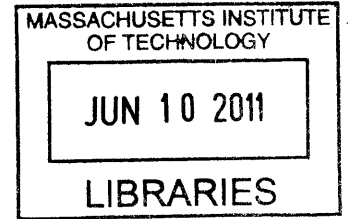# Essays on Disability and Employment

by

Allison V. Thompkins

B.A., Scripps College (2004)

Submitted to the Department of Economics
In Partial Fulfillment of the Requirements for the Degree of   ARCHIVES

Doctor of Philosophy in Economics

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 2011

© 2011 Allison V. Thompkins. All rights reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and
electronic copies of this thesis document in whole or in part
in any medium now known or hereafter created.

Signature of Author..

....
Department of Economics
May 12, 2011

Certified by. ....

....
David Autor
Professor of Economics
Thesis Supervisor

Certified by. .

....
Joshua Angrist
Ford Professor of Economics
Thesis Supervisor

Accepted by

....
Esther Duflo
Abdul Latif Jameel Professor of Poverty Alleviation and Development Economics
Chairman, Departmental Committee on Graduate Studies

Essays on Disability and Employment

by

Allison V. Thompkins

Submitted to the Department of Economics on May 12, 2011
in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy in Economics

ABSTRACT

This dissertation consists of three essays which examine the impact of public policy on labor market outcomes of those with disabilities.

The first essay analyzes a microlending program for people with disabilities in India. People with disabilities are disproportionately represented among the poorest of the poor in developing countries. An increasingly common method of combating poverty in developing countries, providing microlending through self help groups, has been largely unavailable to the disabled. This essay reports on one of the first programs in India to provide people with disabilities access to self help groups and microlending. Between 2002 and 2004, the Indira Kranthi Patham program began over 23,000 self help groups for people with disabilities in rural Andhra Pradesh. I evaluate the effect of this program on borrowing, education, labor market, and asset ownership outcomes by comparing people with disabilities to their non-disabled siblings in treatment and control villages. The estimates suggest that the program led to increased borrowing, education, and asset ownership, while having negative to zero impact on labor market participation among the disabled.

The second essay evaluates the labor market effects of the American with Disabilities Act. In 1990, Congress passed the Americans with Disabilities Act(ADA) to improve the labor market opportunities of the disabled. Immediately following the enactment of the ADA, the employment rate of people with disabilities declined. However, the longer term labor market consequences of the ADA have not been studied. Interest in the longer term post-ADA employment trends of people with disabilities derives from the weakening of the ADA's employment provisions by the Supreme Court. The weakening of these provisions has decreased the cost to employers of hiring disabled workers. This essay uses variation in state disability laws and data from twenty years of the March Current Population Survey to determine the short and longer term impact of the ADA on labor market outcomes of people with disabilities. The estimates suggest that the ADA led to a short-term decline in weeks worked and labor force participation of those with disabilities while having an insignificant impact on these outcomes in the medium and longer run.

The final essay explores the wage implications of the American with Disabilities Act for those with disabilities. Those with disabilities have persistently lower wages than the non-disabled. To improve labor market outcomes of the disabled, Congress passed the Americans with Disabilities Act (ADA). Immediately following the enactment of the ADA, the wages of people with disabilities decreased. However, the longer term wage consequences of the ADA have not been studied. Interest in longer term post-ADA wage trends of people with disabilities derives from the weakening of the ADA's employment provisions by the Supreme Court. This essay uses variation in state disability laws and data from twenty years of the March Current Population Survey to determine the short and longer term impact of the ADA on the log weekly wages of people with disabilities. Using data from the March Current Population Survey, this essay shows that the ADA led to a longer term increase in

the weekly wages of those with disabilities. This finding is sensitive to the composition of the sample. Furthermore, this essay presents evidence that the wage effect of the ADA varies according to level of education.

Thesis supervisor: David Autor
Title: Professor of Economics

Thesis supervisor: Joshua Angrist
Title: Ford Professor of Economics

Contents

3 The Earnings Consequences of the Americans with Disabilities Act   96

Acknowledgements

I would like to thank my advisor, David Autor, for his unparalleled guidance, support, and mentorship over my doctoral studies. He has had a profound impact on me both professionally and personally and I thank him for his lessons. This thesis benefitted tremendously from his thoroughness and patience. I also thank my advisor, Joshua Angrist, for his guidance and support during the writing of my dissertation. His comments and encouragement were invaluable. I thank Esther Duflo for her guidance and support during my doctoral studies. These three professors serve as inspirations to me both professionally and personally. I also thank the staff of the Economics department for their assistance throughout my doctoral studies.

MIT's Disability Services Office and Parking & Transportation Office have been invaluable to me during my time at MIT. The staffs of both offices have ensured that I could fully participate in, and benefit from, the academic, extracurricular and social opportunities that abound at MIT.

I thank my fellow classmates for sharing their intelligence, kindness and amazing sense of humor with me during my time at MIT. To my family, this thesis is a testament to the power of love, support, and unwavering faith. I thank my parents for their love, nurturing and belief in the power of the human spirit. I thank my sister for her love and always believing in me. You all serve as a remarkable inspiration and I am so grateful to have you in my life!

Chapter 1

Microlending in India: An Equal Access Possibility

1.1 Introduction

Interest in microlending to people with disabilities as a means of diminishing poverty and isolation among this group in developing countries has grown in recent years. People with disabilities are disproportionately represented among the poorest of the poor in developing countries, are more prone to severe and prolonged poverty and are "among the most excluded in India".[1] Among those with the least education in developing countries, disabled workers earn roughly 33 percent of comparable non-disabled workers.[2] The Economic and Social Commission for Asia and the Pacific notes that "persons with disabilities... remain disproportionately undereducated, untrained, unemployed, underemployed and poor." Thus, as DFID writes, "given the high proportion of people with disabilities among the poor, it is

---

[1] Singal and Jeffrey (2009).
[2] http://www.ilo.org/public/english/standards/relm/gb/docs/gb295/pdf/esp-3.pdf.

unlikely that these targets [international targets of poverty eradication etc.] can be properly achieved without specific efforts to tackle disability."[3]

This essay examines the effects of the Indira Kranthi Patham(IKP) program for people with disabilities in Andhra Pradesh, India. In 2002, Indira Kranthi Patham, a national program in Andhra Pradesh, launched its disability interventions. Between 2002 and 2004, more than 23,500 self help groups for the disabled were started with over 240,000 members and over 69,000 people with disabilities securing microloans. Customarily, self help groups are comprised of poor women and are formed at the village level; the purpose of self help groups is to alleviate the poverty of, and empower, women by providing access to microloans and education on social issues.

The goals of the IKP program were to enhance the economic livelihood of the disabled, optimize their residual abilities, sensitize the community for the inclusion of people with disabilities, and mainstream disability issues into public policy. This program signaled a change in the approach to disability and microlending programs. Prior to IKP, two other programs in India provided microlending to people with disabilities. The National Handicapped Finance and Development Corporation provided microloans to 19,643 people with disabilities between 1997 and 2005 and the Micro-Finance Scheme dispersed loans to 1,365 people with disabilities between 1997 and 2003.

The identification strategy in this essay uses the fact that exposure to the IKP disability interventions varied by village of residence and disability status. Specific villages were selected to receive the program, while others were not. This creates the second level of comparison between treatment villages and control villages. The first level of difference is within each village. In treatment villages, only those with disabilities were intended to participate in the program. The non-disabled siblings of people with disabilities were not supposed to receive treatment in treatment villages. In control villages, neither people with disabilities nor their non-disabled siblings were targeted to receive treatment. *A priori,* non-disabled siblings are assumed to have better outcomes than their disabled counterparts in the absence of the intervention. Therefore, the program, if successful, should have reduced the difference in outcomes

---

[3] DFID (2000).

between those with disabilities and their non-disabled siblings in treatment villages relative to the difference in outcomes between the disabled and their non-disabled siblings in control villages. I use a difference-in-differences estimator that controls for the variation of outcomes across disability status and village of residence. Only the combination of these two variables is treated as exogenous.

The question of whether participation in microlending causes an improvement in outcomes is a basic concern for development economists. A large body of literature exists on the impacts of microlending. There is, however, a lack of consensus about the efficacy of microlending to lift poor people out of poverty. A number of studies find that microlending leads to positive impacts (Pitt and Khandker 1998; Copestake et al. 2001; Tedeschi 2008). Others are more mixed (Copestake et al. 2005; Banerjee et al. 2010). And other studies find that microlending has no impact on participants (Morduch 1998; MkNelly and Lippold 1998; Coleman 1999). To my knowledge, one paper, Mont and Sen (2009) evaluates microlending to the disabled. They evaluate the Indira Krathi Patham program evaluated in the present essay. They find positive effects of microlending to the disabled but do not employ econometric techniques to address identification problems.

The data constructed for this analysis suffers from two potential sources of bias. First, treatment was non-randomly assigned to villages. As a result, there is imbalance in the characteristics of people with disabilities in treatment villages and the characteristics of people with disabilities in control villages. To remedy the absence of random assignment, I include non-disabled siblings as an additional control and employ a difference-in-differences estimator. The use of non-disabled siblings as a control will mitigate the bias from non-random assignment as long as the difference in potential outcomes between those with disabilities and non-disabled siblings is independent of treatment status. Second, some people with disabilities in control villages received treatment, leading to two-sided non-compliance. This bias is resolved by using a treatment village indicator variable as an instrument for individual treatment status and estimating equations by two stage least squares.

The IKP program increased participation in self help groups among the disabled. Results show that the program also increased borrowing, school attendance and asset ownership but did not impact

9

employment or wages among people with disabilities. To test the import of including non-disabled siblings in the analysis, the essay reports estimates of IKP's effect using specifications which exclude non-disabled siblings. The results suggest that including siblings alters the estimated impact of IKP on education and labor market outcomes but does not affect the estimated impact on borrowing.

The remainder of this essay is organized as follows. Section 1.2 provides background on people with disabilities in India and describes the IKP program in more detail. Section 1.3 describes the data and presents descriptive statistics from the survey of IKP respondents. Section 1.4 outlines the empirical strategy of the essay. Section 1.5 presents and discusses estimates of the effect of IKP on borrowing, education, labor market and asset ownership outcomes. Section 1.6 concludes the essay.

1.2 Background

1.2.1 Disability in India

This subsection presents a brief overview of the status of people with disabilities in India. It draws extensively from Singal and Jeffrey (2009) and World Bank (2007).

Disability in India is often taken as a type of divine punishment, which complicates the delivery of social services. In Andhra Pradesh in 2002, 40 percent of people believed disability to be a punishment or curse by God. Furthermore, in rural India, 50 percent of people believe children with mental illness or cognitive disabilities cannot attend school. The same survey reveals that more than 50 percent of people feel that the disabled should not be allowed to participate in certain celebrations and that disabled people cannot be successfully employed. The majority of those in rural India believe people with disabilities should marry others with disabilities and believe disabled women are unable to care for a family. Such perceptions are held by both the disabled and the non-disabled and account for much of the social isolation experienced by those with disabilities. Due, in part, to these perceptions of disability, reliable measures of disability prevalence in India are nonexistent as many with disabilities do not identify themselves as disabled. Additionally, the definition of disability varies from survey to survey causing

some to be identified as disabled in some surveys but not identified as disabled in other surveys. This results in disability prevalence rates ranging from a low of 1.8 percent to a high of 6 percent.

Since prevailing attitudes in India suggest that people with disabilities cannot attend school, disabled people in India have limited interaction with educational institutions. Educational attainment, school enrollment, and literacy rates of the disabled are lower than their non-disabled counterparts. For example, in 2005, children with disabilities had an out-of-school rate more than five times higher than non-disabled children and 52 percent of the disabled in India were illiterate compared to 35 percent of the non-disabled.[4] This translates to fewer opportunities to engage in income-generating activities. Chiefly, the disabled have substantially lower employment rates than the non-disabled. The lower labor force attachment of the disabled persists over the entire life cycle. Disabled men have an employment rate 14 percent lower than non-disabled men and over 50 percent of the difference was due to unobservable characteristics, which suggests discriminatory behavior towards disabled men in the labor market.[5]

A natural consequence of reduced education and labor market opportunities and the stigma associated with disability is the tight link between disability and poverty. This phenomenon is particularly acute in rural India where poverty rates are more than double urban poverty rates and disability rates are higher. Approximately 8.6 percent of rural households have a disabled member compared to 6.1 percent of urban households. The poverty experienced by people with disabilities is most noticeable at the household level. Households with disabled members have lower ownership rates of assets and are significantly less likely to eat three meals per day. As the wealth of a household increases, the number of people with disabilities in the household decreases, indicating either that households with a disabled member may have lower levels of wealth due to the need to provide for a household member who does not participate in the labor market or those with disabilities have lower levels of wealth. Additionally,

---

[4] O'Keefe (2007).

[5] The Government of India and private entities have undertaken the following initiatives to improve the labor market outcomes of the disabled: quotas for the employment in the public sector, Employment Exchanges, microlending, Vocational Rehabilitation Centers and Non-Governmental Organizations Initiatives. However, these initiatives have had relatively little success in improving labor market outcomes of the disabled in rural areas due to factors such as inadequate funding, minimal attention to job retention and placement of service centers primarily in urban areas.

women with disabilities have a rate of widowhood that is four times the rate of non-disabled women. One's status as a widow is a key welfare indicator for women as widows tend to have lower average living standards and increased social vulnerability.

1.2.2 Indira Kranthi Patham Program for People with Disabilities

Indira Kranthi Patham helps poor people form self help groups (SHGs), provides managed health services, nutritional interventions and training in capacity building. Indira Kranthi Patham is also known for its outreach to people with disabilities in Andhra Pradesh.

In 2002, Indira Kranthi Patham expanded and formalized its outreach by establishing the Indira Kranthi Patham disability interventions (IKP), which offered people with disabilities the opportunity to participate in self help groups and to secure microlending. To qualify for participation, a person must live in a village covered by the program, meet poverty standards, be between the ages of 5 and 50 years old, and have a disability of 40 percent severity or above.

The severity of each person's disability was determined in one of two ways. Either, a person was evaluated at a disability certification camp and given a disability certificate indicating severity of disability. Or, a person self-reported his functional limitations. To meet the 40 percent disability threshold, a person who self-reported having a disability must report having "some" difficulty performing at least two activities of daily living (i.e. walking, seeing) or having "a lot of" difficulty performing at least one activity of daily living.

The IKP program was introduced to villages in 162 mandals throughout Andhra Pradesh.[6] These 162 mandals were assigned to treatment based on the number of people with disabilities residing in the mandal, the interest shown by residents with disabilities in forming self help groups and the extent of economic disadvantage in the mandal. Not all mandals received the same treatment. 78 mandals received the pilot version of the IKP program, which was the most intensive version of the program. The

---

[6] Mandals are subdivisions of states in India. See Figure 1.A.1 in Appendix 1.A.2 for a diagram of the geographical divisions of India.

remaining mandals received either the non-intensive version of IKP or received the IKP program through non-governmental organizations that partnered with IKP. Villages in 953 mandals in Andhra Pradesh were not assigned to treatment and comprise the control group.[7] See Figure 1.A.2 in Appendix 1.A.2 for a graphical representation of treatment and control villages. All villages within each chosen mandal were supposed to receive treatment. However, the availability of IKP staff to lead self help groups and the availability of benefits determined whether a village assigned to treatment actually received treatment. The World Bank reports that "in mostly all villages of the [selected] mandals" self help groups were established and functioning as of August 2008.[8]

Once the mandals were chosen, community development workers identified and recruited people with disabilities from each village to join self help groups (SHGs). Village members compiled a list of people with functional limitations in the village. IKP staff identified those on the list below the poverty line for possible inclusion in SHGs. Once possible participants were identified, IKP staff recruited people with disabilities. In mandals that formed the first SHGs, IKP staff met with those perceived to have the greatest capacity to succeed in SHGs multiple times to encourage their participation. However, recruitment was not a necessary condition for participation.

The program was intended to address unmet needs of the disabled. First, SHGs were designed to meet a minimum of four times per month to provide members the opportunity to meet with group leaders and other group members and to provide the disabled the opportunity to go into public. As discussed in subsection 1.2.1, Indian culture suggests that the disabled should remain out of the mainstream. The requirement that self help group members attend meetings four times per month was one intervention by which the program met its goal of "sensitizing the community [of rural India] for [the] inclusion" of people with disabilities.[9] Second, SHG members were to create an individual business plan, save a minimum of 20 rupees per week and secure loans. These loans were intended to be controlled by the disabled person and were to be used for productive purposes. Since the disabled receive less formal

---

[7] Andhra Pradesh has a total of 1,109 mandals. All mandals not assigned to treatment were considered controls.
[8] ORG Centre for Social Research (2008).
[9] ORG Centre for Social Research (2008).

13

education and participate in the labor market at a lower rate than the non-disabled, such stipulations were meant to improve their economic standing and teach financial independence. Third, self help group members were to learn about government programs that benefit the poor and the disabled. This tenet of the program addressed the lack of awareness among the disabled about disability-centered government programs.[10]

1.3 Data and Descriptive Statistics

1.3.1 IKP Data and Descriptive Statistics

The data used here comes from a one-time administered household survey conducted in the summer of 2008. People with disabilities in 12 mandals were selected to be surveyed. The sample design randomly selected mandals from treatment and control categories. However, oversampling treatment mandals resulted in three-fourths of the sample residing in treatment villages and one-fourth residing in control villages. Eight villages from each mandal were chosen using systematic random sampling.

20 people with disabilities from each village were selected for inclusion in the sample.[11] In treatment villages, 10 people chosen randomly from self help group(SHG) participants and 10 people chosen randomly from SHGs non-participants comprise the survey respondents.[12] In some control villages, people with disabilities formed their own SHGs. In control villages without SHGs, 20 people were randomly chosen to participate in the survey. In control villages that formed SHGs, respondents were chosen in the same manner as in treatment villages. There are a total of 1,920 people with disabilities from 96 villages in the sample.

---

[10] World Bank (2007).
[11] World Bank staff decided to include 20 respondents per village as a result of the following calculations. The 2001 Census of India reports the population of rural Andhra Pradesh to be 53,331,546 which is distributed across 26,6143 villages. This yields an average population of 2,004 people per village. Assuming a disability rate of 1.86 percent, 37 people with disabilities would reside in each village. Hence, IKP staff believed including 20 disabled people from each village in the sample would yield a representative sample of people with disabilities from each village.
[12] If there were fewer than 10 people in the program in a village, all were selected to be surveyed. The rest of the 20 people sampled were chosen randomly from those with disabilities who did not participate in IKP.

Basic data was collected on each individual in the disabled person's household and in-depth self help group, microlending and economic data was collected on the disabled person chosen to participate in the survey. With this data, I constructed a set of controls composed of non-disabled siblings of the disabled respondents. My extract includes those ages 10 years and older because the probability that a child under the age of 10 benefited from a microlending program is minimal. The Data Appendix provides a detailed description of how variables were coded. See Table 1.A.1 in Appendix 1.A.2 for a summary of the sample design.

There are two sample selection issues that must be addressed to minimize the bias in the evaluation. First, the mandals selected to receive interventions were chosen non-randomly. IKP staff chose mandals believed to have both a large number of people with disabilities and people with disabilities who showed substantial interest in forming self help groups. Selecting mandals with a large number of people with disabilities could bias results in either direction. Estimates would be biased upwards if these mandals have unusually highly developed programs for the disabled. Estimates would be biased downwards if the large number of people with disabilities causes each disabled person to receive fewer resources than the average disabled person. Assigning mandals where people with disabilities showed great interest in the program to treatment would likely bias results upwards. To correct the bias of non-random assignment to treatment, I include non-disabled siblings as a control for disabled respondents and employ a difference-in-differences estimator. The key assumption underlying this strategy is the difference in outcomes between the disabled and their siblings in treatment and control villages would be equivalent in the absence of treatment.

Second, although control villages were not intended to receive treatment, some residents formed SHGs, creating two-sided non-compliance. Those in control villages who formed SHGs may bias the estimates of the impact of IKP downward. To nullify this bias, I instrument for individual treatment status with treatment village residency. For instrumental variables to resolve the bias caused by two-sided noncompliance, assignment to treatment must increase the odds that a person receives treatment and assignment to control must *not* increase the odds that a person receives treatment.

15

Descriptive statistics for 1,758 people with disabilities and 565 siblings matched on age are shown in Table 1.1.[13] 37 percent of the disabled in treatment villages and 5 percent of the disabled in control villages participate in self help groups (SHGs). However, none of the 565 siblings participate in self help groups for the disabled. These findings suggest that the sample satisfies monotonicity and confirms that using instrumental variables will resolve bias from two-sided non-compliance. Other descriptive statistics regarding program and outcome variables can be found in Panel C of Table 1.1.

Panel A of Table 1.1 reports the individual characteristics of each sample. T-tests, reported in column (3), conducted on the data reveal the imbalance of the disabled only sample.[14] The disabled only sample in control villages is significantly more likely to be Christian and significantly less likely to be Hindu than the disabled only sample in treatment villages, but this reflects the fact that one-third of the control villages and zero of the treatment villages are located in regions where conversion from Hinduism to Christianity was especially rigorous.

The fact that the disabled only sample in treatment villages is significantly more likely to speak Kannadap reflects the fact that one-third of the treatment villages and none of the control villages border Kannada, and most people who speak Kannadap either live in the state of Kannada or in villages that border Kannada. The disabled only sample in control villages is significantly more likely to belong to Scheduled Tribes which reflects the fact that one-third of the control villages is located in Khammam and Khammam "is the largest tribal populated district in Andhra Pradesh."[15] The fact that the disabled only sample in treatment villages is significantly more likely to belong to Other Backwards Castes and significantly less likely to speak "other" languages is not explained by region of residence and is likely the result of how people with disabilities were identified for inclusion in the sample.

To correct the imbalance in the disabled only sample, I include the matched sibling sample, which is comprised of non-disabled siblings matched on age, as a control. Siblings, on average, are

---

[13] To be included in this sample, non-disabled siblings must be up to 5 years younger or 5 years older than their disabled siblings.
[14] The disabled only sample is comprised of those with disabilities ages 10 and older.
[15] http://www.mapsofindia.com/maps/andhrapradesh/districts/khammam.htm

younger than their disabled counterparts.[16] The matched sibling sample is imbalanced in religion, language, and caste variables. These and other descriptive statistics are reported in Table 1.1. In Panels B, C and D, the matched sibling sample does not have entries for some variables because siblings did not answer the part of the survey corresponding to these variables.

Two noteworthy trends arise when comparing those who received treatment in treatment villages to those who received treatment in control villages. First, 40 percent of disabled residents in treatment villages received a loan through IKP, whereas 97 percent of disabled residents who received treatment in control villages received a loan. Interviews with those who began their own SHGs in control villages reveal that groups began in villages where local banks expressed a willingness to lend to people with disabilities. These villages also had numerous successful women's self help groups run by IKP staff. These women's groups had strong relationships with the same banking institutions used by SHGs comprised of people with disabilities. Additionally, local IKP staff supported those with disabilities in control villages who began their own SHGs. Hence, SHGs started by people with disabilities in control villages shared the following characteristics: (1) they were composed of people desiring loans, (2) they were started in villages where disabled people had equal access to lending institutions, (3) they received support from IKP staff and, (4) they were in most instances patterned after, and used the same linkages as, successful women's self help groups in the same villages.

Second, 22 percent of those who received treatment in treatment villages are on schedule to repay their loans according to the loan agreement while 11 percent of those who received treatment in control villages are on schedule to repay their loans on time. Both of these statistics are low given the percentage of people who received loans. This is suggestive of two phenomena. The first is that the majority of those who secured loans as a result of the program will not be able to repay the loans on time. Second, although a greater percentage of those in control villages who received treatment took out loans, they are less able

---

[16] Non-disabled siblings are younger for two reasons. First, non-disabled siblings included in this survey must reside in the same household as their disabled sibling. On average, the younger the disabled person is more likely he lives in a household with his non-disabled siblings. Second, since non-disabled siblings are within five years of age of their disabled sibling, the matched sibling sample would have a younger age distribution than the disabled only sample.

to repay the loans than those in treatment villages. This suggests either that those in control villages are more constrained than those in treatment villages or that the SHGs in control villages were not as effective in preparing participants to repay the loans on time as SHGs in treatment villages.[17]

1.3.2 Comparison of Characteristics of IKP Participants to Other National Data Sources

Since the data for analyzing the IKP program was gathered non-randomly, it is instructive to compare it to two representative national surveys of India. Appendix 1.A.2 contains tables that compare descriptive statistics of the IKP sample to the NSS 61st Round.

Table 1.A.2 reveals a few differences between the NSS sample and the IKP disabled only and disabled + sibling samples. The higher percentage of males in the IKP samples is due, in part, to how people with disabilities were identified for inclusion into the IKP program. Inclusion in the survey depended upon being identified as disabled by village residents. Further, men with particular functional and physical limitations have an increased chance of being identified as disabled. Therefore, it is possible that the list enumerating people with disabilities in each village included more men than women.[18] Hence, more men would be recruited to participate in the survey as self help group members and non-members.

The younger age of the disabled only sample is caused by the age limit imposed by IKP administrative staff. Since IKP administrators believed that those over the age of 55 were past the age of benefiting from a microlending program, the IKP sample was truncated at age 55. However, the NSS is not truncated and includes people over the age of 55, thereby increasing the average age of the sample. The disabled only and disabled + sibling samples contain higher percentages of those from Scheduled Castes and Scheduled Tribes because IKP participants are required to be below the poverty level. Those from Scheduled Castes and Scheduled Tribes are economically more disadvantaged than members of other castes in India.

---

[17] SHG members were supposed to prepare a Micro Credit Plan for the group, which would detail the amount of the loan and the plan for repayment. These plans were intended to insure that borrowers would be able to repay their loans on time. However, the data suggests that fewer than 20 percent of self help groups required members to prepare the plans.
[18] Mont and Sen (2009).

The disabled only sample is less literate than the NSS. Since the NSS sample is comprised of people with disabilities from rural Andhra Pradesh, one might expect literacy rates to be equivalent between the two samples. However, people included in the IKP survey must be below the poverty line. Perhaps, the lower literacy rate among the IKP sample is a reflection of fewer schooling opportunities among the very poor disabled. Additionally, the disabled only sample has a greater percentage of people in poverty than the NSS. Once again, this is expected given the expressed goals of the IKP program. Table 1.A.3 in Appendix 1.A.2 reports descriptive statistics by district for the disabled + sibling sample and the NSS.

1.4 Empirical Strategy

A natural starting point for IKP impact analysis is an OLS regression of outcome variables on controls and a dummy for program participation. I, therefore, begin with estimates of the following equation:

$$Y_{vi} = \beta SHG_{vi} + \alpha X_{vi} + \pi_v + \epsilon_{vi} \tag{1.1}$$

where Y_{vi} measures outcome variables, such as receiving a loan, for person i in village v, SHG_{vi} is an indicator variable equal to one for those in a self help group, π_v is a set of village fixed effects and X_{vi} is a vector of personal characteristics. In this model, β represents the causal effects of self help group membership on outcome variables. Estimates of β from equation (1.1) are unlikely to be informative about the causal effect of self help group membership on various outcomes because self help group membership is likely to be endogenous and assignment to treatment was non-random. More precisely, conditional on X_{vi}, self help group members may differ causing equation (1.1) to overstate some of the impacts of the program, while understating others. Hence, OLS estimates of the impact of self help group membership on outcomes of interest will be biased. Thus, I use two stage least squares to deal with these issues.

The two stage least squares (2SLS) analysis in this essay combines intention-to-treat (ITT) estimation with difference-in-differences (DD) estimation. ITT resolves bias from two-sided non-compliance. The DD estimation uses the non-disabled siblings of the disabled as a control group. This strategy compares the difference in the outcomes of the disabled and their non-disabled siblings in treatment and control villages by using the interaction of disability status and village of residence as an instrument for self help group membership. The credibility of this approach depends on disability status and village of residence being the only sources of variation.

Disability status and village of residence jointly determine the likelihood of program participation and their interaction is the instrument for borrowing, education and labor market outcomes. The village of residence dummy captures the differences in outcomes between treatment and control village residents. If the disabled only sample was balanced, the village of residence dummy would suffice as the instrument. Since the disabled only sample is imbalanced, using the village of residence as an instrument would violate the exclusion restriction because the village of residence dummy is likely correlated with other covariates.

Hence, I include the matched sibling sample and I interact village of residence with disability status to determine how treatment alters the difference in outcomes between the disabled and their siblings. To be a valid identification strategy, two assumptions must be true. First, it must be that more people with disabilities in treatment villages received treatment than both the disabled in control villages and the non-disabled siblings in treatment and control villages. Panel C of Table 1.1 presents evidence that program participation among the disabled + sibling sample is consistent with monotonicity in assignment to treatment. Second, the difference in outcomes between the disabled and their siblings in treatment and control villages would be equivalent in the absence of treatment.

To determine the first stage relationship between self help group membership and the interaction of treatment village and disability status, I estimate the following equation:

$$SHG_{vi} = \gamma disabled_{vi} + \sigma T_{vi} * disabled_{vi} + \alpha X_{vi} + \pi_v + \epsilon_{vi} \tag{1.2}$$

where SHG_{vi} is a dummy indicating self help group member status, $T_{vi}*disabled_{vi}$ is an interaction of treatment village dummy and disability status dummy, $disabled_{vi}$ is a dummy for having a disability, X_{vi} is a vector of personal characteristics and π_v is a set of village fixed effects. Since the intervention sought to improve various outcomes of the disabled via self help group participation, the first stage must include a dependent variable that encapsulates all of IKP's programmatic goals. The channel by which the program impacted these outcomes was most likely through the total impact of self help group membership, rather than a single component of the self help group program. I, therefore, use self help group membership as the dependent variable in my first stage. Other studies (Pitt and Khandker 1998; Coleman 1999) have shown when evaluating microlending programs across different villages, one should assume village-level heterogeneity that convolutes the true impact of the program exists and correct for it. The fix they use, and the one used for this evaluation, is the inclusion of village fixed effects.

Subsequently, I estimate three alternative specifications of equation (1.2). First, to test the effect of including the matched sibling sample on first stage estimates, I estimate equation (1.2) using the disabled only sample. For this specification, I replace the interaction variable with a dummy for village of residence, and remove village fixed effects as well as the disability dummy. Next, I report specifications that control for most of the variables IKP staff used to select treatment villages in the hope that the variation in treatment eligibility left over is essentially idiosyncratic. To determine the impact of conditioning on assignment to treatment on the first stage, I estimate two alternative specifications of equation (1.2). I estimate equation (1.2) using the disabled + sibling sample and replace village fixed effects with fraction of population with a disability. Lastly, I estimate equation (1.2) using the disabled only sample. For this specification, I replace the interaction variable with a dummy for village of residence, remove the disability dummy and replace village fixed effects with fraction of population with a disability and interest in joining self help groups.

Next, I estimate the reduced form relationship between the variable of interest and borrowing, education, labor market and asset ownership outcomes using the following equations:

$$Y_{vi} = \gamma disabled_{vi} + \eta T_{vi} * disabled_{vi} + \alpha X_{vi} + \pi_v + \epsilon_{vi} \tag{1.3a}$$

$$Y_{vi} = \beta T_{vi} + \alpha X_{vi} + \epsilon_{vi} \tag{1.3b}$$

where Y_{vi} is the outcome of interest, $T_{vi}*disabled_{vi}$ is an interaction of a treatment village dummy and a disability status dummy, $disabled_{vi}$ is a dummy for having a disability, π_v is a set of village fixed effects, T_{vi} is a dummy for being a resident of a treatment village and X_{vi} is a vector of personal characteristics. I estimate equation (1.3a) using the disabled + sibling sample to determine the impact of the program on borrowing, education and labor market outcomes.[19] η indicates the impact of the program on people with disabilities in treatment villages and is the variable of interest. Equation (1.3b) is estimated using the disabled only sample and estimates the impact of the program on asset ownership. β indicates the impact of the program on people with disabilities in treatment villages and is the variable of interest. The inclusion of personal characteristics in the equation partially controls for the imbalance between treatment and control village residents.

To determine the effect of conditioning on the assignment mechanisms, I estimate two alternative specifications. First, I estimate equation (1.3a) for the disabled + sibling sample, replacing village fixed effects with fraction of population with a disability. Second, equation (1.3b) is estimated for the disabled only sample with the introduction of variables controlling for fraction of population with a disability and interest in joining self help groups.

