

The Disability Discrimination Act in the UK: Helping or Hindering Employment Among the Disabled?*

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December 2005

Abstract:

The enactment of the Americans with Disabilities Act (ADA) in 1990 triggered a substantial academic debate about its consequences on employment rates of disabled people. In contrast, the employment provision of the 1996 Disability Discrimination Act (DDA) in Britain has received little attention. Exploiting both pooled and longitudinal data, this paper provides robust evidence that, similar to the ADA in the US, the DDA has had no impact on the employment rate of disabled people or possibly worsened it. Possible reasons for this are higher uncertainty around litigation costs, low levels of general awareness about the Act among disabled people and employers, and a lack of financial support.

Keywords: Disability, Employment, Difference-in-Difference, Discrimination

JEL Classification: J2, I18, J71, J78

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Introduction

In 1995 the UK Government passed the Disability Discrimination Act (DDA). Its intention was to end discrimination against disabled people. It aims to protect people in the areas of employment, access to goods, facilities and services, the management, buying or renting of land or property and education. Under Part II of the Act, which came into force in December 1996, it is unlawful for employers covered by the Act to discriminate against disabled employees. Similar to the Americans with Disabilities Act (ADA) which was introduced in 1990, the employment provision of the DDA aims to overcome barriers to employment for disabled people. It was hoped that the extended rights under the DDA would significantly increase the chances of disabled people to obtain and remain in employment. Critics on the other hand point out that additional costs imposed by the legislation (*hiring* and *firing*, possible litigation and adjustments costs, and higher discount rates through more uncertainty) lower employment rather than raise it. Thus the UK has experienced a similar debate about the merits of legislation intended to improve disabled peoples' labour market outcomes. However, its effects and particularly its impact on employment have not been subject to the same rigorous analysis as has occurred in the US. This paper seeks to provide such evidence.

The theoretical impact of anti-discrimination legislation is ambiguous. By giving them additional rights, disabled people are more likely to supply labor. But higher expected costs may dissuade employers from hiring disabled employees. In the absence of efficient enforcement mechanisms, employers will seek to avoid such extra costs. Such enforcement can either be formal (through tribunals and courts) or informal (name and shame).

The ADA has sparked a large body of economic studies on its effects. DeLeire (2000, 2003) claims that it decreased employment rates for disabled men on average by 7.2 percent compared to the pre ADA period. Yet, there has been no change to male wages post legislation. Acemoglu and Angrist (2001) find a strong decline in hours worked shortly after the introduction of the ADA for men of all working ages and women under 40. Only part of this can be explained by an increase in disability related income transfers. Furthermore, consistent with the ADA, measured effects are larger in medium-sized firms possibly because small firms were exempt. Jolls and Prescott (2004) disaggregate the different effects of the ADA and show that accommodation costs for disabled people account for much of the decline in employment rates. However, ADA effects across states suggest that declining employment rates for disabled people after the immediate post ADA period reflect factors other than the ADA itself. Finally, Hotchkiss (2004) finds little effect on employment rates of disabled people post ADA modelling participation and employment effects separately and even higher employment rates for certain disability types.

Results in these studies are not without controversy. Disability measures based on self-reported work limiting health problems may suffer from several shortcomings (Kruse and Schur 2003). If for example people with disabilities get access to better jobs they might no longer declare themselves as having a work limiting disability. Furthermore, a substantial proportion of those reporting a work disability may not be covered by the ADA disability definition. Finally, empowering disabled people with more rights may remove the stigma attached to bad health and therefore increase willingness to report disabilities. Each of these issues will impact on the measure of

the employment rate of disabled people. Nevertheless, Burkhauser, Daly, Houtenville and Nargis (2002) argue that differences in trends in self-reported work limitation and in health impairments data from US employment surveys are insignificant.

In this paper we use both pooled and longitudinal data to study the effect of the DDA on employment rates of disabled people in England. The paper contributes to the literature in at least two ways. First, to our knowledge this is the first formal economic evaluation of the DDA. Second, the paper also aims to overcome some of the conceptual problems around the disability definition (mainly work limiting) and transition in and out of disability inherent in the US literature by using a range of disability definitions and by using longitudinal data.

