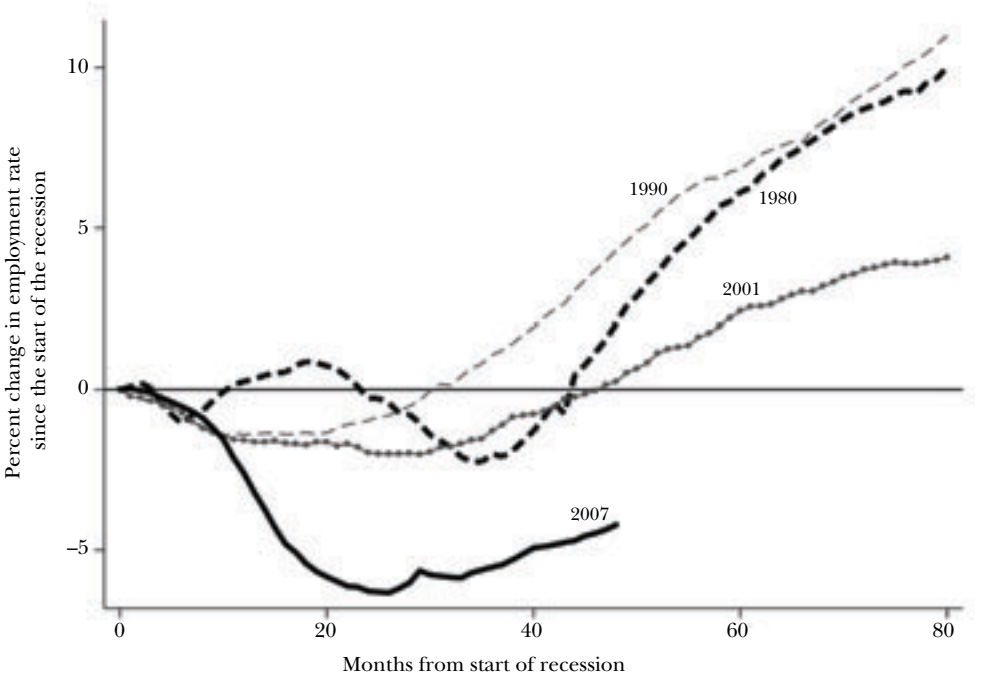


Sources: Current Population Survey (Bureau of Labor Statistics 2012a). Labor market peaks come from NBER (2011).
Note: For the 1980 recession, the recessions beginning in January 1980 and July 1981 are combined into one cycle.

unemployed is among those in the labor force, while the percent employed is among the entire population. We analyze both to capture different margins of behavior.

When discussing the monthly unemployment rate for this and all subsequent analyses in the paper, we present seasonally adjusted measures, which remove the typical variation that takes place within a calendar year. In Figure 1, we plot the percentage point increase in the unemployment rate for these four business cycles by the number of months since the official start of the recession. The paths of the unemployment rate after the 1991 and 2001 recessions were quite similar. After the 1980–82 recessions, unemployment was slower to rise (which may be the result of combining two back-to-back recessions), but after about 48 months, the unemployment rate had dropped sharply. In contrast, the 2007 recession exhibits the steepest and largest increase in the unemployment rate among the four recessions. The unemployment rate rose from 5 percent in December 2007 to a high of 10.1 in October 2009. While the recession officially ended in July 2009, the unemployment rate has remained high. As of December 2011 (the last data point), unemployment rates remain almost 2 points higher, relative to the peak, than at a similar point in the double-dip recession of the early 1980s; however, by comparison with either the January 1980 recession or the

Figure 2
U.S. Seasonally Adjusted Employment, Months since Peak



Sources: Current Employment Statistics (Bureau of Labor Statistics 2012b). Labor market peaks come from NBER (2011).
Note: For the 1980 recession, the recessions beginning in January 1980 and July 1981 are combined into one cycle.

July 1981 recession, the increases in unemployment in the current recession appear far more dramatic and long-lasting.

Figure 2 highlights the relatively weak recovery of 2010–2011 by looking at aggregate monthly employment (seasonally adjusted). This figure shows the percent change in employment compared with the employment level of the first month of each of the four recessions. The magnitude of the fall in the employment level is comparable in the 1980, 1991, and 2001 recessions; and employment falls much more severely in the 2007 recession. In the timing of the recovery of job growth, by 48 months since the beginning of the 2007 recession (where our data end), employment had returned to its prerecession level in the three previous cycles. We are far from that in the Great Recession.

Many earlier studies have examined the effect of business cycles on labor market outcomes. Research on the Great Recession has confirmed that, across demographic groups, the decline in labor market outcomes since 2007 has been worse than any other recession in the postwar period (Goodman and Mance 2011). As in previous recessions, evidence suggests that the effects of the recent downturn have been born disproportionately by racial and ethnic minorities and by male,

younger, and less-educated workers (Elsby, Hobijn, and Şahin 2010; Farber 2011; Kochhar, Fry, and Taylor 2011; Sierminska and Takhtamanova 2011; Verick 2009). However, by contrast with previous recoveries, employment growth patterns have favored men since the official end of the recession in June 2009 (Kochhar 2011). Since the recent recovery has been sluggish relative to previous recoveries, much attention has been paid to the possibility of increased structural unemployment due to job mismatch and the unprecedented extension of unemployment insurance benefits to 99 weeks (as discussed in this symposium by Daly, Hobijn, Şahin, and Valletta; see also Howell and Azizoglu 2011; Reich 2010; Rothstein 2011).

In this paper, we investigate the differential impacts of these factors across demographic groups. The approach we take is most similar to that of Hines, Hoynes, and Krueger (2001) who use annual data from the March Current Population Survey for 1976–96 to examine the impact of cycles on employment, hours, earnings, and income. They adopt a state panel approach where the effects of the business cycle are identified by variation in the timing and severity of cycles across states. They explore differences across education groups (finding greater sensitivity for the less educated) and test for a structural break in sensitivity in 1990 (finding none), as well as examining effects of business cycles on wage growth, health and work injuries, and government finances. As described below, we also use a state panel model in our analysis. We expand on their work by examining monthly data through December 2011, which enables a detailed analysis of the Great Recession and the start of the current recovery. Further, we examine differences across race, gender, age, and education groups and test for differences across groups and over time.

