A Comprehensive Analysis of the Effects of US Disability Discrimination Laws on the Employment of the Disabled Population

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Abstract

We conduct a comprehensive analysis of the effect of disability discrimination laws on the labor markets of individuals with disabilities. We examine almost all variation in the federal law (Americans with Disabilities Act, Supreme Court cases, ADA Amendments Act) in addition to variation in state laws. We focus on estimating the effects of these legal changes on hiring, as this is the margin where the effect of the laws is most unclear. We estimate effects by type of disability, going beyond the conventional "work-limited" definition by using definitions based on the severity of impairments to activities of daily life, and by distinguishing between disability types, such as focusing on if the conditions are salient to an employer at the time of interview. We find that most expansions (contractions) of disability discrimination protections are associated with increases (decreases) in hiring. Our results varied by how disability is defined, such as results differing for those with impairments to activities of daily life or for those with a salient or non-salient physical conditions, and our results varied by the legal change studied. This suggests that studies using a single disability measure or a single legal change may not capture the heterogeneity of effects.

Keywords: disability, discrimination, employment, Americans with Disabilities Act, ADA, Americans with Disabilities Amendments Act, ADAAA, Sutton v. United Air Lines, Murphy v. United Postal Service, Albertson's v. Kirkingburg, Toyota v. Williams

JEL Codes: J71, J78, K31, J14

Introduction

Individuals with disabilities face considerable economic challenges. Compared to individuals without disabilities, they are far less likely to be employed. In 2013, only 34.0% of individuals with disabilities of age 18 to 64 were employed, compared to 74.2% for those without disabilities. This varies by disability type, ranging from 15.2% for self-care disabilities to 15.3% (independent living disabilities), 23.7% (cognitive), 23.9% (ambulatory), 40.0% (vision), and 50.2% (hearing) (Houtenville, Brucker, and Lauer, 2014). Individuals with disabilities also earn much less. The median earnings in 2013 were $20,785 for individuals with disabilities, but $30,728 for those without disabilities) (Houtenville, Brucker, and Lauer, 2014).

Conditional on working, there are still gaps in the wages for individuals with and without disabilities, even when controlling for how disabilities affect occupational job requirements (Kruse et al. 2016; Baldwin and Choe 2014a; Baldwin and Choe 2014b).

Many policies and programs have attempted to close this economic gap between individuals with and without disabilities. These include Ticket to Work, the Benefit Offset National Demonstration, and various rehabilitation programs. While these programs seek to improve the labor supply of individuals with disabilities, their effectiveness in increasing employment and earnings of individuals with disabilities can be limited by the labor demand side through disability discrimination. While disability discrimination is difficult to measure, recent efforts to measure it in contexts where the disability should have no impact on productivity have still found persistent discrimination (Ameri et al., 2015).

Disability discrimination laws are one approach used to try to remove discriminatory barriers. The most notable is Title I of the *Americans with Disabilities Act of 1990* (ADA), which became effective July 1992. Title I of the ADA forbids discrimination in hiring, terminations, promotions, and wages on the basis of disability. It also requires that employers provide accommodations to individuals with disabilities if the accommodation is reasonable given its demands and given the size of the firm. The ADA applies to all firms with at least 15 employees. The ADA was followed up recently by the *ADA Amendments Act of 2008* (ADAAA), effective January 1, 2009, which broadened the ADA in response to how the Supreme Court narrowed the ADA in several notable cases. Most states also have disability discrimination laws, many of which differ from federal law across one or more dimensions (Neumark, Song, and Button, forthcoming; Long, 2004).

While disability discrimination laws seek to help individuals with disabilities, economic theory suggests that they have ambiguous impacts. Given that a worker with a disability is employed, they are less likely to be terminated under disability discrimination laws. These laws impose a possible cost to terminating a protected employee since the termination could be seen (rightfully or wrongly) as discriminatory, prompting legal action (Acemoglu and Angrist, 2001). These laws could also reduce voluntary separations, as employer-provided accommodations may allow individuals with disabilities to work longer.

However, these laws could have adverse effects on hiring. Hiring an individual from a protected class imposes a cost through the possible legal costs that could be faced if the employee is terminated (Bloch, 1994). For disability discrimination laws, there is also the added cost of reasonable accommodations, which further increases the costs of hiring an individual with a disability, and thus creates a disincentive to hire them in the first place (Acemoglu and Angrist, 2001). While hiring discrimination is illegal under the ADA and similar laws, it is more difficult to detect, and it is harder to establish a class of affected workers. Both enforcement of laws on hiring discrimination and proving hiring discrimination are also more challenging compared to for terminations. Economic damages are also smaller in hiring discrimination cases, which makes these cases less attractive to plaintiffs and their attorneys (Bloch, 1994). For these reasons, disability discrimination laws have much less scope to reduce hiring discrimination and could in fact make it worse.

The empirical evidence of the effects of disability discrimination laws on the labor market outcomes of individuals with disabilities is very mixed. Some studies suggest that laws have a negative effect (DeLeire, 2000; Acemoglu and Angrist, 2001; Jolls and Prescott, 2004), others argue for no effect (Beegle and Stock, 2003; Houtenville and Burkhauser, 2004;

Hotchkiss, 2004; Jolls and Prescott, 2004), and some show a positive effect (Kruse and Schur, 2003; Button, forthcoming). These studies are summarized in Table 1 and discussed more in the next section.

Given the lack of consensus on how disability discrimination laws affect labor market outcomes for individuals with disabilities, we probe this question further in three ways. First, we conduct a comprehensive analysis of the effects of disability discrimination laws in the United States on the labor market outcomes of individuals with disabilities. In addition to re-evaluating the effects of the ADA, we explore several additional sources of legal variation. These include Supreme Court re-interpretations of the definition of disability under the ADA, namely the famous "Sutton Trilogy" of cases, followed by the passage of the ADA Amendments Act of 2008 (ADAAA). We also examine state disability discrimination laws that cover individuals more broadly than the federal law, or that may have mediated federal changes.

Second, we focus on measuring the effects on hiring, rather than just employment as was done in most of the previous studies. Measuring hiring effects is important because the effect of disability discrimination laws on hiring, according to theory, are ambiguous while the effect on terminations is negative. So if there are negative effects of disability discrimination laws, they would appear for hiring. The focus on hiring is also important because looking just at employment can confuse the effects of the laws with unrelated movements in and out of the labor force for other reasons (Hotchkiss, 2004; Houtenville and Burkhauser, 2004).

Third, we measure the effects of these laws by using several classifications of disability. Doing so avoids a critique in the literature where the sample of individuals with disabilities is derived solely from the potentially problematic "work-limited" question. This measure is clearly not the legislative definition of disability under the ADA, it groups together a highly

heterogeneous population, it applies to only perceived limitations in working, whereas many ADA plaintiffs specifically allege discrimination based on a condition that limits other major life activities but not work capacity.

But most importantly, the responses to the "work-limited" question may be endogenous to the worker's employment situation, with those able to get work sometimes no longer indicating that they are "work-limited" even if they have the same condition. Similarly, employer accommodations may cause individuals to report that they are no longer "work-limited" because they feel adequately supported at their current job (Kruse and Schur, 2003; Button, forthcoming). This endogeneity can lead to estimated employment effects that are negatively biased.

To address these issues, we expand the traditional "work-limited" approach in two ways. First, we include the "any Activity of Daily Living (ADL) or functional limitation" and "severe ADL or functional limitation" as developed in the SIPP by Kruse and Schur (2003). Second, we introduce a set of new, specific-condition-based metrics, based on which conditions an individual identifies as being the source of his or her work-limitation. This latter grouping allows us to estimate heterogeneous effects of discrimination laws across four groups of individuals with disabilities: (1) individuals with physical disabilities that are salient to employers, (2) individuals with physical disabilities that are not salient to employers, (3) individuals with mental disabilities that are salient to employers and traditionally the subject of separate employment supports, and (4) individuals with other mental disabilities that are not necessarily salient to employers. By separately estimating the effects of the ADA, ADAAA, and other changes in discrimination law by the severity of functional impairment or by salience to the employer, we shed light on the mechanisms through which these laws affect employment and for which subgroups of the disabled population. The salience distinction is of particular importance because it relates to

hiring, which is the main outcome of our analysis. Individuals with conditions that are more salient to an employer, such as missing limbs or requiring a mobility device, may face more of a hiring disincentive than individuals with conditions that are not so salient, such as hypertension.

Our analysis of the effects of changes in discriminations laws generally suggests that expansions in the scope of these laws are associated with modest to large improvements in hiring rates, while a narrowing of the scope leads to lower hiring rates. However, we find different results when redefining the target population by the presence and severity of an ADL limitation, or by whether the work-limiting health condition is physical, mental, salient to an employer, or not. We also find suggestive evidence that the salience of the health condition, and the resulting greater ability of employers to continue to discriminate, mitigates the hiring gains from expansions in the scope of discrimination laws. However, this finding is preliminary, and further analysis with more medically detailed data is necessary to substantiate this finding, as well as to explain the few deviations from the general pattern of a larger scope leading to improved hiring outcomes. Our results point to generally positive effects of these protections, indicating a role for these policies in improving labor market outcomes of disabled populations, although additional research is needed to determine the most effective policies and the most affected populations.

Related Research

Disability Discrimination Laws

This paper builds off several others studies of how disability discrimination laws, namely the ADA, have affected the employment of individuals with disabilities. These papers are summarized in Table 1. The first papers examining the effect of disability discrimination laws were Acemoglu and Angrist (2001) and DeLeire (2000), who examined the ADA and found that

it was associated with a decrease in employment of individuals with disabilities, relative to individuals without disabilities.

This was followed by four papers that probed these results further. Houtenville and Burkhauser (2004) and Hotchkiss (2004) both found that employment of individuals with disabilities fell after the ADA, relative to individuals without disabilities, but they each attributed it to something other than the ADA. Houtenville and Burkhauser (2004) attributed this trend to one that started in the 1980s and arose because SSDI and SSI programs became more accessible. Hotchkiss (2004) attributed it a decrease in the labor force participation rate of individuals with disabilities stemming from a reclassification of individuals without disabilities who were out of the labor force as "disabled." Jolls and Prescott (2004) show that the effects of the ADA were mediated by existing state disability discrimination laws, such that they only find a negative effect of the ADA in states without existing laws that required reasonable accommodations for individuals with disabilities. Kruse and Schur (2003) found that the estimated impact of the ADA depended on how disability was defined. They replicated the negative estimates of Acemoglu and Angrist (2001) and DeLeire (2001) using SIPP data and the work-limited measure of disability. They then exploited the data on functional limitations in the SIPP modules to show that a definition of disability more in line with the ADA, where an individual has a limitation to an ADL, resulted in a *positive* effect of the ADA on employment. At this point, given these studies, the effect of the ADA on employment is uncertain even if one does put more weight in the conclusions of some studies (e.g., Kruse and Schur, 2003) over others.

There is little work that examines the effect of other changes in disability discrimination law other than the ADA. The most notable example exploiting changes in laws after the ADA is Thompkins (2015) who was the first to examine how SCOTUS cases since the ADA that

changed the interpretation of the ADA, along with the subsequent ADAAA, affected employment for individuals with disabilities. We use much of the same legal variation, although our approach differs and is more complete, as detailed later. Thompkins (2015) finds limited effects of the SCOTUS cases and the ADAAA on employment using data from the CPS Annual Social and Economic Supplement (ASEC).

Beegle and Stock (2003) examine state laws passed before the ADA, finding almost no effect on employment, even for those that required reasonable accommodation. This null finding of the effects of state laws contradicts Jolls and Prescott (2004) who find that employment fell after the ADA but only in states without existing laws that required reasonable accommodations. Button (forthcoming) examines a broadening of the definition of disability in California's disability discrimination law in 2001 and finds that it increased employment, even using the "work-limited" definition of disability in the CPS ASEC. Ameri et al. (2015) provide unique evidence by using a resume-correspondence study to measure discrimination against individuals with spinal cord injuries or Asperger's, and if this discrimination differs based on the coverage of the ADA and state laws. They compare firms on either side of the cut-off for coverage of the ADA (15+ employees), finding some evidence that being covered by the ADA reduces discrimination. They also examine existing state laws that are stronger or broader than the ADA (compiled from their research and from Neumark, Song, and Button, forthcoming) but do not find any effects.

Other Discrimination Laws

The effect of discrimination laws for other groups (e.g., sex, race, age) may shed some light on the effects of disability discrimination laws. The theoretical effect of these laws is similar – disincentives for both hiring and firing. However, the hiring disincentive is smaller

because there is no reasonable accommodation requirement. Also, these laws cannot boost tenure at jobs through the mechanism of job accommodations. The empirical literature on the effects of laws protecting other groups generally shows positive effects for Blacks and older workers, but there is no consensus. The literature on sex is much less developed and has mixed conclusions.

There are several studies of age discrimination. Adams (2004) and Neumark and Stock (1999) both find that federal and state age discrimination laws were associated with increased employment of older workers. In an interesting application, Neumark and Song (2013) find that hiring rates of older workers who were "caught" by the increase in the Social Security Administration's full retirement age were higher in states with stronger age discrimination laws. Lahey (2008) finds that greater enforcement of the *Age Discrimination in Employment Act (ADEA) of 1968* in states where it was easier to file a discrimination claim led to lower hiring rates. Neumark (2009) and Neumark and Button (2014) dispute this conclusion. Neumark and Button (2014) find mixed evidence of the effects of state disability discrimination laws, with stronger or broader laws generally associated with worse labor market outcomes for individuals with disabilities during the Great Recession, but with some suggestive evidence that these laws improved labor market outcomes before the recession.

Neumark and Stock (2006) and Donohue (2007) discuss the literature on sex and race. Donohue and Heckman (1991) and Neumark and Stock (2006) find that Title VII *of the Civil Rights Act of 1964* is associated with increased employment of Blacks relative to Whites (and also women relative to men in Neumark and Stock (2006)). However, both sets of authors discuss that it is hard to necessarily say that these effects are casual because there were even stronger improvements in labor market outcomes for the affected groups in periods before this law, and these improvements were caused by more secular forces. Neumark and Stock (2006)

also investigate how state race discrimination laws affected Blacks, finding no employment effect. They also find that state laws forbidding wage discrimination based on sex led to a decrease in employment for women. Most other studies of the effect of sex discrimination laws focus on earnings and wages. There is also an evolving literature on the effect of laws protecting gays and lesbians, but this literature is focused again on earnings (see, e.g., Martell 2013).

A Review of Disability Discrimination Legal Changes

We seek to quantify the impacts of federal disability discrimination law, namely the Americans with Disabilities Act of 1990 (ADA) and the ADA Amendments Act of 2008 (ADAAA), along with the US Supreme Court cases that changed the definition of disability under the ADA (Bragdon v. Abbott, Cleveland v. Policy Management Systems Corp., the "Sutton Trilogy", and Toyota v. Williams). We also seek to determine how the effects of the ADA, the ADAAA, and the US Supreme Court cases may have differed based on existing state disability discrimination laws or changes in these laws over time. We discuss each of these laws and legal changes below and Figure 1 provides a useful timeline of the legal changes we discuss.

The Americans with Disabilities Act of 1990

The most notable employment discrimination law is Title I of the Americans with Disabilities Act of 1990 (ADA), effective July 1992. In addition to forbidding discrimination in hiring, terminations, promotion, and wages on the basis of disability, Title I of the ADA requires employers to reasonably accommodate employees with disabilities. This can be by providing physical aids or some job restructuring, so long as this accommodation is reasonable given the nature of the job and size of the firm (Cooper 1991). The ADA applies to firms with at least 15 employees. The ADA provides three routes for an individual to be considered disabled:

"The term 'disability' means, with respect to an individual-

(A) a physical or mental impairment that substantially limits one or more major life activities of such individual; (B) a record of such an impairment; or (C) being regarded as having such an impairment." (42 U.S. Code §12102 (1))

Who was considered disabled under the ADA was difficult to determine because the definition was not explicit. But because disabilities differ by type, severity, and duration, there was no way for the definition of disability to have been constructed under the ADA to be clear for every circumstance. The Equal Employment Opportunity Commission (EEOC) then took the role of providing guidance on the definition of disability under the ADA.

Their main clarification was discussing what constituted "major life activities." The EEOC defined the first set of major life activities in its regulations. In its regulations, the EEOC stated that major life activities were basic activities that the average person could perform with little or no difficulty, such as "caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning and working." (29 C.F.R. 1630.2(i)) Other major life activities were defined elsewhere. In the Appendix to its regulations, the EEOC also identified sitting, standing, lifting and reaching. (29 C.F.R. 1630, Appendix to Part 1630.2(i)) The EEOC mentioned mental and emotional processes, such as thinking, concentrating and interacting with others in its Compliance Manual (EEOC, 1995). After that, the EEOC also identified sleeping as a major life activity (EEOC, 1997; Taylor, 2009). And while the EEOC had continued to add to the list of major life activities over the years such as when it filed amicus briefs, it was always clear that any list of major life activities was illustrative, not exclusive (Taylor, 2009).

However, even if the EEOC mentioned that many activities constituted "major life activities", courts did not always agree[2] or were strict in their standards[3]. The ability for the EEOC to even specify which activities were "major life activities" was questioned by the Supreme Court in the Sutton v. United Airlines case, discussed below. On the other hand, the list of major life activities from the EEOC was never meant to be interpreted as exhaustive[4]. Thus some courts determined that some activities not mentioned by the EEOC were in fact major life activities (e.g., reading[5]). So by no means was mention by the EEOC the strict standard for the determination of major life activities. Appendix Tables A2 and A3 summarize some cases supporting or denying that certain activities or biological processes were "major life activities." These cases are not meant to be an exhaustive summary, but rather they highlight how the list of major life activities was always in question over time. The list of approved major life activities was clarified in the ADA Amendments Act of 2008, discussed later.

[2] For "lifting", for example, two cases did not consider it to be a major life activity: Lehman v. United Parcel Service, Inc., WL 603085 (W.D. Mo. Feb. 22, 2007) and Maples v. American Greetings Corp., 2007 WL 1089701 (E.D. Ark. Apr. 10, 2007).