Finally, I estimate the following equations by 2SLS:

$$Y_{vi} = \gamma disabled_{vi} + \eta SHG_{vi} + \alpha X_{vi} + \pi_v + \epsilon_{vi} \tag{1.4a}$$

$$Y_{vi} = \beta SHG_{vi} + \alpha X_{vi} + \epsilon_{vi} \tag{1.4b}$$

---

[19] The disabled + sibling sample combines the disabled only sample and the matched sibling sample.

where the variables are as defined above. I estimate equation (1.4a) using the disabled + sibling sample to find the impact of the program on borrowing, education and labor market outcomes. η indicates the impact of the program on people with disabilities in treatment villages and is the variable of interest. To test the import of including the matched sibling sample, I estimate equation (1.4b) for borrowing, education and labor market outcomes using the disabled only sample. In addition, equation (1.4b) is used to estimate the impact of the program on asset ownership. β indicates the impact of the program on people with disabilities in treatment villages and is the variable of interest.

To be valid, an instrument must be a good predictor of the endogenous variable and cannot be correlated with the error term of the estimating equation. This essay uses the interaction of village of residence dummy and disability status dummy as an instrument for self help group membership for equation (1.4a) and assumes that this interaction is uncorrelated with the error term. Results from the first stage confirm that the interaction of disability status and village of residence is a good predictor of self help group membership. For equation (1.4b), a treatment village dummy is the instrument for self help group membership.

1.5 Results

1.5.1 OLS Estimates

I start by estimating equation (1.1). Table 1.2 presents estimates of equation (1.1) for borrowing, education and labor market outcomes. I compare the disabled and their non-disabled siblings in treatment and control villages. The OLS estimates suggest that self help group members are more likely to receive a loan, be self-employed, graduate from secondary school and experience higher wages. Conversely, self help group members are less likely to be employed or attending school. Table 1.3 presents estimates of equation (1.1) for asset ownership outcomes. The suggested effect of the program is that self help group members own more total assets, animals, kitchen items, small appliances, vehicles, radios/televisions and fewer pieces of furniture and clocks.

23

The interpretation of these results as the causal effect of the IKP program relies on the identification assumption that self help group members are identical to self help group non-members. This assumption will be violated if characteristics of self help group members are correlated with assignment to treatment. Moreover, it will be violated if the disabled self-selected into treatment. The allocation of the IKP program to each village was a function of mandal-level characteristics, resulting in the violation of the first assumption. However, employing econometric techniques that control for these factors will mitigate the bias from the violation of the above assumption. Thus, the next subsection presents two stage least squares estimates.

1.5.2 Two Stage Least Squares Estimates

Estimates of equation (1.2) are of intrinsic interest because they provide an assessment of the impact of the IKP program on self help group membership. But, they also represent the first stage of a two stage least squares (2SLS) estimation of the impact of IKP on borrowing, education, labor market and asset ownership outcomes.

The results of the first stage, using the disabled + sibling sample, are reported in column (1) of Table 1.4. The estimates confirm that the interaction between the village of residence dummy and the disability status dummy is significantly associated with self help group membership in the expected direction.

A key empirical strategy in this essay is the inclusion of non-disabled siblings as a control. Column (2) of Table 1.4 presents estimates of equation (1.2) using the disabled only sample. Results from this alternative specification show that the estimate of interest decreases from .340 to .259 when siblings are excluded. This indicates that the inclusion of siblings has a sizeable effect on the size of the first stage estimate but does not impact the expected relationship between self help group membership and the variable of interest.

24

To determine the impact of conditioning on assignment to treatment on the first stage, column (3) of Table 1.4 reports results of an alternative specification of equation (1.2), which replaces village fixed effects with the fraction of village population with a disability. The results show that the estimate of interest is .260.[20] Notable in this table is the finding that the disabled in villages with a larger fraction of people with disabilities are less likely to participate in SHGs, which suggests the assignment mechanism may not have been effective. Also, IKP's effect on SHG membership is remarkably consistent across alternative specifications of the first stage, suggesting estimates from these specifications suffer from the same bias.

Under the assumptions discussed in section 1.4, the interaction between village of residence and disability status is available as an instrument for equation (1.3a) for borrowing, education and labor market outcomes. This instrument was shown to be highly correlated with the endogenous variable in the first stage.

Results of estimating equation (1.3a) for borrowing are presented in column (1) of Tables 1.5 and 1.6. Table 1.5 shows the baseline OLS estimates using the disabled + sibling sample. The estimated impact on borrowing is 8.9 percentage points with the inclusion of religion, language and caste controls. Table 1.6 reports estimates of the reduced form using the disabled only sample. Column (1) shows that the exclusion of non-disabled siblings slightly increases the estimate for borrowing from .089 to .091. Next, I estimate the program's impact on borrowing by conditioning on the assignment mechanism. Column (1) of Tables 1.A.4 and 1.A.5 in Appendix 1.A.2 show that conditioning on assignment to treatment does not substantively alter the findings from the baseline estimation, suggesting that estimates of IKP's impact on borrowing behavior derived from the alternative specifications does not suffer from bias.[21]

---

[20] Column (4) reports estimates of equation (1.2) which replaces village fixed effects with fraction of village population with a disability and a dummy for interest in joining a self help group. The estimated impact of IKP from this estimation is similar to the other specifications.

[21] Estimations that included village ranking by percent of population disabled in place of fraction disabled produced nearly identical results to the ones presented in Appendix 1.A.2.

25

Column (1) of Table 1.7 presents 2SLS estimates of equation (1.4a) for the disabled + sibling sample. Religion, language and caste controls are included in the estimation. The point estimate (.280) is substantially higher than the baseline OLS estimate. The point estimate (.346) using the disabled only sample is substantially higher than the 2SLS estimate using the disabled + sibling sample and suggests that the difference in the first stage estimate between the two samples alters the estimated impact of IKP on borrowing. However, the OLS and 2SLS results from both samples suggest that IKP increased borrowing among the disabled.

Next, I estimate equation (1.3a) by OLS for the following education outcomes: attending school and graduated from secondary school. The results are presented in columns (2) and (3) of Tables 1.5 and 1.6. Table 1.5 shows IKP on increased school attendance and graduation from secondary school by 11.4 percentage points and 2.5 percentage points, respectively. However, IKP's impact on graduating from secondary school is insignificant. Columns (2) and (3) of Table 1.6 report that the exclusion of siblings decreases the value and precision of the estimated impact of IKP on school attendance and graduation rates from secondary school.[22]

Estimates from specifications excluding the matched sibling sample suggest a smaller effect of IKP on education outcomes than estimates using the disabled + sibling sample. This could be caused, in part, by two factors. First, the disabled only sample in control villages has a significantly greater percentage of those in the general social group and the disabled only sample in treatment villages has a significantly greater percentage of members of Other Backwards Castes. There is substantial difference in school attendance across castes in India.[23] Hence, estimates using the disabled only sample will likely yield biased estimates of IKP's impact on education outcomes. Second, since equations run on the

---

[22] Tables 1.A.4 and 1.A.5 in Appendix 1.A.2 show that the specifications which condition on the assignment mechanism yield similar results to the ones discussed in this paragraph.

[23] Bertrand et al. (2007).

disabled only sample exclude village fixed effects, it is plausible that a portion of the bias is due to not controlling for village-level heterogeneity.[24]

Columns (3) and (5) in Table 1.7 present 2SLS estimates of equation (1.4a) for the disabled + sibling sample.[25] The point estimate for attending school (.309) is higher than the OLS estimate as is the point estimate for graduated from secondary school (.109). The 2SLS estimates for the disabled only sample, presented in columns (4) and (6), are significantly smaller than the estimates using the disabled + sibling sample.

However, results using the disabled + sibling sample suggest that IKP improved school attendance among the disabled, which is noteworthy and leads one to ponder the mechanism through which this operates. Perhaps, increased liquidity enabled the disabled to pay for schooling or enabled them to pay for consumption while in school. Or, perhaps the program increased the empowerment of those with disabilities and caused them to believe they could benefit from an education that might lead to increased occupational opportunities. Long-term data with answers to the above questions would be useful to determine which mechanism was at work.

Also evident from Table 1.5 is the fact that although IKP had positive and statistically significant effects on borrowing and school attendance, IKP had a larger effect on school attendance. This suggests that the program effects operated through channels other than, or in addition to, microlending. Further study into the precise channel through which IKP affected the school attendance of those with disabilities would be instructive.

Turning to labor market outcomes, I estimate equation (1.3a) for employment and wages. Results are presented in columns (4) through (6) of Table 1.6 and columns (1) through (3) of Table 1.8. Estimates of the impact of IKP on log imputed wage are determined for the sample of those who reported being

---

[24] Interestingly, estimates using the disabled only sample are similar to estimates using the disabled + sibling sample that replace village fixed effects with fraction of population with disability. Since estimates of IKP's effect on education from specifications replacing village fixed effects with fraction of population with a disability yields estimates similar to the disabled only specification, it is likely that the variable, fraction of population with a disability, does not adequately control for some village-level characteristics.

[25] The interaction of disability status and village of residence instruments for self help group membership for labor market outcomes.

employed in a wage or salary position. Table 1.8 reports OLS estimates using the disabled + sibling sample. The estimated impact of IKP on employment, self-employment and log imputed wages are -9.9 percentage points, -6.2 percentage points and -12.8 percentage points, respectively.[26] All estimates are insignificant.

Columns (4) through (6) of Table 1.6 report that the exclusion of siblings causes the reduced form estimates for the program's impact on employment and log imputed wage to become positive and attenuates the estimate for self-employment. The estimate for log imputed wage becomes significant. In other words, including the matched sibling sample causes the estimates of the variable of interest for all labor market outcomes to decrease.

Table 1.9 presents 2SLS estimates of equations (1.4a) and (1.4b) for employment and wages.[27] The point estimate for employment (-.157) is lower than the OLS estimate as are the point estimates self-employment (-.117) and log imputed wages (-.152), which continues the trend of 2SLS estimates suggesting a larger impact of the program than OLS estimates. Notable is the finding that the 2SLS estimate of IKP's impact on log imputed wages becomes positive and significant when using the disabled only sample.[28]

The results of the 2SLS estimation using the disabled + sibling sample reinforce the finding that the program had an insignificant impact on the labor market outcomes of those with disabilities in treatment villages. Given the finding from the baseline specification that IKP did not affect labor market participation or wages, it is somewhat surprising that all of the alternative specifications suggest nearly identical positive and significant impacts of IKP on wages. This suggests that among those with disabilities, treatment village residents earn more. However, since alternative specifications exclude

---

[26] Replacing village fixed effects with the fraction of population with a disability and interest in joining self help groups causes the estimate of IKP's effect on wage to become positive and significant. This is reported in Tables 1.A.4 and 1.A.5 in Appendix 1.A.2.

[27] The interaction of disability status and village of residence instruments for self help group membership for labor market outcomes when using the disabled + sibling sample.

[28] IKP's estimated effects on labor market outcomes for the disabled only sample are presented in columns (2), (4) and (6) of Table 1.9. An indicator for residing in a treatment village instruments for self help group membership when using the disabled only sample.

village fixed effects and conditioning on the assignment mechanism does not control for village-level heterogeneity, it is likely that the results are biased. For example, treatment villages may have a higher fraction of high-paying jobs, which would cause people with disabilities in treatment villages to have greater access to high-paying employment, thereby causing the disabled in treatment villages to have higher average earnings.[29] It is likely that the village fixed effects in the baseline specification control for this heterogeneity.

The insignificant impact on the short-run employment outcomes of the disabled, as reported from the baseline estimations, is expected in light of the findings that the IKP program significantly increased school attendance among those with disabilities. Since those in the IKP program are more likely to be attending school, and assuming that education acquisition and labor market participation are ordered and linear (i.e. one cannot work until literate), the findings regarding labor market participation are consistent with improved education outcomes. Perhaps increased school attendance among the disabled will enable those with disabilities to engage in income-generating activities in the long run. An area for future research is determining the long-term labor market outcomes of IKP participants.

Lastly, I estimate equation (1.3b) by OLS for asset ownership outcomes and results are presented in Table 1.10. Since this estimation includes the disabled only sample and excludes village fixed effects, these results could suffer from substantial bias and are merely suggestive. The estimated impact of IKP on asset ownership is significant for 3 of 8 asset measures. The IKP program increased total assets (3.847), animals (1.466) and kitchen items owned (2.768). The number of total assets owned is 27 percent higher for those in treatment villages. This increase in total assets owned is driven by a 46 percent increase in the number of animals owned and a 48 percentage point increase in the number of kitchen items owned.

---

[29] Within the disabled only sample, a greater percentage of those residing in treatment villages are employed in the non-agricultural sector than those in control villages. Those employed in the agricultural sector tend to earn lower wages than those employed in the non-agricultural sector.

Table 1.11 presents 2SLS estimates of equation (1.4b) for asset ownership outcomes.[30] Estimates are significant for the three same asset ownership variables. The point estimate for total assets (14.866) is higher than the OLS estimate as are the point estimates for animals (5.662) and kitchen items (10.696). The results of the estimation reinforce the finding that the IKP program may improve asset ownership among households with a disabled member.

However, an increase in the number of animals owned has different implications than an increase in the number of kitchen items owned due to the disparate uses of the assets. The increase in the number of animals owned could indicate that a fraction of those in treatment villages who received loans used their increased liquidity to invest in productive activities. Conversely, an increase in kitchen items indicates that a portion of those in treatment villages used loans to purchase assets for consumption which could be problematic if borrowers are unable to repay these loans on time. As reported in Table 1.1, less than half of the people who took out loans through IKP are on schedule to repay their loans. Hence, it is likely that a non-trivial percentage of those who took loans used the increased liquidity to smooth consumption rather than for income-generating activities which suggests the program may leave a fraction of this population in debt.

Additionally, an increase in the number of animals owned of 46 percent seems a bit high. Items included in this asset category range from chickens to cows. Hence, this magnitude could be plausible if the increase in animals owned derived from increased ownership of inexpensive animals and would be less plausible if the increase in animals owned derived from increased ownership of more expensive animals. Further research is needed to determine the precise impact of microlending on the asset ownership of people with disabilities.

1.6 Conclusion

---

[30] A treatment village resident indicator variable instruments for self help group membership for asset ownership outcomes.

The IKP disability interventions led to an increase in self help group participation, borrowing, education outcomes and asset ownership outcomes, and did not impact labor market participation among the disabled. The estimates of the effect of the program on the borrowing of people with disabilities range from .08 to .28 and the program's estimated effect on school attendance ranges from .114 to .309. However, these improvements were not accompanied by improved labor market outcomes.

Three alternative specifications to the baseline estimations were proposed and executed. The first alternative estimation, which excluded non-disabled siblings, yielded estimates similar to the baseline estimation for borrowing. However, excluding siblings suggests IKP did not impact education or labor market outcomes. The second alternative, which replaced village fixed effects with fraction of population with disability, and third alternative, which replaced village fixed effects with fraction of population with disability and interest in joining self help groups, yielded results similar to the first alternative specification.

While the outcomes of IKP disability interventions studied in this essay suggest the program did impact those with disabilities, the long-term economic well-being of IKP participants is unclear. As alluded to in the previous section, most of the people who secured loans through IKP are not on schedule to repay their loans on time. If, by virtue of their participation in IKP, the disabled smooth short-term consumption but experience greater debt, it is plausible that their participation in IKP may not improve their long-term well-being. Additionally, understanding the future labor market outcomes of current IKP participants who enrolled in school as a result of the IKP program would be of interest in determining the long-term well-being of IKP participants. If IKP participants experience greater future labor market participation and increased wages due to their participation in IKP, the program may have laid the foundations for improved economic well-being among the disabled.

References

Ackerly, BA., "Testing the Tools of Development: Credit Programmes, Loan Involvement and Women's Empowerment," *IDS Bulletin,* 26, (1995), 56-68.

Banerjee, A., Duflo, E., Glennerster, R., and Kinnan, C., "The miracle of microfinance? Evidence from a randomized evaluation," *Unpublished mimeo,* (2010).

Coleman, B., "The Impact of Group Lending in Northeast Thailand," *Journal of Development Economics,* 60, (1999), 105-141.

_____, "Microfinance in Northeast Thailand: Who Benefits and How Much," *World Development,* 34, (2006), 1612-1638.

Copestake, J., S. Bhalotra, and S. Johnson, "Assessing the Impact of Microcredit: a Zambian Case Study," *Journal of Development Studies,* 37, (2001), 81-100.

Copestake, J., Dawson, P., Fanning, J.P., McKay, A. and Wright-Revolledo, K., "Monitoring the diversity of the poverty outreach and impact of microfinance: a comparison of methods using data from Peru," *Development Policy Review,* 23(6), (2005), 703-723.

Deaton, A. and Jean Dreze, "Poverty and Inequality in India, a Reexamination," *Economic and Political Weekly,* (2002), 3729-3748.

DFID, "Disability, Poverty and Development," DFID Paper, (Social Development Department), 2000.

Economic and Social Commission for Asia and the Pacific, "Biwako Millennium Framework for Action towards an Inclusive, Barrier-Free and Rights-Based Society for Persons with Disabilities in Asia and the Pacific," Unescap, 2 August 2009, http://www.unescap.org/stat/cos13/cos13_1e_infl.pdf.

Edgcomb, E. and C. Garber, "Practitioner-Led Impact Assessment: a Test in Honduras," AIMS Paper, (The Small Enterprise Education and Promotion Network), 1998.

Goetz, AM and R. Sen Gupta, "Who Takes the Credit? Gender, Power and Control Over Loan Use in Rural Credit Programmes in Bangladesh," *World Development,* 24 (1994), 45-63.

Greene, W.H. Econometric Analysis, (Upper Saddle River: Prentice-Hall Inc.), 1997.

Hashemi, SM, SR Schuler, and AP Riley, "Rural Credit Programs and Women's Empowerment in Bangladesh," *World Development,* 24, (1996), 635-653.

Jeffrey, R. and N. Singal, "Transitions to Adulthood for Young People with Disabilities in India: Current Status and Emerging Prospects," *Asia Pacific Disability Rehabilitation Journal,* 20, (2009), 15-40.

Kabeer, N., "Conflicts Over Credit: Re-Evaluating the Empowerment Potential of Loans to Women in Rural Bangladesh," *World Development,* 29, (2001), 63-84.

Kaboski, J. and R. Townsend, "Policies and Impact: An Analysis of Village-Level Microfinance Institutions," *Journal of the European Economic Association,* 3(1), (2005), 1-50.

Mitra, S. and U. Sambamoorthi, "Employment of Persons with Disabilities. Evidence from the National Sample Survey," *Economic and Political Weekly*, 41, (2006), 199-203.

MkNelly, B. and K. Lippold, "Practitioner-Led Impact Assessment: a Test in Mali," AIMS Paper, (Freedom from Hunger and Management Systems International), 1998.

Montgomery, R., D. Bhattacharya, and D. Hulme, "Credit for the Poor in Bangladesh," *Finance against Poverty,* Hulme D, P. Mosley (eds). (Routeledge: London), 1996.

Morduch, J., "Does Microfinance Really Help the Poor? New Evidence from Flagship Programs in Bangladesh", *Unpublished mimeo*, 1998.

NSSO, *Disabled Persons in India, NSS 58ᵗʰ round (July-December 2002),(*2003), National Sample Survey Organisation: New Delhi.

ORG Center for Social Research, "Study SHG and Government Programs for People with Disabilities in Andhra Pradesh", *Unpublished mimeo*, 2008.

Osmani, L., "A Breakthrough in Women's Bargaining Power: the Impact of Microcredit," *Journal of International Development,* 19, (2007), 695-716.

Pitt, M. and S. Khandker, "Household and Intra-Household Impact of the Grameen Bank and Similar Targeted Credit Programs in Bangladesh." World Bank Discussion Paper No. 320, 1996.

_____, "The Impact of Group-Based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter?," *Journal of Political Economy, 106,* (1998), 958-996.

Registrar General of India, *Census of India,* (2001) [cited February 2010], Available from: http://www.censusindia.net.

Schuler, SR, SM Hashemi, AP Riley, and A. Akhter, "Credit Programs, Patriarchy and Men's Violence Against Women in Rural Bangladesh," *Social Science and Medicine,* 43, (1996), 1729-1742.

Tedeschi, G., "Overcoming Selection Bias in Microcredit Impact Assessments: A Case Study in Peru," *Journal of Development Studies,* 44, (2008), 504-518.

World Bank, *People with Disabilities in India: From Commitments to Outcomes,* (New Delhi: Human Development Unit, South Asia Region, The World Bank, 2007).

TABLE 1.1
DESCRIPTIVE STATISTICS FOR IKP SAMPLE BY VILLAGE TYPE

	Disabled Only sample			Matched Sibling sample			Disabled who received treatment	
	Treatment Villages (1)	Control Villages (2)	T Statistic (3)	Treatment Villages (4)	Control Villages (5)	T Statistic (6)	Treatment Villages (7)	Control Villages (8)
Panel A: Individual Characteristics								
Female	38%	42%	1.21	40%	40%	0.16	35%	24%
Age (in years)	29.3	29	0.38	17.9	18.3	0.61	28.4	30.8
Youth	27%	23%	1.34	70%	64%	1.09	24%	14%
Young adult	24%	29%	1.24	25%	32%	1.45	33%	30%
Middle age	20%	25%	1.32	4%	4%	0.09	19%	38%
Elderly	28%	23%	1.44	1%	0%	4.49	25%	18%
Married	47%	48%	0.12	7%	15%	1.86	45%	61%
Religion (%)								
Hindu	99%	95%	3.21	99%	95%	3.46	99%	100%
Islam	0%	1%	1.11	0%	0%	4.48	0%	0%
Christian	0%	3%	3.33	0%	4%	3.21	1%	0%
Sikh	0%	0%	0.63	0%	1%	1.96	0%	0%
Language (%)								
Telugu	84%	83%	0.13	82%	75%	0.70	73%	91%
Urdu	1%	1%	0.38	1%	0%	1.02	2%	0%
Hindi	1%	1%	0.01	0%	0%	0.72	0%	0%
Tamil	0%	0%	0.81	0%	0%		0%	0%
Kannadap	13%	0%	5.41	15%	0%	4.64	24%	0%
Other	2%	16%	4.86	2%	25%	4.71	1%	9%
Caste (%)								
General	16%	24%	1.61	17%	27%	1.39	17%	18%
Scheduled Tribe	4%	30%	5.95	5%	36%	3.91	4%	15%
Scheduled Caste	19%	28%	1.45	16%	19%	0.52	16%	37%
Other Backwards Caste	60%	15%	6.74	62%	12%	5.53	62%	30%
Other	1%	3%	1.83	1%	6%	1.98	1%	0%
Panel B: Disability Measures (%)								
Cause								
Birth	60%	62%	0.67	--	--	--	70%	67%
Illness	31%	28%	0.89	--	--	--	22%	20%
Injury	10%	10%	0.41	--	--	--	8%	13%
Type								
Multiple	35%	46%	2.33	--	--	--	32%	39%
Sight	8%	10%	0.55	--	--	--	7%	9%
Hearing	9%	7%	1.07	--	--	--	9%	5%
Cognition	7%	12%	2.15	--	--	--	8%	4%
Self Care	0%	0%	5.23	--	--	--	0%	0%
Communication	3%	2%	1.68	--	--	--	3%	0%
Mobility	38%	25%	3.39	--	--	--	42%	44%
Number of Observations	1322	436		448	117		568	50

NOTES -- This table reports descriptive statistics for the disabled only sample, the matched sibling sample and the sample of people who received treatment in each type of village.

34

TABLE 1.1 continued

DESCRIPTIVE STATISTICS FOR IKP SAMPLE BY VILLAGE TYPE

	Disabled Only sample		Matched Sibling sample		Disabled who received treatment	
	Treatment Villages (1)	Control Villages (2)	Treatment Villages (3)	Control Villages (4)	Treatment Villages (5)	Control Villages (6)
Panel C: Outcome Variables						
Self Help Group Member	37%	5%	0%	0%	100%	100%
Received a Loan	15%	5%	0%	0%	40%	97%
Employed	53%	51%	48%	37%	56%	67%
Self-Employed	17%	15%	10%	6%	24%	23%
Attending School	16%	15%	39%	51%	14%	8%
Graduated from Secondary School	16%	16%	32%	36%	19%	27%
Imputed Wages (Rupees)[a]	36.2	33.9	25.2	22.6	43.0	49.5
Loan Repayment On Schedule	8%	1%	--	--	22%	11%
Increased Access to Disability Programs	34%	5%	--	--	92%	98%
Increased Access to Anti-Poverty Programs	16%	1%	--	--	42%	28%
Panel D: Asset Ownership						
Total Assets	15.4	11.5	--	--	16	13.2
Phone	.2	.2	--	--	0.1	0.3
Animals	3.6	2.2	--	--	4.1	3.1
Vehicles	.5	.4	--	--	0.5	0.4
Furniture	2.5	3.4	--	--	2	3.1
Hi-Tech Items	.6	.7	--	--	0.6	0.7
Time Pieces	1.0	1.0	--	--	0.9	0.6
Kitchen Items	6.7	3.3	--	--	7.4	4.5
Radio/Television	.3	.3	--	--	0.3	0.3
Animals						
Bullock	.4	.2	--	--	0.5	0.2
Buffalo	.4	.4	--	--	0.4	0.3
Cow	.4	.2	--	--	0.4	0.1
Cock/Hen/Duck	1.2	1.2	--	--	1.6	1.5
Pigs	0	0	--	--	0	0
Goats/Sheep	1.2	.2	--	--	1.2	1.1
Number of Observations	1322	436	448	117	568	50

NOTES -- This table reports descriptive statistics for the disabled only sample, the matched sibling sample and the sample of people who received treatment in each type of village.

[a] Imputed wages calculated from the NSS 61st Round (2005).

TABLE 1.2
OLS ESTIMATES FOR THE DISABLED + SIBLING SAMPLE

	Received a loan (1)	Attending school (2)	Graduated from secondary (3)	Employed (4)	Self-employed (5)	Log imputed wages (Rs.)[a] (6)
Self Help Group member	.454 ***	-.004	.065 ***	-.020	.048	.072 *
	(.054)	(.021)	(.024)	(.027)	(.028)	(.038)
Disability dummy	-.036 ***	-.038	-.146 ***	-.178 ***	-.049	-.059
	(.009)	(.031)	(.035)	(.031)	(.018)	(.039)
Female	-.006	-.043 **	-.119 ***	-.015	-.054	-.260 ***
	(.008)	(.022)	(.019)	(.028)	(.018)	(.036)
Youth	-.008	.465 ***	.177 ***	-.320 ***	-.194	-.232 ***
	(.020)	(.036)	(.037)	(.046)	(.040)	(.067)
Young adult	-.002	.044 **	.249 ***	.035	-.061	-.061
	(.018)	(.019)	(.033)	(.042)	(.037)	(.042)
Middle age	.014	.006	.106 ***	.067 *	-.037	.006
	(.019)	(.015)	(.028)	(.039)	(.041)	(.036)
Married	.011	-.062 ***	.021	.278 ***	.083	-.020
	(.013)	(.019)	(.024)	(.034)	(.024)	(.033)
Number of observations	2323	2323	2323	2323	2323	960

NOTES -- This table reports OLS estimates of the impact of SHG participation on borrowing, employment and education outcomes. The models include village fixed effects and control for religion, language, and caste. Column (6) includes the employed disabled + sibling sample, which is a subset of the disabled + sibling sample. All other columns include the disabled + sbling sample. * Indicates significance at the 10% level.   ** Indicates significance at the 5% level.   *** Indicates significance at the 1% level.

TABLE 1.3
OLS ESTIMATES -- ASSET OWNERSHIP FOR DISABLED ONLY SAMPLE

	Total Assets (1)	Animals (2)	Kitchen Items (3)	Small Appliances (4)	Vehicles (5)	Furniture Pieces (6)	Radios/TVs (7)	Clocks (8)
Self Help Group member	1.418	1.337 **	.673	.021	.097 *	-.582 ***	.072 *	-.134 *
	(.948)	(.669)	(.573)	(.052)	(.056)	(.200)	(.042)	(.078)
Female	-1.246 *	-.480	-.143	-.025	-.082 *	-.309 **	-.030	-.104 *
	(.670)	(.396)	(.515)	(.039)	(.045)	(.125)	(.030)	(.055)
Youth	3.364 ***	2.153 ***	.817	.059	.142 **	.055	.052	.123
	(1.267)	(.640)	(.929)	(.068)	(.063)	(.251)	(.054)	(.096)
Young adult	1.994 **	1.235 **	.523	.065	.049	-.011	.023	.095
	(.990)	(.567)	(.723)	(.062)	(.061)	(.185)	(.042)	(.065)
Middle age	1.746	.873 **	1.092	.019	.071	-.234	-.018	-.058
	(1.225)	(.379)	(.886)	(.050)	(.054)	(.197)	(.041)	(.084)
Married	1.749	.917 **	.590	.071	-.006	.079	.021	.142 *
	(1.112)	(.467)	(.865)	(.045)	(.052)	(.174)	(.039)	(.081)
Number of observations	1758	1758	1758	1758	1758	1758	1758	1758

NOTES -- This table reports OLS estimates of the impact of self help group participation on asset ownership for the disabled only sample. All models include religion, language, and caste controls. The small appliances category includes fans and sewing machines. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 1.4
FIRST STAGE ESTIMATES

	SELF HELP GROUP MEMBER			
	(1)	(2)	(3)	(4)
Treatment Village * disability	.340 ***	--	.260 ***	--
	(.042)		(.040)	
Treatment Village dummy	--	.259 ***	--	.229 ***
		(.040)		(.041)
Disability dummy	.060 **	--	.114 ***	--
	(.025)		(.029)	
% of Population with Disability	--	--	-2.501 *	-3.537 *
			(1.461)	(1.858)
Interested in SHG	--	--	--	.247 ***
				(.053)
Female	-.026	-.044 *	-.034 *	-.047 **
	(.016)	(.024)	(.018)	(.023)
Youth	.031	.036	.048	.014
	(.038)	(.050)	(.043)	(.050)
Young adult	.092 ***	.132 ***	.107 ***	.111 ***
	(.033)	(.038)	(.035)	(.039)
Middle age	.034	.053	.042	.042
	(.032)	(.037)	(.035)	(.037)
Married	-.001	.003	.009	-.008
	(.027)	(.034)	(.029)	(.032)
Village fixed effects?	Yes	No	No	No
Number of observations	2323	1758	2323	1758

NOTES -- This table reports first stage estimates for the disabled + sibling sample and the disabled only sample. All specifications include religion, language and caste controls. Columns (1) and (3) include the disabled + sibling sample and columns (2) and (4) include the disabled only sample. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 1.5
REDUCED FORM ESTIMATES USING SIBLING CONTROLS -- BORROWING AND EDUCATION OUTCOMES

	Received a Loan (1)		Attending School (2)		Graduated from Secondary (3)	
Treatment Village * disability	.080 ***	.089 ***	.129 **	.114 **	.028	.025
	(.031)	(.032)	(.059)	(.058)	(.068)	(.074)
Disability Dummy	.049 **	.041 *	-.137 ***	-.126 **	-1.49 **	-.145 **
	(.023)	(.023)	(.05)	(.049)	(.066)	(.071)
Female	-.015	-.016	-.042 *	-.043 *	-1.21 ***	-.121 ***
	(.011)	(.011)	(.022)	(.022)	(.018)	(.019)
Youth	.001	.005	.469 ***	.464 ***	.178 ***	.179 ***
	(.027)	(.027)	(.038)	(.036)	(.04)	(.038)
Young adult	.041 *	.04 *	.045 **	.043 **	.262 ***	.255 ***
	(.024)	(.023)	(.02)	(.019)	(.033)	(.033)
Middle age	.027	.027	.005 ***	.007	.111 ***	.108 ***
	(.023)	(.022)	(.014)	(.015)	(.028)	(.028)
Married	.011	.012	-.065 ***	-.064 ***	.018	.02
	(.02)	(.019)	(.02)	(.019)	(.026)	(.025)
Religion, language and caste controls?	No	Yes	No	Yes	No	Yes
Number of observations	2323	2323	2323	2323	2323	2323

NOTES -- This table reports estimates of equation (1.3a) for borrowing and education outcomes. All specifications include the disabled + sibling sample. * Indicates significance at the 10% level.   ** Indicates significance at the 5% level.   *** Indicates significance at the 1% level.

