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Spillover Effects of the ADA: The Case of Obesity

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Abstract

The Americans With Disabilities Act (ADA) of 1990 has expanded employment opportunities of numerous persons with disabilities, although its effect on employment for disabled individuals has been mixed. With the strong correlation between disability and obesity, the ADA has likely had spillover effects through several court cases related to disability and obesity. The authors create a data set that combines state-level data on cases pertaining to the ADA with an individual-level health data set representative of the U.S. population: the Behavioral Risk Factor Surveillance System, 1993–2007. Controlling for state-level unemployment rates, the authors find little effect of these state-level disability policies on the probability of employment and the probability of being a student. Further analysis reveals that the occurrence of the court cases increases the probability that obese individuals report having a disability, perhaps paving the path for the creation of an environment in which obese individuals with disabilities are able to collect disability benefits.

Keywords

ADA, obesity, employment, court cases

One of the purposes of the Americans With Disabilities Act (ADA) of 1990 was to expand employment opportunities for persons with disabilities. The ADA expanded on previous disability law that only covered public sector employees and applied to private employers, state and local governments, employment agencies, and labor unions. It was signed into law in 1990 and was enacted 2 years later. Under the ADA, there are three definitions of disability: (a) a physical or mental impairment that substantially limits one or more major life activities of such individuals, (b) a record of such an impairment, or (c) being regarded as having such an impairment. As of July 1992, employers with 25 or more employees were covered, whereas employers with 15 or more employees were covered starting July 1994. To be protected by the ADA, a person with a disability must be "qualified" (that is, able to meet the legitimate skill, experience, education, or other requirements of an employment position that he or she holds or seeks) as well as able to perform the "essential functions" of the position either with or without reasonable accommodation.

With obesity's recent implicit classification as a disease for Medicare (United States Department of Health and Human Services, 2004) and the strong correlation between disability and obesity, the ADA has inspired disability-related legislation for obese individuals, creating an environment in which work-related disabilities that obese individuals may have are acknowledged. The "third prong" of disability, described above, may be particularly important

for obese individuals. Moreover, if large firms are more likely to provide health insurance, then obese workers are more likely to work at these firms (Liang & Schone, 2008) and therefore be more likely than their thinner counterparts to be affected and protected by the ADA.

Our empirical question is, "In light of possible discrimination against obese individuals in the labor force, did legislation inspired by the ADA give obese persons who are disabled an advantage over their nondisabled counterparts?" One fear might be that such legislation would deter employers from hiring obese individuals, for fear of lawsuits. We find no such evidence once selection is accounted for by comparing similar groups of individuals. We do find evidence that obese individuals are more likely to classify themselves as disabled after plaintiff-friendly court cases take place in their state. This may pave the way for them to collect much-needed disability benefits.

We create a data set that combines state-level information surrounding litigation pertaining to the ADA (both laws and cases that specifically deal with obesity coverage, hereafter "cases") with an individual-level health data set

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Jennifer Tennant, Department of Economics, 305 Muller Center, Ithaca College, Ithaca, NY 14850, USA Email: jtennant@ithaca.edu representative of the U.S. population: the Behavioral Risk Factor Surveillance System (BRFSS, 1993–2007). Controlling for business cycles using state-level unemployment rates, we find little effect of these state-level disability policies on the probability of employment and the probability of being a student. This may mitigate concerns that the court cases significantly deterred employers from hiring obese individuals. Further analysis reveals that the occurrence of the court cases increases the probability that obese individuals report having a disability, perhaps paving the path for the creation of an environment in which obese individuals with disabilities are able to collect much-needed disability benefits. To our knowledge, no prior study has analyzed the potential effect of ADA-related litigation on obese, disabled individuals.