[3] Courts were particularly picky about what constituted a substantial limitation in sleeping or working (Taylor 2009). For sleeping see Brown v. Principi, 2007 WL 959375 (S.D.N.Y. Mar. 29, 2007), DeJesse v. First Judicial District of Pennsylvania, 2007 WL 4336225 (E.D. Pa. Dec. 12, 2007) 33., Boerst v. General Mills Operations Inc., 2002 WL 59637 (6th Cir. Jan. 15, 2002). "Working" as a major life activity was subject to the so-called "single job rule." Under this rule, it is not enough for plaintiffs to argue that their impairment precludes them from a single job or narrow range of jobs, they must argue that it precludes them from a class of jobs or a broader range of jobs (Long, 2008).

[4] The EEOC appendix states explicitly that "this list is not exhaustive" (29 C.F.R. App. § 1630.2(i)) and that major life activities are "… those basic activities that the average person in the general population can perform with little or no difficulty." ((29 C.F.R. App. § 1630.2(i)) (see Zucker 2003).

[5] Reading was deemed a major life activity in Head v. Glacier Northwest, Inc., 413 F.3d 1053 (9th Cir. 2005); Shaffer v. Spherion Corp., 2007 WL 4557778 (D. Col. Dec. 20, 2007), and Szmaj v. AT&T, 291 F.3d 955 (7th Cir. 2002) (but in Szmaj, "reading all day" is not a major life activity).

Major Re-Interpretations of Definition of Disability under the ADA

Here we discuss major US Supreme Court cases that restricted or broadened the ADA's definition of disability in a significant way[6]. These cases include, in chronological order, Bragdon v. Abbott[7] (1998), Cleveland v. Policy Management Systems Corp. (1999)[8], the "Sutton Trilogy"[9] of US Supreme Court Cases (1999), and Toyota v. Williams[10] (2002). Some of the restrictions imposed in the Sutton Trilogy and in Toyota v. Williams were removed by the ADA Amendments Act of 2008, discussed later.

Bragdon v. Abbott.

In Bragdon v. Abbott, the Supreme Court deemed an individual with asymptomatic HIV as disabled under the ADA. This was because HIV "substantially limits" the major life activity of reproduction. This was important because the EEOC did not mention reproduction as a major life activity. Thus, the Supreme Court's willingness to deem it a major life activity affirms the fact that the EEOC's lists of major life activities were not exhaustive. This case also clarified that a major life activity can be an internal, autonomous, activity and that there was no required link between a major life activity and the alleged discrimination[11].

The case also raised the question of if the ADA covered other asymptomatic conditions[12]. The dissent in the case argued that "taken to its logical extreme would render every individual

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[6] We do not analyze the effects of some other notable cases because they did not deal with the definition of disability. See http://adagreatlakes.com/Resources/Anniversary/25thAnniversary/ADA_Major_Cases.asp (accessed Dec. 30, 2015) for a summary of some major cases.
[7] Bragdon v. Abbott, 524 U.S. 624 (1998), decided June 25, 1998.
[8] Cleveland v. Policy Management Systems Corp. (97-1008) 526 U.S. 795 (1999) 120 F.3d 513, decided on May 24, 1999.
[9] Sutton v. United Airlines (119 S. Ct. 2139 (1999)), Murphy v. United Parcel Service, Inc. (119 S. Ct. 2133 (1999)), and Albertson's, Inc. v. Kirkingburg (119 S. Ct. 2162 (1999)), all decided on June 22, 1999.
[10] Toyota Motor Mfg., KY., Inc. v. Williams (534 U.S. 184 (2002)), decided January 8, 2002.
[11] See http://adagreatlakes.com/Resources/Anniversary/25thAnniversary/ADA_Major_Cases.asp (accessed Dec. 30, 2015) for a summary.
[12] For example, this could lead to the coverage of genetic alterations that predispose a person to a particular disease but do not currently impose an impairment. See Liu (2000) for a detailed discussion.

with a genetic marker for some debilitating disease 'disabled' here and now because of some possible future effects." (Bragdon, 524 U.S. at 661) Thus, this case was one of the few that expanded the definition of disability under the ADA.

Cleveland v. Policy Management Systems Corp.

In Cleveland v. Policy Management Systems Corp., the Supreme Court decided that receipt of Social Security Disability Insurance (SSDI) or an application for SSDI did not automatically deem the individual to no longer be covered by the ADA. At issue was if an SSDI receipt made the plaintiff no long qualify as disabled under the ADA because receipt of SSDI might suggest that she could no longer "perform the essential functions" of her job. Thus, this case expanded the definition of disability by not precluding those who had received or applied for SSDI from the protections of the ADA. However, SSDI receipt or application was not ignored: "to survive a summary judgment motion, an ADA plaintiff cannot ignore her SSDI contention that she was too disabled to work, but must explain why that contention is consistent with her ADA claim that she can perform the essential functions of her job, at least with reasonable accommodation."[13]

In addition to this expansion, this case had additional implications for the labor supply of individuals with disabilities. Individuals with disabilities who were on the margins of being in the workforce or using SSDI would no longer be as worried that an SSDI application, or SSDI receipt, would disqualify them from ADA protection. Thus this might encourage more SSDI applications.

[13] See https://www.law.cornell.edu/supct/html/97-1008.ZS.html (accessed Sept. 14, 2016).

The Sutton Trilogy.

The “Sutton Trilogy” refers to three related Supreme Court cases in 1999 that narrowed the interpretation of the definition of disability under the ADA. The Trilogy led to the exclusion of individuals with "mitigating measures" such as glasses, medication, or assistive devices from being considered disabled if the mitigating measure(s) made their condition(s) no longer "substantially limit" a major life activity. In Sutton v. United Airlines, the plaintiffs were not considered disabled because their vision was deemed to no longer “substantially limit” the major life activity of “seeing” when they used glasses. In Murphy v. United Parcel Service, the condition was blood pressure that was mitigated by medication. In Albertsons v. Kirkingburg, “mitigating measures” was even extended to “…measures undertaken, whether consciously or not, with the body’s own systems.” (527 U.S. 555 (1999) p.565-566) In this case, it was the plaintiff’s monocular vision that the Supreme Court argued that he was able to compensate for adequately on his own. This trilogy of cases had a large effect on the definition of disability under the ADA by narrowing the definition substantially.

Toyota v. Williams.

Toyota v. Williams established that an individual with a condition (in this case, carpel tunnel syndrome) had to prove that the condition prevented or restricted tasks that were of central importance to most people’s daily life. This ruling overturned the interpretation of the case by the Court of Appeals, which sided with the defendant and argued that she was substantially limited in the major life activity of performing manual tasks. The unanimous opinion of the Supreme Court was that the Court of Appeals applied a standard of major life activity that was too job-specific and, because of this, it deviated from that in Sutton v. United Airlines (Anfang 2003). The implication of this case was a strengthening of the standard to

determine if an individual with a condition is "substantially limited" through making limitations that are job-specific not eligible. Thus this case further narrowed the definition of disability under the ADA. More broadly, this case indicated that the definition of disability must "… be interpreted strictly to create a demanding standard for qualifying as disabled…"[14], setting some precedent for the ADA to be interpreted more narrowly going forward.

The ADA Amendments Act of 2008

The ADA Amendments Act of 2008 (ADAAA) became effective January 1, 2009. The ADAAA made several significant changes to the ADA, with the goal of making the ADA broader and undoing some of the restrictions placed on the ADA by the Supreme Court, particularly in the Sutton Trilogy. The ADAAA explicitly stated that the intent of Congress was for the ADA to favor broad coverage of individuals[15]. Thus the ADAAA rejects the "demanding standard" set by the Supreme Court's interpretation of the ADA in Toyota v. Williams and other similarly demanding standards in other cases (Long 2008). One way the ADAAA removed this demanding standard was by making the "substantially limits" requirement less strict by requiring a "…lower degree of functional limitation than the standard previously applied by the courts."[16] This change allows those who were on the margins of having a severe enough impairment to now be covered under the ADA.

In addition to these broad changes in the interpretation of the ADA, the ADAAA also made more specific changes to the ADA. These included:

1. Explicitly listing what were major life activities (and adding major bodily functions to this list);

[14] See https://www.law.cornell.edu/supct/html/00-1089.ZO.html (accessed Sept. 14, 2016).
[15] "The definition of disability in this Act shall be construed in favor of broad coverage of individuals under this Act, to the maximum extent permitted by the terms of this Act" ADA Amendments Act of 2008 sec. 4, § 3(4)(A).
[16] See http://www1.eeoc.gov//laws/regulations/adaaa_fact_sheet.cfm?renderforprint=1 (accessed Dec. 29, 2015)

2. Stating that episodic conditions or conditions in remission should be evaluated as if they were in their active state, overturning the Sutton Trilogy (thereby making mitigating measures no longer a consideration); and,
3. Lowering the standard to be considered disabled under the "regarded as" prong of the ADA definition of disability.

All these changes broadened who could be considered disabled under the ADA, leading more individuals to be covered.

First, the ADAAA explicitly listed what qualified as "major life activities"[17]. Appendix Table A2 provides a summary of how different activities changed in their status of being "major life activities" over time, both before and after the ADAAA. The major life activities listed in the ADAAA have significant overlap with those issued in EEOC publications. Included in this table are all the major life activities that the ADAAA explicitly mentioned, plus one that was not ("interacting with others").

What differentiates these activities that the ADAAA added is to what extent they were considered to be major life activities *before* the ADAAA. All but three activities (bending, communicating, and reading) were mentioned as major life activities by the EEOC at some point[18]. Thus for these three it is more likely that the ADAAA added these as new major life activities, but even the other major life activities were in question even if the EEOC mentioned them, as discussed earlier.

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[17] "…major life activities include, but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working."

[18] However, bending was not deemed to be a major life activity in the courts, but courts were more favorable to communicating and reading (Taylor, 2009). For bending, see Parkinson v. Anne Arundel Medical Center, Inc., 214 F. Supp. 2d 511 (D. Md. 2002), Petty v. Freightliner Corp., 123 F. Supp. 2d 979, 982 (W.D.N.C.2000). For communicating, see DeMar v. Car-Freshner Corp., 1999 WL 34973, *4 (N.D.N.Y. Jan. 14, 1999). For reading, see the earlier cited cases in footnote #.

The ADAAA also listed several major bodily functions as "major life activities"[19]. This list, like the examples of major life activities in the EEOC publications, were not meant to be exhaustive. These are presented in Appendix Table A3. The EEOC did not explicitly mention any of these as being major life activities, but these were explicitly mentioned as major life activities in the ADAAA. Thus the addition of major bodily functions is a significant expansion of coverage of the ADA. The inclusion of these functions makes it much easier for individuals with certain impairments or conditions (e.g., diabetes, cancer, heart disease) to be covered by the ADA.

Second, the ADAAA also deemed conditions that were episodic or in remission to be considered as if they were in their active state[20]. The Supreme Court emphasized in Sutton v. United Airlines and Toyota v. Williams that courts must consider the individual in their present state, rather than considering what the individual would be like if the condition were active (or more active) (Long, 2008). This led to the coverage of conditions such epilepsy, bipolar disorder, depression, claustrophobia[21].

Third, the ADAAA overturned the Sutton Trilogy of Supreme Court cases by stating that mitigating measures should no longer be considered in determining whether an impairment "substantially limits" a major life activity[22]. This increased coverage to many individuals with

[19] "a major life activity also includes the operation of a major bodily function, including but not limited to, functions of the immune system, normal cell growth, digestive, bowel, bladder, neurological, brain, respiratory, circulatory, endocrine, and reproductive functions."

[20] "An impairment that is episodic or in remission is a disability if it would substantially limit a major life activity when active." - 42 U.S.C. § 12102(4)(D).

[21] See, e.g., Walker v. Town of Greeneville, 347 F. Supp. 2d 566, 572–73 (E.D. Tenn. 2004)

[22] "The determination of whether an impairment substantially limits a major life activity shall be made without regard to the ameliorative effects of mitigating measures… This includes medication, artificial aids, assistive technology, reasonable accommodations, and ―learned behavioral or adaptive neurological modifications." - 42 U.S.C. § 12102(4)(E)(i). However, the ADAAA excludes corrective lenses (Long, 2008).

disabilities who were not deemed disabled under the ADA because of their use of prosthetic devices, medication[23], or other measures undertaken.

Fourth, the ADAAA also removed from the "regarded as" prong of the definition of disability (part (C)) the requirement that the perceived disability is regarded as being of a magnitude that would "substantially limit" a major life activity[24]. The previous "substantially limits" requirement of this prong made it even more difficult for plaintiffs to establish that they were perceived as being disabled as they had to establish that the perception was that they were substantially limited in one or more major life activities. Now plaintiffs just need to show that they were discriminated against because of a perceived impairment that is not transitory or minor[25].

State Disability Discrimination Law

Variation in laws across states.

Most states have disability discrimination laws. Beegle and Stock (2003) summarize the evolution of state disability discrimination laws prior to the ADA. They discuss if the law covered public employees, private employees, or both, if the law had a reasonable accommodations requirement, and the definition of disability under the law (classifying states by if their law covers physical disabilities, mental disabilities, or both). Jolls and Prescott (2004) also discuss these pre-existing state laws and argue that there were only negative impacts of the

[23] For example, those with epilepsy, bipolar disorder, and diabetes who took medication to manage their condition (Long, 2008).

[24] "An individual meets the requirement of ―being regarded as having such an impairment if the individual establishes that he or she has been subjected to an action prohibited under this Act because of an actual or perceived physical or mental impairment whether or not the impairment limits or is perceived to limit a major life activity." (42 U.S.C. § 12102(3)(A))

[25] Transitory was defined as "… an impairment with an actual or expected duration of [six] months or less" (42 U.S.C. § 12102(3)(B)). However, "minor" was not defined (Long, 2008).

ADA in states without pre-existing disability discrimination laws that required reasonable accommodation.

While Beegle and Stock (2003) and Jolls and Prescott (2004) note that "ADA-like" state laws existed before the ADA, Neumark, Song, and Button (forthcoming) discuss how some state disability discrimination laws are actually stronger or broader than the federal ADA (or even the ADAAA). They discuss three ways that state laws differ from the ADA: the definition of disability, larger potential damages (via higher caps or no caps on compensatory and punitive damages, relative to the caps in the ADA), and a lower minimum firm size for laws to apply (the ADA applies to firms with at least 15 employees). Here we focus on the former: how states differ in how they define disability, as this provides useful variation over time when interacted with federal variation in the ADA.

Medical definition of disability.

As discussed more in-depth in Neumark, Song, and Button (forthcoming) and Long (2004) some states use a less demanding definition of disability. These are the so-called "medical definition" states of CT, IL, NJ, NY, and WA[26]. In these states, an individual is considered disabled if their impairment is medically diagnosed, regardless of whether the impairment "substantially limits" a major life activity. Since individuals have had difficulty[27] proving that their impairments have substantially limited a major life activity, this less strict definition leads to much broader coverage.

[26] Washington added the medical definition of disability in 2007, but before then the definition was unclear (Long, 2004). We discuss this in-depth later.

[27] See Colker (1999) and Burgdorf (1997) for detailed discussions of the difficulty that plaintiffs have had under the ADA.

"Materially limits" or "limits".

Two states, California and Minnesota, have the usual requirement that an impairment must limit a major life activity, but they have a weaker standard than "substantially limits". In California, the standard is just "limits", which is a much lower standard. California's laws are discussed in greater detail below and also in Button (forthcoming). In Minnesota, the definition of disability is similar to the ADA definition, except with "materially limits" instead of "substantially limits"[28]. While these distinctions may seem trivial, case law[29] suggests they are not and that these states have a broader definition (Long, 2004; Button, forthcoming).

Variation in state laws over time.

While there is significant variation in the characteristics of state disability discrimination laws across states, there is little variation within states over time. That is, few states have amended their laws. Thus, the unique features of state laws that make them stronger or more broadly covering than the ADA were typically present when these laws were first adopted. But here we discuss some of the changes over time.

The interpretation of the definition of disability or the requirements for reasonable accommodations under state law usually followed the federal case law (Long, 2004). However, after the Sutton Trilogy of US Supreme Court cases, some states felt that these rulings diverged from the intent of their state disability discrimination laws. These states then passed laws to outright reject aspects of these cases.

[28] Minn. Stat. 363.01(12) defines disability as "…any condition or characteristic that renders a person a disabled person. A disabled person is any person who (1) has a physical, sensory, or mental impairment which materially limits one or more major life activities; (2) has a record of such an impairment; or (3) is regarded as having such an impairment."

[29] For Minnesota see Sigurdson v. Carl Bolander & Sons, Co., 532 N.W.2d 225, 228 n.3 (Minn. 1995). For California see Colmenares v. Braemer Country Club, Inc., 63 P.3d 220, 223 (Cal. 2003)

California.

California made a significant amendment to its disability discrimination law on September 30, 2000 through the passage of the Prudence Kay Poppink Act, which was effective January 1, 2001. This legal change, along with its implications on the labor market for individuals with disabilities, is discussed and evaluated in-depth in Button (forthcoming), who found that this significantly broader law increased the employment of individuals with disabilities in California.

Maine.

Maine's disability discrimination laws followed those of the ADA until Whitney v. Wal-Mart (2006 ME 3736)[30] where the Maine Supreme Judicial Court ruled that Maine's definition of disability did not require the "substantially limits" requirement of the ADA. In response to Whitney v. Wal-Mart, Maine's legislature passed a bill in 2007 (Laws 2007 c. 385, §3), effective June 21, 2007, which overturned Whitney v. Wal-Mart, thus keeping the “substantially limits” requirement as in the ADA. However, this act did expand the definition of disability in other ways. First, it ignored the Sutton Trilogy by deeming that the “substantially limits” requirement is not dependent on the use of mitigating measures. Second, individuals with certain impairments were deemed disabled under the law regardless of if their impairments "substantially limit" a major life activity[31].

[30] See https://scholar.google.com/scholar_case?case=12271024718339929818&hl=en&as_sdt=6&as_vis=1&oi=scholarr (accessed Apr. 18, 2015). This case was decided on April 11, 2006.

