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AMERICANS WITH DISABILITIES ACT
USING STATE-LAW VARIATION:
PRELIMINARY EVIDENCE ON
EDUCATIONAL PARTICIPATION EFFECTS

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**Identifying the Effects of the Americans with Disabilities Act Using State-Law Variation:
Preliminary Evidence on Educational Participation Effects**

Christine Jolls*

Abstract

The Americans with Disabilities Act of 1990 (ADA) broadly prohibits discrimination on the basis of disability in employment and other settings. Several empirical studies have suggested that employment levels of individuals with disabilities declined rather than increased after the ADA's passage. This paper provides a first look at whether lower disabled employment levels after the ADA might have resulted from increased participation in educational opportunities by individuals with disabilities as a rational response to the ADA's employment protections. The main empirical finding is that individuals with disabilities who were not employed in the years following legal innovation in the form of the ADA were more likely than their pre-ADA counterparts to give educational participation as their reason for not being employed. This preliminary evidence suggests the value of further study, with better education data, of the relationship between the ADA's enactment and disabled participation in educational opportunities.

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Congress passed the Americans with Disabilities Act of 1990 (ADA) with an unusual degree of political consensus and popular support. The ADA broadly prohibits discrimination on the basis of disability in employment and other settings. Given the breadth of the political support for the ADA, it was quite unexpected to find early evidence that the law actually worsened rather than improved employment prospects for individuals with disabilities (A.M. Gamboa 1995).

Subsequent papers have closely examined the question of the employment effects of the ADA, reaching varying conclusions. Thomas DeLeire (2000) and Daron Acemoglu and Joshua Angrist (2001) – some of the earliest papers in what has become a substantial literature – offer significant evidence of disabled employment declines resulting from the ADA’s enactment. Other authors, however, have questioned whether the decline in disabled employment in the years following the ADA’s enactment is actually a consequence of the law or whether instead the decline resulted from other contemporaneous factors such as changes in federal disability benefits levels or changes in health status (e.g., John Bound and Timothy Waidmann 2000; Douglas Kruse and Lisa Schur 2003).

Variation in state-level employment discrimination regimes for individuals with disabilities in the period before the ADA’s enactment provides a helpful means of cutting through the existing thicket and identifying more credibly the effects of the ADA on outcomes – in terms of both employment and (my focus here) educational participation – for individuals with

disabilities. Prior to the ADA's enactment, some states had employment discrimination regimes that closely mirrored the ADA in both requiring employers to avoid disability-based discrimination in hiring, firing, and terms and conditions of employment and requiring employers to provide "reasonable accommodations" – such as assistive technology or changes in workplace structures – to individuals with disabilities (see Table 1, column 1). Another group of states tracked the ADA in prohibiting disability-based discrimination in hiring, firing, and terms and conditions of employment, but did not require reasonable accommodations (Table 1, columns 2 and 3). A third group imposed no limits whatever on the treatment of disabled employees in the pre-ADA period (Table 1, column 3). With respect to the ADA's employment effects, this state-law variation permits inquiry into the relationship between the impact of the ADA's employment discrimination provisions on disabled employment and the degree to which these provisions were actually a legal innovation in a given state. If disabled employment effects are significantly correlated with the degree to which the employment discrimination provisions of the ADA were an innovation in a given state, then non-ADA changes around the time of the ADA's passage – such as changes federal disability benefits or health status – may not be the best explanations for declining disabled employment after the ADA.¹

In fact the degree to which the ADA's employment discrimination provisions were an innovation relative to pre-ADA state law is closely connected to the degree to which disabled employment declined just after the ADA's passage (Christine Jolls and J.J. Prescott 2004). In particular, while relative disabled employment declined significantly just after the ADA's enactment in states in which these provisions were a substantial innovation relative to the pre-ADA state-level employment discrimination regime, relative disabled employment was stable in states with ADA-like employment discrimination regimes in place prior to the ADA's

enactment. The innovation-related employment declines identified by the state-law variation, however, were concentrated in the initial years after the ADA's enactment. This finding about the timing of the ADA's employment effects suggests the empirical plausibility of the potential explanation offered by Jolls (2000:280) for disabled employment declines after the ADA: disabled individuals in states in which the ADA's employment discrimination provisions were a substantial innovation relative to pre-ADA state law may have temporarily reduced their labor supply because these provisions, by raising the returns to education for individuals with disabilities in those states, encouraged such individuals to invest in education.

