The Extent and Effect of Employer Compliance with the Accommodations Mandates of the Americans with Disabilities Act

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Using data from several waves of the National Institute on Aging's Health and Retirement Study, the author of this article evaluates whether employers have complied with the requirements of the Americans with Disabilities Act (ADA) that they (a) accommodate workers who become disabled while in their employ and (b) not pass on the costs of that treatment in the form of lower wages. The author also examines the impact of accommodations on improved job attachment. Study results suggest that workers were accommodated slightly more after the passage of the ADA than before, though in certain specific ways only. Workers appear to have paid for their accommodations in the form of lower wages. Finally, the author shows that accommodation has been very effective at increasing job attachment for individuals with disabilities, but this effectiveness has lessened with time since the ADA's passage.

Low levels of employment are pervasive among the population of individuals with disabilities. One reason for this is that disability partly arises from physiological or psychological conditions that may lower productive capacity. Individuals with disabilities may also face inhospitable work environments that further impair their work capacity, however. Section 504 of the Rehabilitation Act of 1973 gave persons with disabilities protection against workplace discrimination. The Americans with Disabilities Act (ADA), which became law in 1990, extended that antidiscrimination protection, in part by requiring that employers offer reasonable workplace accommodations to their workers with disabilities.

The ADA's accommodations mandate has been among the more controversial aspects of the law; but despite work on how labor market experiences for individuals with disabilities have changed since the ADA's passage, no articles have examined whether the law changed the extent to which these workers are accommodated, or if the change in accommodation affected their employment.

To address these two issues in this article, I used multiple waves of data from the Health and Retirement Study (HRS), a study sponsored by the National Institute on Aging and conducted by the Institute for Social Research at the University of Michigan that surveys more than 22,000 individuals every 2 years. I first compare the receipt of accommodations by workers with disabilities before and after the passage of the ADA. This comparison permits an assessment of whether the law has been effective at generating better accommodation treatment of workers with disabilities by their employers, when measured against a baseline of their accommodation treatment before the law was passed. Second, I examine the effect of accommodations on wages to determine whether, contrary to the requirements of the ADA, the wage levels of workers who are accommodated have decreased. Third, I discuss whether accommodation has improved work attachment for individuals with disabilities.

Introduction

The ADA mandates that employers provide "reasonable accommodations" to workers who become disabled while in their employ. *Accommodations* have been defined to include items as varied as restructuring jobs, modifying work schedules, making facilities accessible, and acquiring equipment and devices. As used in the legislation, accommodations are actions taken on the *employer's* part to make the workplace more hospitable to workers with disabilities. Despite its laudable goal of improving employment outcomes for workers with disabilities (see Note 1), the law has been controversial since before its passage—chiefly because of its two other requirements. One of the two requirements is that employers must treat all workers "equally"; therefore, workers who are accommodated cannot be paid lower wages. In addition, changing the composition of a workforce to have relatively fewer workers with disabilities in an effort to avoid the mandate's effect is illegal (see Note 2).

Economists such as Rosen (1991) have argued that this mandate, combined with the equal pay requirement, leads to inefficient resource allocation. According to this argument, there are costs and benefits associated with employer-provided accommodations that vary depending on the characteristics of particular employers and individual workers with disabilities. In an unregulated market, the employers and the workers assess the magnitude of these net benefits and devise a sharing rule governing how they are split. Whatever sharing rule is adopted, accommodation occurs only when the benefits accruing from it exceed the costs associated with its provision. A federal mandate that employers offer accommodations in situations where they otherwise would not, combined with a requirement that the associated costs not be passed on to accommodated workers, should therefore result in inefficiency.

Nor has this been the sole criticism. Since before the ADA's passage, researchers such as Weaver (1991) questioned whether the requirement that employers provide accommodations unless these proved to be "unreasonable" would create an uncertain legal standard that would take years of litigation to settle. Recently, other interested parties have leveled similar criticisms, arguing that the legislation encourages frivolous and worthless lawsuits. Some individuals have wondered whether (a) the law is overly broad, bringing under its umbrella conditions that are not considered disabilities in the conventional sense of the word or (b) employers are being forced to make costly, wasteful adjustments to the work environment in order to deter lawsuits. Some persons contend that the law's main effect may have been not to encourage employment of individuals with disabilities but, rather, to make it more likely that people will call themselves disabled. Early in 2000, the U.S. Congress held hearings to explore these and other disputed aspects of the law, and many persons also fear that recent Supreme Court rulings do not augur well for the law's future (see Biskupic, 1999; Carter, 2000; "Disability Decisions," 1999).

There may be truth to some of these criticisms, but it is unarguable that, historically, persons with disabilities have been prevented from demonstrating the full measure of their potential because of ignorance, discrimination, or misunderstanding on the part of employers (see Johnson & Lambrinos, 1985). Among these misunderstandings is that a limitation or disability is something intrinsic to the person with a particular physical or psychological condition. Instead, it may be viewed as something that is imposed by society on the person, through the set of activities the person is called upon to do and the environment in which he or she is made to perform them. If modest adjustments to the workplace could right the historical wrongs and change incorrect notions about the capacities of individuals with disabilities, there might be national support for a law mandating these measures in a nation concerned with both economic efficiency and equity.