Raw Changes by Group and Comparisons across 1980 and 2007 Recessions

We begin with a snapshot of the labor market outcomes by demographic group in May 2007, on the eve of the Great Recession. Table 1 shows the employment, unemployment, hours, and earnings of individuals by age, race, sex, and education. Employment, hours, and earnings are higher for men, whites, prime-age workers, and those with higher education levels. The opposite pattern, for most groups, is found for unemployment. These differences can be substantial. For example, less than half of individuals with no high school degree are working at the peak of the business cycle in 2007, compared to 86 percent of college graduates. Fifty-nine percent of black women are working, compared to 71 percent of white women.

For this comparison, and for much of what follows, we utilize individual-level data from the Current Population Survey (CPS) Merged Outgoing Rotation Group (MORG) covering the period from January 1979 to December 2011.[1] The CPS is a representative monthly household survey conducted by the U.S. Bureau of Labor

[1] We obtain the CPS-MORG extracts from the National Bureau of Economic Research: ⟨http://www.nber.org/morg/annual/⟩. Our sample includes individuals aged 16 to 60. We drop those over age 60

Table 1
Labor Market Outcomes by Race, Gender, Education, and Age, May 2007

	Employment rate (%)	*Unemployment rate (%)*	*Usual weekly earnings (2010$)*	*Hours last week*
White men	81	3.6	830	34
White women	71	3.2	499	25
Black men	66	9.1	448	26
Black women	59	6.5	401	24
Hispanic men	79	6.2	524	32
Hispanic women	58	4.9	298	20
Age 16 to 19	33	14.4	69	8
Age 20 to 24	68	6.4	306	23
Age 25 to 44	81	3.7	679	32
Age 45 to 60	75	3.3	707	30
Less than high school	48	10.1	187	16
High school graduate	72	5.4	306	28
Some college	76	3.6	545	29
College graduate	86	1.6	1,039	35

Source: Authors' tabulations of Current Population Survey Merged Outgoing Rotation Group (CPS-MORG) data.
Note: May 2007 was the eve of the Great Recession.

Statistics that collects information on unemployment, labor force participation, and demographic characteristics of the population. The MORG is a subset of the full CPS sample, with detailed information for 25,000 or more individuals per month, including their employment status, weekly work hours, and usual weekly earnings, as well as the age, education, race, ethnicity, and gender of each recipient. We collapse the MORG into cells based on state, year-month, and demographic group. Our demographic groups are defined by single year of age, gender, race/ethnicity (white, black, Hispanic, other),[2] and education (less than high school, high school, some college, college graduate or more).[3] For each cell, we calculate the percent employed and the percent unemployed using the CPS-provided weights.

to abstract from retirement decisions; we also drop the small number of observations missing ethnicity, which are all pre-2002.

[2] White, black, and other races are all non-Hispanic. Because of small population shares, we do not present results for the "other" race group. For the remainder of the paper we will refer to these as "race" groups even though they are more accurately race/ethnicity groups. By "single year of age" we mean, for example, that 18 year-olds are a separate group from 19 year-olds.

[3] Beginning in January 1992, the Bureau of Labor Statistics and the Census Bureau changed the focus of the Current Population Survey educational-attainment question from years of attainment to degree-receipt. We follow the matching procedure outlined in Jaeger (1997) to create categories that are comparable over time. However, the redesign of the education question creates a discontinuity in the categorization of educational attainment for which we cannot fully correct.

Next we turn to exploring the "raw" changes in labor market outcomes for these groups during the 2007 recession and comparing them to the changes in the recessionary episodes of the early 1980s. Here, we define the recessions by identifying the low and high points of the seasonally adjusted national unemployment rate; the subsequent high to low points of the unemployment rate identify the recovery. Our qualitative conclusions are unchanged if we use the NBER dating. However, for present purposes we prefer using the unemployment rates to date the cycles because the NBER dating depends in substantial part on GDP growth, and labor market measures tend to lag changes in GDP. Thus for 2007, we have the recession of May 2007 to October 2009 and the recovery of October 2009 to December 2011 (the last month in our data). For the 1980 cycle, we have the recession of May 1979 to November 1982 and the recovery of November 1982 to January 1985 (we use 27 months of recovery because that matches the data availability for the current recovery).

In the first two columns of Table 2, we show peak-to-trough changes in the unemployment rate for the race/sex, age, and education subgroups over the 1980 and 2007 recessions. To construct this table (and all subsequent calculations using the Current Population Survey), we first compute monthly unemployment rates for each demographic group from the CPS-MORG data. We then carry out a seasonal adjustment to this data, regressing each time series on a set of month dummies (with December omitted), and using the constant and residuals from this regression to create the adjusted series. Bold typeface in the table indicates groups for which the difference between peak-to-trough changes in labor market outcomes in the two recessions is statistically significant at the 5 percent level.

In the 2007 recession, the demographic groups who have high baseline unemployment rates (Table 1) also had the greatest increase in unemployment (Table 2) over the recession. Men had larger increases than women; blacks and Hispanics had larger increases than whites; youth had larger increases than the middle aged; and low education groups were also hit the hardest.

Comparing the 2007–2009 recession to the 1980s recession, several patterns emerge. First, for most groups, the increase in unemployment is greater in the more recent recession (although only statistically significantly different for high school graduates and college graduates). The largest increases (relative to the 1980s recession) are for Hispanic women and those with a high school degree. The exceptions include black men, Hispanic men, and those with less than a high school degree, all groups that experienced a smaller increase in unemployment rates compared to the 1980s recession. However, over time the educational distribution has shifted toward the higher educational categories so, although all but the least-educated did worse, on average people have moved into the better-faring groups.

