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DID AGE DISCRIMINATION PROTECTIONS HELP OLDER WORKERS WEATHER THE GREAT RECESSION?*

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Abstract: We examine whether stronger age discrimination laws at the state level moderated the impact of the Great Recession on older workers. We use a difference-in-difference-in-differences strategy to compare older workers in states with stronger and weaker laws, to their prime-age counterparts, both before, during, and after the Great Recession. We find very little evidence that stronger age discrimination protections helped older workers weather the Great Recession, relative to younger workers. The evidence sometimes points in the opposite direction, with stronger state age discrimination protections associated with more adverse effects of the Great Recession on older workers. We suggest that this may be because stronger age discrimination laws protect older workers in normal times, but during an experience like the Great Recession severe labor market disruptions make it difficult to discern discrimination, weakening the effects of stronger state age discrimination protections.

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I. Introduction

The Great Recession led to dramatic increases in unemployment rates and unemployment durations for workers of all ages. But unemployment durations of older individuals rose far more dramatically (Figure 1). The relative increase in unemployment durations for older workers indicates that older individuals who became unemployed as a result of the Great Recession, or who are seeking new employment, have had greater difficulty becoming re-employed.

The implication is that the effects of the Great Recession – which are likely to linger for many years – may pose challenges to longer-term reforms intended to increase employment of older workers, such as increases in the Full Retirement Age (FRA) for Social Security. Unemployed workers may be more likely to claim Social Security benefits early (Hutchens, 1999), to forego returning to work, and to seek support from other public programs to bridge the period until age 62 (Autor and Duggan, 2003; Dorn and Sousa-Poza, 2010; Riphahn, 1997). Difficulties in getting hired seem likely to exacerbate these effects, making it harder to return to employment, and forestalling efforts of older individuals to find the partial-retirement jobs that they often use to bridge career employment to retirement (Cahill et al., 2005; Johnson et al., 2009).

The increase in unemployment durations for older workers has led to speculation that age discrimination plays a role.[1] Moreover, there may be some reasons to expect more discrimination in very slack labor markets, as long queues of job applicants make it less costly for employers to discriminate (Biddle and Hamermesh, 2012). Many states offer stronger protections against age discrimination than the federal Age Discrimination in Employment Act (ADEA). These stronger state protections affect retirement and employment of older individuals, leading to more delaying of claiming benefits until the FRA and increased employment prior to the FRA (Neumark and Song, 2011), in part because stronger age discrimination protections increase hiring of older individuals into new jobs (Neumark and Song, 2012).

[1] See, for example, http://www.nytimes.com/2013/02/03/business/americans-closest-to-retirement-were-hardest-hit-by-recession.html?pagewanted=all&_r=0, http://www.nytimes.com/2009/04/13/us/13age.html?pagewanted=all, and http://www.cbsnews.com/2100-501445_162-4944750.html (all viewed April 16, 2013).

The question this paper studies is whether these stronger age discrimination protections at the state level also acted to protect older workers during the Great Recession. Of course we do not actually know whether age discrimination was or is occurring. But we can ask whether these state protections reduced the adverse effects of the Great Recession on older workers relative to younger workers. The research informs how severe recessions impact older workers, especially in ways that work against the goal of lengthening work lives, and whether, and in what manner, stronger age discrimination protections mitigate the adverse effects of sharp economic downturns on achieving this goal.

To summarize the results, we find very little evidence that stronger age discrimination protections helped older workers weather the Great Recession, relative to younger workers. Indeed when there is evidence that stronger state age discrimination protections mediated the effects of the Great Recession, they appear to have made things relatively worse for older workers. We suggest that this may be because stronger age discrimination laws protect older workers in normal times – of which we find some evidence – but during an experience like the Great Recession severe labor market disruptions make it difficult to discern discrimination, so that employer behavior in states with and without stronger age discrimination protections becomes more similar.

II. Related Research

There are three strands of related prior research. First, existing research provides ample evidence that age discrimination remains pervasive (Neumark, 2008). Moreover, some research as well as a good deal of conjecture suggests that age discrimination is particularly pervasive with regard to hiring (Adams, 2004; Hirsch et al., 2000; Hutchens, 1988; Lahey, 2008a; Posner, 1995).

Second, research establishes the effects of state and federal age discrimination laws in increasing employment of protected older workers (Neumark and Stock, 1999; Adams, 2004), although not new hiring (Lahey, 2008b). More recent evidence establishes that state age discrimination protections that are stronger than the ADEA made it easier for workers affected by increases in the FRA to remain employed (Neumark and Song, 2011), and finds evidence that these stronger state age discrimination protections increased hiring of those affected by increases in the FRA at new employers (Neumark and Song, 2012).

One subsidiary goal of this paper is to provide new evidence on the effects of stronger state age discrimination protections that is independent from the evidence in these other papers.

Third, research has begun to look at some of the effects of the Great Recession on older workers. Gustman et al. (2011) find little impact on flows into retirement, although their data go only through 2010 and the labor market for older workers worsened subsequently. Rutledge and Coe (2012) estimate the effect of the national unemployment rate during the Great Recession on early benefit claiming, estimating sizable impacts.

III. Data

We rely primarily on two data sources: the Current Population Survey (CPS) and the Quarterly Workforce Indicators (QWI). The CPS data provide estimates of the unemployment rate, the employment-to-population ratio, and unemployment durations, while the QWI data provide estimates of hires.[2]

Current Population Survey (CPS)

The CPS monthly micro-data were used to construct estimates by state, month, age group, and sex of the unemployment rate, the employment-to-population ratio, and median unemployment duration.[3] The age groups we use are prime-age individuals (ages 25 to 44) and older individuals (55 and older).[4] Population weights were used to create statistics that are representative of the populations within each state, age group, sex, and month cell.

Table 1 presents summary statistics for the CPS from 2003 to 2011 by age group and sex, both weighted by state population and unweighted.[5] The unweighted estimates weight states equally, while the

[2] The QWI also reports data on separations, but not the reason for the separation (see Abowd et al., 2009, p. 208). Because we cannot distinguish quits and involuntary separations, we look only at hires with the QWI data.
[3] We do not use mean duration due to bias from top coding and changes to the top coding in January 2011, where the top coding changed from two years to five (http://www.bls.gov/cps/duration.htm, viewed April 13, 2013).
[4] The federal ADEA applies to those aged 40 and over, while some state laws extend to younger workers. In that sense our "prime-age" (25-44) age group is not the ideal control. However we chose this age range to match what is available in the QWI data, which are reported aggregated by age. We also regard it as relatively unlikely that there is much age discrimination faced by those aged 40-44. And our focus on the older age group is useful because it encompasses the age for which policy reforms are attempting to increase attachment to the labor force and lengthen work lives.
[5] Most likely due to small sample sizes in some cells, in particular for older individuals in small states there are

weighted estimates weight more populous states more heavily, leading to estimates that are representative of the population.[6] The weighted estimates differ slightly, as larger states tend to have slightly worse labor market outcomes.

Unemployment rates are higher for prime-age individuals than older individuals, for both men and women (by 1.6 percentage points for men, and 1.8 percentage points for women, for the weighted estimates), and unemployment rates are also lower for women (for both age groups). To some extent, the former difference likely reflects the subjective nature of unemployment, as older individuals who cannot find work may be more likely to leave the labor force. The employment-to-population ratios similarly show that prime-age men and women are more likely to be employed. In contrast to unemployment rates, durations are much higher for older than younger workers; median duration is higher by 7.8 weeks for older men, and by 6.7 weeks for women (weighted estimates).

Quarterly Workforce Indicators (QWI)

For the QWI-based estimates of hiring, quarterly data by age, sex, and state were downloaded from the Cornell University's Virtual Research Data Center.[7] We divided hires by the average employment level from the QWI in 2005, to normalize hires as rates rather than levels that would reflect state population; we use employment levels for each of the two age groups, and for men and women separately. The QWI provides data in age groups bins, so the prime-age group is generated by summing ages 25 to 34 and ages 35 to 44, and the older group is generated by summing ages 55 to 64 and ages 65 to 99, separately by sex as well. QWI data became available for different states at different times, and are updated for each state at different times.[8] Data from all states are available from 2004:Q2 to 2011:Q4 for

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occasionally cells with no unemployed individuals in the sample, in which case unemployment durations cannot be estimated. For our sample period there are two cells of prime-age men, four cells of prime-age women, 200 cells of older men, and 331 cells of older women with no unemployed observations, out of a total of 5,400 observations for each age group. For these cases, we replace the missing unemployment duration variables with zeros.

[6] We use state population estimates generated from the CPS. These are generated by summing the provided population weights for all observations for each state, yielding estimates that are based on Census population estimates and projections (U.S. Bureau of Labor Statistics, 2006, Section 10-8).

[7] The QWI provides data for all states and the District of Columbia, with the exclusion of Massachusetts. We use the R2013Q1 release, as of May 7, 2013. By downloading data from the Cornell RDC website, we acknowledge support by NSF Grant #SES-0922005 that made this data possible.

[8] See http://www.vrdc.cornell.edu/qwipu/starting_dates.html (viewed May 20, 2013).

hires, and 2005:Q3 to 2011:Q4 if DC is included. We use 2004:Q2 to 2011:Q4 and exclude Washington, DC, to create a balanced panel.[9]

Table 2 presents summary statistics for the QWI by age group and sex. Not surprisingly, the hiring rate (as we define it) is higher for prime-age than for older workers, for both men and women. The hiring rate is slightly higher for men than for women in both age groups.

State Age Discrimination Laws

Data on age discrimination laws at the state level were compiled for Neumark and Song (2011) and are used here. In this paper we focus on two features of state age discrimination laws that were found in that research to be effective: firm-size minima for the applicability of state age discrimination laws, and stronger remedies than the federal ADEA.

The firm-size minimum specifies the minimum number of employees working at a firm for state age discrimination laws to apply. Whereas the ADEA applies for firms with 20 or more workers, many states have lower minimums, and some apply to firms that have only one employee. Age discrimination laws are stronger – covering more workers – the lower this minimum firm size.[10] Figure 2 shows the minimum firm size required for each state as of 2003. Following Neumark and Song (2011), we categorize states as either having lower firm-size minimum (fewer than 10) or higher firm-size minimum (10 or more).[11]

Stronger remedies exist when the state age discrimination laws go beyond those of the federal law by providing compensatory or punitive damages, whether or not proof of intent or willful violation is required. In 2003, there were 29 states (plus DC) with stronger remedies. These are shaded in Figure 2. There were no changes to the strength of remedies during our sample period. Three states (AR, MS, and

[9] We confirmed that results using an unbalanced panel beginning in 2004:Q2 and the later data for DC were very similar.

[10] Neumark and Song (2012) find that older workers tend to work at smaller firms, which could reinforce the effects of these lower firm-size minima.

[11] Since 2003, there have been few changes to these laws; the only change during our sample period is when Nebraska changed its minimum firm size from 25 to 20 in 2007 and when Oklahoma changed it from 15 to one in December 2011. Since we classify states by having lower firm-size minima (less than ten) or higher firm-size minima (ten or more), only Oklahoma's change requires recoding, and given that this change occurs in the final month of our sample, we ignore it as it could only have a negligible effect.

SD) do not have state age discrimination laws, and these are put in the higher firm-size minimum group and classified as not having stronger remedies, because in these states the ADEA prevails.

IV. Methods

To infer how stronger state age discrimination laws mediated the impact of the Great Recession on older vs. younger workers, we need to isolate the effects of these laws from other influences that affect outcomes for these two age groups. These other influences can include differences that persist over time and across states. For example, we clearly want to control for average differences between, say, unemployment rates for older and younger workers. In addition, there may be some age-related differences that vary across states, perhaps because of differences in industrial composition, the actual demographic makeup of the broad age groups we use, and other policy differences. Finally, it is possible that the economic shocks caused by the Great Recession differed for older and younger workers nationally, as well as by state, or that policy changes adopted because of the recession had differential impacts. With regard to shocks, for example, the industries that were more affected by the Great Recession may have tended to employ a greater share of older workers in some states.

To control for these confounding factors, we employ a difference-in-difference-in-differences (DDD) empirical strategy. In our case, we have four groups: (1) older individuals in states with stronger laws, (2) older individuals in states with weaker laws, (3) prime-age individuals in states with stronger laws, and (4) prime-age individuals in states with weaker laws. (We also have two classifications of stronger and weaker laws, as noted above, but we ignore that variation for this discussion.) Moreover, we compare differences between these four groups in periods during and after the Great Recession to before the Great Recession – which is our third level of differencing – to ask how the impact of the Great Recession on older vs. younger workers depended on state age discrimination laws.

We begin by presenting a series of figures that show the levels and differences over time for unemployment rates, employment-to-population ratios, median unemployment duration, and hiring

rates.[12] For each outcome, for each type of law (firm-size minimum and the strength of remedies), and for men and women, we present three figures. The first presents seasonally-adjusted time-series estimates for each of the four groups defined by age and the age discrimination laws. For the estimates derived from CPS data, the estimates are weighted by state population using the provided population weights, so the estimates are representative of the population in states with or without stronger laws. For the QWI data, the total number of hires and separations are summed for states with and without stronger laws, and then divided by the sum of employment in these states in 2005. These estimates are implicitly weighted by state population, since larger states contribute more weight to the calculation. The second figure shows the difference in the time-series between older and younger workers, for states with stronger and with weaker laws. And the third figure shows the difference between these. These provide a difference-in-difference estimate at each point in time, and comparing this across time is then informative about how age discrimination laws influenced the effects of the Great Recession on older vs. younger workers.

After providing a set of figures that display the data visually, we turn to regression estimates that enable a sharper focus on the estimated differences during and after the Great Recession vs. earlier, and permit statistical inference on these differences. In addition, the regressions allow us to include other control variables that could have differentially affected older and younger workers across states, in ways that differ during and after the Great Recession compared to earlier.

For these regressions, we need to specify pre- and post-Great Recession periods. We choose to consider the recession period itself and the ensuing period separately, in part because (as we will see) the labor market dynamics were quite different in these periods, and in part because labor market changes often lag the output changes that define recessions.[13] This implies that we have two DDD estimators – one pertaining to the Great Recession period relative to earlier, and the other pertaining to the post-Great

[12] In these figures, the data are seasonally adjusted using X-12-ARIMA.

[13] For example, following the Great Recession, aggregate U.S. economic growth became positive in the 3rd quarter of 2009 (http://www.bea.gov/national/index.htm#gdp (viewed August 27, 2012)), whereas job growth (as measured by the payroll survey) did not become positive until the fall of 2010 (http://www.bls.gov/webapps/legacy/cesbtab1.htm, viewed August 27, 2012). (It actually ticked up seven months earlier but then declined again slightly.)

Recession period relative to the same pre-recession period.

