The Impact of the Americans with Disabilities Act on Wages, Accommodations and Labor Force Attachment of the Disabled

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Abstract

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Low levels of labor supply are pervasive among the disabled population. One obvious reason this is so is the fact that physical disability arises from adverse physiological or psychological conditions which lower productive capacity and the ability to work. But, the disabled also may face inhospitable work environments which further impair their work capacity. National concern about this possibility led to the passage of the Americans with Disabilities Act, (A.D.A.), which became law in 1990, and requires, among other things, that employers accommodate their disabled workers.

Before the passage of this important piece of labor market legislation, there was virtually no formal analysis of the role played by employer-provided accommodation in the labor force experience of the disabled. And, in the years since the legislation has been in effect, no empirical work in economics has looked directly at the effect of the law on the receipt of accommodations by disabled workers; the degree to which the law, by virtue of its effect on the accommodation experience of those workers, affected their labor force attachment; or at the extent to which the employers have complied with the various provisions of the law.

Using multiple waves of data from the Health and Retirement Study (H.R.S.), this paper attempts to answer these questions. First, it compares the receipt of accommodation by disabled workers before and after the passage of the A.D.A. This comparison permits an assessment of whether the law has been effective at generating better accommodation treatment of disabled workers by their employers, when measured against the baseline of their accommodation treatment before the law was passed. Second, the effect of accommodation on wages is examined to determine whether, contrary to the wage requirement of the A.D.A., the wages of accommodated disabled workers are lowered. Third, the paper examines whether accommodation has improved work attachment of the disabled.

Background

The A.D.A. mandates that employers provide "reasonable accommodation" to workers who become disabled while in their employ.[1] Despite its laudable goals of improving labor force outcomes for disabled workers,[2] the law has been controversial since before its passage – chiefly because of its two other requirements. One is that firms must treat all workers "equally", so that disabled workers who are accommodated cannot be paid lower wages. Nor is it legal for firms to change the composition of their workforce towards relatively fewer disabled workers in an effort to avoid the mandate's effect.[3]

Economists such as Rosen (1991) have argued that the mandate, combined with the equal pay requirement, leads to inefficient resource allocation. By this argument, there are costs and benefits associated with employer-provided accommodations which vary depending on the characteristics of particular employers and disabled workers. In an unregulated market, firms and disabled 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 firms offer accommodations in situations where they otherwise would not, combined with a requirement that the resource cost of this activity not be passed on to the accommodated worker should therefore result in inefficiency.

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[1] Accommodation includes things as varied as job restructuring, use of modified work schedules, making facilities accessible to the disabled, and the acquisition of equipment and devices. As used in the legislation, accommodations are actions taken on the *firm's* part to make the workplace more hospitable to disabled workers.

[2] Countless empirical studies have identified the tendency towards non-work among the disabled. The strong tendency towards non-work among the disabled is confirmed by the fact that large-scale, micro surveys such as the *Panel Study of Income Dynamics* (P.S.I.D.) typically *define* disability as the presence of a physical condition which limits, prevents or otherwise constrains the ability of the individual to perform market work

[3] The paper does not study whether there has been a change in fraction of disabled persons who make up the typical workforce. Ideally, firm level employment data, which we do not possess, is required to answer this question.

Nor has this been the sole criticism. Since before the A.D.A.'s passage, writers such as Weaver (1991) questioned whether the requirement that firms provide accommodations unless these proved to be "unreasonable" would create an uncertain legal standard, requiring years of litigation to settle. Recently, others have leveled similar criticisms, arguing that the legislation encourages frivolous and worthless lawsuits. Others have wondered whether the law is overly broad, bringing under its umbrella conditions which are not considered disabilities in the conventional sense of the word, or whether firms are being forced to make costly, wasteful adjustments to the work environment in order to prevent being sued. Some contend that the law's main effect may not have been not to encourage employment of the truly disabled, but rather to make it more likely that people will call themselves disabled. Early in 2000, Congressional hearings were held to explore these and other disputed aspects of the law, and there is among many a fear that recent Supreme Court rulings do not augur well for the law's future.[4]

Even if the truth of these criticisms is conceded, it is unarguable that persons impaired by physical or psychological handicaps must be added to any list of those who because of ignorance, discrimination or mis-understanding on the part of employers have historically been prevented from demonstrating the full measure of their potential. (See Johnson and Lambrinos (1985) for evidence on discrimination against the disabled.) If by modest adjustments to the workplace this historical wrong could be corrected, then it is quite possible that that there might be national support for a law mandating these measures in a nation concerned both about economic efficiency and also about equity.