ADA and Obesity

Even though the mission of the ADA was to improve the lives of people with disabilities by, among other things, lessening discrimination and diminishing the barriers to work, several studies have pointed to the counterintuitive adverse effects that the passage of the ADA has had on employment. Yet, identifying the potential effect that such a law has on labor market outcomes can be problematic due to the effects of confounding factors and the temptation to compare groups that are incomparable. In theory, the effect of the ADA on employment outcomes could go in many different directions. In line with its mission, the ADA could increase labor force and educational opportunities for those with disabilities. However, there might be selection bias, and the presence of a law or case in a certain state may be a response to an existing problem, rendering any beneficial direct effects of the law on outcomes to appear conservative at best. Alternatively, policy makers fear that employers may react to such laws by lowering employment levels to suboptimal levels. Thus, although the law may have caused a shift in the labor supply curve to the right, it may simultaneously have shifted demand to the left. Two states, Maryland and Pennsylvania, have additional state-level incentives that may affect employer decisions, but court cases may also serve as an incentive for employers to hire disabled workers for fear of lawsuits. Eliminating these two states does not alter the qualitative nature of our results. Results are available from the authors on request.

Although no prior research has specifically analyzed ADA-inspired legislation surrounding obesity, there are several studies on the effects of the ADA itself. Using the Survey of Income and Program Participation, DeLeire (2000) found that employment of disabled males declined and their wages did not increase. Acemoglu and Angrist (2000) found a significant post-ADA drop in the employment of disabled workers, as evidenced by the Current

Population Survey (CPS). They find that this is not due to the increase in disability transfers, perhaps suggesting that employers were less inclined to hire disabled workers. They find that the negative employment effects of the ADA are limited to 1992 and 1993, a short time period for a recently enacted law to have an effect. However, all studies do not show negative effects of the ADA on employment and education of people with disabilities. Comparing 2000 to 1990, Tennant (2006) found positive effects of the ADA on home-based employment for disabled workers. Another promising result was found by Jolls (2004), who uses the CPS to show that the ADA prompted disabled persons to further their levels of education as a rational response to the act.

Other factors changed simultaneously to the passage of the ADA, which leads to difficulty in estimating the law's potential effect. As evidenced by DeLeire (2000), those simply reporting a disability has gone up over time and particularly in the post-ADA period. Our measure of poor health using the BRFSS data confirms this, showing an increase over time in the percentage of those reporting poor health days. This renders estimating the effect of the ADA per se on outcomes a challenge.

Obesity, defined as having a body mass index (BMI) greater than or equal to 30 kg/m², is strongly correlated with the probability of having a disability (Baumgartner et al., 2004; Marks, 2007; Obesity and Disability, 2007). Lakdawalla, Bhattacharya, and Goldman (2004) found that a substantial rise in disability for 18- to 59-year-olds can be explained by increases in obesity. Butcher and Park (2008) showed that although the median BMI has increased, the increase in the variance of BMI is the more relevant indicator, pointing to the heavier right tail of the BMI distribution, with more people in the morbidly obese category. This might affect labor force participation not only because of the disability component but also because of discrimination against obese workers. Puhl and Brownell (2001) highlighted the connections between obesity and labor market discrimination and Cawley (2004) showed that wages are lower in general for those who are obese. If more productive obese workers are not being hired and/or are being paid less than the value of their marginal product of labor, this is not only a moral issue but also one that has adverse effects on economic growth.

Congress intended that the ADA "provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities" and provide broad coverage (ADA Amendments Act, 2008). The courts were urged to implement the ADA broadly. In fact, Congress wanted the courts to define disability more broadly than they did and passed the ADA Amendments Act of 2008 in response to court cases that seemed to go against the intent of the ADA. The ADA Amendments Act rejected the holdings in various court cases (e.g., Sutton v.

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United Air Lines, Inc., 1999; Toyota Motor Manufacturing, Kentucky, Inc. v. Williams, 2002) that Congress believed construed the definition of disability too narrowly (Meyer & Woodard, 2009). The Act states, "lower courts have incorrectly found in individual cases that people with a range of substantially limiting impairments are not people with disabilities" (ADA Amendments Act, 2008). Because court cases have been important in shaping disability policy overall, we attempt to analyze the potential effects that statelevel ADA-related obesity cases may have on the employment and education of obese, disabled individuals. We further analyze the probability of reporting having a disability after obesity-friendly legislation has taken place in the respondent's state of residence.