We start with the following basic DDD model:

$$Y_{ast} = \beta_0 + \beta_1 OLD_a + \beta_2 LAW_s + \beta_3 OLD_a \times LAW_s + \beta_4 GR_t + \beta_5 AFTERGR_t + \beta_6 OLD_a \times GR_t + \beta_7 OLD_a \times AFTERGR_t + \beta_8 LAW_s \times GR_t + \beta_9 LAW_s \times AFTERGR_t + \beta_{10} OLD_a \times LAW_s \times GR_t + \beta_{11} OLD_a \times LAW_s \times AFTERGR_t + \varepsilon_{ast} \quad [1]$$

where a is the age group – prime (25 to 44) or older (55+) – s is the state, and t is time. The CPS data are monthly and extend from January 2003 to December 2011; the QWI data are quarterly and cover 2004:Q2 to 2011:Q4. Y_{ast} is the outcome variable, *OLD* equals one for the older group, and zero for the prime-age group, *GR* is a dummy for the time period of the Great Recession as defined by the NBER (2007:Q4 to 2009:Q2 for the quarterly QWI data and December 2007 to June 2009 for the monthly CPS data), *After GR* is a dummy for the time period after the Great Recession, and *LAW* is a dummy variable, varying across analyses for the two indicators we use of stronger state age discrimination laws. Rather than seasonally adjusting the data used in the regressions, we simply include calendar-month (CPS) or calendar-quarter (QWI) dummy variables interacted with *OLD*, *LAW*, and *OLD* × *LAW*, to approximate the seasonal adjustment made in the figures.

The DDD parameters are β_{10} and β_{11}. β_{10} captures the effect of stronger age discrimination laws on older vs. younger workers during the Great Recession compared to before, while β_{11} captures the same type of effect, but for the period after the Great Recession compared to the same baseline. For example, suppose our dependent variable is hiring rate. A positive coefficient on β_{10} (β_{11}) would indicate that age discrimination laws boosted the *relative* hiring of older workers during (after) the Great Recession, relative to the period prior to the recession.

Other parameters are also potentially informative about the effects of age discrimination laws. For example, β_3 captures the differential effect of stronger age discrimination laws on older vs. younger workers in the baseline period – clearly a question of broad interest. However, we might be less confident in a causal interpretation of this parameter because it is identified solely from cross-sectional variation, by

age, across states. For example, it is possible that stronger laws prevailing in the baseline, pre-recession period were adopted in response to longer-term labor market differences between older and younger workers. In contrast, with age discrimination laws almost universally fixed over our sample period, the variation that identifies β_{10} and β_{11}, which is induced by the Great Recession, is quite clearly exogenous.

We augment the basic DDD model in equation [1] by adding several control variables. First, we estimate more saturated versions of the model, replacing *LAW* with a set of state dummy variables, and *OLD* and *OLD* × *LAW* with a set of state dummies interacted with *OLD*. The first change relaxes the constraint that the baseline differences for young workers between states with and without a stronger age discrimination law are the same for all states, and the second change allows the baseline difference between young and old workers to vary across states.

We also add controls for extensions to the number of weeks of unemployment insurance (UI) available due to automatic increases from the extended benefits program and due to the new emergency unemployment compensation (EUC) program created in June 2008. These UI increases are linked to decreases in the likelihood of exiting unemployment, leading to higher unemployment rates (Rothstein, 2011) and longer unemployment durations (Farber and Valletta, 2013). We use data on the number of extra UI weeks available from Farber and Valletta (2013). To account for the lagged labor market effects of the extensions, we also include lags of this variable up to two years. This variable (and all its lags) are entered in levels and interacted with *OLD*.

Finally, we introduce controls for the possibility that the economic shocks caused by the Great Recession had differential impacts on older and younger workers that vary by state. If these differences are correlated with state age discrimination laws, we could erroneously attribute age differences in the effects of the Great Recession to these laws. Figure 3, which compares the distribution of older (55+) and prime-age (25-44) workers to employment growth at the two-digit NAICS industry level, shows that industries that were hit harder tended to employ relatively younger workers. We want to introduce a control that captures state-level variation in shocks stemming from the industry and age composition of each state's workforce.

Specifically, we construct what should be an exogenous measure of the age composition of employment shocks by state, using information on national changes in employment coupled with the baseline age composition of industry employment in each state. Let subscripts *s* index states, *a* age group, *g* gender, and *k* industries. Denote by SE_{asgk03} total employment for age group *a*, in state *s*, for gender *g* and industry *k*, in the baseline year of 2003. Denote by AE_{kt} national (aggregate) employment in each period *t* in industry *k*, and denote by AE_{k03} national employment in industry *k* in 2003. Then we can predict the variation in employment by age and state (and sex) based solely off national employment changes subsequent to the base year of 2003, by applying the national changes to the baseline composition, as in

$$PE_{agst} = \sum_{k} SE_{agsk03} \times \left(\frac{AE_{kt}}{AE_{k03}}\right). \qquad [2]$$

We use non-seasonally adjusted monthly employment at the national level, by two-digit NAICS code, to measure AE_{kt} and AE_{k03}, both of which come from the Quarterly Census of Employment and Wages (QCEW). We use the QWI to measure SE_{agsk03}, since the QWI allows for employment estimates by age and state (and sex).[14] For each *k*, the ratio in equation [2] captures the growth in industry *k* over time. This is multiplied by the mean employment of age group *a* and gender *g* in state *s* and industry *k* in 2003.[15] This weights the national industry employment growth by the age and sex composition of employment in that industry in the baseline year. Our resulting age composition control is the difference in predicted employment growth rates between the two age groups, or:

$$CC_{gst} = \{(\log(PE_{old,g,s,t}) - \log(PE_{old,g,s,t-1}) - [\log(PE_{prime,g,s,t}) - \log(PE_{prime,g,s,t-1})]\} \times 100. \qquad [3]$$

CC_{gst} captures the difference in predicted growth rates between older and prime-age employment within the state (for each sex separately). If both groups are hit with the same predicted shock, then CC_{gst} equals zero. In contrast, for example, CC_{gst} will be positive if the shock that hit the state in period *t* was more favorable to employment of older workers. This variable should be exogenous to state economic

[14] Since Massachusetts is missing from the QWI, we use CPS data to generate SE_{ask03} for the state.
[15] Since Arizona has missing data in 2003, we use 2004 as the baseline for that state. See http://www.vrdc.cornell.edu/qwipu/starting_dates.html (viewed May 20, 2013).

developments that could in turn be influenced by age discrimination laws, since it is based off national employment growth with fixed weighting during the base year of 2003. We include the contemporaneous value of CC_{gst} and up to two years of its lags. Like for the UI controls, this variable (and all its lags) are entered in levels and interacted with *OLD*.

V. Results

Unemployment rates

Figure 4 presents the graphs for the unemployment rate, distinguishing states by the firm-size minimum for age discrimination laws. The left-hand graphs are for men, and the right-hand graphs for women. The top panels show that, for both sexes, and irrespective of the state age discrimination law, unemployment rates – which were initially a bit higher for younger than for older workers – rose substantially more for younger workers during the Great Recession (indicated by the shaded region), and remained higher for younger workers in the subsequent years shown. In terms of unemployment rates, then, the Great Recession did not harm older workers as much as younger workers.

To make it easier to see how the Great Recession affected older vs. younger workers in states with stronger and weaker age discrimination laws, the second row displays the differential effect of the Great Recession on younger and older workers depending on whether there was a stronger state age discrimination law – in this case a lower firm-size minimum. As the left-hand panel in the second row shows, the relative increase in the unemployment rate of younger men during the Great Recession was larger in states with a stronger age discrimination law. The lines are in negative territory in this period because unemployment rates rose less for older than for younger workers. However, the pattern reverses for some part of the period after the Great Recession, with – in relative terms – larger increases in the unemployment rates of older men in the states with the stronger age discrimination protection. For women the pattern is different, with the main indication being that stronger age discrimination protection was associated with relative increases in unemployment rates for older workers in the period *after* the Great Recession.

These differences are displayed yet more clearly in the bottom row of the table, which shows the

difference-in-differences estimates. In these figures a negative value indicates that the stronger age discrimination law is associated with smaller increases in unemployment among older workers relative to younger workers. For men, therefore, we see that during the Great Recession the line is almost always in negative territory, although often not by much. Subsequent to the Great Recession, however, the evidence is even less clear. And for women the sharpest result appears to be for the period after the Great Recession, during which the stronger age discrimination protection is associated with higher relative unemployment of older workers.

In Figure 5, we turn to the same kind of evidence, but focusing on the other type of age discrimination protection – stronger remedies. On the left-hand side, for men, there is no evidence that a stronger age discrimination law helped older workers. During the Great Recession the pattern is not consistent, although for most months the relative unemployment rate of older workers was higher in states with the stronger protection. In the period after the Great Recession there is rather clear evidence that relative unemployment rates for older workers were higher in states with the stronger age discrimination protection – especially the first 18 months or so after the Great Recession ended. For women this negative conclusion is even stronger. During most of the Great Recession period, and for the entire post-recession period, unemployment rates were higher for older relative to younger workers in the states with the stronger age discrimination protection. However, the size of the gap is smaller than for men.

Thus, for unemployment rates, there is relatively little indication that stronger state age discrimination protections protected older workers from increases in unemployment during and after the Great Recession. Indeed the most pronounced evidence appears to be in the opposite direction, especially for women, and for both men and women for the stronger age discrimination protection in the form of stronger remedies.

The regression estimates are reported in Tables 3 and 4.[16] We begin, for the firm-size minimum in Table 3, column (1), with the estimates of equation [1] for men. The first row shows that the baseline

[16] Most of the regression estimates we report are weighted by state population. We present results for men and women, and for the two different indicators of stronger state age discrimination laws.

(pre-Great Recession) difference in unemployment rates is about half a percentage point – lower for older men (−0.54). The second row is the estimate of the baseline difference between states with and without this stronger state age discrimination protection, and the third row – which is more interesting – is the baseline difference in the relative unemployment rate of older vs. younger workers in states with this stronger protection. The estimated coefficient is negative, consistent with the stronger age discrimination law lowering unemployment of older workers in the pre-recession period; but the estimate (– 0.42 percentage points) is statistically insignificant.

The next two estimates – for *GR* and *After GR* – show the differences in unemployment rates for the reference group of younger workers during and then after the Great Recession. The differences, of course, are sharp – about two percentage points higher during the Great Recession, and five percentage points higher in the subsequent period. The following two rows, for *GR* × *OLD* and *After GR* × *OLD*, show the differential effects of the Great Recession on unemployment rates of older workers. Consistent with what we saw in Figures 4 and 5, these estimates are negative, indicating that unemployment rates rose by less for older workers. The two rows that follow – for *GR* × *LAW* and *After GR* × *LAW* – allow for differential effects of the Great Recession across states on the reference group of younger workers. In column (1) these estimates are small and insignificant, which is true for most of the specifications.

Finally, the estimates of most interest are the DDD estimates – for *GR* × *OLD* × *LAW* and *After GR* × *OLD* × *LAW*. These estimates capture the differential effects of the Great Recession on older vs. younger workers, across states with and without the stronger age discrimination protection. These estimates can be interpreted as estimating the change in the graphs in the bottom panels of Figure 4 from before the Great Recession to two subsequent periods – the Great Recession itself, and the period following the Great Recession. As column (1) shows, in this case both estimates are small and statistically insignificant, paralleling the ambiguous evidence for men in Table 4.

In columns (2)-(5) we continue to focus on men, but we enrich the specification. We first introduce state dummy variables and interactions between all of these and the dummy for older workers. In this more-saturated specification we can no longer estimate the effects of the stronger age

discrimination protection on older workers in the pre-Great Recession period. However, we can still of course estimate the DDD parameters of interest, and these estimates are unchanged.

In columns (3)-(5) we introduce controls for the UI benefit extensions and for the age composition effects of aggregate shocks to the state economy. We do this for the original column (1) model, for the saturated model, and then for the same model unweighted. We find that the UI extensions were associated with higher unemployment rates. The estimate we report is the sum of the contemporaneous and lagged values (through two years) of the coefficient estimates. The estimated sum of the coefficients of the UI benefit extensions variable – which therefore reflects the effect of an extra week of benefits that lasts for two years – is 0.11 in column (3) and 0.08 in column (4), and statistically significant in both cases. To put the estimate in column (4), for example, in perspective, it implies that a 12.5 week extension that lasted for two years would add one percentage point to the unemployment rate. We do not necessarily attribute a causal interpretation to this because the extensions are triggered by unemployment rates; but we do want to control for this dimension of variation in policy across states and over time. The estimated effect of the interaction of the UI benefit variable with age is zero, indicating no differential association with unemployment rates of older workers.

The estimated coefficient of the age composition control is significant and positive for younger workers, which makes sense because positive values of the age composition control imply that national industry trends in employment favor older workers in the state. Correspondingly, the estimated interactions with OLD are negative (and significant in columns (4) and (5)), because this control indicates that national trends in industry employment were favorable to older workers in the state.[17] The estimated sums of coefficients are very large, but recall that these coefficients reflect a one percentage point differential between the "predicted" growth rate of employment for older vs. younger workers that persists for two years. When we look at the individual regression coefficients, we find much smaller

[17] We would not necessarily expect the combined effect to be positive for older workers because the age composition control is only a relative measure. A positive value does not imply that national trends are raising employment (lowering unemployment).

effects for any one period, and the effects dissipate within two years.[18] More important than the estimated effects of the controls are the estimated DDD parameters. In both columns, the estimates scarcely change as a result of adding the controls.

In column (5) we report estimates of the same specification, without weighting. Interestingly, the estimated signs of the two DDD parameters are now both positive – consistent with stronger age discrimination protections if anything increasing unemployment rates of older workers relative to the young during and after the Great Recession. Moreover, the estimated coefficient for the post-recession period is statistically significant at the 10-percent. However, we focus on the weighted estimates.

Columns (6)-(8) turn to women, first showing the simple specification with no controls, then adding in the UI and compositional controls, and then the full specification corresponding to column (4). The estimates in columns (6) and (7) show that the baseline unemployment rate difference between older and younger women is larger than for men (1.26 or 1.39 percentage points lower, vs. 0.54 or 1.07 for men). The fourth and fifth rows show that the Great Recession had a smaller impact on unemployment rates of women than of men. Turning to the DDD estimates, the point estimates for the post-recession period are larger (0.54-0.67) for women than for men, consistent with Figure 3. But the estimates are insignificant.

Overall, the estimates in Table 3 do not provide evidence that a stronger age discrimination law in the form of a lower firm-size minimum for applicability of state laws had a statistically significant impact on the influence of the Great Recession on the relative unemployment rates of older men or women. Certainly there is *no* evidence that this protection led to smaller increases in unemployment; and indeed for women the point estimates for the period after the Great Recession suggest if anything the opposite.

Table 4 presents the regression estimates for stronger remedies, for which Figure 5 gave a stronger indication that this age discrimination protection *worsened* the effects of the Great Recession. Having gone through Table 3 in detail, we summarize the results of Table 4 – which has the exact same

[18] This is generally true for all of the models we estimate below, so we do not revisit this point, nor discuss the estimated coefficients of these control variable much at all.

format – much more quickly.