Most critics and nearly all advocates of the A.D.A. typically presume the *effectiveness* of

[4]See "The Disability Decisions," *The Washington Post,*, June, 24, 1999, "Supreme Court Limits Meaning of Disability," *The Washington Post*, June 23, 1999; and "Actor urges changes in disabilities penalties: Discourage frivolous suits, Clint Eastwood tells House Hearing" *Detroit News*; May 19, 2000.

accommodation; that when they receive accommodation, disabled workers exhibit greater labor market attachment. But, there is very little convincing about this or *any* aspect of the accommodation experience of disabled workers before or after the passage of the A.D.A. A proper assessment of the A.D.A. requires at a minimum, knowledge about the extent of compliance by firms with the law's various requirements, and how that compliance, particularly in the area of accommodations, has affected labor market outcomes for the disabled.

Collignon (1986) is one of the only a handful of studies which look at the incidence of accommodations before the A.D.A. was passed. The study is a summary of the results of the Berkeley Planning Association Accommodations Study of 1982, in which several federal contractors with more than 50 workers were interviewed to determine whether they accommodated their disabled workers, and at what cost.[5] In a sample of 348 disabled men, Burkhauser et al. (1992) look at the incidence of accommodation before the A.D.A, and examine the effect of employer-provided accommodation on the job exit hazards. Neither study examines the effect of the legislation.

Recent work by Acemoglu and Angrist (1998) uses the Current Population Survey (C.P.S.) to examine changes in employment rates for people who self-classify as "disabled" over the interval spanned by the passage of the A.D.A., but their paper does not directly study accommodation. Also, their only measure of disability is a simple binary self-report. Bound and Daly (1996) examine accommodation directly, using the first wave of the data set used in this paper, but their study is not concerned with the effect of the A.D.A. Thus, they measure neither the extent of wage and

[5]Thirty percent of respondents had accommodated a disabled worker before the A.D.A . Most cost less than $500, and generally posed "no problem" for the firm. However, firms in the survey were asked only about direct cost outlays, not about other costs, such as time costs which are likely to be associated with accommodation.

accommodation compliance, nor the impact of that law on labor force attachment. Also, they do not attempt to control for endogenous accommodation receipt.

Given its focus, this paper extends the small previous literature in obvious ways. Also, by focusing directly and mainly on accommodations, the paper studies the dimension which was the explicit target of the A.D.A., and abstracts away from other effects that the law may have had. The next section briefly describes the estimating equations and challenges. The data are described in the subsequent section. Sections presenting results and a conclusion follow.

Empirical Strategy

According to the requirement of the A.D.A. which is the main focus of this paper, workers who become disabled while employed should be provided accommodation by their onset employers, so long as the costs of that accommodation are not unreasonable. If firms have actually complied with this accommodations mandate, the fraction of all disabled workers accommodated by their onset employers should be greater after the passage of the A.D.A. than before, provided that there are at least some workers whose accommodations costs are "reasonable" who would not have been accommodated prior to the passage of the legislation. The second requirement of the A.D.A. of interest in this paper is that accommodated disabled workers should not suffer a wage penalty for the treatment they receive. Thus, compliance with the wage requirement of the A.D.A. implies that in the post-A.D.A period, wages of accommodated workers should be no lower than those of their counterparts who are not accommodated, all else equal.

A straightforward empirical test to assess the extent of accommodations compliance by firms after the A.D.A estimates an equation of the form

$$A_i = a_1 X_{it} + a_2 T_{A.D.A.} + e_{i1} \qquad (1)$$

where A_i is a binary variable which equals 1 if and only if a disabled worker is accommodated by his onset employer; X_{it} is a vector of controls; and $T_{A.D.A.}$ is a binary measure which indicates the time period after the passage of the A.D.A. Estimating an equation such as (1) requires individual level data which spans the time periods before and after the passage of the A.D.A., and equation (1) could be estimated either as a linear probability or a probit model.

Testing for compliance by firms with the A.D.A's wage requirements is, in principle, similarly straightforward. Restricting attention to the period after passage of the law, and to a sample of disabled workers, one may simply estimate regressions of the form:

$$w_{it} = b_1 \Gamma_{it} + b_2 A_{it} + e_{i2}, \qquad (2)$$

where w_{it} is the wage and Γ_{it} is a vector of controls. Wage compliance means that the coefficient b_2 equals 0, or at least is non-negative.