TABLE 1.6

REDUCED FORM ESTIMATES FOR THE DISABLED ONLY SAMPLE

	Received a Loan (1)	Attending School (2)	Graduated from Secondary (3)	Employed (4)	Self-Employed (5)	Log Imputed Wages (Rs.)[a] (6)
Treatment Village dummy	.091 ***	.008	.012	.005	-.011	.097 ***
	(.031)	(.014)	(.026)	(.044)	(.029)	(.040)
Female	-.030 *	-.042 **	-.103 ***	-.009	-.065 ***	-.266 ***
	(.017)	(.020)	(.019)	(.027)	(.022)	(.031)
Youth	-.010	.458 ***	.165 ***	-.311 ***	-.178 ***	-.273 ***
	(.038)	(.032)	(.037)	(.047)	(.038)	(.072)
Young adult	.060 **	.034 **	.235 ***	.032	-.071 *	-.042
	(.026)	(.014)	(.025)	(.043)	(.040)	(.037)
Middle age	.035	.003	.102 ***	.075 *	-.034	-.005
	(.027)	(.011)	(.025)	(.040)	(.041)	(.034)
Married	.009	-.061 ***	.008	.274 ***	.096 ***	.013
	(.025)	(.012)	(.022)	(.035)	(.026)	(.031)
Number of observations	1758	1758	1758	1758	1758	780

NOTES -- This table reports estimates of equation (1.3b) on borrowing, education and labor market outcomes. All models control for religion, language and caste. Column (6) includes the employed disabled sample, which is a subset of the disabled only sample. All other columns include the disabled only sample. * Indicates significance at the 10% level ** Indicates significance at the 5% level *** Indicates significance at the 1% level.

TABLE 1.7

TWO STAGE LEAST SQUARES ESTIMATES FOR BORROWING AND EDUCATION OUTCOMES

	Received a Loan		Attending School		Graduated from Secondary	
	(1)	(2)	(3)	(4)	(5)	(6)
Self Help Group member	.280 ***	.346 ***	.309 *	.032	.109	.046
	(.079)	(.091)	(.163)	(.055)	(.206)	(.100)
Disability Dummy	.019	--	-.138 **	--	-.160 **	--
	(.019)		(.056)		(.079)	
Female	-.011	-.017	-.035	-.040 **	-.118 ***	-.101 ***
	(.009)	(.015)	(.024)	(.020)	(.020)	(.018)
Youth	.003	-.021	.454 ***	.457 ***	.175 ***	.163 ***
	(.021)	(.030)	(.037)	(.032)	(.039)	(.036)
Young adult	.015	.015	.015	.030 *	.244 ***	.229 ***
	(.020)	(.025)	(.027)	(.016)	(.040)	(.026)
Middle age	.021	.019	-.003	.001	.105 ***	.100 ***
	(.019)	(.024)	(.017)	(.010)	(.027)	(.025)
Married	.011	.008	-.063 ***	-.061 ***	.020	.007
	(.015)	(.017)	(.020)	(.012)	(.025)	(.022)
Village fixed effects?	Yes	No	Yes	No	Yes	No
Number of observations	2323	1758	2323	1758	2323	1758

NOTES -- This table reports 2SLS estimates of the impact of self help group participation on borrowing and education outcomes. The odd columns include the disabled + sibling sample while the even columns include the disabled only sample. For the odd columns, Treatment Village * disability dummy instruments self help group membership. For the even columns, Treatment Village dummy instruments for self help group membership. All models include religion, language and caste controls. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 1.8
REDUCED FORM ESTIMATES USING SIBLING CONTROLS -- LABOR MARKET OUTCOMES

	Employed (1)		Self-Employed (2)		Log Imputed Wage (Rs.)[a] (3)	
Treatment Village * disability	-.099	-.081	-.054	-.062	-.121	-.128
	(.070)	(.069)	(.038)	(.040)	(.086)	(.086)
Disability Dummy	-.105 *	-.122 **	.005	.013	.056	.066
	(.058)	(.057)	(.031)	(.034)	(.067)	(.066)
Female	-.009	-.014	-.058 ***	-.055 ***	-.280 ***	-.266 ***
	(.028)	(.027)	(.018)	(.018)	(.038)	(.036)
Youth	-.329 ***	-.320 ***	-.189 ***	-.192 ***	-.217 ***	-.222 ***
	(.047)	(.046)	(.039)	(.039)	(.071)	(.065)
Young adult	.034	.033	-.051	-.056	-.044	-.051
	(.041)	(.041)	(.037)	(.037)	(.041)	(.041)
Middle age	.066 *	.066 *	-.041	-.036	.005	.010
	(.038)	(.039)	(.041)	(.041)	(.036)	(.035)
Married	.278 ***	.279 ***	.087 ***	.085 ***	-.002	-.016
	(.036)	(.034)	(.024)	(.024)	(.030)	(.033)
Religion, language and caste controls?	No	Yes	No	Yes	No	Yes
Number of observations	2323	2323	2323	2323	960	960

NOTES -- This table reports reduced form estimates of equation (3a) for labor market outcomes for the disabled + sibling sample. All models include village fixed effects. Columns (1) and (2) include the disabled + sibling sample whereas column (3) includes the employed disabled + sibling sample. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level. [a] Imputed wage calcluated from the NSS 61st Round (2005).

TABLE 1.9
TWO STAGE LEAST SQUARES ESTIMATES FOR LABOR MARKET OUTCOMES

	Employed		Self-Employed		Log Imputed Wages(Rs.)[a]	
	(1)	(2)	(3)	(4)	(5)	(6)
Self Help Group member	-.157	.019	-.117	-.042	-.152	.303 **
	(.205)	(.170)	(.122)	(.114)	(.223)	(.122)
Disability Dummy	-.133 *	--	.004	--	.044	--
	(.069)		(.041)		(.094)	
Female	-.019	-.008	-.058 ***	-.067 ***	-.277 ***	-.245 ***
	(.028)	(.027)	(.019)	(.023)	(.043)	(.034)
Youth	-.316 ***	-.311 ***	-.189 ***	-.176 ***	-.209 ***	-.310 ***
	(.046)	(.048)	(.040)	(.039)	(.075)	(.078)
Young adult	.046	.030	-.047	-.065	-.035	-.095 **
	(.045)	(.049)	(.038)	(.042)	(.052)	(.045)
Middle age	.070 *	.074 *	-.033	-.032	.018	-.036
	(.040)	(.042)	(.041)	(.041)	(.038)	(.038)
Married	.277 ***	.274 ***	.083 ***	.096 ***	-.023	.011
	(.035)	(.035)	(.025)	(.026)	(.033)	(.034)
Village fixed effects?	Yes	No	Yes	No	Yes	No
Number of observations	2323	1758	2323	1758	960	780

NOTES -- This table reports 2SLS estimates of the impact of IKP membership on labor market outcomes. Columns (1) and (3) include the disabled + sibling sample. Column (5) includes the employed disabled + sibling sample. Columns (2) and (4) include the disabled only sample while column (6) includes the employed disabled only sample. In columns (1), (3) and (5), Treatment Village * disability dummy instruments for self help group membership. In columns (2), (4) and (6), Treatment Village dummy instruments for self help group membership. All specifications include religion, language and caste controls.   * Indicates significance at the 10% level.   ** Indicates significance at the 5% level.   *** Indicates significance at the 1% level.   [a] Imputed wage calculated from the NSS 61st Round (2005).

TABLE 1.10

REDUCED FORM ESTIMATES -- ASSET OWNERSHIP FOR THE DISABLED ONLY SAMPLE

	Total Assets (1)	Animals (2)	Kitchen Items (3)	Small Appliances (4)	Vehicles (5)	Furniture Pieces (6)	Radios/TVs (7)	Clocks (8)
Treatment Village Dummy	3.847 ***	1.466 ***	2.768 ***	-.039	.082	-.606 *	.023	.156
	(1.159)	(.412)	(.883)	(.076)	(.070)	(.333)	(.048)	(.101)
Female	-1.232 *	-.514	-.116	-.027	-.085 *	-.293 **	-.033	-.094 *
	(.683)	(.415)	(.520)	(.039)	(.046)	(.125)	(.030)	(.056)
Youth	3.323 ***	2.172 ***	.772	.061	.144 **	.046	.054	.116
	(1.246)	(.607)	(.911)	(.067)	(.062)	(.248)	(.054)	(.099)
Young adult	2.384 **	1.476 ***	.762	.065	.065	-.115	.032	.088
	(.951)	(.534)	(.688)	(.062)	(.062)	(.195)	(.044)	(.065)
Middle age	1.955 *	.987 ***	1.228	.018	.079	-.282	-.014	-.058
	(1.179)	(.368)	(.858)	(.051)	(.053)	(.207)	(.042)	(.083)
Married	1.765	.925 *	.601	.070	-.005	.075	.022	.142 *
	(1.078)	(.478)	(.822)	(.045)	(.052)	(.174)	(.040)	(.081)
Number of observations	1758	1758	1758	1758	1758	1758	1758	1758

NOTES -- This table reports reduced form estimates of the impact of IKP on asset ownership for the disabled only sample. All models include religion, language and caste controls. Small appliances include fans and sewing machines.   * Indicates significance at the 10% level.   ** Indicates significance at the 5% level.   *** Indicates significance at the 1% level.

44

TABLE 1.11
TWO STAGE LEAST SQUARES ESTIMATES -- ASSET OWNERSHIP FOR THE DISABLED ONLY SAMPLE

	Total Assets (1)	Animals (2)	Kitchen Items (3)	Small Appliances (4)	Vehicles (5)	Furniture Pieces (6)	Radios/TVs (7)	Clocks (8)
Self Help Group member	14.866 ***	5.662 ***	10.696 ***	-.149	.318	-2.342 *	.090	.604
	(4.950)	(1.768)	(3.570)	(.289)	(.275)	(1.268)	(.186)	(.414)
Female	-.575	-.264	.357	-.033	-.071	-.397 ***	-.029	-.067
	(.785)	(.422)	(.655)	(.036)	(.049)	(.151)	(.030)	(.060)
Youth	2.781	1.966 ***	.382	.066	.133 *	.132	.051	.094
	(1.734)	(.739)	(1.205)	(.068)	(.070)	(.254)	(.052)	(.108)
Young adult	.426	.730	-.647	.085	.023	.194	.020	.009
	(1.451)	(.634)	(1.066)	(.072)	(.068)	(.224)	(.041)	(.080)
Middle age	1.173	.689 *	.664	.026	.062	-.159	-.019	-.089
	(1.377)	(.417)	(1.010)	(.053)	(.059)	(.205)	(.042)	(.091)
Married	1.722 **	.908 *	.570	.071	-.006	.082	.021	.140 *
	(1.288)	(.486)	(1.012)	(.046)	(.055)	(.180)	(.039)	(.080)
Number of observations	1758	1758	1758	1758	1758	1758	1758	1758

NOTES -- This table reports 2SLS estimates of IKPs' effect on asset ownership for the disabled only sample. Treatment Village dummy instruments for self help group membership. All models include religion, language and caste controls. Small appliances include fans and sewing machines.   * Indicates significance at the 10% level.   ** Indicates significance at the 5% level.   *** Indicates significance at the 1% level.

45

Appendices

1.A.1 Data Appendix

Demographic variables

Demographic information comes from the household survey. Each question was asked of everyone in each household. Weights were constructed for each person included in the survey. The weights were based on the probability that the household would be included in the survey based on the number of people with disabilities in the village that the household resides in.

       Disability: The survey included two measures of disability. The first question asked "Has this person ever been identified as disabled by a government medical officer?" The second disability measure comes from the following question "Do you have difficulty (seeing, hearing, walking or climbing stairs, lifting a two liter jug of water, remembering or concentrating, learning new tasks, self care, communicating)?" The respondent was asked about her functional difficulties one by one. The respondent could give one of the following responses to each question: unable, a lot, some, no. A respondent was marked as disabled if they answered yes to the first question or answered either a lot or unable to the second disability measure.

       Age: Respondents were asked "age in completed years". Respondents age 10 years through 19 years were classified as youth. Respondents age 20 years through 29 years were classified as young adults. Respondents age 30 years through 39 years were classified as middle age adults. Respondents age 40 through 50 years were classified as old.

       Marital status: Respondents were asked about their marital status. Those who marked "currently married" were classified as married. All other responses were given a value of zero for my married indicator variable.

46

Treatment variables

Treatment information comes from the household survey, which was asked of the disabled family member, and the village survey, which was asked of a village informant (i.e. a ward member, sarpanch etc.).

 Self Help Group member: Respondents were asked "Nature of SHG membership". Those who marked being a "member of IKP / Velugu SHG of PWD (people with disabilities)" were given a value of one for the Self Help Group member indicator variable.

 Borrowing: Respondents were asked "Have you received a loan through or by virtue of being a (IKP / Velugu) SHG member?" Those who marked "yes" were given a value of one for the received a loan indicator variable.

Labor market variables

Labor market information comes from the household survey. Each question was asked of everyone in each household.

 Employed: Respondents were asked about their "usual principal status". Those who marked being self-employed, employed in casual wage labor, being a salaried worker, or engaging in unpaid labor were given a value of one for the employed indicator variable. All others were given a value of zero.

 Self-employed: Using responses from the usual principal status question, those who marked being self-employed were given a value of one for the self-employed indicator variable.

 Log wages: Log wages were imputed using the NSS 61st Round. Using the NSS, I calculated average wages for respondents in my sample stratifying on respondent's age, gender,

educational level, and usual principal status. I assigned the average wages calculated from the NSS to each respondent in my sample.

Education variables

Education information comes from the household survey. Each question was asked of everyone in each household.

Attending school: Respondents were asked: "Current attendance in education institution?" Those who marked currently attending were assigned a value of one for the attending school indicator variable.

Graduated from secondary: Respondents were asked: "General standard of education?" Those who marked completed higher secondary were assigned a value of one for the graduated from secondary indicator variable.

Assets

Asset information comes from the household survey and is reported at the household level. The respondent was asked the following question: "How many of the following items does your household possess?" Respondents were asked about 28 different assets (i.e. buffalo, pig, bicycle, table, etc.). The assets were then grouped according to asset type. For example, all animal assets were grouped into one category titled "animals".

1.A.2 Figure and Table Appendix

FIGURE 1.A.1
GEOGRAPHICAL DIVISIONS OF INDIA

State

↓

District

↓

Mandal

↓
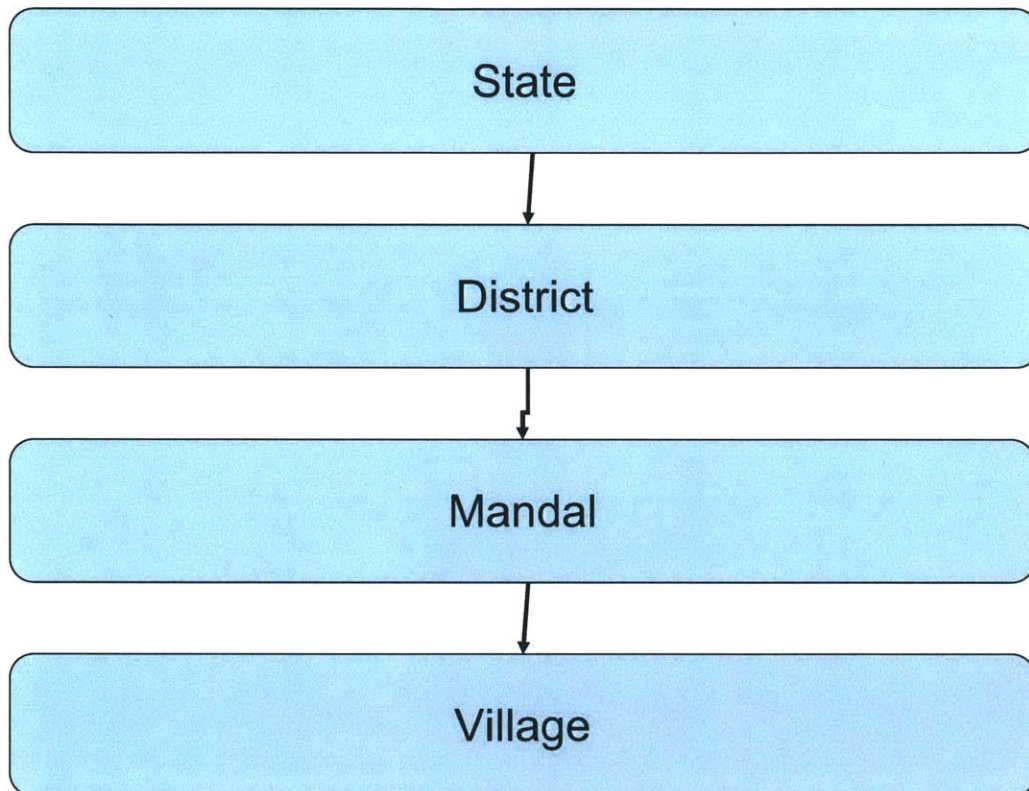
Village

FIGURE 1.A.2
Location of Treatment and Control Villages in Andhra Pradesh
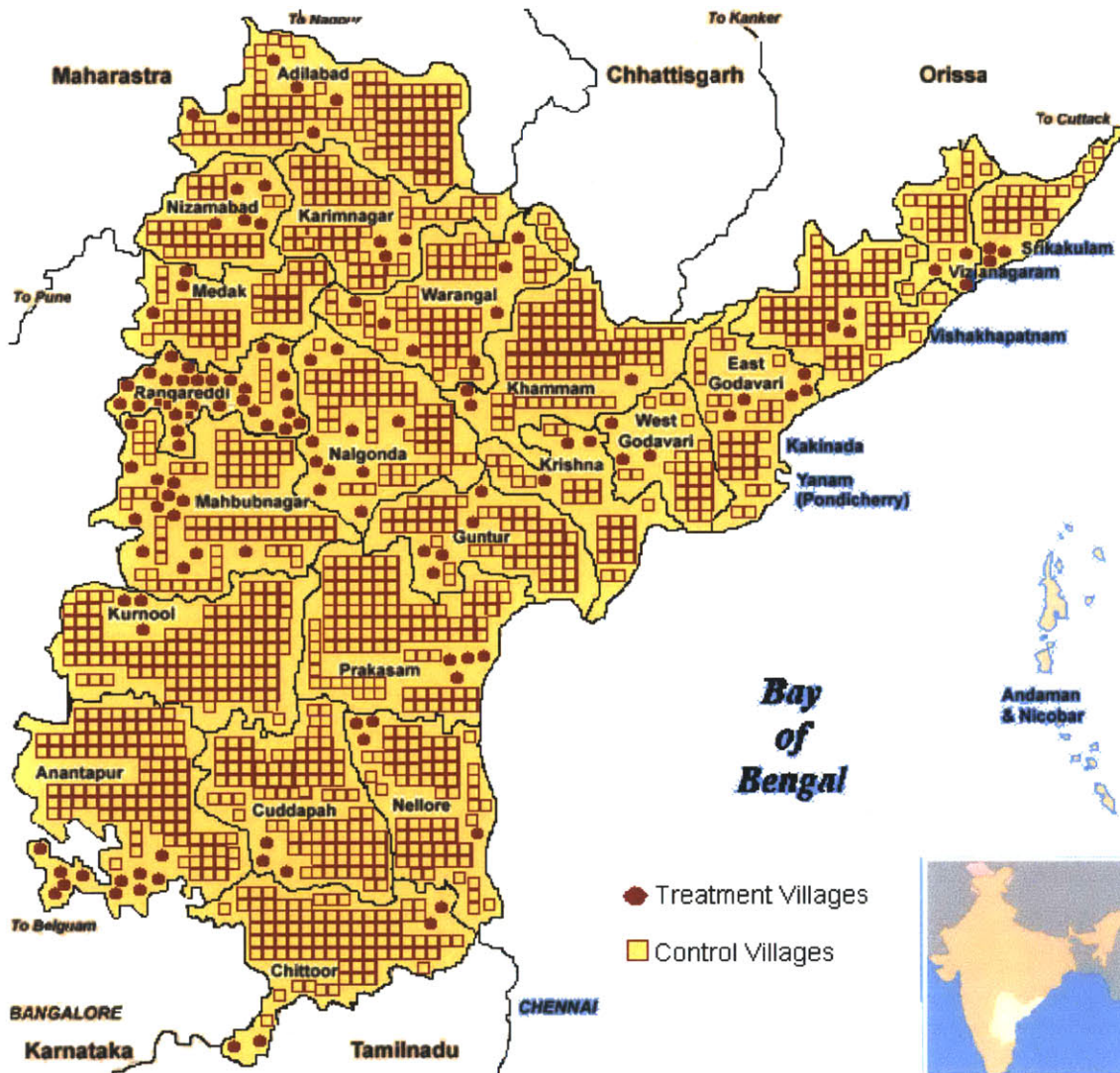
Source: www.indianrealtynews.com

TABLE 1.A.1
Sample design

Level of division (1)	Number included in sample (2)
State	1
District	10
Mandal	12
Village	96: 24 controls, 76 treatment
People with disabilities	1,758
Matched siblings	565

NOTES -- This table reports the sample design of the IKP sample.

TABLE 1.A.2

COMPARISON OF DESCRIPTIVE STATISTICS FOR IKP SAMPLE AND NATIONAL SURVEY SAMPLE 61st Round (2005)

Sample	Female (1)	Age (in years) (2)	Hindu (3)	Muslim (4)	Christian (5)	Sikh (6)	Scheduled Caste (7)	Scheduled Tribe (8)
IKP Disabled Only Sample	40%	27.3	98%	1%	1%	0%	21%	11%
IKP Disabled + Sibling Sample	40%	25.1	98%	1%	1%	0%	20%	9%
NSS 61st Round	49%	32.4	89%	8%	3%	0%	16%	7%

NOTES -- This table reports descriptive statistics for the disabled only sample, the disabled + sibling sample and the NSS. NSS estimates are for the state of Andrah Pradesh.

TABLE 1.A.2 continued

COMPARISON OF DESCRIPTIVE STATISTICS FOR IKP SAMPLE AND NATIONAL SURVEY SAMPLE 61st Round (2005)

Sample	Literate (9)	Literate males (10)	Literate females (11)	Below secondary education (12)	Secondary or above (13)	Poverty (14)	Agricultural sector (15)	Non-agricultural sector (16)	Weekly Income (Rs.) (17)
IKP Disabled Only Sample	48%	53%	41%	35%	19%	72%	70%	30%	151.8
IKP Disabled + Sibling Sample	54%	58%	48%	36%	29%	--	67%	33%	140.1
NSS 61st Round	48%	56%	39%	35%	12%	62%	70%	30%	106.6

NOTES -- This table reports descriptive statistics for the disabled only sample, the disabled + sibling sample and the NSS. NSS estimates are for the state of Andrah Pradesh. Weekly income for the two IKP samples are imputed from the NSS 61st Round (2005).

TABLE 1.A.3

COMPARISON OF DESCRIPTIVE STATISTICS BY DISTRICT FOR DISABLED + SIBLING SAMPLE AND NSS 61st Round

District		Female (1)	Age (2)	Hindu (3)	Muslim (4)	Christian (5)	Sikh (6)	Scheduled Caste (7)	Scheduled Tribe (8)
Medak	Disabled + Sibling Sample	33%	26	100%	0%	0%	0%	3%	18%
	NSS	49%	32.4	94%	4%	2%	0%	--	--
Rangareddy	Disabled + Sibling Sample	37%	26.5	99%	0%	1%	0%	13%	4%
	NSS	49%	32.4	94%	4%	2%	0%	--	--
Mahbubnagar	Disabled + Sibling Sample	41%	24	99%	0%	0%	0%	15%	3%
	NSS	49%	32.4	94%	4%	2%	0%	--	--
Khammam	Disabled + Sibling Sample	41%	25.8	98%	0%	2%	0%	10%	62%
	NSS	49%	32.4	94%	4%	2%	0%	14%	22%
East Godavari	Disabled + Sibling Sample	39%	26.6	99%	0%	1%	0%	21%	1%
	NSS	50%	33	93%	3%	4%	0%	--	--
Prakasam	Disabled + Sibling Sample	42%	27.6	91%	4%	6%	0%	58%	11%
	NSS	49%	33	93%	3%	4%	0%	--	--
Nellore	Disabled + Sibling Sample	40%	28.5	96%	2%	1%	1%	39%	2%
	NSS	50%	33	93%	3%	4%	0%	22%	9%
Cuddapah	Disabled + Sibling Sample	43%	27.3	94%	0%	4%	2%	22%	3%
	NSS	49%	33.9	90%	9%	1%	0%	--	--
Anantapur	Disabled + Sibling Sample	40%	27.8	99%	0%	1%	0%	21%	3%
	NSS	49%	32.5	86%	10%	2%	0%	--	--
Chittor	Disabled + Sibling Sample	39%	24.9	100%	0%	0%	0%	16%	0%
	NSS	50%	33.9	90%	9%	1%	0%	--	--

NOTES -- This table reports descriptive statistics by district for the disabled + sibling sample and the NSS 61st Round.

55

TABLE 1.A.3 continued

COMPARISON OF DESCRIPTIVE STATISTICS BY DISTRICT FOR DISABLED + SIBLING SAMPLE AND NSS 61st Round

District		Literate (9)	Literate males (10)	Literate females (11)	Below secondary education (12)	Secondary or above (13)	Marital status (14)	Agricultural sector (15)	Non-agricultural sector (16)	Employed (17)
Medak	Disabled + Sibling Sample	55%	55%	54%	41%	14%	45%	73%	25%	50%
	NSS	53%	66%	41%	81%	19%	64%	78%	39%*	15%
Rangareddy	Disabled + Sibling Sample	57%	57%	55%	42%	15%	44%	58%	39%	51%
	NSS	66%	75%	57%	81%	19%	64%	56%	44%	41%
Mahbubnagar	Disabled + Sibling Sample	48%	60%	32%	26%	22%	26%	33%	22%	50%
	NSS	46%	58%	33%	81%	19%	64%	83%	39%*	52%
Khammam	Disabled + Sibling Sample	60%	68%	48%	42%	18%	38%	77%	20%	51%
	NSS	58%	67%	48%	81%	19%	64%	77%	39%*	46%
East Godavari	Disabled + Sibling Sample	45%	51%	34%	37%	8%	36%	67%	32%	53%
	NSS	65%	70%	61%	81%	19%	63%	68%	38%*	38%
Prakasam	Disabled + Sibling Sample	32%	43%	18%	27%	5%	43%	76%	22%	33%
	NSS	58%	70%	46%	81%	19%	63%	79%	38%*	49%
Nellore	Disabled + Sibling Sample	53%	57%	48%	33%	20%	45%	37%	11%	45%
	NSS	65%	74%	57%	81%	19%	63%	72%	28%	46%
Cuddapah	Disabled + Sibling Sample	47%	49%	45%	26%	20%	44%	66%	31%	57%
	NSS	64%	77%	51%	76%	23%	64%	72%	37%*	44%
Anantapur	Disabled + Sibling Sample	44%	43%	46%	30%	14%	40%	56%	20%	62%
	NSS	57%	69%	44%	83%	17%	63%	76%	44%*	46%
Chittor	Disabled + Sibling Sample	46%	53%	38%	39%	8%	32%	29%	71%	18%
	NSS	67%	78%	56%	76%	23%	64%	71%	37%*	46%

NOTES -- This table reports descriptive statistics by district for the disabled + sibling sample and the NSS 61st Round.

TABLE 1.A.4
REDUCED FORM ESTIMATES USING SIBLING CONTROLS

	Received a Loan (1)	Attending School (2)	Graduated From Secondary (3)	Employed (4)	Self-Employed (5)	Log Imputed Wage (Rs.)[a] (6)
Treatment Village * disability	.086 ***	.026	.019	-.011	-.009	.088 **
	(.032)	(.016)	(.026)	(.046)	(.029)	(.042)
% of Population with Disability	-.943	.086	.270	.598 ***	-.098	-1.592
	(1.022)	(.978)	(1.407)	(.828)	(.867)	(1.402)
Disability Dummy	.048 *	-.057 **	-.144 ***	-.171	-.024	-.074 *
	(.025)	(-1.97)	(.038)	(.049)	(.028)	(.039)
Female	-.021 *	-.038 *	-.117 ***	-.015	-.061 ***	-.283 ***
	(.013)	(.021)	(.018)	(.027)	(.018)	(.034)
Youth	.002	.441 ***	.128 ***	-.311 ***	-.183 ***	-.229 ***
	(.034)	(.031)	(.033)	(.045)	(.039)	(.068)
Young adult	.047 *	.041 ***	.239 ***	.035	-.062 *	-.052
	(.027)	(.016)	(.029)	(.042)	(.038)	(.037)
Middle age	.035	-.001	.105 ***	.082 **	-.041	-.005
	(.025)	(.011)	(.026)	(.040)	(.043)	(.034)
Married	.011	-.073 ***	-.015	.275 ***	.101 ***	.019
	(.021)	(.014)	(.021)	(.033)	(.025)	(.029)
Number of observations	2323	2323	2323	2323	2323	960

NOTES -- This table reports reduced form estimates of the impact of IKP on borrowing, education and labor market outcomes. Columns (1)-(5) include the disabled + sibling sample. Column (6) includes the employed disabled + sibling sample. All models include religion, language and caste controls. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

[a] Imputed wage calculated from the NSS 61st Round (2005).

TABLE 1.A.5
REDUCED FORM ESTIMATES FOR THE DISABLED ONLY SAMPLE

	Received a Loan (1)	Attending School (2)	Graduated from Secondary (3)	Employed (4)	Self-Employed (5)	Log Imputed Wages (Rs.)[a] (6)
Treatment village dummy	.078 **	.008	.015	.013	-.012	.088 **
	(.034)	(.015)	(.027)	(.046)	(.030)	(.040)
% of Population with Disability	-1.265	-.082	.453	1.35	-.117	-1.474
	(1.308)	(.833)	(1.226)	(.924)	(1.089)	(1.435)
Interest in SHG	.115 ***	-.010	-.015	.026	.019	.054
	(.025)	(.051)	(.050)	(.548)	(.053)	(.085)
Female	-.034 **	-.042 **	-.103 ***	-.008	-.065 ***	-.266 ***
	(.016)	(.020)	(.019)	(.027)	(.022)	(.032)
Youth	-.018	.459 ***	.167 ***	-.309 ***	-.179 ***	-.281 ***
	(.039)	(.033)	(.038)	(.049)	(.038)	(.071)
Young adult	.053 *	.034 **	.237 ***	.036	-.072 *	-.048
	(.028)	(.015)	(.027)	(.044)	(.040)	(.037)
Middle age	.033	.003	.103 ***	.076 *	-.035	-.009
	(.027)	(.011)	(.024)	(.405)	(.041)	(.034)
Married	.004	-.061 ***	.008	.274 ***	.095 ***	.012
	(.024)	(.013)	(.022)	(.036)	(.026)	(.030)
Number of observations	1758	1758	1758	1758	1758	780

NOTES -- This table reports reduced form estimates of the impact of IKP on borrowing, employment and education outcomes. All models control for religion, language and caste. Column (6) includes the employed disabled sample, which is a subset of the disabled only sample. All other columns include the entire disabled only sample.

* Indicates significance at the 10% level   ** Indicates significance at the 5% level   *** Indicates significance at the 1% level.

[a] Imputed wage calcluated from the NSS 61st Round (2005).

Chapter 2

The Long-term Employment Consequences of the Americans with Disabilities Act

2.1 Introduction

Those with disabilities have persistently lower labor force participation rates, higher dependency on government transfers and lower wages than the non-disabled (Acemoglu and Angrist 2001; Bound and Burkhauser 1999). In an effort to reverse these trends and ballooning expenditures on federal entitlement programs for the disabled, in 1990, Congress enacted the Americans with Disabilities Act (ADA).[31] Congress assumed that the lower economic status of those with disabilities was due to reduced access to employment opportunities. Title I of the ADA was intended to improve the labor market outcomes of people with disabilities by creating equal employment opportunities. However, immediately following the ADA's enactment, opponents of the ADA suggested that the legislation would increase the costs of employing the disabled, thereby, worsening their labor market outcomes (Oi 1991; Olson 1997). While numerous studies present evidence of the ADA's negative short-term labor market effects on those with

---

[31] Leonard (1991).

disabilities, to my knowledge, there has not been a study that evaluates the "longer term" labor market consequences of the ADA.