For the post-Great Recession period, which is the period when unemployment rates peaked, the DDD estimates in all of the weighted specifications for men are positive, quite consistent in magnitude – around one – and statistically significant at the one-percent level. For women the estimates are about 0.5 but not statistically significant. These estimates imply that where state age discrimination laws provided for stronger remedies, unemployment rates for older workers rose more in relative terms after the Great Recession, especially for men. In contrast, the estimated coefficient of $OLD \times LAW$ is negative and significant for men, consistent with this stronger age discrimination protection lowering unemployment of older workers *prior* to the Great Recession, although recall our earlier caveat that identification of this parameter is less compelling. This pattern of results – with stronger age discrimination protections associated with better labor market outcomes for older workers prior to the Great Recession, but a relatively worsening of outcomes during and after the Great Recession, will re-appear in other results reported below.

Employment-to-population ratios

Having explained our analysis in detail for unemployment rates, we now turn to similar analyses for the other labor market outcomes we study. The formats of the figures for the graphical analysis and the tables for the regression analysis are the same, so we just highlight the main results.

Figures 6 and 7 present graphs for the employment-to-population ratio. As expected, the top figures show higher employment-to-population ratios for prime-age workers and for men. In Figure 6 the middle and bottom figures show that, for men, the relative employment-to-population ratios of older versus younger men have been higher in states with lower firm-size minima, consistent with stronger age discrimination protections improving labor market outcomes for older workers. For women this is less apparent, although it does seem to be case for the pre-Great Recession period. The bottom figure for men does not show much of a difference during or after the Great Recession, whereas for women the relative advantage of older workers seems to be erased during these periods. Figure 7, which looks at stronger remedies, to some extent reverses this. Older women show a persistent advantage in states with stronger

remedies, although this does diminish during the Great Recession. For men, there is no clear difference before the recession, and if anything a worsening in the position of older men in the period subsequent to the Great Recession.

The regression estimates in Tables 5 and 6 indicate statistically significant differences in the effects of the Great Recession associated with stronger age discrimination protections, but only for women. The evidence in Table 5 points to significant negative estimates for a lower firm-size minimum in the period after the Great Recession (and negative, but insignificant estimates during the Great Recession). In contrast, Table 6 finds some evidence of significant negative effects during the Great Recession. Note that, like some of the earlier results for men for unemployment rates (in Table 4), these results suggest that stronger age discrimination protections led to worse labor market outcomes for older workers.

Unemployment durations

As noted earlier (Figure 1), the aggregate data show a much sharper increase in unemployment durations for older workers than for younger workers during and after the Great Recession, and indeed the rise in unemployment durations of older workers has attracted considerable attention.[19] unemployment duration – median duration in weeks, and Figure 8 does not provide firm evidence one way or the other that a lower firm-size minimum for state age discrimination laws was associated with differential changes in median unemployment durations.[20] For men, there is no change apparent during the Great Recession, and in the period after the Great Recession the direction of the difference varies. For women, there is more of an indication that during the Great Recession this stronger age discrimination protection was associated with smaller relative increase in median durations for women, but the period after the Great Recession the figure shows perhaps some increase in durations.

In Figure 9, which instead looks at stronger remedies under state age discrimination laws, the pre-Great Recession period shows significantly shorter durations for older men in states with stronger

[19] See the news stories referenced earlier with regard to age discrimination.
[20] We found qualitatively similar results using the percentage of unemployment spells lasting 26 weeks or longer.

remedies; echoing earlier results, this is consistent with stronger laws helping these older workers in the pre-recession period. For women, however, there is no evidence of such an effect in this period. Turning to the period of the Great Recession and afterward, for men the shorter durations of older workers evaporate, whereas for women the data point to a decrease in durations during the Great Recession.

Tables 7 and 8 present the corresponding regression evidence. For median unemployment durations and the lower firm-size minimum, in Table 7, there is no statistically significant evidence that this age discrimination protection was associated with differential changes in unemployment durations of older men or older women. As in the figures, though, note that the sign pattern is not consistent, with this age discrimination protection associated with longer spells of older men relative to younger men during the Great Recession, and shorter spells afterwards, whereas for women the signs are reversed.

For stronger remedies, in Table 8, the evidence is stronger and more consistent. For men, the estimates suggest that stronger remedies resulted in longer durations of unemployment for older men relative to younger men by above five weeks both during the Great Recession and after the Great Recession (with a smaller estimate for the latter period in the unweighted estimates). The estimates are generally statistically significant at the one-percent level. For women the signs are reversed, indicating that stronger remedies were associated with smaller increases in unemployment durations during and after the Great Recession (with the former estimates larger and statistically significant, at least at the 10-percent level). Note also that this stronger age discrimination protection was associated with shorter unemployment durations in the period prior to the Great Recession – significantly so in one case for women.

Hiring

Finally, we turn to evidence on hiring from the QWI data. The top panels of Figure 10 show the dramatic drop in hiring rates for all groups, in both sets of states, during the Great Recession, and how these hiring rates have remained low. The middle panels show that the hiring rates for older men and women have been consistently higher in states with a lower firm-size minimum, consistent with this type of age discrimination boosting hiring of older workers. However, the middle panels also do not reveal

much evidence of a change in the relative hiring rate of older workers during or after the Great Recession.

For stronger remedies – shown in Figure 11 – there is a more-pronounced change for women, with the hiring rate for older women relative to younger women dropping during the Great Recession and afterwards, and remaining low.

Similarly, in the regression Tables 9 and 10 only for women and stronger remedies (Table 12, columns (7) and (8)) is there statistically significant evidence that stronger state age discrimination protections are associated with different changes. Paralleling Figure 11, the evidence indicates that stronger remedies under state law were associated with relative declines in the hiring of older women in the period after the Great Recession. Note also that in both tables the *OLD* × *LAW* coefficient estimates are in many cases positive and significant, indicating that stronger age discrimination protections were associated with higher hiring rates of older relative to younger workers in the period prior to the Great Recession.[21]

VI. Summary, Discussion, and Conclusions

We have investigated, for many labor market outcomes, whether the adverse effects of the Great Recession on older workers relative to younger workers were mitigated in states where age discrimination protections were stronger. Table 11 summarizes the results. The "During GR" and "After GR" columns summarize results for the key DDD parameters that measure the change in labor market outcomes for older vs. younger workers, during or after the Great Recession relative to the prior period, in states with stronger age discrimination protections vs. other states. We summarize results for specifications in the prior tables that are common for both men and women (columns (1), (3), (4), and (6)-(8)). The "Pre-GR" column summarizes results for the *OLD* × *LAW* interaction which captures the difference in outcomes,

[21] In addition to the specifications discussed thus far, we estimated specifications where we substituted for *GR* and *After GR* with a continuous measure that captures the severity of the Great Recession within each state. This effectively means that we interact *GR* and *After GR* with a variable with only cross-state variation, allowing for differential impacts of the Great Recession across states, in both the recessionary period itself and afterwards. The approach and results are described in an appendix available from the authors. The results were very similar, in part because using an exogenous measure of the severity of the Great Recession across states – generated from national industry employment trends coupled with the workforce composition of each state by industry, age, and sex, related to equation [2] – does not generate much variation in the strength of the Great Recession across states. Using a measure like changes in unemployment rates over time would exhibit more cross-state variation, but would potentially be endogenous with respect to the effects of state age discrimination laws.

associated with stronger protections, for older versus younger workers prior to the Great Recession; this is identified only in the less-saturated models in the previous tables (columns (1), (3), (6), and (7)). We report the sign of the estimates when it is consistent.

For men, we simply find *no* evidence that stronger age discrimination protections helped older workers weather the Great Recession, relative to younger workers. When there is evidence that stronger state age discrimination protections mediated the effects of the Great Recession, they appear to have made things relatively worse for older workers. This is the case for unemployment rates and unemployment durations. The estimates that indicate age discrimination protections leading to a *worsening* of outcomes for older workers, relative to younger workers, are shaded in the table.

For women, the evidence is more mixed. On the one hand, there is some evidence that stronger age discrimination protections were associated with relatively smaller increases in the unemployment durations of older women during the Great Recession; these estimates have a black border. On the other hand, we also find that in the period after the Great Recession states with stronger age discrimination protections had larger declines in their employment-to-population ratio and larger declines in the hiring rate for older women.

Thus, between the results for men and women, there is very little evidence that stronger state age discrimination protections helped older workers weather the Great Recession. Moreover, there is some indication that the opposite occurred, with older workers bearing more of the brunt of the Great Recession in states with stronger age discrimination protections.

Finally, turning to the "Pre-GR" column, there is some evidence that stronger age discrimination protections helped older men and women in the period prior to the Great Recession. This is true for unemployment rates, employment-to-population ratios, and hiring for men, and for unemployment durations and hiring for women. Indeed in some cases we find that stronger age discrimination protections helped older workers in the pre-Great Recession period, but led to a relative worsening of outcomes for older workers during and after the Great Recession. The estimates where we find at least some statistically significant evidence of this pattern are underlined in Table 11. This evidence arises for

unemployment rates and durations for men, and for hiring rates for women – in all cases for stronger remedies.

How should this evidence be interpreted? There is evidence from the initial adoption of state and then federal age discrimination laws that these laws increased employment of older men (Neumark and Stock, 1999; Adams, 2004). On the other hand, there has been some speculation that age discrimination laws may reduce hiring of older workers. Why? In hiring discrimination cases it is difficult to identify a class of affected workers, and for this reason and others economic damages can be much smaller than in termination cases (Adams, 2004; Posner, 1995), reducing the effectiveness of these laws in hiring cases. Moreover, because the ADEA makes it more difficult to terminate older workers (Neumark and Stock, 1999), it may actually *discourage* their hiring (Bloch, 1994; Lahey, 2008b). Nonetheless, for specific groups of older workers – those affected by increases in Social Security's FRA, Neumark and Song (2012) find some evidence that state age discrimination laws increased hiring.

However, this evidence does not speak to variation in the effectiveness of age discrimination laws over the business cycle – and especially during a severe downturn like that experienced during the Great Recession. Why might these laws lead to relatively worse outcomes for older workers during and after a severe recession, and why might this even happen for laws that *help* older workers in more normal economic circumstances?

One interpretation is that state age discrimination protections are effective at reducing age discrimination during normal times, but that during a severe downturn the age discrimination protections becomes ineffective, leading employers in states with these protections to behave more like employers in other states, resulting in a relative worsening of labor market outcomes for older workers. Why might age discrimination protections become ineffective (or simply less effective) during a severe recession? It seems plausible that an event like the Great Recession creates such severe disruptions in labor markets that sorting out the effects of age discrimination versus changing business conditions on employment adjustments becomes very difficult, reducing the likelihood that workers, attorneys, or the EEOC or state commissions that enforce state anti-discrimination laws perceive age discrimination, or that claims of age

discrimination can prevail.

It is even possible that because stronger state age discrimination laws impose constraints on employers, there could be "pent-up demand for age discrimination" that firms act on during a sharp downturn – with more of this occurring in states with stronger age discrimination laws. This type of story has parallels to economic research arguing that firms undertake more organizational restructuring or labor reallocation during economic downturns (e.g., Aghion and Saint-Paul, 1998; Davis and Haltiwanger, 1990).

There are a number of potential implications of this evidence and conjecture in terms of the longer-term goal of lengthening work lives. If it is correct, then as the economy recovers the stronger state age discrimination protections – in the states that have them – would become more effective at improving labor market outcomes for older workers. On the other hand, if it did indeed become easier to discriminate against older workers during the Great Recession and its aftermath, the extended periods of unemployment, especially among workers near retirement ages, might have hastened transitions out of the labor market and toward retirement, permanently lowering employment among older workers. Finally, if indeed it is easier for employers to engage in age discrimination during sharp economic downturns – and especially if the implication of this is that some older workers leave the job market permanently during such periods – then it may be useful to think about whether it is possible to modify age discrimination protections so that they maintain their effectiveness in times of economic turbulence when there are many terminations of workers. It is not obvious, however, what kinds of changes might meet this objective, since inferring discriminatory patterns in terminations or other dimensions of employer behavior will inevitably be difficult when labor markets are more volatile.