Consistent estimates of the effect of accommodation as estimated by (1) and (2) are likely to be forthcoming only if there is information available about individuals' disability status that is more detailed than the simple summary measure, indicating merely whether or not a person self-classifies as "disabled". Without more detailed information about the *specific types* of disabilities affecting people included in the vectors X_{it} and Γ_{it}, the estimates of a_2 and b_2 do not measure the degree to which there is accommodation and wage compliance, respectively.

The problem is that the passage of the law can be expected to have caused both the set of disabled persons placing themselves at risk to be accommodated, and the set of people actually receiving accommodation to change. 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 conditions. Such persons would therefore never be at risk to be accommodated because they anticipate the likelihood of actually being accommodated to be very low. After the A.D.A., there might be uncertainty about whether there would be accommodation for blind persons ho remained labor force participants. Some of the blind might remain with their employers long enough to place themselves at risk to be accommodated, and some of them might in fact receive this treatment. But if the fraction of blind people choosing to work after disability onset rises by more than the fraction receiving accommodation when they do work, a simple regression of accommodation receipt before and after the A.D.A. will find misleadingly that accommodation incidence actually *fell* after the law, if there were no controls for blindness and other specific conditions.

Similarly, with only a binary measure of disability status, an equation such as (2) might find that in the post-A.D.A. period, the wages of accommodated disabled workers were lower than those of workers not accommodated. This would be true even if firms fully complied with the wage mandate, and also accommodated all blind workers the A.D.A, but if blind workers as a group earn very low wages. These problems are significantly reduced if there is information on specific disability types, as is true in this paper, but not in some recent work.

The third piece of evidence in the paper assesses whether accommodation is effective at raising disabled workers labor force attachment, and whether this effectiveness was different before and after the passage of the A.D.A.. We focus on the decision by a worker to separate from the firm at which he was employed at the time he suffered his disabling condition, and ask how the accommodation decision made by that onset employer affects this separation decision. Summary statistics reveal that

this is a useful measure on which to focus, as separation from the onset employer soon after disability onset is highly correlated with other measures of interest, such as complete labor force non-participation and with application for disability benefits. Also, the focus on the behavior of workers at the onset of disability is consistent with the language of the accommodations mandate of the A.D.A. which applies to firms at which a worker is employed when his disability strikes. Fortunately, the data used in the paper, has relatively good information on the accommodation experience of disabled workers at these onset employers.

Letting S_i be a binary variable which equals 1 of the worker no longer works at the onset employer within a year after the onset of his disability, we are interested in the equation

$$S_i = g_1 Z_{it} + g_2 A_i + g_3 T_{A.D.A.} + g_4 \left(A_i * T_{A.D.A.} \right) + e_{i3}. \qquad (3)$$

The coefficients g_2 and g_4 measure, respectively, how accommodation affects labor force attachment overall, and whether this effect is different in the pre and post-A.D.A. period. In (3), as in the other estimating equations in the model, the vector of controls Z_{it} has information on various specific disabilities

There is an important question whether the coefficients g_2 and g_4 are measures of the *treatment* effect on accommodation or whether they instead partly capture the fact that workers with varying levels of latent attachment to the labor force are differentially offered accommodation by their firms. Since the vector Z_{it} does not contain information on individuals' levels of labor force attachment, estimates from equation (3) might suffer from omitted variables bias, since firms' decisions on whether to offer accommodation likely depend on firms' estimates of these latent attachment levels.

This potential endogeneity problem is, in principle, substantially reduced if the regression contains a proxy for a worker's latent level of labor force attachment directly among the regressors. The estimated wage just prior to the date of disability onset is a good candidate to be this proxy. After all, it is standard in labor economics to posit that workers decide whether to quit their job by comparing their wage rate to their reservation wages. A worker with a wage level which is idiosyncratically high just prior to the onset of his disability should be strongly attached to his employer.

Unfortunately, for a significant fraction of the sample studied in the paper, disabled workers are not asked retrospective questions about their wages at the time of onset. However, for most of the disabled sample, we know their *starting* wage at the onset employer, the year they began working for the employer and the year of onset. Using the average annual growth in wages observed in the data, we estimate the wage at the date of onset using a simple procedure.

$$\hat{w}_{it}^{o} = g * T * \tilde{w}_{it}^{s} \qquad (4)$$

where $\hat{w}_{it}^{o}$ is the person's estimated wage year before disability onset; g is the average annual growth rate in wages calculated from the entire H.R.S. sample, T is the person's tenure at the onset employer the year before onset; and $\tilde{w}_{it}^{s}$ is his starting wage at the onset employer, corrected for his starting age and starting year.