Most critics—and nearly all advocates—of the ADA assume that if employers complied with all aspects of the accommodations mandate, workers with disabilities would participate more fully in the labor force. Little evidence has emerged regarding employer compliance with the ADA, however, or, in fact, about any aspect of the accommodation experience of workers with disabilities before or after its passage. A proper assessment of the ADA requires, at a minimum, knowledge about the extent of employer compliance with the law's various requirements and how that compliance, particularly in the area of accommodations, has affected labor market outcomes for individuals with disabilities.

Only a handful of studies have examined the incidence of accommodations before the ADA was passed. The study by Collignon (1986) is a summary of the results of the Berkeley Planning Association Accommodations Study of 1982, in which several federal contractors with more than 50 employees were interviewed to determine whether they provided accommodations for their workers with disabilities and, if so, at what cost (see Note 3). In a sample of 348 men with disabilities, Burkhauser, Butler, and Kim (1992) looked at the incidence of accommodations before the ADA and examined the effect of employer-provided accommodations on how quickly the disabled leave the labor force. Neither study examined the effect of the legislation. Similarly, Daly and Bound (1996), who studied accommodation directly, using the first wave of the data set used in this article, did not include the effect of the ADA.

Some researchers have examined the impact of the ADA on labor market outcomes by examining the change in outcomes for people who have self-classified as having disabilities from the period just prior to the law's passage to an interval afterwards. Recent examples of this work include Acemoglu and Angrist (1998) and DeLeire (2000). None of these studies assessed the issue of compliance with the law's accommodations mandate, nor did these researchers look at the effect of the law on workers' accommodations experiences (see Note 4).

This article is the first to include an examination of the specific question regarding whether the ADA changed the workplace accommodations experiences of employees with disabilities. By focusing directly and mainly on accommodations, I was able to target the dimension that was a major goal of the ADA and filter out other effects that the law may have had. As previously noted, other researchers have examined how people self-classified as having disabilities fared before and after the law in terms of wages and employment rates. This type of analysis is not informative, however, about the degree to which employers have complied with the two major mandates of the legislation: that workers be accommodated and that their wages not decrease as a result of any accommodation they receive.

Empirical Strategy

The ADA mandates that workers who become disabled while employed cannot be fired because of their disability, particularly if the employer can make a reasonable accommodation that would enable the worker to still fulfill his or her job functions. If employers have actually complied with this ac-

commodations mandate, the fraction of all workers with disabilities who are accommodated by their employers at onset should be greater after the passage of the ADA than before, provided that there are at least some employees whose accommodations costs are "reasonable." The second requirement of the ADA that is of interest here is that accommodated employees should not be penalized by a reduction in wages because of the treatment they receive. Thus, compliance with the wage requirement of the ADA implies that in the post-ADA period, wages of accommodated workers should be no lower than those of their counterparts who are not receiving accommodations, all else being equal.

The extent of accommodations compliance by employers after passage of the ADA may be assessed by using the following regression:

$$A_i = \alpha_1 X_{it} + \alpha_2 T_{ADA} + \epsilon_{i1} \quad (1)$$

where α_i is a binary variable that equals 1 only if a disabled worker is accommodated by his or her employer at the time the disability occurred, X_{it} is a vector of controls, and T_{ADA} is a binary measure that indicates the amount of time after the passage of the ADA. Equation 1 could be estimated either as a linear probability or a probit model.

Estimating an equation such as Equation 1 requires individual-level data that span the time periods before and after the passage of the ADA. Only one nationally representative data set (discussed later) contains the relevant information on accommodations.

Testing whether firms have complied with the ADA's wage requirements is similarly straightforward. Restricting attention to (a) the period after passage of the law and (b) a sample of workers with disabilities, one may simply estimate regressions of the following form:

$$\omega_i = \beta_1 \Gamma_{it} + \beta_2 A_{it} + \epsilon_{i2} \quad (2)$$

where ω_i is the wage and Γ_{it} is a vector of controls. Wage compliance means that the coefficient β_2 equals 0 or at least is nonnegative. Because this regression is meant to determine if the wages of accommodated people with disabilities are less than those of nonacommodated people with disabilities, Regression Equation 2 can be estimated only for a sample of workers with disabilities.

Accurate estimates of the effect of accommodation from Equation 1 and Equation 2 are likely to be forthcoming only if more is known about people's disability status than a simple summary measure indicating whether a person self-classifies as having or not having a disability. Without more detailed information about the specific types of disabilities affecting people included in the vectors X_{it} and Γ_{it}, the estimates of α_2 and β_2 do not measure the degree to which there are accommodation and wage compliance, respectively.

The problem is that the passage of the ADA probably changed both the set of persons with disabilities placing themselves in a situation where they could be accommodated and the set of people actually receiving accommodations. Suppose, for example, that prior to the passage of the law, blind people were not accommodated under any circumstances. Knowing this, workers who became blind might simply have dropped out of the labor force immediately following the onset of their condition. Such persons would therefore never have the opportunity to receive accommodations because they anticipate the likelihood of actually being accommodated to be very low. After passage of the ADA, there might be uncertainty about whether there would be accommodations for blind persons who remained in the labor force. Some of the blind employees might remain with their employers long enough to have the opportunity to receive accommodations, and some of these individuals might receive them. If, however, the fraction of blind people choosing to work after disability onset rises by more than the fraction receiving accommodations when they do work, a simple regression of accommodation receipt before and after passage of the ADA will misleadingly indicate that accommodation incidence actually *fell* after passage, if there were no controls for blindness and other specific conditions.