The final two columns of Table 2 show results focusing on changes (in percentage point terms) in the employment rate. The patterns across groups are fairly similar to those of the unemployment rate: men, black and young workers, and low education groups all experienced greater reductions in employment in the current recession. However, comparing the two recessions presents a noticeably different pattern than the one for the unemployment rate. For all groups

Table 2
Peak-to-Trough Percentage Point Changes in Unemployment and Employment Rates by Group, 1980 and 2007 Recessions
(percentage points)

	Peak-to-trough changes in unemployment rate		*Peak-to-trough changes in employment rate*	
	May 1979 to Nov. 1982	*May 2007 to Oct. 2009*	*May 1979 to Nov. 1982*	*May 2007 to Oct. 2009*
White men	5.79	6.47	**–4.79**	**–7.34**
White women	3.73	3.59	**1.92**	**–2.81**
Black men	11.91	9.50	–8.41	–9.02
Black women	4.79	5.73	–0.85	–6.14
Hispanic men	10.23	6.09	–10.94	–6.25
Hispanic women	3.63	6.46	–0.56	–4.97
Age 16 to 19	10.55	10.86	–6.99	–7.79
Age 20 to 24	8.05	8.76	–5.39	–8.69
Age 25 to 44	5.29	5.78	**–2.05**	**–5.90**
Age 45 to 60	3.57	3.89	–0.82	–2.93
Less than high school	10.83	8.12	–5.95	–8.72
High school graduate	**5.96**	**8.28**	**–3.37**	**–7.99**
Some college	3.64	5.17	**–0.02**	**–4.72**
College graduate	**1.75**	**2.84**	–1.35	–2.15

Source: Authors' tabulations of Current Population Survey Merged Outgoing Rotation Group (CPS-MORG) data.
Notes: Peak-to-trough dated using minimum and maximum seasonally adjusted U.S. unemployment rates. Bold typeface indicates groups for which the difference between peak-to-trough changes in labor market outcomes in the two recessions is statistically significant at the 5 percent level. This significance test was implemented by a simple difference-in-differences regression as follows: using data for the four time periods 5/79, 11/82, 5/07, and 10/09, we regressed group-specific employment for each major demographic group on indicator variables for 1) 2007 recession (5/07 *or* 10/09), 2) trough periods (11/82 or 10/09), and 3) 2007 trough (10/09). The test is based on the statistical significance (at the 5 percent level) of indicator "3" for the 2007 trough.

except Hispanic men, the employment rate fell more during the recent recession than during the 1980s (and statistically significantly so for whites, those ages 25–44, high school graduates, and those with some college). One possible reason for this difference is that the 1980s recession occurred while women's labor force participation rates were undergoing a secular increase; that increase leveled out (and even slightly reversed) at the start of the twenty-first century (as discussed in this journal by Juhn and Potter 2006). For example, white women experienced *increases* in employment rates during the 1980s recession, but decreases during the current recession. The 1980s increase in employment for white women (and relatively small decreases in employment rates for black and Hispanic women) were likely driven by the secular increase in women's labor force participation rates, thus masking any business cycle sensitivity.

A Regression Approach for Potentially Confounding Factors

The crude changes over time across recessions are informative about the cross-group and cross-recession patterns, but they are also limited. Cross-group comparisons may be confounded by changes in other determinants of labor market success. For example, if the composition of low education groups is shifting over time to racial, ethnic, or age groups that fare worse in the labor market, then the measured change over time for low education groups will be confounded with those changes. If there are nonrecession-based changes in labor market patterns over time—like the increase in women's labor market participation—then these will also be wrapped up in the measured changes. To address these issues, we turn to a regression-adjusted measure of sensitivity to business cycles. We seek to use differences in the timing and intensity of state-level movement in unemployment rates to estimate how different demographic groups are affected by business cycle swings.

Again, we use the Current Population Survey (CPS) Merged Outgoing Rotation Group (MORG) data from January 1979 to December 2011. As noted already, we collapse the MORG into cells based on state, year-month, and the demographic groups (race/sex × age × education) described earlier. Also, we supplement this data with national and state unemployment statistics compiled from the Current Population Survey by the Bureau of Labor Statistics (2011a, b).

As a starting point, we estimate a regression in which the dependent variable y is the unemployment rate for a particular group, defined by the demographic cell g for that group, (race/sex × age × education), state s, and time (year-month) t. Our regression equation takes the form:

$$y_{gst} = \beta_{major\text{-}group} UN_{st} + RaceSex_g + Age_g + Educ_g + \alpha_s + \delta_t + year_t \gamma_s + \varepsilon_{gst}$$

We estimate this equation for each major demographic group, such as black men, white women, those without a high school degree, those with a college degree or more, those 18 years of age, 19 years of age, and so on. On the right-hand side of each equation, UN_{st} is the state unemployment rate in month-year t, $RaceSex_g$, Age_g, and $Educ_g$ are group-specific intercepts, and we include state (α_s) and year-month (δ_t) fixed effects and state-specific time trends (γ_s). The coefficient of interest is $\beta_{major\text{–}group}$, which gives the sensitivity of the group (for example, white men) to the state unemployment rate.[4] We use the Current Population Survey population weights for each cell, and we conduct statistical inference clustering on U.S. states.[5]

[4] We estimate this model separately by major demographic group, with the unit of observation being subgroup by state by year-month cells. For example, when we estimate the model for white men, there are 180 observations (45 age categories × 4 education categories) for each state-year-month. In this example, the $RaceSex_g$ dummies are dropped from the regression; the Age_g and $Educ_g$ dummies control for compositional shifts within white men.