This paper provides preliminary evidence on the possibility that the ADA increased participation in educational opportunities by individuals with disabilities in states in which the ADA's employment discrimination provisions were a substantial innovation compared to states in which they were not. As in the context of the ADA's employment effects, examining the ADA's impact on disabled educational participation against the backdrop of states with preexisting ADA-like employment discrimination regimes helps to control for general changes in incentives for disabled educational participation that may have occurred contemporaneously with the ADA's enactment. A limited review of evidence from the Current Population Survey (CPS) provides qualified support for the idea that movement in disabled educational participation after the ADA's enactment was positively correlated with the degree to which the ADA's employment discrimination provisions were a substantial innovation relative to pre-ADA state law.

I. Educational Investment and the Labor Market

In a conventional labor market in which the typical worker is demanded and paid in accordance with the worker's marginal revenue product of labor, taste-based discrimination against a group of workers – such as individuals with disabilities – reduces this group's wage

below the group's marginal revenue product of labor and also depresses the group's employment level (John Donohue 1986:1415-1418).² Empirically, Marjorie Baldwin and William Johnson (1994) offer evidence of large discrimination-induced wage and employment gaps between disabled and nondisabled workers. Within this framework, the effect of an employment discrimination law such as the ADA – assuming the law is fully enforceable – is to align the wages and employment levels of the disadvantaged group with those of the advantaged group (see Jolls 2000:243-51; Jolls 2001:693-94).

The implications of this analysis for disabled workers' educational decisions are fairly straightforward. Human capital theory suggests that decisions about educational investment are likely to be driven at least in part by the labor market returns to such investment. Because employment discrimination law in the above analysis increases both the wages and the employment levels of disadvantaged workers, it increases the returns to educational investment by this group. Thus, the enactment of an employment discrimination law should increase educational participation by members of the disadvantaged group. In the context of the ADA, the new regime should increase educational participation by individuals with disabilities in the states in which the ADA's employment discrimination provisions were an innovation compared to states in which they were not.

II. Data

As is true in many areas of legal regulation (e.g., David Autor, John Donohue and Stewart Schwab 2003), state-level employment discrimination regimes for individuals with disabilities in the pre-ADA period consisted of a mix of statutory and judicial law. Judicial opinions turn out to be an important source in understanding the pre-ADA state-level employment discrimination regimes because a number of states imposed obligations by judicial

decision rather than by statutory provision, and because in some cases judicial opinions substantially clarified the meaning of an ambiguous statutory framework. The state groupings used in this paper reflect not only statutory law but also all pre-ADA case law available in the Westlaw legal database. I refer to states in which the pre-ADA state-level regime mirrored the ADA's employment discrimination provisions (column 1 of Table 1) as the "control" states; to states in which the pre-ADA state-level regime contained more limited regulation of the treatment of disabled employees (columns 2 and 3 of Table 1) as the "limited protection" states; and to states in which the pre-ADA state-level regime imposed no limits whatever on the treatment of disabled employees (column 4 of Table 1) as the "no protection" states.

For the disability status of individuals as well as most other demographic and economic variables used below, I rely on the March CPS.³ The dependent variable of interest in the present work is participation in educational opportunities. I measure educational participation using responses to the CPS question about whether the reason a respondent was not working in the observation year was the pursuit of educational opportunities.⁴ Although there are various other educational participation questions in the CPS, this question seems best suited for examining the hypothesis that ADA-driven innovation relative to pre-ADA state-level employment discrimination law produced a short-run decline in disabled employment because of the positive effect of such innovation on disabled educational investment incentives.

III. Disabled Educational Participation Before and After the ADA

Table 2 presents basic statistics on the mean proportion of individuals who give educational participation as the reason for not being employed for disabled versus nondisabled individuals, before and after the ADA, across the three state groups from Table 1. While common practice in examining the effects of a changed legal regime is to examine two-year

windows before and after the change (e.g., Jonathan Gruber 1994; Autor, Donohue and Schwab 2002), the fact that there are only three states in one of the state groups here – the no-protection group – means that the number of individuals who both identify as disabled in the CPS and give educational participation as their reason for not being employed in any given year is often extremely small (less than five) in this state group. Thus, sensible examination of the ADA’s effects across the three state groups required the use of longer time windows. The empirical analysis uses data from 1987, the first observation year for which disability status is available in the CPS, through 1997, five years after the first year in which the ADA was in effect.

While the ADA went into effect in 1992, it was passed in June of 1990, and from the perspective of examining educational investment prompted by ADA-driven innovation in the legal treatment of employment discrimination the relevant “start date” is the date on which the ADA would have been viewed as a reliable basis on which to make decisions about education. Therefore, Table 2 treats the period from 1987 through 1990 as the pre-ADA period and the period from 1991 to 1997 as the post-ADA period.