[31] These were: "...absent, artificial or replacement limbs hands, feet or vital organs: alcoholism; amyotrophic lateral sclerosis; bipolar disorder; blindness or abnormal vision loss; cancer; cerebral palsy; chronic obstructive pulmonary disease; Crohn's disease: cystic fibrosis; deafness or abnormal hearing loss diabetes; substantial disfigurement; epilepsy; heart disease; HIV or AIDS; kidney or renal diseases; lupus; major depressive disorder; mastectomy mental retardation; multiple sclerosis; muscular dystrophy; paralysis; Parkinson's disease; pervasive developmental disorders; rheumatoid arthritis; schizophrenia and acquired brain injury;" (MRSA §4553-A (1)(B))

Massachusetts.

While Massachusetts state law is similar to the ADA, one way it differed was by ignoring the Sutton Trilogy. In Dahill v. Police Department of Boston, 434 Mass. 233 (2001)[32], the court ruled that mitigating measures should not be considered when determining if an individual is considered disabled under Massachusetts law[33].

Maryland.

Maryland rejected the Sutton Trilogy effective December 24, 2001 when it re-codified its statute relating to disability discrimination, adding that an individual is considered disabled if they use a "remedial appliance or device".

Oregon.

In Washburn v. Columbia Forest Products, Inc., 197 Or. App. 104 (2005)[34], the Oregon Court of Appeals held that "mitigating measures" should be ignored in determining who has a disability under Oregon's disability discrimination law. This was then overturned by the Oregon Supreme Court in 2006. Thus for the short period of time from the Oregon Court of Appeals decision (decided January 12, 2005) to the Oregon Supreme Court decision (decided May 4, 2006), it could be argued that Oregon's definition of disability ignored the Sutton Trilogy.

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[32] See https://scholar.google.com/scholar_case?case=12171363873297467041&q=Dahill+v.+Police+Department+of+Boston&hl=en&as_sdt=8000006&as_vis=1 (accessed December 15, 2014). The case was decided on May 25, 2001.

[33] See Romano (2003) for a detailed discussion of this case.

[34] See https://scholar.google.com/scholar_case?q=Washburn+v.+Columbia+Forest+Products&hl=en&as_sdt=8000006&as_vis=1&case=14096218848017347712&scilh=0 (accessed December 15, 2015).

Rhode Island.

Rhode Island amended their disability discrimination law (Laws 2000, c. 507, §2) effective July 22, 2000, to ensure that mitigating measures were not considered in the determination of disability[35].

Washington.

Washington's definition of disability was vague before an amendment (Laws 2007, c. 317), effective May 4, 2007, changed Washington's definition to follow a medical diagnosis definition like Connecticut, Illinois, New Jersey, and New York. These medical diagnosis definition of disability deem individuals to be disabled if they have a diagnosed condition, thus bypassing the "substantially limits" requirement (Neumark, Song and Button, forthcoming; Long 2004). Prior to this amendment, Wash. Rev. Code §49.60.180 prohibited discrimination on the basis of physical disability, but the term was not well defined (Long, 2004). It appears that Washington's lack of definition caused courts to rely on the federal definition of disability, which included the "substantially limits" requirement. After the 2007 amendment, Washington law stated that: "`Disability' means the presence of a sensory, mental, or physical impairment that:(i) Is medically cognizable or diagnosable; or (ii) Exists as a record or history; or (iii) Is perceived to exist whether or not it exists in fact." (Wash. Rev. Code § 49.60.040 (7)(a))"

Data

Survey of Income and Program Participation (SIPP)

We primarily use the Survey of Income and Program Participation (SIPP) panels[36] as they provide two benefits: (1) a longitudinal data structure that allows us to estimate effects on

[35] The act stated that: "...whether a person has a disability shall be determined without regard to the availability or use of mitigating measures, such as reasonable accommodations, prosthetic devices, medications or auxiliary aids." (RI ST §42-87-1 (A)(1)(e))

hiring and (2) survey modules that provide variable disability and functional impairment measures beyond the conventional "work-limited" measure of disability.

The SIPP is a representative survey of American households, re-interviewing these households every four months for between two and four years, with attempts to follow and interview those who move out of a household. In addition to the core set of questions about employment, income, and program participation, every interview contains targeted sets of questions referred to as "topical modules." We use both the "Work Disability" and "Functional Limitations and Disability – Adults" topical modules for our classifications of disabled subgroups. We use individuals of either gender who are of age 21 to 61.

Creating hiring transitions.

The four-month frequency of SIPP interviews contains questions on each month since the prior interview, providing person-month data on employment status. We exploit this longitudinal nature of the SIPP to construct person-month hiring data, following the procedure outlined in Neumark, Song, and Button (forthcoming). To measure hiring we use the monthly employment status data to categorize respondents as employed, self-employed, or not working. If respondents report having a job for at least one week during the reference month, we record them as employed. If they report having a job for at least one week during the reference month and own their own business, we define them to be self- employed. If they report having no job, we define them to be not working. If they make a transition from self-employed or not working in the previous month (time t-1) to employed in the current month (time t), then we code them as hired. If they are employed at t-1 and employed at t and report that they started their job at t, then we

[36] We use the 1990, 1991, 1992, 1993, 1996, 2001, 2004, and 2008 SIPP panels in our analyses, providing both pre- and post-treatment measures of employment for respondents around the discrimination law policy changes we focus on.

code them as hired at t. We focus on the sample not employed at period t-1, and estimate models for whether these respondents were hired as of period t. We also exploit this longitudinal structure of the SIPP to create a variable for labor force entry, which is movement from being not in the labor force to being either employed or unemployed.

However, the SIPP suffers from seam bias which affects the accuracy of this transition rates. This is a tendency for individuals to report the same value within a four-month interview period. This overstates the changes in employment between waves and understates the changes within each four-month reference period of waves (Ham, Li, and Shore-Sheppard 2009). To address this seam bias, we include an indicator variable for being on a seam between two interview waves.

Disability variables in the SIPP.

Over the past two and a half decades, courts, states, and the federal government have wrestled with the issue of who is entitled to ADA protections. Amidst this evolving ADA definition of disability is the unfortunate fact that most large datasets have very limited measures of those potentially affected by these protections. The most common measure - the "work disability" or "work-limited" measure based on a reported "physical or mental health condition limiting the kind or amount of work" one can do – has been the nearly exclusive measure of disability used in economic analyses of the labor market effects of the ADA. However, this measure suffers from multiple drawbacks: it is clearly not the legislative definition of disability under the ADA, it groups together a highly heterogeneous population, and it applies to only perceived limitations in working, whereas many ADA plaintiffs specifically allege discrimination based on a condition that limits other major life activities but not work capacity. Most importantly, this disability measure could be endogenous to employment or to employer

accommodations of health conditions may remove their interference with work (Kruse and Schur, 2003; Button, forthcoming). Burkhauser et al. (2002) shows that for individuals with a reported impairment (e.g., blind in both eyes), those that report being work-limited are more likely to be employed than those who are not. This suggests that individuals who have an impairment but are sufficiently integrated into the workforce do not report a work limitation.

To address these issues, we expand the traditional "work-limited" approach in two ways: we include the "any Activity of Daily Living (ADL) or functional limitation" and "severe ADL or functional limitation" as developed in the SIPP by Kruse and Schur (2003), and we introduce a set of new, specific-condition-based metrics, based on which conditions an individual identifies as being the source of his or her work-limitation (see Wittenburg and Nelson (2006) for a thorough discussion of disability question design in the SIPP).

We follow Kruse and Schur (2003)'s methodology in defining an ADL or functional limitation. We agree with Kruse and Schur (2003) that this approach to categorizing disability is better tied to the definition of disability under the ADA, which requires a substantial limitation to a "major life activity". While major life activities were in flux and not always defined (see Appendix Table A2), many of them overlap with ADL or functional limitations, leading to a disability categorization that is more closely tied to the ADA definition.

SIPP respondents were asked to report on any difficulty with a variety of functional activities (seeing, hearing, speaking, lifting, climbing stairs, and walking) and activities of daily living (ADLs, which include activities such as dressing, preparing meals, and eating). We classify respondents who answer "yes" to having difficulty with any of these activities as having "any ADL or function limitation." For those reported to have difficulty with any activity, the survey asked whether they were able to do that activity at all (for the functional activities) or

needed help in doing the activity (for the ADLs). We classify those who responded "yes" to these additional questions as having "severe ADL or functional limitations."

These definitions allow for estimation of the effects of changes in disability discrimination laws on the work-limited and ADL/functionally limited populations independently. For example, we will be able to estimate the effect of the ADA, SCOTUS decisions, and the ADAAA on individuals reporting an ADL or functional limitation, a population for which disability discrimination laws are more specifically targeted.

In addition to these ADL/functional limitation categories, we have constructed a new specific-condition-based categorization of individuals potentially differentially affected by discrimination law. Specifically, if respondents answer yes to the work-limitation question asked in the Work Disability History Topical Module ("Do you have a physical, mental, or other health condition that limits the kind or amount of work you can do at a job or business?"), they are then asked "Which of these conditions cause your work limitation?" and are provided a list of approximately 30 common work-limiting conditions (see Appendix Table A4 for a list of these conditions across our SIPP panels).

We then group these conditions into one of four categories:

1) Salient Physical Condition: includes mobility and sensory conditions likely salient to a potential employer (e.g., missing limbs, blindness)
2) Non-Salient Physical Condition: includes medical conditions that may not be apparent to a potential employer (e.g., diabetes, high blood pressure)
3) Mental Retardation, Developmental Disability, or Cerebral Palsy
4) Other mental disorders not classified under group 3 (e.g., mental or emotional conditions)

We supplement these measures of work-limiting health conditions with the corresponding adult functional impairment Topical Module, which asks all individuals whether they use a wheelchair, walker, or cane, as well as whether they have one of four mental conditions, namely mental retardation, developmental disability, learning disability, or other mental condition.

Although previous research estimating a general effect for the entire work-limited population has found mixed results, the actual impact of the law is likely to vary substantially across subgroups of this population, especially when considering the hiring margin, where potential employers may have different knowledge of future workers' health conditions. For example, previous research has shown large wage penalties for obese workers (Baum and Ford, 2004), most notably among employers offering health insurance (Bhattacharya and Bundorf, 2009). Although the sample sizes in the SIPP prevent the estimation of condition-specific effects, this research suggests a role for separately estimating treatment effects by physical condition based on the information available to an employer.

We also separate out mental retardation/developmental disability from other mental conditions due to the systematic disability program participation differences across these groups. Autor and Duggan (2006) note that those with non-retardation, non-developmental mental disabilities were the fastest growing group of Social Security Disability Insurance beneficiaries since the early 1980s, while per-capita beneficiary rates of individuals with mental retardation or developmental disabilities has remained flat during this time period. Additionally, this latter group has traditionally been the target of supported employment programs with distinct labor market opportunities, challenges, and policy interventions (Nord et al. 2013).

Conducting these sub-analyses by either ADL/functional limitation or health condition

category allows for a further understanding of the mechanisms and margins of effect of disability discrimination laws. And, as discussed above, there has been substantial reinterpretation and definition of who should be protected by disability discrimination legislation; these sub-analyses, on the other hand, help to measure a different question, which is determining which groups of individuals are *de facto* affected by such laws.

Current Population Survey, Annual Social and Economic Supplement (CPS ASEC)

In addition to the SIPP, we use the CPS ASEC, often called the "March CPS" since this supplement to the CPS occurs primarily as an add-on to the March survey. The CPS ASEC provides the advantage of a much larger sample size, which is especially important for analyzing effects by state laws. However, the CPS ASEC has the disadvantages that the data is not longitudinal like the SIPP, so we can only analyze employment, and only one measure of disability is available – the "work limited" measure.

We use data from 1988 (the earliest available date) to 1995 to analyze the effect of the ADA, and data from 1996 to 2012 to analyze the effect of the SCOTUS cases and the ADAAA. We use the same sample restrictions as in the SIPP data: age of 21 to 61, and we include both men and women.

We use employment status in the current period to quantify employment effects. It is possible instead to use weeks worked last year (see e.g., Thompkins, 2015). However, disability is assigned with reference to the current period, and there is a non-trivial proportion of individuals who indicate that they are disabled but may not have answered that they were

disabled for the previous calendar year for which weeks worked are reported[37].

Methodology

We run separate analyses for the effects of the ADA and the subsequent changes to the ADA (SCOTUS cases, ADAAA). For both of these analyses, we consider models that both do not incorporate (difference-in-differences) and do incorporate (difference-in-difference-in-differences) how state laws have mediated the effects of these federal changes.

Effects of the Americans with Disabilities Act

A difference-in-differences methodology.

We first consider a model of the effect of the ADA that does not, for now, incorporate state variation in existing disability discrimination laws. This model is:

$$Y_{ist} = \beta_1 DIS_i + \beta_2 (ADA_t * DIS_i) + X_i\beta_3 + \mathrm{T}_{dt}\beta_4 + \theta_{st}\beta_5 + \delta_{ds}\beta_6 + Z_{dst}\beta_7 + \varepsilon_{ist} \quad [1]$$

where Y_{ist} is one of the outcome variables (hired indicator, labor force entry indicator, or employed indicator in SIPP, or just employed indicator in CPS ASEC); i indexes individuals, s indexes states, d indexes disability status, and t indexes time (monthly for SIPP, annual for CPS ASEC); DIS_i is an indicator variable for being an individual with a disability (for now, using the "work-limited" standard); X_i is a vector of individual socio-economic characteristics[38]; θ_{st} are state-by-time fixed effects; δ_{ds} are disabled-by-state fixed effects, T_{dt} are group-specific time trends (discussed below), and ε is the error term. The state-by-time fixed effects control for any

[37] Burkhauser, Houtenville, and Wittenburg (2001) compared the standard one-period disability measure in the CPS to a two-period measure, where the individual reports being disabled in two consecutive years. They find that the incidence of disability in 1996 using the one-period measure is about 8% while it is about 5% for the two-period measure (see Exhibit 3). So far fewer individuals report being disabled two years in a row, so there is some fraction of individuals who would report being disabled at the time of interview, but not for the previous calendar year.

[38] For the SIPP this is indicator variables for each age in years, sex, level of education, marital status, and race (Black, Asian, White, other race), Hispanic ancestry, metro status, and being "on-seam". For the CPS ASEC this is similar except the race indicator variables are more broad, especially for the SCOTUS/ADAAA sample, and there is no metro status or "on-seam" control.

factors that vary by state over time and affect individuals with and without disabilities similarly. The disabled-by-state fixed effects control for any time-invariant factors at the state level by disability status level, such as lower employment for individuals with disabilities in certain states. The coefficient of interest is β_2 which captures the effect of the ADA on individuals with disabilities, relative to those without disabilities. This and all other regressions are weighted using population weights and all standard errors are clustered at the state level[39] (Bertrand, Duflo, and Mullainathan, 2004).

Z_{dst} are controls that vary by disability status, state, and time. These include the state unemployment rate, which is also included interacted with DIS_i, which controls for economic shocks that may have hit different states differentially over time, and may have affected individuals with disabilities differently. Also included are controls for policies enacted in some states over time, also interacted with DIS_i. These are the weeks of extra unemployment insurance that were available (from Farber and Valletta, 2015) and tax credits for hiring individuals with disabilities (from Neumark and Grijalva, 2013).

Group-specific time trends are represented by the variable T_{dt} in the model. A fundamental issue in the literature estimating the impacts of the ADA is the issue of time trends: were outcomes trending in parallel for individuals with and without disabilities? This appears to be a real concern in this application. Houtenville and Burkhauser (2004) and Hotchkiss (2004) question the negative employment effects of the ADA estimated in Acemoglu and Angrist (2001) and DeLeire (2000), arguing that the employment decline for individuals with disabilities

[39] To the extent that individuals are not nested within state, there is also serial correlation within individual for the SIPP data when hiring is used as the outcome. This occurs for those individuals that move to a new state. This occurs infrequently (5% of the time), such that standard errors with multi-way clustering (individual and state) are very similar from those just clustered on state.

after the ADA was due to decreasing labor force participation for other reasons, a trend that was apparent even before the ADA. Thus, this suggests that time trends should be included. A model with linear time trends is also more appealing because it relies on a weaker assumption ("Parallel Growth") than the model without these trends ("Parallel Paths") (Mora and Reggio 2013). However, including time trends when there are no differential trends decreases precision by removing a significant amount of treatment variation. Including time trends can also attenuate estimates if treatment effects occur, at least in part, as an increase in the growth rate (e.g., employment growth rate) rather than simple an increase in levels (e.g., employment level jump) (Meer and West 2016). For these reasons, we consider regressions with and without group-specific time trends. At a minimum we always estimate regressions with and without group-specific linear trends, but in some cases and we explore additional plausible time trend specifications (quadratic time trends, state-by-disabled specific linear trends).

Effects by disability type.

We exploit the more detailed disability measures that we generated using the SIPP data to measure effects of the ADA by disability type. In addition to estimating Equation [1] using the work-limited definition of disability, we explore two other sets of disability designations. First we follow Kruse and Schur (2003) and estimate the effects of the ADA on two populations: those with any ADL or functional limitation and those with a severe ADL or functional limitation.

$$Y_{ist} = \beta_1(ADA_t * anyADL_i) + \beta_2(ADA_t * severeADL_i) + X_i\beta_3 + \mathrm{T}_{dt}\beta_4 + \theta_{st}\beta_5 + \delta_{ds}\beta_6 + Z_{dst}\beta_7 + \varepsilon_{ist} \quad [2]$$

Where we replace the disability indicator variables (DIS_i) from Equation [1] with two different indicator variables: $anyADL_i$, corresponding to an individual reporting any ADL or functional impairment, and $severeADL_i$, corresponding to an individual reporting a severe ADL or functional impairment. The coefficient β_1 then corresponds to the effect of the ADA on the outcome variable among those reporting any ADL or functional impairment, while β_2 is the *additional* impact of the ADA if that ADL or functional impairment is severe. The overall effect of the ADA on a severely impaired individual is therefore the sum of these two coefficients. T_{dt} are group time trends that are specific to each disability status. For linear trends, this means a separate linear trend for each disability type. $\delta_{ds}$are disability type by state fixed effects.