[5] Our approach is similar in spirit to equation 7 and Table 2 in Blanchard and Katz (1992), who examine the responsiveness of U.S. states to the overall U.S. business cycle. We differ from their approach in that we use state-year-demographic group variation, and we examine responsiveness by specific demographic

This regression analysis embodies several changes to our analysis, compared to the raw differences presented in the previous section. First, it changes the source of variation used to estimate the sensitivity to the business cycle. The raw changes in the previous section were driven by national changes over time; specifically, comparing labor market outcomes by group between the peak and trough of a recession. Instead, here our coefficients are based on panel fixed effect estimates. We include state fixed effects, which remove variation that is purely driven by cross-state differences. We also include time fixed effects, which remove variation common to a point in time and control for flexible national time trends. Doing so protects our estimates from being driven by secular changes in demographic patterns such as changes in women's attachment to the labor market. After controlling for the fixed effects, we are left with variation that is driven by how the timing and severity of the business cycle affects states differently. When a state enters a recession (or recovery) earlier than the national average, or when a state's change in overall unemployment is greater than the national average, that variation is used to identify the coefficients in our regression.

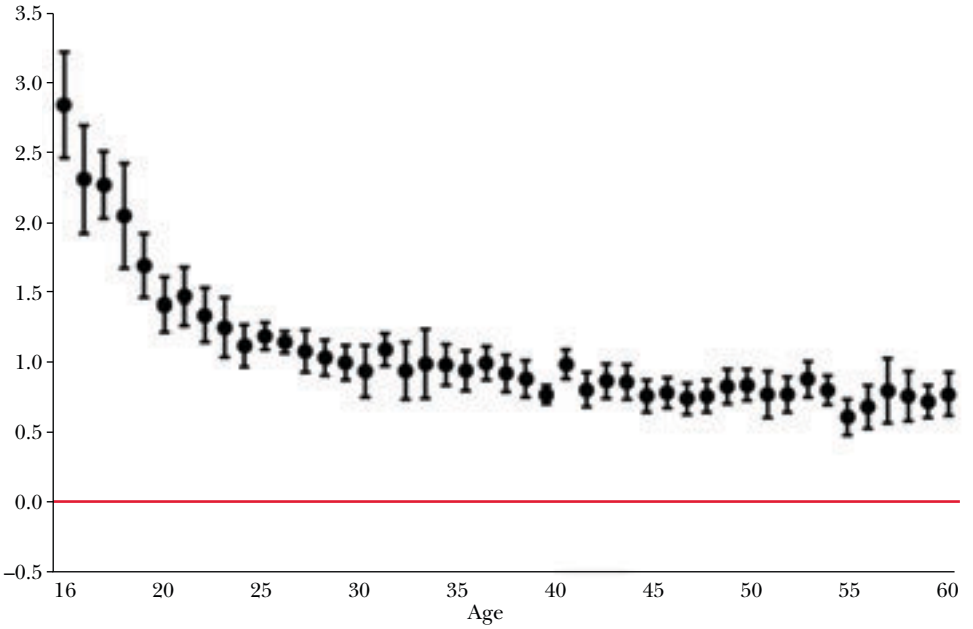
Another feature of the regression analysis, compared to the raw changes above, is that we can control for demographic characteristics, thereby statistically adjusting for any differences in the composition of groups. For example, the group of workers with less than a high school degree is becoming more Hispanic over time. The raw differences for education groups, shown above, may in part reflect such changes in composition. A final important difference between the two approaches is that the regression results are not only estimated over the recession periods, but instead are estimated using data from both contractions and expansions.

To begin, we estimate this regression separately for each of our major demographic groups. For example, we estimate it for all 16 year-olds, and preserve the coefficient β_{16} (for this regression, the age dummies are excluded from the estimation). We then estimate the regression for 17 year-olds, and so on. After estimating for each age, we re-estimate the equation separately for each of our six main race/sex groups, and for our four education categories. The results are presented in Figures 3 and 4.

Figure 3 shows the results of the series of regression estimates for each single year of age. Each point on the graph represents estimates from a separate regression: the *x*-axis gives the person's age, and on the *y*-axis, we plot the estimated coefficient and the 95 percent confidence interval. For example, the first point on the graph is interpreted as "when a state-year experiences a percentage point higher unemployment rate, 16 year-olds in that state experience a 2.8 percentage point higher unemployment rate." Figure 3 shows that the labor market cycle hits especially hard

groups to overall state-year variation. By regressing state-specific labor market outcomes on the overall unemployment rate, Blanchard and Katz note, "Here, obviously, the proper weighted average of coefficients [across states] is equal to one; of interest is the distribution of [group-specific coefficients] across [groups]." Here, we too are interested in the descriptive findings for the differences in effects of cycles across demographic groups.

Figure 3
Effect of State Unemployment Rate on Group Unemployment Rate, by Single Year of Age
(percentage points)

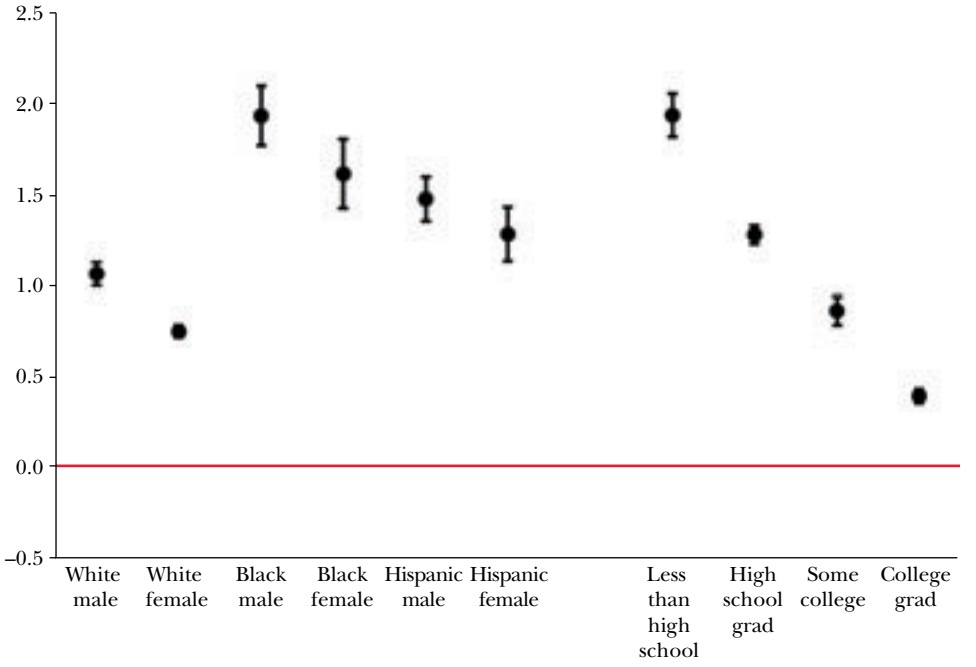


Source: Authors' tabulations of the Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) for 1/1979–12/2011.
Notes: Each point is the estimate on state unemployment rate from a separate regression (along with the 95 percent confidence interval) for a given demographic group. The model also includes fixed effects for demographic group, state, and year-month, as well as state linear time trends. See text for details.

for youth, with responsiveness for 16–19 year-olds more than twice that of those in their mid-20s. The coefficients continue to decline, at a more modest rate, until ages in the mid-50s.