Employment Provisions of Discrimination Legislation in the UK

The Disability Discrimination Act 1995 brought in measures to prevent discrimination against disabled people. It defines a *disabled* person as a person with a physical or mental impairment which has a substantial and long-term adverse effect on his/her ability to carry out normal day-to-day activities. Part II of the DDA which came into force in December 1996 is based on the principle that disabled people should not be discriminated against in employment or when seeking employment. Under the Act employers may have to make *reasonable* adjustments if their employment arrangements or premises place disabled people at a substantial disadvantage compared with non-disabled people. This includes the provision of auxiliary aids or services. However, there has been no anticipatory duty to make these adjustments under the legislation. The Act originally covered employers with more than 15

employees. Since October 2004 this exemption has been removed and all employers regardless of their size are covered.

The Act therefore imposes prospective additional costs on employers. First, hiring and firing of disabled people may be more expensive through the potential threat of lawsuits. Second, employing a disabled person may require alterations to the physical features of the workplace. Furthermore, it may be efficient for firms and employees to share investments in human capital (DeLeire 2000). This however, is no longer possible under the DDA. On the other hand the Act reduces barriers to employment and opportunity costs for disabled people which may increase their labour supply. Hence, whether anti discrimination legislation increases or hampers the labour market participation of disabled people is foremost an empirical question.

It is important to note that the DDA is not the sole policy instrument aimed at increasing the employability of disabled people. In 1994 a scheme called *Access to Work* (AtW) brought together various older disability programmes. Access to Work aims to assist disabled people who are in paid employment or with a job to start by providing practical support and helping to meet *unreasonable* additional costs associated with overcoming work-related obstacles resulting from disability. This may encompass adaptations to premises and equipment, employment of support workers, special aids and equipment, or communication support at job interviews. Access to work, however, is not pro-active and a disabled person needs to have an employer in order to be eligible for help. There have been several changes to the programme over the years including different cost sharing arrangements between government and employer (Thornton et al. 2001). The UK Government has also introduced further measures to increase the incentives of disabled people to become employed. These include the Disabled Person's Tax Credit and the New Deal for Disabled People

(NDDP). Both are meant to increase incentives for disabled people to seek employment by providing tax relieve and tailored advise.

Finally, the Department for Work and Pensions has a performance target to statistically significantly increase the employment rate of disabled people and reduce the difference between their employment rate and the overall employment rate by 2007 as part of its Public Service Agreement with the Treasury. The implication is that there is external pressure on employment service managers to find employment for disabled people. Hence one might expect to see a reduction in the gap between overall employment rates and those of disabled people, irrespective of the impact of anti-discrimination legislation.

Data and Definition of Disability

The main analysis in this paper is based on data from the British Household Panel Study (BHPS) for the first 12 waves (1991-2002). Each year over 5,000 households consisting of roughly 10,000 individuals have been interviewed. The BHPS offers a wide range of variables and is nationally representative. For the purpose of our analysis only individuals who are aged 16 to 64 (59 for women), not working for the armed forces or in self-employment¹ and residing in England have been included. Participation in paid employment is defined by whether an individual has done paid work in the week prior to the interview or has not done paid work but has had a job from which they were absent. This broad definition includes both active and inactive individuals and is used as a filter question for several other employment related questions in the BHPS questionnaire.

¹ One might expect switching from self-employment to paid employment due to provision of additional facilities by employers. As we have argued demand effects can go either way. We leave this for future research, though the effects are likely to be small.

In order to look at a range of disability definitions and not just rely on one survey, we repeat the analysis with data from the Family Resources Survey (FRS) for 1994/94 to 2002/03. The FRS is a continuous cross-sectional survey with an annual target sample size of 24,000 private households (25,000 prior to April 1997). Its advantage is its much larger sample size compared to the BHPS. Unfortunately, this larger size has to be traded off against a more restricted set of controls and the absence of a longitudinal element. The sample has been restricted in a similar fashion to the BHPS to maximise comparability between the results.²

Clearly, any meaningful evaluation of the DDA and its impact on employment rates of disabled people requires a measure of disability which complies with the disability definition in the legislation. Unfortunately, such a measure does not exist in any available survey that would allow a comparison of pre- and post DDA employment effects. The Labour Force Survey (LFS) and the FRS have recently introduced a DDA disability question. However, while these questions are likely to cover currently DDA disabled, they will not capture former DDA disabled which also come within the ambit of the Act. Hence, these questions do not guarantee full coverage of those affected by the legislation. Furthermore, the order of the disability questions in the LFS questionnaire has changed since 1997 which makes it difficult to compare pre- and post effects.