Method

Data

As the largest telephone-based health survey available, the BRFSS has tracked health conditions and risk behaviors for adults 18 years of age and older in the United States for more than 20 years. The survey is conducted by state health departments in collaboration with the Centers for Disease Control. Although only 15 states participated in 1984, the number grew to 33 in 1987, to 45 in 1990, and to all 51 states (including the District of Columbia) in 1996. More than 350,000 adults are interviewed each year, with response rates of around 50%. The average number of interviews per state ranged from approximately 800 in 1984 to approximately 3,500 in more recent years. These data are publicly available from the Centers for Disease Control at http:// www.cdc.gov/brfss and provide information on a variety of personal characteristics, including gender, age, education, marital status, family income, and state of residence. In addition, measures of general health and health limitations are included as well as anthropometric measures such as weight and height. We use years 1993 to 2007 in our analysis, as data on general health and disability are not available prior to 1993.

To mitigate error due to self-reports, all weights and heights used in this analysis are adjusted for self-report error. Although opinions are mixed regarding the validity of self-reported weight and height, it is generally agreed that men in particular tend to overreport height and women tend to underreport weight (Himes & Roche, 1982; Kuczmarski, Kuczmarski, & Najjar, 2001; Spencer, Appleby, Davey, & Key, 2002). Using the relationship between objective measures of weight and height and self-reported values from the National Health and Nutrition Examination Survey (NHANES), the height values in the BRFSS sample were adjusted (Rashad, 2008). Because NHANES gathers information on both self-reported and actual weight and

height, these measures are adjusted in the BRFSS using this information. The adjustment is done separately by age, gender, and race, and has previously been used in the literature (see, for example, Cawley, 1999; Chou, Grossman, & Saffer, 2004). The coefficients obtained are then applied to self-reported height for the corresponding race-gender groups in the BRFSS to predict actual height. Regression results using self-reported weight and height, available on request, yield qualitatively similar results.

State-level data pertaining to the plaintiff-friendly obesity laws were obtained from numerous sources, the most broad-reaching being a search of federal and state-level court cases using keywords "ADA," "disability," and "obesity" in general search engines as well as LexisNexis. Summaries of the laws for the various states are available from the authors on request. As indicated in Figure 1, there was no evidence of being plaintiff friendly in terms of obesity coverage for 36 states.

We use three possible measures of disability in the BRFSS, each with its advantages and disadvantages:

Use equipment. This variable is based on the question "Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?" and is our best measure of disability. It is asked regularly in the main survey that each state administers (a "core" question) starting 2003 but was also a "core" question in 2001 and was asked of a subset of respondents (a "module" question) in 2002. Approximately 10% of obese respondents use special equipment, versus 5% of nonobese respondents.

Poor health. This variable is based on the question "During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?" This question is a "core" question, asked in the main survey in all years. The exception is 2002, when it was a "module" question, only asked of a subset of respondents. We define poor health as having been impaired from participating in usual activities for at least 1 day in the month prior to being surveyed. (Sensitivity analyses using alternative cutoffs yielded qualitatively similar results.) This variable is asked of almost all respondents in all years (useful for showing trends), yet is a largely imperfect measure of disability. Approximately 24% of obese respondents are in poor health using this definition, versus 18% of nonobese respondents.

Limited activity. This variable is based on the question "Are you limited in any way in any activities because of physical, mental, or emotional problems?" This was a "core" question in 2001 and 2003 to 2007 and a "module" question in 1993 to 2000 and 2002. In 1993 to 1995, the question was phrased "Are you limited in any way in any activities because of any impairment or health problem?" and was only asked of older respondents (70 years of age

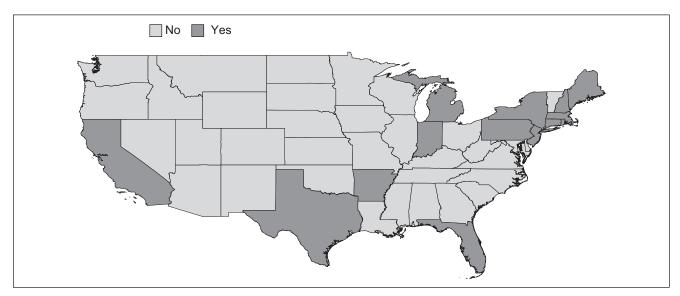


Figure 1. States with obesity plaintiff-friendly laws Note: Alaska and Hawaii do not currently have plaintiff-friendly laws.

and older in 1993 and 65 years of age and older in 1994 to 1995). This question is quite vague and is not a clear measure of disability, particularly in regards to work. Approximately 25% of obese respondents are in limited in activities, versus 15% of nonobese respondents.