In Figure 4 we present results from stratifying on race-sex demographic groups and on education. The results here suggest that the unemployment rate of men is more responsive to business cycle movements than the unemployment rate for women; that the response for blacks is greater than for Hispanics, for whom in turn the labor market response is higher than for whites; and that low education groups are more responsive than high education groups. The differences are large: an increase of one percentage point in the state unemployment rate leads to almost a two percentage point increase in unemployment for workers with less than a high school degree compared to less than half a percentage point increase for those with a college degree. The responsiveness of the unemployment rate of black men to the business cycle is almost double the responsiveness of white men's unemployment

Figure 4
Effect of State Unemployment Rate on Group Unemployment Rate, by Race/Sex and Education
(percentage points)



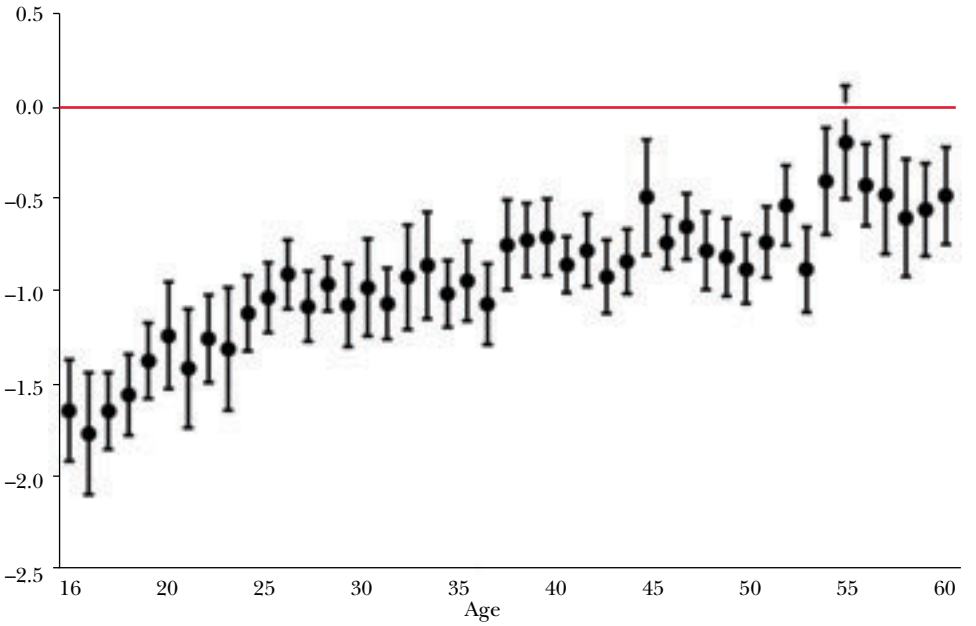
Source: Authors' tabulations of the Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) for 1/1979–12/2011.
Notes: Each point is the estimate on state unemployment rate from a separate regression (along with the 95 percent confidence interval) for a given demographic group. The model also includes fixed effects for demographic group, state, and year-month, as well as state linear time trends. See text for details.

rate, and the responsiveness of the unemployment rate of black women is more than double the responsiveness of that of white women.

These results are qualitatively similar to the raw changes presented earlier. This correspondence is remarkable, for three reasons: First, the two models are estimated using fundamentally different sources of variation, that is, state versus national cycles. Second, the model controls for time trends for each subgroup. Third, the regression model is estimated over the full 1979–2011 time period, rather than just during the 2007 or 1980s recessions.

We then carry out a parallel regression exercise, but this time using the employment rate, rather than the unemployment rate, as our left-hand-side dependent variable. In Figure 5 we consider the sensitivities of the age-specific employment rate to the overall state-month unemployment rate. The interpretation of the coefficients is similar to that discussed above; for example, a one percentage point increase in the state unemployment rate leads to a 1.7 percentage point reduction

Figure 5
Effect of State Unemployment Rate on Group Employment Rate, by Single Year of Age
(percentage points)