Second, we explore a set of four types of disability conditions. We replace the disability indicator variable (DIS_i) with four different indicator variables for disability types: (1) a physical disability that is salient to employers (PHY_i^S); (2) a physical disability that is not salient (PHY_i), (3) mental retardation or developmental disability ($MRDD_i$); and, (4) any other mental disability (MEN_i). This is:

$$\begin{aligned} Y_{ist} = {} & \beta_1 PHY_i^S{}_i + \beta_2 PHY_i + \beta_3 MRDD_i + \beta_4 MEN_i + \beta_5 (ADA_t * PHY_i^S) \\ & + \beta_6 (ADA_t * PHY_i) + \beta_7 (ADA_t * MRDD_i) + \beta_8 \beta_1 (ADA_t * PHY_i^S) \\ & + \beta_2 (ADA_t * PHY_i) + \beta_3 (ADA_t * MRDD_i) + \beta_4 (ADA_t * MEN_i) \\ & + X_i \beta_9 \beta_5 + T_{dt} \beta_{10} \beta_6 + \theta_{st} \beta_{11} \beta_7 + \delta_{ds} \beta_{12} \beta_8 + Z_{dst} \beta_{13} \beta_9 + \varepsilon_{ist} \end{aligned} \quad [3]$$

Where T_{dt} are again specific to each disability status and $\delta_{ds}$are disability type by state fixed effects.

A difference-in-differences-in-differences methodology.

To quantify how the effects of the ADA were mediated by existing state laws that were in place before the ADA, we follow the approach of Jolls and Prescott (2004) and interact our $ADA_t * DIS_i$ variable in Equation [1] with indicator variables for existing state laws, as coded by Jolls and Prescott (2004) and presented in Appendix Table A1[40]. This regression is:

$$Y_{ist} = \beta_1(ADA_t * DIS_i * LP_s) + \beta_2(ADA_t * DIS_i * NP_s) + X_i\beta_3 + \mathrm{T}_{dst}\beta_4 + \theta_{st}\beta_5 + \delta_{ds}\beta_6 + \lambda_{dt}\beta_7 + Z_{dst}\beta_8 + \varepsilon_{ist} \quad [4]$$

where T_{dst} refers to disabled-by-state linear time trends, instead of disabled-specific linear time trends as in Equation [1] since the treatment group here is based off the intersection of state and disability status. λ_{dt} are disabled-by-time fixed effects which are new to this model. These capture the effect of the ADA on individuals with disabilities in "ADA-like" states. So while we run a set of regressions without time trends, the regression without time trend includes a fully flexible time trend by disability status through λ_{dt}. The coefficients of $\beta_1$and β_2 capture the effects of the ADA on individuals with disabilities in states with existing disability discrimination laws without an accommodation requirement (LP for "limited protections"), or no law (NP, "no protections"), relative to ADA-like laws (the excluded category). These laws are summarized in Appendix Table A1.

[40] We use the state laws as presented in Jolls and Prescott (2004), except we add D.C., which was not included. We confirm from Beegle and Stock (2003, p. 814) that D.C. had an "ADA-like" law prior to the ADA, and we correspondingly classify it in this group.

Effects of the U.S. Supreme Court Cases and the ADA Amendments Act

A difference-in-differences methodology.

We explore if judicial re-interpretations of the ADA by the SCOTUS affected the labor markets for individuals with disabilities. We examine the effects of the SCOTUS cases of Bragdon v. Abbott, Cleveland v. Policy Management Systems, the Sutton Trilogy, and Toyota v. Williams which either restricted or broadened the definition of disability under the ADA. We start with the model without state variation in laws, analogous to Equation [1]:

$$\begin{aligned} Y_{ist} = \; & \beta_1(DIS_i * BRAGDON_t) + \beta_2(DIS_i * SUTTON_t) + \beta_3(DIS_i * TOYOTA_t) \\ & + \beta_4(DIS_i * ADAAA_t) + X_i\beta_5 + \mathrm{T}_{dt}\beta_6 + \theta_{st}\beta_7 + \delta_{ds}\beta_8 + Z_{dst}\beta_9 \\ & + \varepsilon_{ist} \end{aligned} \qquad [5]$$

where BRAGDON is an indicator variable for after Bragdon v. Abbott (July 1998 and onwards in the SIPP data, 1999 and onwards in the CPS ASEC since the CPS ASEC primarily occurs in March), the SUTTON is an indicator variable for after the Sutton Trilogy (July 1999 and onwards, 2000 and onwards)[41], TOYOTA is an indicator variable for after the Toyota Manufacturing, KY, Inc. v. Williams (January 2002 and onwards, 2002 and onwards)[42], and ADAAA is an indicator variable for the ADA Amendments Act, (January 2009 and onwards, 2009 and onwards). The coefficients of interest are β_1 to β_4.

[41] The Cleveland case occurred the month before Sutton (May 1999). In the regressions with SIPP data we attempt to control for the month that Cleveland was active, but Sutton was not (June 1999). However, this month is missing from our data based on the timing of the waves in the SIPP. Likely the coefficient on Sutton also incorporates some effect from Cleveland. We expect the effects of Cleveland and Sutton to work in opposite directions since Cleveland is an expansion of the definition of disability while Sutton is a contraction, but we anticipate that the effect of Cleveland was very small relative to the Sutton trilogy.

[42] Since all these cases were decided after the 15th of the month, we code the law as becoming effective the following month.

And Equation [5] estimated using ADL limitations is:

$$
\begin{aligned}
Y_{ist} = \; & \beta_1(anyADL_i * BRAGDON_t) + \beta_2(anyADL_i * SUTTON_t) \\
& + \beta_3(anyADL_i * TOYOTA_t) + \beta_4(anyADL_i * ADAAA_t) \\
& + \beta_5(severeADL_i * BRAGDON_t) + \beta_6(severeADL_i * SUTTON_t) \\
& + \beta_7(severeADL_i * TOYOTA_t) + \beta_8(severeADL_i * ADAAA_t) \\
& + X_i\beta_5 + \mathrm{T}_{dt}\beta_6 + \theta_{st}\beta_7 + \delta_{ds}\beta_8 + Z_{dst}\beta_9 + \varepsilon_{ist}
\end{aligned}
\qquad [6]
$$

And Equation [5] estimated by disability type is:

$$
\begin{aligned}
Y_{ist} = \; & \beta_1\left(PHY_i^S * BRAGDON_t\right) + \beta_2(PHY_i * BRAGDON_t) \\
& + \beta_3(MRDD_i * BRAGDON_t) + \beta_4(MEN_i * BRAGDON_t) \\
& + \beta_5\left(PHY_i^S * SUTTON_t\right) + \beta_6(PHY_i * SUTTON_t) \\
& + \beta_7(MRDD_i * SUTTON_t) + \beta_8(MEN_i * SUTTON_t) \\
& + \beta_9\left(PHY_i^S * TOYOTA_t\right) + \beta_{10}(PHY_i * TOYOTA_t) \\
& + \beta_{11}(MRDD_i * TOYOTA_t) + \beta_{12}(MEN_i * TOYOTA_t) \\
& + \beta_{13}\left(PHY_i^S * TOYOTA_t\right)\left(PHY_i^S * ADAAA_t\right) \\
& + \beta_{14}(PHY_i * TOYOTA_t)(PHY_i * ADAAA_t) \\
& + \beta_{15}(MRDD_i * TOYOTA_t)(MRDD_i * ADAAA_t) \\
& + \beta_{16}(MEN_i * TOYOTA_t)(MEN_i * ADAAA_t) + X_i\beta_{17} + \mathrm{T}_{dt}\beta_{13} \\
& + \theta_{st}\beta_{14} + \delta_{ds}\beta_{15} + Z_{dst}\beta_1 + \varepsilon_{ist}
\end{aligned}
\qquad [7]
$$

Where T_{dt} in Equations [6] and [7] are again specific to each disability status.

A difference-in-difference-in-differences methodology.

There is some variance in state laws that suggests that the effects of the SCOTUS cases and the ADAAA may have differed by state. There are two reasons for this. First, six states (CA, ME, MD, MA, OR, RI) passed laws rejecting the Sutton trilogy (see Appendix Table A1), thus allowing state law to operate as though these cases did not occur. So while these court cases restricted or expanded the definition of disability, they may not have done so in states that rejected these cases as individuals could pursue their case under the unaffected state law instead. Similarly, when the ADAAA caused the Sutton trilogy to be ignored at the federal level, the effect of the ADAAA would have been smaller in states that had already rejected the Sutton trilogy under state law.

Second, a few states had a "medical definition" of disability (CT, IL, NJ, NY, and WA starting in 2007) (see Appendix Table A1) that allowed individuals to be deemed disabled under state law if they had a medical diagnosis with a condition. This medical definition by-passes the strict "substantially limited" requirement in the ADA (Long, 2004; Neumark, Song, and Button, forthcoming). In these states, the Sutton Trilogy cases that restricted the definition of disability did not do so under these state laws. Similarly, under Bragdon v. Abbott, the definition of disability was expanded to deem an individual with asymptomatic HIV as disabled, because HIV substantially limited the major life activity of reproduction. But under the medical definition of disability, diagnosis with HIV would have been sufficient to establish coverage under state disability discrimination law.

Under the Sutton Trilogy, it was deemed that individuals with "mitigating measures" were no longer deemed "substantially limited", and thus not deemed disabled, if their mitigating

measure(s) made their condition no longer "substantially limit" a major life activity. Since the medical definition states had no "substantially limits" requirement, these cases had no effect on the definition of disability under state law[43].

In Toyota v. Williams, restrictions were placed on the use of "working" as a major life activity. But again the medical definition bypasses the requirements to prove a substantial limitation to a major life activity. Thus none of these cases had an effect on the state laws that followed the medical definitions of disability.

Consider an alternative version of Equation [5] with interactions between the earlier variables and an indicator for being a state with a medical definition of disability:

$$\begin{aligned} Y_{ist} = \; & \beta_1(DIS_i * MED_s * BRAGDON_t) + \beta_2(DIS_i * MED_s * SUTTON_t) \\ & + \beta_3(DIS_i * MED_s * TOYOTA_t) + \beta_4(DIS_i * MED_s * ADAAA_t) \\ & + \beta_5(DIS_i * REJECT_{st}) + \beta_6(DIS_i * REJECT_{st} * ADAAA_t) \\ & + \beta_7(DIS_i * CA_{st}) + \beta_8(DIS_i * WA_{st}) + X_i\beta_9 + \mathrm{T}_{dst}\beta_{10} + \theta_{st}\beta_{11} \\ & + \delta_{ds}\beta_{12} + \lambda_{dt}\beta_{13} + Z_{dst}\beta_{14} + \varepsilon_{ist} \end{aligned} \qquad [8]$$

where MED_s is an indicator variable for being a state with a medical definition of disability (CT, IL, NJ, NY, and WA from May 2007 onward), $REJECT_{st}$ is an indicator variable equal to one for

[43] There is one aspect of the decision in Albertson v. Kirkingburg that is likely to stand under state law even in the medical definition states. In Albertson, the supreme court ruled that Albertsons did not have to waive safety standards for individuals with disabilities. This relates to the reasonable accommodations requirement under the ADA, and most state laws follow the federal standards and regulations with respect to reasonable accommodation (Long, 2004). But this is a minor change.

states that had rejected the Sutton Trilogy, and thus ignored mitigating measures[44], CA_{st} is an indicator variable for California after its major legislative change (January 2001 and after), and WA_{st} is an indicator variable for Washington after its major legislative change (May 2007 and after). Since this regression includes disabled-by-time fixed effects (λ_{dt}), the estimates from β_1 to β_4 reflect the effects on these legal changes in medical definition states, relative to states without the medical definition of disability. Similarly, β_5 is a DDD estimator that calculates the difference in outcomes for individuals with disabilities before and after their state rejected the Sutton trilogy, net of this before-and-after for individuals with disabilities in states that did not reject Sutton, and net of this before-and-after for individuals without disabilities in states that rejected. Since part of the effect of the ADAAA was to reject the Sutton trilogy β_6 captures the fact that the ADAAA may have had a weaker effect in states that had already rejected Sutton.

Z_{dst} includes the same controls as in the ADA analysis by state, but we also include two indicator variables for legal changes in Maine. We include an indicator for the period after the Whitney v. Walmart case, discussed above, but before the statute amendment (July 2007 to December 2007) and an indicator variable for after the statute amendment that expanded the definition of disability be rejecting Sutton and automatically covering several conditions (January 2008 and onward).

[44] California in January 2001, Maine in June 2007, Maryland in December 2001, Massachusetts in June 2001, Oregon from January 2005 to May 2006, and Rhode Island in July 2000. Since California and Maine are controlled for separately, this coefficient is only identified from variation in MD, MA, OR, and RI.

Results

Descriptive Statistics

Before showing regression results, we provide descriptive statistics for our SIPP-based ADA analysis in Table 2 and the SIPP-based SCOTUS/ADAAA analysis in Table 4. We divide the sample by respondents who are not work-limited and the three distinct methods we use to classify the population potentially affected by the ADA: those reporting a work-limitation; those reporting any or a severe ADL or functional impairment; and each of the four groups based on the work-limiting health condition in question (physical salient; physical non-salient; mental retardation/developmental disability; and other mental condition).

Table 2 shows that an individual falling into any one of these categories has a substantially lower monthly hiring rate than those who are not work-limited (6.59%), with those reporting mental retardation or a developmental disability at the lowest likelihood (1.40%), and those with other mental conditions at the highest (2.78%). With the exception of these two mental condition categories, individuals falling into any of the other disabled categories are substantially older on average than not-work-limited respondents. Although there are broadly similar rates of high school graduation, disabled individuals are somewhat less likely to have some college, and are much less likely to have completed college. They are also less likely to be married, and more likely to be black. Lastly, they are less likely to be living in a metro area. In general, individuals with work-limitations, ADL limitations, or physical work-limiting health conditions tend to be broadly similar, while those whose work-limiting health conditions differ both from these other disability categories and from each other.

Table 4 reports the corresponding descriptive statistics for our post-ADA sample for the SIPP. The same general patterns hold, with those reporting any disability generally older, with

lower education, and a lower likelihood of being married. And similar to the descriptive statistics discussed above, although these patterns also hold for those reporting other mental conditions, this last group tends to be more likely to be hired, be younger, and live in metro areas when compared to other disabled individuals.

Of particular note in Tables 2 and 4 are the respective hiring rates for each population under study. The average hiring rate from the ADA to post-ADA sample has dropped for nearly every subpopulation under study, from just under half a percentage point for those without any work-limitation (from 0.0659 to 0.0613) to nearly a full percentage point for those with severe ADL limitations and those with non-salient, physical health conditions. Unlike the other groups, however, the hiring rate for the MR/MD group has increased slightly, from 0.014 to 0.0156, highlighting the importance of separately analyzing these groups when studying differences in labor market outcomes. These differences across groups tend to be persistent, with those reporting other mental disabling health conditions being hired at consistently higher rates than the other disabled populations. But each disabled group we measure has consistently lower hiring rates than the non-work-limited population, ranging from just under a quarter of the non-work-limited rate to just over 40 percent of this rate.

Tables 3 and 5 provide means of summary statistics using CPS ASEC for the ADA sample (Table 3) and for the SCOTUS/ADAAA sample (Table 5). All means are weighted to create population-representative statistics. Individuals with disabilities ("work-limited" measure) have lower employment rates compared to individuals without disabilities: 28.7% (ADA sample) and 20.6% (SCOTUS/ADAAA), compared to 79.3% and 80.3%. This is largely due to decreased labor force participation for individuals with disabilities. As in the SIPP samples, individuals with disabilities are on average older, reflecting the increased onset of disability with age, and

are more likely to be Black, less likely to be Hispanic, are less educated, and are less likely to be married.

Regression Analyses

Effects of the Americans with Disabilities Act.

We start by presenting the estimates from Equation [1], which estimates the effects of the ADA using the work-limited measure of disability in the SIPP and the CPS ASEC. Table 6, Panel (a) presents the effects on hiring using SIPP data. Regardless of the type of group-specific time trends used (none, linear by disability status, quadratic by disability status, linear by state-by-disability status), the estimate is always negative and statistically insignificant, ranging from -0.0019 to -0.0014. The fact that this effect does not vary with time trends differs from to studies that found that estimated *employment* effects were sensitive to pre-existing trend differences between those with and without work limitations (Houtenville and Burkhauser, 2004; Hotchkiss, 2004, Button, forthcoming). Even if these estimates were statistically significant, they would only be moderate. The mean hiring rate for individuals who are work-limited over the sample is 0.0247. The largest estimate of -0.0019 would represent a 7.7 percent decrease in the hiring rate if it were statistically significant.

Table 6, Panel (b) presents estimated effects on labor force status. These match the hiring effects and are similar in magnitude, suggesting that most of the hiring transitions come from those not in the labor force. This is not surprising since a large proportion of individuals with disabilities are not in the labor force.

Table 6 presents the estimated effects on employment using both the SIPP (Panel (c)) and the CPS ASEC (Panel (d)). Here, unlike for hiring, the estimates are highly sensitive to the inclusion or exclusion of group-specific time trends. The estimated effect is quite large and

negative without time trends: -0.0126 (SIPP) and -0.0363 (CPS ASEC), statistically significant at the 1% level. But this employment effect becomes positive and insignificant after adding time trends. The sensitivity of the employment results to the inclusion of time trends reflects the arguments in Hotchkiss (2004) and Houtenville and Burkhauser (2004) that the effects of the ADA were negative only if the differential trend between those with and without disabilities is not controlled for.

These negative differential trends in employment rates for individuals with disabilities is clear in Figure 2. This figure uses CPS ASEC data to plot the difference in employment rates between individuals with and without work limitations in each year. The employment gap is centered at zero for the year 1992 (the year Title I of the ADA became effective, although it became effective a few months after CPS ASEC respondents were surveyed). The figure shows that the employment rate is declining in general, except for a curious uptick that begins after 2012 (although this Figure extends to 2015, our analysis with either data set stops at 2012).

Effects of the ADA by disability status.