A total of 24% of our sample is obese. Those individuals residing in states where obesity plaintiff–friendly laws exist are systematically different from those living in other states, one of the key difficulties in comparing states without taking potential confounding factors into account. Moreover, those residing in these states are less likely to work, more likely to be students, more likely to be in poor health, and yet slightly less likely to have used equipment for his or her disability. Readers can request a copy of the complete weighted summary statistics of the BRFSS data from the authors.

Empirical Model

Our empirical model is based on a static labor supply model in which the decision to work includes the indirect costs of a lack of accommodations provided at a potential workplace. The dependent variables of interest are outcomes related to employment and the likelihood of being a student. To investigate the effect that ADA may have on various measures of these outcomes, the following general equation is estimated:

$$\begin{array}{l} \textit{Outcome} = \alpha_0 + \alpha_1 \textit{Case} + \alpha_2 \textit{Ob} + \alpha_3 \textit{Dis} + \\ \alpha_4 (\textit{Case} \times \textit{Ob}) + \alpha_5 (\textit{Case} \times \textit{Dis}) + \alpha_6 (\textit{Ob} \times \textit{Dis}) + \end{array} (1) \\ \alpha_7 (\textit{Case} \times \textit{Dis} \times \textit{Ob}) + \alpha_8 (\textit{unemp}) + \overline{\alpha}_9 X + \varepsilon, \end{array}$$

where *Outcome* represents either working or being a student; *Case* represents being in a state that is plaintiff-friendly

in obesity coverage (see Figure 1); Dis is a dichotomous indicator that is equal to 1 if the respondent used equipment for his or her disability, reports being either in poor health for at least 1 of the 30 days prior to being surveyed or having limitations in activity, and 0 otherwise; Ob is a dichotomous indicator that is equal to 1 if the respondent has a BMI greater than or equal to 30 kg/m², and 0 otherwise; unemp represents the state unemployment rate in a given year; X includes personal, parental, and demographic characteristics; and ε is an error term. Due to the dichotomous nature of our outcome variables, all models utilize probit estimations. Marginal effects are reported in the tables. Our coefficient of interest is α_2 , which shows the potential effect that a case might have on disabled, obese individuals. We are thus comparing obese individuals who are disabled with a comparable group: obese individuals who are *not* disabled. Due to potential concerns with comparing disabled and nondisabled individuals in general, we net out differences between disabled and nondisabled individuals who are not obese in our DDD (difference-in-difference-in-difference) estimation.

The main coefficient of interest, α_7 , may be biased downward due to the potential benefits the case might have on those who have a propensity to being obese and/or disabled but are not in these categories; the effect shown is that over and beyond the effect that the case might have on all other groups (for example, nonobese and disabled individuals, obese and nondisabled individuals, etc.). Moreover, the measures of disability that we use, particularly the question regarding poor health, may not be an ideal measure for disability. Our measure for equipment use is more appropriate yet is only available in the BRFSS starting 2001 (and is a modular question, asked of only a subset of respondents, in 2002).

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Table 1. Effect of Obesity Plaintiff–Friendly Cases on Work and Student Status, Using Three Alternate Measures of Disability

Outcome	Work	Student
Equipment use \times Obese \times Case	-0.0026 (0.008)	0.0020* (0.001)
Poor health \times Obese \times Case	-0.0055 (0.005)	-0.0011*** (0.000)
$\begin{array}{c} \text{Limited} \times \text{Obese} \times \\ \text{Case} \end{array}$	-0.0087* (0.005)	-0.0003 (0.001)

Note: Marginal effects of probit coefficients are reported. Standard errors are reported in parentheses and are clustered on the state level to account for the aggregate nature of several explanatory variables. A constant and controls for year of survey and state of residence are included in all regressions. All controls are included in all regressions. Number of observations in the equipment use regressions is 1,798,205. The number of observations in the poor health and the limited activity regressions are 2,810,992 and 1,943,584, respectively. *p < .10.**p < .05.**p < .05.**p < .01.