The BHPS has two broad disability questions:

Does your health limit the type of work or the amount of work you can do?

and

² Differences mainly occur in terms of education. This has been proxied using the full-time education leaving age which is available for all waves. More recently more detailed education variables have been added to the FRS. Also, the dependent variable uses a slightly different route of questions but is broadly comparable with the BHPS.

Does your health in any way limit your daily activities compared to most people of your age?

where the first is usually referred to as work limiting disability (WLD) and the second identifies limitations in day-to-day activities (DALD). The former is the sort of question that has been used in studies of the ADA. The latter is closer to the DDA definition except that it does not establish whether the disability is longstanding. Both questions have been asked in all waves other than wave nine, which corresponds to calendar year 1999. For some analysis in the paper a proxy variable has been derived for 1999.³

In the FRS, there are two additional disability questions, namely a longstanding illness (LSI) and a limiting longstanding illness question (LLSI). These questions are:

Do you have any long-standing physical or mental illness, health problem or disability? By long-standing I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time? Please include problems that are due to old age.

and if so, a follow-up question it put to the individual to determine whether the health problem is limiting

Does this physical or mental illness or disability (Do any of these physical or mental illnesses or disabilities) limit your activities in any way?

³ The proxy variable has been derived in the following manner to be able to use all 11 waves. If individuals are answering “yes” to “Does your health in any way limit your daily activities compared to most people of your age?” in the preceding and succeeding year (wave 8 or 10) it is assumed that they are also disabled in wave 9. Similarly, if they answer “no” in wave 8 and 10, it is assumed they would do so in wave 9 as well. In all other cases where answers differ in wave 8 and 10, if the answer is “yes” to the related wave 9 specific question “Being limited in the kind of work or other activities?” individuals are assumed to be disabled.

Hence, the LLSI is a sub-group of LSI individuals. Note that the latter does not specify the activities and the reference group as the DALD does.

One advantage of surveys such as the LFS and FRS is that they not only have a DDA but also a work limiting disability question which makes it possible to establish the overlap between the two. There is conclusive evidence that work limiting and DDA disability in the LFS overlap by more than 93 percent (DWP 2004). Our analysis reveals that the WLD and DALD in the BHPS overlap by more than 94 percent in the period 1991 to 2002. Thus given that the LFS and BHPS questions are very similar, there is good reason to believe that by using the BHPS variable a very good, but not perfect, coverage of the DDA population can be achieved. The same applies to the two FRS questions.

In our analysis, we utilise all four measures of disability, namely WLD, DALD, LSI, and LLSI. Given the nature of the questions asked in the two surveys, our analyses is much more likely to capture the relevant population covered by disability legislation compared to U.S. studies.

Analysis and Results

Anti discrimination legislation may affect the number of disabled people in various ways. On the one hand the willingness of declaring a health problem might have increased due to the extension of rights and public awareness. On the other hand if the Act meets its objective and strengthens the employability of disabled people, fewer might declare themselves as being disabled ones they have obtained jobs (Kruse and Schur 2003). Hence, the net effect on self-reported disability in the aftermath of the DDA is a-priori ambiguous.

Figure 1 depicts the four disability measures from 1991 to 2002 for England. On average the prevalence of disability in the working age population ranges from 10 (DALD) to 25 percent (LSI). While DALD, WLD, and LLSI have evolved similarly over time (with the somewhat puzzling exception of 1996), the LSI has increased from 1994/95 to 1998/99 and since then has fluctuated substantially. This may be due to the cross-sectional nature of the FRS and to changes in the interpretation of what is a somewhat ambiguous question in that it does not specify the relevant time period.

< **Figure 1 about here**>

It appears therefore that in the post DDA period, the percentage of disabled among the working population has been flat or falling for WLD, DALD, and LSSI while the LSI has risen. In the immediate post-enactment period the WLD has stayed flat, DALD and LLSI have slightly increased and LSI has continued its upward trend.⁴ Whether any of these changes results from the introduction of the Act cannot be determined from a simple examination of these trends. It might, for example, be possible that the increase in the pre DDA period has been anticipatory and in 1997/98 reached its “equilibrium” level. It might however also be the case that the increase is due to a genuine increase in the number of disabled people in the population and not linked to the legislation at all. In general, it seems safe to conclude from Figure 1 that there is no obvious break in the any of the series shortly after the introduction of the DDA which would indicate a significant behavioural change in self-reported disability.

Figure 2 reports relative employment rates of disabled people in England over time.