Previous research nearly unanimously agrees that Title I of the Americans with Disabilities Act(ADA) resulted in lower labor force participation and employment rates of people with disabilities (Deleire 2000; Acemoglu and Angrist 2001; Kruse and Schur 2002; Baldwin and Johnson 2000). However, the majority of the literature regarding the ADA does not delineate the mechanism that caused the ADA to decrease labor force participation of the disabled or evaluate the ADA's impact past the late 1990s. Since the ADA seeks to improve labor market outcomes of disabled people via two mandates and each mandate has unique theoretical implications, identifying the employment effects of each mandate is critical for future legislative efforts. Furthermore, since the ADA has been significantly and incrementally weakened by Supreme Court rulings between 1999 and 2010, the interpretation of the employment provisions of the ADA has evolved since the 1990s which may have caused the labor market effects of the Act to change over time. This essay presents new evidence on the longer term impact of the ADA on the number of weeks worked and labor force participation of the disabled by exploiting two sources of variation: pre-ADA state disability legal regimes and the changing interpretation of the ADA caused by Supreme Court decisions.

The empirical analysis in this essay evaluates the labor market outcomes of people with disabilities using data from the March Current Population Survey(CPS) for 1988-2010. These data are useful for the purposes of this essay because the CPS has an income supplement that identifies people with disabilities on a yearly basis. To investigate the longer term impact of the ADA on the weeks worked and labor force participation of those with disabilities, this essay employs a difference-in-differences estimator that compares outcomes of people with disabilities before and after the signing of the ADA across three groups of states. The essay separates the years following the passage of the ADA into five

intervals based on Supreme Court rulings and amendments that altered one of the two provisions of Title I of the ADA.[32]

I exploit variation in pre-ADA state disability legislation to identify the mechanism by which each of the changes to the ADA impacted the labor market outcomes of the disabled. I follow Jolls and Prescott's empirical strategy of separating states into three categories based on their pre-ADA state disability legislation. States that had legislation providing disability anti-discrimination coverage and reasonable accommodation provisions are termed "Quasi-ADA" states because laws in these states closely resemble the ADA. States that provided disability anti-discrimination coverage but no provisions for reasonable accommodations are termed "Anti-discrimination" states. States without legislation prohibiting discrimination against those with disabilities in private labor markets are termed "No Law" states. The combination of pre-ADA state disability legislation and changes in the interpretation of Title I of the ADA are assumed to be exogenous. I find that there was a short-term decline in weeks worked and labor force participation of the disabled in "Anti-discrimination" and "No Law" states relative to the disabled residing in "Quasi-ADA" states. This significant short-run decline becomes insignificant in the longer run. Following the analysis of the ADA, I evaluate the labor market consequences of the Americans with Disabilities Act Amendments Act(ADAAA), which was enacted in 2009, by employing a difference-in-differences estimator. The results suggest that the ADAAA did not alter the weeks worked by those with disabilities but did significantly decrease the labor force participation of the disabled.

The first paper that explicitly disaggregates the ADA's labor market effects on those with disabilities based on pre-ADA state laws is Jolls and Prescott(2004). Jolls and Prescott also use the CPS to compare labor market outcomes of the disabled before and after the ADA across three state groups. They find significant negative effects on weeks worked and labor force participation for the years 1990-1991, 1991-1992 and 1992-1993 and insignificant negative impacts from 1993 through 1999. The results in this essay are similar to those in Jolls and Prescott(2004) in that I also find significant negative declines in the short-term and insignificant medium-term impacts of the ADA. In other respects, the present essay

---

[32] The rulings and amendments are discussed in detail in section 2.2.

differs from Jolls and Prescott's paper. First, the post-ADA time frame is extended to the year 2010 and the empirical results show declines in weeks worked and labor force participation only in 1990-1992. Second, the post-ADA year intervals are constructed according to key changes to the interpretation of the ADA. Third, to evaluate the impact of the ADAAA on labor market outcomes of the disabled, this essay adopts the empirical strategy of Acemoglu and Angrist(2001). Finally, for the majority of the essay, only people with disabilities are included in this analysis.

The essay proceeds as follows. Section 2.2 provides background on Title I of the ADA, six Supreme Court decisions that altered the interpretation of Title I and the ADAAA. Section 2.3 presents the theoretical and empirical framework used to examine and interpret the longer term effects of the ADA. Section 2.4 discusses the data used. Section 2.5 includes the main empirical results of the longer term effects of the ADA on the number of weeks worked and labor force participation rates of those with disabilities in addition to the labor market effects of the ADAAA on those with disabilities. The essay concludes in section 2.6.

2.2 Legislative Background

Most states had a disability anti-discrimination statute before the ADA. Table 2.1 lists these along with the year of enactment. For each state in Table 2.1, the following information is presented: the year the legislation was enacted, the statutory number of the legislation, the presence of a reasonable accommodation mandate in the statute, and the coding of states into pre-ADA disability legislation dummy variables that are used in the regression analysis below.[33] This essay follows Jolls and Prescott's coding of Arkansas as a state without pre-ADA disability legislation. Although Beegle and Stock(2003)

---

[33] For example, in 1985, Arizona passed an anti-discrimination statute requiring reasonable accommodations for the disabled and is coded as a "Quasi-ADA" state.

codes Arkansas as having pre-ADA disability legislation, the legislation did not cover disability discrimination by private sector employers.[34]

As shown in Table 2.1, there is considerable variation across states with respect to the requirements of each state's disability anti-discrimination statute. This variation is one aspect of my identification strategy as it allows for both the identification of the mandate by which changes in the ADA impacted labor market outcomes among the disabled and the quantification of these effects.

Anti-discrimination provisions for people with disabilities were developed from earlier civil rights legislation that covered traits such as race or gender. In many states, the predecessors to state disability statutes were "White Cane" provisions and laws passed in the 1960s and 1970s that granted those with visual disabilities and other physical disabilities protection in public sector employment. Following the adoption of the White Cane laws, most states amended existing anti-discrimination laws to include coverage for those with disabilities and expanded employment protection for those with disabilities to include the private sector.[35] Some state laws grant plaintiffs the right to seek damages for mental anguish, embarrassment and foregone interest. Almost all states with disability statutes by the mid 1980s "offered comparable or better remedies than those provided at the federal level [by the Rehabilitation Act, 1973] for disabled persons with claims of discrimination by employers."[36]

Although the ADA went into effect after state disability legislation, the ADA did not render state laws obsolete because the ADA provides a floor for disability discrimination coverage. That is, in states that offer state disability laws with greater protection than the ADA, entities must comply with the most stringent law in their respective state.[37] For example, the ADA required businesses with 15 or more employees to comply with the law in 1994. However, 34 states required such businesses to comply with state disability laws well before 1994. In this instance, state law is not preempted by federal law.

---

[34] See Jolls and Prescott(2004) for a detailed discussion of state coding differences between their paper and Beegle and Stock(2003).
[35] See Beegle and Stock(2003) for a detailed discussion of state disability statutes.
[36] Beegle and Stock (2003).
[37] Burgdorf (1995).

In light of the "patchwork" approach to disability discrimination protection prior to 1990, the intent of the Americans with Disabilities Act(ADA) was "to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities."[38] The ADA was signed into law in July, 1990 and went into effect in July, 1992. Title I of the ADA contains the employment provisions of the law and initially covered all employers with at least 25 employees. In 1994, coverage was extended to employers with 15 employees or more. Title I of the ADA consists of two parts. First, the ADA prohibits discrimination in hiring, firing, wages and promotion against "qualified individuals with a disability."[39] Second, it requires employers to provide reasonable accommodations to otherwise qualified disabled individuals unless doing so would cause an undue burden. A reasonable accommodation is a change in the work environment that does not substantively alter the job but results in an equal employment opportunity for a person with a disability. Examples include purchasing special equipment for disabled employees or permitting flexible work hours.

The ADA enforces its mandates through the Equal Employment Opportunity Commission(EEOC) and the courts. Those with disabilities who feel they have been discriminated against can file a charge with the EEOC. The charge will be investigated and the EEOC will either resolve the charge or give permission for the charging party to sue at his or her own expense. The ADA defines disability as "a physical or mental impairment that substantially limits one or more of the major life activities of... an individual; a record of such an impairment; or being regarded as having such an impairment."[40]

When Congress drafted the bill, it purposefully used vague language for the definition of disability and the definition of reasonable accommodation. This was done to cover individuals with a wide variety of physical and mental conditions under purview of the law.[41] However, the broad language

---

[38] ADA (1990).
[39] ADA (1990).
[40] ADA (1990).
[41] Lee (2003).

regarding the definition of disability and reasonable accommodation has led employers and disabled individuals to seek clarification on these points from the Supreme Court.

Table 2.2 documents Supreme Court decisions used in this essay to group the years following the ADA into intervals. An individual seeking a favorable Supreme Court decision under the employment provisions of the ADA must meet four criteria to demonstrate a prima facie case of disability discrimination. First, the plaintiff must either show that the condition in question meets the ADA's definition of disability, or she has a record of such a condition, or the employer mistakenly regarded the plaintiff as having such a condition. Second, the plaintiff must show she is qualified for the position by proving that she can perform essential functions of the position. Third, the accommodation requested by the plaintiff must be reasonable. Fourth, the plaintiff must show that the negative action taken by the employer was done on the basis of the plaintiff's disability. However, the majority of Supreme Court rulings on Title I of the ADA have focused on the first criteria(establishing a person has, or is regarded as having, a disability) because this is the threshold issue that must be found in favor of the plaintiff before other issues can be ruled on. In most ADA cases brought before the Supreme Court involving employment provisions, the Court, due to its narrow interpretation of the definition of disability, has held that the plaintiff's condition was not a disability under the ADA.[42] Since each plaintiff has not been considered disabled, he or she was not entitled to the protection of the ADA; thus the Court did not render a decision on the other three criteria.

The first three Supreme Court decisions regarding the ADA used in this essay are known as the *Sutton* trilogy. The decisions were handed down on June 22, 1999 and had similar effects on the interpretation of the ADA. The first case, *Sutton v. United Airlines, Inc.*, involved two sisters who were severely near-sighted and applied to be pilots with United Airlines; however, due to their myopia, they did not meet the uncorrected vision standard of United Airlines pilots. As a result, they were not hired by United Airlines. Since the sisters' vision was fully corrected with mitigating measures, the Supreme Court decided that they did not meet the ADA's definition of disability. The Court held that "[a] 'disability'

---

[42] Klein (2010).

65

exists only where an impairment 'substantially limits' a major life activity, not where it 'might,' 'could,' or 'would' be substantially limiting if mitigating measures were not taken."[43] The second case, *Murphy v. United Parcel Service, Inc.*, involved a plaintiff who was hired to be a commercial driver for UPS but was subsequently fired for having hypertension.[44] The Court held that when the plaintiff was compliant with his medication, he was not substantially limited in any major lift activity; thus, the plaintiff's condition did not meet the ADA's definition of disability. In the third case, *Albertson's, Inc. v. Kirkingberg*, the plaintiff did not meet the standards of the Department of Transportation for a commercial driver's license due to monocular vision. Since the plaintiff was able to correct his monocular vision using subconscious adjustments to the manner in which he perceived peripheral objects, the Court held Kirkingberg did not meet the ADA's definition of disability. By holding that any condition that can be effectively mitigated by device, medication or another method, is not a disability under the ADA, the Court substantially narrowed the population that could seek relief under the ADA; thereby, altering the interpretation of the ADA after June 1999.

The next major Supreme Court decision regarding the ADA was *Toyota, Inc. v. Williams* (2002). In *Williams*, the plaintiff had carpal tunnel syndrome and sued her employer for failing to accommodate her condition. The Court held that the plaintiff was not disabled, because for an impairment to be considered a disability, it must prevent or severely restrict an "individual from doing activities that are of central importance to most people's daily lives."[45] Additionally, the Court said the impairment must be permanent or long-term. Similar to the *Sutton* trilogy, *Williams* altered the interpretation of the ADA by restricting the number of people covered by the ADA.

In 2002, the Supreme Court decided its first case regarding the reasonable accommodation mandate of the ADA, *U.S. Airways, Inc. v. Barnett*. In deciding whether a job transfer was a reasonable accommodation when the company's seniority policy would award the position to another employee, the

---

[43] *Sutton v. United Airlines, Inc.*, 527 U.S. 471 (1991).
[44] The Department of Transportation requires that "the driver of a commercial motor vehicle in interstate commerce have no current clinical diagnosis of high blood pressure."
[45] *Toyota, Inc. v. Williams* (2002).

Court said that an accommodation that conflicts with a company's seniority system is not reasonable but an employee can still present evidence of special circumstances that make reasonable exceptions to a company's seniority rule. This case, by determining that accommodations which interfere with a neutral company policy are not reasonable, restricted the definition of reasonable accommodation.

The final case decided by the Supreme Court regarding the ADA was *Chevron, U.S.A, Inc. v. Echazabal* (2002). In *Echazabal*, the Supreme Court held that an employer can refuse to employ a person with a disability if the task of the job poses too great a risk to the individual's health due to disability. This case altered the interpretation of the ADA by reducing the cost to employers of not hiring a disabled individual and eliminating the possibility of being required to provide reasonable accommodation the disabled individual would have needed.

In response to the impact of the above cases on the interpretation of the ADA, in 2008, Congress passed the Americans with Disabilities Act Amendments Act (ADAAA), which became effective January 2009. Since the Supreme Court, contrary to the intent of Congress, significantly narrowed the definition of disability in the ADA, the ADAAA expanded the protection of the ADA by altering the way courts interpret the definition of disability. Specifically, the ADAAA does the following: requires the term "substantially limited" to be inclusive of less limiting impairments than the Supreme Court case *Toyota* allows, provides a non-exhaustive list of "major life activities" covered by the ADA, expands "major life activities" to include major bodily functions, expands the "regarded as" category to include everyone with a known impairment, does not require entities to provide accommodations to those who fall under the "regarded as" prong, and prohibits consideration of mitigating measures when determining whether an impairment is a disability. While the ADAAA increases the population covered by the ADA, which may increase the cost associated with hiring a person with a disability, it also decreases the population that are entitled to reasonable accommodations which may lower the cost of employing those with disabilities.

2.3 Theoretical and Empirical Framework

The theoretical consequences of the ADA on the labor market have been extensively modeled and will be briefly summarized here.[46] There are three aspects of the ADA that pertain to the labor market: non-discrimination in hiring and firing, non-discrimination in wages, and mandates requiring employer-provided accommodations. Regulations outlawing disability-based discrimination in hiring and firing impose costs on firms due to an increased risk of lawsuits. However, non-discrimination in hiring a disabled worker provides a subsidy to hiring the disabled because not hiring the disabled person increases the risk of a costly lawsuit. These two factors indicate that the ADA should be associated with increased demand for, and increased employment of, disabled workers.

On the other hand, non-discrimination in firing increases the cost of hiring a disabled worker because the risk of a lawsuit associated with firing the disabled worker is higher. This would likely depress the demand for, and employment of, those with disabilities. Therefore, firms weigh the perceived costs of hiring a person with a disability with the perceived cost of not hiring a person with a disability. If, as a result of the ADA, the perceived penalties for not hiring disabled workers are relatively larger than the discounted cost of firing disabled workers, then the net effect of the ADA would be increased demand for, and employment of, the disabled.

Provisions requiring non-discrimination in wages of the disabled may increase the relative cost of disabled workers if either the productivity of disabled workers is lower than that of non-disabled workers or disabled workers are costlier to employ due to the accommodation mandate. Assuming an adequate supply of non-disabled workers, if disabled workers are less productive than non-disabled workers, the mandate of non-discrimination in wages would suggest that demand for disabled workers would fall because firms choose to employ cheaper (non-disabled) labor at the prevailing wage. As long as the elasticity of substitution between the two types of labor is positive, employment of the disabled would fall as firms substitute non-disabled for disabled workers.[47]

---

[46] See Acemoglu and Angrist (2001) for a detailed model of the employment effects of the ADA.

[47] This result would also hold in the case of labor capital decisions. Depending on the technology used by and relative input prices of firms, firms may substitute away from disabled labor towards increased use of capital in response to an increase in relative wages.

Regulations requiring firms to provide reasonable accommodations also increase the cost of hiring disabled employees. This provision requires firms to pay the wages of the disabled and to provide accommodations that the firm may not have provided in the absence of legislation, which results in a decrease in the relative demand for disabled workers. Since the ADA prohibits firms from cutting the wages of disabled employees in response to increased worker costs, the reasonable accommodation mandate further depresses demand for disabled workers.[48] However, this downward pressure on demand for disabled labor may be partially offset by an increase in the supply of disabled workers induced to become labor force participants by the reasonable accommodation requirement. This offset would occur only if the equal pay mandate is *not* binding. If the equal pay mandate is binding(i.e. if disabled workers are less productive than non-disabled workers), the increased labor supply of disabled workers does not offset the depressed demand for the disabled because the wages of the disabled cannot fall.

Thus, the theoretical predictions of the ADA's consequences imply that, in states where the ADA is an innovation, the ADA should be associated with decreased demand for disabled workers and decreased employment rates among the disabled in the short run. However, the impact of the ADA is likely to vary across states, based on pre-existing state disability statutes, and across time as the interpretation of the ADA evolves. Since state disability statutes have one or more of the provisions of the ADA, the preceding theoretical framework also holds for state disability laws and will not be recapitulated.

The empirical framework of this essay separates states into three groups according to the mandates of their pre-ADA state disability laws. In states with pre-ADA laws that include disability anti-discrimination and reasonable accommodation mandates("Quasi-ADA" states), the ADA was not an innovation and did not impose new costs on firms. In "Quasi-ADA" states, the ADA should not be associated with a change in demand for, or employment among, the disabled. However, in states with pre-ADA state laws that include only disability anti-discrimination mandates("Anti-discrimination" states),

---

[48] The extent to which employer-provided accommodations decrease the employment of those with disabilities depends on the cost of accommodation.

the ADA would have imposed additional costs to employers previously not required to provide reasonable accommodations. This increased cost should decrease demand for, and employment of, the disabled in these states. Lastly, in states without pre-ADA disability statutes("No Law" states), the ADA is a complete innovation and would likely decrease demand for disabled workers.

While the preceding relationship between ADA and the three categories of states most likely holds in the years immediately following the ADA's enactment, this relationship would change as the Supreme Court altered the interpretation of the ADA. Supreme Court rulings regarding the ADA fall into one of two categories: rulings regarding the definition of disability, which alters who is covered by the ADA, and rulings regarding what is considered a reasonable accommodation. Since the ADA provides a floor for disability coverage, Supreme Court rulings that restrict the definition of disability weaken the ADA and would cause states to rely on their own disability statutes when determining who qualifies for disability legislation coverage; thereby, nullifying relationship between the ADA and labor market outcomes of the disabled.[49]

Supreme Court rulings that restrict the definition of reasonable accommodations would also cause the relationship between the ADA and labor market outcomes of the disabled to go to zero. The new definition of reasonable accommodations should lead to an increase in the demand for labor from those with disabilities in "No Law" states and in "Anti-discrimination" states relative to the demand for those with disabilities in "Quasi-ADA" states. This is due to the reduced cost of hiring disabled workers in "Anti-discrimination" and "No Law" states and the unchanged cost to employers in "Quasi-ADA" states.

---

[49] Specifically, the restricted definition of disability would likely increase demand for, and employment of, the disabled in "No Law" states relative to "Quasi-ADA" states because the cost of hiring disabled workers would fall relative to "Quasi-ADA" states. The impact of these rulings on the relative labor force participation rates of those with disabilities in "Quasi-ADA" states and "Anti-discrimination" states is dependent upon the relative inclusiveness of the definition of disability within each state law since all states are still covered by the reasonable accommodations mandate of the ADA. If "Quasi-ADA" states and "Anti-discrimination" states have state laws with equivalent disability definitions, the Supreme Court rulings would cause these states to have equal labor force participation rates among the disabled. If, however, "Quasi-ADA" states have less inclusive disability definitions in their state laws than "Anti-discrimination" states, then the demand for disabled workers in "Anti-discrimination" states will be higher than the demand for disabled workers in "Quasi-ADA" states. If "Quasi-ADA" states have more inclusive disability definitions than the "Anti-discrimination" states, then the reverse would hold.

The ADA Amendments Act(ADAAA), which increased the stringency of the ADA by expanding the population covered by the law, would increase the cost of hiring disabled workers in "Anti-discrimination" and "No Law" states leading to a decline in the demand for disabled workers in those states relative to "Quasi-ADA" states. The ADAAA should cause the labor market effects of the ADA to be negative.

The empirical analysis in this essay is designed to assess the longer term weeks worked and labor force participation effects of the ADA on disabled workers. Following the theoretical framework above, I estimate the short, and longer, term labor market effects of the ADA for disabled workers using a difference-in-differences approach. I begin by estimating the following equation:

$$(2.1) \quad Y_{ist} = \gamma X_{ist} + \alpha_1 (D9092_t * LLP_s) + \beta_1 (D9092_t * NLP_s) + \alpha_2(D9399_t * LLP_s) + \beta_2(D9399_t *$$

$$NLP_s) + \alpha_3(D0002_t * LLP_s) + \beta_3 (D0002_t * NLP_s) + \alpha_4(D0308_t * LLP_s) + \beta_4(D0308_t *$$

$$NLP_s) + \alpha_5(D0910_t * LLP_s) + \beta_5(D0910_t * NLP_s) + v_t + \pi_s + \varepsilon_{ist}$$

where Y_{ist} indicates an outcome (alternately weeks worked and labor force participation) of individual i in state s in year t. X_{ist} is a vector of standard demographic controls (age, gender, minority status, educational attainment and marital status) and state economic variables. The state economic variables capture differences in economic conditions across states for each year. v_t is a set of year dummy variables, π_s is a set of state indicator variables, LLP_s is a dummy variable equal to 1 for in the "Anti-discrimination" state group as they offered Limited Legal Protection prior to the ADA's enactment, and NLP_s is a dummy variable equal to 1 for states in the "No Law" state group as they offered No Legal Protection prior to the ADA. LLP_s and NLP_s capture the state group main effects for each outcome.

There are five post-ADA year intervals and each interval has its own dummy variable. $D9092_t$ equals 1 for observations from years 1990-1992. This interval corresponds to the transition years after the ADA passed but before the Act went into effect. $D9399_t$ equals 1 for observations from 1993-1999, which are the years prior to Supreme Court decisions altering the ADA. $D0002_t$ equals 1 for observations from

2000-2002. This interval coincides with the years following the *Sutton* trilogy of cases which narrowed the ADA's definition of disability. D*0308*$_t$ equals 1 for observations from the years 2003-2008, which are the years after the Supreme Court restricted the definition of reasonable accommodations. D*0910*$_t$ equals 1 for observations from the years 2009-2010. This interval corresponds to the years after the ADA Amendments Act was passed. The comparison time interval is 1988-1989.

With this specification, I evaluate the labor market effects impact of an evolving interpretation of the ADA on the disabled by using a difference-in-differences estimation that compares changes in outcomes among disabled people in pre and post-ADA eras across states with different pre-ADA disability regimes. In equation (2.1), the coefficients of interest are the α's and β's as they are the difference-in-differences estimators. The α's measure the change between the pre-ADA interval and each post-ADA interval in the outcomes of people with disabilities in "Anti-discrimination" states relative to the same change in "Quasi-ADA" states. Since "Anti-discrimination" states have pre-ADA laws that provide disability anti-discrimination coverage, the α's represent the labor market effects of the ADA that operate through the reasonable accommodations mandate. The β's measure the change between the pre-ADA interval and each post-ADA interval in the outcomes of people with disabilities in "No Law" states relative to the same change in "Quasi-ADA" states and represents labor market effects of the ADA that operate through both disability anti-discrimination coverage and reasonable accommodations mandate. β_j − α_j represents the change in outcomes due to changes in the interpretation of the ADA that operate through the ADA's anti-discrimination provision. The key assumptions underlying this strategy are two-fold. First, people with disabilities in "No Law" states are equivalent to the disabled in "Quasi-ADA" and "Anti-discrimination" states; therefore, they are an adequate control group. Second, in the absence of the ADA, the evolution of labor market outcomes of the disabled would have been the same across the state groups.

Estimates from three modifications to equation (2.1) are also presented. First, state unemployment rates and disability rates are removed to determine if state fixed effects and year fixed effects capture observable state-level economic variation that would impact labor market outcomes of the

disabled. Second, a linear time trend for each state group is introduced to the estimation. Third, a linear time trend for each state is included. Linear time trends allow for the possibility that changes in outcomes by state groups or individual states can be explained by extrapolating different trends for the "Quasi-ADA", "Anti-discrimination" and "No Law" state groups and for each state, respectively.

A possible source of concern for the empirical strategy is, while "Quasi-ADA" and "Anti-discrimination" states are approximately equal in size and are geographically balanced, "No Law" states are comprised of three states located in the southern region of the country. If, between pre- and post-ADA periods, an unobserved shock occurred in the southern region of the country that impacted people with disabilities or if states with higher proportions of people with disabilities experienced a labor market shock, the difference-in-differences estimators would capture the impact of these unobserved shocks in addition to any labor market effect caused by the ADA.[50] However, Jolls and Prescott(2004) use a matching strategy to show that there were no trends affecting only southern states that would bias results using "No Law" states.

Lastly, I present estimates of ADA Amendments Act(ADAAA) labor market effects. Since the ADAAA was a change in federal policy against a backdrop of uniform federal disability policy, it may be the case that the ADAAA should be evaluated outside the framework of state disability statutes. I estimate the following:

$$(2.2) \quad Y_{ist} = \beta X_{ist} + \gamma disability_i + \alpha_1 (2006_t * disability_i) + \alpha_2(2007_t * disability_i) + \alpha_3(2008_t *$$
$$disability_i) + \alpha_4(2009_t * disability_i) + \alpha_5(2010_t * disability_i) + \delta_1(2006_t * X_{ist}) +$$
$$\delta_2(2007_t * X_{ist}) + \delta_3(2007_t * X_{ist}) + \delta_4(2008_t * X_{ist}) + \delta_5(2009_t * X_{ist}) + \delta_6(2010_t * X_{ist}) +$$
$$\varepsilon_{ist}$$

where X_{ist} is a vector of personal characteristics including, age, gender, education, minority status, region of residence and marital status, and $disability_t$ is an indicator variable equal to 1 for those with a disability.

---

[50] The "No Law" state group has the greatest percentage of people with disabilities of the three state groups.

73

Since non-disabled individuals are included as controls for those with disabilities, a disability main effect is included in the regression along with a full set of year * disability interactions. Equation (2.2) is run with two base periods: 2005 and 2007. For this analysis, the years 2005 through 2008 are considered pre-treatment years. 2009 is considered a transition year and 2010 is considered a post-treatment year. The α's are the coefficients of interest as they describe the change in the labor market outcomes of the disabled relative to the non-disabled for each year. This strategy uses a difference-in-difference estimator to compare the difference in outcomes of those with disabilities and the non-disabled before the ADAAA to the same difference after the ADAAA and relies on the assumption that in the absence of the ADAAA, the differences in outcomes between the disabled and the non-disabled would have been the same over time. This empirical strategy is used in Acemoglu and Angrist(2001) to evaluate the consequences of the ADA.[51]

2.4 Data and Descriptive Statistics

This sample is drawn from the 1988-2010 March CPS and is limited to those ages 18-62. Disabled workers are identified in the March CPS Income Supplement by the following question: "Does [respondent] have a health problem which prevents him/her from working or which limits the kind or amount of work he/she can do?" Although this question has been used by other researchers working on disability issues, using this measure of disability is subject to a few caveats. First, the definition of disability used in the CPS, which focuses on work disabilities, differs from the ADA's definition, which focuses on functional limitations. As a result, this essay may capture the labor market outcomes of those

---

[51] The Appendix presents estimates of the impact of the ADAAA on labor market outcomes using the state group variables. I estimate the following:

$$Y_{ist} = \beta X_{ist} + \alpha(D0910_t * LLP_s) + \gamma(D0910_t * NLP_s) + v_t + \pi_s + \epsilon_{ist}$$

where the variables are the same as above. α and γ are the coefficients of interest as the measure the effects of the ADAAA relative to those in the "Quasi-ADA" state group. This equation is estimated with two base periods: 2005-2008 and 2007-2008.

not covered by the ADA. However, employment trends over time for populations defined by work disabilities are similar to employment trends over time for populations defined by impairments.[52] Thus, the labor market outcomes of disabled respondents included in the CPS data has enough overlap with the labor market outcomes of those with disabilities covered by the ADA to make studying labor market outcomes of the disabled using the CPS informative. Second, and perhaps more damaging, the ADA's enactment could have changed the composition of the group identifying themselves as disabled on surveys.[53] However, other researchers working on disability issues have found no evidence of composition bias in the CPS(Jolls and Prescott 2004; Acemoglu and Angrist 2001; Beegle and Stock 2003).

The variables in the Income Supplement refer to the previous calendar year so the sample has data for weeks worked and labor force participation in 1987-2009. The disability status question in the supplement refers to the respondents' status in the previous year. The tables and figures refer to estimates by survey year.

Descriptive statistics organized by survey year intervals are reported in Table 2.3 and descriptive statistics stratified on survey year intervals and state groups are reported in Table 2.4. Nearly 10 percent of each state's population reports a disability limiting work with the percentage increasing slightly from 1988-1989 to 2009-2010 (6 percent versus 8 percent.) This finding is comparable to the disability rate found in Acemoglu and Angrist (2001), who also use CPS data. However, this disability rate is below the figures found when using data such as the Census or SIPP.[54] Interestingly, as can be seen in Table 2.4, "No Law" states have the highest average state disability rates while "Quasi-ADA" states have the lowest.

As expected, labor force participation and weeks worked by those with disabilities are both low with an average of 37 percent participating in the labor force in 1988-1989 and working an average of 15.7 weeks during the same period. Table 2.4 shows that labor force participation rates and weeks worked

---

[52] Burkhauser, et. al. (2002).
[53] See Kruse and Schur (2003) for a description of the routes by which the ADA's passage could alter the composition of people answering 'yes' to disability questions on surveys.
[54] See DeLeire (2000), Beagle and Stock (2003), and Haveman and Wolfe (1990) for various measures of disability prevalence found in different samples.

by the disabled are higher in each year interval for "Quasi-ADA" states relative to "Anti-discrimination" and "No Law" states.

Across time comparisons in Table 2.3 reveal that the labor force participation rates of disabled workers decline from 37 percent in 1988-1999 to 22 percent in 2009-2010. A similar decline is noticed for weeks worked which is 15.7 in 1988-1989 and declines to 9.7 in 2009-2010. At the same time, however, educational attainment of people with disabilities improved markedly. The percentage of people with disabilities with at least a high school diploma increased from 26 percent in 1988-1989 to 77 percent in 2009-2010 while the fraction attending school increased from 20 percent in 1988-1989 to 28 percent in 2009-2010. High school graduation rates are higher for the disabled in "Quasi-ADA" and "Anti-discrimination" states relative to the disabled in "No Law" states. Interestingly, school attendance among the disabled tends to be highest in "Anti-discrimination" states. Other demographic characteristics of the disabled do not appear to have changed much between 1988 and 2010.

Table 2.4 also allows the comparison of the strength of state economies across state groups. For all three state groups, the state unemployment rate rose between 1988-1989 and 2009-2010 with "Anti-discrimination" and "No Law" states experiencing the highest unemployment rate in 2009-2010 of 10 percent.

2.5 Results

Figure 2.1 plots average weeks worked by state group. Between 1990 and 1992, weeks worked by those with disabilities in "Quasi-ADA" states remained fairly constant while falling for those with disabilities in "Anti-discrimination" and "No Law" states. Between 1993 and 2000, weeks worked fell in "Quasi-ADA" states while remaining constant in "Anti-discrimination" and "No Law" states. Weeks worked fell for all three state groups between 2000 and 2002 with the most drastic decline occurring in "No Law"

states. Interestingly, between 2003 and 2008, weeks worked rose in "No Law" states while falling in "Quasi-ADA" and "Anti-discrimination" states.[55]

Table 2.5 reports ordinary least squares estimates of equation (2.1) and estimates of extensions to equation (2.1). The dependent variable is weeks worked. Column (1) reports results from equation (2.1). Column (2) excludes controls for state economic variables. Columns (3) and (4) introduce linear time trends by state group and by individual states, respectively. The parameters of interest are a set of state group * year interval interactions, with 1988-1989 as the base period. These interaction terms report the change in relative weeks worked of those with disabilities.