We report the results from estimating Equations [2] and [3] in Table 7, wherein we separately estimate the effects of the ADA on hiring and employment by disability subgroup. In Panel (b), we estimate the effects of the ADA following Kruse and Schur (2003) separately by the presence of any ADL or functional impairment and the presence of a severe ADL or functional impairment. Consistent with Kruse and Schur (2003)'s earlier analysis, we find that those reporting any ADL limitation tended to experience an increase in the likelihood of being hired of approximately half a percentage point. When compared to the baseline likelihood of being hired of 2.5% among this population, this increase amounts to a 20% increase, a statistically significant and substantial increase.

However, this entire effect disappears if this individual's ADL or functional impairment is severe. These findings – that those with non-severe ADLs experienced a boost to their likelihood of finding a job, while those with severe ADLs did not – is consistent with a number of explanations. These including easier observation of the limitation by the potential employer, the likely greater accommodations potentially required for employment of that individual, or a lack of these accommodations being deemed "reasonable" under the ADA.

Panel (c) shows regression coefficients from Equation [3], where we estimate the effect of the ADA separately according to the four categories of work-limiting health conditions discussed above. None of these coefficients are statistically significant, mirroring the insignificant results for the work-limited measure of disability. This may be an indication that the type of medical condition was not as important a distinction within the ADA as the extent to which the condition limited ADLs or resulted in a functional impairment, as that seems to matter based on the ADL results in panel (b). These insignificant results by these four disability types could also be due to a lack of statistical power, since we split the work-limited population is into four smaller groups. However, as we conduct analyses by subsequent changes in discrimination laws by specific types of potentially disabling health conditions, these categorizations will gain importance.

Effects of the ADA by existing state laws.

Table 8, Panel (a) presents the estimated effects of the ADA on hiring, by existing state law. Similar to the average hiring results in Table 6, Panel (a) of the same table, none of the hiring estimates are statistically significant. The estimated effect for states without disability discrimination ("No Protection" – or NP) is negative – a decrease in the hiring rate of 0.0039 in

the regression with linear state-by-disability status trends, which is just over twice the negative impact on average from Panel (a). However, this effect is never statistically significant.

While the effect for NP states is negative relative to ADA-like states, the effect for states with an existing law that did not require reasonable accommodations ("Limited Protections" of LP) is positive in sign relative to ADA-like states. The estimated effect in the regression with state-by-disability status linear time trends is a 0.0036 percentage point increase in the hiring rate, which is a similar magnitude to the effect for NP, but of the opposite sign. This is surprising since one would anticipate that the effects for LP would lie between those of NP states and states with ADA-like laws. But again, none of these estimates are statistically significant. These results suggest that there is not enough evidence to conclude that existing state laws mediated the effect of the ADA.

Table 8, Panel (b) presents estimates of the effect on employment, using data from the CPS ASEC. Interestingly, the signs are reversed compared to the estimated effects on hiring: estimates for LP are negative and estimates for NP are positive. However, only one estimate is statistically significant: the estimated effect on NP states in the regression with state-by-disability status linear time trends (column (4)). This estimate is large: a 12.4 percentage point increase in employment, statistically significant at the 1% level. This suggests a massive employment increase for individuals with work-limiting disabilities in states without a disability discrimination law. While these effects appear unrealistically large, they no doubt rule out negative effects, as Jolls and Prescott (2004) argue occurred, to the extent that the assumption of state-specific trends makes sense over not having state-specific trends. Including state-specific trends requires fewer assumptions about parallel paths by state, and for this reason, we generally favor these results over those without trends.

Post-ADA Analysis

We discuss the effects of each legal change separately (Bragdon, Sutton, Toyota, ADAAA), followed by a discussion of to what extent state laws mediated the effects of these federal changes.

Effects of Bragdon v. Abbott.

The Bragdon decision expanded the definition of disability under the ADA to include conditions that substantially limited reproductive functions (in this case, HIV). Table 9, Columns (1) and (2) present the effects on hiring. The estimates are insignificant in both regressions with and without linear trends by disability status. Columns (3) and (4) present the estimated effects on labor force entry. These effects are virtually zero and are not statistically significant. Columns (5) and (6) present estimated effects on employment, using the CPS ASEC. In both the regression with and without linear time trends, the coefficient is negative and statistically significant. The effect is a 2.55 percentage point decrease in the employment rate for the regression with linear time trends (Column (6)).

Table 10, Panel (b), presents the effects using ADL limitations as the disability measure. Bragdon appears to be overall statistically insignificant and insignificant for those reporting any or severe ADLs. However, Table 12 shows that one group experienced a marginally significant increase in hiring: those reporting a work-limiting but non-salient physical health condition. This increase was a 0.42 percentage point increase in the hiring rate (or a 28.6% increase relative to the average hiring rate of 1.47% for this group). We classify the condition in question in the Bragdon case, HIV, as a physical, non-salient condition. Thus this marginally significant and positive estimate is consistent with our sub-analysis in Table 8: those most affected by the change in a broadening of a discrimination law experienced an increase in the likelihood of being

hired. Since Bragdon effectively added conditions that "substantially limit" reproductive functions to the list of conditions covered by the ADA, it may have led to some uncertainty over if other non-salient conditions, and illnesses in particular, that limit other bodily functions would be covered by the ADA (Liu, 2000).

Effects of the Sutton Trilogy.

The most notorious Supreme Court decisions affecting the scope of the ADA were the "Sutton Trilogy" of cases, which significantly narrowed the ADA's definition of disability by excluding workers whose health conditions, through the use "mitigating measures," no longer "substantially limited" a major life activity.

Table 9, Columns (1) and (2) present the effect of Sutton on hiring rates, using the work-limited disability measure. The estimate is almost identical regardless of linear time trends. The estimate with these trends is a 2.32 percentage point decrease in the hiring rate, statistically significant at the 1% level. This is a massive decrease in hiring relative to the hiring rate of the work-limited over the sample period (1.79%)[45].

These estimated effects match the effects on labor force entry as well (Columns (3) and (4)), with significantly less entry occurring after Sutton. The estimate in Column (4) indicates that labor force entry fell by 3.07 percentage points after Sutton. Many hires occur from out of non-employment, so this explains part of the decrease in labor force entry. The larger labor force exit could also suggest that some unemployed individuals became discouraged and left the labor force, or some individuals experienced employment separations and left the labor force.

[45] This large effect requires future analysis to ensure its validity, and contingent on the effect being robust, the possible mechanisms and explanations for such a large shift. This applies to the similarly large estimated effect of Toyota.

Columns (5) and (6) present effects on employment using the CPS ASEC. There appears to be no effect on employment. The estimate with linear trends (Column (6)) indicates that employment rose by 0.98 percentage points, but this is statistically insignificant because the standard error is large – 0.0093. Thus, it does not appear that the estimated effects on hiring are reflected in employment. This may be because terminations decreased after Sutton, although a contraction of disability discrimination protections would predict increased terminations. The other explanation is that it is more difficult to disentangle secular employment trend differentials by disability status from the employment effects of Sutton.

We then use our alternative measures of disability and we present results using these measures in Tables 10 and 11. The effect of the Sutton trilogy, reported across ADL impairments and health conditions in Tables 10 and 11, is a consistent and strong decrease in the likelihood of being hired. In contrast to the expanding scope of Bragdon, this narrowing led to a decrease in the employment prospects of individuals who may otherwise be covered by the ADA.

The only statistically insignificant effect occurs for those with mental retardation or developmental disabilities. This is an insignificant decrease in the hiring rate of 0.73 percentage points in the regression with linear trends by disability type (Column (2)). This insignificant result likely reflects the fact that mitigating measures are unlikely to play a role in these conditions. The estimates are all negative and statistically significant for the other conditions. For those with salient physical health conditions, this is a 0.87 percent point decrease in the hiring rate (Column (2)). This becomes a 1.76 percent point decrease for those with non-salient physical health conditions. So those with less salient conditions fared worse after Sutton.

This discrepancy could be because mitigating measures do not cause many of the salient physical conditions (see Appendix Table A4) to necessarily no longer “substantially limit” a

major life activity. For example, use of a mobility device may make the individual no longer substantially limited in their ability to walk, but they could still be substantially limited in other major life activities (e.g., standing, lifting, performing manual tasks, reaching, see Appendix Table A2). However, mitigating measures are definitely relevant to some conditions that fall into the salient, physical group (e.g., vision problems, which were under consideration in Sutton v. United Air Lines and Albertsons v. Kirkingburg, missing limbs, broken bone/fracture). So this explanation is not clear-cut since even this more granular division of disability categories nevertheless includes a substantial amount of heterogeneity.

But we would argue that mitigating measures are more relevant to more of the non-salient physical conditions. This is because "mitigating measures" includes medication, and medication could make many of the conditions no longer "substantially limit" a major life activity (e.g., arthritis, diabetes, epilepsy, heart trouble, high blood pressure, lung or respiratory trouble, stomach trouble). One case within the Sutton Trilogy, Murphy v. UPS, specifically dealt with one of these conditions – high blood pressure – and ruled that medication was a "mitigating measure" that made the petitioner no longer "substantially limited."

Finally, the largest negative effect of the Sutton Trilogy on hiring occurs for individuals with a mental condition other than mental retardation or developmental disability. Mitigating measures are unlikely to be relevant for some of these conditions (alcohol and drug abuse, learning disability) but are likely very relevant to mental or emotional conditions, which includes conditions such as ADHD, depression, and bipolar disorder (Wittenburg and Nelson 2006). Although the precise mechanism for the Sutton Trilogy's decisions impact on hiring for this group is, therefore, unclear, the estimated effect is large, suggesting an avenue for future research in how discrimination laws affect the diverse population included in this group.

Effects of Toyota v. Williams.

In the Toyota case, SCOTUS restricted the definition of disability by excluding those who were substantially limited in their ability to perform manual tasks that were tied to the job, but not necessarily limited in their ability to do activities of "central importance to most people's daily lives." And more broadly, this case determined that the ADA must be "interpreted strictly to create a demanding standard for qualifying as disabled"[46]. Table 9, Columns (1) and (2) show positive effects on hiring, using the work-limited measure. The regression with linear trends (Column (2)) suggests an increase in the hiring rate of 2.68 percentage points, statistically significant at the 1% level, with a similar effect without trends. This positive effect of a narrowing of the definition of disability is contrary the estimated effects of Sutton, which were negative. Of course, one explanation is that this case could have boosted hiring by making individuals with work-limitations less costly to hire (Acemoglu and Angrist, 2001; Bloch, 1994), but this is inconsistent with the results for Sutton. Another possible explanation stems from the Toyota case (Jan. 8, 2002) occurring soon after the Sutton Trilogy (June 22, 1999).) (two years, six months, and 18 days between the two). If the effects of the negative effects of the Sutton trilogy were temporary, then negative effect of Sutton may have dissipated during the period that Toyota was active but before the ADAAA (2002 to 2008). It is difficult to determine to what extent this occurred.

Table 9, Columns (3) and (4) present effects on labor force entry. These again match the hiring estimates, similar to how the hiring and labor force entry estimates for Sutton match each other.

[46] See https://www.law.cornell.edu/supct/html/00-1089.ZO.html (accessed Sept. 14, 2016).

Table 9, Columns (5) and (6) present employment effects using the CPS ASEC and the work-limited definition of disability. Interestingly, the employment estimates are negative. The more reliable estimate with linear trends (Column (6)) suggests a decrease in the employment rate of 1.48 percentage points, but this is only marginally significant. The apparent contradiction of an increase in the hiring rate (Columns (1) and (2)) but a decrease in the employment rate (Columns (5) and (6)) could be due to there being large existing trends in the employment rate of individuals with disabilities, relative to those without disabilities, that make it more difficult to isolate the effects on employment. In almost all cases, the hiring results are unchanged in a meaningful way when the group-specific time trends are changed, suggesting that differential trends in hiring rates by disability status are less of a problem.

Tables 10, Panel (b), presents estimates using ADL limitations. The effects for both hiring (Columns (1) and (2)) and labor force entry (Columns (3) and (4)) for any ADL limitation are similarly large and positive and match the estimates using the work-limited measure. There does not appear to be a differential effect of Sutton for if the ADL is severe.

Table 11 presents estimates using the four disability categorizations. All estimates for all disability types, for both hiring and labor force entry, and for regressions with and without linear time trends are positive and statistically significant at the 1% level. In the regression with time trends, the hiring effect estimates range from a 2.00 percent increase in the hiring rate for salient physical conditions to a 3.32 percent increase for mental retardation and developmental disability.

Effects of the ADA Amendments Act.

Finally, the ADAAA clarified and legislated Congress's stated intention for the ADA to have a broad scope of applicability, representing an expansion of the scope of the original ADA

mostly through undoing the Sutton Trilogy. Table 9, Columns (1) and (2) present the estimated effects on hiring. The estimates with and without linear trends are similar, and both indicate a large increase in the hiring rate. For the regression with linear trends, this is a 1.37 percentage point increase, statistically significant at the 1% level. This is the opposite sign of Sutton (negative), suggesting that the ADAAA removed some of the damage of Sutton and boosted hiring rates as intended. Columns (3) and (4) present the estimated effects on labor force entry rates, and these again match the hiring estimates. Columns (5) and (6) present the estimated effects on employment. The estimate changes significantly when linear time trends are included, going from a 4.19 percent decrease, statistically significant at the 1% level, to an insignificant 0.77 percent decrease after adding linear time trends.

Tables 10 and 11 present the effects of the ADAAA using our other disability measures. Like the ADA, the effect was strongest for those reporting any ADL, although unlike the much earlier law, there is still a net positive effect for those reporting a severe ADL. We see largely the same pattern of effects as the Sutton decision, but in the opposite direction. Those who enjoyed the greatest increases in hiring were those with non-salient physical conditions and other mental conditions; these individuals have often been those on the margin of being covered by the ADA when its scope is expanded or narrowed. Further, this pattern is consistent with any change in discrimination laws being able reduced by the ability of employers to continue to discriminate against saliently disabled individuals.

The Impact of State Laws on the SCOTUS Cases and the ADAAA.

Table 12 presents results that indicate to what extent state laws mediated the effects of the SCOTUS cases and the ADAAA. Columns (1) and (2) present estimated effects on hiring. All estimates are insignificant except the estimates on the interaction between the Sutton trilogy

and existing state laws with a medical definition of disability. This interaction is negative, suggesting that the Sutton trilogy was more harmful in states with a medical definition of disability. The estimates with and without trends are similar, a 0.76 percentage point decrease or a 0.82 percentage point decrease, respectively, both statistically significant at at least the 5% level. These negative estimates are contrary to our expectations, as the Sutton trilogy did not affect the broader state law. Since the broader state law was still available, it should have dampened the effect of the Sutton trilogy, leading this interaction to be of the opposite sign.

Columns (3) and (4) present the estimated effects on employment, using the CPS ASEC. The negative hiring effect for the Sutton interaction with the medical definition is somewhat matched in the employment results, as the estimate with linear state-by-disability status time trends (Column (4)) is marginally significant – a 1.82 percentage point decrease in employment. There is one other statistically significant estimate, which is for the ADAAA interacted with existing state laws with a medical definition of disability. Again, these existing state laws made the expansion of the ADA through the ADAAA less relevant, because the existing state law was already broader, broader even than the ADAAA. The estimate with state-by-disability status linear time trends (4) is negative and statistically significant at the 5% level. This estimate is a 2.71 percentage point decrease in employment[47].

Other than these negative, statistically significant effects for interactions with Sutton and the ADAAA, none of the other estimates are statistically significant, suggesting little role for state laws to mediate the effect of the federal laws.

[47] The counter-intuitive effects by existing state laws suggests that further research could probe this question to better account for state-specific factors that may affect the analysis, such as geographic variation in labor markets or state-specific economic shocks.

Discussion

In general, our estimates lean more towards showing positive effects of expansions in disability discrimination protections (negative effects of contractions), but the size, and in places even the direction, of the effect depends strongly on how disability is defined and the specific legal changes we look at.

Starting with the ADA, the overall estimate on the work-limited population shows no effect on hiring or employment, largely consistent with prior research on the topic. However, analyses estimating the impact on hiring for those with any ADL impairment shows a positive effect (but the effects are null for those with a severe impairment). These results suggest that although the ADA had no effect on the work–limited population, it did improve labor market outcomes for those with functional impairments, providing additional evidence for the Kruse and Schur (2003) argument that ADL limitations and functional impairment measures are more closely linked to the definition of disability under the ADA.

Having an ADL limitation corresponds at least loosely with having a limitation to a "major life activity," since ADL limitations and major life activities are often similar. Since the ADL measure more likely represents those newly covered by disability discrimination protections under the ADA, it is more likely to detect impacts and estimate the actual policy impact on the target population than another measure, which would be subject to more attenuation bias by including those unaffected by the legal change. The ADL limitations measure is also preferable because it avoids the endogeneity of the work-limited measure of disability to the employment situation or to job accommodations (Kruse and Schur, 2003; Button, forthcoming), a point demonstrated by Burkhauser et al. (2002). However, for policymakers who are instead concerned about the work-limited population or those with severe ADL limitations,

the ADA did not appear to affect hiring. Regardless, there is no evidence of a negative hiring effect of the ADA on any disabled population in our analysis.

The second exception to the results showing no effects of the ADA is that the employment effects are negative without group-specific time trends (a 3.63 percentage point decrease in employment for the CPS ASEC, and 1.26 percentage point decrease in employment for the SIPP). This effect vanishes when disability-specific linear time trends are added. As argued by Hotchkiss (2004) and Houtenville and Burkhauser (2004), there are differential pre-trends in employment rates by disability status that are confused with the effect of the ADA when these trends are not accounted for. This is also shown clearly in Figure 2. For this reason, our preferred specifications include these trends and we thus argue that the employment estimates realistically show no effect on employment.

To sum this evidence up, there appears to be a beneficial effect of the ADA on hiring for a specific population: those with non-severe ADL impairments. However, this effect is limited to hiring for this subpopulation; our results show no effects of the ADA using any other disability measure or using employment instead of hiring. In either case, we reject the conclusions of Acemoglu and Angrist (2001) and DeLeire (2000) that the ADA led to negative effects on employment outcomes.