Clearly, there is some degree of variation depending on the disability measure. In the

⁴ The dip and successive increase in the LLSI between 1995 and 1997 seems rather sample driven given that none of the other indicators decreases in 1996.

early 1990's only the WLD and DALD are available. Both start on a relative high level, falling thereafter and increasing again in more recent years. However, there was also a distinct peak just before the introduction of the DDA in 1996 followed by a sharp drop in employment rates in the immediate post DDA year. This is particularly pronounced for the WLD measure. Interestingly, people who report work disabilities have a systematically higher employment rate compared to people reporting limitations to daily activities. General unemployment rates have been falling since 1993 and since 1996 the UK economy has experienced even lower unemployment rates and stable or gradually falling inflation. Hence the DDA was introduced in a very favourable macro economic environment with strong growth in overall employment rates.

Employment rates of the disabled as measured by the FRS are distinctly different. While both LSI and LSSI follow roughly the same trend over time, the gap between the two measures is about 20 percent. Similar to the BHPS, the relative employment rates of LSI and LSSI have risen since 1995, though the rate of increase slows after 1996. Hence, while the WLD and DALD show a decline in the immediate post-DDA period, the LSI and LSSI merely level off.

<Figure 2 about here>

In the American literature Kruse and Schur (2003) find that more people reported work disabilities following the introduction of the ADA. They also show that disabled workers are more exposed to labour market downturns through the LIFO (last in, first out) process. Conversely, their employment rates may grow relatively quickly during

upturns. It is therefore by no means clear that any of the observed trends in our data are linked to the introduction of the DDA.

Going beyond examination of trends in the data, we now describe a more sophisticated examination of the factors influencing the probability of employment among disabled people in England. The theoretical justification for our model stems from the Acemoglou and Angrist (2001) argument that the general equilibrium effects of disability legislation on the employment rates of the disabled are ambiguous.

Employers' hiring decisions will be influenced not only by the supply price of disabled labour, which may be affected by disability legislation, and also by hiring and termination costs, which depend on, for example, the willingness of the disabled to sue if they are not hired and on the additional costs of providing accommodation and assistance to the disabled. We apply a difference-in-difference analysis to model the probability of employment among disabled people using individual data from both the BHPS and the FRS. Our reduced-form specification is:

$$Emp_{it}^* = \alpha + X_{it}'\beta + \gamma_1 Disabled_{it} + \lambda DDA_{it} + \gamma_2 DDA_{it} * Disabled_{it} + \varepsilon_{it} \quad (1)$$

where X_{it} is a vector of individual characteristics of individual i (age, gender, children, house ownership, household size, education, marital status and region) at point t , $Disabled$ a dummy for the disability status, DDA a dummy taking on unity for the post DDA period and zero otherwise, and ε_{it} the residual. Emp_{it}^* is not observed, instead we observe $Emp_{it} = 1[Emp_{it}^* > 0]$, where $1[\]$ represents the index function.

Finally, the coefficient on the interaction term will capture the effect of the Act on the employment rate of disabled people.

Equation (1) is usually estimated using pooled probit or OLS. However, and in contrast to the US literature, we can utilise the longitudinal element of the BHPS and therefore control for unobserved heterogeneity. Hence, we also estimate a fixed effects model. Furthermore, we also run a broader pooled model taking into consideration whether an individual has ever been disabled in the 12 waves. Though not in place in 1996, the DDA now also protects individuals who have ever been disabled according to the DDA definition. Despite the fact that we are unable to cover the entire life span, controlling for past disability will circumvent a major concern with previous studies where results may have partly been driven by individuals changing their disability status post employment.

Table 1 and Table 2 report summary statistics for the overall samples as well as the four self-identified disability groups. As mentioned previously, within the BHPS sample, differences between the two disability measures are negligible. In contrast, the distributions of the two FRS disability measures are substantially different. In general disabled people are older, less well educated (leave education younger), more likely to be married, less likely to own property and to have children and live in smaller households.

< Table 1 about here >

< Table 2 about here >

The DDA was passed in 1995 and came into power in December 1996. The post DDA period is therefore defined from 1997 onwards given that BHPS interviews take place between September and April and FRS interviews are carried out between April and

March of the following year. Since neither the WLD nor the DALD question were asked in 1999, the post-DDA period is 1997 to 1998 for the WLD and either 1997 to 1998 or 1997 to 2002 for the DALD, depending on whether the 1999 proxy disability variable is used. In contrast, the FRS is available for the full period between 1994/95-2002/03.