The top two rows in Table 2 show the effect of the ADA’s enactment on disabled individuals in both the limited-protection state group, in which the ADA’s employment discrimination provisions were an innovation relative to pre-ADA state law, and the control state group, in which they were not. The probability of a disabled individual giving educational participation as the reason for not being employed declined in the first state group relative to the second (a state-time difference of $-.0039$), but, as Table 2 shows, a similar pattern held for nondisabled individuals, leaving no significant relative effect of ADA-driven innovation on the educational participation of individuals with disabilities. Looking still further down Table 2 to the comparison of the no-protection state group and the control group, however, a different

pattern appears. Educational participation of individuals with disabilities increased with the ADA's enactment in the no-protection group – where the ADA's employment discrimination provisions were the most significant innovation – relative to the control group; by contrast, for the nondisabled, educational participation declined with the ADA's enactment in the no-protection group relative to the control group. On balance, then, the simple mean probabilities point to an increase in relative disabled educational participation with the ADA's enactment in no-protection states compared to control states.

Table 3 moves to a regression framework, employing the straightforward difference-in-difference-in-difference (DDD) specification in equation (1) below, where Y denotes whether an individual was not employed because of participation in educational opportunities; i indexes individuals, j indexes states, and t indexes years; X denotes a vector of demographic and state-level economic characteristics; ADA denotes a dummy variable equal to 1 in the post-ADA period, DIS denotes a dummy variable equal to 1 for individuals with disabilities, LP denotes a dummy variable equal to 1 for states in the limited protection group; and NP denotes a dummy variable equal to 1 for states in the no-protection group:

$$\begin{aligned}
Y_{ijt} = & \beta_0 + \beta_1 X_{ijt} + \beta_2 ADA_t + \beta_3 DIS_i + \beta_4 LP_j \\
& + \beta_5 NP_j + \beta_6 (ADA_t \times DIS_i) + \beta_7 (ADA_t \times LP_j) \\
& + \beta_8 (ADA_t \times NP_j) + \beta_9 (DIS_i \times LP_j) \\
& + \beta_{10} (DIS_i \times NP_j) + \beta_{11} (ADA_t \times DIS_i \times LP_j) \\
& + \beta_{12} (ADA_t \times DIS_i \times NP_j) \quad (1)^5
\end{aligned}$$

The coefficients of interest in equation (1) are the coefficients on the triple interaction terms, $ADA_t \times DIS_i \times LP_j$ and $ADA_t \times DIS_i \times NP_j$. These coefficients measure the change between the pre- and post-ADA periods in disabled versus nondisabled educational participation in limited-protection and no-protection states, respectively, compared to control states.

The results in Table 3, which reflect a variety of timing assumptions, are consistent with the preliminary findings in Table 2. As the top panel of Table 3 shows, the ADA's enactment had no significant effect on disabled educational participation in the limited-protection states compared to the control states, but it had a positive effect on disabled educational participation in the no-protection states compared to the control states.⁶ In terms of magnitude, the estimated marginal effect of the ADA's enactment on disabled educational participation in no-protection states compared to control states is 0.025 in column 1, 0.024 in column 2, 0.011 in column 3, and 0.013 in column 4; these estimates reflect at least a doubling of the pre-ADA probability of disabled educational participation in no-protection states reported in Table 2 (0.0098).

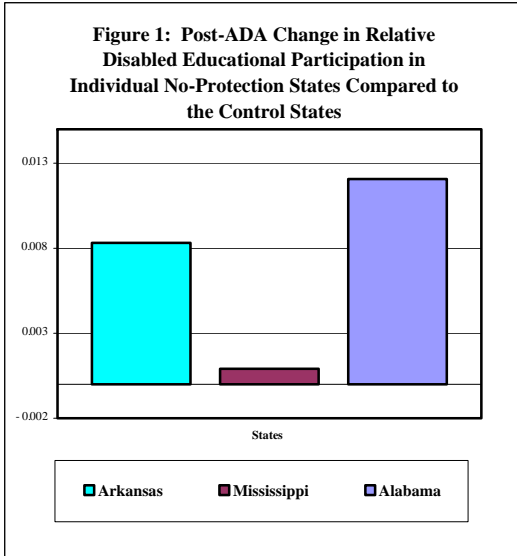
An important concern with the results reported up until now is that the no-protection group, in which I estimate that the enactment of the ADA had a significant positive effect on relative disabled educational participation compared to the control group, consists of only three states, all of which are from the South (Table 1, column 4). With respect to the small size of the group, the basic concern is that a large increase in disabled educational investment in one state – generated by some state-specific effect rather than by ADA-driven innovation – could be masking declines in disabled educational investment in the other states, which of course would make a causal link to the ADA unlikely. Figure 1 below shows, however, that relative disabled educational investment followed an upward pattern in all three of the states in the no-protection group, compared to the trend in the control group.