The problem of potential endogeneity in the accommodations variable may be solved if there are some elements of the vector X_{it} in the accommodations equation (1) which do not appear in among the controls in the Γ_{it} and Z_{it} in the wage and separation equations, respectively. If variables exists which can plausibly be said to influence the firm'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 (1).

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

In making his decision whether to separate from his employer or not, a disabled worker is likely to only be concerned with how much his impairment bothers him, whether the firm makes accommodations for him; and what he will be paid. Whether he became disabled because of an accident or not is likely to be irrelevant to that decision, unless there is something about his job that makes a recurrence of the accident more likely. If suffering an "accident" is a random event, then it can be argued that this variable could be excluded from the separation and wage equations, once the fact that he 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 the worker remain at work by making accommodations for him might discover that decision to be a particularly unwelcome one to other workers. Also, accidents at work may make the firm liable for various types of disability payments if the worker stops working.[6] This could serve as an inducement to offer accommodation.

Admittedly, the instrument is not perfect. That is, we cannot be sure that it has no independent effect on separation, except through its effect on accommodations. However, if there is such an effect, it is likely to cause an underestimate of the effect of accommodation on lowering job separation, and on

[6] For a large portion of the sample, we are unable to determine whether the worker is covered by a disability insurance plan at the onset employer. This variable is therefore excluded from the analysis.

any wage penalty that workers receive when they are accommodated. 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, then the true effect is probably even larger. Being able to sign the bias this way greatly improves our confidence in the TSLS estimates.[7]

Data

The paper uses multiple waves of data from the *Health and Retirement Study* (H.R.S.). The H.R.S is 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 limitation which limited the kind or amount of work that he/she could do. Disabled persons either have a permanent impairment which currently limits their capacity to perform paid work, or currently (at the date of the survey) have an impairment which they define as temporary, but which they have had before.

One major benefit that the H.R.S. offers the student of the effect of disabling illness on market outcomes, is that it contains both a simple, binary disability measure, of the sort found in many other large scale surveys, as well as detailed information about the specific conditions affecting the person rarely available in survey data typically used by economists.

People who are "disabled" in Wave 1 of the survey necessarily became disabled before the first time that they are observed in the data set. Retrospective questions about the onset of their conditions

[7] We also estimate bivariate probit models of the type suggested by Heckman (1978) which rely on non-linearity assumptions to identify the accommodation's effect on job separation. These estimates are quite similar to those presented here, but are much less efficiently estimated.

were put to all of these persons. Two of these questions permit the dating of disability onset. One asks when the relevant condition "first happened to you", and the other asks 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 disabled people either: (1) reported both a "first occur" date and a "first bother" date, with the latter being larger than the former; or gave a "first occur" date, but no "first bother" date. In the analysis, the onset date is taken to be the "first interfere" date whenever that date was available, and the "first occur" date when it was not.

Other retrospective questions in first wave deal with labor market activity and other labor force information before and after the onset of disability. Disabled persons in Wave 1 who were employed at 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 information on the characteristics of the onset firm. The sample is restricted to people who were between 20 and 62 years old at onset.

Among people who were not disabled in the first wave of the survey, we are able to track onset of disability into Wave 2 of the survey – conducted about 2 years after the first wave. From questions about changes in job and employer status, we are able to determine both the characteristics of the onset employer, and how the worker's labor market behavior changes after onset. Then, by wave 3 of the data, we can determine labor force attachment for the people who became disabled by Wave 2.

Table 1 describes the sample used in this study. The sample consists of 1604 persons who were employed at the onset of their disabilities, with more than two-thirds experiencing disability onset prior to the passage of the A.D.A. The sample is nearly 60% male, about three-quarters white, and with almost three-quarters married in the year they are observed in the H.R.S. There appears to be no

difference in the prevalence of different disabling conditions between persons suffering onset before the passage of the A.D.A. and those suffering onset afterwards. 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 became disabled as a result of a work-related accident.

Not surprisingly given that the H.R.S. 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. Those disabled after the A.D.A was passed were older by almost ten years at the time of onset. Perhaps for this reason, their wages were significantly higher at onset as well, as were their quit propensities. Disability has the familiar, strong negative effect on labor supply for the entire sample, with seventy-percent of people leaving their onset employer within one year of disability onset. But, the numbers are fifty-eight and seventy-seven percent before and after the A.D.A respectively, and this differences is almost surely the result of the much higher age of onset in the post-A.D.A group. The regression in the section below should remove these age effects.