Our evidence on the effects of other legal changes is less straightforward. For three of the four changes (Bragdon, Sutton, ADAAA), the hiring estimates suggest that expansions of the law are associated with either positive or no effects, and contractions are associated with either negative or no effects. Bragdon (expansion) led to no effect for all disability definitions, except for a marginally positive effect for non-salient physical conditions. The Sutton Trilogy (contraction) resulted in negative hiring effects for all disability definitions, except there is no

effect for those with mental retardation or developmental disabilities. The ADAAA was associated with increased hiring for all disability definitions except, again for mental retardation and developmental disabilities, where there was no effect.

So while this evidence for the ADA, Bragdon, Sutton, and the ADAAA leans towards showing that disability discrimination protections are associated with either no effects on hiring or on positive effects, the results from the Toyota case make this conclusion much weaker. The Toyota case (a contraction) appears to have led to increased hiring for all disability definitions. Of course, this could be the actual effect of Toyota, but it is also feasible that it captures some delayed effects of Sutton, since the Toyota case was only two years, six months, and 18 days later. We leave further analysis of this estimated boost to labor force measures after the Toyota for future study.

Consistent with the ADA evidence, the evidence across all federal legal changes points toward generally positive or no effects on hiring of broader disability discrimination laws. Additionally, many of our estimates are smaller for individuals with conditions that are more likely to be salient to potential employers. Although further analyses of these effects with a more medically detailed data set is necessary to substantiate this pattern, it is suggestive that the positive effects of expanded disability discrimination protection are mitigated by employers' continued ability to discriminate against individuals with apparent health conditions.

The employment results for Bragdon and Toyota further show the importance of defining the target disabled population when estimating labor market effects. Using the regressions with linear time trends, our preferred specification, we find no estimated employment effect for the ADA, Sutton, or the ADAAA on the work-limited population. But there are negative estimated effects for Bragdon and Toyota for this population. For Bragdon, this negative effect stands in

contrast to the effects of Bragdon on our ADL and condition groups being null or slightly positive. For Toyota, there is a large contraction for the work-limited population while all measures for the ADL and condition groups show positive effects of Toyota.

Conclusion

Recent increases in long-term federal disability programs have led to increased interest in policies aimed at improving the labor market outcomes of currently or potentially disabled individuals; disability discrimination laws are one approach used to try to improve these outcomes. However, recent measures of disability discrimination indicate that it continues to be persistent in the American workforce (Ameri et al., 2015), despite nearly 25 years of the Americans with Disabilities Act.

One explanation for the continued discriminatory barriers faced by disabled individuals in the labor market is that these disability discrimination laws have ambiguous theoretical impacts. Given that a worker with a disability is employed, they are less likely to be terminated under disability discrimination laws, since the termination could be seen (rightfully or wrongly) as discriminatory, prompting legal action (Acemoglu and Angrist 2001), limiting the frequency of job separations for disabled individuals, thereby improving employment. Further, these laws could also reduce voluntary separations, as employer-provided accommodations may allow individuals with disabilities to work longer. However, these laws could have adverse effects on hiring, since hiring an individual from a protected class imposes a cost through the possible legal costs that could be faced if the firm terminates the employee, as well as added cost of reasonable accommodations. These costs create a disincentive to hire individuals with disabilities who are covered by the law in the first place. While hiring discrimination is illegal under the ADA and similar state laws, it is more difficult to detect, enforce, and economic incentives to pursue hiring

discrimination cases are smaller because it is harder to establish a class of affected workers and damages are smaller (Bloch, 1994).

The empirical evidence of the effects of disability discrimination laws on the labor market outcomes of individuals with disabilities is very mixed. Some studies find that laws have a negative effect (DeLeire, 2000; Acemoglu and Angrist, 2001; Jolls and Prescott, 2004), others generally argue for no effects (Beegle and Stock, 2003; Houtenville and Burkhauser, 2004; Hotchkiss, 2004;), and some show a positive effects (Kruse and Schur, 2003; Button, forthcoming). However, the vast majority of these analyses (Kruse and Schur, 2003 being the exception) focus on a single change and measure the disabled population through a single question: whether an individual has a health condition that limits the type or extent of work he or she can do.

Given the lack of consensus on how disability discrimination laws affect labor market outcomes for individuals with disabilities, we probe this question further in three ways. First, we conduct a comprehensive analysis of the effects of disability discrimination laws in the United States on the labor market outcomes of individuals with disabilities, analyzing five major changes in the federal law since 1992 (the ADA, Bragdon v. Abbot, the Sutton Trilogy, Toyota v. Williams, and the ADA Amendments Act). Second, we focus on measuring the effects on hiring, rather than just employment as was done in most of the previous studies, which avoids conflating the effects of the laws with unrelated movements in and out of the labor force for other reasons (Hotchkiss, 2004; Houtenville and Burkhauser, 2004). Third, we measure the effects of these laws by using several classifications of disability. Although these classifications continue to include heterogeneous individuals, we argue they more accurately represent the

populations likely to be affected by disability discrimination laws and provide clearer estimates of the mechanisms of these laws' effects.

Our analyses of the effects of changes in discriminations laws on these groups generally suggest that expansions in the scope of these laws are associated with modest to large improvements in hiring rates, while a narrowing of the scope leads to lower hiring rates. However, we often find different results when redefining the target population by the presence and severity of an ADL limitation, or by whether the work-limiting health condition is physical, mental, salient to an employer, or not. Most notably, we find positive effects of the ADA for individuals with a non-severe limitation to an activity of daily life, but we find no effect using other measures of disability. We also find suggestive evidence that the salience of the health condition, and the resulting greater ability of employers to continue to discriminate, mitigates the hiring gains from expansions in the scope of discrimination laws. However, this finding is preliminary, and further analysis with more medically detailed data is necessary.

Additionally, there are a few exceptions to the pattern of increased disability discrimination protection leading to improved labor market outcomes that demand further investigation. Despite these caveats, our analysis is the first to comprehensively explore the major federal and state disability discrimination legal changes of the past 25 years and their effects across a range of disabled subpopulations, and we find little evidence of negative impacts on labor market outcomes of expanded protections. Instead, our results point to generally positive effects of these protections, indicating both a role for these policies in improving labor market outcomes of disabled populations as well as future study as to the exact mechanisms of these effects.

References

Acemoglu, Daron, and Joshua D. Angrist. 2001. “Consequences of Employment Protection? The Case of the Americans with Disabilities Act.” *Journal of Political Economy* 109 (5): 915–57. doi:10.1086/322836.

Adams, Scott J. 2004. “Age Discrimination Legislation and the Employment of Older Workers.” *Labour Economics* 11: 219–41. doi:10.1016/j.labeco.2003.06.001.

Ameri, Mason, Lisa Schur, Meera Adya, Scott Bentley, Patrick McKay, and Douglas Kruse. 2015. “The Disability Employment Puzzles: A Field Experiment on Employer Hiring Behavior.” *Nber*, no. December 2014: 1–70. doi:10.3386/w21560.

Anfang, Stuart a. 2003. “Toyota v. Williams: Determining Disability under the ADA.” *The Journal of the American Academy of Psychiatry and the Law* 31 (1): 97–100. http://www.ncbi.nlm.nih.gov/pubmed/12817849.

Autor, David, and Mark G. Duggan. 2006. "The growth in the social security disability rolls: a fiscal crisis unfolding." The journal of economic perspectives 20.3: 71-96.

Baldwin, Marjorie L., and Chung Choe. 2014a. “Wage Discrimination Against Workers with Sensory Disabilities.” *Industrial Relations* 53 (1): 101–24. doi:10.1111/irel.12048.

Baldwin, Marjorie L, and Chung Choe. 2014b. “Re-Examining the Models Used to Estimate Disability-Related Wage Discrimination.” *Applied Economics* 46 (10–12): 1393–1408. doi:10.1080/00036846.2013.872762.

Baum, Charles L., and William F. Ford. 2004. "The wage effects of obesity: a longitudinal study." Health Economics 13.9: 885-899.

Beegle, Kathleen, and Wendy A. Stock. 2003. “The Labor Market Effects of Disability Discrimination Laws.” *Journal of Human Resources* 38: 806–59. doi:10.3368/jhr.XXXVIII.4.806.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. 2004. “How Much Should We Trust Differences-In-Differences Estimates?” Article. *The Quarterly Journal of Economics* 119 (1). Oxford University Press: 249–75. doi:10.1162/003355304772839588.

Bhattacharya, Jay, and M. Kate Bundorf. 2009. "The incidence of the healthcare costs of obesity." Journal of health economics 28.3: 649-658.

Bloch, Farrell. 1994. *Antidiscrimination Law and Minority Employment: Recruitment Practices and Regulatory Constraints*. Chicago: University of Chicago Press.

Burgdorf, Robert L. 1997. “Substantially Limited: Protection from Disability Discrimination: The Special Treatment Model and Misconstructions of the Definition of Disability.” *Villanova Law Review* 42 (2): 409–586. doi:10.1525/sp.2007.54.1.23.

Burkhauser, Richard V., Mary C. Daly, Andrew J. Houtenville, and Nigar Nargis. 2002. "Self-Reported Work-Limitation Data: What they Can and Cannot Tell Us." *Demography*, 39: 541-555

Burkhauser, Richard V., Andrew J. Houtenville, and David C. Wittenburg. 2001. “A User Guide to Current Statistics on the Employment of People with Disabilities.”

Button, Patrick. 2016. "Expanding Employment Discrimination Protections for Individuals with Disabilities: Evidence from California" Forthcoming in *Industrial and Labor Relations Review*

Colker, Ruth. 1999. “The Americans with Disabilities Act: A Windfall for Defendants.” *Harvard Civil Rights Civil Liberties Law Review* 34: 99–162.

Cooper, Jeffrey O. 1991. “Overcoming Barriers to Employment: The Meaning of Reasonable

Accommodation and Undue Hardship in the Americans with Disabilities Act." *University of Pennsylvania Law Review* 139 (5): 1423–68.

DeLeire, Thomas. 2000. "The Wage and Employment Effects of the Americans with Disabilities Act." *Journal of Human Resources* 35 (4): 693–715. doi:10.2307/146368.

Donohue, John J. 2007. "Antidiscrimination Law." In *Handbook of Law and Economics*, edited by A. M. Polinsky and Steven Shavell, 1387–1472. Elsevier.

Donohue, John J., and James J. Heckman. 1991. "Continuous Versus Episodic Change: The Impact of Civil Rights Policy on the Economic Status of Blacks." *Journal of Economic Literature* 29 (4): 1603–43. doi:10.3386/w3894.

Equal Employment Opportunity Commission (EEOC). "EEOC Compliance Manual," Section 902.

The U.S. Equal Employment Opportunity Commission ("EEOC"). 1995. "Section 902 Definition of the Term Disability" Retrieved December 9, 2015 from http://www.lb7.uscourts.gov/documents/INND/208CV4.pdf

The U.S. Equal Employment Opportunity Commission ("EEOC"). 1997. "EEOC Enforcement Guidance on the Americans with Disabilities Act and Psychiatric Disabilities" EEOC Notice Number 915.002, Date 3-25-97. Retrieved December 9, 2015 from http://www.eeoc.gov/policy/docs/psych.html

Farber, Henry S., and Robert G. Valletta. 2015. "Do Extended Unemployment Benefits Lengthen Unemployment Spells? Evidence from Recent Cycles in the U.S. Labor Market." *Journal of Human Resources* 50 (4): 873–909.

Ham, JC, X Li, and L Shore-Sheppard. 2009. "Seam Bias , Multiple-State , Multiple-Spell Duration Models and the Employment Dynamics of Disadvantaged Women." *NBER Working Paper No. 17527* #15151. http://www.nber.org/papers/w15151.

Hotchkiss, Julie L. 2004. "A Closer Look at the Employment Impact of the Americans with Disabilities Act." *Journal of Human Resources* 39 (4): 887–911. doi:10.2139/ssrn.319970.

Houtenville, Andrew J., Debra L. Brucker, and Eric A. Lauer. 2014. "Annual Disability Statistics Compendium: 2014." Durham, NH.

Houtenville, Andrew J., and Richard V. Burkhauser. 2004. "Did the Employment of People with Disabilities Decline in the 1990s , and Was the ADA Responsible: A Replication and Robustness Check of Acemoglu and Angrist (2001)."

Jolls, Christine, and J. J. Prescott. 2004. "Disaggregating Employment Protection: The Case of Disability Discrimination." Vol. No. 10740. doi:10.3386/w10740.

Kruse, Douglas, Lisa Schur, Sean Rogers, and Mason Ameri. 2016. "Why Do Workers with Disabilities Earn Less? Occupational Job Requirements and Disability Discrimination."

Lahey, Joanna N. 2008. "State Age Protection Laws and the Age Discrimination in Employment Act." *Journal of Law and Economics* 51 (3): 433–60. doi:10.1086/589670.

Liu, Eugenia. 2000. "Bragdon v. Abbott: Extending the Americans with Disabilities Act to Asymptomatic Individuals." *Journal of Health Care Law and Policy* 3: 382–408.

Long, Alex B. 2004. "State Anti-Discrimination Law as a Model for Amending the Americans with Disabilities Act." *University of Pittsburgh Law Review* 65: 597–653. doi:10.5195/lawreview.2004.14.

———. 2008. "Introducing the New and Improved Americans with Disabilities Act: Assessing the ADA Amendments Act of 2008." *Northwestern University Law Review* 103: 217–29. doi:10.2139/ssrn.1273922.

Martell, Michael E. 2013. "Do ENDAs End Discrimination for Behaviorally Gay Men?" *Journal*

of Labor Research 34 (2): 147–69. doi:10.1007/s12122-012-9154-9.
Meer, Jonathan, and Jeremy West. 2016. “Effects of the Minimum Wage on Employment Dynamics.” Techreport. *Journal of Human Resources* 51 (2): 500–522. http://www.nber.org/papers/w19262.
Mora, Ricardo, and Iliana Reggio. 2013. “Treatment Effect Identification Using Alternative Parallel Assumptions.” *Universidad Carlos III de Madrid Working Papers* 12–33 (March 2013).
Neumark, David. 2009. “The Age Discrimination in Employment Act and the Challenge of Population Aging.” *Research on Aging* 31 (1): 41–68. doi:10.1177/0164027508324640.
Neumark, David, and Patrick Button. 2014. “Did Age Discrimination Protections Help Older Workers Weather the Great Recession?” *Journal of Policy Analysis and Management* 33 (4): 566–601. doi:10.1002/pam.
Neumark, David, and Diego Grijalva. 2013. “The Employment Effects of State Hiring Credits During and After the Great Recession.” Unpublished.
Neumark, David, and Joanne Song. 2013. “Do Stronger Age Discrimination Laws Make Social Security Reforms More Effective?” *Journal of Public Economics* 108: 1–16. doi:10.1016/j.jpubeco.2013.09.006.
Neumark, David, Joanne Song, and Patrick Button. 2016. “Does Protecting Older Workers from Discrimination Make It Harder to Get Hired? Evidence from Disability Discrimination Laws.” *Forthcoming in Research on Aging*.
Neumark, David, and Wendy A. Stock. 1999. “Age Discrimination Laws and Labor Market Efficiency.” *Journal of Political Economy* 107 (5): 1081. doi:10.1086/250091.
———. 2006. “The Labor Market Effects of Sex and Race Discrimination Laws.” *Economic Inquiry* 44 (3): 385–419. doi:10.1017/CBO9781107415324.004.
Nord, D., Leucking, R., Mank D., et al. 2013. “The state of the science of employment and economic self-sufficiency for people with intellectual and developmental disabilities.” Intellectual and Developmental Disabilities, 51, 376-384.
Romano, Kevin J. 2003. “Dahill v. Police Department of Boston: How the Massachusetts Supreme Judicial Court Provided Handicap Discrimination Protection to Half the State’s Population.” *New England Law Review* 37: 1157–94.
Schur, Lisa A. 2003. “Barriers or Opportunities? The Causes of Contingent and Part-Time Work among People with Disabilities.” *Industrial Relations* 42 (4): 589–622. doi:10.1111/1468-232X.00308.
Taylor, Barry C. 2009. “Court Interpretations of Major Life Activities Under the ADA: What Will Change After the ADA Amendments Act?”
Thompkins, Allison V. 2015. “Did the ADA Evolve into Our Ramp to Full Employment ? An Analysis of 18 Years of the Americans with Disabilities Act.” *Journal of Contemporary Management*, 13–32.
Wittenburg, David, and Sandi Nelson. 2006. "A guide to disability statistics from the survey of income and program participation." Employment and Disability Institute Collection, 1195.
Zucker, Kiren. 2003. “The Meaning of Life: Defining ‘Major Life Activities’ Under the Americans with Disabilities Act.” *Marquette Law Review* 86 (5). http://scholarship.law.marquette.edu/mulr/vol86/iss5/3.
29 C.F.R. 1630, Appendix to Part 1630.2(i). Retrieved December 9, 2015 from https://www.law.cornell.edu/cfr/text/29/part-1630/appendix-lii10