Table 3 reports predicted changes in employment based on pooled probit estimations using variants of Equation (1). Robust standard errors have been reported for non-interaction terms and estimations have been clustered in order to account for repeated cross-section observations. Since we estimate probit models, we account for non-linearity by using an interpretation of the interaction effects suggested by Ai and Norton (2003) and previously used by DeLeire (2000). Given the large number of interaction effects, standard errors have been derived by the bootstrap method.

Six models have been estimated using DALD as the disability variable. Model (1) only includes a disability dummy, a post DDA dummy and the difference-in-difference variable. This specification suggests that the employment rate of disabled people has fallen on average by a statistically significant 3.5 percent in post-DDA years 1997 and 1998. The effect does not change when regional effects are included in the specification. However, when including the remaining individual characteristics such as age, gender, children, house ownership, household size, education, and marital status reduces the predicted probability of change in employment becomes insignificant.

<Table 3 about here >

Models (4) to (6) replace the single difference-in-difference post-DDA measure with year indicator variables which permit the results to be expressed as changes relative to 1996, the year in which the DDA came into operation. While for post DDA years the change in employment is negative, none of these effects is statistically significant. Further, and similar to the US findings (DeLeire 2000, Acemoglu and Angrist 2001) the main effect of disability on employment probabilities is strongly negative in all models.

The negative change in employment is even larger when the WLD measure is used. Table 4 again reports changes in employment for six different model specifications. The post DDA variable indicates a drop in employment by up to 4.5 percent and is highly significant. In contrast to Table 3, replacing the post DDA period variable with year indicators yields significantly negative results for 1998 where the employment rate of disabled people is reduced by up to 4 percent compared to 1996.

< Table 4 about here >

As described above, neither disability question was asked in the 1999 BHPS.

However, using related questions, a proxy for the DALD variable can be constructed.

Thus Table 5 reports results similar to Table 3 for the longer period 1991 to 2002⁵.

While the interaction terms remain negative, none is statistically significant which is not surprising given the relatively longer panel and the recovery in employment rates among disabled people in more recent waves of the BHPS. .

Thus, difference-in-difference analysis suggests a 0 to 3 percent fall in the probability of employment in the post-DDA period, while the aggregate trends merely show that

⁵ Note that the standard errors are not corrected for this procedure, though we would expect, given the number of observations involved, the effect to be small.

employment rates of disabled people in the years since the enactment of the legislation have levelled off.

< Table 5 about here >

Furthermore, given the differences in unconditional relative employment rates (Figure 1), the FRS sample has been used to check the robustness of the BHPS results. Table 6 and Table 7 report the estimation results for the LSI and LLSI respectively based on the same model specifications as in Table 3 to Table 5. In contrast to the BHPS data, one would expect to see a significant increase in employment amongst disabled people post DDA from Figure 2. However, we find only a small 1 percent increase in employment for the basic model specifications (1) and (2) using the LSI definition and the rise seems mainly driven by an increase in employment as late as 2002. This also holds true to a lesser extent for the LLSI definition. For all other specifications there is no evidence of a significant expansion of employment amongst disabled people.

<Table 6 and Table 7 about here>

<Table 8 about here>

In order to rule out that the results are driven by unobserved heterogeneity, Table 8 reports estimates from a fixed effects model with a similar set of observable characteristics. The results indicate that the DDA has reduced the employment rate of disabled people by between 5 and 8 percentage points depending on the model used. Therefore, the results also indicate that not controlling for time invariant unobservable

characteristics such as awareness of institutional arrangements in the labour market may cause an upward bias in the estimated policy effect.

< Table 9 about here >

<Table 10 about here >

A common criticism as discussed above is that self-reported disability may be endogenous, and in particular, partly determined by employment status. It has often been argued that people are less likely to report being disabled once they are employed. Table 10 reports a transition matrix for DALD and employment status for the overall sample.⁶ Around 7.5 percent of individuals describing themselves as disabled in one year are employed in the following year. Of these almost 52% also change disability status. It is not possible from this information to assess whether there is any causal link nor whether the employment status change precedes the change in disability status. However, it has been argued that these switches may artificially deflate the employment rate of disabled people in the type of stock analysis undertaken above. If the introduction of the DDA has led to an additional disproportional increase in these switches, this may then explain the observed decrease in employment rates. Looking at pre- and post-DDA period, however, reveals that there was a slight but significant decrease in the proportion of switchers who subsequently describe themselves as not disabled once they have entered employment (around 1 percentage point). This suggests that there is no evidence of an