A remaining concern with the results for the no-protection group stems from the lack of geographic diversity within that group. The problem arises from the possibility that an unobserved shock in the southern region of the country between the pre- and post-ADA periods might, if it differentially affected disabled and nondisabled individuals, be driving the apparent

effect of the ADA's enactment on disabled educational participation in the no-protection group. A straightforward strategy to alleviate this concern about a possible "southern trend" is simply to re-estimate equation (1) on just the southern states from each of the three state groups. Results, reported in the bottom panel of Table 3, are consistent with the pattern described above.

IV. Conclusion

This paper offers preliminary evidence that disabled educational participation responded positively to the ADA's enactment in states with no pre-ADA restrictions on disability-based discrimination in employment. Intuitively, even if – as the results here suggest – disabled individuals do not alter their educational participation in response to changes in the specific nature of the employment protections afforded to them, they may respond to the more obvious switch from no protection to the employment discrimination provisions of the ADA. However, given the data limitations in the CPS, at most the empirical results presented here provide very preliminary evidence suggesting the value of further study, with better education data, of the relationship between the ADA's enactment and disabled educational participation. Such further study should also account for possible ADA-related changes in the quality or quantity of educational opportunities available to individuals with disabilities.



Notes: Each bar represents the means-based DDD estimate of the ADA’s effect on relative disabled educational participation in the named state. The means-based DDD estimate for a given state is computed by subtracting the post-ADA change in nondisabled educational participation in that state from the post-ADA change in disabled educational participation in the state; and then by subtracting from the resulting figure the comparable difference for the control state group. The difference for the control state group, using the figures in Table 2, is $.0034 - .0053 = -.0019$.

Table 1: Pre-ADA State Laws Governing Disability Discrimination in Employment

Control states	Limited-protection (LP) states		No-protection (NP) states
Ariz.	Alas.	Neb.	Alab.
Colo.	Cal.	Nev.	Ark.
Del.	Conn.	N.H.	Missi.
Idaho	Flor.	N.J.	
Iowa	Geor.	N.Y.	
Louis.	Haw.	N.D.	
Mass.	Ill.	Ohio	
Minn.	Ind.	Okl.	
N.M.	Kan.	S.C.	
N.C.	Kent.	S.D.	
Or.	Maine	Tenn.	
Penn.	Mary.	Texas	
R.I.	Mich.	Utah	
Ver.	Misso.	W.V.	
Virg.	Mont.		
Wash.			
Wisc.			
Wyo.			

Notes: Control states are states with pre-ADA employment discrimination regimes that both required employers to avoid disability-based discrimination in hiring, firing, and terms and conditions of employment and required employers to provide reasonable accommodations to individuals with disabilities. Limited-protection states are states with pre-ADA employment discrimination regimes that prohibited disability-based discrimination in hiring, firing, and terms and conditions of employment but did not require reasonable accommodations. No-protection states are states that imposed no limits whatever on the treatment of disabled employees in the pre-ADA period. For further details on the pre-ADA state-level regimes, see Jolls and Prescott (2004).

Table 2: Means Analysis by State, Time, and Disability Status (Men and Women – Ages 18-58)

(1) COMPARISON OF LIMITED-PROTECTION AND CONTROL STATES

DISABLED INDIVIDUALS	Pre-ADA	Post-ADA	Time Diff.
Limited-Protection States	0.0137 (0.0012)	0.0131 (0.0009)	-0.0006 (0.0015)
Control States	0.0102 (0.0015)	0.0135 (0.0014)	0.0034 (0.0020)
Time-State Diff.			-0.0039 (0.0025)

NONDISABLED INDIVIDUALS	Pre-ADA	Post-ADA	Time Diff.
Limited-Protection States	0.0254 (0.0004)	0.0293 (0.0003)	0.0039 (0.0005)
Control States	0.0176 (0.0005)	0.0229 (0.0005)	0.0053 (0.0007)
Time-State Diff.			-0.0014 (0.0009)
Time-State-Group Diff.			-0.0026 (0.0026)