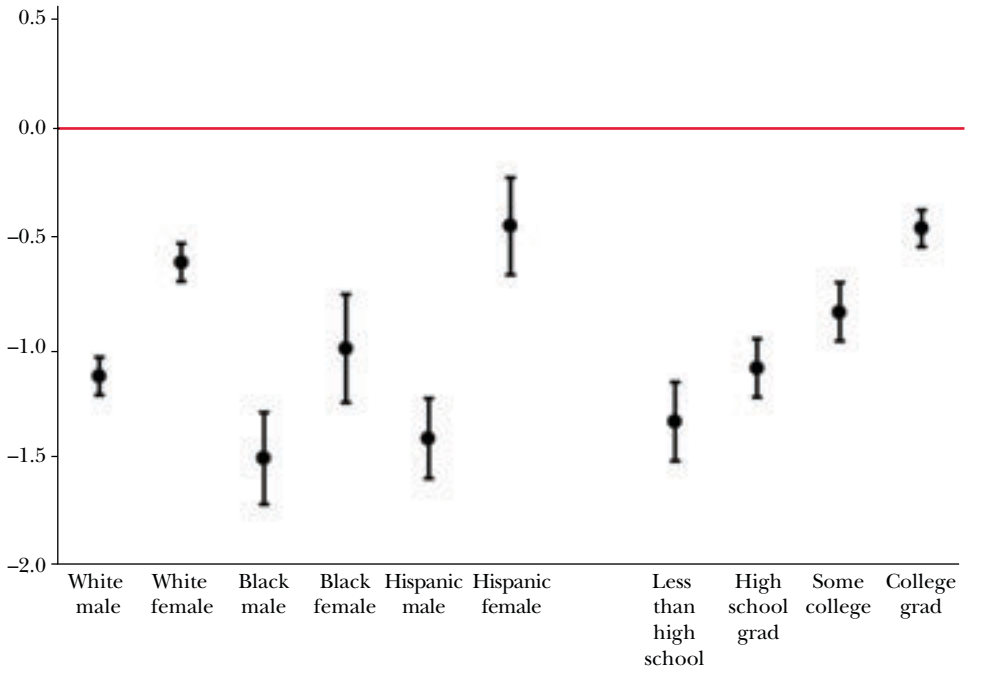


Source: Authors' tabulations of the Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) for 1/1979–12/2011.
Notes: Each point is the estimate on state unemployment rate from a separate regression (along with the 95 percent confidence interval) for a given demographic group. The model also includes fixed effects for demographic group, state, and year-month, as well as state linear time trends. See text for details.

in the employment rate for 16 year-olds. The patterns here are similar to Figure 3: the youngest are the most responsive, and by-age cyclicality declines with age.

Figure 6 shows estimates of the impact of the overall state-month unemployment rate on the employment rate by race-sex and education groups. The patterns for the race/sex groups are somewhat different for employment compared to the unemployment rate in Figure 4. It is still the case that white individuals are less responsive than their black counterparts, women are less responsive than are men, and higher education groups, less responsive than lower education groups. (In reading the graph, note that as one moves *up* the *y*-axis the sensitivity gets closer to 0 and is therefore *less* sensitive). However, in contrast to Figure 4, here the gender differences in responsiveness are much greater. The gender differences are large enough to dominate the race differences, so that the three least-responsive groups (among the six race/sex groups) are the three groups of women. For this measure, Hispanic women are the least responsive of all the demographic groups. It can be shown that the cyclical responsiveness of the employment rate, the unemployment

Figure 6
Effect of State Unemployment Rate on Group Employment Rate, by Race/Sex and Education
(percentage points)



Source: Authors' tabulations of the Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) for 1/1979–12/2011.
Notes: Each point is the estimate on state unemployment rate from a separate regression (along with the 95 percent confidence interval) for a given demographic group. The model also includes fixed effects for demographic group, state, and year-month, as well as state linear time trends. See text for details.

rate, and the labor force participation rate are related through an adding-up identity. The larger gender differences for cyclical responsiveness of the employment rate is consistent with women being more likely to act as added workers (labor force increasing in recessions) and men being more likely to act as discouraged workers (labor force decreasing in recessions). Hispanic women, with their high rates of marriage (compared to the other groups) may be most likely to behave as added workers; hence the very large widening for Hispanics.

One potential limitation of our specification is that the time dummies throw away a large portion of the national macro cycle. We have re-estimated our first regression equation without the year-month dummies, and present results from this in figures in an online appendix available with this paper at ⟨http://e-jep.org⟩. The results are very similar to those in Figures 3–6. The exception to this is that women's employment appears to be more responsive when the year-month

dummies are omitted. This is exactly the demographic group and the outcome variable that reflects the concerns discussed above about bias due to long-run demographic trends.

Taken as a whole, these regression results largely reinforce the simple over-time patterns: men, nonwhites, youth, and those with lower education levels are the most responsive to cycles. Given the important differences in these two methodological approaches discussed above, we are impressed by the similarity of the findings. We interpret this as evidence of the robustness of the patterns that we document.

Did Cyclical Responses Differ in the Great Recession?

We can use a variation of our regression model to explore whether the Great Recession is different from earlier business cycle patterns. In particular, as above in our analysis of raw changes, we compare the Great Recession to the early-1980s recession. In so doing, we focus on two additional questions: First, for each demographic group, is the pattern of business cycle responsiveness in the Great Recession similar to what it was in the back-to-back recessionary episodes of the early 1980s? Second, how do the responses to the recoveries compare across the demographic groups?

To investigate these questions, we again implement a regression model. We start with our original regression equation, but instead of estimating separate models for each major demographic group (for example, less than a high school education), we pool all observations from all groups together. We then run three regressions on this pooled data set, with each regression focusing on different categories of major groups: race/sex groups, age groups, and education groups.[6] In each model, we allow for the responsiveness of each major demographic group in the category under consideration to vary depending on the time period. The time periods cover the 1980s recession, the 2007 recession, and all other time periods. For example, in the regression focusing on education categories, we estimate 12 key coefficients, one for each of the three time periods times four education groups ($\beta^{time\text{-}period}_{education-group}\ UN_{st}$). One coefficient in this regression would measure the responsiveness for high school graduates in the 1980s recession and another for college graduates in the 2007 recession, and so on. For each major demographic group (for example, high school graduates), we then test for equality of coefficients across the two recessions (testing whether $\beta^{1980}_{major-group} = \beta^{2007}_{major-group}$).

We repeat this exercise focusing on the recovery periods for each recession. This leads to a total of six regression models, covering three major group categories (age, race/sex, and education) and two phases of the cycle (recessions and recoveries). To implement these regressions, we use data from May 1979 to November 1982

[6] We consider six race/sex demographic groups (white men, white women, black men, black women, Hispanic men, and Hispanic women); four age groups (16–19, 20–24, 25–44, and 45–60); and four education groups (less than high school, high school grad only, some college, and college graduate).

for the recessionary period of the early 1980s and from May 2007 to October 2009 for the 2007 recession, based on the minimum to maximum of the national (seasonally adjusted) unemployment rate. For the recovery periods, we use November 1982 through January 1985 and October 2009 to December 2011.