⁶ The DALD definition has been chosen rather than WLD because the former is said to be less prone to sudden switches of disability status following changes in the employment circumstances. Yet, we find very little difference between the two definitions with regard to status switches.

increase in the proportion of disability status switches that coincide with moves into employment in the post-DDA phase.⁷

Furthermore, we consider the extreme case where individuals are coded as disabled if they have ever reported a disability during the study period. Table 9 reports the results of a pooled OLS model. Again, we find a negative impact of the Act on employment though smaller than in the fixed effects model.

Implications and Conclusions

Employers will hire or retain an employee if the benefits from doing so outweigh the costs. The DDA is likely to have increased the uncertainty around litigation and adjustment costs as well as future changes or expansions of the Act. Hence, at least theoretically, the DDA may have increased employment costs of disabled people by shifting discrimination and adjustment costs from the employee to the employer. Unless the legislation is fully enforced this may lead to lower rather than higher employment rates.

Empirically, there is some evidence that employment rates of disabled people have fallen in the aftermath of the enactment of the Americans with Disabilities Act (ADA) in 1990. Over a decade down the track, it is still not beyond doubt what has been causing this decrease. However, recent evidence seems to show a causal link between the ADA and the fall in employment. It has been suggested that most of this decline has been due to worksite accommodation costs imposed on employers when employing disabled people. It seems therefore that the US has not satisfactorily resolved the problem of how to pay for adjustment costs. Though firms can cover

⁷ These refers to a conditional probability model controlling for age, age square, marital status and gender. The full conditional transition tables can be obtained from the authors upon request.

extra costs through a tax credit system, this may not be effective if fully offsetting ongoing accommodation and assistance costs.

In contrast, in the UK the Access to Work scheme (AtW) allows employers to recover parts or the full amount of *unreasonable* adjustment costs for a maximum period of three years. However, no such scheme exists for *reasonable* costs. Furthermore, government in-house research has shown that employers who make special provision for disabled employees often find that the actual costs are low. This has led to the suggestion that it is not actual costs but perceived costs that matter. Yet, there is no conclusive evidence as yet whether this is mainly a selection effect or reflects genuine misperception among employers.

Evidence in this paper suggests that the DDA resulted in a decline or, in the best case, in a levelling off in employment rates of disabled people in the immediate post-DDA period. This trend may have reversed in 2002. There are several possible factors which may contribute to the observed pattern of response after the introduction of the DDA:

- 1 Increasing tightness of the UK labour market since 1996, leading to higher disability-related employment rates.
- 2 Changes in perceived costs of physical adjustments. Despite the fact that general awareness of the legislation among employers is still low (DWP, 2004), government in-house research has shown that employers who make special provision for disabled employees often find that the actual costs are low. This will also tend to increase employment rates.
- 3 Changes in expected costs of non-compliance. Employment tribunal cases have increased since 1996 from 17 to over 2,300 in 2000. The average award for pecuniary losses was £9,841 in 2000. Thus, the expected costs of non-

compliance are low because this still represents a tiny fraction of the disabled workforce. Nevertheless, the trend in tribunal cases suggests that these expected costs are rising. This effect could depress employment among disabled people.

Enforcement of legislation is only as effective as the specific awareness among involved parties about their rights and duties. Over time, awareness of adjustment and compliance costs will change and hence lead to different labour market effects. In the period immediately following the passage of the DDA, our evidence suggests that the balance of these effects on the employment prospects for disabled people was negative. More recently the balance may have changed, but there is insufficient evidence to draw any strong conclusion.

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Appendix

Figures and Tables

Figure 1: Percentage of disabled working age population in England, BHPS 1991-2002, FRS 1994/95-2002/03