Similarly, with only a binary measure of disability status, an equation such as Equation 2 might find that in the post-ADA period, the wages of accommodated workers were lower than those of workers who did not receive accommodations. This would be true even if employers fully complied with the wage mandate, and also accommodated all blind workers under the ADA, if blind workers as a group earn very low wages. These problems are significantly reduced if there is information concerning specific disability types, as is true in this article.

The third assessment concerns whether accommodation is effective at raising the labor force attachment of workers with disabilities and whether this effectiveness was different after the passage of the ADA. For this article, I evaluated whether workers leave their employer within 6 months of onset of a disability and how the accommodation decision made by that onset employer affected this decision. Summary statistics have shown that this is a useful measure on which to focus, because people who leave their employers within 6 months of disability onset are likely to (a) never return to the labor force and (b) apply for disability benefits. Also, focusing on the behavior of workers at the onset of a disability is consistent with the language of the ADA's accommodations mandate, which applies to employers for which the employee works at the time that his or her disability occurs. Fortunately, the data I used offered relatively good information as to the accommodation experiences of workers with disabilities at these employers.

Let S_i be a binary variable that equals 1 if the worker no longer works at the onset employer within a year after the onset of his or her disability. The equation would look like the following:

$$S_i = \gamma_1 Z_{it} + \gamma_2 A_i + \gamma_3 T_{ADA} + \gamma_4 (A_i * T_{ADA}) + \epsilon_{i3} \quad (3)$$

The coefficients γ_2 and γ_4 measure how accommodation affects labor force attachment overall, and whether this effect is different from the pre-ADA period to the post-ADA period, respectively. In Equation 3, as in the other equations in the

model, the vector Z_{it} contains information on various specific disabilities.

The coefficients γ_2 and γ_4 do not accurately measure the effect of accommodation on job separation, if receiving accommodations is related to some unobserved factor that determines a person's willingness to be in the labor force. When this happens, there occurs what economists call an *endogeneity bias.* The basic idea can be illustrated with an example. Suppose that workers are differentially committed to their jobs, and that their commitment is not observed by the researcher. Suppose further that employers offer accommodations to workers whom they believe are deeply committed to their jobs. The estimated effect of accommodation in the regression above would then assess both how much accommodation caused people to remain on their jobs *and* how long committed people remained on their job, whether they were accommodated or not. This is the essence of the endogeneity problem.

Endogeneity problems are of concern in every regression that uses nonexperimental data. In the context of accommodation, the problem is, in principle, substantially reduced if the regression contains an indicator of a worker's latent commitment to the job. The wage just prior to the date of disability onset is a good candidate to be this proxy. After all, it is a standard assumption in labor economics that workers decide whether to quit their job by comparing their wage rate to their reservation wages. A worker with a wage level that he or she considers to be good just prior to the onset of his or her disability should be strongly attached to the employer.

For a significant fraction of the sample in this study, workers with disabilities were not asked retrospective questions about their wages at the time of onset. For most of the participants with disabilities, I was able to obtain their *starting wage* at the onset employer, the year they began working for that employer, and the year of disability onset. Using the average annual growth in wages observed in the data, I estimated the wage at the date of onset using the following simple procedure:

$$\omega_{it}^{o} = g^{*} T^{*} \omega_{it}^{s} \qquad (4)$$

where ω_{it}^{o} is the estimated wage year of the person before disability onset, g is the average annual growth rate in wages calculated from the entire HRS sample, T is the person's tenure at the onset employer the year before onset, and ω_{it}^{s} is his or her starting wage at the onset employer, corrected for starting age and starting year.

Another solution to an endogeneity problem in the accommodations variable is if there are some elements of the vector X_{it} in Accommodations Equation 1 that do not appear among the controls in Γ_{it} and Z_{it} in the wage and separation equations, respectively. If variables exist that can plausibly be said to influence the employer's accommodation decision but not the worker's wage or level of attachment to the labor force, these variables may be used as instruments for accommodation in two-stage least squares (TSLS) estimates of Equations 2 and 3, where the first stage regression is Equation 1.

From a series of questions put to adults with disabilities in the first two waves of the HRS, I could determine whether they became disabled as a result of an accident or injury that they experienced at work. I argue that this variable, and interactions between it and variables measuring establishment characteristics, are strong candidates to be instruments for accommodation.

In making the decision whether to separate from an employer, a worker with a disability is likely to be concerned only with how much the disability bothers him or her, whether the employer will make accommodations, and what he or she will be paid. Whether the disability cause was an accident or something else probably is irrelevant to that decision, unless there is something about the job that makes a recurrence of the accident more likely. If suffering an accident is a random event, it can be argued that this variable could be excluded from the separation and wage equations, once the fact that the worker is now disabled is accounted for. On the other hand, if a worker suffers an accident at work, an employer who is unwilling to help him or her remain at work by making accommodations might discover that such a decision would be particularly unwelcome to other workers. Also, accidents at work may make the employer liable for various types of disability payments if the employee stops working (see Note 5). This possibility could serve as an inducement to offer accommodations.