The results in Table 2.5 suggest that disabled individuals in "Anti-discrimination" and "No Law" states worked significantly fewer weeks in the 1990-1992 interval relative to "Quasi-ADA" states. Column (1) reports that people with disabilities in "No Law" states experienced the greatest decline in weeks worked, -2.2, and the disabled in "Anti-discrimination" states experienced a decline of 1.7. This difference is most likely due to the fact that the ADA imposed two new requirements on "No Law" states while imposing only one new requirement on "Anti-discrimination" states. The results suggest the short-term weeks worked effect of the reasonable accommodations mandate of the ADA was -1.7 and the short-term weeks worked effect of disability discrimination prohibition was -.5. Estimates on the remaining interaction variables are insignificant. In columns (1) and (2), the estimates on the interaction variables for 1993-1999 and 2000-2002 are negative, while the relationship between weeks worked and the interaction variable becomes positive in 2003-2008 for "Anti-discrimination" states and becomes positive in 2009-2010 for the "No Law" states. The sign on the interaction variables in columns (1) and (2) are the same and the point estimates of the interaction variables are roughly equivalent, suggesting that state fixed effects and year fixed effects sufficiently capture each state's economic condition and additional state-level controls are not needed.

---

[55] Column (1) of Table 2.A.1 in the Appendix reports estimates of a "barebones" model of weeks worked regressed on treatment variables.

In columns (1) and (2), estimates of the interaction variables are insignificant for all time periods except 1990-1992. The findings suggest that, after the transition period of 1990-1992, the labor market effects of the ADA were zero. This is reasonable for the years 2000 through 2008 since the ADA's interpretation was weakened during this time period. However, it is surprising, but consistent with previous research, that the labor market effects are insignificant between 1993 and 1999, as the ADA's interpretation was not weakened during this time period. This suggests that the ADA may not have been the sole cause of the decline in the labor market attachment of those with disabilities and another phenomenon may have been at work during the mid to late 1990s. Another surprise in these findings is the insignificant labor market effects in 2009-2010, which coincides with the years following the enactment of the ADAAA.[56] Possible explanations for this finding are offered below.

Columns (3) and (4) report estimates of equation (2.1) that include time trends. Specifications that include time trends report larger point estimates for the interaction variables and more of the estimates are estimated with precision. The results show a significant decline in weeks worked for those in "No Law" states relative to those in "Quasi-ADA" states throughout all time intervals with the decline increasing over time. Estimates for "Anti-discrimination" states are all negative but insignificant. A possible explanation for the significant decline in weeks worked in "No Law" states relative to "Quasi-ADA" states is that people with disabilities in "No Law" states are significantly more likely to be minorities than those with disabilities in other states. One might be concerned that the significant, negative labor market effects for "No Law" states is actually a labor market trend among minorities. However, estimates of equation (2.1) with state group time trends using disabled non-minorities yield the same significant decline in weeks worked in "No Law" states. Therefore, the decline in weeks worked in "No Law" states is not solely due to a trend among minorities.

Column (3) also reports positive estimates for the two time trend variables. The trend for "No Law" states is significant. This suggests that people with disabilities in "No Law" states experienced an increase in weeks worked between 1988 and 2010. However, relative to "Quasi-ADA" states, those in

---

[56] See analysis regarding estimates found in Table 2.7 for a discussion of the impact of the ADAAA.

"No Law" states had a decrease in weeks worked and this difference increased over time. This is a significantly different finding from the baseline model and suggests that estimates of the interaction variable in the baseline model may comingle these two trends, resulting in the insignificant estimates reported in columns (1) and (2).

Figure 2.2 plots labor force participation by state group. Between 1990 and 1992, labor force participation by those with disabilities in "Quasi-ADA" states rose while falling slightly for those with disabilities in "Anti-discrimination" and "No Law" states. Between 1993 and 2000, labor force participation fell dramatically in "Quasi-ADA" states while falling to a lesser extent in "Anti-discrimination" and "No Law" states. Labor force participation fell for all three state groups between 2000 and 2002 with the most drastic decline in "No Law" states. Interestingly, between 2003 and 2008, labor force participation rose in "No Law" states while falling slightly in "Quasi-ADA" and "Anti-discrimination" states.[57]

Table 2.6 presents estimates of the ADA's impact on the labor force participation of those with disabilities and is organized in the same manner as Table 2.5. Similar to the findings for weeks worked, the interaction variables are significant only for 1990-1992 in columns (1) and (2). In 1990-1992, those with disabilities in "No Law" states experienced a 6.4 percent decline in labor force participation relative to "Quasi-ADA" states while those with disabilities in "Anti-discrimination" states experienced a 3.9 percent decline in labor force participation relative to "Quasi-ADA" states. Thus, the ADA's reasonable accommodation mandate is responsible for 3.9 percent of the decline in labor force participation of the disabled, while the disability anti-discrimination mandate was responsible for 2.5 percent of the decline in labor force participation.

Columns (3) and (4) report that the inclusion of state group time trends and state time trends improves the precision of the estimates of the interaction variables for "No Law" and "Anti-discrimination" states and significantly alters the value of the point estimates on all of the interaction

---

[57] Column (2) of Table 2.A.1 in the Appendix reports estimates from a "barebones" regression of labor force participation on the treatment variables.

variables. Estimates for the interaction variables are negative and become more so with time and estimates for the state group time trends are positive, which is the same finding as estimates for these parameters in Table 2.5. It is likely that the cause of the increasingly negative point estimates of the interaction variables and the positive point estimates on the time trend variables is the same as the cause for these trends for models including weeks worked. The results reported in columns (3) and (4) suggest a nearly uniform decline in labor force participation for both state groups relative to "Quasi-ADA" states. The decline is always greater for "No Law" states and is greatest, for both state groups, in the years following the Americans with Disabilities Act Amendments Act (ADAAA).[58]

To further explore the impact of the ADAAA on labor market outcomes of the disabled, Table 2.7 reports estimates of equation (2.2). The parameters of interest are a set of year * disability interactions. Columns (1) and (2) report estimates with weeks worked as the dependent variable and show that the estimate for disability * 2010, the post-treatment variable, is positive, and its precision improves with the specification with a shorter pre-ADAAA time horizon. However, both specifications suggest that the ADAAA induced those with disabilities to increase weeks worked by less than one week. Unlike estimates for weeks worked, the results for labor force participation, reported in columns (3) and (4), are nearly identical for the two pre-ADAAA time horizons. The results show that the labor force participation of those with disabilities fell a significant 1.7 percent in 2010.

The findings suggest that the longer term impact of the ADA on the weeks worked by and labor force participation of the disabled has diminished to zero. A possible explanation for this is, as the Supreme Court weakened the interpretation of ADA, the labor market effects of the legislation has gone to zero in the longer run. However, this explanation does not fully explain the finding for 1993-1999 and the post-ADA Amendments Act years of 2009-2010. The first Supreme Court rulings regarding the employment provisions of the ADA came in 1999. Thus, the insignificant labor market effects of the ADA in 1993-1999 may be due to changing norms induced by the ADA itself. Alternatively, it is quite

---

[58] One may be concerned that the significant negative estimates for "No Law" states are due to trends in minority labor force participation. However, results using the subsample of disabled non-minorities yield the same conclusions as the results presented in Table 2.6.

possible that the ADA is not responsible for the decline in weeks worked by and labor force participation of the disabled. Since the labor market outcomes of the disabled worsened for all three state groups, regardless of the presence of pre-ADA state disability legislation, it is likely that there is a factor that affected those with disabilities across all states. One factor suggested by Autor and Duggan(2001) is the liberalization of the Social Security Disability Insurance program.

The results of the baseline model also suggest that state disability statutes are becoming increasingly irrelevant in the labor market outcomes of the disabled. However, these results may confound the effects of state disability statutes with state time trends of labor market outcomes. As such, future research that evaluates the ADA using a state disability statute framework may benefit from the inclusion of state group time trends. Furthermore, evaluating the ADAAA in a framework that does not explicitly control for state disability statutes and allows labor market outcomes to vary by year is likely to be the most informative approach. The results from this approach suggests that the ADAAA did significantly impact labor force participation of the disabled but did not influence weeks worked. This is an interesting finding. Perhaps, the ADAAA reduced the demand for new disabled employees but did not alter the labor market behavior those with disabilities who were already working. Alternatively, it could be that the full impact of the ADAAA on weeks worked may need a time horizon longer than two years to be fully estimated; however, this runs counter to the results found regarding the labor market effects of the ADA, which suggests that these labor market effects of the ADA were concentrated in the two years immediately following its passage. Further research into this issue is warranted.

2.6 Conclusion

People with disabilities have worse economic outcomes than the non-disabled across a multitude of economic and disability measures. Partly in response to the lower labor force attachment of the disabled, Congress passed the Americans with Disabilities Act(ADA) in 1990 to create equal employment opportunities for the disabled. However, theoretical predictions and previous research indicate that the

ADA may have negatively impacted the short-term labor market outcomes of the disabled. Since its enactment, the ADA has undergone changes to its two central employment provisions: the definition of disability and the definition of reasonable accommodation. Questions regarding the ADA's longer term effect on the labor market outcomes of the disabled persist as the Supreme Court continues to alter the interpretation of the Act.

This essay presents new evidence on the longer term effects of the ADA based on two sources of variation: pre-ADA state disability legislation and five Supreme Court decisions that significantly altered the ADA's interpretation. The findings in this essay indicate that in the short run, the ADA significantly diminished the weeks worked and labor force participation of the disabled, while having insignificant impacts on both outcomes in the longer run, and the ADAAA did not significantly influence the weeks worked by those with disabilities, but did significantly decrease the labor force participation of the disabled.

Two areas for future research remain. First, understanding why the labor market effects of the ADA become insignificant between 1993 and 1999 would be instructive to understanding how employers response to federal legislation changes in the medium run. Second, deciphering the extent to which the economic downturn of the late 2000s contributes to these results would also be informative.

References

Acemoglu, D. and J. Angrist, "Consequences of Employment Protection? The Case of the Americans With Disabilities Act," *Journal of Political Economy*, 109, (2001), 915-957.

Albertsons, Inc. v. Kirkingburg, 527 U.S. 555 (1999).

Allbright, A., "2009 Employment Decisions under the ADA Title I—Survey Update," *Mental & Physical Disability Law Reporter*, 34, (2010), 339-343.

Americans with Disabilities Act of 1990(July 26, 1990), 42 US Code 12101.

Anderson, C., "Ideological Dissonance, Disability Backlash, and the ADA Amendments Act," *Wayne Law Review*, 55, (2009), 1267-1327.

Angrist, J. and J. Pischke, Mostly Harmless Econometrics: An Empiricist's Companion, (Princeton: Princeton University Press, 2009)

Autor, D. and M. Duggan, "Disability Recipiency and the Decline in Unemployment," National Bureau of Economic Research working paper #8363, (2001).

Bailey, S., "The New ADA—Expanding Coverage and Redefining Disability." *Colorado Lawyer*, 39, (2010), 47-52.

Baldwin, M. and W. Johnson, "Labor Market Discrimination against Men with Disabilities in the Year of the ADA." *Southern Economic Journal*, 66, (2000), 548-566.

Baldwin, M. and E. Schumacher, "A Note on Job Mobility Among Workers with Disabilities," *Industrial Relations*, 41, (2002), 430-441.

Beegle, K. and W. Stock, "The Labor Market Effects of Disability Discrimination Laws," *Journal of Human Resources*, 38, (2003), 806-859.

Board of Trustees of the University of Alabama v. Garrett, 121 S. Ct. 955 (2001).

Bound, J. and T. Waidmann, "Accounting for Recent Declines in Employment Rates Among the Working-Aged Disabled," *Journal of Human Resources*, 37, (2002), 231-250.

Burkhauser, R., M. Daly, A. Houtenville and N. Nargis, "Self-Reported Work-Limitation Data," *Demography*, 39, (2002), 541-555.

Bragdon v. Abbott, 524 U.S. 624 (1998).

Chevron, Inc. v. Echazabal, 536 U.S. 73 (2002).

Cox, J., "Crossroads and Signposts: the ADA Amendments Act of 2008," *Indiana Law Journal*, 85, (2010), 187-225.

DeLeire, T., "The Wage and Employment Effects of the Americans with Disabilities Act," *Journal of Human Resources*, 35, (2000), 693-715.

Hotchkiss, J., "A Closer Look at the Employment Impact of the Americans with Disabilities Act," *Journal of Human Resources*, 39, (2004), 887-911.

Joiner, A., "The ADAAA: Opening the Floodgates," *San Diego Law Review*, 47, (2010), 331-369.

Jolls, C. and J. Prescott, "Disaggregating Employment Protection: the Case of Disability Discrimination," *Unpublished mimeo*, (2004).

Jones, J., "Enfeebling the ADA: the ADA Amendments Act of 2008," *Oklahoma Law Review*, 62, (2010), 667-699.

Kirchner, C, "Looking Under the Street Lamp: Inappropriate Uses of Measures Just Because They are There," *Journal of Disability Policy Studies*, 7, (1986), 78-90.

Klein, P., "The ADA Amendments Act of 2008: the Pendulum Swings Back," *Case Western Reserve Law Review*, 60, (2010), 407-490.

Murphy v. United Parcel Service, Inc., 527 U.S. 516 (1999).

Race, P., "ADA Amendments Act of 2008: the Effect on Employers and Educators," *Willamette Law Review*, 46, (2009), 356-402.

Sauer, E., "The ADA Amendments Act of 2008: the Mitigating Measures Issues, No Longer a Catch-22," *Ohio Northern University Law Review*, 36, (2010), 215-236.

Selmi, M., "Interpreting the Americans with Disabilities Act: Why the Supreme Court Rewrote the Statute, and Why Congress Did Not Care," *George Washington Law Review*, 76, (2008), 522-555.

Stapleton, D. and R. Burkhauser (eds.), The Decline in Employment of People with Disabilities, (Kalamazoo: W.E. Upjohn Institute for Employment Research), 2003.

Sutton v. United Air Lines, 527 U.S. 471 (1999).

Toyota Manufacturing, Kentucky, Inc. v. Williams, 534 U.S. 184 (2002).

Valderrama, H., "Is the ADAAA a 'Quick Fix' or Are We Out of the Frying Pan and Into the Fire?: How Requiring Parties to Participate in the Interactive Process Can Effect Congressional Intent Under the ADAAA," Houston Law Review, 47, (2010), 175-213.

Weber, M., "Unreasonable Accommodation and Due Hardship," Florida Law Review, 62, (2010), 1119-1178.

TABLE 2.1
STATE DISABILITY ANTI-DISCRIMINATION LAWS

State (1)	Statutory Section (2)	Date Adopted* (3)	Anti-discrimination Provisions and Reasonable Accommodation Requirement (4)	Anti-discrimination Provisions (5)	No Statute (6)	Category Assigned for Empirical Analysis (7)
Alabama					x	No Law
Alaska	18.80.220(a)(1)	1969		x		Anti-Discrimination
Arizona	41-1463(b)	1985	x			Quasi-ADA
Arkansas					x	No Law
California	Govt. 12940(a), 12994	1973		x		Anti-Discrimination
Colorado	24-34-402(1)(a)	1977	x			Quasi-ADA
Connecticut	46a-60(a)(1)	1973		x		Anti-Discrimination
Delaware	19:723(b), 724(a), 724(e)(2)	1988	x			Quasi-ADA
Florida	760.10(1)	1977		x		Anti-Discrimination
Georgia	34-6A-4(a)	1981		x		Anti-Discrimination
Hawaii	378-2(1)	1975		x		Anti-Discrimination
Idaho	67-5909(1)	1988	x			Quasi-ADA
Illinois	68:1-103(Q),2-102(A)	1971		x		Anti-Discrimination
Indiana	22-9-1-3(1)	1975		x		Anti-Discrimination
Iowa	601 A.6(1)(a)	1972	x			Quasi-ADA
Kansas	44-1009(a)(1)	1974		x		Anti-Discrimination
Kentucky	207.150(1)	1976		x		Anti-Discrimination
Louisiana	46:2254(A), (C)	1980	x			Quasi-ADA
Maine	5:4572(1)(A)	1973		x		Anti-Discrimination
Maryland	49B:16(a)	1974		x		Anti-Discrimination
Massachusetts	151B:4(16)	1972	x			Quasi-ADA
Michigan	37.1102(2), 1202(1)	1976		x		Anti-Discrimination
Minnesota	363.03:1(2), (6)	1973	x			Quasi-ADA
Mississippi					x	No Law
Missouri	213.055.1(1)	1978		x		Anti-Discrimination
Montana	49-2-303(a), 49-4-101	1974		x		Anti-Discrimination
Nebraska	48-1104	1973		x		Anti-Discrimination
Nevada	613.330(1)	1971		x		Anti-Discrimination
New Hampshire	354-A:8(I)	1975		x		Anti-Discrimination
New Jersey	10:5-4.1, -12(a), -29.1	1972		x		Anti-Discrimination
New Mexico	28-1-7(A), (J)	1973	x			Quasi-ADA
New York	Exec. 296(1)(a)	1974		x		Anti-Discrimination
North Carolina	168A-4, 5(a)	1973	x			Quasi-ADA
North Dakota	14-02.4-03	1983		x		Anti-Discrimination
Ohio	4112.02(A)	1976		x		Anti-Discrimination
Oklahoma	25:1302(A)	1981		x		Anti-Discrimination
Oregon	659.425(1)	1973	x			Quasi-ADA
Pennsylvania	43:955(a), (b)	1974	x			Quasi-ADA
Rhode Island	28-5-7(1)	1973	x			Quasi-ADA
South Carolina	43-33-530	1983		x		Anti-Discrimination
South Dakota	20-13-10, 23.7, 23.8	1986		x		Anti-Discrimination
Tennessee	8-50-103(a)	1976		x		Anti-Discrimination
Texas	Civ. Art. 5221k:5.01	1975		x		Anti-Discrimination
Utah	34-35-6(1)(a)(i)	1979		x		Anti-Discrimination
Vermont	21:495(a)(1). 494d(6)	1973	x			Quasi-ADA
Virginia	51.5-41(A), (C)	1975	x			Quasi-ADA
Washington	49.60.180	1973	x			Quasi-ADA
West Virginia	5-11-9(a)(1)	1981		x		Anti-Discrimination
Wisconsin	111.321, 322(1), 34(1)(b)	1965	x			Quasi-ADA
Wyoming	27-9-105(a), (d)	1985	x			Quasi-ADA

NOTES -- This table reports which states had pre-ADA disability anti-discrimination statutes and the major provisions of the statutes. *The following states adopted reasonable accommodations mandates after adopting traditional anti-discrimination provisions: Iowa, Massachusetts, Minnesota, New Mexico, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington and Wisconsin.

TABLE 2.2
UNITED STATES SUPREME COURT DECISIONS REGARDING THE ADA

Case/Statute	Year Decided/ Implemented	Expanded Definition of Disability	Restricted Definition of Disability	Expanded Definition of Reasonable Accommodation	Restricted Definition of Reasonable Accommodation
(1)	(2)	(3)	(4)	(5)	(6)
Sutton v. United Airlines	1999		X		
Murphy v. UPS	1999		X		
Albertson's v. Kirkingburg	1999		X		
Toyota Motor Mfg. v. Williams	2002	X			
Chevron v. Echazabal	2002				X
US Airways v. Barnett	2002				X
ADA Amendments Act	2009	X		X	

NOTES -- This table reports the impact of Supreme Court decisions and amendments that significantly altered the interpretation of Title I of the ADA.

TABLE 2.3
DESCRIPTIVE STATISTICS

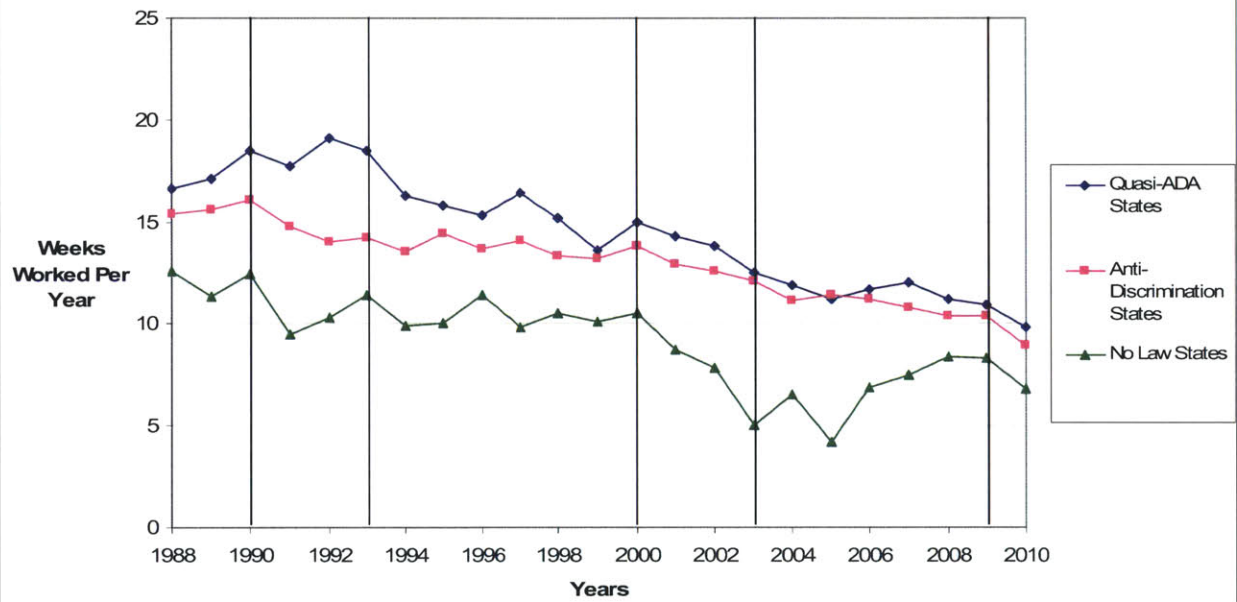|	1988-1989 (1)	1990-1992 (2)	1993-1999 (3)	2000-2002 (4)	2003-2008 (5)	2009-2010 (6)
Female	.48	.49	.50	.51	.51	.51
Age (in years)	41.88	42.15	42.73	44.11	44.53	45.83
High School Graduate	.26	.40	.69	.73	.75	.77
Married	.47	.48	.44	.42	.40	.39
Minority	.20	.20	.23	.24	.25	.24
Rate	.04	.05	.05	.04	.04	.10
State Disability Rate	.07	.07	.08	.08	.08	.08
Weeks Worked	15.70	15.70	14.17	13.25	11.06	9.70
Labor Force Participants	.37	.36	.31	.28	.24	.22
Attending School	.20	.26	.27	.27	.29	.28
Receives SSI/DI	.13	.12	.11	.10	.10	.08
Number of Observations	9,838	16,181	37,038	20,686	45,872	16,458

NOTES -- This table reports weighted descriptive statistics for the sample of those with disabilities ages 18-62 years by time interval. Data comes from the March CPS and is weighted using CPS weights.

TABLE 2.4
DESCRIPTIVE STATISTICS BY STATE GROUP

	1988-1989 (1)	1990-1992 (2)	1993-1999 (3)	2000-2002 (4)	2003-2008 (5)	2009-2010 (6)
Female						
Quasi-ADA	.46	.49	.50	.52	.51	.50
Anti-Discrimination	.48	.48	.50	.51	.51	.50
No Law	.51	.47	.49	.53	.50	.52
Age (in years)						
Quasi-ADA	41.88	41.87	42.58	44.10	44.47	45.82
Anti-Discrimination	41.90	42.2	42.75	44.06	44.54	45.89
No Law	41.58	43.18	43.32	44.83	44.65	45.08
High School Graduate						
Quasi-ADA	.27	.44	.71	.75	.77	.78
Anti-Discrimination	.26	.39	.69	.72	.75	.77
No Law	.17	.33	.58	.65	.67	.67
Married						
Quasi-ADA	.49	.49	.44	.42	.39	.40
Anti-Discrimination	.47	.47	.44	.43	.40	.39
No Law	.49	.49	.46	.43	.40	.41
Minority						
Quasi-ADA	.17	.16	.18	.20	.22	.21
Anti-Discrimination	.21	.21	.23	.24	.25	.25
No Law	.33	.34	.38	.39	.42	.37
State Unemployment Rate						
Quasi-ADA	.04	.05	.04	.04	.04	.09
Anti-Discrimination	.04	.05	.05	.04	.04	.10
No Law	.06	.05	.05	.04	.05	.10
State Disability Rate						
Quasi-ADA	.07	.07	.08	.08	.08	.08
Anti-Discrimination	.07	.07	.08	.08	.08	.08
No Law	.09	.10	.10	.10	.11	.12
Weeks Worked						
Quasi-ADA	16.88	18.46	15.85	14.32	11.74	10.3
Anti-Discrimination	15.48	14.94	13.75	13.11	11.13	9.62
No Law	11.94	10.7	10.42	8.91	6.43	7.48
Labor Force Participants						
Quasi-ADA	.40	.42	.35	.30	.26	.24
Anti-Discrimination	.37	.34	.30	.27	.24	.21
No Law	.30	.24	.22	.18	.14	.14
Attending School						
Quasi-ADA	.17	.27	.28	.24	.29	.25
Anti-Discrimination	.22	.26	.28	.28	.29	.30
No Law	.17	.28	.18	.35	.26	.20
Receives SSI/DI						
Quasi-ADA	.13	.12	.11	.10	.10	.08
Anti-Discrimination	.13	.13	.11	.11	.10	.08
No Law	.08	.07	.08	.07	.07	.05

NOTES -- This table reports weighted descriptive statistics for the sample of those with disabilities ages 18-62 years by time interval and state group. Data comes from the March CPS and is weighted using CPS weights.

Figure 2.1: State Employment Trends

TABLE 2.5
ESTIMATES FOR WEEKS WORKED

	(1)	(2)	(3)	(4)
Female	-1.823 ***	-1.825 ***	1.973 ***	-1.973 ***
	(.134)	(.134)	(.783)	(.807)
Age	-.199 ***	-.198 ***	-.199 ***	-.199 ***
	(.007)	(.007)	(.007)	(.007)
Education	1.508 ***	1.508 ***	1.508 ***	1.506 ***
	(.047)	(.047)	(.047)	(.046)
Married	2.700 ***	2.692 ***	2.696 ***	2.690 ***
	(.179)	(.180)	(.179)	(.179)
Minority	-3.736 ***	-3.738 ***	-3.738 ***	-3.743 ***
	(.277)	(.277)	(.277)	(.276)
State Unemployment %	-2.908 **	--	-3.285	4.800
	(4.746)		(4.741)	(4.888)
State Disability Rate	14.778 ***	--	-1.948 *	11.421
	(8.391)		(11.719)	(8.570)
LLP States * Time Trends	--	--	.094	--
			(.105)	
NLP States * Time Trends	--	--	.395 ***	--
			(.118)	
Transition Years				
1990-1992 * LLP	-1.739 **	-1.756 **	-1.973 **	-1.973 **
	(.771)	(.777)	(.783)	(.807)
1990-1992 * NLP	-2.181 ***	-2.156 ***	-3.190 ***	-3.004 ***
	(.789)	(.777)	(.914)	(.929)
Pre-Ruling Years				
1993-1999 * LLP	-.770	-.764	-1.475	-1.498 *
	(.661)	(.669)	(.921)	(.901)
1993-1999 * NLP	-.373	-.350	-3.361 **	-3.061 *
	(1.337)	(1.35)	(1.692)	(1.681)
Post-Disability Definition Decision Years				
2000-2002 * LLP	-.079	-.049	1.256	-1.192
	(.748)	(.753)	(1.301)	(1.270)
2000-2002 * NLP	-.503	-.480	-5.465 ***	-5.102 ***
	(.737)	(.715)	(1.735)	(1.760)
Post-Reasonable Accommodation Decision Years				
2003-2008 * LLP	.601	.601	-.999	-960 *
	(.717)	(.731)	(1.615)	(1.577)
2003-2008 * NLP	-.605	-.402	-7.324 ***	-6.862 ***
	(.687)	(.669)	(1.917)	(1.967)
ADA Amendments Act Years				
2009-2010 * LLP	1.480	.402	-1.541	-1.572
	(2.676)	(.708)	(2.083)	(2.043)
2009-2010 * NLP	.434	1.699	-6.830 **	-6.450 **
	(.687)	(1.938)	(2.687)	(2.638)
State group time trends	No	No	Yes	No
State time trends	No	No	No	Yes
Number of observations	145,940	145,940	145,940	145,940

NOTES -- This table reports OLS estimates for the CPS sample described in the text. The dependent variable is weeks worked. Standard errors are in parentheses. All specifications include year fixed effects and state fixed effects, employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

Figure 2.2: State Labor Force Participation Rates
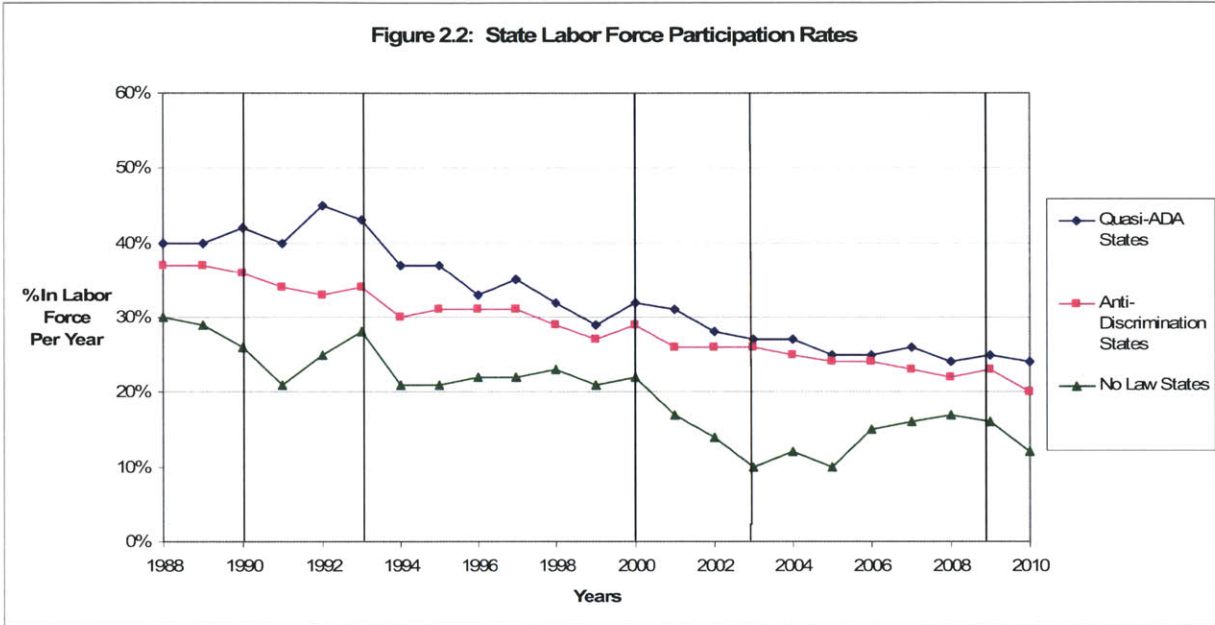
TABLE 2.6
ESTIMATES FOR LABOR FORCE PARTICIPATION