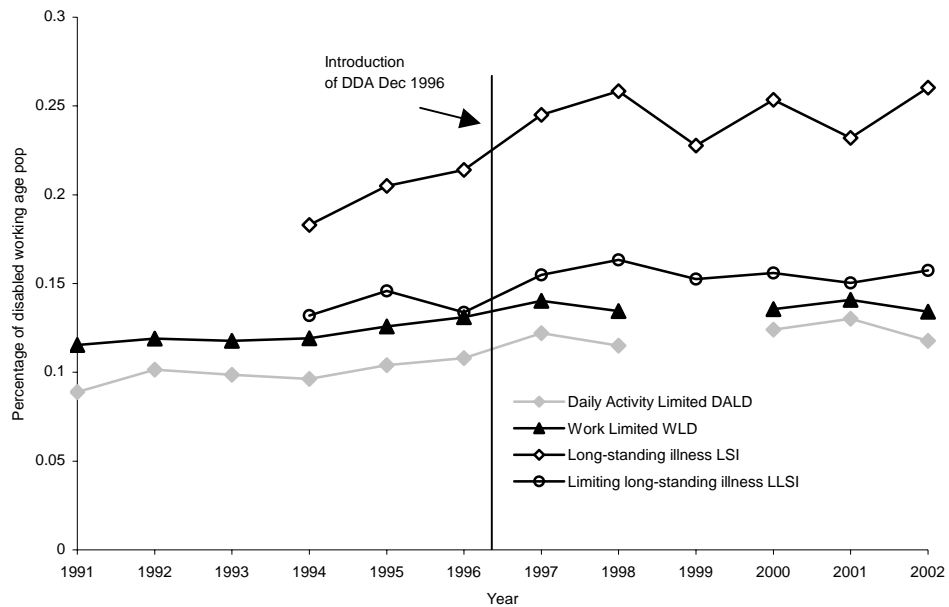


Figure 2: Relative employment rates for two disability measures in England, BHPS 1991-2002, and FRS 1994/95-2002/03

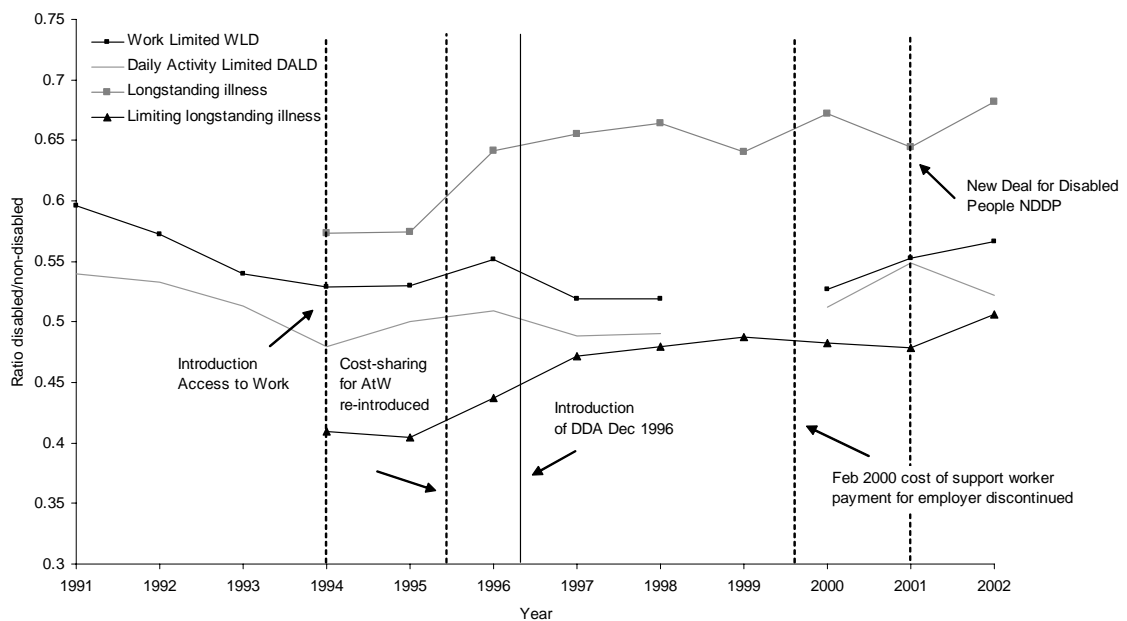


Table 1: Descriptive Statistics, BHPS 1991-1998 (England)