The detailed findings of these regressions, along with some additional statistical tests, are presented in an online appendix available with this paper at ⟨http://e-jep.org⟩.[7] Here, we summarize the main qualitative conclusions.

When comparing the responsiveness of unemployment rates for different major demographic subgroups in the recession of the 1980s with the Great Recession, the across-group patterns are similar to those of the stratified regression (shown earlier in Figures 3 and 4). The responsiveness of the unemployment rates of men, Hispanics, youth, and those with lower education levels are higher in both recessions, while the unemployment rates of women, prime-aged workers, and higher education groups are less responsive. For each of the race/sex groups, the cyclical responsiveness is very similar across recession periods, and we cannot reject the hypothesis of equality across the 1980 and 2007 recessions for any of these groups.[8] We do find that the Great Recession has statistically significantly larger impacts for older workers, and for each education category. The magnitude of the change is small, however: for example, the coefficient for those aged 45–60 increases from 0.70 in the 1980s recession to 0.85 in the 2007 recession. Our main punch-line is thus reinforced: the Great Recession is deeper than previous recessions, but otherwise is affecting groups more or less similarly.

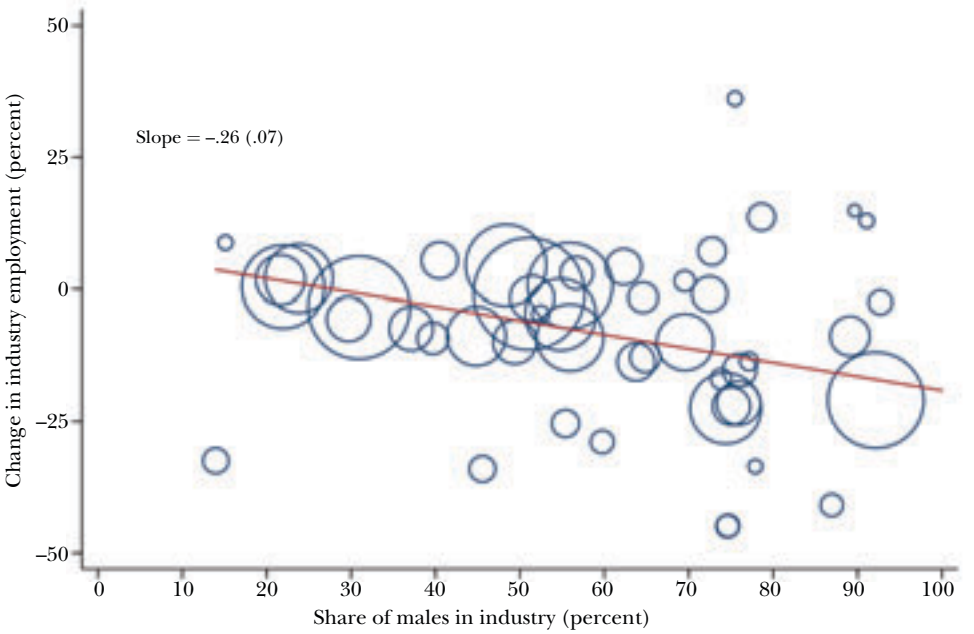
The story is somewhat different when we consider the responsiveness of the unemployment rate for different demographic groups in the recoveries following the 1980s and the 2007–2009 recessions. The cyclicality for the race/sex groups is significantly lower for the Great Recession, suggesting a weaker responsiveness to the recovery. For example, for black women the coefficient is 1.58 in the 1980s recovery and 1.34 in the 2007 recovery. For the age and education comparisons, the patterns for the 1980s recovery and the current recovery are relatively comparable.[9]

[7] The pooled regression presented in the electronic Appendix is more restrictive than the stratified regressions behind Figures 3–6 because it imposes identical time dummies and state fixed effects for all demographic groups. In order to preserve the flexibility of the pooled regressions, we include as control variables group-specific quadratic time trends and group-specific state fixed effects. These controls allow us to recover similar coefficients to the stratified models.

[8] In an alternative specification in which we pooled together all men as a group, we did find that the cyclicality in the Great Recession for men is statistically significantly higher than in the 1980s recession, although the magnitude of the over-time differences is fairly small.

[9] Given that we are regressing group-specific unemployment rates on the state aggregate unemployment rate, one might expect that the average across demographic subgroups (appropriately weighted by population shares) should average to 1. This is not necessarily the case because our group outcome measures come from our MORG sample where we limit the sample to those aged 16–60. The cycle measure, the state unemployment rate, is the aggregate unemployment rate published by the Bureau of Labor Statistics (2011b).

Figure 7
Percent Change in Employment over 2007 Recession versus Share Male, by Industry



Source: Authors' tabulations of Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) data.
Notes: Observations are weighted by total industry employment in May 2007 (the start of the recession). Industry classification is based on 2-digit sectors from the 2002 North American Industry Classification System (NAICS).

What Explains the Differences across Demographic Groups?

One likely explanation for these persistent differences in the impacts of cycles across demographic groups derives from the variation in cyclicality across industries. Construction and manufacturing are more-cyclical industries while services and government are less cyclical. Furthermore, many of the demographic groups that exhibit larger cyclical variation (men, those with lower education levels, minorities) are more likely to be employed in the industries with greater exposure to cycles. As an illustration of the importance of industry in the context of demographic comparisons, Figure 7 presents a scatterplot of the percent decline in industry employment between the peak and trough of the current recession (for 52 industry groups). We show the difference in the severity of the labor market shock on the *y*-axis, and on the *x*-axis is the share male in the industry (measured at the peak). We have added a bivariate regression line for guidance.[10] As the figure shows, the higher the share

[10] The percent change in employment is calculated between May 2007 and October 2009, and we collapse the data to industry using the "2-digit" NAICS industry codes. The regression line is calculated

male in the industry, the larger the employment decline in the current recession. This appears to be an industry effect (as opposed to a "male" effect), because the employment pattern persists if we decompose the employment loss into the loss for women and the loss for men.