Figure 1: Timeline of Major Legal Events Affecting the Definition of Disability

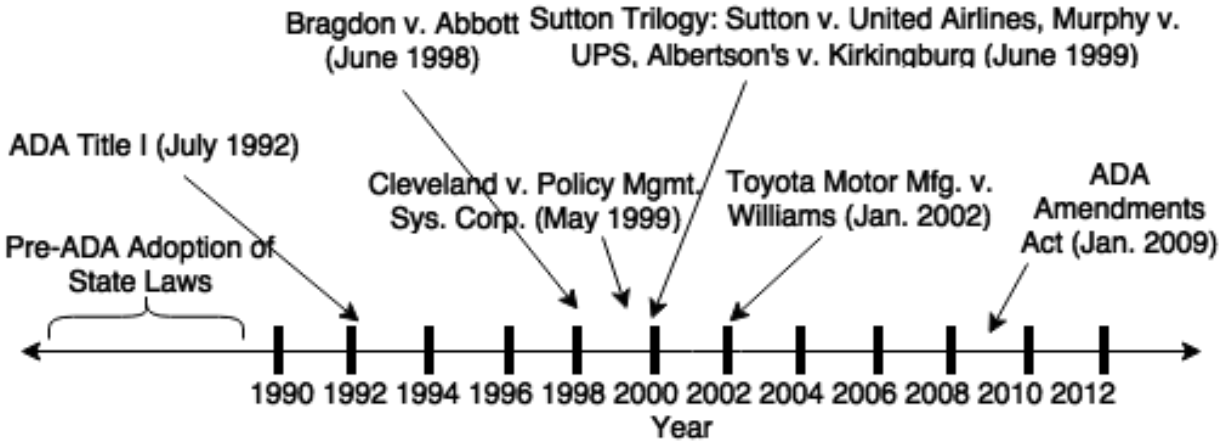
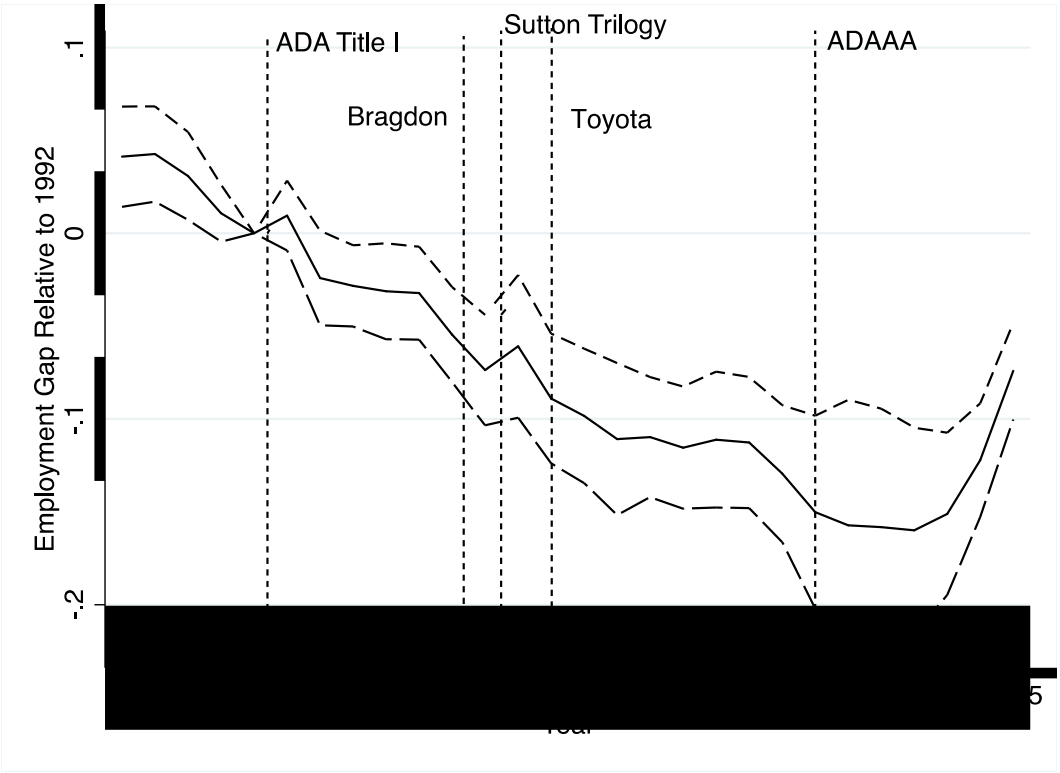


Figure 2: Employment Gap (Disabled – Non-Disabled) by Year, CPS ASEC, Work-Limited Definition



Notes: Estimates are the difference in employment rates between individuals with and without work-limitations, for each year in the CPS ASEC from 1988 to 2015. The gap estimates are re-centered at zero for the year 1992, which is right before Title I of the ADA took effect. These estimates are constructed from regressions using the same controls as in Equation 1.

Table 1: Summary of Literature: Laws Studied, Disability Measures, and Outcomes

Study	Laws Studied	Measures of Disability	Outcomes Studied and Results
DeLeire (2000)	Adoption of the ADA	Work-Limited	Employment (-), Wages (-)
Acemoglu and Angrist (2001)	Adoption of the ADA	Work-Limited	Employment (-), Earnings (-)
Beegle and Stock (2003)	Adoption of pre-ADA state laws	Work-Limited	Employment (null), Earnings (-), Labor force participation (-)
Kruse and Schur (2003)	Adoption of the ADA	Work-Limited, Limitations to ADLs	Employment (+ or - depending on measure of disability)
Houtenville and Burkhauser (2004)	Adoption of the ADA	Work-Limited; 2-period Work-Limited	Employment (- or null, depending on measure of disability)
Hotchkiss (2004)	Adoption of the ADA	Work-Limited	Employment (null)
Jolls and Prescott (2004)	Adoption of the ADA, given existing state laws	Work-Limited	Employment (- only in states without pre-existing reasonable accommodation law, otherwise null)
Thompkins (2015)	ADA, some post-ADA SCOTUS cases, and the adoption of the ADAAA (2009)	Work-Limited	Employment (-, ADA; null, SCOTUS; null, ADAAA)
Ameri et al. (2015)	ADA (post ADAAA), state laws	Resume-Correspondence study with spinal cord injury or Asperger's.	Interview requests (+ if covered by ADA, null for state laws)
Button (forthcoming)	CA's Prudence Kay Poppink Act (2001)	Work-Limited	Employment (+)

Table 2: Descriptive Statistics for the ADA Sample (SIPP)

	Not Work-Limited	Work-Limited	Any ADL Limitation	Severe ADL Limitation	Physical, Salient	Physical, Non-Salient	MR/MD Mental	Mental, Other
Hiring Rate	0.0659	0.0247	0.0247	0.0251	0.0204	0.0231	0.0140	0.0278
Labor Force Entry Rate	0.0628	0.0265	0.0260	0.0266	0.0218	0.0249	0.0168	0.0311
Employed	0.7795	0.4375	0.5065	0.5159	0.3975	0.4195	0.3164	0.4498
Age	38.23	43.12	44.56	44.48	44.01	45.23	37.99	40.19
Male	0.4863	0.4999	0.4606	0.4668	0.5348	0.4855	0.5855	0.4706
High School Only	0.3746	0.3825	0.3906	0.3927	0.3983	0.3786	0.3744	0.3620
Some College	0.2360	0.1928	0.1844	0.1827	0.1948	0.1919	0.0543	0.2259
College	0.2530	0.1089	0.1139	0.1147	0.1193	0.0995	0.0371	0.1266
Married	0.6446	0.5061	0.5837	0.5804	0.5163	0.5716	0.1883	0.4086
Widowed	0.0163	0.0392	0.0450	0.0448	0.0449	0.0450	0.0211	0.0389
Divorced	0.1269	0.2102	0.1966	0.1984	0.2023	0.2256	0.0995	0.2407
Black	0.1167	0.1493	0.1461	0.1454	0.1654	0.1442	0.1899	0.1437
Asian	0.0351	0.0183	0.0185	0.0175	0.0211	0.0197	0.0113	0.0124
Other Race	0.0063	0.0116	0.0098	0.0097	0.0092	0.0132	0.0069	0.0128
Hispanic	0.0927	0.0811	0.0907	0.0889	0.0823	0.0758	0.0959	0.0779
Metro	0.7754	0.7174	0.7007	0.6996	0.7226	0.6967	0.6974	0.7492
On-Seam	0.2517	0.2517	0.2514	0.2514	0.2517	0.2520	0.2504	0.2513
N	2,811,340	331,119	362,361	319,040	97,624	169,877	22,998	82,763

Notes: Monthly weighted averages from 1990-1993 Survey of Income and Program Participation panels. Sample limited to working-age (21-61) individuals. Hiring rates are calculated from those who are currently employed but were self-employed, unemployed, or not in the labor force in the previous month. ADLs are activities of daily living limitations include getting around inside the home, getting in and out of a bed or chair, taking a bath or shower, dressing, eating, using the toilet, using the telephone, keeping track of money and bills, preparing meals, and doing housework. Severe limitations correspond to those unable to do these activities or have assistance. Other disability categories defined according to Appendix Table A4.

Table 3: Descriptive Statistics for the ADA Sample (CPS ASEC)

	Not Work-Limited	Work-Limited
Employed	0.7932	0.2872
Unemployed	0.0472	0.0485
In Labor Force	0.8403	0.3357
Age	38.06	44.18
Male	0.4865	0.5152
White	0.8474	0.7915
Black/Negro	0.1123	0.1780
Asian or Hawaiian/ Pacific Islander	0.0299	0.0148
American Indian/ Aleut/Eskimo	0.0057	0.0112
Other Race	0.0046	0.0044
Hispanic	0.0980	0.0946
Never Married/Single	0.2204	0.2426
Married	0.6390	0.4864
Separated, Divorced, or Widowed	0.1406	0.2709
Less than High School	0.3207	0.5252
High School or GED	0.1912	0.2085
Some College	0.2773	0.1779
Post-Secondary Degree	0.2108	0.0884
N	610,900	45,827

Notes: Cross-sectional weighted averages of working-age (21-61) adults in the Current Population Survey, Annual Social and Economic Supplement, income years 1988-1995.

Table 4: Descriptive Statistics for the Post-ADA Sample (SIPP)

	Not Work-Limited	Work-Limited	Any ADL Limitation	Severe ADL Limitation	Physical, Salient	Physical, Non-Salient	MR/MD Mental	Mental Other
Hiring Rate	0.0613	0.0179	0.0172	0.0173	0.0147	0.0147	0.0156	0.0219
Labor Force Entry Rate	0.0647	0.0193	0.0186	0.0187	0.0165	0.0156	0.0175	0.0236
Employed	0.8195	0.4226	0.4674	0.4700	0.4146	0.3504	0.4266	0.4074
Age	40.25	45.54	46.96	46.97	47.31	48.19	45.47	41.41
Male	0.4881	0.4785	0.4241	0.4258	0.4578	0.4621	0.4513	0.4961
High School Only	0.2587	0.3205	0.3174	0.3154	0.3102	0.3161	0.3246	0.3181
Some College	0.3414	0.3362	0.3369	0.3423	0.3556	0.3479	0.3330	0.3288
College	0.3014	0.1232	0.1365	0.1369	0.1305	0.1024	0.1138	0.1365
Married	0.6275	0.4633	0.5154	0.5173	0.4930	0.5161	0.4362	0.3636
Widowed	0.0135	0.0376	0.0428	0.0420	0.0416	0.0489	0.0339	0.0267
Divorced	0.1275	0.2215	0.2265	0.2246	0.2306	0.2430	0.2033	0.2340
Black	0.1142	0.1669	0.1606	0.1571	0.1784	0.1675	0.1345	0.1571
Asian	0.0359	0.0384	0.0401	0.0404	0.0423	0.0357	0.0468	0.0404
Other Race	0.0282	0.0199	0.0215	0.0210	0.0195	0.0171	0.0225	0.0200
Hispanic	0.1355	0.1105	0.1186	0.1156	0.1151	0.1094	0.1209	0.0962
Metro	0.8235	0.7722	0.7694	0.7700	0.7775	0.7510	0.7728	0.7881
On-Seam	0.2500	0.2502	0.2501	0.2503	0.2509	0.2503	0.2514	0.2490
N	5,914,034	813,912	788,101	709,523	395,455	347,761	255,703	180,514

Notes: See the notes to Table 2. Monthly weighted averages from 1996-2008 Survey of Income and Program Participation panels.

Table 5: Descriptive Statistics for the Post-ADA Sample (CPS ASEC)

	Non-Disabled	Disabled
Employed	0.8031	0.2062
Unemployed	0.0468	0.0354
In Labor Force	0.8499	0.2416
Age	39.83	46.18
Male	0.4910	0.4856
White	0.8141	0.7556
Black/Negro	0.1171	0.1917
Asian or Hawaiian/ Pacific Islander	0.0516	0.0236
American Indian/ Aleut/Eskimo	0.0087	0.0154
Two or More Races	0.0084	0.0136
Hispanic	0.1425	0.1071
Never Married/Single	0.2522	0.2841
Married	0.6046	0.4228
Separated, Divorced, or Widowed	0.1431	0.2931
Less than High School	0.1102	0.2550
High School or GED	0.3038	0.3802
Some College	0.1966	0.1796
Post-Secondary Degree	0.3894	0.1852
N	1,580,573	124,443

Notes: Cross-sectional weighted averages of working-age (21-61) adults in the Current Population Survey, Annual Social and Economic Supplement, income years 1996-2012.

Table 6: Effects of the ADA, Work-Limited Definition of Disability (SIPP and CPS ASEC)

	(1)	(2)	(3)	(4)
Panel (a): Hiring (SIPP)	-0.0014	-0.0019	-0.0014	-0.0018
ADA x Work-Limited	(0.0014)	(0.0014)	(0.0013)	(0.0013)
Panel (b): Labor Force Entry (SIPP)	-0.0011	-0.0023*	-0.0014	-0.0025*
ADA x Work-Limited	(0.0013)	(0.0013)	(0.0013)	(0.0014)
Panel (c): Employment (SIPP)	-0.0126***	0.0033	…	…
ADA x Work-Limited	(0.0042)	(0.0022)		
Panel (d): Employment (CPS ASEC)				
ADA x Work-Limited	-0.0363***	0.0099	0.0188	0.0112
	(0.0054)	(0.0120)	(0.0118)	(0.0120)
Group-Specific Time Trends:	None	Linear, Disabled	Quadratic, Disabled	Linear, Disabled-by-State

Notes: SIPP and CPS ASEC samples are described in Tables 2 and 3. Weighted linear probability regression results, with each coefficient representing a distinct regression. Regressions include indicator variables for each possible value of age in years, sex, level of education, marital status, race, Hispanic ancestry, metro status (SIPP sample), and being "on-seam" (for SIPP sample), as well as state-by-time and disability status by state fixed effects. In addition, these regressions include controls for the state unemployment rate, weeks of extra unemployment insurance available (from Farber and Valletta, 2015) and tax credits for hiring individuals with disabilities (from Neumark and Grijalva, 2013), all interacted with disability status. Standard errors are clustered at the state level.
Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 7: Effects of the ADA by Disability Type (SIPP)

Outcome:	(1)	(2)	(3)	(4)	(5)	(6)
	Hiring Rate		Labor Force Entry		Employment	
Panel (a): Work-Limited						
ADA x Work-Limited	-0.0014	-0.0019	-0.0011	-0.0023*	-0.0126***	0.0033
	(0.0014)	(0.0014)	(0.0013)	(0.0013)	(0.0042)	(0.0022)
Panel (b): ADL Limitations						
ADA x Any ADL Limitation	0.0055**	0.0049**	0.0039	0.0032	0.0010	0.0052
	(0.0025)	(0.0022)	(0.0031)	(0.0032)	(0.0087)	(0.0055)
ADA x Severe ADL Limitation	-0.0046*	-0.0057**	-0.0042	-0.0043	-0.0179*	0.0006
	(0.0024)	(0.0023)	(0.0028)	(0.0032)	(0.0096)	(0.0056)
Panel (c): Disability by Type						
ADA x Physical, Salient	0.0001	-0.0014	0.0000	-0.0014	-0.0009	0.0038
	(0.0015)	(0.0016)	(0.0015)	(0.0018)	(0.0056)	(0.0033)
ADA x Physical, Non-Salient	-0.0027	-0.0019	-0.0032**	-0.0022	-0.0210***	-0.0030
	(0.0016)	(0.0016)	(0.0015)	(0.0014)	(0.0050)	(0.0035)
ADA x MR/MD Mental	0.0032	0.0011	0.0072*	0.0034	0.0203	0.0141
	(0.0033)	(0.0025)	(0.0039)	(0.0033)	(0.0148)	(0.0089)
ADA x Other Mental	0.0028	0.0008	0.0010	-0.0011	-0.0035	0.0102***
	(0.0018)	(0.0017)	(0.0022)	(0.0022)	(0.0060)	(0.0034)
Group-Specific Time Trends:	None	Linear, Disability-by-Type	None	Linear, Disability-by-Type	None	Linear, Disability-by-Type

Notes: See notes to Table 6. The fixed effects and policy controls described in the notes to Table 6 are included here, but are included interacted by disability type and not just by the binary disabled/non-disabled distinction. SIPP sample described in Table 2. ADL is limitation to Activities of Daily Living or a functional impairment. Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 8: Effects of the ADA, Work-Limited Definition of Disability, by Existing State Laws (SIPP and CPS ASEC)

	(1)	(2)
Panel (a): Hiring (SIPP)		
ADA x Work-Limited x Limited Protection State (LP)	0.0041	0.0036
	(0.0028)	(0.0024)
ADA x Work-Limited x No Law State (NP)	-0.0054	-0.0039
	(0.0076)	(0.0076)
Panel (b): Employment (CPS ASEC)		
ADA x Work-Limited x Limited Protection State (LP)	-0.0078	0.0376
	(0.0114)	(0.0233)
ADA x Work-Limited x No Law State (NP)	0.0214	0.1235***
	(0.0145)	(0.0314)
Group-Specific Time Trends:	None	Linear, Disabled-by-State

Notes: See notes to Table 6. SIPP and CPS ASEC samples described in Tables 2 and 3. Compared to the regressions in Table 6, these regressions include disability status by time fixed effects, which absorb the effect of the ADA on the excluded group: states with existing "ADA-like" laws. LP are states with an existing disability discrimination law that does not require reasonable accommodations ("limited protections" or LP). NP are states without an existing disability discrimination law ("No Protections" or NP). The categorization of existing state laws comes from Jolls and Prescott (2004) except for DC, which comes from Beegle and Stock (2003). Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 9: Effects of SCOTUS Cases and the ADAAA, Work-Limited Definition of Disability, Average Effects

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome, Survey:	Hiring, SIPP		Labor Force Entry, SIPP		Employment, CPS ASEC	
Bragdon x Work-Limited	0.0019	0.0021	-0.0003	-0.0003	-0.0329***	-0.0255***
	(0.0017)	(0.0018)	(0.0022)	(0.0022)	(0.0070)	(0.0069)
Sutton x Work-Limited	-0.0235***	-0.0232***	-0.0307***	-0.0307***	0.0010	0.0098
	(0.0026)	(0.0025)	(0.0032)	(0.0032)	(0.0089)	(0.0093)
Toyota x Work-Limited	0.0252***	0.0268***	0.0297***	0.0300***	-0.0366***	-0.0148*
	(0.0021)	(0.0023)	(0.0024)	(0.0026)	(0.0066)	(0.0086)
ADAAA x Work-Limited	0.0100***	0.0137***	0.0093**	0.0099**	-0.0419***	-0.0077
	(0.0030)	(0.0033)	(0.0037)	(0.0041)	(0.0107)	(0.0113)
Group-Specific Time Trends:	None	Linear, Disabled	None	Linear, Disabled	None	Linear, Disabled