We exploit variation in the timing of the laws, our source of identification. Controls for state and year are included in all regressions, and thus, our source of variation comes from states with court cases that were plaintiff-friendly in terms of coverage of obesity, as shown in Figure 1, taking into account the year they took place. States with plaintifffriendly legal cases include Arkansas, Connecticut, Florida, Indiana, New Jersey, New York, Pennsylvania, and Texas. Although California, Maine, Massachusetts, Michigan, New Hampshire, and Rhode Island also had relevant cases, our data begin in 1993 due to availability of our disability measures. Unless similar state-level legislation took place in favor of obese, disabled individuals in the same year, we can debatably attribute the effects of these cases on our outcomes of interest. Our results are provided in Table 1. As a robustness check, we run regressions using an alternative, incorrect measure of obesity (variable pseudo-obese), defined as having a BMI of 21 or 22 kg/m², which represents approximately 17% of our sample. These regressions do not provide evidence of any significant effect of plaintiff-friendly cases on work and student status of obese people with disabilities when the *pseudo-obesity* measure is used. (Results from these regressions are available on request.)

We run additional models, results of which are shown in Table 2, where we predict the probability of reporting a disability. Our aim here is to test whether these cases encouraged obese persons who are perhaps borderline disabled to report having a disability and potentially collect much-needed disability benefits. This model is shown as,

$$Outcome = \alpha_0 + \alpha_1 Case + \alpha_2 Ob + \alpha_3 (Case \times Ob) + \alpha_4 (unemp) + \overline{\alpha}_5 X + u,$$
 (2)

In this case, *Outcome* represents being disabled based on one of our three definitions, and *u* is an error term.

Results

The regression results in the study are marginal effects derived from probit regressions, using work and student status as dependent variables. We outline the highlights here, but the complete regression results are available on request. Table 1 shows the effect of obesity plaintifffriendly laws on work and student status of individuals who are obese and disabled, using three separate measures of disability. The regression results in the first row use our strictest measure of disability, equipment use. Evaluated at the mean, those who need equipment are 35.81 percentage points less likely to work than their healthier counterparts. Our coefficient of interest, showing the interaction of equipment use, obese, and the state litigation variable, suggests that obese persons with disabilities living in obesity plaintiff-friendly states are only 0.26 percentage points less likely to work, yet we cannot place much confidence in this imprecisely measured estimate. However, as previously stated, due to the nature of the DDD estimate, these results are likely very conservative.

Some of the other variables (results not shown) give expected results, such as a decrease in the probability of working when the unemployment rate is higher (although insignificant) and a greater probability of being employed if one is a college graduate. The demographic variables reveal extraordinary explanatory power and suggest differences in employment among various groups of individuals commonly found in the labor economics literature. The more education an individual has, the more likely he or she is to be employed, with each degree obtained increasing the likelihood of employment. Differences across gender (males are more likely to be employed), race/ethnicity (White non-Hispanic individuals are more likely to be employed), and marital status (married, divorced, and widowed individuals are more likely to be employed than their single counterparts) are also very stark.

The coefficient on the interaction term of interest for the probability of being a student indicates that these individuals are significantly more likely to be students (p < .10). (The costs of concluding nonsignificance are high enough to warrant using a more relaxed probability level.) This suggests that obese, disabled individuals are 0.20 percentage points more likely to be students. Although this may seem small in magnitude, it implies an increase of 4.5% from the mean value of 4.4%. When student status is the dependent variable, we get some expected results from our demographic and general economic variables. There is a statistically significant increase in the probability of being a student

	(1)	(2)	(3)
Outcome	Equipment use	Poor health	Limited activity
Case × Obese	0.0034*** (0.001)	0.0049** (0.002)	0.0036* (0.002)
Observations	1,801,244	2,817,668	1,946,662

Table 2. Effect of Plaintiff-Friendly Cases on the Probability of Reporting a Disability

Note: Standard errors are reported in parentheses and are clustered on the state level to account for the aggregate nature of several explanatory variables. Controls for case and obese status are included. All demographic controls are included in all regressions. *p < .10. **p < .05. ***p < .01.

when the unemployment rate is higher, which makes sense as many people go to school to wait out the downturn. We also see that, compared with those who are single, married, widowed, and divorced people are significantly less likely to be students. Education seems to follow education. Not surprisingly, those who have completed some college have a higher probability of being a student because some of them are finishing up their degrees. Those with college degrees are often in school for postgraduate studies.