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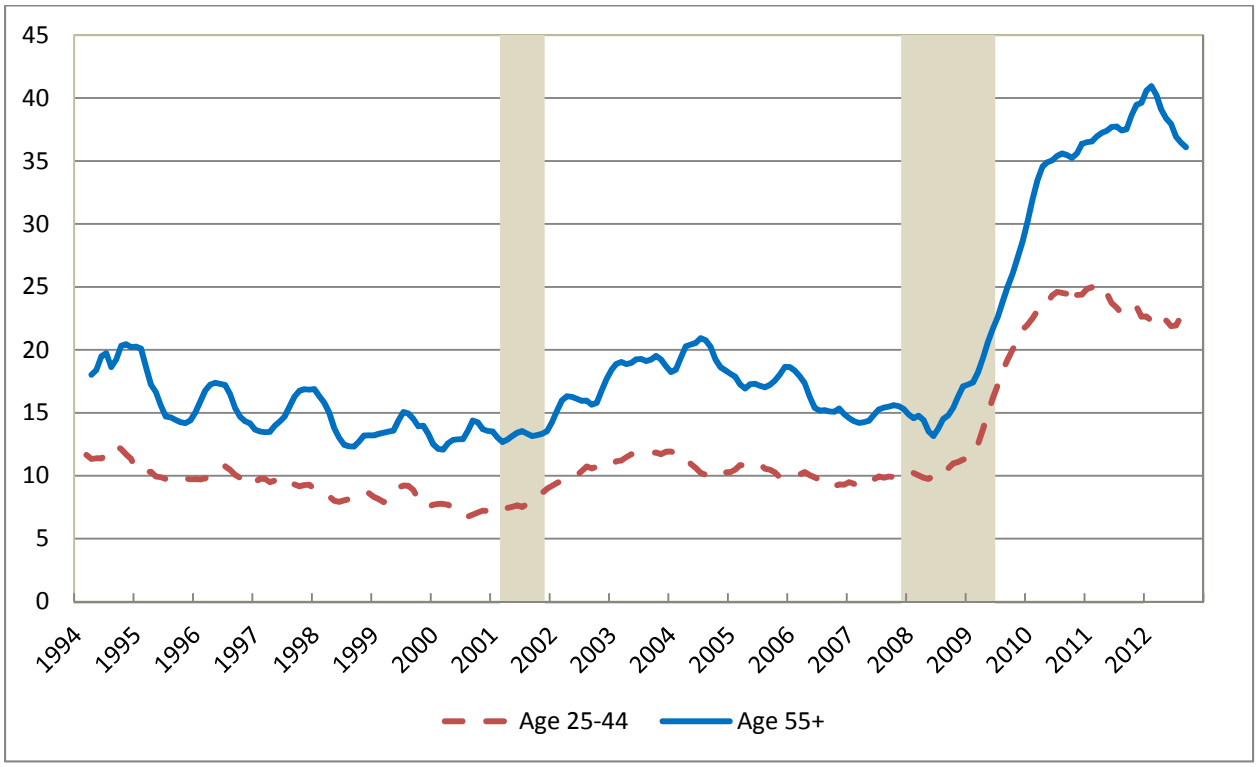
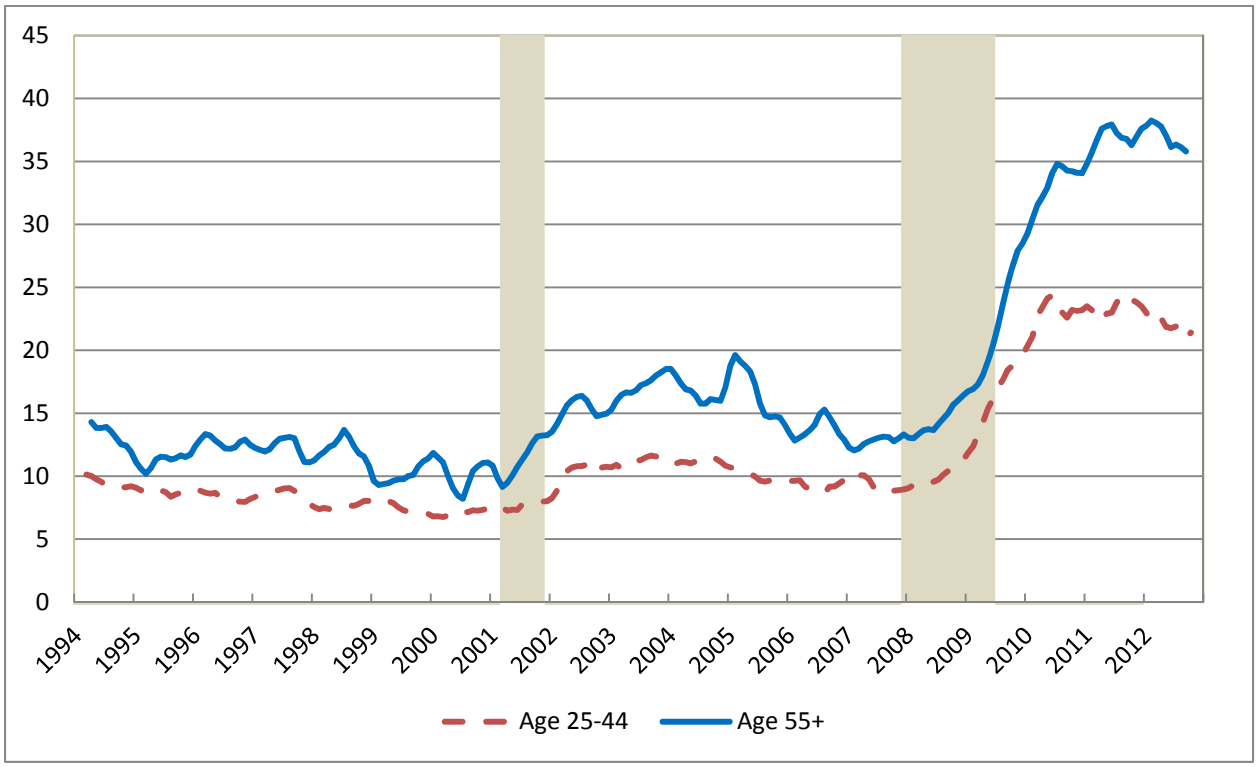
Figure 1: Median Unemployment Durations, in Weeks

A. Men

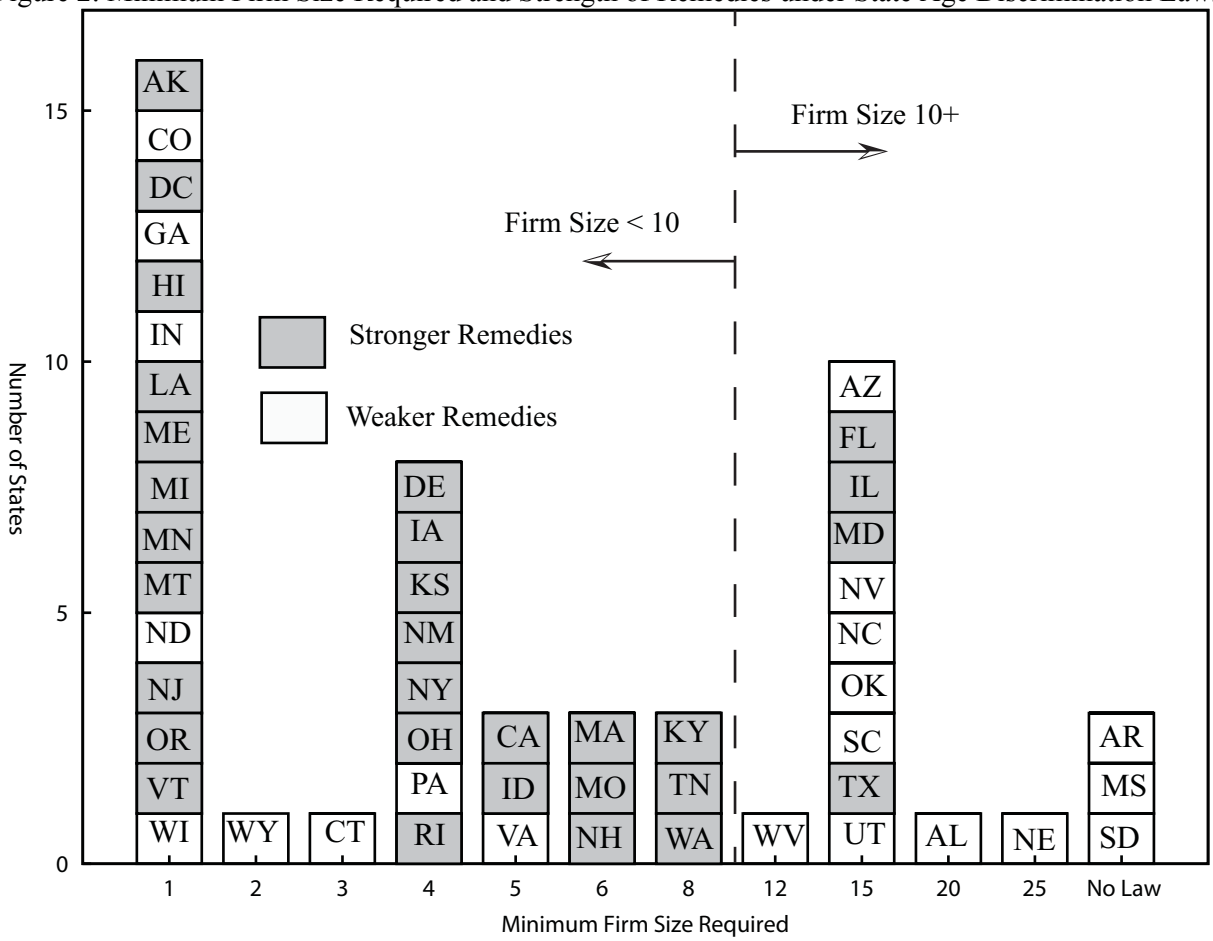


B. Women



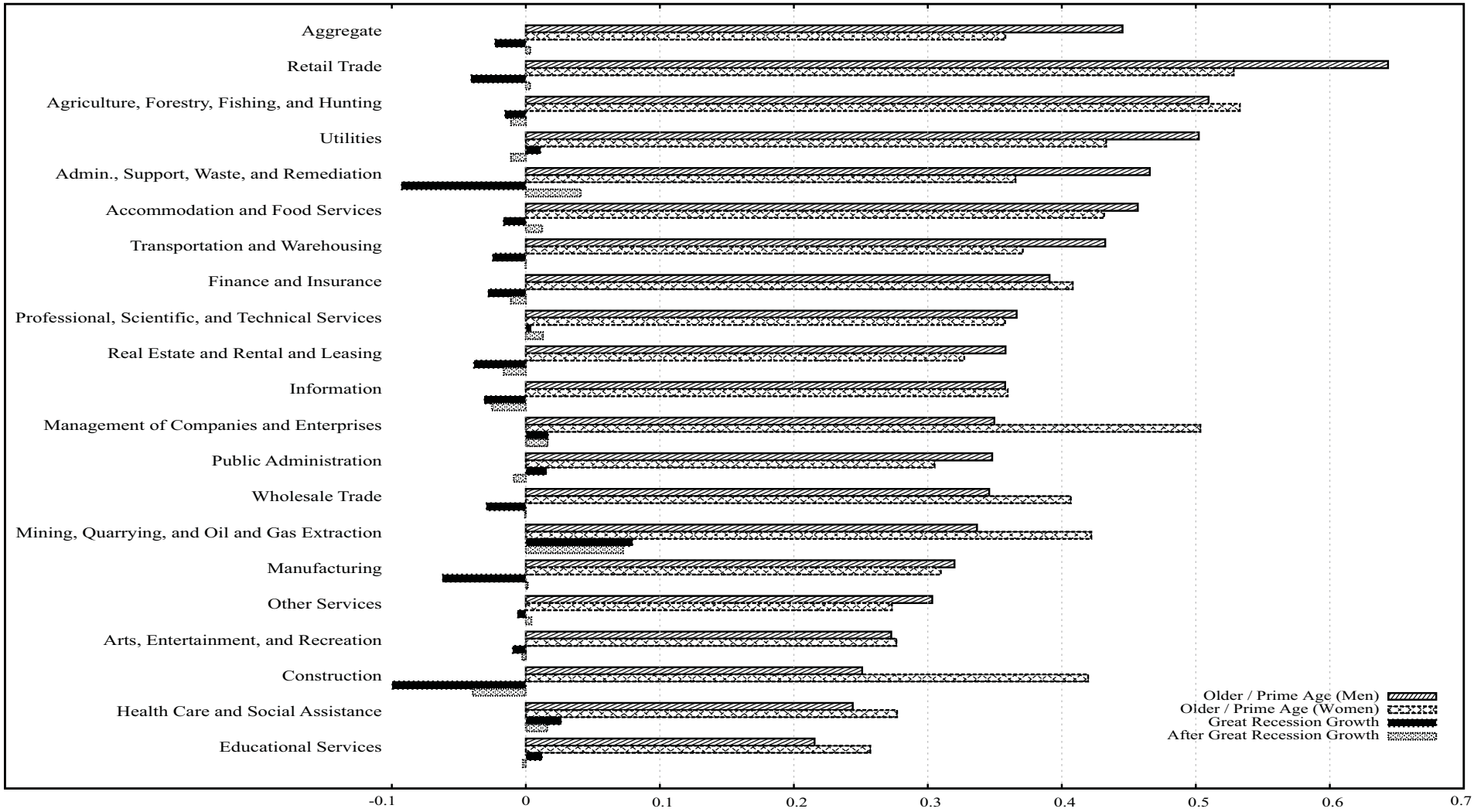
The shaded areas indicate official dates according to the NBER. Each series was generated using the Current Population Survey "Basic Monthly" micro-data. State estimates were calculated and weighted by state population to generate nationally representative estimates. Each series was seasonally adjusted and smoothed using X-12-ARIMA.

Figure 2: Minimum Firm Size Required and Strength of Remedies under State Age Discrimination Laws



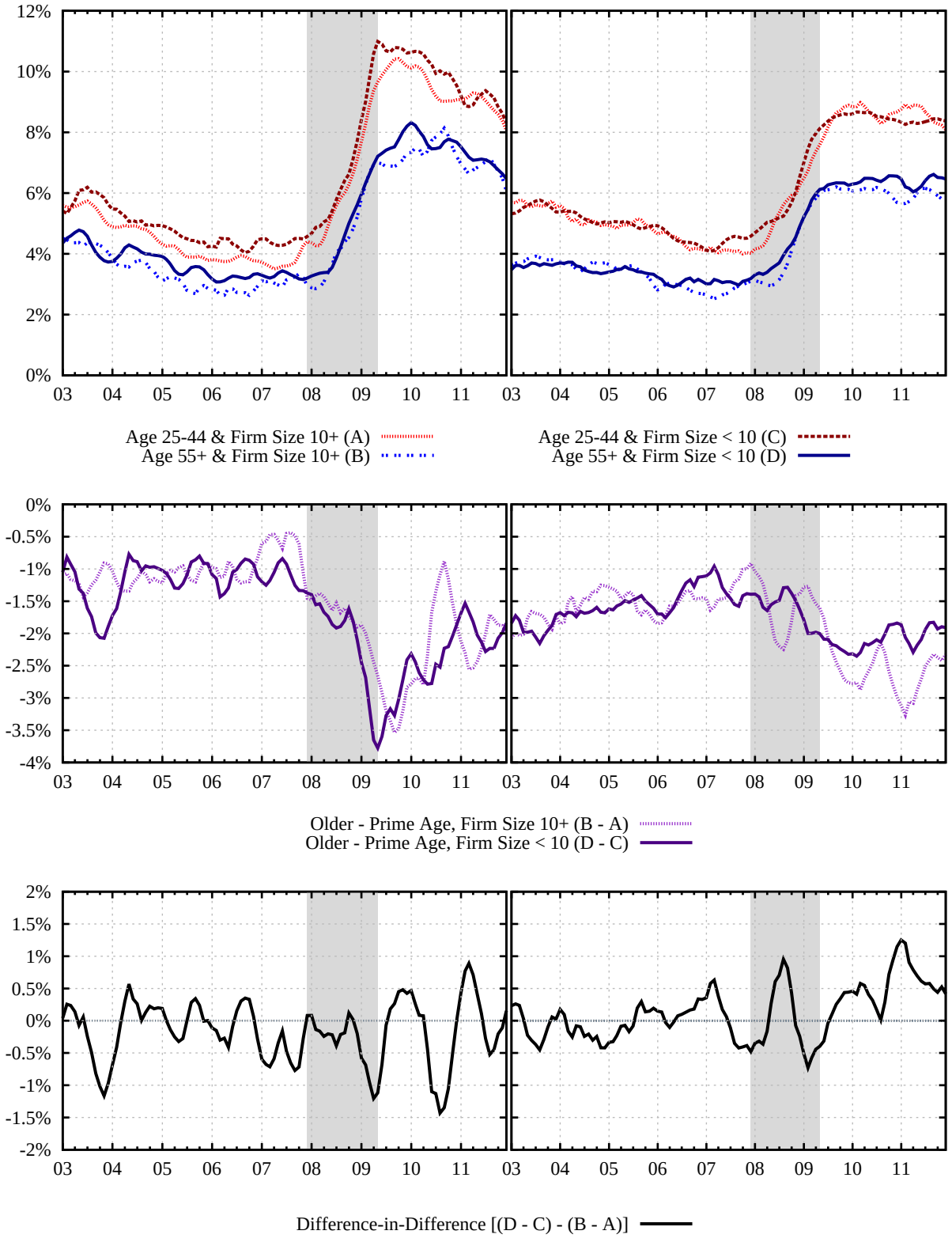
See Neumark and Song (2011) for additional details on age discrimination laws by state.