Notes: See notes to Table 6. SIPP and CPS ASEC samples described in Tables 4 and 5. Regressions include the same controls as described in Table 6. Bragdon v. Abbott was decided on June 25, 1998; the Sutton Trilogy of cases were decided on June 22, 1999; Toyota v. Williams was decided on Jan. 8, 2002; and the ADA Amendments Act of 2008 (ADAAA) became effective on January 1, 2009. Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 10: Effects of SCOTUS Cases and the ADAAA by Disability Type (Part 1) (SIPP)

	(1)	(2)	(3)	(4)
	Hiring		Labor Force Entry	
Panel (a): Work-Limited				
Bragdon x Work-Limited	0.0019	0.0021	-0.0003	-0.0003
	(0.0017)	(0.0018)	(0.0022)	(0.0022)
Sutton x Work-Limited	-0.0235***	-0.0232***	-0.0307***	-0.0307***
	(0.0026)	(0.0025)	(0.0032)	(0.0032)
Toyota x Work-Limited	0.0252***	0.0268***	0.0297***	0.0300***
	(0.0021)	(0.0023)	(0.0024)	(0.0026)
ADAAA x Work-Limited	0.0100***	0.0137***	0.0093**	0.0099**
	(0.0030)	(0.0033)	(0.0037)	(0.0041)
Panel (b): ADL Limitations				
Bragdon x Any ADL	0.0047	0.0050	0.0011	0.0015
	(0.0031)	(0.0031)	(0.0030)	(0.0031)
Sutton x Any ADL	-0.0168***	-0.0167***	-0.0245***	-0.0243***
	(0.0041)	(0.0040)	(0.0052)	(0.0052)
Toyota x Any ADL	0.0248***	0.0262***	0.0359***	0.0377***
	(0.0041)	(0.0042)	(0.0037)	(0.0036)
ADAAA x Any ADL	0.0112**	0.0153**	0.0092*	0.0150**
	(0.0048)	(0.0065)	(0.0048)	(0.0062)
Bragdon x Severe ADL	-0.0003	-0.0004	-0.0008	-0.0011
	(0.0031)	(0.0032)	(0.0029)	(0.0029)
Sutton x Severe ADL	-0.0007	-0.0006	0.0008	0.0008
	(0.0041)	(0.0060)	(0.0067)	(0.0066)
Toyota x Severe ADL	-0.0088**	-0.0085**	-0.0156***	-0.0164***
	(0.0041)	(0.0042)	(0.0037)	(0.0039)
ADAAA x Severe ADL	-0.0031	-0.0035	-0.0021	-0.0054
	(0.0041)	(0.0062)	(0.0045)	(0.0066)
Group-Specific Time Trends:	None	Linear, Disability-by-Type	None	Linear, Disability-by-Type

Notes: See notes to Tables 6 and 7. SIPP sample described in Table 4. Regressions include the same controls as in Table 9. Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 11: Effects of SCOTUS Cases and the ADAAA on Hiring by Disability Type (Part 2) (SIPP)

	(1)	(2)	(3)	(4)
	Hiring		Labor Force Entry	
Bragdon …				
x Physical, Salient	0.0013	0.0013	-0.0017	-0.0014
	(0.0029)	(0.0029)	(0.0025)	(0.0024)
x Physical, Non-Salient	0.0041*	0.0042*	0.0016	0.0016
	(0.0022)	(0.0022)	(0.0022)	(0.0022)
x MR/MD Mental	0.0019	0.0011	-0.0001	-0.0015
	(0.0031)	(0.0033)	(0.0037)	(0.0038)
x Other Mental	-0.0015	-0.0010	0.0004	0.0008
	(0.0030)	(0.0030)	(0.0034)	(0.0035)
Sutton …				
x Physical, Salient	-0.0081***	-0.0087***	-0.0138***	-0.0146***
	(0.0028)	(0.0028)	(0.0036)	(0.0036)
x Physical, Non-Salient	-0.0177***	-0.0176***	-0.0225***	-0.0226***
	(0.0033)	(0.0033)	(0.0034)	(0.0034)
x MR/MD Mental	-0.0042	-0.0073	-0.0129**	-0.0179***
	(0.0045)	(0.0047)	(0.0056)	(0.0055)
x Other Mental	-0.0233***	-0.0228***	-0.0269***	-0.0265***
	(0.0030)	(0.0036)	(0.0044)	(0.0044)
Toyota …				
x Physical, Salient	0.0218***	0.0200***	0.0284***	0.0265***
	(0.0024)	(0.0025)	(0.0036)	(0.0038)
x Physical, Non-Salient	0.0283***	0.0292***	0.0324***	0.0322***
	(0.0025)	(0.0026)	(0.0028)	(0.0028)
x MR/MD Mental	0.0432***	0.0332***	0.0508***	0.0341***
	(0.0042)	(0.0039)	(0.0042)	(0.0042)
x Other Mental	0.0171***	0.0202***	0.0194***	0.213***
	(0.0030)	(0.0030)	(0.0030)	(0.0034)
ADAAA …				
x Physical, Salient	0.0064*	0.0030	0.0048	0.0017
	(0.0037)	(0.0052)	(0.0045)	(0.0059)
x Physical, Non-Salient	0.0094***	0.0115***	0.0089***	0.0083**
	(0.0029)	(0.0032)	(0.0032)	(0.0038)
x MR/MD Mental	-0.0076	-0.0328***	-0.0016	-0.0433***
	(0.0053)	(0.0057)	(0.0054)	(0.0074)
x Other Mental	0.0088**	0.0169***	0.0092**	0.0145***
	(0.0043)	(0.0047)	(0.0043)	(0.0048)
Group-Specific Time Trends:	None	Linear, Disability-by-Type	None	Linear, Disability-by-Type

Notes: See notes to Table 6. SIPP sample described in Table 4. Regressions include the same controls as in Table 9.
Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Table 12: Effects of SCOTUS Cases and the ADAAA, Work-Limited Definition of Disability, Effects by State Laws

	(1)	(2)	(3)	(4)
Outcome, Survey:	Hiring, SIPP		Employment, CPS ASEC	
Bragdon x Med x Work-Limited	0.0001	-0.0005	0.0216	0.0128
	(0.0027)	(0.0031)	(0.0168)	(0.0167)
Sutton x Med x Work-Limited	-0.0082**	-0.0076***	-0.0095	-0.0182*
	(0.0032)	(0.0030)	(0.0105)	(0.0095)
Toyota x Med x Work-Limited	0.0025	0.0025	0.0153	-0.0100
	(0.0040)	(0.0055)	(0.0171)	(0.0183)
ADAAA x Med x Work-Limited	0.0013	0.0026	0.0025	-0.0271**
	(0.0050)	(0.0034)	(0.0091)	(0.0112)
Reject x Work-Limited	-0.0003	0.0045	0.0044	0.0072
	(0.0022)	(0.0052)	(0.0199)	(0.0263)
Reject x ADAAA x Work-Limited	-0.0018	0.0054	0.0156	0.0050
	(0.0022)	(0.0043)	(0.0094)	(0.0119)
Group-Specific Time Trends:	None	Linear, Disabled-by-State	None	Linear, Disabled-by-State

Notes: See notes to Table 6. SIPP sample described in Table 4. Regressions include the same controls as in Table 9.
Significance levels: * p< 0.10; ** p < 0.05; *** p < 0.01

Appendix Material

Appendix Table A1: State Disability Discrimination Laws

State	State Law Before ADA (Jolls and Prescott, 2004)	Medical Definition of Disability (Neumark, Song, and Button, forthcoming)	State Law Rejected the Sutton Trilogy before the ADAAA
Alabama	No law (NP)	No law	No law
Alaska	Limited Protection (LP)	No	No
Arizona	ADA-Like (AD)	No	No
Arkansas	No law (NP)	No	No
California	Limited Protection (LP)	No ("limits" only, effective Jan. 1, 2001)	Yes (REJECT) (effective Jan. 1, 2001)
Colorado	ADA-Like (AD)	No	No
Connecticut	Limited Protection (LP)	Yes (MED)	No (Implicitly rejected via medical definition)
Delaware	ADA-Like (AD)	No	No
D.C.	ADA-Like (AD)	No	No
Florida	Limited Protection (LP)	No	No
Georgia	Limited Protection (LP)	No	No
Hawaii	Limited Protection (LP)	No	No
Idaho	ADA-Like (AD)	No	No
Illinois	Limited Protection (LP)	Yes (MED)	No (Implicitly rejected via medical definition)
Indiana	Limited Protection (LP)	No	No
Iowa	ADA-Like (AD)	No	No
Kansas	Limited Protection (LP)	No	No
Kentucky	Limited Protection (LP)	No	No
Louisiana	ADA-Like (AD)	No	No
Maine	Limited Protection (LP)	No	Yes (REJECT) (effective June 21, 2007)
Maryland	Limited Protection (LP)	No	Yes (REJECT) (effective Dec. 24, 2001)
Massachusetts	ADA-Like (AD)	No	Yes (REJECT) (effective May 25, 2001)
Michigan	Limited Protection (LP)	No	No
Minnesota	ADA-Like (AD)	No ("materially limits" only)	No
Mississippi	No law (NP)	No law	No law
Missouri	Limited Protection (LP)	No	No
Montana	Limited Protection (LP)	No	No

State	State Law Before ADA (Jolls and Prescott, 2004)	Medical Definition of Disability (Neumark, Song, and Button, forthcoming)	State Law Rejected the Sutton Trilogy before the ADAAA
Nebraska	Limited Protection (LP)	No	No
Nevada	Limited Protection (LP)	No	No
New Hampshire	Limited Protection (LP)	No	No
New Jersey	Limited Protection (LP)	Yes (MED)	No (Implicitly rejected via medical definition)
New Mexico	ADA-Like (AD)	No	No
New York	Limited Protection (LP)	Yes (MED)	No (Implicitly rejected via medical definition)
North Carolina	ADA-Like (AD)	No	No
North Dakota	Limited Protection (LP)	No	No
Ohio	Limited Protection (LP)	No	No
Oklahoma	Limited Protection (LP)	No	No
Oregon	ADA-Like (AD)	No	Yes (REJECT) (But only from Jan. 12, 2005 to May 4, 2006)
Pennsylvania	ADA-Like (AD)	No	No
Rhode Island	ADA-Like (AD)	No	Yes (REJECT) (effective July 22, 2000)
South Carolina	Limited Protection (LP)	No	No
South Dakota	Limited Protection (LP)	No	No
Tennessee	Limited Protection (LP)	No	No
Texas	Limited Protection (LP)	No	No
Utah	Limited Protection (LP)	No	No
Vermont	ADA-Like (AD)	No	No
Virginia	ADA-Like (AD)	No	No
Washington	ADA-Like (AD)	Yes (MED) (effective May 2007)	No (Implicitly rejected via medical definition)
West Virginia	Limited Protection (LP)	No	No
Wisconsin	ADA-Like (AD)	No	No
Wyoming	ADA-Like (AD)	No	No

Notes: State laws before the ADA are from Jolls and Prescott (2004), except D.C. was not used in Jolls and Prescott (2004) but it had an ADA-like law before the ADA, as shown in Beegle and Stock (2004, p. 814). Medical definition of disability is from Neumark, Song, and Button (forthcoming).

Appendix Table A2: Major Life Activities Over Time

Major Life Activity:	Defined by EEOC	Supporting Cases	Opposing Cases	Added by ADAAA
bending	No		Parkinson v. Anne Arundel Medical Center, Inc., 214 F. Supp. 2d 511 (D. Md. 2002), Petty v. Freightliner Corp., 123 F. Supp. 2d 979, 982 (W.D.N.C.2000)	Yes
breathing	Yes			Yes
caring for oneself	Yes			Yes
communicating	No	DeMar v. Car-Freshner Corp., 1999 WL 34973, *4 (N.D.N.Y. Jan. 14, 1999)		Yes
concentrating	Yes†	Emerson v. Northern States Power Co., 256 F.3d 506 (7th Cir. 2001), Battle v. United Parcel Service, 438 F.3d 856 (8th Cir. 2006)	Pack v. Kmart Corp. 166 F..3d 1300 (10th Cir. 1999)	Yes
eating	Yes¶	See Lawson v. CSX Transportation, Inc., 245 F.3d 916 (7th Cir. 2001); Fraser V. Goodale, 342 F.3d 1032 (9th Cir. 2003); Miller v. Verizon Communications, 2007 WL 542146 (D. Mass. Feb. 7, 2007)		Yes
hearing	Yes			Yes
interacting with others	Yes†	McAlindon v. County of San Diego, 192 F.3d 1226 (9th Cir. 1999), Jacques v. DiMarzio, Inc., 386 F.3d 192, 202 (2d Cir. 2004)	Soileau v. Guilford of Maine, 105 F.3d 12, 15 (1st Cir. 1997)	No
learning	Yes			Yes
lifting	Yes‡	Jacoby v. Arkema Inc., 2007 WL 2955593 (E.D. Pa. Oct. 9, 2007)	Lehman v. United Parcel Service, Inc., WL 603085 (W.D. Mo. Feb. 22, 2007) and Maples v. American Greetings Corp., 2007 WL 1089701 (E.D. Ark. Apr. 10, 2007)	Yes
performing manual tasks	Yes	Toyota v. Williams (Supported but had to establish that the tasks were of "central importance to most people's daily lives")		Yes
reaching	Yes‡			

Major Life Activity:	Defined by EEOC	Supporting Cases	Opposing Cases	Added by ADAAA
reading	No	Head v. Glacier Northwest, Inc., 413 F.3d 1053 (9th Cir. 2005); Shaffer v. Spherion Corp., 2007 WL 4557778 (D. Col. Dec. 20, 2007)	Szmaj v. AT&T, 291 F.3d 955 (7th Cir. 2002) (but "reading all day" is not a major life activity)	Yes
seeing	Yes			Yes
sitting	Yes‡			
sleeping	Yes‖	Desmond v. Mukasey, 530 F.3d 944 (D.C.Cir.2008) 30.	Brown v. Principi, 2007 WL 959375 (S.D.N.Y. Mar. 29, 2007), DeJesse v. First Judicial District of Pennsylvania, 2007 WL 4336225 (E.D. Pa. Dec. 12, 2007) 33., Boerst v. General Mills Operations Inc., 2002 WL 59637 (6th Cir. Jan. 15, 2002) (suggesting that the standard for being "substantially limited" in sleep is high)	Yes
speaking	Yes			Yes
standing	Yes‡			Yes
thinking	Yes†			Yes
walking	Yes			Yes
working	Yes	Rodriguez v. Conagra Grocery Products Co., 436 F.3d 468 (5th Cir. 2006) 59.		Yes

Notes: Unless otherwise noted by one of the following symbols, “defined by the EEOC” means that the major life activity was defined in the EEOC regulations (29 C.F.R § 1630.2(i).) † means defined by the compliance manual (EEOC,), ‡ means defined by the appendix (29 C.F.R. 1630, Appendix to Part 1630 - Interpretive Guidance on Title I of the Americans with Disabilities Act.), ¶ means defined by the EEOC Instructions for Field Offices: Analyzing ADA Charges After Supreme Court Decisions Addressing “Disability” and “Qualified” located at http://www.eeoc.gov/policy/docs/field-ada.htm, ‖ means defined by EEOC Enforcement Guidance on the ADA and Psychiatric Disabilities.

Appendix Table A3: Major Bodily Functions Over Time

Major Bodily Functions:	Defined by EEOC	Supporting Cases	Opposing Cases	Added by ADAAA
immune system	No			Yes
neurological system	No			Yes
normal cell growth	No			Yes
brain	No			Yes
digestive system	No			Yes
respiratory system	No			Yes
bowel	No			Yes
circulatory	No	Snyder v. Norfolk Southern Railway Corp., 463 F.Supp.2d 528 (E.D. Pa. Nov. 15, 2006)	Taylor v. Nimock's Oil Company, 214 F.3d 957 (8th Cir. 2000)	Yes
bladder	No	Fiscus v. Wal Mart Stores, Inc., 385 F.3d 378, 384 (3d Cir. 2004), Heiko v. Colombo Savings Bank, 434 F.3d 249 (4th Cir. 2006) (both end-stage renal disease)		Yes
endocrine functions	No			Yes
reproductive functions	No	Bragdon v. Abbott 524 U.S. 624 (1998), Lederer v. BP Prods. N. Am, 2006 WL 3486787 (S.D. N.Y. Nov. 20, 2006); Yindee v. CCH, Inc., 458 F.3d 599 (7th Cir. Aug. 11, 2006)		Yes

Notes: No major bodily functions were mentioned by the EEOC as being major life activities, although some cases argued that they were or were not. All these listed major bodily functions were added by the ADAAA.

Appendix Table A4: Conditional Disability Classifications

	Work-Limiting Conditions - Work Disability History Topical Module	Standalone Condition Questions - Adult Functional Impairment Topical Module
Salient Physical	Blindness or vision problems Broken bone/fracture Cerebral Palsy Deafness Head or spinal cord injury Missing limbs Paralysis of any kind Stiff/deformed foot/hand/finger Stroke Thyroid trouble or goiter Tumor, cyst or growth	Use a wheelchair, walker, or cane
Non-Salient Physical	AIDS Arthritis or rheumatism Back or spine problems Cancer Carpal tunnel syndrome Diabetes Epilepsy or seizures Heart trouble Hernia High blood pressure Kidney stones/kidney trouble Lung or respiratory trouble Multiple sclerosis (MS) Stomach trouble	
MR/MD Mental	Mental retardation	Mental Retardation Developmental Disability
Other Mental	Alcohol/Drug Abuse Learning disability Mental or emotional conditions	Learning Disability Other Mental Condition

Note: Condition classifications are not mutually exclusive and are assigned from most recent corresponding topical module interview.