The second and third rows of Table 1 also look at the effect of obesity plaintiff–friendly cases on work and student status; however, the disability measures are poor health and limited activity, less appropriate measures of disability than the equipment use measure used in Row 1 of Table 1. In this case, when the dependent variable is work, there are negative results of being disabled and obese in a plaintiff-friendly state, significant only at the 10% level for the "limited activity" disability measure. When student status is the dependent variable, we obtain a negative, significant result on the interaction term poor health \times obese \times ADA_obese (p < .01). As discussed above, no effects are seen when the incorrect measure of obesity ("pseudo-obese") is used.

Although we lack information on disability benefits, we investigated the potential effect that the occurrence of a case in a respondent's state of residence had on the probability that an obese person reported having a disability, as measured by the three indicators in our data. These models compare obese and nonobese individuals and, as with our previous models, include state and year controls. We thus continue to exploit the variation in the occurrence of a case in a given state in a given year. Results, shown in Table 2, consistently show significant increases in the probability of obese persons reporting a disability after a state has an obesity-friendly case. This could affect the labor force participation of obese, disabled persons in conflicting ways, including increased employment due to protection under the auspices of the ADA or the ability to apply for disability benefits, which may have a negative impact on their employment, particularly for those who identify as being "limited" in the type of work they can do. One of the eligibility requirements for Social Security Disability Insurance or Supplemental Security Income-Adult Disability is the inability to perform any "substantial gainful activity" because of physical, mental, or emotional conditions.

Discussion

As stated eloquently elsewhere, "[i]ndividuals who are obese face greater challenges in terms of disability and chronic disease than do their non-obese counterparts. However, their personal challenges also translate into major issues for public budgets and for society at large" (Obesity and Disability, 2007). Our study provides some new evidence on the effects of ADA-inspired legislation surrounding obesity on employment for obese, disabled individuals. We find that these plaintiff-friendly court cases have little effect on the employment of obese, disabled individuals.

As discussed earlier, these estimates are likely to be conservative at best. We exploit state-level variation in ADAinspired obesity court cases, which is limited. Although imprecisely measured, what they do suggest is, when using the BRFSS's clearest definition of disability, employment levels are not *decreasing* due to state efforts to protect obese, disabled individuals, as some might suggest due to the lack of incentives to provide accommodations for these types of workers. We find evidence of increases in the probability of being a student, in line with the result found in Jolls (2004), perhaps encouraging obese, disabled individuals to further their education in states where promising litigation has occurred. In particular, our results suggest that the probability of being a student increases by 0.2 percentage points, which suggests an increase of approximately 400,000 adults in the time period being considered.

These are important results in light of the increasing presence of disability among the obese in the United States (Obesity and Disability, 2007) and possible fears that legislation to protect the disabled may lead to decreased employment (DeLeire, 2000). When using the BRFSS's clearest measure of disability, we find no evidence that for obese individuals, protective legislation leads to decreased employment.

There are some limitations to our study. Although we exploit various possible definitions of disability, none of the definitions in the BRFSS provide a perfect definition of disability. The various measures yield a range of results, yet the consistency in the qualitative nature of the results somewhat mitigates these concerns. Another limitation is that a few questions were only asked of a subset of respondents in certain years. Moreover, because we exploit variation in the

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timing of the ADA-inspired obesity legislation and use DDD estimation, our results are conservative at best.

Although it is important to note that productivity is often unaffected by an individual's weight, it may be socially optimal to create an environment in which reasonable accommodations can be provided to obese individuals who identify as having a disability and to pave a path where they can acknowledge the existence of a disability without facing opposition. Federal policies aimed at limiting discrimination in the workplace and accommodating obese workers with disabilities may be economically optimal as well as in line with the mission of the ADA.

Declaration of Conflicting Interests

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