Admittedly, the instrument is not perfect; that is, I cannot be sure that it has no independent effect on separation except through its effect on accommodations. If there is such an effect, however, it is likely to cause an underestimate of the effect of accommodations on lowering the rate of job separation and on any wage penalty that workers receive when they are given accommodations. With respect to separation, for example, one would suppose that any independent effect of suffering an accident at work would be to make the worker more likely to separate from the employer. If the TSLS estimate finds that accommodated workers are overall less likely to separate, the true effect is probably even greater (see Note 6).

Data

For the study reported here, I used the first three waves of data from the HRS, an ongoing panel study drawn from a nationally representative sample of households in which at least one person was born between 1931 and 1941. In Wave 1, conducted in 1992, respondents were asked to report on the presence of any physical problem that limited the kind or amount of work that he or she could do. Individuals with disabilities have either a permanent impairment that currently limits their capacity to perform paid work or (at the date of the survey) an impairment that they define as temporary but have had before.

One major benefit of the HRS is that it contains both a simple, binary disability measure, of the sort found in many other large-scale surveys, and detailed information about the specific conditions affecting the person that is rarely available in survey data typically used by economists.

People who had disabilities in Wave 1 of the survey necessarily became disabled before the first time they were observed in the data set. Retrospective questions about the onset of their conditions were asked of all of these persons. Two of the questions permitted the dating of disability onset. One question asked when the relevant condition "first happened to you," and the other asked about when the relevant condition "first began to bother you." For a significant portion of the sample, these two dates were different. More than 700 respondents with disabilities (a) reported both a "first occur" date and a "first bother" date, with the latter being larger than the former, or (b) gave a "first occur" date but no "first bother" date. In the analysis, the onset date, when it was available, was taken to be the "first interfere" date. When onset date was not available, the "first occur" date was used instead.

Other retrospective questions in Wave 1 dealt with labor market activity and other labor force information before and after the onset of disability. Persons with disabilities in Wave 1 who were employed at disability onset were included in the sample only if they were not self-employed and provided information on onset age, length of time that they remained with the onset employer, and characteristics of the onset employer. The sample was restricted to people who were between 20 and 62 years old at time of disability onset.

For people who were not disabled in Wave 1, I was able to track onset of disability into Wave 2, which was conducted in 1994, 2 years after the first wave. From questions about changes in job and employer status, I was able to determine how the worker's employment changed between Waves 1 and 2. Similarly, I examined how disability and employment changed between Wave 2 and Wave 3, which was conducted in 1996.

Table 1 describes the sample used in this study. The sample consists of 1,604 persons who were employed at the onset of their disabilities, with more than two thirds experiencing disability onset prior to the passage of the ADA. This sample was approximately 60% male, about 75% White, and with almost 75% married in the year they were observed for the HRS. There appeared to be no difference in the prevalence of different disabling conditions between persons whose onset occurred before the passage of the ADA and persons whose onset was post-ADA. The three most common conditions for people in both groups were, in decreasing order, back or spinal trouble, heart or circulatory problems, and arthritis. Interestingly, fully 22% of the sample incurred a disability as a result of a work-related accident.

Not surprisingly, because the HRS is a panel survey of a random sample of individuals who are all of a given age at a particular point in time, the timing of disability onset is the source of the most noticeable differences between the two groups. Individuals whose disability occurred after passage of the ADA were older by almost 10 years at the time of onset. Perhaps for this reason, their wages were significantly higher at onset as well, as was their propensity to quitting their job. Disability had the familiar, strongly negative effect on labor supply for the entire sample, with 70% of people leaving their onset employer within 1 year of disability onset. The numbers are 58% and 77% before and after passage of the ADA, respectively, and this difference is almost surely the result of the much higher age of disability onset in the post-ADA group.

Results

Accommodations

Table 2 summarizes the accommodation experiences of workers employed at the onset of their disabilities. Twenty-eight percent of these workers reported receiving accommodations before passage of the ADA, whereas 33% reported it after passage. Although this provides evidence that the law may have had a modest effect on improving accommodations offered to workers, it is noteworthy that a large majority of workers with disabilities reported not being accommodated by their onset employer, both before and after passage of the ADA. Because occurrence of accommodations was reported by the worker, it is possible that workers could be understating their true levels of accommodation in an attempt to justify poor labor force attachment. This is an additional reason to use TSLS estimates when assessing accommodations' effects.

Before passage of the ADA, the most commonly received type of accommodation was a change in job duties. The two next most common accommodations made by employers in the pre-ADA period were having another person help the worker with his or her tasks and providing more breaks or rest periods.

These same three accommodations were also the most common ones after the ADA was passed, although the most commonly reported one was the provision of more breaks and rest periods. Employers also appeared to be relatively willing to be flexible along other dimensions having to do with the time requirements of a job. Thus, in both pre- and post-ADA, almost 30% of accommodated workers were permitted by the onset employer to shorten their work day or to change their work hours. Employer-provided accommodations such as providing special transportation, purchasing special equipment, or retraining the individual for a different job appeared to be relatively rare in both time periods. The results in Table 2 do not suggest that the passage of the ADA dramatically changed workers' accommodation experiences with their onset employers.