Figure 3: Age Distribution across Industries vs. Aggregate Industry Employment Growth



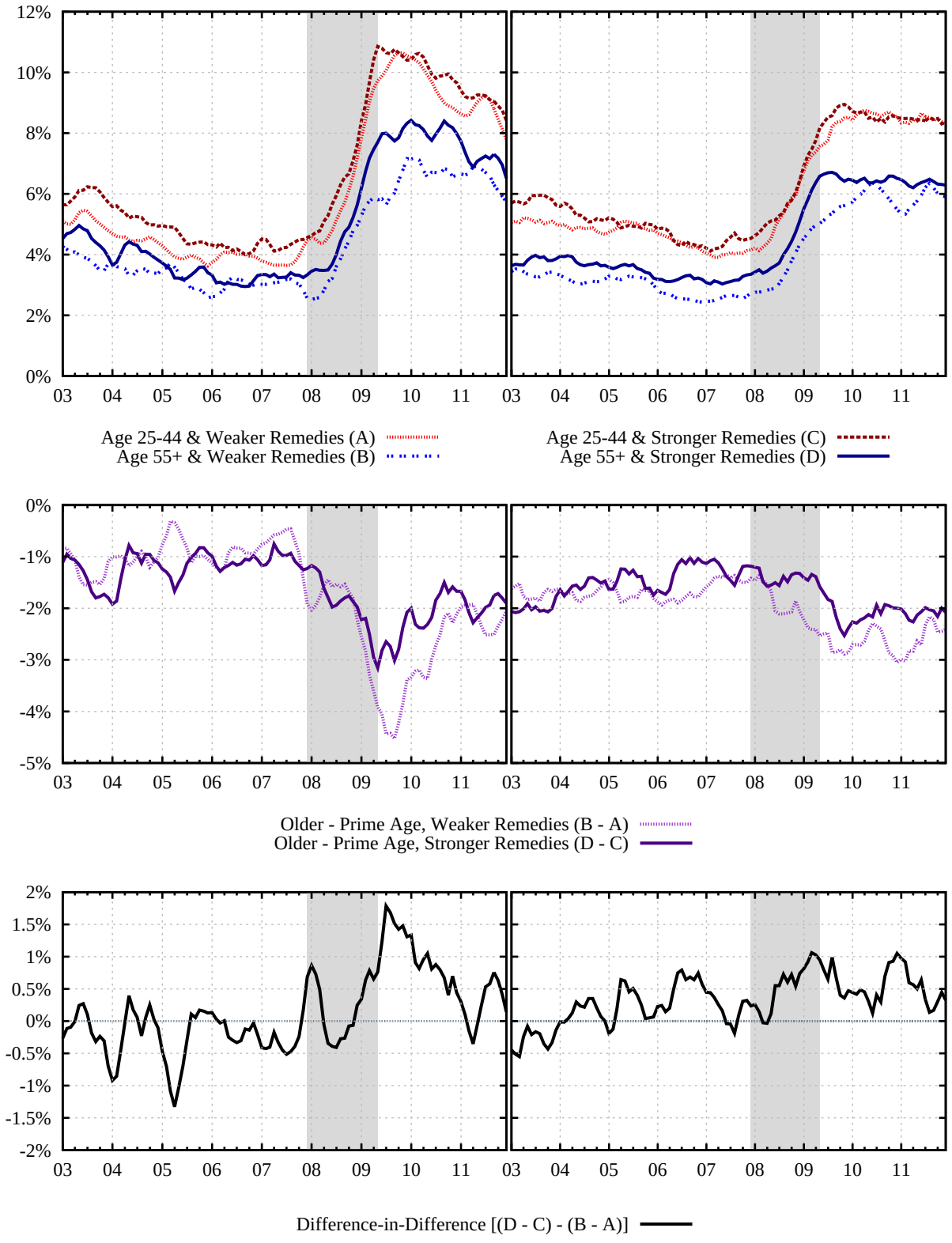
The top two bars are the number of older (55+) workers in the two-digit NAICS industry divided by the number of prime-age workers (25-44), first for men (first bar) and then women (second). The bottom two bars are annualized growth rates during the Great Recession (third) and after the Great Recession (fourth) for each industry. We use December 2007 to December 2008 for the Great Recession and June 2009 to June 2011 for after. The start dates we use (December 2007 and June 2009) match the start and end dates of the GR according to the NBER. Industries are sorted in decreasing order for Older / Prime Age (Men).

Figure 4: Unemployment Rates by Age and Firm-Size Minimum, Men (Left) and Women (Right)



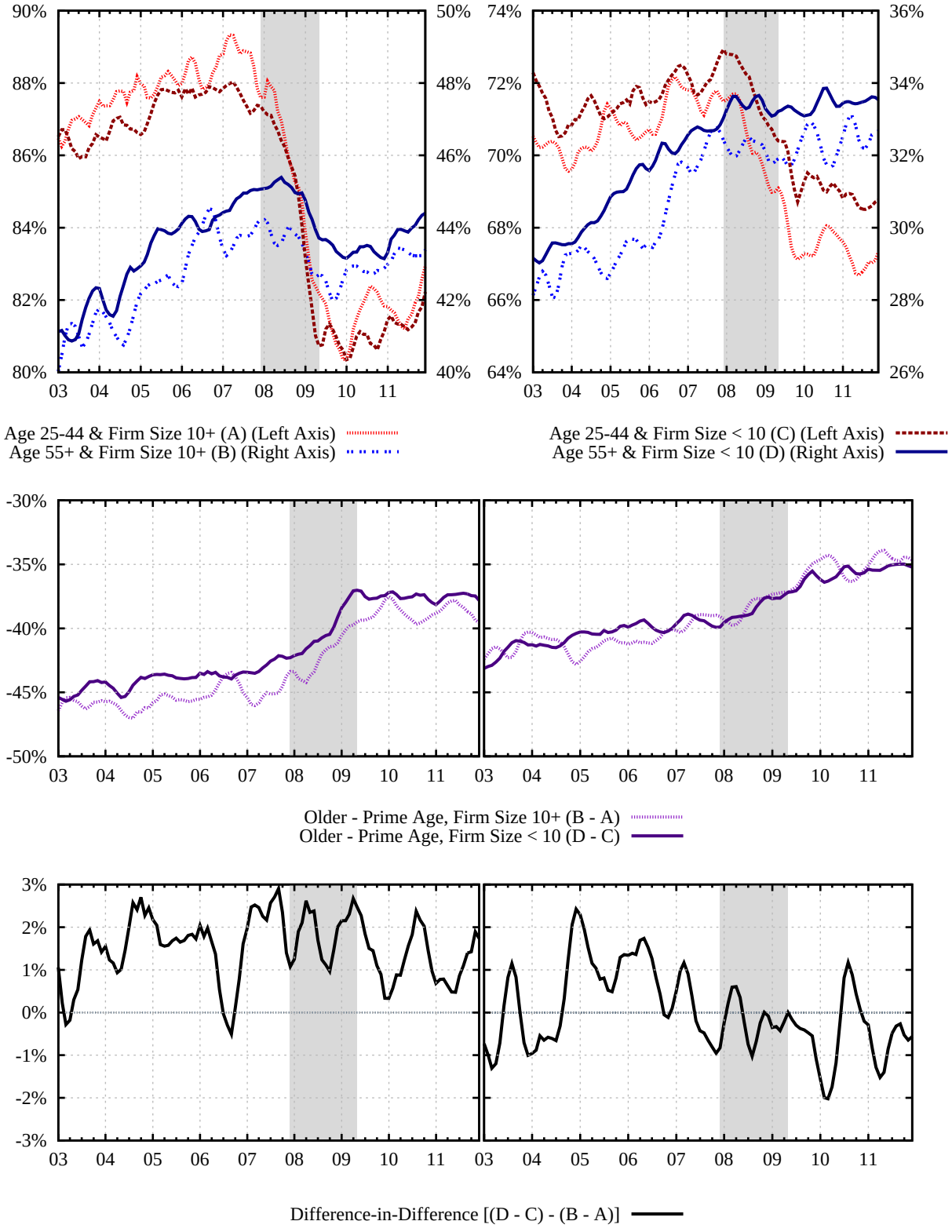
See the notes to Figure 1 above. States are divided into two groups based on the minimum firm size required for age discrimination laws to apply. See Figure 2 for additional details on age discrimination laws by state. Each series in the top figure is generated using the Current Population Survey "Basic Monthly" micro-data, using the provided population weights, and seasonally adjusted and smoothed using X-12-ARIMA.

Figure 5: Unemployment Rates by Age and Strength of Remedies, Men (Left) and Women (Right)



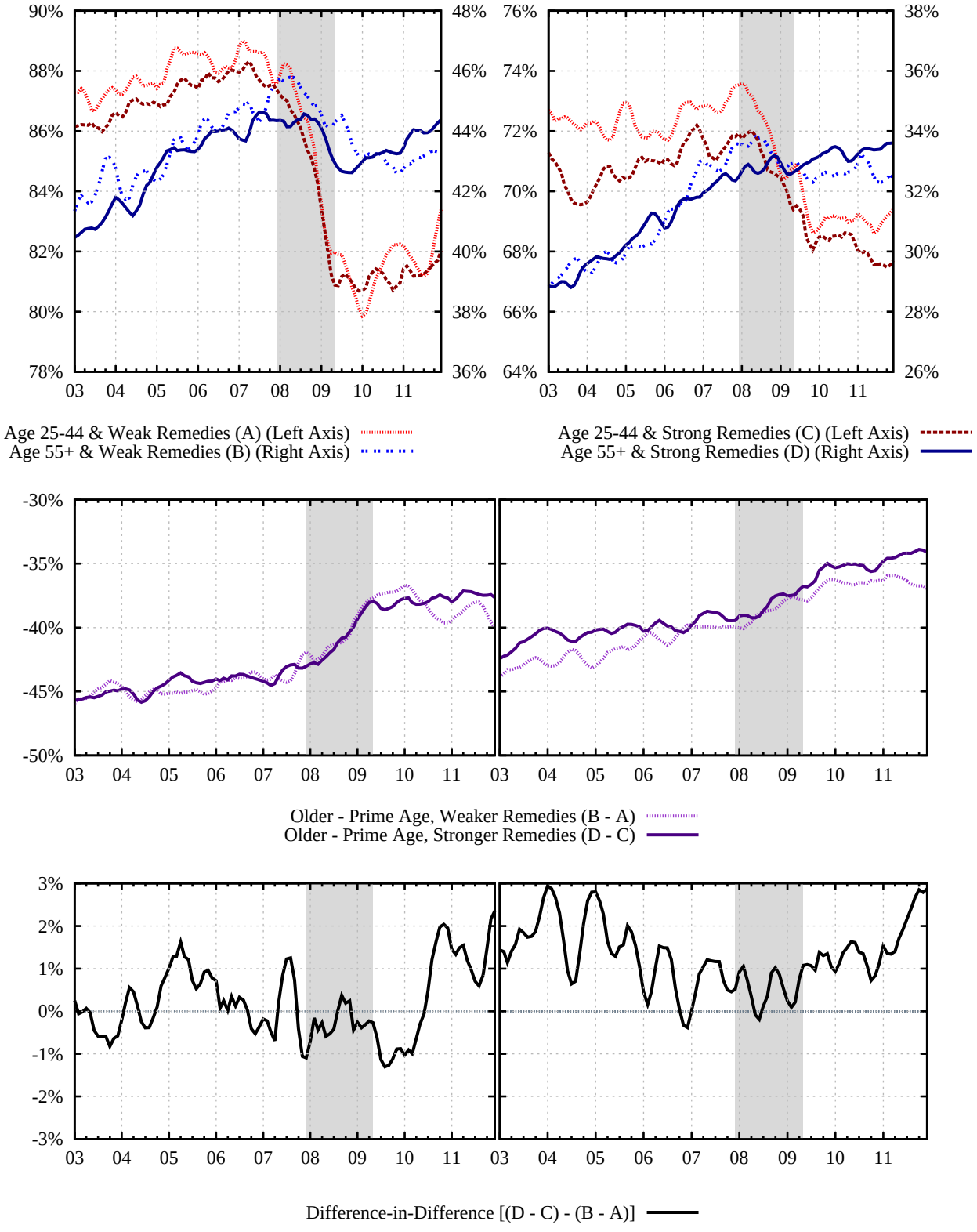
See notes to Figure 4. The only difference is that stronger remedies than the federal law are used instead of firm-size minimum.

Figure 6: Employment-to-Population by Age and Firm-Size Minimum, Men (Left) and Women (Right)



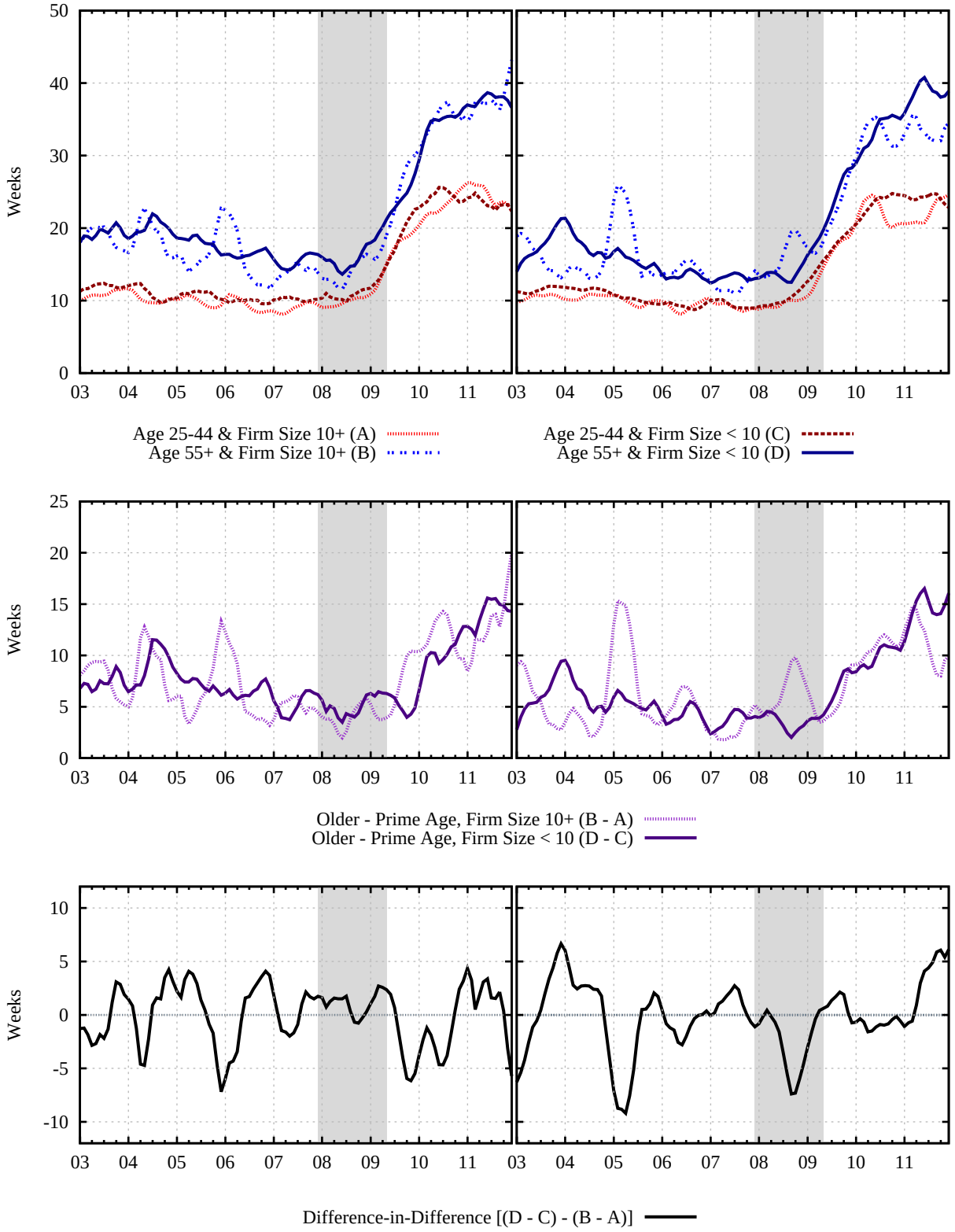
See notes to Figure 4.