	(1)	(2)	(3)	(4)
Female	-.042 ***	-.042 ***	-.042 ***	-.042 ***
	(.003)	(.003)	(.003)	(.000)
Age	-.006 ***	-.006 ***	-.006 ***	-.006 ***
	(.000)	(.000)	(.000)	(.000)
Education	.033 ***	.033 ***	.032 ***	.033 ***
	(.001)	(.001)	(.001)	(.001)
Married	.045 ***	.045 ***	.046 ***	.045 ***
	(.004)	(.004)	(.004)	(.004)
Minority	-.072 ***	-.072 ***	-.072 ***	-.073 ***
	(.007)	(.007)	(.007)	(.007)
State Unemployment %	.105 *	--	.095	.153 ***
	(.125)		(.127)	(.114)
State Disability Rate	.093	--	.072	.058
	(.194)		(.195)	(.176)
LLP States * Time Trends	--	--	.003	--
			(.002)	
NLP States * Time Trends	--	--	.011	--
			(.002)	
Transition Years				
1990-1992 * LLP	-.040 **	-.039 ***	-.047	-.047 *
	(.016)	(.015)	(.018)	(.018)
1990-1992 * NLP	-.064 **	-.066 **	-.092 **	-.089 **
	(.026)	(.026)	(.028)	(.028)
Pre-Ruling Years				
1993-1999 * LLP	-.019	-.018	-.042	-.042 **
	(.013)	(.013)	(.022)	(.022)
1993-1999 * NLP	-.017	-.019	-.099 ***	-.042 ***
	(.018)	(.018)	(.022)	(.022)
Post-Disability Definition Decision Years				
2000-2002 * LLP	-.005	-.006	-.044	-.043 *
	(.016)	(.016)	(.031)	(.031)
2000-2002 * NLP	-.020	-.022	-.157 ***	-.152 ***
	(.015)	(.014)	(.030)	(.030)
Post-Reasonable Accommodation Decision Years				
2003-2008 * LLP	.010	.011	-.042	-.042 *
	(.015)	(.015)	(.036)	(.035)
2003-2008 * NLP	-.011	-.013	-.198 ***	-.192 ***
	(.015)	(.014)	(.033)	(.033)
ADA Amendments Act Years				
2009-2010 * LLP	-.007	-.007	-.072	-.072 *
	(.015)	(.016)	(.045)	(.044)
2009-2010 * NLP	-.010	-.011	-.241 ***	-.236 ***
	(.032)	(.034)	(.033)	(.033)
State group time trends	No	No	Yes	No
State time trends	No	No	No	Yes
Number of observations	145,940	145,940	145,940	145,940

NOTES -- This table reports OLS estimates for the CPS sample described in the text. The dependent variable is labor force participantion. Standard errors are in parentheses. All specifications include year fixed effects and state fixed effects, employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 2.7
ESTIMATES OF THE CONSEQUENCES OF THE ADAAA

	Dependent Variable: Weeks Worked		Dependent Variable: Labor Force Participation	
	(1)	(2)	(3)	(4)
Disability Main Effects	-28.221 ***	-28.324 ***	-.574 ***	-.575 ***
	(.384)	(.381)	(.008)	(.009)
Disability * 2006	.064	--	.002	--
	(.365)		(.006)	
Disability * 2007	-.422	--	-.001	--
	(.369)		(.007)	
Disability * 2008	-.669 *	-.254	-.012 *	-.012 *
	(.398)	(.327)	(.007)	(.007)
Disability * 2009	-.112	.299	-.007	-.007
	(.431)	(.412)	(.010)	(.008)
Disability * 2010	.290	.710 *	-.017 **	-.017 *
	(.411)	(.368)	(.009)	(.009)
Female	-6.476 ***	-6.203 ***	-.127 ***	-.124 ***
	(.305)	(.324)	(.006)	(.006)
Number of observations	747,216	497,512	747,216	497,512

NOTES -- This table reports OLS estimates of equation (2.2). The sample used for this analysis includes those with and without disabilities age 18-62 years in the CPS for 1988-2010. Columns (1) and (3) include observations from 2005 through 2010, with a base year of 2005. Columns (2) and (4) include observations from 2007 throughth 2010, with a base year of 2007. Standard errors are in parentheses. All specifications employ CPS survey weights and are clustered at the state level. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

93

Appendix

TABLE 2.A.1
BASIC ESTIMATES OF LONG-TERM CONSEQUENCES OF ADA

	DEPENDENT VARIABLE: WEEKS WORKED (1)	DEPENDENT VARIABLE: LABOR FORCE PARTICIPATION (2)
Transition Years		
1990-1992 * LLP	-1.93 **	-.043 **
	(.863)	(.018)
1990-1992 * NLP	-2.453 ***	-.074 ***
	(.871)	(.029)
Pre-Ruling Years		
1993-1999 * LLP	-.660	-.017
	(.660)	(.013)
1993-1999 * NLP	-.421	-.022
	(1.228)	(.016)
Post-Disability Definition Decision Years		
2000-2002 * LLP	.138	-.002
	(.778)	(.018)
2000-2002 * NLP	-.382	-.022
	(.733)	(.017)
Post-Reasonable Accommodation Decision Years		
2003-2008 * LLP	.822	.015
	(.814)	(.016)
2003-2008 * NLP	-.173	-.009
	(.714)	(.015)
ADA Amendments Act Years		
2009-2010 * LLP	.651	-.002
	(.755)	(.017)
2009-2010 * NLP	2.237	.001
	(2.097)	(.038)
Number of observations	145,940	145,940

NOTES -- This table reports estimates from the "barebones" regression described in the text and uses the CPS sample described in the text. Standard errors are in parentheses. All specifications include year fixed effects and state fixed effects, exclude demographic controls, employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 2.A.2
ESTIMATES OF ADAAA'S IMPACT USING STATE LAWS

	Dependent Variable: Weeks Worked		Dependent Variable: Labor Force Participation	
	(1)	(2)	(3)	(4)
Female	-1.375 ***	-1.379 ***	-.027 ***	-.027 ***
	(.171)	(.198)	(.004)	(.006)
Age	-.147 ***	-.135 ***	-.004 ***	-.004 ***
	(.009)	(.012)	(.000)	(.000)
Education	1.342 ***	1.293 ***	.030 ***	.029 ***
	(.054)	(.048)	(.001)	(.001)
Married	1.724 ***	1.453 ***	.023 ***	.020 **
	(.334)	(.457)	(.006)	(.008)
Minority	-2.800 ***	-2.758 ***	-.056 ***	-.054 ***
	(.246)	(.292)	(.006)	(.007)
State Unemployment %	21.284 *	17.282	.659 **	.789 ***
	(12.370)	(13.784)	(.271)	(.298)
State Disability Rate	33.183 **	7.411	.023	-.167
	(16.045)	(21.332)	(.367)	(.518)
ADA Amendments Act Years				
2009-2010 * LLP	-.250	.117	-.019	-.014
	(.435)	(.484)	(.012)	(.012)
2009-2010 * NLP	1.472	.449	-.016	-.037
	(1.518)	(1.637)	(.030)	(.026)
Number of observations	46,416	30,672	46,416	30,672

NOTES -- This table reports OLS estimates for the CPS sample described in the text. Columns (1) and (3) include observations from 2005 through 2010, with a base year of 2005. Columns (2) and (4) include observations from 2007 througth 2010, with a base year of 2007. Standard errors are in parentheses. All specifications include year fixed effects and state fixed effects, employ CPS survey weights and are clustered at the state level.   * Indicates significance at the 10% level.   ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

Chapter 3

The Earnings Consequences of the Americans with Disabilities Act on People with Disabilities

3.1 Introduction

Those with disabilities have persistently lower wages and higher dependency on government transfers than the non-disabled (Acemoglu and Angrist 2001; Bound and Burkhauser 1999). For example, in 1990, disabled adults earned real wages that were 19 percent less than those of the non-disabled.[59] In an effort to reverse these trends and ballooning expenditures on federal entitlement programs for the disabled, in 1990, Congress enacted the Americans with Disabilities Act (ADA).[60] Congress assumed that the lower economic status of those with disabilities was due to reduced access to employment opportunities. Title I of the ADA was intended to improve the labor market outcomes of people with disabilities by creating equal employment opportunities. However, immediately following the ADA's

---

[59] DeLeire (2000).
[60] Leonard (1991).

enactment, opponents of the ADA suggested that the legislation would increase the costs of employing the disabled; thereby, worsening their labor market outcomes (Oi 1991; Olson 1997). While a few studies present evidence of the ADA's short-term wage effects on those with disabilities, to my knowledge, there has not been a study that evaluates the "longer term" wage consequences of the ADA.

Previous research nearly unanimously agrees that Title I of the Americans with Disabilities Act(ADA) resulted in lower labor force participation and employment rates of people with disabilities (Deleire 2000; Acemoglu and Angrist 2001; Kruse and Schur 2002; Baldwin and Johnson 2000). There is, however, a lack of consensus regarding the wage effects of the ADA. One study finds that the ADA did not alter the earnings of disabled men (DeLeire 2000). And another study finds that the ADA decreased the earnings of disabled men(Acemoglu and Angrist 2001). Additionally, the majority of the literature regarding the wage effects of the ADA does not evaluate the ADA's impact past the late 1990s. Since the ADA has been significantly and incrementally weakened by Supreme Court rulings between 1999 and 2008, the interpretation of the employment provisions of the ADA has evolved since the 1990s which may have caused the wage effects of the Act to change over time. This essay presents new evidence on the medium and longer term impact of the ADA on the weekly wages of the disabled by exploiting two sources of variation: pre-ADA state disability legal regimes and the changing interpretation of the ADA caused by Supreme Court decisions.

The empirical analysis in this essay evaluates the wage outcomes of people with disabilities using data from the March Current Population Survey(CPS) for 1988-2010. These data are useful for the purposes of this essay because the CPS has an income supplement that identifies people with disabilities on a yearly basis. To investigate the longer term impact of the ADA on the log weekly wages of those with disabilities, this essay employs two empirical strategies. First, a difference-in-differences estimator is used to compare the log weekly wages of people with disabilities before and after the signing of the ADA across three state groups. Second, a difference-in-differences-in-differences estimator is used to compare the log weekly wages of people with disabilities to the log weekly wages of the non-disabled before and after the signing of the ADA across three state groups. The essay separates the years following the

97

passage of the ADA into five intervals based on Supreme Court rulings and amendments that altered Title I of the ADA.[61]

I exploit variation in pre-ADA state disability legislation to identify the mechanism by which each of the changes to the ADA impacted the wages of the disabled. I follow Jolls and Prescott's empirical strategy of separating states into three categories based on their pre-ADA state disability legislation. States that had legislation providing disability anti-discrimination coverage and reasonable accommodation provisions are termed "Quasi-ADA" states because laws in these states closely resemble the ADA. States that provided disability anti-discrimination coverage but no provisions for reasonable accommodations are termed "Anti-discrimination" states. States without legislation prohibiting discrimination against those with disabilities in private labor markets are termed "No Law" states. The combination of pre-ADA state disability legislation and changes in the interpretation of Title I of the ADA are assumed to be exogenous. Results from the difference-in-differences estimation show that there was not a short-term change in the log weekly wages of disabled workers in "Anti-discrimination" and "No Law" states relative to the disabled residing in "Quasi-ADA" states. However, in the medium run, the log weekly wages of disabled workers increased in "Anti-discrimination" states and remained unchanged in "No Law" states. Disabled workers without a high school diploma experienced a significant increase in log weekly wages while disabled workers with, at least one year of college education, did not experience an ADA-induced change in wages. Results from the difference-in-differences-in-differences alters the ADA's estimated impact on wages and show that the ADA did not alter the weekly wages of the disabled relative to the non-disabled.

The first paper that explicitly disaggregates the ADA's labor market effects on those with disabilities based on pre-ADA state laws is Jolls and Prescott(2004). Jolls and Prescott also use the CPS to compare labor market outcomes of the disabled before and after the ADA across three state groups. They find significant negative effects on weeks worked and labor force participation. However, the present essay differs from Jolls and Prescott's paper. First, the wage effect of the ADA is estimated in lieu

---

[61] The rulings and amendments are discussed in detail in section 3.2.

of the ADA's impact on the weeks worked and labor force participation of the disabled. Second, the post-ADA time frame is extended to the year 2010. Third, the post-ADA year intervals are constructed according to key changes to the interpretation of the ADA. Fourth, people without disabilities are included in part of this analysis.

The essay proceeds as follows. Section 3.2 provides background on Title I of the ADA, six Supreme Court decisions that altered the interpretation of Title I and the ADAAA. Section 3.3 presents the theoretical and empirical framework used to examine and interpret the wage effect of the ADA. Section 3.4 discusses the data. Section 3.5 includes the main empirical results of the effects of the ADA on the log weekly wages of those with disabilities. The essay concludes in section 3.6.

3.2 Legislative Background

Most states had a disability anti-discrimination statute before the ADA. Table 3.1 lists these along with the year of enactment. In Table 3.1, the following information is presented for each state: the year the legislation was enacted, the statutory number of the legislation, the presence of a reasonable accommodation mandate in the statute, and its pre-ADA disability legislation code used in the regression analysis below.[62] This essay follows Jolls and Prescott's coding of Arkansas as a state without pre-ADA disability legislation. Although Beegle and Stock(2003) codes Arkansas as having pre-ADA disability legislation, the legislation did not cover disability discrimination by private sector employers.[63]

As shown in Table 3.1, there is considerable variation across states with respect to the requirements of each state's disability anti-discrimination statute. This variation is one aspect of my identification strategy as it allows for both the identification of the mandate by which changes in the ADA impacted labor market outcomes among the disabled and the quantification of these effects.

---

[62] For example, in 1985, Arizona passed an anti-discrimination statute requiring reasonable accommodations for the disabled and is coded as a "Quasi-ADA" state.

[63] See Jolls and Prescott(2004) for a detailed discussion of state coding differences between their paper and Beegle and Stock(2003).

Anti-discrimination provisions for people with disabilities were developed from earlier civil rights legislation that covered traits such as race or gender. In many states, the predecessors to state disability statutes were "White Cane" provisions and laws passed in the 1960s and 1970s that granted those with visual disabilities and other physical disabilities protection in public sector employment. Following the adoption of the White Cane laws, most states amended existing anti-discrimination laws to include coverage for those with disabilities and expanded employment protection for those with disabilities to include the private sector.[64] Some state laws grant plaintiffs the right to seek damages for mental anguish, embarrassment and foregone interest. Almost all states with disability statutes by the mid 1980s "offered comparable or better remedies than those provided at the federal level [by the Rehabilitation Act, 1973] for disabled persons with claims of discrimination by employers."[65]

Although the ADA went into effect after state disability legislation, the ADA did not render state laws obsolete because the ADA provides a floor for disability discrimination coverage. That is, in states that offer state disability laws with greater protection than the ADA, entities must comply with the most stringent law in their respective state.[66] For example, the ADA required businesses with 15 or more employees to comply with the law in 1994. However, 34 states required such businesses to comply with state disability laws well before 1994. In this instance, state law is not preempted by federal law.

In light of the "patchwork" approach to disability discrimination protection prior to 1990, the intent of the Americans with Disabilities Act(ADA) was "to provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities."[67] The ADA was signed into law in July 1990 and went into effect in July 1992. Title I of the ADA contains the employment provisions of the law and initially covered all employers with at least 25 employees. In 1994, coverage was extended to employers with 15 employees or more. Title I of the ADA consists of two parts. First, the ADA prohibits discrimination in hiring, firing, wages and promotion against "qualified

---

[64] See Beegle and Stock(2003) for a detailed discussion of state disability statutes.
[65] Beegle and Stock (2003).
[66] Burgdorf (1995).
[67] ADA (1990).

individuals with a disability."[68] Second, it requires employers to provide reasonable accommodations to otherwise qualified disabled individuals unless doing so would cause an undue burden. A reasonable accommodation is a change in the work environment that does not substantively alter the job but results in an equal employment opportunity for a person with a disability. Examples include purchasing special equipment for disabled employees or permitting flexible work hours.

The ADA enforces its mandates through the Equal Employment Opportunity Commission(EEOC) and the courts. Those with disabilities who feel they have been discriminated against can file a charge with the EEOC. The charge will be investigated and the EEOC will either resolve the charge or give permission for the charging party to sue at his or her own expense. The ADA defines disability as "a physical or mental impairment that substantially limits one or more of the major life activities of... an individual; a record of such an impairment; or being regarded as having such an impairment."[69]

When Congress drafted the bill, it purposefully used vague language for the definition of disability and the definition of reasonable accommodation. This was done to cover individuals with a wide variety of physical and mental conditions under purview of the law.[70] However, the broad language regarding the definition of disability and reasonable accommodation has led employers and disabled individuals to seek clarification on these points from the Supreme Court.

Table 3.2 documents Supreme Court decisions used in this essay to group the years following the ADA into intervals. An individual seeking a favorable Supreme Court decision under the employment provisions of the ADA must meet four criteria to demonstrate a prima facie case of disability discrimination. First, the plaintiff must either show that the condition in question meets the ADA's definition of disability, or she has a record of such a condition, or the employer mistakenly regarded the plaintiff as having such a condition. Second, the plaintiff must show she is qualified for the position by proving that she can perform essential functions of the position. Third, the accommodation requested by

---

[68] ADA (1990).
[69] ADA (1990).
[70] Lee (2003).

101

the plaintiff must be reasonable. Fourth, the plaintiff must show that the negative action taken by the employer was done on the basis of the plaintiff's disability. However, the majority of Supreme Court rulings on Title I of the ADA have focused on the first criteria(establishing a person has, or is regarded as having, a disability) because this is the threshold issue that must be found in favor of the plaintiff before other issues can be ruled on. In most ADA cases brought before the Supreme Court involving employment provisions, the Court, due to its narrow interpretation of the definition of disability, has held that the plaintiff's condition was not a disability under the ADA.[71] Since each plaintiff has not been considered disabled, he or she was not entitled to the protection of the ADA; thus the Court did not render a decision on the other three criteria.

The first three Supreme Court decisions regarding the ADA used in this essay are known as the *Sutton* trilogy. The decisions were handed down on June 22, 1999 and had similar effects on the interpretation of the ADA. The first case, *Sutton v. United Airlines, Inc.*, involved two sisters who were severely near-sighted and applied to be pilots with United Airlines; however, due to their myopia, they did not meet the uncorrected vision standard of United Airlines pilots. As a result, they were not hired by United Airlines. Since the sisters' vision was fully corrected with mitigating measures, the Supreme Court decided that they did not meet the ADA's definition of disability. The Court held that "[a] 'disability' exists only where an impairment 'substantially limits' a major life activity, not where it 'might,' 'could,' or 'would' be substantially limiting if mitigating measures were not taken."[72] The second case, *Murphy v. United Parcel Service, Inc.*, involved a plaintiff who was hired to be a commercial driver for UPS but was subsequently fired for having hypertension.[73] The Court held that when the plaintiff was compliant with his medication, he was not substantially limited in any major lift activity; thus, the plaintiff's condition did not meet the ADA's definition of disability. In the third case, *Albertson's, Inc. v. Kirkingberg*, the plaintiff did not meet the standards of the Department of Transportation for a commercial driver's license

---

[71] Klein (2010).
[72] *Sutton v. United Airlines, Inc.*, 527 U.S. 471 (1991).
[73] The Department of Transportation requires that "the driver of a commercial motor vehicle in interstate commerce have no current clinical diagnosis of high blood pressure."

due to monocular vision. Since the plaintiff was able to correct his monocular vision using subconscious adjustments to the manner in which he perceived peripheral objects, the Court held Kirkingberg did not meet the ADA's definition of disability. By holding that any condition that can be effectively mitigated by device, medication or another method, is not a disability under the ADA, the Court substantially narrowed the population that could seek relief under the ADA; thereby, altering the interpretation of the ADA after June 1999.

The next major Supreme Court decision regarding the ADA was *Toyota, Inc. v. Williams* (2002). In *Williams*, the plaintiff had carpal tunnel syndrome and sued her employer for failing to accommodate her condition. The Court held that the plaintiff was not disabled, because for an impairment to be considered a disability, it must prevent or severely restrict an "individual from doing activities that are of central importance to most people's daily lives."[74] Additionally, the Court said the impairment must be permanent or long-term. Similar to the *Sutton* trilogy, *Williams* altered the interpretation of the ADA by restricting the number of people covered by the ADA.

In 2002, the Supreme Court decided its first case regarding the reasonable accommodation mandate of the ADA, *U.S. Airways, Inc. v. Barnett*. In deciding whether a job transfer was a reasonable accommodation when the company's seniority policy would award the position to another employee, the Court said that an accommodation that conflicts with a company's seniority system is not reasonable but an employee can still present evidence of special circumstances that make reasonable exceptions to a company's seniority rule. This case, by determining that accommodations which interfere with a neutral company policy are not reasonable, restricted the definition of reasonable accommodation.

The final case decided by the Supreme Court regarding the ADA was *Chevron, U.S.A, Inc. v. Echazabal* (2002). In *Echazabal*, the Supreme Court held that an employer can refuse to employ a person with a disability if the task of the job poses too great a risk to the individual's health due to disability. This case altered the interpretation of the ADA by reducing the cost to employers of not hiring a disabled

---

[74] *Toyota, Inc. v. Williams* (2002).

103

individual and eliminating the possibility of being required to provide reasonable accommodation the disabled individual would have needed.

In response to the impact of the above cases on the interpretation of the ADA, in 2008, Congress passed the Americans with Disabilities Act Amendments Act (ADAAA), which became effective January 2009. Since the Supreme Court, contrary to the intent of Congress, significantly narrowed the definition of disability in the ADA, the ADAAA expanded the protection of the ADA by altering the way courts interpret the definition of disability. Specifically, the ADAAA does the following: requires the term "substantially limited" to be inclusive of less limiting impairments than the Supreme Court case *Toyota* allows, provides a non-exhaustive list of "major life activities" covered by the ADA, expands "major life activities" to include major bodily functions, expands the "regarded as" category to include everyone with a known impairment, does not require entities to provide accommodations to those who fall under the "regarded as" prong, and prohibits consideration of mitigating measures when determining whether an impairment is a disability. While the ADAAA increases the population covered by the ADA, which may increase the cost associated with hiring a person with a disability, it also decreases the population that are entitled to reasonable accommodations which may lower the cost of employing those with disabilities.

3.3 Theoretical and Empirical Framework

The theoretical consequences of the ADA on the labor market have been extensively modeled and will be briefly summarized here.[75] There are three aspects of the ADA that pertain to the labor market: non-discrimination in hiring and firing, non-discrimination in wages, and mandates requiring employer-provided accommodations. Regulations outlawing disability-based discrimination in hiring and firing impose costs on firms due to an increased risk of lawsuits. However, non-discrimination in hiring a disabled worker provides a subsidy to hiring the disabled because not hiring the disabled person increases

---

[75] See Acemoglu and Angrist (2001) for a detailed model of the employment effects of the ADA.

the risk of a costly lawsuit. These two factors indicate that the ADA should be associated with increased demand for, and increased employment of, disabled workers.

On the other hand, non-discrimination in firing increases the cost of hiring a disabled worker because the risk of a lawsuit associated with firing the disabled worker is higher. This would likely depress the demand for, and employment of, those with disabilities. Therefore, firms weigh the perceived costs of hiring a person with a disability with the perceived cost of not hiring a person with a disability. If, as a result of the ADA, the perceived penalties for not hiring disabled workers are relatively larger than the discounted cost of firing disabled workers, then the net effect of the ADA would be increased demand for, and employment of, the disabled.

Provisions requiring non-discrimination in wages of the disabled may increase the relative cost of disabled workers if either the productivity of disabled workers is lower than that of non-disabled workers or disabled workers are costlier to employ due to the accommodation mandate. Assuming an adequate supply of non-disabled workers, if disabled workers are less productive than non-disabled workers, the mandate of non-discrimination in wages would suggest that demand for disabled workers would fall because firms choose to employ cheaper (non-disabled) labor at the prevailing wage. As long as the elasticity of substitution between the two types of labor is positive, employment of the disabled would fall as firms substitute non-disabled for disabled workers.[76]

Regulations requiring firms to provide reasonable accommodations also increase the cost of hiring disabled employees. This provision requires firms to pay the wages of the disabled and to provide accommodations that the firm may not have provided in the absence of legislation, which results in a decrease in the relative demand for disabled workers. Since the ADA prohibits firms from cutting the wages of disabled employees in response to increased worker costs, the reasonable accommodation

---

[76] This result would also hold in the case of labor capital decisions. Depending on the technology used by and relative input prices of firms, firms may substitute away from disabled labor towards increased use of capital in response to an increase in relative wages.

mandate further depresses demand for disabled workers.[77] However, this downward pressure on demand for disabled labor may be partially offset by an increase in the supply of disabled workers induced to become labor force participants by the reasonable accommodation requirement. This offset would occur only if the equal pay mandate is *not* binding. If the equal pay mandate is binding(i.e. if disabled workers are less productive than non-disabled workers), the increased labor supply of disabled workers does not offset the depressed demand for the disabled because the wages of the disabled cannot fall.

Thus, the theoretical predictions of the ADA's consequences imply that, in states where the ADA is an innovation, the ADA should be associated with increased wages for disabled workers. However, the impact of the ADA is likely to vary across states, based on pre-existing state disability statutes, and across time as the interpretation of the ADA evolves. Since state disability statutes have one or more of the provisions of the ADA, the preceding theoretical framework also holds for state disability laws and will not be recapitulated.

The empirical framework of this essay separates states into three groups according to the mandates of their pre-ADA state disability laws. In states with pre-ADA laws that include disability anti-discrimination and reasonable accommodation mandates("Quasi-ADA" states), the ADA was not an innovation and did not impose new costs on firms. In "Quasi-ADA" states, the ADA should not be associated with a change in the wages of the disabled. However, in states with pre-ADA state laws that include only disability anti-discrimination mandates("Anti-discrimination" states), the ADA's impact on wages depends on the anti-discrimination provisions of the state statutes. If the statutes include an equal pay mandate, then the ADA would not alter the wages of people with disabilities in these states. However, if the statutes exclude an equal pay mandate, then the ADA should increase the weekly wages of disabled workers. Lastly, in states without pre-ADA disability statutes("No Law" states), the ADA is a complete innovation and would likely increase the wages of disabled workers.

---

[77] The extent to which employer-provided accommodations decrease the employment of those with disabilities depends on the cost of accommodation.

While the preceding relationship between ADA and the three categories of states most likely holds in the years immediately following the ADA's enactment, this relationship would change as the Supreme Court altered the interpretation of the ADA. Supreme Court rulings regarding the ADA fall into one of two categories: rulings regarding the definition of disability, which alters who is covered by the ADA, and rulings regarding what is considered a reasonable accommodation. Since the ADA provides a floor for disability coverage, Supreme Court rulings that restrict the definition of disability weaken the ADA and would cause states to rely on their own disability statutes when determining who qualifies for disability legislation coverage; thereby, nullifying relationship between the ADA and wages of the disabled in states with pre-ADA disability statues. However, the restricted definition of disability would likely decrease the wages the disabled in "No Law" states relative to "Quasi-ADA" states because fewer people are covered by the equal pay mandate.

Supreme Court rulings that restrict the definition of reasonable accommodations should expand employers' resources since employers must provide fewer reasonable accommodations. If employers use these increased resources to invest in the firm and if that investment takes the form of higher wages for disabled workers, then the wages of disabled workers in "Anti-discrimination" states and "No Law" states will increase relative to the wages of the disabled in "Quasi-ADA" states. However, if the investment takes any other form, the wages of the disabled in "No Law" states and in "Anti-discrimination" states should be unchanged relative to the wages of the disabled in "Quasi-ADA" states.

The ADA Amendments Act(ADAAA), which increased the stringency of the ADA by expanding the population covered by the law, should cause the wages of the disabled in "No Law" states and "Anti-discrimination" states to increase relative to "Quasi-ADA" states because a greater percentage of the disabled in "Anti-discrimination" and "No Law" states are covered by the ADA's equal pay mandate.

The empirical analysis in this essay is designed to assess the wage effects of the ADA on disabled workers. Following the theoretical framework above, I estimate the short and longer term wage effects of the ADA for disabled workers using a difference-in-differences approach. I begin by estimating the following baseline equation:

$$(3.1) \quad Y_{ist} = \alpha_1 (D9092_t * LLP_s) + \beta_1 (D9092_t * NLP_s) + \alpha_2 (D9399_t * LLP_s) + \beta_2 (D9399_t *$$

$$NLP_s) + \alpha_3 (D0002_t * LLP_s) + \beta_3 (D0002_t * NLP_s) + \alpha_4 (D0308_t * LLP_s) + \beta_4 (D0308_t *$$

$$NLP_s) + \alpha_5 (D0910_t * LLP_s) + \beta_5 (D0910_t * NLP_s) + v_t + \pi_s + \varepsilon_{ist}$$

where Y_{ist} indicates the log weekly wages of individual i in state s in year t. v_t is a set of year dummy variables, π_s is a set of state indicator variables, LLP_s is a dummy variable equal to 1 for states in the "Anti-discrimination" state group as they offered Limited Legal Protection prior to the ADA's enactment, and NLP_s is a dummy variable equal to 1 for states in the "No Law" state group as they offered No Legal Protection prior to the ADA. LLP_s and NLP_s capture the state group main effects.

There are five post-ADA year intervals and each interval has its own dummy variable. $D9092_t$ equals 1 for observations from years 1990-1992. This interval corresponds to the transition years after the ADA passed but before the Act went into effect. $D9399_t$ equals 1 for observations from 1993-1999, which are the years prior to Supreme Court decisions altering the ADA. $D0002_t$ equals 1 for observations from 2000-2002. This interval coincides with the years following the *Sutton* trilogy of cases which narrowed the ADA's definition of disability. $D0308_t$ equals 1 for observations from the years 2003-2008, which are the years after the Supreme Court restricted the definition of reasonable accommodations. $D0910_t$ equals 1 for observations from the years 2009-2010. This interval corresponds to the years after the ADA Amendments Act was passed. The comparison time interval is 1988-1989.

With this specification, I evaluate the wage effects of an evolving interpretation of the ADA on the disabled by using a difference-in-differences procedure that compares changes in outcomes among disabled people in pre and post-ADA eras across states with different pre-ADA disability regimes. In the baseline equation, the coefficients of interest are the α's and β's as they are the difference-in-differences estimators. The α's measure the change between the pre-ADA interval and each post-ADA interval in the log weekly wages of people with disabilities in "Anti-discrimination" states relative to the same change in "Quasi-ADA" states. Since "Anti-discrimination" states have pre-ADA laws that provide disability anti-

108

discrimination coverage, the α's represent the wage effects of the ADA that operate through the reasonable accommodations mandate. The β's measure the change between the pre-ADA interval and each post-ADA interval in the log weekly wages of people with disabilities in "No Law" states relative to the same change in "Quasi-ADA" states and represents wage effect of the ADA that operate through both anti-discrimination coverage and reasonable accommodations mandate.

The key assumptions underlying this strategy are three-fold. First, people with disabilities in "No Law" states are equivalent to the disabled in "Quasi-ADA" and "Anti-discrimination" states; therefore, they are an adequate control group. Second, in the absence of the ADA, the evolution of log weekly wages of the disabled would have been the same across the state groups. Third, the ADA did not alter the labor force participation of the disabled. If the ADA did impact the labor market behavior of the disabled, estimates of the ADA's wage effects using the baseline model would suffer from selection bias.

Estimates from five extensions to the baseline model are reported. First, standard demographic controls (age, gender, minority status, educational attainment and marital status) and state economic variables are added to equation (3.1). Second, equation (3.1) and equation (3.1) plus controls are estimated for the sample excluding observations from the years 1990-1992. Third, equation (3.1) and equation (3.1) plus controls are estimated for the sample excluding observations from years 1990-1995. Results from these subsamples are estimated because Thompkins(2011) finds that the ADA altered the labor force participation and weeks worked by those with disabilities in the years 1990-1992 and Acemoglu and Angrist(2001) find labor market effects of the ADA for 1992-1995. For equation (3.1) to yield unbiased estimates of the ADA's wage effects, it must be the case that the ADA did not alter the labor market behavior of the disabled; hence, the estimated wage effects of the ADA using a sample that excludes the years 1990-1995 is likely to be unbiased. Fourth, results from equation (3.1) and equation (3.1) plus controls are estimated for the two subsamples stratified on education. It is likely that the wage effects of the ADA varies based on level of education. Finally, state trends are added to equation (3.1) plus controls. Linear time trends allow for the possibility that changes in log weekly wages can be explained by extrapolating different trends for each state.