Table 3 covers the issue of accommodation compliance more formally with a series of regressions that were described in Equation 1. Column I, which shows the regression with only a basic set of demographic variables as controls, indicates that there was a statistically significant increase in accommodation experiences of about 5 percentage points after passage of the ADA. Column II adds controls for specific disability types, the estimated level of onset wage, and characteristics of the onset

TABLE 1
Means and Standard Deviations for Selected Variables for Persons with Disabilities Employed at Onset

Variable	Disability onset					
	All		Before ADA		After ADA	
	M	*SD*	*M*	*SD*	*M*	*SD*
White	0.75	(0.4)	0.75	(0.43)	0.75	(0.43)
Male	0.56	(0.5)	0.59	(0.49)	0.51	(0.48)
Schooling (yrs.)	11.1	(3.2)	11.1	(3.3)	11.2	(3.2)
Year of disability onset	1984	(8.8)	1980	(7.9)	1992	(2.0)
Age at disability onset (yrs.)	48.9	(10.32)	45.4	(10.1)	56.1	(5.3)
Estimated hourly wage at onset[a]	7.32	(5.7)	5.96	(5.5)	9.2	(5.4)
Left onset employer within 1 year of onset	0.71	(0.479)	0.581	(0.498)	0.774	(0.345)
Disabling condition						
Cancers and tumors; skin conditions	0.05	(0.19)	0.02	(0.18)	0.07	(0.25)
Musculoskeletal system and connective tissue	0.48	(0.5)	0.51	(0.5)	0.55	(0.5)
Heart, circulatory, and blood conditions	0.20	(0.39)	0.21	(0.41)	0.21	(0.41)
Respiratory system conditions	0.07	(0.26)	0.07	(0.26)	0.06	(0.25)
Endocrine, metabolic, and nutritional	0.04	(0.19)	0.03	(0.18)	0.02	(0.15
Digestive system (stomach, liver, gallbladder, kidney, bladder)	0.03	(0.16)	0.02	(0.15)	0.03	(0.14)
Neurological and sensory	0.07	(0.25)	0.07	(0.25)	0.04	(0.19)
Reproductive system and prostate	0.002	(0.04)	0.001	(0.03)	0.01	(0.08)
Emotional and psychological	0.03	(0.17)	0.02	(0.16)	0.01	(0.12)
Other	0.05	(0.21)	0.03	(0.18)	0.07	(0.25)
Observations (no. of)	1,604		1,066		538	

Note. ADA = Americans with Disabilities Act of 1990. The sample is restricted to persons who were employed at the onset of their disability; who were not self-employed; for whom accommodation information was available; and for whom information on age, race, marital status, and schooling was available.
[a]See text for description of estimation procedure for onset wages.

employer. The post-ADA terms remains statistically significant and are slightly larger. It appears that onset employers complied with the accommodations mandate, to a degree. Column III adds a binary measure indicating whether the person became disabled because of an accident at work. This variable is strongly statistically significant, which is very reassuring, because this column is the first stage of the TSLS technique (see Note 7).

Table 4 presents the estimated coefficient of the post-ADA term from a series of linear probability regressions identical to those in last column of Table 3, but where the outcome variable is whether the worker received the particular accommodation indicated in the first row of the table. These results show that the better accommodations workers received after passage of the ADA were of two types: allowing the worker to change his or her time of arrival and departure and allowing him more breaks and rest periods. For no other accommodation variable was the estimated coefficient statistically significant.

The estimates of the effect of the ADA on accommodations suggest that the passage of the law modestly increased accommodations for workers at onset. Accommodation compliance was not universal, however. Moreover, it appears that most of the increase in accommodation experiences were mostly an increase in two or three time-related accommodations.

Wages After Accommodation

Have employers in the post-ADA period complied with the requirement that the costs of accommodation not be passed on to workers in the form of lower wages? Information about wages of workers with disabilities before the passage of the ADA does not exist, so we cannot study how accommodation affected wages in this period.

Table 5 presents the results of a series of log wage regressions for the wages that workers with disabilities earned at the time of the three waves of the HRS—all post-ADA. Col-

TABLE 2
Acccomodation Experience Among Workers Employed at Onset of Disability

Accommodation	All		Before ADA		After ADA	
	M	*SD*	*M*	*SD*	*M*	*SD*
Accommodated at onset[a]	0.30	(0.46)	0.28	(0.45)	0.33	(0.47)
Type of accommodation received						
Get someone to help worker	0.40	(0.49)	0.39	(0.48)	0.42	(0.49)
Shorter work day	0.31	(0.47)	0.29	(0.45)	0.34	(0.47)
Permission to change time of arrival/departure	0.35	(0.48)	0.33	(0.47)	0.38	(0.49)
More breaks and rest periods	0.41	(0.49)	0.37	(0.48)	0.47	(0.5)
Special transportation	0.05	(0.22)	0.05	(0.22)	0.06	(0.24)
Change worker's job to something easier to do	0.42	(0.5)	0.49	(0.5)	0.32	(0.47)
Help to learn new job skills	0.14	(0.34)	0.16	(0.36)	0.1	(0.3)
Get worker special equipment	0.13	(0.33)	0.11	(0.31)	0.16	(0.37)
Some other type of help	0.29	(0.45)	0.27	(0.48)	0.33	(0.47)

Note. ADA = Americans with Disabilities Act of 1990. Data from several waves of the Health and Retirement Study. Table reports means for each variable.
[a]"Did your employer do anything special to help you out so that you could stay at work?"

umn I shows that after the law was passed, wages of accommodated workers were 4.3% lower, but the *t* statistic on the accommodation coefficient is only 1.3. Column II adds specific disability controls. The estimate falls somewhat, to –3.8%, but the associated *t* statistic is larger, at 1.7%. These first two regressions provide evidence, albeit modest, that some of the costs of accommodation may have been passed on to the workers in the form of lower wages.