Figure 7: Employment-to-Population by Age and Strength of Remedies, Men (Left) and Women (Right)



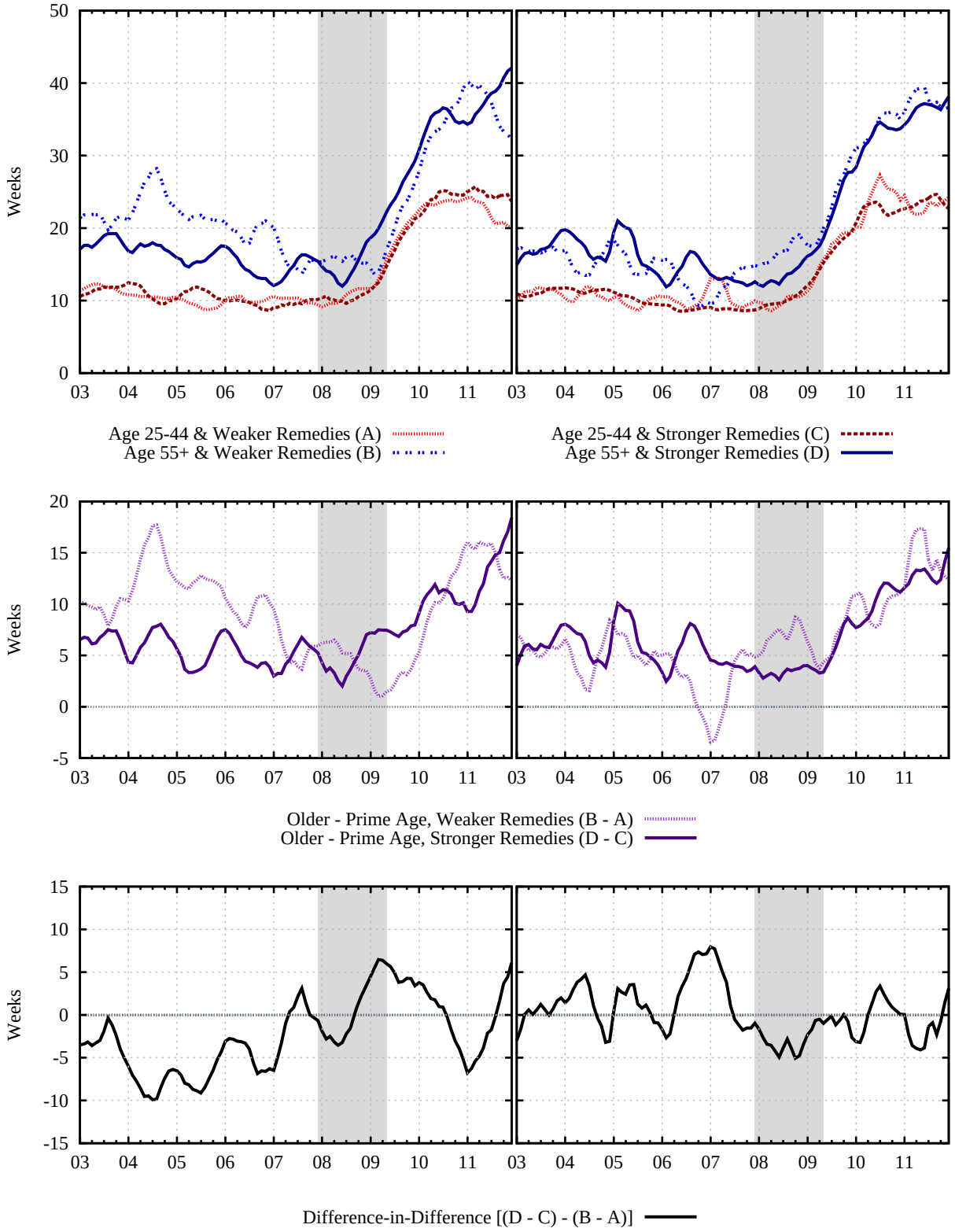
See notes to Figures 4 and 5.

Figure 8: Median Unemployment Duration by Age and Firm-Size Minimum, Men (Left) and Women (Right)



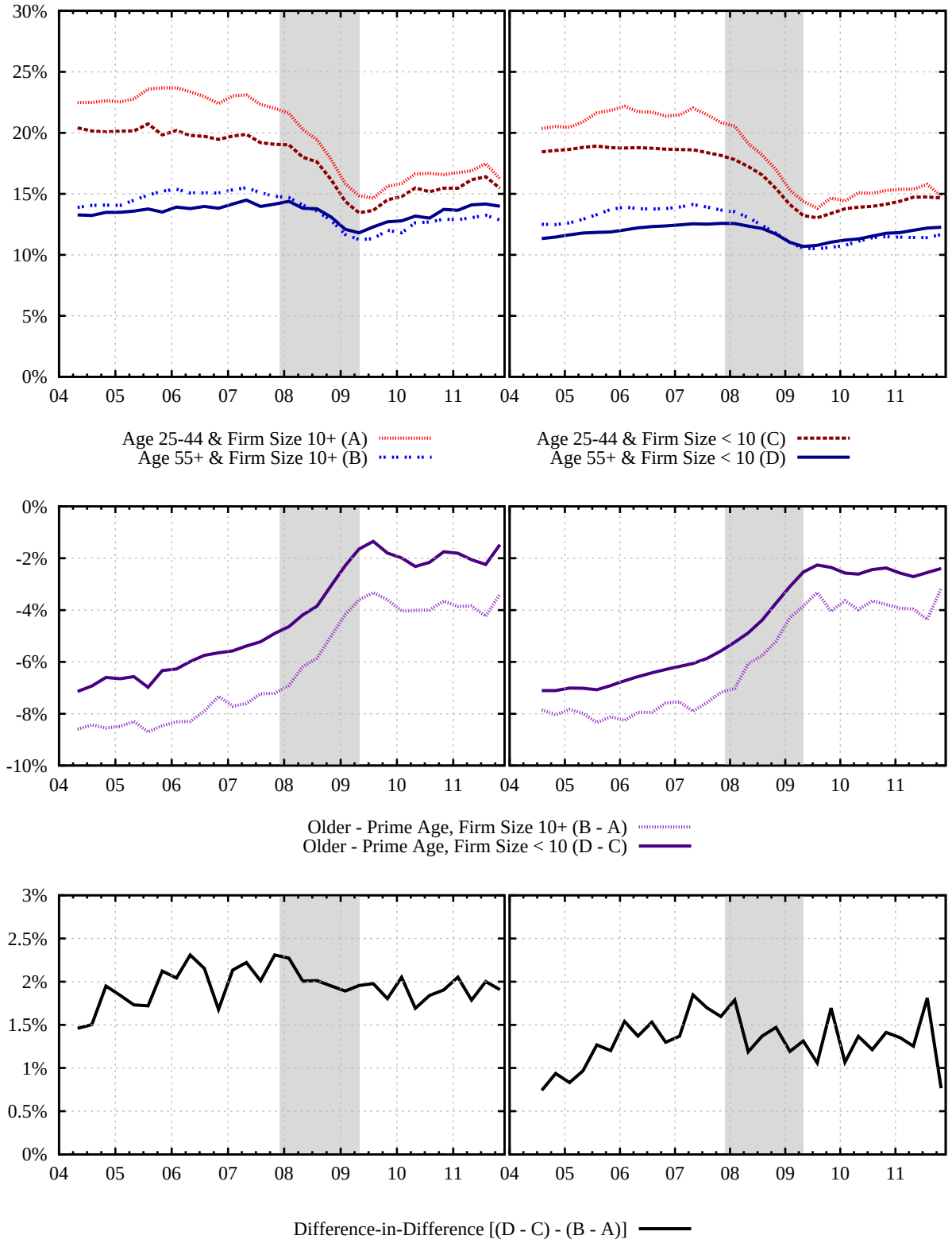
See notes for Figure 4.

Figure 9: Median Unemployment Duration by Age and Strength of Remedies, Men (Left) and Women (Right)



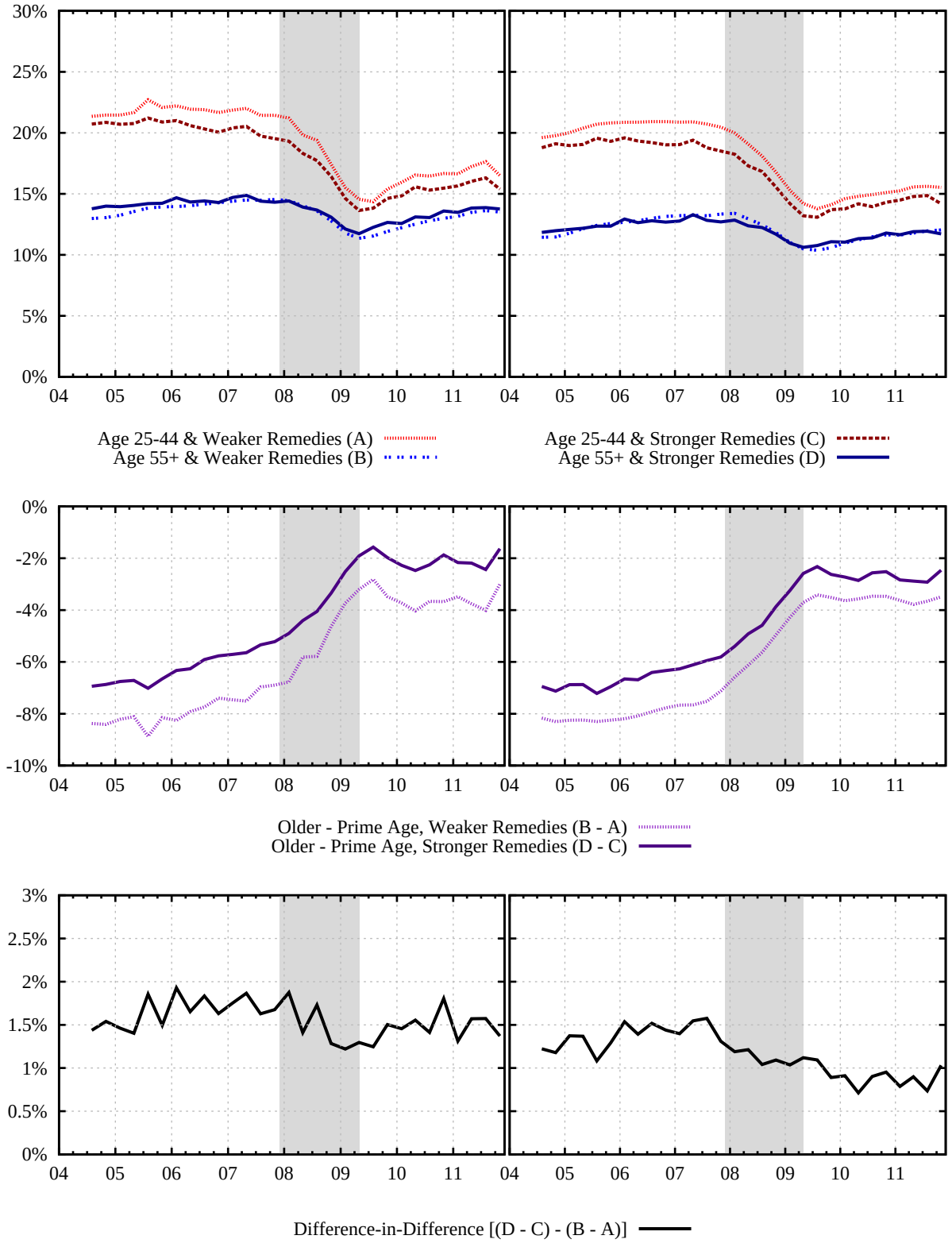
See notes to Figures 4 and 5.

Figure 10: Hiring Rates by Age and Firm-Size Minimum, Men (Left) and Women (Right)



See the notes to Figure 4. States are divided into two groups based on the minimum firm size required for age discrimination laws to apply. Each series in the top figure is generated by summing QWI estimates of the number of hires per quarter, by age group, in states of each law group, and dividing the entire series by the average employment across all those states in 2005. For most of the hiring series, X-12-ARIMA smooths using the two nearest quarters, resulting in 2004:Q2 being missing. However, when the data are smoother it can use fewer quarters to smooth, so in some cases data for 2004:Q2 are available.

Figure 11: Hiring Rates by Age and Strength of Remedies, Men (Left) and Women (Right)



See notes to Figures 4, 5, and 12. The only difference is that stronger remedies than the federal law are used instead of firm-size minimum.

Table 1: Summary Statistics for CPS Data

	Prime-age (25 - 44) Men				Prime-age (25 - 44) Women			
	Unweighted	Weighted	Min	Max	Unweighted	Weighted	Min	Max
Unemployment rate	6.1	6.5	0	21.1	5.6	6.1	0	19.2
	(3.1)	(3.1)			(2.5)	(2.5)		
Employment-to-population ratio	85.8	85.2	67.9	97.1	72.4	70.5	54.7	87.9
	(4.5)	(4.2)			(5.3)	(4.6)		
Median unemployment duration	13.6	14.2	0	104	13.0	13.8	1	64
	(9.7)	(9.2)			(9.1)	(8.8)		
	Older (55+) Men				Older (55+) Women			
	Unweighted	Weighted	Min	Max	Unweighted	Weighted	Min	Max
Unemployment rate	4.4	4.9	0	24.1	3.9	4.3	0	18.3
	(2.8)	(2.8)			(2.5)	(2.4)		
Employment-to-population ratio	44.2	43.3	23.4	62.4	33.0	31.8	17.4	50.5
	(5.7)	(4.6)			(5.0)	(3.8)		
Median unemployment duration	21.5	22.0	0	119	19.8	20.5	0	119
	(21.1)	(18.9)			(21.4)	(19.4)		
Compositional control	0.009	0.007	-1.7	1.4	-0.002	-0.002	-2.0	1.7
	(0.379)	(0.348)			(0.386)	(0.395)		
Extra UI weeks available	19.4	21.1	0	73	19.4	21.1	0	73
	(25.5)	(27.4)			(25.5)	(27.4)		

Standard deviations are in parentheses. These statistics were generated for each state and month from 2003 to 2011 using the Current Population Survey monthly micro-data, weighting by the provided population weights. There are 5,508 observations for each age group and sex. The weighted estimates use Census-based population estimates to weight each state-level estimate by state population. In some cases there are not enough observations from which to calculate statistics, such as median durations for older workers in small states. In these cases the missing observations are coded as zeros. Data are not seasonally adjusted.