Next, I estimate the following equation using the disabled + non-disabled sample:

$$(3.2) \quad Y_{ist} = \alpha_1(D9399_t * LLP_s) + \beta_1(D9399_t * NLP_s) + \alpha_2(D0002_t * LLP_s) + \beta_2(D0002_t * NLP_s) +$$

$$\alpha_3(D0308_t * LLP_s) + \beta_3(D0308_t * NLP_s) + \alpha_4(D0910_t * LLP_s) + \beta_4(D0910_t * NLP_s) +$$

$$\delta_1(D9399_t * Disabled_i * LLP_s) + \gamma_1(D9399_t * NLP_s) + \delta_2(D0002_t * Disabled_i * LLP_s) +$$

$$\gamma_2(D0002_t * Disabled_i * NLP_s) + \delta_3(D0308_t * Disabled_i * LLP_s) + \gamma_3(D0308_t * Disabled_i *$$

$$NLP_s) + \delta_4(D0910_t * Disabled_i * LLP_s) + \gamma_4(D0910_t * Disabled_i * NLP_s) + \tau_1 Disabled_i +$$

$$\tau_2(Disabled_i * LLP_s) + \tau_3(Disabled_i * NLP_s) + \tau_4(D9399_t * Disabled_i) + \tau_5(D0002_t *$$

$$Disabled_i) + \tau_6 (D0308_t * Disabled_i) + \tau_7(D0910_t * Disabled_i) + \tau_1 v_t + \pi_s + \varepsilon_{ist}$$

where the variables are defined as above. *Disabled$_i$* is an indicator variable which equals 1 for those with disabilities.

With this specification, I evaluate the wage effects of an evolving interpretation of the ADA on the disabled by using a difference-in-differences-in-differences(DDD) estimation that compares changes in outcomes among disabled workers compared to changes among non-disabled workers in pre and post-ADA eras across states with different pre-ADA disability regimes. In equation (3.2), the coefficients of interest are the δ's and γ's as they are the DDD estimators. The δ's measure the change between the pre-ADA interval and each post-ADA interval in the log weekly wages of people with disabilities versus the wages of people without disabilities in "Anti-discrimination" states relative to the same change in "Quasi-ADA" states. The γ's measure the change between the pre-ADA interval and each post-ADA interval in the wages of people with disabilities versus the wages of people without disabilities in "No Law" states relative to the same change in "Quasi-ADA" states.

The key assumptions underlying this strategy are three-fold. First, people with disabilities in "No Law" states are equivalent to the disabled in "Quasi-ADA" and "Anti-discrimination" states; therefore, they are an adequate control group. Second, in the absence of the ADA, the evolution of the difference in the log weekly wages of the disabled and the log weekly wages of the non-disabled would have been the same across the state groups. Third, the ADA did not alter the labor force participation of the disabled or

110

the non-disabled. Fourth, people with disabilities are equivalent to people without disabilities in each state group; therefore, the non-disabled are an adequate control group.

A possible source of concern for the empirical strategy is, while "Quasi-ADA" and "Anti-discrimination" states are approximately equal in size and are geographically balanced, "No Law" states are comprised of three states located in the southern region of the country. If, between pre- and post-ADA periods, an unobserved shock occurred in the southern region of the country that impacted people with disabilities or if states with higher proportions of people with disabilities experienced a labor market shock, the difference-in-differences and DDD estimators would capture the impact of these unobserved shocks in addition to any labor market effect caused by the ADA.[78] However, Jolls and Prescott(2004) use a matching strategy to show that there were no trends affecting only southern states that would bias results using "No Law" states.

3.4 Data and Descriptive Statistics

This sample is drawn from the 1988-2010 March CPS and is limited to those ages 18-59 with positive earnings. Disabled workers are identified in the March CPS Income Supplement by the following question: "Does [respondent] have a health problem which prevents him/her from working or which limits the kind or amount of work he/she can do?" Although this question has been used by other researchers working on disability issues, using this measure of disability is subject to a few caveats. First, the definition of disability used in the CPS, which focuses on work disabilities, differs from the ADA's definition, which focuses on functional limitations. As a result, this essay may capture the labor market outcomes of those not covered by the ADA. However, employment trends over time for populations defined by work disabilities are similar to employment trends for populations defined by impairments.[79] Thus, the labor market outcomes of disabled respondents included in the CPS data has enough overlap with the labor market outcomes of those with disabilities covered by the ADA to make studying labor

---

[78] The "No Law" state group has the greatest percentage of people with disabilities of the three state groups.
[79] Burkhauser, et. al. (2002).

market outcomes of the disabled using the CPS informative. Second, and perhaps more damaging, the ADA's enactment could have changed the composition of the group identifying themselves as disabled on surveys.[80] However, other researchers working on disability issues have found no evidence of composition bias in the CPS (Jolls and Prescott 2004; Acemoglu and Angrist 2001; Beegle and Stock 2003).

The variables in the Income Supplement refer to the previous calendar year so the sample has data for years 1987-2009. The disability status question in the supplement refers to the respondents' status in the previous year. The tables and figures refer to estimates by survey year.

Descriptive statistics organized by survey year intervals are reported in Table 3.3 and descriptive statistics stratified on survey year intervals and state groups are reported in Table 3.4. Nearly 10 percent of each state's population reports a disability limiting work with the percentage increasing slightly from 1988-1989 to 2009-2010 (7 percent versus 8 percent.) This finding is comparable to the disability rate found in Acemoglu and Angrist (2001), who also use CPS data. However, this disability rate is below the figures found when using data such as the Census or SIPP.[81] Interestingly, as can be seen in Table 3.4, "No Law" states have the highest average state disability rates while "Quasi-ADA" states have the lowest.

Across time comparisons in Table 3.3 reveal that the weekly wages of disabled workers increased from $450 in 1988-1989 to $575 in 2009-2010. The average weeks worked increased from 43 in 1988-1989 to 45 in 2009-2010. At the same time, educational attainment of people with disabilities improved markedly. The percentage of people with disabilities with at least a high school diploma increased from 40 percent in 1988-1989 to 88 percent in 2009-2010. High school graduation rates are higher for the disabled in "Quasi-ADA" and "Anti-discrimination" states relative to the disabled in "No Law" states. Other demographic characteristics of the disabled do not appear to have changed much between 1988 and 2010.

---

[80] See Kruse and Schur (2003) for a description of the routes by which the ADA's passage could alter the composition of people answering 'yes' to disability questions on surveys.
[81] See DeLeire (2000), Beagle and Stock (2003), and Haveman and Wolfe (1990) for various measures of disability prevalence found in different samples.

Table 3.4 shows that "Quasi-ADA" states and "Anti-discrimination" states alternate reporting the highest weekly wages and weeks worked of the disabled. Table 3.4 also allows the comparison of the strength of state economies across state groups. For all three state groups, the state unemployment rate rose between 1988-1989 and 2009-2010 with "Anti-discrimination" and "No Law" states experiencing the highest unemployment rate in 2009-2010 of 10 percent.

3.5 Results

Table 3.5 reports ordinary least squares estimates of the wage effects of the ADA using the Disabled Only sample. Columns (1), (3) and (5) report estimates of the baseline equation for the full sample, the sample without years 1990-1992 and the sample without 1990-1995, respectively. Columns (2), (4) and (6) report estimates of the baseline equation plus controls for the full sample, the sample without years 1990-1992 and the sample without 1990-1995, respectively. The parameters of interest are a set of state group * year interval interactions, with 1988-1989 as the base period. The interaction terms report the change in relative log weekly wages of workers with disabilities.

The results in column (1) suggests that, relative to "Quasi-ADA" states, the log weekly wages of the disabled in "Anti-discrimination" and "No Law" states increase for each time interval following the passage of the ADA, with one exception: "No Law" states in 2000-2002. However, all of the estimates, except for one, are insignificant. Column (2), which presents estimates of equation (3.1) plus controls, shows that three of the five estimates for "No Law" states are negative and an increased number of the interaction variables are estimated with precision. Since these estimates are found using the full sample, they are likely to suffer from selection bias and should not be used to draw conclusions regarding the wage effect of the ADA. Hence, estimates from two subsamples are presented.

Columns (3) and (4) present estimates from the sample which excludes years 1990-1992. Similar to results from the full sample, results reported in column (3) suggest a mostly positive relationship between log wages and the interaction variables. Disabled workers in "No Law" states in 2009-2010

113

experienced the largest increase in log weekly wages; however, only the estimate for "Anti-discrimination" states in 2003-2008 is significant and the point estimate for this variable is significant for all specifications. As shown in column (4), the inclusion of controls changes the estimates along two dimensions. First, an increased number of estimates for "No Law" states become negative. Second, the estimates of interest are slightly more precise. Columns (5) and (6) present estimates using the sample sans 1990-1995. The estimates reported in these columns are quite similar to the estimates reported in columns (3) and (4).

The estimates in Table 3.5 suggest, in the short run, the ADA did not significantly increase the log weekly wages of disabled workers in "Anti-discrimination" states relative to "Quasi-ADA" states, while the longer run relative wage effects of the ADA for "Anti-discrimination" states vacillates between a significant 11 and 20 percent increase in weekly wages. In contrast, estimates for "No Law" states suggest the ADA did not significantly alter the relative earnings of disabled workers in the short run and may have depressed the relative wages of disabled workers in these states.

A few trends emerge from Table 3.5 regardless of the sample used. First, people with disabilities in "No Law" states in 2000-2002 experienced a decline in their wages, relative to "Quasi-ADA" states. This finding is logical since this time interval corresponds to the restriction of the ADA's definition of disability and "No Law" states did not have state statutes covering the disabled. If fewer people are considered disabled by the ADA, then fewer people are protected by the ADA's equal pay mandate which would result in falling relative wages of the disabled in "No Law" states. Second, all estimates for "Anti-discrimination" states are positive and estimated with precision in models with controls. This indicates that, in terms of log weekly wages, the ADA's equal pay mandate most benefitted disabled workers in states with a partial disability anti-discrimination regime. Third, the estimates for "Anti-discrimination" and "No Law" states in 2009-2010 are positive, which suggests that the Americans with Disabilities Act Amendments Act increased the relative wages of those with disabilities.

Table 3.6 reports estimates of equation (3.1) and equation (3.1) plus controls with the inclusion of state time trends and is organized in the same manner as Table 3.5. Specifications that include time trends

114

report larger point estimates for the interaction variables, fewer negative estimates for "No Law" states in each time interval and more precise estimates. The results show that regardless of the sample used, disabled workers in "Anti-discrimination" did not experience a significant change in log weekly wages relative to those in "Quasi-ADA" states. However, the log weekly wages of the disabled in "No Law" states did significantly increase relative to disabled workers in "Quasi-ADA" states for every time interval after 1999 in all but two specifications. Additionally, the point estimate for "No Law" states becomes larger over time. These findings suggest that the ADA significantly improved the log weekly wages of disabled workers in states without a pre-ADA disability regime and this improvement increased over time. However, such findings are quite different from the results derived from equations without state trends. One possible explanation for this difference is found in Thompkins(2011), which finds that including state trends in equations such as equation (3.1) yields significant, negative effects of the ADA. Since equations such as equation (3.1) yield a significant labor force participation effect of the ADA, it is likely that the estimated wage effect of the ADA using this specification is biased due to the estimated selection effect of the ADA.

While the above results are informative, it may be the case that the wage effect of the ADA varies by level of education. Table 3.7 reports estimates of equation (3.1) and equation (3.1) plus controls for the two subsamples stratified on education. Panel A reports estimates of the baseline equation, while Panel B reports estimates of the baseline equation plus controls. People with disabilities are divided into the following three categories: those without a high school diploma, those with a high school diploma, and those who enrolled in at least one year of college. The odd columns report results from the sample *sans* 1990-1992 and the even columns report results using the sample which excludes 1990-1995. The parameters of interest are a set of state group * year interval interactions, with 1988-1989 as the base period. The interaction terms report the change in relative log weekly wages of workers with disabilities.

Regardless of the years included in the sample, results suggest that the disabled without a high school diploma in "Anti-discrimination" states experienced significant increases in weekly wages in 1993-1999, 2003-2009 and 2009-2010 and those without a diploma in "No Law" states saw a significant

115

increase in their wages in 2009-2010. Results for high school graduates show a significant increase in wages for those in "No Law" states for each interval. Additionally, estimates for high school graduates in "Anti-discrimination" states are negative for each interval, but are not significantly different from zero. Disabled workers with at least one year of college in "Anti-discrimination" and "No Law" states experience a statistically insignificant decline in relative weekly wages for all year intervals.

Although these estimates are imprecisely measured, the relationship between log weekly wages and the variables of interest is quite different across level of education and demonstrates the import of estimating separate models. The results suggest that those with disabilities who did not attend college benefitted more from the equal pay mandate of the ADA than those with some college education. This is a somewhat surprising result that deserves further attention. Although the ADA did not alter labor market participation rates of the disabled beyond 1995, perhaps the ADA induced sectoral shifts among those with disabilities who have less education. The ADA may have caused those without a high school diploma to switch jobs in such a way that their new jobs were higher paying. Alternatively, it could be that those with disabilities who have at least one year of college are more likely to be employed in positions where they were paid on par with non-disabled workers prior to the ADA causing the equal pay mandate of the ADA to be inconsequential. Since those with less education are more likely to be employed in jobs that require physical labor, it follows that, prior to the ADA, disabled workers in these jobs were less productive than non-disabled workers causing firms to pay disabled workers less than non-disabled workers. In this instance the equal pay mandate would have resulted in higher wages for disabled workers with less education.

Table 3.8 reports estimates of equation (3.1) with the inclusion of state time trends and is organized in the same manner as Table 3.7. Specifications that include time trends report far fewer significant point estimates for the interaction variables. Additionally, the significant advantage disabled workers with less education enjoyed in the form of higher wages has disappeared as has the distinct disadvantage experienced by disabled workers with at least one year of college. These findings suggest that the wage effect of the ADA is similar across education levels, which is a significantly different

116

finding from the results derived from equations without state trends. Once again, it is likely that the estimated wage effect of the ADA using this specification is biased due to the selection effect of the ADA estimated with this specification.

Turning to the difference-in-differences-in-differences(DDD) estimation of the wage effects of the ADA, Figure 3.1 plots average log weekly wages by disability status. Overall, the log weekly wages of those without disabilities increases steadily between 1988 and 2010, while the log weekly wages of those with disabilities is far more variable over the same time period. Between 1988 and 1990, the log weekly wages of those with disabilities remained constant while increasing modestly for the non-disabled. After 1993, log weekly wages of the non-disabled steadily increase. The log weekly wages of the disabled remain virtually flat between 1991 and 1998. After 1998, wages of disabled workers increase slightly. However, the log weekly wages of the disabled are less than the log weekly wages of the non-disabled in every year. Figures 3.2-3.4 plot average log weekly wages by disability status for "Quasi-ADA" states, "Anti-discrimination" states and "No Law" states separately. The most striking feature of these figures is that while the figures for "Quasi-ADA" states and "Anti-discrimination" states look nearly identical to Figure 3.1, the figure for "No Law" states is quite different from Figure 3.1.

Table 3.9 reports ordinary least squares estimates of the wage effects of the ADA using a DDD framework that compares the log weekly wages of the disabled to the log weekly wages of the non-disabled. Columns (1), (3) and (5) report estimates of equation (3.2) for the full sample, the sample without years 1990-1992 and the sample without 1990-1995, respectively. Columns (2), (4) and (6) report estimates of equation (3.2) plus controls for the full sample, the sample without years 1990-1992 and the sample without 1990-1995, respectively. The parameters of interest are a set of disabled * state group * year interval interactions, with 1988-1989 as the base period. The triple interaction terms report the change between pre- and post-ADA intervals in log weekly wages of workers with disabilities versus log weekly wages of the non-disabled relative to the same change in "Quasi-ADA" states.

The results in column (1) suggest that, relative to "Quasi-ADA" states, the log weekly wages of the disabled in "Anti-discrimination" and "No Law" states increase for each time interval following the

117

passage of the ADA. However, all of the estimates are insignificant. Column (2), which presents estimates of equation (3.2) plus controls, shows that one of the estimates for "No Law" states is negative. Again, all of the triple interaction variables are insignificant. As discussed above, estimates found using the full sample are likely to suffer from selection bias. Hence, estimates from two subsamples are presented.

Columns (3) and (4) present estimates from the sample which excludes the years 1990-1992. Similar to results from the full sample, results reported in column (3) suggest a positive relationship between log wages and the interaction variables. Disabled workers in "No Law" states in 2003-2008 experienced the largest increase in log weekly wages; however, all of the triple interaction variables are statistically insignificant. As shown in column (4), the inclusion of controls decreases the size of the point estimate for all but one of the interaction variables and causes the point estimate for the disabled in "No Law" states in 1993-1999 to become negative. Columns (5) and (6) present estimates using the sample sans 1990-1995. The estimates reported in these columns are quite similar to the estimates reported in columns (3) and (4). The estimates using a DDD framework suggest that the ADA did not significantly alter the relative earnings of disabled workers in "Anti-discrimination" states nor the relative earnings of the disabled residing in "No Law" states.

The results from DDD estimation show a different wage effect of the ADA for the disabled than the results from the difference-in-differences estimation. This is most likely due to the addition of the non-disabled as a control group. The lack of a wage effect of the ADA when using a DDD framework suggests that the equal pay mandate of ADA did not enable the disabled to gain ground in weekly wages vis-à-vis the non-disabled. However, the significant wage effect found using a difference-in-differences model suggest that the equal pay mandate allowed some within the disability community to experience higher weekly wages. This is a more nuanced view of the ADA and suggests that evaluation of employment policies targeting the disabled should be evaluated on two levels: the within group impact of the policy and the across group impact.

Since the ADA's wage effect varies by education status using a difference-in-differences estimator, it is instructive to determine if a similar finding holds using a DDD estimation framework. Table 3.10 reports estimates of equation (3.2) and equation (3.2) plus controls for the two subsamples stratified on education. Panel A reports estimates of equation (3.2), while Panel B reports estimates of equation (3.2) plus controls. The sample which includes those with disabilities and those without disabilities are divided into the following three categories: those without a high school diploma, those with a high school diploma, and those who enrolled in at least one year of college. The odd columns report results from the sample *sans* 1990-1992 and the even columns report results using the sample which excludes 1990-1995. The parameters of interest are a set of year interval* disabled * state group interactions, with 1988-1989 as the base period. The triple interaction terms report the change between pre- and post-ADA intervals in log weekly wages of workers with disabilities versus log weekly wages of the non-disabled relative to the same change in "Quasi-ADA" states.

Regardless of the years included in the sample, results suggests that the disabled without a high school diploma in "Anti-discrimination" states experienced significant increases in log weekly wages in 2003-2008 and those without a diploma in "No Law" states saw a significant increase in their wages in 2003-2008 and 2009-2010. Results for high school graduates in "No Law" states show a significant decrease in log weekly wages in 1993-1999 and an increase in log wages for 2000-2002, 2003-2008 and 2009-2010; however, these results are sensitive to the inclusion of demographic control variables. Additionally, estimates for high school graduates in "Anti-discrimination" states are positive for each interval except 1993-1999, but are statistically insignificant. Disabled workers with at least one year of college in "No Law" states experience a decline in relative weekly wages for all year intervals and the estimates are significant for 2000-2002 and 2009-2010. Estimates for disabled workers with at least one year of college in "Anti-discrimination" are insignificant and show a variable relationship between log weekly wages of the disabled and the variables of interest. These results suggest that, when compared to those without disabilities, the disabled without a high school diploma, disabled high school graduates and college-educated disabled persons in "No Law" states experienced an ADA-induced decline in log

119

weekly wage. These findings are different from the results using the disabled only sample and reinforce the finding that the ADA impacted within-group wages in a different manner from across-group wages.

3.6 Conclusion

People with disabilities have worse economic outcomes than the non-disabled across a multitude of economic and disability measures. Partly in response to the lower economic standing of the disabled, Congress passed the Americans with Disabilities Act(ADA) in 1990 to create equal employment opportunities for the disabled. However, theoretical predictions and previous research indicate that the ADA may have negatively impacted the short-term weekly wages of the disabled. Since its enactment, the ADA has undergone changes to its two central employment provisions: the definition of disability and the definition of reasonable accommodation. Questions regarding the ADA's longer term effect on the wages of the disabled persist as the Supreme Court continues to alter the interpretation of the Act.

This essay presents new evidence on the longer term effects of the ADA based on two sources of variation: pre-ADA state disability legislation and five Supreme Court decisions that significantly altered the ADA's interpretation. The findings in this essay indicate that in the short run, the ADA insignificantly increased weekly wages of disabled workers while significantly increasing their wages in the longer run. Additionally, disabled workers with less education experienced the largest increase in their weekly wages. However, these findings hold only when analyzing the disabled. When the non-disabled are included in the analysis, the wage effects of the ADA are insignificant which suggests that the ADA did not significantly improve wages of the disabled compared to the non-disabled.

Two areas for future research remain. First, understanding why the wage effect of the ADA varies so dramatically across education levels would be instructive to understanding the employment trends of disabled workers. Second, deciphering the extent to which the economic downturn of the late 2000s contributes to these results would also be informative.

References

Acemoglu, D. and J. Angrist, "Consequences of Employment Protection? The Case of the Americans With Disabilities Act," *Journal of Political Economy*, 109, (2001), 915-957.

Albertsons, Inc. v. Kirkingburg, 527 U.S. 555 (1999).

Allbright, A., "2009 Employment Decisions under the ADA Title I—Survey Update," *Mental & Physical Disability Law Reporter*, 34, (2010), 339-343.

Americans with Disabilities Act of 1990(July 26, 1990), 42 US Code 12101.

Anderson, C., "Ideological Dissonance, Disability Backlash, and the ADA Amendments Act," *Wayne Law Review*, 55, (2009), 1267-1327.

Angrist, J. and J. Pischke, Mostly Harmless Econometrics: An Empiricist's Companion, (Princeton: Princeton University Press), 2009.

Autor, D. and M. Duggan, "Disability Recipiency and the Decline in Unemployment," National Bureau of Economic Research working paper #8363, (2001).

Bailey, S., "The New ADA—Expanding Coverage and Redefining Disability." *Colorado Lawyer*, 39, (2010), 47-52.

Baldwin, M. and W. Johnson, "Labor Market Discrimination against Men with Disabilities in the Year of the ADA." *Southern Economic Journal*, 66, (2000), 548-566.

Baldwin, M. and W. Johnson, "Labor Market Discrimination against Men with Disabilities." *The Journal of Human Resources*, 29, (1993), 1-19.

Beegle, K. and W. Stock, "The Labor Market Effects of Disability Discrimination Laws," *Journal of Human Resources*, 38, (2003), 806-859.

Board of Trustees of the University of Alabama v. Garrett, 121 S. Ct. 955 (2001).

Bound, J. and T. Waidmann, "Accounting for Recent Declines in Employment Rates Among the Working-Aged Disabled," *Journal of Human Resources*, 37, (2002), 231-250.

Bound, J., M. Schoenbaum, and T. Waidmann, "Disability Status and Racial Differences in Labor Force Attachment," *Journal of Human Resources*, 30(Supp.), (1995), S227-67.

Burkhauser, R., M. Daly, A. Houtenville and N. Nargis, "Self-Reported Work-Limitation Data," *Demography*, 39, (2002), 541-555.

Burkhauser, R., M. Daly, A. Houtenville and N. Nargis, "How Working Age People with Disabilities Fared over the 1990s Business Cycle: An Examination of the 1980s and 1990s," Federal Reserve Bank of San Fransisco working paper #2001-07, (2001).

Burkhauser, R. and M. Daly, "United States Disability Policy in a Changing Environment." Federal Reserve Bank of San Francisco Working Paper # 2002-21, (2000).

Bragdon v. Abbott, 524 U.S. 624 (1998).

Chevron, Inc. v. Echazabal, 536 U.S. 73 (2002).

Cox, J., "Crossroads and Signposts: the ADA Amendments Act of 2008," *Indiana Law Journal,* 85, (2010), 187-225.

DeLeire, T., "The Wage and Employment Effects of the Americans with Disabilities Act," *Journal of Human Resources,* 35, (2000), 693-715.

Dolton, P. and G. Makepeace, "Sample Selection and Male-Female Earnings Differentials in the Graduate Labour Market," *Oxford Economic Papers,* 38, (1986), 317-341.

Greene, W., Econometric Analysis, (New Jersey: Pearson Education, Inc), 2003.

Gruber, J. and J. Kubik, "Disability Insurance Rejection Rates and the Labor Supply of Older Workers," *Journal of Public Economics,* 64, (1997), 1-23.

Haveman, R. and B. Wolfe, "The Economic Well-being of the Disabled: 1962-1984," *Journal of Human Resources,* 25, (1990), 32-54.

Hotchkiss, J., "A Closer Look at the Employment Impact of the Americans with Disabilities Act," *Journal of Human Resources,* 39, (2004), 887-911.

Joiner, A., "The ADAAA: Opening the Floodgates," *San Diego Law Review,* 47, (2010), 331-369.

Jolls, C. and J. Prescott, "Disaggregating Employment Protection: the Case of Disability Discrimination," *Unpublished mimeo,* (2004).

Jones, J., "Enfeebling the ADA: the ADA Amendments Act of 2008," *Oklahoma LawReview,* 62, (2010), 667-699.

Kirchner, C, "Looking Under the Street Lamp: Inappropriate Uses of Measures Just Because They are There," *Journal of Disability Policy Studies,* 7, (1986), 78-90.

Klein, P., "The ADA Amendments Act of 2008: the Pendulum Swings Back," *Case Western Reserve Law Review,* 60, (2010), 407-490.

Leonard, J., "Disability Policy and the Return to Work,"Disability and Work Incentives: Rights and Opportunities, Ed. Carolyn L. Weaver, (Washington, D.C.: AFI Press), 1991.

Murphy v. United Parcel Service, Inc., 527 U.S. 516 (1999).

Oi, W., "Disability and a Workfare-Welfare Dilemma."Disability and Work Incentives: Rights and Opportunities. Ed. Carolyn L. Weaver. Washington, D.C.: AFI Press. 31-45, 1991.

Olson, W., The Excuse Factory: How Employment Law is Paralyzing the American Workplace, (The Free Press), 1997.

Race, P., "ADA Amendments Act of 2008: the Effect on Employers and Educators," *Willamette Law Review*, 46, (2009), 356-402.

Russell, M. and R. Malhotra, "The Political Empowerment of Disablement: Advances and Contradictions." Socialist Register 2002: A World of Contradictions, 2002.

Sauer, E., "The ADA Amendments Act of 2008: the Mitigating Measures Issues, No Longer a Catch-22," *Ohio Northern University Law Review*, 36, (2010), 215-236.

Selmi, M., "Interpreting the Americans with Disabilities Act: Why the Supreme Court Rewrote the Statute, and Why Congress Did Not Care," *George Washington Law Review*, 76, (2008), 522-555.

Stapleton, D. and R. Burkhauser (eds.), The Decline in Employment of People with Disabilities, (Kalamazoo: W.E. Upjohn Institute for Employment Research), 2003.

Sutton v. United Air Lines, 527 U.S. 471 (1999).

Thompkins, A., "The Long-term Employment Consequences of the Americans with Disabilities Act." Unpublished Manuscript. Cambridge: Massachusetts Institute of Technology, 2011.

Toyota Manufacturing, Kentucky, Inc. v. Williams, 534 U.S. 184 (2002).

Valderrama, H., "Is the ADAAA a 'Quick Fix' or Are We Out of the Frying Pan and Into the Fire?: How Requiring Parties to Participate in the Interactive Process Can Effect Congressional Intent Under the ADAAA," Houston Law Review, 47, (2010), 175-213.

Weber, M., "Unreasonable Accommodation and Due Hardship," Florida Law Review, 62, (2010), 1119-1178.

TABLE 3.1
STATE DISABILITY ANTI-DISCRIMINATION LAWS

State (1)	Statutory Section (2)	Date Adopted* (3)	Anti-discrimination Provisions and Reasonable Accommodation Requirement (4)	Anti-discrimination Provisions (5)	No Statute (6)	Category Assigned for Empirical Analysis (7)
Alabama					x	No Law
Alaska	18.80.220(a)(1)	1969		x		Anti-Discrimination
Arizona	41-1463(b)	1985	x			Quasi-ADA
Arkansas					x	No Law
California	Govt. 12940(a), 12994	1973		x		Anti-Discrimination
Colorado	24-34-402(1)(a)	1977	x			Quasi-ADA
Connecticut	46a-60(a)(1)	1973		x		Anti-Discrimination
Delaware	19:723(b), 724(a), 724(e)(2)	1988	x			Quasi-ADA
Florida	760.10(1)	1977		x		Anti-Discrimination
Georgia	34-6A-4(a)	1981		x		Anti-Discrimination
Hawaii	378-2(1)	1975		x		Anti-Discrimination
Idaho	67-5909(1)	1988	x			Quasi-ADA
Illinois	68:1-103(Q),2-102(A)	1971		x		Anti-Discrimination
Indiana	22-9-1-3(1)	1975		x		Anti-Discrimination
Iowa	601 A.6(1)(a)	1972	x			Quasi-ADA
Kansas	44-1009(a)(1)	1974		x		Anti-Discrimination
Kentucky	207.150(1)	1976		x		Anti-Discrimination
Louisiana	46:2254(A), (C)	1980	x			Quasi-ADA
Maine	5:4572(1)(A)	1973		x		Anti-Discrimination
Maryland	49B:16(a)	1974		x		Anti-Discrimination
Massachusetts	151B:4(16)	1972	x			Quasi-ADA
Michigan	37.1102(2), 1202(1)	1976		x		Anti-Discrimination
Minnesota	363.03:1(2), (6)	1973	x			Quasi-ADA
Mississippi					x	No Law
Missouri	213.055.1(1)	1978		x		Anti-Discrimination
Montana	49-2-303(a), 49-4-101	1974		x		Anti-Discrimination
Nebraska	48-1104	1973		x		Anti-Discrimination
Nevada	613.330(1)	1971		x		Anti-Discrimination
New Hampshire	354-A:8(I)	1975		x		Anti-Discrimination
New Jersey	10:5-4.1, -12(a), -29.1	1972		x		Anti-Discrimination
New Mexico	28-1-7(A), (J)	1973	x			Quasi-ADA
New York	Exec. 296(1)(a)	1974		x		Anti-Discrimination
North Carolina	168A-4, 5(a)	1973	x			Quasi-ADA
North Dakota	14-02.4-03	1983		x		Anti-Discrimination
Ohio	4112.02(A)	1976		x		Anti-Discrimination
Oklahoma	25:1302(A)	1981		x		Anti-Discrimination
Oregon	659.425(1)	1973	x			Quasi-ADA
Pennsylvania	43:955(a), (b)	1974	x			Quasi-ADA
Rhode Island	28-5-7(1)	1973	x			Quasi-ADA
South Carolina	43-33-530	1983		x		Anti-Discrimination
South Dakota	20-13-10, 23.7, 23.8	1986		x		Anti-Discrimination
Tennessee	8-50-103(a)	1976		x		Anti-Discrimination
Texas	Civ. Art. 5221k:5.01	1975		x		Anti-Discrimination
Utah	34-35-6(1)(a)(i)	1979		x		Anti-Discrimination
Vermont	21:495(a)(1). 494d(6)	1973	x			Quasi-ADA
Virginia	51.5-41(A), (C)	1975	x			Quasi-ADA
Washington	49.60.180	1973	x			Quasi-ADA
West Virginia	5-11-9(a)(1)	1981		x		Anti-Discrimination
Wisconsin	111.321, 322(1), 34(1)(b)	1965	x			Quasi-ADA
Wyoming	27-9-105(a), (d)	1985	x			Quasi-ADA

NOTES -- This table reports which states had pre-ADA disability anti-discrimination statutes and the major provisions of the statutes. *The following states adopted reasonable accommodations mandates after adopting traditional anti-discrimination provisions: Iowa, Massachusetts, Minnesota, New Mexico, North Carolina, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington and Wisconsin.

TABLE 3.2
UNITED STATES SUPREME COURT DECISIONS REGARDING THE ADA

Case/Statute (1)	Year Decided/ Implemented (2)	Expanded Definition of Disability (3)	Restricted Definition of Disability (4)	Expanded Definition of Reasonable Accommodation (5)	Restricted Definition of Reasonable Accommodation (6)
Sutton v. United Airlines	1999		X		
Murphy v. UPS	1999		X		
Albertson's v. Kirkingburg	1999		X		
Toyota Motor Mfg. v. Williams	2002	X			
Chevron v. Echazabal	2002				X
US Airways v. Barnett	2002				X
ADA Amendments Act	2009	X		X	

NOTES -- This table reports the impact of Supreme Court decisions and amendments that significantly altered the interpretation of Title I of the ADA.