To explore this further, we create a "predicted" peak-to-trough change in the employment rate (May 2007 to October 2009) for each demographic group. Specifically, we follow Bartik (1991) and create predicted changes in the employment level for each demographic group by multiplying the group's share of total employment in 30 industry-occupation cells at the peak (May 2007) by the U.S.-wide peak-to-trough change in total industry-occupation employment and summing across industry-occupations. The difference between the actual and predicted changes can be interpreted as the group-specific component of employment loss that operates above (or below) the direct effect of being in cyclical industry-occupations. The 30 cells are defined by ten industries times three occupations (managerial, clerical/services, and "blue collar").[11]

We present the results in Table 3, setting out the predicted change in the employment rate in column 2, the actual change in the employment rate in column 3, and the employment rate at the peak in column 1 (repeated from Table 1).

The results in Table 3 show that the difference in the cyclicality between men and women is explained almost completely by the gender differences in the industry-occupation of employment. The male employment rate is predicted to decrease by 7.4 percentage points, slightly larger than the observed decline of 7.1 percentage points. The female employment rate is predicted to drop by 3.0 percentage points, just below the observed 3.4 percentage point decline. Interestingly, the Great Recession has larger impacts than predicted for blacks, young workers, and more-educated workers. On the other hand, whites, older workers, and less-educated workers experienced smaller declines than predicted. For example, older workers (45–60) experienced a 3.3 percentage point reduction in their employment rate, two percentage points lower than their predicted decline. College-educated workers experienced a 4.6 percentage point decline in their employment rate compared to the predicted decline of 3.2 percentage points. The largest discrepancies between predicted and actual change are for youth, especially for teens. For this group, their industry/occupation mix predicts a loss of 1.6 percentage points of employment; the actual loss was 7.3 points. We speculate that this finding may reflect the dynamics of hiring and separations during the recession. Workers with job tenure were able to lower their rate of quits, but those starting without jobs (such as youth)

using a weighted regression, with industry employment at the peak as the weights. There are a total of 52 industries and while we include all observations to calculate the regression line, in the figure we drop the few observations outside the –50 percent, +50 percent range on the *y*-axis to improve the scaling.

[11] Using detailed industry codes in the CPS-MORG, we group observations into 10 major industries: 1) Agriculture, Forestry and Fishing, 2) Mining, 3) Construction, 4) Manufacturing, 5) Transportation, Warehousing, and Utilities, 6) Wholesale Trade, 7) Retail Trade, 8) Finance, Insurance, Real Estate, and Information, 9) Services, and 10) Public Administration. We create regression-based seasonally adjusted data series for each group-industry-occupation prior to performing this analysis.

Table 3

Actual and Predicted Percentage Point Change in Employment Rate, by Group

(predictions based on industry-occupation mix)

		May 2007 to October 2009	
	Employment rate (%) May 2007	*Predicted change*	*Actual change*
Men	81	–7.4	–7.1
Women	71	–3.0	–3.4
White	66	–5.1	–4.7
Black	59	–4.8	–6.9
Hispanic	58	–6.4	–6.3
Age 16 to 19	33	–1.6	–7.3
Age 20 to 24	68	–5.0	–8.3
Age 25 to 44	81	–6.0	–5.5
Age 45 to 60	85	–5.3	–3.3
Less than high school	48	–5.7	–4.8
High school graduate	**72**	–7.1	–6.7
Some college	76	–4.9	–6.6
College graduate	86	–3.2	–4.6

Source: Authors' tabulations of Current Population Survey, Merged Outgoing Rotation Group (CPS-MORG) data.

Notes: We create predicted changes in the employment level for each demographic group by multiplying the group's share of total employment in 30 industry-occupation cells at the peak (May 2007) by the U.S.-wide peak-to-trough change in total industry-occupation employment and summing across industry-occupation. The difference between the actual and predicted changes can be interpreted as the group-specific component of employment loss that operates above (or below) the direct effect of being in cyclical industry-occupations. The 30 cells are defined by 10 industries times three occupations (managerial, clerical/services, and "blue collar").

may have been hit hardest by the large drop in hiring rates (Davis, Faberman, and Haltiwanger 2012).

Conclusion

The labor market decline during the Great Recession and its aftermath has been both deeper and longer than the early 1980s recession—indeed, the longest and deepest since the Great Depression. The labor market effects of the Great Recession have not been not uniform across demographic groups. Men, blacks, Hispanics, youth, and those with lower education levels experience more employment declines and unemployment increases compared to women, whites, prime-aged workers, and those with high education levels. However, these dramatic differences in the cyclicality across demographic groups have been remarkably stable since at least the late 1970s and across recessionary periods versus expansionary periods. These

gradients persist despite the dramatic changes in the labor market over the past 30 years, including the increase in labor force attachment for women, Hispanic immigration, the decline of manufacturing, and so on.

The general tone of these findings might be surprising given much emphasis in the press on the "man-cession"—that is, the greater effect that the Great Recession has had on men (for examples of newspaper accounts, see Rampell 2009, Irwin and Dennis 2011). Our analysis shows that men, across recessions and recoveries, experience more cyclical labor market outcomes. This is largely the result of the higher propensity of men to be employed in highly cyclical industries such as construction and manufacturing, while women are more likely to be employed in less-cyclical industries such as services and public administration. More generally, much of the difference in the cyclical effect across groups during the 2007 recession is explained by differing exposure to fluctuations due to the industries and occupations in which the groups are employed.

Although overall the 2007–2009 recession appears similar to the 1980s recession, reponsiveness by women's employment and by that of the youngest and oldest workers was somewhat greater in the more recent recession. Further, we do find evidence of a "he-covery;" and the extent to which the current recovery is being experienced more by men than women (compared to the 1980s recovery) is largely due to a drop in women's cyclicality during the current recovery.

Despite these various distinctions, the overarching picture is one of stability in the demographic patterns of response to the business cycle over time. Who loses in the Great Recession? The same groups who lost in the recessions of the 1980s and who experience weaker labor market outcomes even in the good times. Viewed through the lens of these demographic patterns across labor markets, the Great Recession is different from business cycles over the three decades earlier in size and length, but not in type.

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