These results are *not for earnings,* but rather *for wages,* which equal earnings per hour worked. This means that the reductions are not explained by the fact that certain accommodations, such as a shortening of the workday, lowered workers' total take-home pay, even if wages remained the same. The results suggest that quite apart from the fact that their total earnings fell because they were allowed to work fewer hours, the cost of accommodation apparently was passed on to workers, because their hourly take-home pay fell after accommodations were provided.

How credible are these estimates? One concern is that the accommodation variable may be mismeasured. Workers would not have to deliberately misreport their true accommodation status for this to be a true. For example, employers might make adjustments for their workers that those workers do not know about, such as assigning workers with disabilities to work that the employer, but not the worker, knows to be less strenuous. For this reason, I measured accommodation status as described in the previous section. Column III presents these TSLS estimates and robust standard errors. These estimates are slightly larger in absolute value than the ordinary least squares results; according to the former, receiving accommodations post-ADA was associated with wages that were lower by approximately 5%. More important, this effect on wages is sta-

TABLE 3
Linear Probability Estimate of Receiving Any Type of Accommodations From Onset Employer

Variable	I	II	III
Constant	0.079	0.044	0.044
	(0.08)	(0.116)	(0.116)
Onset after passage of ADA	0.05	0.068	0.056
	(0.023)	(0.032)	(0.031)
White	0.065	0.029	0.039
	(0.026)	(0.032)	(0.031)
Male	0.012	0.01	–0.002
	(0.023)	(0.028)	(0.04)
Onset age	0.05	0.002	0.002
	(0.1)	(0.002)	(0.002)
Years of schooling	0.01	0.013	0.01
	(0.003)	(0.004)	(0.004)
Disability type indicators		Yes	Yes
Onset industry indicators, estimated onset wage		Yes	Yes
Suffered accident at work?			0.12
			(0.006)
R^2	0.016	0.024	0.04

Note. ADA = Americans with Disabilities Act of 1990. Robust standard errors are in parentheses. Data are from several waves of the Health and Retirement Study. See text for explanations. Columns I, II, and III refer to different regression specifications.

TABLE 4
Linear Probability Estimate of Receiving Particular Types of Accommodations by Onset Employer

	Get someone to help worker	Shorter work day	Permission to change time of arrival/ departure	More breaks & rest periods	Special transp.	Change worker's job to something easier to do	Help to learn new job skills	Get worker special equipment
Onset post-ADA	0.0126	0.022	0.036	0.059	−0.001	−0.003	0.01	0.016
	(0.029)	(0.02)	(0.02)	(0.023)	(0.008)	(0.02)	(0.01)	(0.011)
R^2	0.039	0.0439	0.0352	0.0417	0.0306	0.0254	0.0301	0.0345

Note. ADA = Americans with Disabilities Act of 1990. Table reports point estimate of accommodation variable from linear probability model described in text. Data are from several waves of the Health and Retirement Study. See text for description.

tistically significant. Given the likely direction of any bias in TSLS, these estimates are probably the lower bound of the degree to which wages are decreased after accommodation, on average.

Table 6 shows how receiving particular types of accommodation affected wage in the post-ADA time period. The table presents (a) the coefficient on the particular accommodation variable in a simple OL. regression and (b) the TSLS estimate, where the instruments are as described previously. The regressions are identical in form to the log wage regressions presented in the last column of Table 6. The table shows the *R*-squared statistics for the various regressions, and Huber-White corrected standard errors.

The table shows that workers who were allowed to shorten their work day or granted permission to change their arrival or departure times earned hourly wages that were 17% and 16% lower, respectively. Being able to take more breaks and rest periods was associated with hourly wages that were 10% lower than would otherwise be the case. None of the other accommodations variables differed significantly from zero in the log wage regressions. When the various types of accommodations are instrumented for, the point estimates on the three accommodation types that were significantly different from zero in the OLS regressions remained strongly significant and were slightly larger in absolute value. The TSLS estimates of the other types of accommodations were not significantly different from zero.

These results indicate that the receipt of accommodations was associated with a decrease in wages post-ADA, but only for the three time-related types of accommodations. Because the earlier results indicated that these three types of accommodations were the only ones for which there was any change in incidence detectable after the law was passed, it may be stated that the table shows that at least some of the costs of accommodations were passed on in the form of lower wages to those workers who received more accommodations than would have been true before the law was passed. This is entirely consistent with economic theory and inconsistent with what I have termed *wage compliance* with the ADA.

TABLE 5
Log Wage Regressions of the Effect of Accommodation After the ADA

Variable	I	II	III
Constant	1.89	1.74	1.74
	(0.22)	(0.23)	(0.23)
Receiving any accommodation?	−0.043	−0.038	−0.053
	(0.033)	(0.023)	(0.026)
White	0.106	0.107	0.107
	(0.048)	(0.048)	(0.048)
Male	0.309	0.318	0.318
	(0.037)	(0.037)	(0.037)
Onset age	−0.003	−0.003	−0.003
	(0.003)	(0.003)	(0.003)
College?	0.305	0.229	0.229
	(0.041)	(0.043)	(0.043)
Disability type indicators		Yes	Yes
Region indicators		Yes	Yes
Industry, firm size, & occupation indicators			Yes
R^2	0.150	0.182	0.211

Note. ADA = Americans with Disabilities Act of 1990. Robust standard errors are in parentheses. See text for explanations. Columns I, II, and III refer to different regression specifications.