TABLE 3.3
DESCRIPTIVE STATISTICS

	1988-1989 (1)	1990-1992 (2)	1993-1999 (3)	2000-2002 (4)	2003-2008 (5)	2009-2010 (6)
Female	.44	.44	.48	.51	.50	.51
Age (in years)	38.78	39.08	40.42	41.69	42.56	43.35
High School Graduate	.40	.55	.84	.87	.88	.88
Married	.51	.51	.47	.45	.41	.40
Minority	.14	.13	.14	.17	.18	.17
State Unemployment	.04	.05	.05	.04	.04	.10
State Disability Rate	.07	.07	.08	.08	.08	.08
Weeks Worked	42.52	43.22	43.51	44.30	44.56	45.05
Attending School	.18	.28	.25	.23	.27	.36
Receives SSI/DI	.12	.10	.09	.07	.08	.08
Weekly Wages	449.99	468.47	480.26	571.96	573.49	574.68
Number of Observations	2,195	3,473	7,217	3,692	6,785	1,915

NOTES -- This table reports weighted descriptive statistics for the sample of those with disabilities ages 18-59 years by time interval. Data comes from the March CPS and is weighted using CPS weights.

TABLE 3.4
DESCRIPTIVE STATISTICS BY STATE GROUP

	1988-1989 (1)	1990-1992 (2)	1993-1999 (3)	2000-2002 (4)	2003-2008 (5)	2009-2010 (6)
Female						
Quasi-ADA	.41	.46	.48	.51	.50	.51
Anti-Discrimination	.45	.43	.48	.50	.50	.51
No Law	.48	.45	.48	.51	.51	.54
Age (in years)						
Quasi-ADA	39.00	38.66	40.25	41.33	42.40	44.31
Anti-Discrimination	38.82	39.22	40.43	41.85	42.59	42.93
No Law	36.11	41.05	42.30	41.63	43.63	42.96
High School Graduate						
Quasi-ADA	.39	.59	.84	.88	.89	.90
Anti-Discrimination	.42	.53	.85	.87	.87	.87
No Law	.25	.57	.78	.81	.88	.79
Married						
Quasi-ADA	.52	.50	.46	.45	.41	.41
Anti-Discrimination	.50	.50	.48	.45	.41	.39
No Law	.50	.60	.53	.49	.50	.42
Minority						
Quasi-ADA	.10	.10	.11	.13	.15	.10
Anti-Discrimination	.15	.13	.15	.18	.18	.19
No Law	.28	.19	.26	.31	.30	.20
State Unemployment						
Quasi-ADA	.04	.05	.04	.04	.04	.09
Anti-Discrimination	.06	.05	.05	.04	.04	.10
No Law	.06	.05	.05	.04	.05	.10
State Disability Rate						
Quasi-ADA	.07	.07	.08	.08	.08	.08
Anti-Discrimination	.07	.07	.08	.08	.08	.08
No Law	.09	.10	.10	.10	.11	.12
Weeks Worked						
Quasi-ADA	42.92	43.71	43.79	44.68	44.55	44.93
Anti-Discrimination	42.56	42.97	43.43	44.20	44.59	44.92
No Law	38.37	42.77	42.45	42.60	43.78	48.79
Weekly Wage						
Quasi-ADA	464.76	465.11	472.51	571.76	559.11	541.70
Anti-Discrimination	444.93	469.25	484.08	574.13	579.63	582.85
No Law	424.10	490.38	478.51	525.46	582.17	717.98
Attending School						
Quasi-ADA	.18	.27	.26	.20	.31	.30
Anti-Discrimination	.19	.30	.25	.24	.25	.38
No Law	.12	.08	.25	.51	.33	.31
Receives SSI/DI						
Quasi-ADA	.13	.08	.09	.07	.06	.07
Anti-Discrimination	.12	.11	.09	.08	.09	.08
No Law	.05	.06	.06	.07	.07	.01

NOTES -- This table reports weighted descriptive statistics for the sample of those with disabilities ages 18-59 years by time interval and state group. Data comes from the March CPS and is weighted using CPS weights.

TABLE 3.5
ESTIMATES FOR UNSTRATIFIED DISABLED ONLY SAMPLE

	Full Sample		Sample Without Years 1990-1992		Sample Without Years 1990-1995	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	--	-.248 ***	--	-.239 ***	--	-.235 ***
		(.021)		(.022)		(.022)
Age	--	.010 ***	--	.010 ***	--	.010 ***
		(.001)		(.001)		(.001)
High School Graduate	--	.388 ***	--	.419 ***	--	.362 ***
		(.032)		(.037)		(.038)
Some College	--	.832 ***	--	.864 ***	--	.831 ***
		(.045)		(.049)		(.049)
Married	--	.337 ***	--	.330 ***	--	.330 ***
		(.022)		(.023)		(.022)
Minority	--	-.021	--	-.028	--	-.030
		(.031)		(.032)		(.033)
State Unemployment %	--	-1.560 *	--	-1.480	--	-2.440 **
		(.798)		(.914)		(.983)
State Disability Rate	--	-.420	--	-.147	--	.104
		(1.158)		(1.278)		(1.273)
Transition Years						
1990-1992 * LLP	.111	.128	--	--	--	--
	(.106)	(.094)				
1990-1992 * NLP	.134	-.070	--	--	--	--
	(.169)	(.129)				
Pre-Ruling Years						
1993-1999 * LLP	.169 *	.165 *	.168 *	.164 *	.154	.160 *
	(.097)	(.089)	(.097)	(.090)	(.102)	(.091)
1993-1999 * NLP	.091	-.100	.092	-.099	.086	-.106
	(.199)	(.163)	(.199)	(.162)	(.190)	(.140)
Post-Disability Definition Decision Years						
2000-2002 * LLP	.106	.111	.104	.112	.104	.106
	(.103)	(.095)	(.102)	(.095)	(.102)	(.094)
2000-2002 * NLP	-.057	-.199 **	-.054	-.195 **	-.053	-.210 **
	(.102)	(.088)	(.101)	(.089)	(.100)	(.088)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.198 **	.199 **	.198 **	.201 **	.198 **	.197 **
	(.090)	(.082)	(.090)	(.083)	(.090)	(.083)
2003-2008 * NLP	.123	-.065	.127	-.065	.127	-.085
	(.132)	(.128)	(.131)	(.126)	(.132)	(.128)
ADA Amendments Act Years						
2009-2010 * LLP	.138	.199 **	.138	.199 *	.143	.204 *
	(.110)	(.107)	(.110)	(108)	(.111)	(.109)
2009-2010 * NLP	.197	.146	.202	.146	.215	.146
	(.160)	(.116)	(.157)	(.112)	(.159)	(.116)
Number of observations	25,277	25,277	21,804	21,804	18,479	18,479

NOTES -- This table reports OLS estimates for the CPS samples described in the text. The dependent variable is log weekly wages. All specifications include year fixed effects and state fixed effects. Standard errors are in parentheses. All specifications employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

127

TABLE 3.6
ESTIMATES FOR UNSTRATIFIED DISABLED ONLY SAMPLE WITH STATE TRENDS

	Full Sample		Sample Without Years 1990-1992		Sample Without Years 1990-1995	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	--	.010 ***	--	-.238 ***	--	-.233 ***
		(.001)		(.022)		(.022)
Age	--	-.247 ***	--	.010 ***	--	.010 ***
		(.021)		(.001)		(.001)
High School Graduate	--	.388 ***	--	.418 ***	--	.363 ***
		(.031)		(.036)		(.038)
Some College	--	.831 ***	--	.863 ***	--	.832 ***
		(.045)		(.049)		(.050)
Married	--	.339 ***	--	.331 ***	--	.331 ***
		(.022)		(.023)		(.022)
Minority	--	-.021	--	-.029	--	-.029
		(.030)		(.031)		(.033)
State Unemployment %	--	-1.240	--	-1.043	--	-2.267 **
		(.863)		(.949)		(.999)
State Disability Rate	--	-.483	--	.366	--	.948
		(1.279)		(1.400)		(1.343)
Transition Years						
1990-1992 * LLP	.119	.136	--	--	--	--
	(.102)	(.093)				
1990-1992 * NLP	.240	.034	--	--	--	--
	(.156)	(.129)				
Pre-Ruling Years						
1993-1999 * LLP	.186	.174	.188	.175	-.018	.008
	(.135)	(.132)	(.145)	(.146)	(.155)	(.152)
1993-1999 * NLP	.400 *	.183	.415	.201	.763 ***	.522 ***
	(.229)	(.221)	(.260)	(.249)	(.193)	(.181)
Post-Disability Definition Decision Years						
2000-2002 * LLP	.127	.121	.131	.126	-.139	-.109
	(.224)	(.214)	(.234)	(.229)	(.254)	(.240)
2000-2002 * NLP	.436 **	.250	.458 **	.279	.856 ***	.637 ***
	(.211)	(.235)	(.237)	(.266)	(.217)	(.228)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.229	.211	.234	.218	-.135	-.097
	(.278)	(.268)	(.293)	(.291)	(.316)	(.296)
2003-2008 * NLP	.816 ***	.565 *	.840 **	.588	1.400 ***	1.089 ***
	(.316)	(.330)	(.359)	(.383)	(.312)	(.292)
ADA Amendments Act Years						
2009-2010 * LLP	.183	.216	.189	.226	-.270	-.162
	(.345)	(.319)	(.364)	(.348)	(.399)	(.370)
2009-2010 * NLP	1.037 ***	.908 ***	1.064 ***	.934 **	1.729 ***	1.544 ***
	(.319)	(.313)	(.371)	(.369)	(.342)	(.382)
Number of observations	25,277	25,277	21,804	21,804	18,479	18,479

NOTES -- This table reports OLS estimates for the CPS sample described in the text. The dependent variable is log weekly wages. All specifications include year fixed effects, state fixed effects and time trends for individual states. Standard errors are in parentheses. All specifications employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

128

TABLE 3.7
ESTIMATES FOR DISABLED ONLY SAMPLE STRATIFIED ON EDUCATION

	No High School Diploma		High School Diploma		At Least One Year of College	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Baseline Estimation						
Pre-Ruling Years						
1993-1999 * LLP	.364 **	.374 **	-.229	-.191	-.125	-.182
	(.143)	(.162)	(.223)	(.234)	(.138)	(.137)
1993-1999 * NLP	.144	.110	.829 ***	1.128 ***	-.012	-.200
	(.386)	(.479)	(.159)	(.192)	(.338)	(.312)
Post-Disability Definition Decision Years						
2000-2002 * LLP	.210	.239	-.315	-.333	-.125	-.123
	(.235)	(.239)	(.234)	(.233)	(.155)	(.155)
2000-2002 * NLP	-.271	-.269	.732 ***	.693 ***	-.062	-.061
	(.188)	(.191)	(.278)	(.268)	(.300)	(.302)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.550 ***	.573 ***	-.191	-.207	-.129	-.129
	(.206)	(.204)	(.190)	(.189)	(.140)	(.139)
2003-2008 * NLP	.506 *	.509 *	.942 ***	.907 ***	-.198	-.199
	(.285)	(.286)	(.173)	(.177)	(.209)	(.209)
ADA Amendments Act Years						
2009-2010 * LLP	.554 **	.581 ***	-.373 *	-.380 *	-.053	-.047
	(.216)	(.220)	(.214)	(.214)	(.182)	(.180)
2009-2010 * NLP	1.040 ***	1.063 ***	.651 ***	.625 ***	.164	.176
	(.359)	(.356)	(.186)	(.188)	(.174)	(.167)
Number of observations	3,994	3,433	7,168	5,922	10,642	9,124
Panel B: Estimation With Controls						
Pre-Ruling Years						
1993-1999 * LLP	.276 **	.317 **	-.145	-.087	-.137	-.184
	(.129)	(.154)	(.200)	(.214)	(.136)	(.127)
1993-1999 * NLP	.012	-.083	.447 ***	.711 ***	-.154	-.334
	(.392)	(.471)	(.139)	(.198)	(.318)	(.288)
Post-Disability Definition Decision Years						
2000-2002 * LLP	.176	.198	-.271	-.284	-.141	-.137
	(.242)	(.245)	(.206)	(.204)	(.148)	(.145)
2000-2002 * NLP	-.323	-.324	.326	.293	-.188	-.210
	(.233)	(.232)	(.209)	(.202)	(.286)	(.288)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.491 **	.516 **	-.133	-.140	-.138	-.134
	(.199)	(.201)	(.165)	(.165)	(.140)	(.137)
2003-2008 * NLP	.351 ***	.330	.463 ***	.422 **	-.302	-.327
	(.291)	(.287)	(.165)	(.183)	(.196)	(.203)
ADA Amendments Act Years						
2009-2010 * LLP	.446 **	.487 **	-.239	-.234	-.057	-.043
	(.220)	(.225)	(.185)	(.185)	(.179)	(.173)
2009-2010 * NLP	.942 **	.932 **	.275 *	.270	.099	.108
	(.407)	(.396)	(.151)	(.167)	(.221)	(.196)
Controls?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3,994	3,423	7,168	5,922	10,642	9,124

NOTES -- This table reports OLS estimates for the CPS samples described in the text. The dependent variable is log weekly wages. All specifications include year fixed effects and state fixed effects. Standard errors are in parentheses. All specifications employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. The odd columns present estimates using the sample which excludes the years 1990-1992. The even columns present estimates using the sample which excludes the years 1990-1995. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

TABLE 3.8

ESTIMATES FOR DISABLED ONLY SAMPLE STRATIFIED ON EDUCATION

	No High School Diploma		High School Diploma		At Least One Year of College	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Baseline Estimation						
Pre-Ruling Years						
1993-1999 * LLP	.337	-.139	-.138	.021	.033	-.295
	(.394)	(.597)	(.260)	(.319)	(.203)	(.215)
1993-1999 * NLP	-.018	-1.117	.635 ***	1.762 ***	.912	.899
	(.456)	(.994)	(.218)	(.377)	(.452)	(.427)
Post-Disability Definition Decision Years						
2000-2002 * LLP	.155	-.495	-.260	-.076	.119	-.293
	(.670)	(.923)	(.332)	(.346)	(.306)	(.294)
2000-2002 * NLP	-.563	-2.006	.431	1.783 **	1.423	1.405
	(1.199)	(1.721)	(.405)	(.739)	(.512)	(.552)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.443	-.449	-.167	.101	.192	-.373
	(.817)	(1.153)	(.405)	(.448)	(.366)	(.352)
2003-2008 * NLP	.153	-1.819	.526	2.609 ***	1.895	1.882
	(1.456)	(2.150)	(.368)	(.766)	(.535)	(.588)
ADA Amendments Act Years						
2009-2010 * LLP	.438	-.680	-.351	-.026	.345	-.359
	(1.142)	(1.507)	(.499)	(.552)	(.418)	(.443)
2009-2010 * NLP	.522	-1.903	.124	2.738 ***	2.733	2.700
	(1.736)	(2.693)	(.542)	(1.106)	(.448)	(.625)
Number of observations	5,540	3,433	7,168	5,922	10,624	9,124
Panel B: Estimation With Controls						
Pre-Ruling Years						
1993-1999 * LLP	.160	-.207	-.105	.064	-.004	-.346
	(.378)	(.564)	(.252)	(.338)	(.208)	(.210)
1993-1999 * NLP	.098	-1.125	.240	1.026 ***	.588	.531
	(.382)	(.687)	(.233)	(.391)	(.439)	(.468)
Post-Disability Definition Decision Years						
2000-2002 * LLP	-.049	-.579	-.278	-.107	0.069	-.367
	(.653)	(.868)	(.312)	(.364)	(.316)	(.306)
2000-2002 * NLP	-.205	-1.801	-.041	.924	1.012	.946
	(1.038)	(1.332)	(.376)	(.673)	(.522)	(.623)
Post-Reasonable Accommodation Decision Years						
2003-2008 * LLP	.160	.553	-.178	.078	.136	-.461
	(.816)	(1.110)	(.399)	(.486)	(.376)	(.365)
2003-2008 * NLP	.609	-1.590	-.084	1.445 *	1.389	1.309
	(1.198)	(1.579)	(.490)	(.744)	(.549)	(.734)
ADA Amendments Act Years						
2009-2010 * LLP	.084	-.798	-.287	.038	.285	-.457
	(1.135)	(1.473)	(.485)	(.586)	(.431)	(.461)
2009-2010 * NLP	1.068	-1.607	-.406	1.573	2.204	2.100
	(1.501)	(2.022)	(.636)	(.1082)	(.462)	(.780)
Controls?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	5,540	3,433	7,168	5,922	10,624	9,124

NOTES -- This table reports OLS estimates for the CPS samples described in the text. The dependent variable is log weekly wages. Standard errors are in parentheses. All specifications employ CPS survey weights, are clustered at the state level and include year fixed effects, state fixed effects and time trends for individual states. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. The odd columns present estimates using the sample which excludes the years 1990-1992. The even columns present estimates using the sample which excludes the years 1990-1995. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

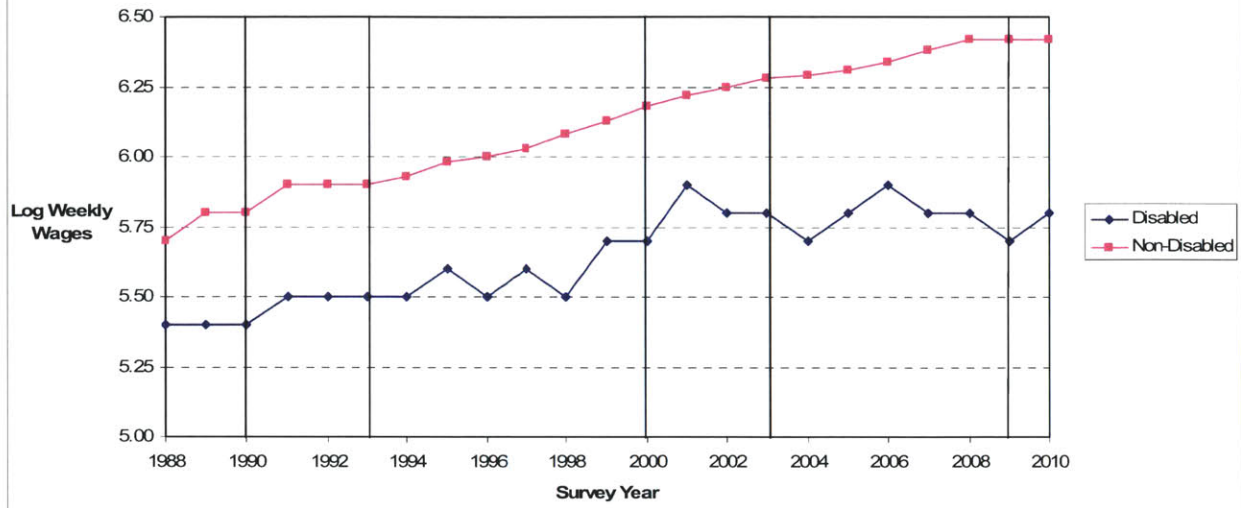Figure 3.1: Log Weekly Wages By Disability Status

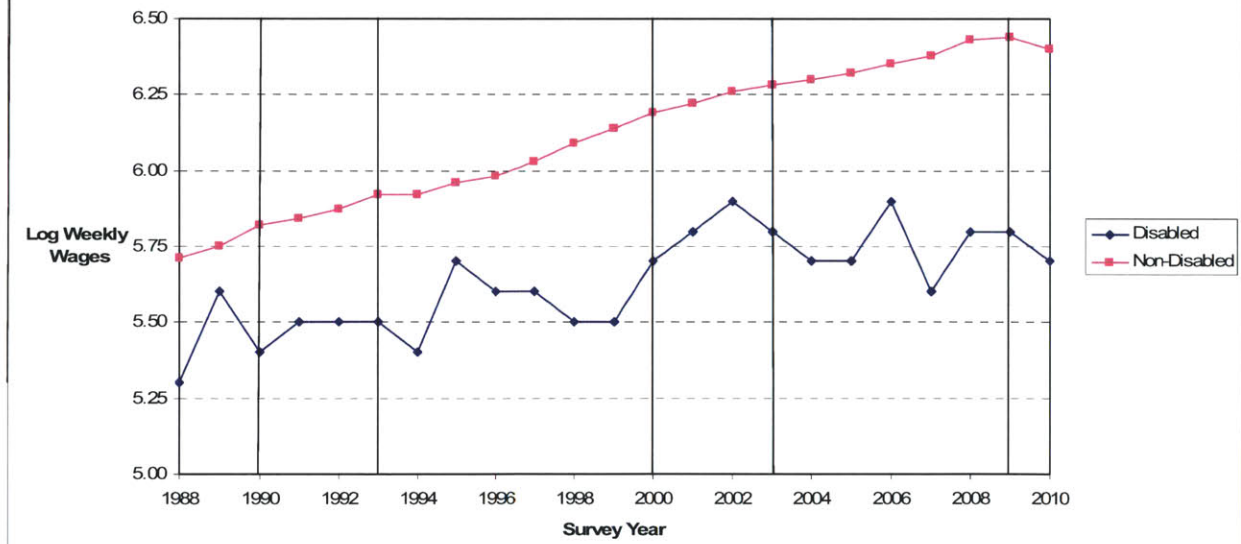Figure 3.2: Log Weekly Wages For Those In "Quasi-ADA" States

131

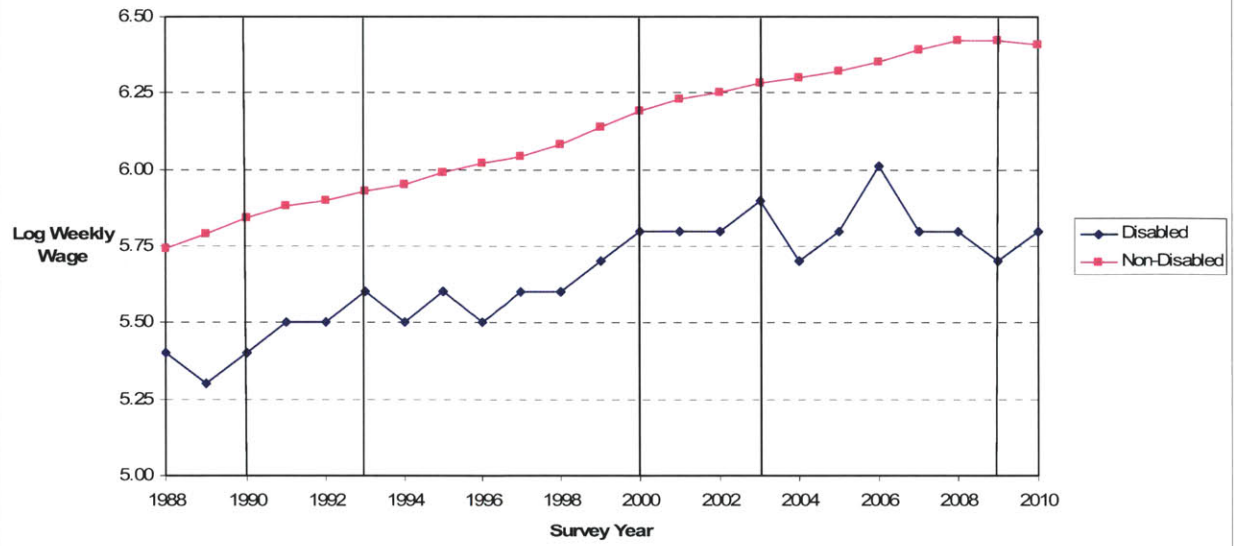Figure 3.3: Log Weekly Wages For Those in "Anti-Discrimination" States
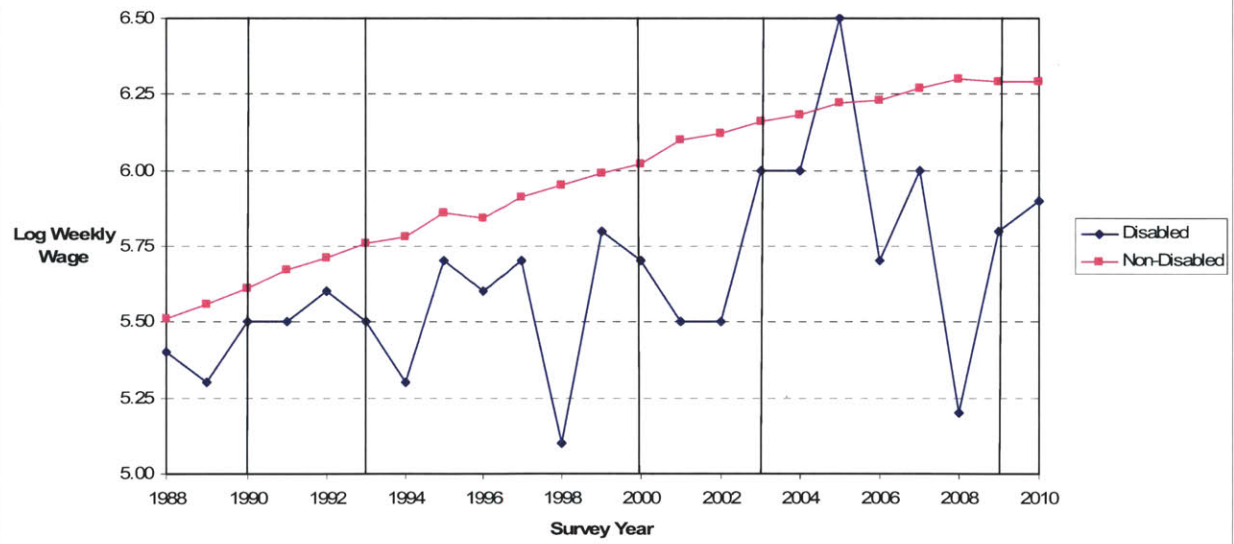

Figure 3.4: Log Weekly Wages For Those In "No Law" States

133

TABLE 3.9
ESTIMATES FOR UNSTRATIFIED DISABLED + NON-DISABLED SAMPLE

	Full Sample		Sample Without Years 1990-1992		Sample Without Years 1990-1995	
	(1)	(2)	(3)	(4)	(5)	(6)
Disabled	-.407 ***	-.394 ***	-.407 ***	-.394 ***	-.407 ***	-.393 ***
	(.045)	(.041)	(.045)	(.041)	(.045)	(.041)
Disabled *LLP	-.021	-.028	-.021	-.028	-.021	-.028
	(.065)	(.055)	(.065)	(.055)	(.065)	(.055)
Disabled *NLP	-.060	.030	-.060	.029	-.060	.029
	(.159)	(.141)	(.159)	(.142	(.159)	(.142)
Transition Years						
1990-1992 *Disabled* LLP	.021	.012	--	--	--	--
	(.071)	(.057)				
1990-1992 *Disabled* NLP	.253	.078	--	--	--	--
	(.175)	(.152)				
Pre-Ruling Years						
1993-1999 *Disabled* LLP	.084	.064	.084	.064	.066	.039
	(.665)	(.066)	(.066)	(.066)	(.076)	(.074)
1993-1999 *Disabled* NLP	.130	-.014	.129	-.013	.046	-.085
	(.204)	(.184)	(.204)	(.185)	(.224)	(.190)
Post-Disability Definition Decision Years						
2000-2002 *Disabled* LLP	.054	.047	.053	.047	.053	.047
	(.089)	(.084)	(.089)	(.083)	(.089)	(.084)
2000-2002 *Disabled* NLP	.068	.025	.068	.026	.068	.025
	(.101)	(.099)	(.100)	(.100)	(.100)	(.099)
Post-Reasonable Accommodation Decision Years						
2003-2008 *Disabled* LLP	.117	.114	.116	.113	.116	.113
	(.080)	(.073)	(.080)	(.073)	(.080)	(.073)
2003-2008 *Disabled* NLP	.182	.057	.182	.058	.182	.058
	(.189)	(.173)	(.189)	(.174)	(.189)	(.174)
ADA Amendments Act Years						
2009-2010 *Disabled* LLP	.070	.092	.069	.092	.069	.091
	(.096)	(.092)	(.096)	(.093)	(.096)	(.093)
2009-2010 *Disabled* NLP	.012	.085	.012	.086	.012	.086
	(.170)	(.129)	(.170)	(.129)	(.170)	(.130)
Number of observations	1,606,670	1,606,670	1,415,359	1,415,359	1,231,923	1,231,923

NOTES -- This table reports OLS estimates for the CPS sample described in the text. The dependent variable is log weekly wages. All specifications include year fixed effects, state fixed effects and time trends for individual states. Standard errors are in parentheses. All specifications employ CPS survey weights and are clustered at the state level. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

	No High School Diploma		High School Diploma		At Least One Year of College	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Baseline Estimation						
Disabled	-.429 ***	-.429 ***	-.325 ***	-.325 ***	-.290 ***	-.290 ***
	(.077)	(.077)	(.088)	(.088)	(.055)	(.055)
Pre-Ruling Years						
1993-1999 *Disabled* LLP	.107	.133	.106	.026	.016	-.013
	(.139)	(.165)	(.262)	(.267)	(.086)	(.110)
1993-1999 *Disabled* NLP	.285	.225	-1.220	-1.300	-.047	-.095
	(.188)	(.206)	(.767)	(.916)	(.264)	(.294)
Post-Disability Definition Decision Years						
2000-2002 *Disabled* LLP	.107	.110	.652	.651	-.012	-.013
	(.213)	(.214)	(.477)	(.477)	(.093)	(.093)
2000-2002 *Disabled* NLP	-.023	-.021	.941 *	.938 *	-.076	-.076
	(.119)	(.119)	(.512)	(.512)	(.133)	(.133)
Post-Reasonable Accommodation Decision Years						
2003-2008 *Disabled* LLP	.317 *	.319 *	.026	.025	.037	.037
	(.166)	(.166)	(.313)	(.313)	(.099)	(.099)
2003-2008 *Disabled* NLP	.336 *	.337 *	.850 ***	.845 ***	-.049	-.049
	(.175)	(.175)	(.313)	(.314)	(.274)	(.274)
ADA Amendments Act Years						
2009-2010 *Disabled* LLP	.316 *	.318	.248	.249	-.012	-.012
	(.226)	(.226)	(.705)	(.703)	(.111)	(.122)
2009-2010 *Disabled* NLP	.460	.463	1.407 *	1.408 *	-.283	-.283
	(.292)	(.291)	(.805)	(.803)	(.196)	(.196)
Number of observations	140,848	121,777	60,813	58,707	1,213,698	1,051,439
Panel B: Estimation With Controls						
Disabled	-.466 ***	-.465 ***	-.384 ***	-.386 ***	-.362 ***	-.360 ***
	.070	(.070)	(.088)	(.088)	(.055)	(.055)
Pre-Ruling Years						
1993-1999 *Disabled* LLP	.108	.128	-.009	-.181	.013	-.017
	(.143)	(.167)	(.271)	(.270)	(.082)	(.103)
1993-1999 *Disabled* NLP	.246	.151	-1.519 **	-1.678 **	-.232	-.279
	(.190)	(.199)	(.709)	(.848)	(.170)	(.191)
Post-Disability Definition Decision Years						
2000-2002 *Disabled* LLP	.124	.125	.872 *	.869 *	-.026	-.026
	(.205)	(.206)	(.503)	(.503)	(.093)	(.093)
2000-2002 *Disabled* NLP	.002	.001	.928 *	.921 *	-.199 **	-.199 **
	(.143)	(.142)	(.532)	(.531)	(.094)	(.094)
Post-Reasonable Accommodation Decision Years						
2003-2008 *Disabled* LLP	.343 **	.344 **	.003	.003	.034	.034
	(.147)	(.148)	(.303)	(.304)	(.092)	(.092)
2003-2008 *Disabled* NLP	.346 **	.347 **	.273	.260	-.213	-.212
	(.155)	(.154)	(.320)	(.319)	(.179)	(.180)
ADA Amendments Act Years						
2009-2010 *Disabled* LLP	.378 *	.379 *	.360	.364	.003	.003
	(.221)	(.221)	(.675)	(.676)	(.109)	(.109)
2009-2010 *Disabled* NLP	.551 **	.560 **	.926	.938	-.266 ***	-.266 ***
	(.255)	(.255)	(.793)	(.793)	(.092)	(.092)
Number of observations	140,848	121,777	60,813	58,707	1,213,698	1,051,439

NOTES -- This table reports OLS estimates for the CPS samples described in the text. The dependent variable is log weekly wages. Standard errors are in parentheses. All specifications employ CPS survey weights, are clustered at the state level and include year fixed effects and state fixed effects. LLP refers to "Anti-Discrimination" states. NLP refers to "No Law" states. The odd columns present estimates using the sample which excludes the years 1990-1992. The even columns present estimates using the sample which excludes the years 1990-1995. * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.