Results

A. Accommodations

Table 2 summarizes the accommodation experience of worker employed at the onset of their disabilities. Twenty-eight percent of workers report having been accommodated before the passage of the A.D.A., and 33% report receiving this treatment after the law was passed. While this is evidence that the law may have had a modest effect on improving workers accommodation treatment, it is noteworthy that a large majority of disabled workers report not being accommodated by their onset employer, both before and after the A.D.A. was passed. Accommodation is a self-report, however,

and there is the possibility 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 later when we assess accommodation's effects.

The most commonly received type of accommodation before the passage of the A.D.A. was a change in the job duties. The two next most common accommodations made by employers in the pre-A.D.A. period were to get another person to help the disabled worker with his tasks, and the provision of more breaks or rest-periods.

These same three accommodations were the most common after the A.D.A was passed as well, though the most commonly reported one in that time is 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 time periods, almost 30% of accommodated workers were permitted by the onset employer to shorten their work day, or to change their work hours. Accommodations such as getting the worker special transportation, purchasing special equipment, or re-training for new employment appear to be relatively rare in both time periods. The results in Table 2 do not suggest that the passage of the A.D.A. dramatically changed workers accommodation experience from their onset employers.

Table 3 gets at the issue of accommodation compliance more formally with a series of regressions described in (1). The first column shows the regression with only a basic set of demographic variables as controls, indicates that there was a statistically significant increase in accommodation experience after the A.D.A. of about 5 percentage points. Column (II) adds controls for specific disability types, for the estimated level of onset wage, and for characteristics of the onset firm . The post-A.D.A. terms remains statistically significant, and is slightly larger. It appears that the

accommodations mandate was complied with (to a degree) by onset employers. Column (III) adds a binary measure indicating whether the person became disabled because of an accident at work. This variables is strongly statistically significant. This is very reassuring, as this column is the first stage of the TSLS techniques employed later.[8]

Table 4 presents the estimated coefficient of the post-A.D.A. term from a series of linear probability regressions identical to those in last column of Table 4, but where the outcome variable is whether the worker received the particular accommodation indicated in the first row of the table. These results indicate that the better accommodation treatment which workers received after the A.D.A. centered on two types of accommodation: allowing the worker to change his 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 A.D.A on accommodations suggest that the passage of the law modestly increased accommodation among workers disabled at onset. What has been termed "accommodation compliance" was not universal, however. Moreover, it appears that most of the increase in accommodation experience comes from an increase in two or three time related accommodations.

B. Wages After Accommodation

Have employers in the post-A.D.A period complied with the requirement that the costs of accommodation not be passed on to workers in the form of lower wages? While the data allow us to examine this question, we are unable to do look at wages after the accommodation decision in the time

[8] In some specifications, we used as additional instruments interactions between the accident-at-work variable, and characteristics of the firm. None of these models performed better than the basic model presented here with only the binary accident at work variables as an instrument.

period before the A.D.A. Therefore, unlike the accommodation results above we cannot determine how wage compliance compares to what was true for accommodated workers before the law.

Table 5 presents the results of a series of log wage regressions for the wages of disabled workers earned at the time of the three waves of the H.R.S. - all in the post-A.D.A. time period. Column (I) shows that after the law was passed, wages of accommodated disabled workers are 4.3 percent lower, but the *t*-statistic on the accommodation coefficient is only 1.3. Column (II) adds specific disability controls. While these estimates are smaller, suggesting that the wages of accommodated disabled workers in the post-A.D.A. time period receive wage which 3.8 percent lower than their colleagues who are not accommodated, the *t*-statistic on this estimate is larger at 1.7. These first two regressions provide evidence, but only very modest evidence, that consistent with standard theory, some of the costs of accommodation may have been passed on to accommodated workers in the form of lower wages.

How credible are these estimates? One major problem is that the accommodation variable may be mis-measured. Nor is it necessary that workers deliberately mis-report their true accommodation status for this to be a problem. For example, it is possible that firms might make adjustments for their workers which those workers do not know about, such as assigning disabled workers to work which the firms but not the workers know to be less strenuous. For this reason, we instrument for 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 O.L.S. results; according to them receiving accommodation in the post-A.D.A was associated with lower wages of about five percent. More importantly, this effect of accommodation on wages is

estimated to be statistically significant. Given the likely direction of any bias in TSLS, these estimates may be read an the lower bound on the degree to which wages are decreased after accommodation.