Accommodation and Separation from Onset Employer

The last set of estimates presented here concern the effects of accommodations on labor supply. This was assessed via a simple binary measure indicating whether the person with a disability remained with his or her onset employer 1 year after disability onset. As shown in Table 1, about 71% of workers with disabilities no longer worked at the onset employer 1 year

TABLE 6
Estimated Effect on Log Wages of Particular Types of Accommodations Post-ADA

	Get someone to help worker	Shorter work day	Permission to change time of arrival/ departure	More breaks & rest periods	Special transp.	Change worker's job to something easier to do	Help to learn new job skills	Get worker special equipment
OLS estimates	−0.066	−0.176	−0.161	−0.096	−0.145	0.06	0.03	0.13
	(0.062)	(0.07)	(0.06)	(0.065)	(0.124)	(0.08)	(0.09)	(0.101)
R^2	0.24	0.23	0.21	0.22	0.24	0.24	0.23	0.22
I.V. estimates	−0.051	−0.193	−0.176	−0.116	−0.144	0.041	0.002	0.11
	(0.082)	(0.081)	(0.077)	(0.06)	(0.185)	(0.082)	(0.09)	(0.132)
R^2	0.24	0.245	0.22	0.22	0.25	0.25	0.24	0.22

Note. ADA = Americans with Disabilities Act of 1990; I.V. = instrumental variables. Robust standard errors are in parentheses.

after disability onset. Fifty-five percent did not work at all 1 year after onset, and the about 50% had applied for disability benefits within 18 months of occurrence of disability. The job separation variable used in the regressions is therefore a good but imperfect proxy for the subsequent nonparticipation of a person with disabilities in the labor force and for his or her application for disability benefits. The models were also estimated with the separation within 1.5 and 2 years of onset, and the results were qualitatively the same.

Two points about the data must be made at this juncture. First, because all of the persons in the HRS were between 51 and 61 years of age at Wave 1, it is possible that people who became disabled in their youth might not have survived all the way through their 51st birthdays. The estimates presented here thus may suffer from survival bias. The people classified as having a disability could be individuals with relatively mild conditions. On the other hand, people who became disabled in their youth may have recovered by age 51, with the result that the people examined here had systematically more severe cases of disability. It is unclear whether (a) there are any survival bias in these data, and (b) if bias exists, what its direction is. Second, there is likely to be some measurement error in variables that, in the sample of individuals who acquired a disability before the time of this survey, depended on recollections about specific labor market information, such as the date at which a person separated from his or her onset employer (see Note 8). If the separation variable was plagued by some measurement error, and if that error was random, it was simply subsumed in the error term and caused no problems in the analysis.

The regression in the first column of Table 7 has the basic set of demographic control variables and three variables measuring, respectively, whether the person was accommodated at onset, whether he or she acquired the disability after passage of the ADA, and the interaction between these two variables. The effect of the demographic controls is unsurprising. Men were less likely to separate soon after onset, as were persons who were White. More-educated people were less likely to quit the onset job, but older workers were more likely to separate. Accommodations provided before the law was passed was estimated to have a large effect on job attachment: People who were given accommodations were 32 percentage points less likely to quit their onset employer within a year.

This accommodations effect was much smaller after the law was passed, however, reducing the likelihood of job separation by about 10 percentage points. This is still a large effect, but it is noticeably smaller than the pre-ADA effect. When controls for specific disability types were added to the regression, the same basic pattern was evident, as shown in column II. Accommodations undoubtedly are effective at lowering job separation in the post-ADA time period, but this effectiveness is smaller than what was true in the years before passage.

Column III adds the estimated wage just prior to onset, as given by Equation 4, to the list of regressors in the job separation models in a attempt to capture any endogeneity in the accommodations variables. The point estimates for the variables of interest to which the estimated wage variables were added are almost exactly the same as in column II.

When I made adjustments for accommodation status in column IV, using as instruments variables that measured whether the person acquired a disability as a result of an injury at work, the point estimates were larger, and the effect of accommodations was now estimated to be a reduction in early postonset separation of almost 54 percentage points. Given the average separation rate from the onset employer, these results suggest that accommodations cut early job withdrawal in the pre-ADA time period by more than 75%, other factors having been accounted for. Notice also that the TSLS estimates showed that the pattern of accommodation was much less effective at lowering the probability of early postonset employer separation post-ADA, and by an amount very similar to the OLS estimates.