Table 2: Summary Statistics for QWI Data, Hires Relative to 2005 Employment (%)

	Prime-age (25 - 44) Men				Prime-age (25 - 44) Women			
	Unweighted	Weighted	Min	Max	Unweighted	Weighted	Min	Max
Hires	19.3	18.5	8.7	40.7	17.6	17.3	8.3	37.3
	(4.9)	(4.2)			(4.2)	(3.9)		
	Older (55+) Men				Older (55+) Women			
	Unweighted	Weighted	Min	Max	Unweighted	Weighted	Min	Max
Hires	13.8	13.6	6.6	33.4	11.9	12.1	6.1	27.4
	(3.6)	(3.0)			(3.2)	(2.9)		

Standard deviations are in parentheses. These statistics were generated for each state, quarter, and age group from 2004:Q2 to 2011:Q4 using the Quarterly Workforce Indicators. There are 1,519 observations for each age group and sex. The weighted estimates use Census-based population estimates to weight each state observation by state population. Data are not seasonally adjusted.

Table 3: DDD Regressions for Unemployment Rates Using Lower Firm-Size Minimum

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-0.54****	…	-1.07**	…	…	-1.26***	-1.39***	…
	(0.18)		(0.52)			(0.38)	(0.44)	
LAW	0.08	…	0.13	…	…	-0.01	-0.88**	…
	(0.33)		(0.65)			(0.46)	(0.37)	
OLD × LAW	-0.42	…	-0.44	…	…	-0.37	0.55	…
	(0.35)		(0.56)			(0.42)	(0.51)	
Great Recession (GR)	1.94***	1.95***	0.58	0.37	0.48	0.72**	0.31	0.36
	(0.61)	(0.61)	(0.56)	(0.54)	(0.29)	(0.34)	(0.33)	(0.33)
After GR	5.08***	5.09***	-0.26	0.63	1.20**	3.79***	0.33	1.31***
	(0.75)	(0.75)	(0.82)	(0.75)	(0.45)	(0.46)	(0.45)	(0.41)
GR × OLD	-0.76**	-0.76**	-0.24	-0.19	-0.52*	0.01	0.05	0.07
	(0.37)	(0.37)	(0.39)	(0.39)	(0.26)	(0.37)	(0.35)	(0.36)
After GR × OLD	-1.26***	-1.27***	-0.34	-0.38	-0.88*	-1.06**	-0.18	-0.33
	(0.36)	(0.37)	(0.57)	(0.56)	(0.49)	(0.41)	(0.53)	(0.58)
GR × LAW	0.06	0.07	-0.10	-0.19	-0.25	0.25	0.22	0.19
	(0.65)	(0.65)	(0.57)	(0.56)	(0.38)	(0.41)	(0.37)	(0.39)
After GR × LAW	-0.11	-0.10	-0.58	-0.63	-1.13**	-0.23	-0.54	-0.50
	(0.84)	(0.84)	(0.69)	(0.68)	(0.51)	(0.58)	(0.49)	(0.52)
GR × OLD × LAW	-0.23	-0.23	-0.16	-0.14	0.25	-0.02	-0.09	-0.04
	(0.41)	(0.42)	(0.38)	(0.38)	(0.31)	(0.45)	(0.43)	(0.44)
After GR × OLD × LAW	0.11	0.11	0.21	0.22	0.70*	0.54	0.63	0.67
	(0.41)	(0.41)	(0.40)	(0.41)	(0.40)	(0.50)	(0.49)	(0.50)
Cumulative effect, 2 years:								
UI benefit extensions	…	…	0.11***	0.08***	0.07***	…	0.08***	0.05**
(weeks)			(0.01)	(0.01)	(0.01)		(0.01)	(0.01)
UI benefit extensions	…	…	-0.00	-0.00	-0.01	…	-0.01	-0.01
(weeks) × OLD			(0.01)	(0.10)	(0.01)		(0.01)	(0.01)
Age composition control	…	…	21.76**	43.13***	27.68***	…	19.22	32.34***
			(9.22)	(9.21)	(6.31)		(14.82)	(6.29)
Age composition control	…	…	-7.82	-11.33**	-9.46*	…	-0.12	-15.95*
× OLD			(5.46)	(5.21)	(5.55)		(11.58)	(8.44)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

Standard errors, clustered at the state level, are in parentheses. *, **, and *** mean statistically significant from zero at the 10%, 5%, and 1% levels, respectively. The sample period is 2003-2011. There are 11,016 observations. The unemployment rate and other proportion variables in following tables are on a scale of zero to 100. For both the unemployment insurance and compositional controls, both the contemporaneous variable and up to 24 months of lags are included. See the notes to Table 1 for information on the CPS data. In the regressions, rather than using seasonally-adjusted data, all regression models include calendar-month dummy variables. To allow for different seasonality by age group and type of state (defined by age discrimination law) – to better match the separate seasonal adjustment we do in the figures – these are also entered interacted with *LAW*, *OLD*, and *LAW* × *OLD*.

Table 4: DDD Regressions for Unemployment Rates Using Stronger Remedies

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-1.05***	…	-0.64	…	…	-1.51***	-1.94***	…
	(0.20)		(0.45)			(0.26)	(0.32)	
LAW	0.63*	…	1.54*	…	…	0.40	-0.58	…
	(0.35)		(0.83)			(0.25)	(0.40)	
OLD × LAW	-1.42***	…	-2.04**	…	…	-0.19	0.43	…
	(0.39)		(0.78)			(0.32)	(0.44)	
Great Recession (GR)	2.04***	2.04***	0.52*	0.32	0.31	0.92***	0.51*	0.55*
	(0.26)	(0.26)	(0.30)	(0.31)	(0.24)	(0.28)	(0.28)	(0.29)
After GR	5.13***	5.13***	-0.27	0.61	0.82*	3.82***	0.38	1.36***
	(0.34)	(0.34)	(0.49)	(0.44)	(0.43)	(0.37)	(0.42)	(0.40)
GR × OLD	-1.30***	-1.31**	-0.71**	-0.66**	-0.62**	-0.26	-0.19	-0.19
	(0.34)	(0.34)	(0.31)	(0.30)	(0.26)	(0.37)	(0.36)	(0.37)
After GR × OLD	-1.85***	-1.86***	-0.85**	-0.93**	-0.76	-1.00**	-0.20	-0.34
	(0.19)	(0.19)	(0.41)	(0.40)	(0.46)	(0.49)	(0.48)	(0.52)
GR × LAW	-0.09	-0.08	-0.08	-0.09	0.04	-0.04	-0.09	-0.12
	(0.45)	(0.45)	(0.42)	(0.42)	(0.35)	(0.38)	(0.35)	(0.37)
After GR × LAW	-0.19	-0.17	-0.50	-0.46	-0.55	-0.26	-0.49	-0.50
	(0.60)	(0.60)	(0.48)	(0.51)	(0.47)	(0.52)	(0.42)	(0.46)
GR × OLD × LAW	0.56	0.57	0.56	0.57	0.47	0.38	0.31	0.37
	(0.40)	(0.40)	(0.38)	(0.39)	(0.32)	(0.46)	(0.44)	(0.44)
After GR × OLD × LAW	0.96***	0.97***	1.05***	1.05***	0.59	0.42	0.52	0.57
	(0.26)	(0.26)	(0.26)	(0.27)	(0.37)	(0.55)	(0.54)	(0.55)
Cumulative effect, 2 years:								
UI benefit extensions	…	…	0.11***	0.08***	0.07***	…	0.07***	0.05***
(weeks)			(0.01)	(0.01)	(0.01)		(0.01)	(0.01)
UI benefit extensions	…	…	-0.01	-0.00	-0.01	…	-0.01	-0.01
(weeks) × OLD			(0.01)	(0.01)	(0.01)		(0.01)	(0.01)
Age composition control	…	…	24.01**	41.93***	26.74***	…	16.82	32.98***
			(10.00)	(9.47)	(6.22)		(14.26)	(5.75)
Age composition control	…	…	-7.48	-11.51**	-9.13*	…	-3.92	-16.65**
× OLD			(5.06)	(4.82)	(5.44)		(11.87)	(7.94)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 3.

Table 5: DDD Regressions for Employment-to-Population Ratio Using Lower Firm-Size Minimum

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-46.41***	…	-47.02***	…	…	-40.41***	-41.06***	…
	(1.50)		(1.88)			(1.66)	(1.02)	
LAW	-0.42	…	-0.40	…	…	1.85	1.72	…
	(0.55)		(0.85)			(1.49)	(1.25)	
OLD × LAW	1.84	…	3.89*	…	…	-0.72	-0.03	…
	(1.55)		(2.11)			(1.89)	(1.29)	
Great Recession (GR)	-2.33***	-2.35***	-1.18*	-0.82	-0.63	-0.44	-0.12	-0.25
	(0.68)	(0.68)	(0.68)	(0.62)	(0.47)	(0.34)	(0.39)	(0.37)
After GR	-6.32***	-6.35***	-0.57	-1.54*	-2.23***	-3.46***	0.53	-0.46
	(0.98)	(0.97)	(0.99)	(0.85)	(0.56)	(0.29)	(1.18)	(0.46)
GR × OLD	3.43***	3.43***	2.23**	2.07*	2.47***	2.64***	2.26***	2.36***
	(1.08)	(1.09)	(1.01)	(1.08)	(0.79)	(0.47)	(0.46)	(0.49)
After GR × OLD	6.74***	6.73***	6.23***	5.02***	5.53***	5.78***	5.82***	4.46***
	(1.01)	(1.02)	(1.21)	(1.18)	(0.87)	(0.43)	(0.79)	(0.70)
GR × LAW	0.15	0.16	0.27	0.42	0.41	0.65	0.66	0.54
	(0.72)	(0.72)	(0.64)	(0.63)	(0.54)	(0.43)	(0.48)	(0.43)
After GR × LAW	0.22	0.23	0.68	0.80	1.55**	0.96**	1.50***	1.13***
	(1.05)	(1.05)	(0.91)	(0.89)	(0.67)	(0.42)	(0.39)	(0.38)
GR × OLD × LAW	0.45	0.44	0.26	0.21	-0.15	-0.53	-0.78	-0.49
	(1.12)	(1.14)	(1.08)	(1.06)	(0.87)	(0.55)	(0.53)	(0.57)
After GR × OLD × LAW	-0.32	-0.33	-0.35	-0.48	-0.88	-0.95*	-1.21**	-0.77
	(1.04)	(1.05)	(1.04)	(1.00)	(0.92)	(0.57)	(0.53)	(0.59)
Cumulative effect, 2 years:								
UI benefit extensions	…	…	-0.13***	-0.10***	-0.09***	…	-0.10***	-0.07***
(weeks)			(0.02)	(0.01)	(0.01)		(0.03)	(0.01)
UI benefit extensions	…	…	0.02	0.06***	0.05***	…	0.01	0.02
(weeks) × OLD			(0.02)	(0.02)	(0.02)		(0.02)	(0.01)
Age composition control	…	…	-14.35	-46.83***	-35.03***	…	-68.34	-0.76
			(16.68)	(9.42)	(6.88)		(44.92)	(10.41)
Age composition control	…	…	7.64	13.24	2.93	…	90.58**	-53.92**
× OLD			(12.50)	(11.65)	(9.64)		(36.38)	(20.91)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 3.

Table 6: DDD Regressions for Employment-to-Population Ratios Using Stronger Remedies

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-44.47***	…	-44.02***	…	…	-41.61***	-40.69***	…
	(0.68)		(1.19)			(0.86)	(0.85)	
LAW	-0.78	…	-1.49	…	…	-1.78	0.06	…
	(0.62)		(1.14)			(1.24)	(1.43)	
OLD × LAW	1.26	…	0.80	…	…	1.44	-0.80	…
	(1.04)		(1.87)			(1.31)	(1.64)	
Great Recession (GR)	-2.26***	-2.27***	-0.97*	-0.60	-0.34	-0.31	-0.06	-0.12
	(0.45)	(0.45)	(0.50)	(0.47)	(0.39)	(0.39)	(0.38)	(0.37)
After GR	-6.47***	-6.49***	-0.61***	-1.59***	-1.76***	-3.26***	0.45	-0.31
	(0.44)	(0.44)	(0.63)	(0.51)	(0.58)	(0.47)	(1.26)	(0.58)
GR × OLD	4.00***	4.00***	2.61***	2.47***	2.72***	2.90***	2.54***	2.56***
	(0.67)	(0.68)	(0.63)	(0.68)	(0.65)	(0.42)	(0.39)	(0.41)
After GR × OLD	6.33***	6.33***	5.60***	4.72***	5.13***	5.05***	5.30***	3.82***
	(0.57)	(0.58)	(0.85)	(0.72)	(0.71)	(0.57)	(0.84)	(0.77)
GR × LAW	0.04	0.03	0.03	0.05	-0.05	0.43	0.40	0.32
	(0.58)	(0.57)	(0.54)	(0.55)	(0.47)	(0.47)	(0.51)	(0.47)
After GR × LAW	0.43	0.42	0.76	0.72	0.87	0.60	0.99*	0.73
	(0.73)	(0.72)	(0.62)	(0.62)	(0.62)	(0.54)	(0.55)	(0.50)
GR × OLD × LAW	-0.41	-0.40	-0.39	-0.38	-0.58	-0.87*	-1.13**	-0.81
	(0.87)	(0.89)	(0.83)	(0.85)	(0.74)	(0.51)	(0.49)	(0.52)
After GR × OLD × LAW	0.27	0.28	0.15	0.12	-0.19	0.17	-0.06	0.42
	(0.75)	(0.76)	(0.75)	(0.76)	(0.76)	(0.65)	(0.64)	(0.68)
Cumulative effect, 2 years:								
UI benefit extensions	…	…	-0.13***	-0.10***	-0.09***	…	-0.08***	-0.07***
(weeks)			(0.02)	(0.01)	(0.01)		(0.03)	(0.01)
UI benefit extensions	…	…	0.03	0.06***	0.05***	…	0.01	0.02
(weeks)× OLD			(0.02)	(0.02)	(0.02)		(0.02)	(0.01)
Age composition control	…	…	-16.64	-45.05***	-33.73***	…	-41.38	0.20
			(16.64)	(9.19)	(6.85)		(45.26)	(10.21)
Age composition control	…	…	8.83	12.41	2.43	…	75.31**	-55.41**
× OLD			(13.07)	(12.10)	(9.54)		(36.93)	(21.56)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 3.