Table 6 presents estimates of the effect on the log wages of disabled workers in the post-A.D.A. time period of receiving particular types of accommodations. The tables presents the coefficient on the particular accommodation variable in a simple O.L.S. regression, and the TSLS estimate, where the instruments are as described above. 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 are allowed to shorten their work day, or who are granted permission to change their arrival or departure times from work earn hourly wages which are 17 and 16 percent respectively. Being able to take more breaks and rest periods is associated with hourly wages which are 10 percent lower than would otherwise be the case. None of the other accommodations variables is significant from zero in the log wage regressions. When the various types of accommodation are instrumented for, the point estimates on the three accommodation types which were significantly different from zero in the O.L.S. regressions remain strongly significant, and are slightly larger in absolute value. The TSLS estimates of the other types of accommodation are all not significantly different from zero.

The results indicate that the receipt of accommodation was associated with a decrease in wages in the post-A.D.A. time period, but only for the three time-related types of accommodations. Since the earlier results show that these three types of accommodation are the only ones for which there was any change in incidence detectable after the law was passed, we may say that the table shows that at least some of the costs of accommodations were passed on the in form of lower wages to those workers

who received more accommodation than would have been true before the law was passed. This is entirely consistent with economic theory, and inconsistent with what has here been termed "wage compliance".

C. Accommodation and Separation from Onset Employer

The last set of estimates that the paper presents are of accommodation's labor supply effects. The labor supply measure used is a simple binary measure indicating whether the disabled person remains with his onset employer 1 year after disability onset. As shown in Table 1, about 71% of disabled workers no longer worked at the onset employer one year after disability onset. Fifty-five percent did not work at all one year after onset, and the about one-half had applied for disability benefits within eighteen months of becoming disabled. The job separation variable used in the regressions is therefore a good, but imperfect proxy for a disabled person's subsequent non-participation in the labor force, and for his application for disability benefits. The models were also estimated with the separation within 1.5 and two years of onset, and the results are qualitatively the same.

Two points about the data must be made before the results are presented. First, because all of the persons in the H.R.S. are between 51 and 61 years of age in first wave of the H.R.S., it is possible that people who became disabled in their youth might not have survived all the way through their 51st birthday, the estimates presented here may suffer from survival bias. The people classified as "disabled" could be those who have relatively mild cases of disability. On the other hand, people who become disabled in their youth may have recovered by age 51, causing the disabled people the paper examines to have systematically more severe cases of disability. It is unclear whether there is any survival bias in these data, and also, if bias exists, what is its direction. Second, there is likely to be some measurement

error in variables which, for the sample disabled before the sample period, depend on recollections about specific labor market information such the date at which a person separated from his onset employer.[9] If the separation variable is plagued with some measurement error, and if that error is random, it is simply subsumed in the error term and causes no problems in the analysis.

The regression in the first column of Table 7 has the basic set of demographic controls variables, as well as three variables measuring respectively, whether the person was accommodated at onset, whether he was disabled after the passage of the A.D.A., and the interaction between these two variables. The effect of the demographic controls is unsurprising. Men are less likely to separate soon after onset, as are whites. More educated people are less likely to quit the onset job, while older workers are more likely to separate. Accommodation before the law was passed is estimated to have a large effect on job attachment: people accommodated were 32 percentage points less likely to quit their onset employer with a year.

But this effect of accommodation was much smaller after the law was passed. After the law, accommodation appears to have reduced the likelihood of job separation by about 10 percentage points. This is still a large effect, but it is noticeably smaller than the pre-A.D.A. effect. When controls for specific disability types are added to the regression, the same basic pattern is evident in Column (II). Accommodation is undoubtedly effective at lowering job separation in the post-A.D.A. time period, but this effectiveness is smaller than what was true in the years before the legislation was passed.

Column (III) adds the estimated wage just prior to onset, as given by (4), to the list of regressors in the job separation models in a crude attempt to capture any endogeneity in the

[9] These recollection problems may be particularly large in this paper because the people doing the remembering are disabled, and physical incapacitation may adversely affect memory.

accommodations variables. The point estimates for the variables of interest with the estimated wage variables added are almost exactly the same as in column (II).

When we instrument for accommodation status in column (IV) using as instruments variables which measure whether the person became disabled as a result of an injury at work, the point estimates are larger. Thus, the level effect of accommodation is now estimated to be a reduction in early post-onset separation of almost 54 percentage points. Given the average separation rate from the onset employer, these results suggest that accommodation cut early job withdrawal in the pre-A.D.A time period by more than seventy-five percent, other factors having been accounted for. Notice also that the TSLS estimates show the pattern of accommodation being much less effective at lowering the probability of early post-onset employer separation in the post-A.D.A. time period, and by an amount very similar to the O.L.S. estimates.