(2) COMPARISON OF NO-PROTECTION AND CONTROL STATES

DISABLED INDIVIDUALS	Pre-ADA	Post-ADA	Time Diff.
No-Protection States	0.0098 (0.0037)	0.0157 (0.0036)	0.0059 (0.0051)
Control States	0.0102 (0.0015)	0.0135 (0.0014)	0.0034 (0.0020)
Time-State Diff.			0.0025 (0.0055)

NONDISABLED INDIVIDUALS	Pre-ADA	Post-ADA	Time Diff.
No-Protection States	0.0327 (0.0018)	0.0322 (0.0014)	-0.0006 (0.0023)
Control States	0.0176 (0.0005)	0.0229 (0.0005)	0.0053 (0.0007)
Time-State Diff.			-0.0059 (0.0024)
Time-State-Group Diff.			0.0084 (0.0060)

Notes: Means reflect the average probability of giving educational participation as a reason for not being employed. All estimates are weighted using CPS survey weights. Standard errors are in parentheses. The pre-ADA period is 1987-1990. The post-ADA period is 1991-1997. Some differences do not quite sum because of rounding. See Table 1 for state groups.

Table 3: Probit Regression Results
(Men and Women – Ages 18-58)

	(1)	(2)	(3)	(4)
<u>ALL STATES</u>				
ADA*DIS	0.09 (0.10) [0.09]	0.09 (0.10) [0.09]	0.09 (0.09) [0.09]	0.06 (0.08) [0.10]
ADA*DIS*LP	-0.12 (0.12) [0.10]	-0.12 (0.11) [0.10]	-0.09 (0.10) [0.10]	-0.07 (0.10) [0.10]
ADA*DIS*NP	0.56 (0.12) [0.23]	0.54 (0.12) [0.22]	0.32 (0.18) [0.23]	0.36 (0.17) [0.25]
State, year fixed effects?	No	Yes	Yes	Yes
<u>SOUTHERN STATES ONLY</u>				
ADA*DIS	-0.16 (0.09) [0.20]	-0.15 (0.09) [0.20]	-0.07 (0.11) [0.20]	-0.13 (0.15) [0.23]
ADA*DIS*LP	-0.19 (0.24) [0.26]	-0.19 (0.25) [0.26]	-0.04 (0.28) [0.27]	-0.05 (0.25) [0.28]
ADA*DIS*NP	0.69 (0.11) [0.29]	0.67 (0.10) [0.28]	0.40 (0.19) [0.29]	0.42 (0.18) [0.31]
State, year fixed effects?	No	Yes	Yes	Yes

Notes: The dependent variable is equal to 1 if the respondent was not employed in the observation year because of participation in educational opportunities and 0 otherwise. Robust standard errors clustered on state-disability interactions are in parentheses below coefficient estimates, and robust standard errors clustered on state-disability-year interactions are in square brackets below coefficient estimates. Columns (1) and (2) treat 1987-1989 as the pre-ADA years and 1990-1997 as the post-ADA years. Column (3) treats 1987-1990 as the pre-ADA years and 1991-1997 as the post-ADA years. Column (4) treats 1987-1990 as the pre-ADA years and 1993-1997 as the post-ADA years. In the top panel, N=822,331 in columns (1)-(3) and 664,030 in column (4). In the bottom panel, N=116,414 in columns (1)-(3) and 93,837 in column (4). The southern states are Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. All regressions employ CPS survey weights and include controls for age, race, sex, educational attainment, marital status, union membership, state disability benefit receipts, the interaction of disability and state disability benefit receipts, state unemployment rate, and the interaction of disability and state unemployment rate. See Table 1 and equation (1) for further details.

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¹ For changes in federal disability benefits or health status to explain such a pattern of employment declines, these changes would have to be correlated with pre-ADA state-level employment discrimination regimes, which seems unlikely.

² In some markets, workers may receive an “efficiency wage” rather than a wage equal to the marginal revenue product of labor, and the effects of employment discrimination law require separate analysis in such settings.

³ For state receipts of disability benefits and state unemployment rates I rely on the data series generously provided by David Autor and Mark Duggan. For an extensive discussion of various issues related to the use of the CPS disability measure, including the possibility that the ADA’s enactment could have altered the shape or size of the group responding “yes” to the CPS disability question, see Jolls and Prescott (2004).

⁴ Other choices in response to this question are retirement, inability to find work, family obligations, illness/disability, and “other”.

⁵ In specifications with state and year fixed effects, ADA_t , LP_j , and NP_j are omitted.

⁶ Both Table 2 and Table 3 use data on all respondents, not just those who are not employed. Limiting the sample to just those who are not employed does not alter the basic pattern of results reported in Table 3, although it modestly reduces the precision of the estimates.