Table 7: DDD Regressions for Median Unemployment Duration Using Lower Firm-Size Minimum

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	6.19***	…	10.60***	…	…	8.06***	5.92**	…
	(1.08)		(3.51)			(1.60)	(2.88)	
LAW	1.19	…	2.18	…	…	1.19	1.69	…
	(0.92)		(2.21)			(1.00)	(1.20)	
OLD × LAW	-0.15	…	-7.30	…	…	-4.55**	3.54	…
	(1.56)		(4.54)			(2.25)	(3.89)	
Great Recession (GR)	0.26	0.30	0.92	0.27	0.39	0.37	0.80*	0.83*
	(0.65)	(0.64)	(0.88)	(0.83)	(0.64)	(0.42)	(0.48)	(0.51)
After GR	12.95***	13.00***	5.29***	5.37***	4.83***	11.50***	2.78	4.35***
	(2.29)	(2.30)	(1.78)	(1.49)	(1.07)	(1.63)	(1.75)	(1.53)
GR × OLD	-2.86**	-2.87**	-2.99**	-2.75**	-3.93***	-0.09	0.35	0.32
	(1.09)	(1.10)	(1.24)	(1.31)	(1.22)	(1.53)	(1.56)	(1.55)
After GR × OLD	4.35***	4.34***	-1.95	-1.78	-3.05	4.65***	3.24	2.06
	(1.33)	(1.34)	(2.48)	(2.76)	(3.05)	(1.18)	(2.75)	(2.84)
GR × LAW	0.13	0.12	0.41	0.16	0.48	0.20	0.49	0.31
	(0.79)	(0.78)	(0.76)	(0.72)	(0.69)	(0.56)	(0.54)	(0.55)
After GR × LAW	-0.64	-0.67	-0.99	-1.28	-1.30	0.72	0.17	0.05
	(2.43)	(2.44)	(2.33)	(2.29)	(1.29)	(1.80)	(1.65)	(1.62)
GR × OLD × LAW	0.70	0.69	0.64	0.70	1.00	-1.98	-1.78	-1.68
	(1.70)	(1.71)	(1.73)	(1.76)	(1.50)	(1.79)	(1.76)	(1.79)
After GR × OLD × LAW	-1.03	-1.05	-1.82	-1.74	-0.90	1.26	1.15	1.25
	(2.03)	(2.05)	(2.03)	(2.03)	(2.11)	(1.70)	(1.72)	(1.75)
Cumulative effect, 2 years:								
UI benefit extensions (weeks)	…	…	0.22***	0.21***	0.22***	…	0.21***	0.19***
			(0.04)	(0.04)	(0.03)		(0.03)	(0.03)
UI benefit extensions (weeks)× OLD	…	…	0.16***	0.17**	0.17***	…	0.05	0.07
			(0.06)	(0.07)	(0.06)		(0.07)	(0.08)
Age composition control	…	…	-45.42**	6.02	-15.29	…	-40.51	19.99
			(21.34)	(19.45)	(11.97)		(31.40)	(19.17)
Age composition control × OLD	…	…	67.07**	49.68	48.51	…	9.96	-22.64
			(25.29)	(35.29)	(29.19)		(52.21)	(50.51)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 3.

Table 8: DDD Regressions for Median Unemployment Duration Using Stronger Remedies

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	8.67***	…	9.42***	…	…	7.27***	7.75**	…
	(1.56)		(2.95)			(2.28)	(3.15)	
LAW	-0.12	…	-2.74	…	…	-0.58	0.03	…
	(0.61)		(1.69)			(0.58)	(1.15)	
OLD × LAW	-2.08	…	-1.12	…	…	-5.04**	-4.85	…
	(1.93)		(3.70)			(2.48)	(4.65)	
Great Recession (GR)	0.58	0.58	1.34**	0.60	0.89	0.24	0.70	0.73
	(0.39)	(0.39)	(0.61)	(0.62)	(0.60)	(0.54)	(0.54)	(0.56)
After GR	11.91***	11.92***	4.25***	4.28***	3.89***	11.86***	2.81**	4.46***
	(0.82)	(0.82)	(1.14)	(1.12)	(0.97)	(1.17)	(1.38)	(1.20)
GR × OLD	-6.18***	-6.19***	-6.12***	-5.97***	-6.02***	1.62	1.97	1.95
	(1.50)	(1.52)	(1.84)	(1.88)	(1.62)	(1.94)	(1.98)	(1.98)
After GR × OLD	-0.03	-0.04	-6.13**	-5.81**	-4.72*	7.56***	5.81*	4.58
	(1.49)	(1.50)	(2.62)	(2.88)	(2.76)	(1.61)	(3.16)	(3.06)
GR × LAW	-0.34	-0.31	-0.23	-0.26	-0.24	0.39	0.57	0.46
	(0.64)	(0.64)	(0.68)	(0.68)	(0.67)	(0.63)	(0.62)	(0.64)
After GR × LAW	0.90	0.95	0.64	0.65	0.46	0.15	-0.10	-0.15
	(1.56)	(1.56)	(1.42)	(1.41)	(1.05)	(1.54)	(1.36)	(1.37)
GR × OLD × LAW	5.48***	5.48***	5.53***	5.54***	4.82***	-4.37**	-4.03*	-3.99*
	(1.68)	(1.69)	(1.65)	(1.68)	(1.62)	(2.02)	(2.09)	(2.08)
After GR × OLD × LAW	5.37***	5.37***	5.08***	5.10***	2.39	-3.03	-3.21	-3.17
	(1.82)	(1.83)	(1.78)	(1.78)	(1.88)	(1.98)	(2.04)	(2.02)
Cumulative effect, 2 years:								
UI benefit extensions	…	…	0.22***	0.21***	0.22***	…	0.21***	0.19***
(weeks)			(0.04)	(0.04)	(0.03)		(0.03)	(0.03)
UI benefit extensions	…	…	0.16***	0.16**	0.16**	…	0.05	0.08
(weeks)× OLD			(0.05)	(0.06)	(0.06)		(0.08)	(0.08)
Age composition control	…	…	-46.81**	2.46	-16.33	…	-30.77	20.22
			(22.55)	(21.41)	(12.11)		(29.56)	(19.43)
Age composition control	…	…	51.57**	43.51	45.76	…	12.45	-12.33
× OLD			(24.98)	(33.28)	(29.47)		(50.20)	(52.20)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 3.

Table 9: DDD Regressions for Hires Relative to 2005 Employment (%) Using Lower Firm-Size Minimum

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-6.87***	…	-9.37***	…	…	-6.42***	-7.55***	…
	(0.44)		(1.42)			(0.32)	(0.63)	
LAW	-3.58***	…	-4.02***	…	…	-2.94**	-3.54***	…
	(1.26)		(1.34)			(1.12)	(1.02)	
OLD × LAW	1.40**	…	0.86	…	…	0.88**	1.05	…
	(0.57)		(1.47)			(0.43)	(1.23)	
Great Recession (GR)	-3.14***	-3.17***	-1.45*	-1.09	-0.67	-2.58***	-1.49**	-1.50**
	(0.86)	(0.87)	(0.75)	(0.74)	(0.44)	(0.71)	(0.69)	(0.69)
After GR	-6.15***	-6.19***	-2.73*	-2.77***	-1.51	-5.97***	-2.68**	-2.94***
	(0.98)	(0.99)	(1.40)	(1.01)	(0.92)	(0.76)	(1.07)	(0.76)
GR × OLD	2.10***	2.10***	1.09***	0.96**	0.88***	1.87***	1.13***	1.25***
	(0.44)	(0.44)	(0.41)	(0.40)	(0.21)	(0.36)	(0.37)	(0.38)
After GR × OLD	4.09***	4.09***	1.88**	3.20***	2.85***	3.88***	1.82***	2.95***
	(0.47)	(0.48)	(0.84)	(0.55)	(0.42)	(0.38)	(0.61)	(0.49)
GR × LAW	0.76	0.77	1.01	1.14	0.72	0.65	0.95	1.00
	(0.87)	(0.88)	(0.86)	(0.84)	(0.58)	(0.73)	(0.74)	(0.75)
After GR × LAW	1.81*	1.81*	2.17**	2.37**	2.27***	1.64**	2.02**	2.17**
	(1.02)	(1.03)	(1.02)	(0.96)	(0.76)	(0.81)	(0.79)	(0.82)
GR × OLD × LAW	0.19	0.20	0.05	0.00	0.07	0.21	-0.05	0.05
	(0.46)	(0.47)	(0.44)	(0.43)	(0.27)	(0.38)	(0.41)	(0.41)
After GR × OLD × LAW	0.01	0.02	-0.16	-0.13	-0.26	0.14	-0.23	0.06
	(0.50)	(0.50)	(0.54)	(0.49)	(0.34)	(0.40)	(0.41)	(0.40)
Cumulative effect, 2 years:								
UI benefit extensions (weeks)	…	…	-0.07**	-0.02	-0.06**	…	-0.06**	-0.04**
			(0.03)	(0.01)	(0.03)		(0.02)	(0.02)
UI benefit extensions (weeks)× OLD	…	…	0.08***	0.00	0.01	…	0.03**	0.00
			(0.02)	(0.01)	(0.01)		(0.01)	(0.01)
Age composition control	…	…	-8.49	-24.50***	-18.73***	…	-20.07**	-31.49***
			(5.32)	(3.74)	(3.06)		(8.20)	(6.97)
Age composition control × OLD	…	…	2.16	9.98***	8.04***	…	26.59***	11.87***
			(3.35)	(1.85)	(1.29)		(5.17)	(3.18)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

Standard errors, clustered at the state level, are in parentheses. *, **, and *** mean statistically significant from zero at the 10%, 5%, and 1% levels, respectively. The sample period is 2004:Q2-2011:Q4. The hiring variable is constructed by dividing the number of hires in the quarter by the average employment in 2005 for that state and multiplying by 100. In the regressions, rather than using seasonally-adjusted data, all regression models include calendar-quarter dummy variables. To allow for different seasonality by age group and type of state (defined by age discrimination law) – to better match the separate seasonal adjustment we do in the figures – these are also entered interacted with *LAW*, *OLD*, and *LAW* × *OLD*.

Table 10: DDD Regressions for Hires Relative to 2005 Employment (%) Using Stronger Remedies

	Men (1)	Men (2)	Men (3)	Men (4)	Men (5)	Women (6)	Women (7)	Women (8)
OLD	-6.75***	…	-5.45***	…	…	-6.45***	-8.56***	…
	(0.34)		(0.87)			(0.29)	(0.60)	
LAW	-1.29	…	-2.11	…	…	-1.24	-3.35**	…
	(1.30)		(1.52)			(1.15)	(1.36)	
OLD × LAW	1.16**	…	-0.56	…	…	0.88**	7.07***	…
	(0.55)		(1.67)			(0.41)	(1.47)	
Great Recession (GR)	-2.40***	-2.45***	-0.51	-0.18	0.10	-2.01***	-0.92***	-0.96***
	(0.35)	(0.36)	(0.41)	(0.39)	(0.40)	(0.30)	(0.31)	(0.31)
After GR	-5.06***	-5.12***	-1.64	-2.15***	-0.53	-5.31***	-1.95**	-2.63***
	(0.60)	(0.61)	(1.00)	(0.68)	(1.16)	(0.53)	(0.92)	(0.66)
GR × OLD	2.29***	2.29***	1.10***	1.03***	0.77***	2.15***	1.42***	1.52***
	(0.14)	(0.14)	(0.21)	(0.19)	(0.20)	(0.14)	(0.17)	(0.15)
After GR × OLD	4.17***	4.17***	1.58**	3.31***	2.65***	4.30***	1.99***	3.29***
	(0.24)	(0.24)	(0.69)	(0.38)	(0.54)	(0.22)	(0.55)	(0.40)
GR × LAW	-0.34	-0.32	-0.33	-0.32	-0.57	-0.22	0.09	0.14
	(0.57)	(0.58)	(0.59)	(0.61)	(0.52)	(0.48)	(0.52)	(0.53)
After GR × LAW	0.13	0.15	0.43	0.38	0.24	0.60	0.85	1.02
	(0.81)	(0.82)	(0.83)	(0.86)	(0.76)	(0.69)	(0.72)	(0.74)
GR × OLD × LAW	-0.11	-0.10	-0.11	-0.10	0.30	-0.21	-0.46	-0.35
	(0.30)	(0.30)	(0.31)	(0.30)	(0.26)	(0.25)	(0.28)	(0.27)
After GR × OLD × LAW	-0.12	-0.09	-0.36	-0.22	0.23	-0.49	-0.84***	-0.57*
	(0.36)	(0.35)	(0.38)	(0.36)	(0.34)	(0.30)	(0.30)	(0.32)
Cumulative effect, 2 years:								
UI benefit extensions (weeks)	…	…	-0.08**	-0.02	-0.05*	…	-0.06**	-0.04**
			(0.03)	(0.01)	(0.03)		(0.02)	(0.02)
UI benefit extensions (weeks)× OLD	…	…	0.09***	0.00	0.01	…	0.04***	0.00
			(0.02)	(0.01)	(0.01)		(0.01)	(0.01)
Age composition control	…	…	-9.48	-22.68***	-18.08***	…	-19.97**	-29.98***
			(5.90)	(3.15)	(3.04)		(9.61)	(7.28)
Age composition control × OLD	…	…	4.81	9.83***	7.98***	…	26.67***	13.18***
			(3.16)	(1.86)	(1.32)		(4.96)	(3.37)
State dummies and interactions with OLD		Yes		Yes	Yes			Yes
Weighted	Yes	Yes	Yes	Yes		Yes	Yes	Yes

See notes to Table 9.

Table 11: Summary Table, Estimates of DDD Parameters

		Men			Women		
			DDD			DDD	
		Pre-GR	During GR	After GR	Pre-GR	During GR	After GR
		(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rates	Lower firm size	−	−	+	?	−	+
	Stronger remedies	−***	+	+***	?	+	+
Employment-to-population ratio	Lower firm size	+*	+	−	−	−	−**
	Stronger remedies	+	−	+	?	−**	?
Median unemployment durations	Lower firm size	−	+	−	?	−	+
	Stronger remedies	−	+***	+***	−**	−**	−
Hiring rates	Lower firm size	+**	+	?	+**	?	?
	Stronger remedies	?	−	−	+***	−	−**

The Pre-GR results are based on the estimates of coefficients of *OLD* × *LAW* in Table 3-12. The During GR and After GR results are based on estimates of coefficients of *GR* × *OLD* × *LAW* and *After GR* × *OLD* × *LAW* in columns (1), (3), (4), (6), (7), and (8) in Tables 3-10 (to use the same specifications for men and women). If all estimates are the same sign, then either – or + is reported. Otherwise ? is reported. The asterisks report the most significant estimates in the tables. Estimates surrounded by a box are those for which the evidence indicates that stronger age discrimination helped older workers relative to younger workers. Shaded estimates are those that indicate the opposite. Underlined sets of estimates are those where the main effect indicates that prior to the Great Recession stronger age discrimination protections helped older workers, but generated relatively worse outcomes for them during or after the Great Recession.