Conclusion

The goal of this paper has been to study three questions related to the accommodations mandate in the American's with Disabilities Act. First, has the accommodations mandate in the law changed the incidence of accommodation among disabled workers? Second, contrary to a requirement in the law, do firms lower the wages of accommodated disabled workers in the post-A.D.A. time period? Third, what is the effect of accommodation on job separation, and has that effect changed since the passage of the law?

Overall, the A.D.A seems to have caused an increase in the incidence of accommodations. This is reassuring, for it was the principal goal of the legislation. But, the positive news of firms' accommodation compliance must be modified in at least two ways. One is that the increase in

accommodation incidence of only five percent among disabled workers does not at all indicate a *dramatic* improvement in accommodation compared to the period before the A.D.A. Moreover, accommodation improvement appears to have been concentrated in only two or three time-related adjustments, such as modifications to the work schedules or in the arrival and departure times from work.

There is evidence that since the A.D.A has become law, firms have passed some of the costs of accommodation on to accommodated 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 over this issue? Part of the answer may be that whereas an individual disabled worker knows whether or not he has been accommodated, it may be difficult for him to know what his wages would be if he were not. Hence, the bulk of the controversy which attends the law focuses on the matter of accommodation receipt. Only from statistical analysis performed on a sample of disabled worker could this aspect of apparent non-compliance by firms be detected

In measuring the effect of accommodation on labor force attachment of the disabled, the paper focuses 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 contains observations for only a few years after onset for people who became disabled after the A.D.A. was passed. However, it appears that this early separation measure is strongly correlated with other measures of labor supply behavior.

Employer-provided accommodation is found to improve labor market attachment among the disabled as many have suspected, but of which there is little previous evidence. The estimated effect is

large in both the pre and post-A.D.A time period but, surprisingly, is much smaller in the time period after the law. This pattern is evident both in simple regressions and with TSLS estimates.

This change after the law is surprising, and is consistent with the results found by Acemoglu and Angrist (1998) who do not directly examine accommodation receipt but do look at employment rates among disabled adults before and after the law. One possible explanation for the result in this paper is that accommodation may now be offered to people with more serious conditions than was previously the case and which cannot be captured by the set of disability indicators at hand. Another could be that increases in accommodation after the law are made along dimensions which help ensure compliance, but which do little to actually enhance workers' job attachment. Finally, it is possible that firms may mask a decrease in labor demand for the disabled workers, which is ruled out by the law, by making low cost accommodation just after onset.

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Table 1. Means of Selected Variables for Disabled Persons Employed at Onset, by When Suffered Disability Onset (Standard Errors in Parentheses)

	All	Before A.D.A	After A.D.A
White	0.75	0.75	0.75
	(0.4)	(0.43)	(0.43)
Male	0.56	0.59	0.51
	(0.5)	(0.49)	(0.48)
Married	0.72	0.71	0.73
	(0.45)	(0.45)	(0.45)
Years of Schooling	11.1	11.1	11.2
	(3.2)	(3.3)	(3.2)
Year of Disability Onset	1984	1980	1992
	(8.8)	(7.9)	(2)
Age at Disability Onset	48.9	45.4	56.1
	(10.32)	(10.1)	(5.3)
Estimated Hourly Wage at Onset*	7.32	5.96	9.2
	(5.7)	(5.5)	(5.4)
Left Onset Employer With One Year of Onset	0.71	0.581	0.774
	(0.479)	(0.498)	(0.345)
Disabling Condition			
Cancers and tumors; skin conditions	0.05	0.02	0.07
	(0.19)	(0.18)	(0.25)
Musculoskeletal system and connective tissue	0.48	0.51	0.55
	(0.5)	(0.5)	(0.5)
Heart, circulatory and blood conditions	0.20	0.21	0.21
	(0.39)	(0.41)	(0.41)
Respiratory system conditions	0.07	0.07	0.06
	(0.26)	(0.26)	(0.25)
Endocrine, metabolic and nutritional	0.04	0.03	0.02
	(0.19)	(0.18)	(0.15)
Digestive system (stomach, liver, gallbladder,	0.03	0.02	0.03
kidney, bladder)	(0.16)	(0.15)	(0.14)
Neurological and Sensory	0.07	0.07	0.04
	(0.25)	(0.25)	(0.19)
Reproductive System and Prostate	0.002	0.001	0.01
	(0.04)	(0.03)	(0.08)
Emotional and Psychological	0.03	0.02	0.01
	(0.17)	(0.16)	(0.12)
Other	0.05	0.03	0.07
	(0.21)	(0.18)	(0.25)
# of Observations	1604	1066	538

** See text for description of estimation procedure for onset wages. 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 were non-missing.*

Table 2. Acccomodation Experience Among Workers Employed at Onset of Disability

	All	Before A.D.A	After A.D.A
Accommodated at Onset: "Did your employer do anything Special to help you out so that you could stay at work?"	**0.30 (0.46)**	**0.28 (0.45)**	**0.33 (0.47)**
Types of Accommodation Received Among Accommodated Workers			
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)

Data from several waves of the Health and Retirement Study.