TABLE 7
Linear Probability Estimate of Effects of Accommodations by Onset Employer on Separating From Labor Force

Variable	I	II	III	IV
Constant	0.663	0.741	0.666	0.682
	(0.077)	(0.08)	(0.106)	(0.113)
Accommodated by onset employer	−0.326	−0.315	−0.332	−0.545
	(0.030)	(0.03)	(0.033)	(0.197)
Onset post-ADA	0.217	0.204	0.191	0.07
	(0.032)	(0.033)	(0.03)	(0.06)
Accommodated by onset employer (onset post-ADA)	0.226	0.225	0.236	0.446
	(0.049)	(0.049)	(0.05)	(0.206)
White	−0.068	−0.065	−0.06	−0.046
	(0.022)	(0.026)	(0.028)	(0.03)
Male	−0.062	−0.071	−0.096	−0.096
	(0.022)	(0.022)	(0.026)	(0.027)
Onset age	0.004	0.003	0.005	0.005
	(0.001)	(0.001)	(0.002)	(0.002)
Years of schooling	−0.01	−0.01	−0.009	−0.005
	(0.003)	(0.003)	(0.004)	(0.003)
Disability type indicators		Yes	Yes	Yes
Estimated hourly onset wage			−0.003	−0.003
			(0.03)	(0.03)
R^2	0.185	0.20	0.211	0.233

Note. Separation occurred within 1 year of disability onset. Robust standard errors are in parentheses. ADA = Americans with Disabilities Act of 1990.

Discussion

In this article, my goal was to study three questions related to the accommodations mandate in the ADA: Has this mandate changed the incidence of accommodations among workers with disabilities? Contrary to a requirement in the law, did employers lower the wages of workers who were accommodated post-ADA? What was the effect of accommodations on job separation, and has that effect changed since passage of the ADA?

Overall, the ADA seems to have caused an increase in the incidence of accommodations. This is reassuring, because providing such accommodations was a major goal of the legislation. This positive news must be modified in at least two ways, however. First, the increase in accommodations incidence was only 5% among workers with disabilities, which does not indicate a *dramatic* improvement in the incidence of accommodations compared to the period before passage of the ADA. Moreover, accommodations improvements appear to have been concentrated in only two or three time-related adjustments, such as modifications to work schedules or to arrival and departure times from work.

There is evidence that since the ADA became law, employers have passed some of the costs of accommodations on to their workers in the form of lower wages. Basic labor demand theory could (and did, before the law) predict this result, but the behavior is nonetheless outlawed by the legislation. Why, then, has there been little debate and few lawsuits on this issue? Part of the answer may be that whereas individual workers with disabilities know whether or not they have been accommodated, it may be difficult for them to know what wages would be if they were not. Hence, the bulk of the controversy that attends the law focuses on the matter of accommodation receipt. Only from statistical analysis performed on a sample of workers with disabilities could this aspect of apparent noncompliance be detected.

In measuring the effect of accommodations on labor force attachment of workers with disabilities, I focused in this article on separation from the workforce within a year or two of disability onset as the measure of labor force attachment. This choice was driven mainly by the fact that data used in the study contain observations for only a few years after onset for people who acquired disabilities after the ADA was passed. However, it appears that this early separation measure is strongly correlated with other measures of labor supply behavior.

Employer-provided accommodations did appear to improve labor market attachment among workers with disabilities, as many researchers have suspected but for which there was little previous evidence. The estimated effect was large both pre- and post-ADA passage, but, surprisingly, it was much smaller after the legislation went into effect. This pattern was evident in both simple regressions and TSLS estimates.

This is a surprising result. One possible explanation is that accommodations may now be offered to people with more serious conditions than was previously the case, and this factor could not be captured by the set of disability indicators at hand. Another explanation could be that increases in accommodations post-ADA are made along dimensions that help ensure compliance but do little to actually enhance workers' job attachment. Finally, even though the law makes it illegal, employers may mask a decrease in demand for workers with disabilities by making low-cost accommodations just after onset.

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AUTHOR'S NOTES

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2. The data and programs used in this article are available from the author upon request.

NOTES

1. Countless empirical studies have identified the tendency toward nonwork among individuals with disabilities. This strong tendency has been confirmed by the fact that large-scale micro surveys, such as the Panel Study of Income Dynamics, typically *define disability* as the presence of a physical condition that limits, prevents, or otherwise constrains the ability of the individual to perform market work.
2. I did not study whether there has been a change in the percentage of persons with disabilities in the typical workforce. Ideally, employer-level employment data, which we do not possess, are needed to answer this question.
3. Thirty percent of respondents had accommodated a worker with disabilities before passage of the ADA. Most of these accommodations cost less than $500 and generally posed "no problem" for the employer. However, employers were asked only about direct cost outlays, not about other costs that are likely to be associated with accommodations, such as those related to time.
4. I emphasize this point because the overall labor market conditions of workers with disabilities could have changed in the wake of the ADA for reasons having nothing to do with accommodations. For example, irrespective of how employers complied with the accommodations mandates, the employment experiences of workers with disabilities might have changed because of how the law affected their attitudes toward work.
5. For a large portion of the sample, I was unable to determine whether the worker was covered by a disability insurance plan at the onset employer. This variable was excluded from the analysis.
6. I also estimated bivariate probit models of the type suggested by Heckman (1978), which rely on nonlinearity assumptions to identify the accommodation's effect on job separation. These estimates are quite similar to those presented here, but they are much less efficiently estimated.
7. In some specifications, I used interactions between the accident-at-work variable and characteristics of the employer. None of these models performed better than the basic model presented here, with only the binary accident-at-work variables as an instrument.
8. These recollection problems may be particularly large in this study because the people have disabilities that may have adversely affected memory.

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