Table 3. Linear Probability Estimate of Receiving any Type of Accommodation From Onset Employer. (Robust Standard Errors in Parentheses).

	(I)	(II)	(III)
Variable			
Constant	0.079 (0.08)	0.044 (0.116)	0.044 (0.116)
Onset After Passage of A.D.A.	0.05 (0.023)	0.068 (0.032)	0.056 (0.031)
White	0.065 (0.026)	0.029 (0.032)	0.039 (0.031)
Male	0.012 (0.023)	0.01 (0.028)	-0.002 (0.04)
Onset Age	0.05 (0.1)	0.002 (0.002)	0.002 (0.002)
Years of Schooling	0.01 (0.003)	0.013 (0.004)	0.01 (0.004)
Disability Type Indicators		Yes	Yes
Onset Industry Indicators, Estimated Onset Wage		Yes	Yes
Suffered Accident at Work?			0.12 (0.006)
R-Squared	0.016	0.024	0.04

The data in Table come from multiple waves of data from the Health and Retirement Study. See text for explanations.

Table 4. Linear Probability Estimate of Receiving Particular Types of Accommodation by Onset Employer

	Get someone to help worker	Shorter work day	Permission to change time of arrival or departure	More breaks and rest periods	Special transportation?	Change worker's job to something easier to do	Help to learn new job skills	Get worker special equipment
Onset After A.D.A.	0.0126 (0.029)	0.022 (0.02)	0.036 (0.02)	0.059 (0.023)	-0.001 (0.008)	-0.003 (0.02)	0.01 (0.01)	0.016 (0.011)
R-Squared	0.039	0.0439	0.0352	0.0417	0.0306	0.0254	0.0301	0.0345

Table 5. Log wage regressions of the Effect of Accommodation After the A.D.A. (Robust Standard Errors in Parentheses)

	(I)	(II)	(III)*
Variable			
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, and Occupation Indicators			Yes
R-Squared	0.150	0.182	0.211

*Regressions in this Table also include marital status and number of children as regressors. * Accommodation. status is instrumented for in column (IV). See text for explanations*

Table 6. Estimated Effect on Log Wages of Particular Types of Accommodation in Post-A.D.A. Time Period. (Robust Standard Errors in Parentheses)

	Get someone to help worker	Shorter work day	Permission to change time of arrival or departure	More breaks and rest periods	Special transportation?	Change worker's job to something easier to do	Help to learn new job skills	Get worker special equipment
O.L.S	-0.066	**-0.176**	**-0.161**	**-0.096**	-0.145	0.06	0.03	0.13
Estimates	(0.062)	**(0.07)**	**(0.06)**	**(0.065)**	(0.124)	(0.08)	(0.09)	(0.101)
R-Squared	0.24	0.23	0.21	0.22	0.24	0.24	0.23	0.22
I.V.	-0.051	**-0.193**	**-0.176**	**-0.116**	-0.144	0.041	0.002	0.11
Estimates	(0.082)	**(0.081)**	**(0.077)**	**(0.06)**	(0.185)	(0.082)	(0.09)	(0.132)
R-Squared	0.24	0.245	0.22	0.22	0.25	0.25	0.24	0.22

Note, that each column represents a different regression. All regresssions contain the full set of controls presented in Table 5 column (IV).

Table 7. Linear Probability Estimate of Effect Accommodation by Onset Employer On Separating from Labor Force Within One Year of Onset (Robost Standard Errors in Parentheses).

	(I)	(II)	(III)	(IV)*
Variable				
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 After Passage of A.D.A.	0.217	0.204	0.191	0.07
	(0.032)	(0.033)	(0.03)	(0.06)
Accommodated by Onset Employer * Onset After A.D.A.	0.226	0225	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-Squared	0.185	0.20	0.211	0.233

*Regressions in this Table also include marital status and number of children as regressors. *This is a Two Stage Least Squares regression, where the instruments for accommodation status are described in the text.*