	All		ALD		Non ALD		WLD		Non WLD	
	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div
Employment	0.7221	0.4480	0.3908	0.4880	0.7602	0.4270	0.4205	0.4937	0.7650	0.4240
Age	36.55	12.65	43.24	12.73	35.78	12.41	43.48	12.76	35.56	12.32
Male	0.4662	0.4989	0.4546	0.4980	0.4676	0.4990	0.4715	0.4992	0.4655	0.4988
Married	0.5558	0.4969	0.6177	0.4860	0.5487	0.4976	0.6226	0.4848	0.5463	0.4979
Higher degree	0.0192	0.1372	0.0111	0.1050	0.0201	0.1404	0.0112	0.1053	0.0203	0.1411
Degree	0.1521	0.3591	0.0858	0.2802	0.1597	0.3663	0.0892	0.2851	0.1611	0.3676
A-level	0.1851	0.3884	0.1245	0.3302	0.1921	0.3940	0.1256	0.3314	0.1935	0.3951
O-level	0.3786	0.4850	0.2910	0.4543	0.3887	0.4875	0.2925	0.4549	0.3909	0.4880
House owned	0.7202	0.4489	0.6136	0.4870	0.7325	0.4427	0.6217	0.4850	0.7342	0.4418
Children 0-4	0.1494	0.3565	0.1094	0.3122	0.1540	0.3610	0.1012	0.3016	0.1562	0.3631
Children 5-11	0.2200	0.4143	0.2025	0.4019	0.2220	0.4156	0.1962	0.3972	0.2234	0.4165
Children 12-15	0.1613	0.3678	0.1522	0.3593	0.1624	0.3688	0.1482	0.3554	0.1632	0.3696
Household size	3.1707	1.3342	2.9633	1.4376	3.1946	1.3197	2.9681	1.4156	3.1996	1.3198
ALD	0.1033	0.3043								
WLD	0.1246	0.3303								
N	44329		4578		39751		5525		38804	

Table 2: Descriptive Statistics, FRS 1994/95-2002/03 (England)

	All		LSI		Non LSI		LLSI		Non LLSI	
	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div	Mean	Std-Div
Employment	0.6991	0.4587	0.4855	0.4998	0.7629	0.4253	0.3445	0.4752	0.7613	0.4263
Age	39.21	12.24	44.67	12.32	37.58	11.73	45.64	12.12	38.08	11.90
Male	0.4798	0.4996	0.5219	0.4995	0.4672	0.4989	0.5250	0.4994	0.4719	0.4992
Married	0.8482	0.3588	0.8095	0.3927	0.8598	0.3472	0.7861	0.4100	0.8591	0.3479
Children 0-4	0.1290	0.3352	0.0801	0.2715	0.1435	0.3506	0.0713	0.2574	0.1391	0.3460
Children 5-11	0.1290	0.3352	0.0952	0.2935	0.1391	0.3460	0.0896	0.2856	0.1359	0.3427
Children 12-15	0.1069	0.3090	0.0927	0.2900	0.1112	0.3143	0.0885	0.2840	0.1101	0.3131
Education leaving age	18.94	12.38	17.54	9.78	19.35	13.03	17.17	9.38	19.25	12.81
LSI	0.2301	0.4209							0.0950	0.2932
LLSI	0.1492	0.3563	0.6487	0.4774						
N	233260		53662		179598		34812		198448	

Table 3: Probit results of the predicted change in employment (DALD), BHPS 1991-1998 (England)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.
Disabled	-0.3641**	0.0134	-0.3617**	0.0135	-0.3252**	0.0151	-0.3765**	0.0206	-0.3737**	0.0207	-0.3410**	0.0231
Post 1996	0.0367**	0.0051	0.0368**	0.0051	0.0411**	0.0053						
Disabled x Post 1996	-0.0349**	0.0164	-0.0359**	0.0162	-0.0193	0.0162						
Disabled x 1991							0.0317	0.0281	0.0310	0.0287	0.0405	0.0269
Disabled x 1992							0.0318	0.0255	0.0298	0.0271	0.0292	0.0275
Disabled x 1993							0.0154	0.0268	0.0159	0.0261	0.0215	0.0266
Disabled x 1994							-0.0172	0.0266	-0.0153	0.0254	-0.0233	0.0257
Disabled x 1995							-0.0064	0.0236	-0.0082	0.0241	-0.0058	0.0224
Disabled x 1996												
Disabled x 1997							-0.0216	0.0237	-0.0228	0.0236	-0.0104	0.0218
Disabled x 1998							-0.0296	0.0231	-0.0305	0.0245	-0.0064	0.0248
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	46395		46395		44337		46395		46395		44337	
R2	0.0501		0.0535		0.1752		0.0507		0.0541		0.1758	

Note: Robust s.e; bootstrapped s.e for interaction terms, **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, higher degree, degree, A-level, O-level and below, children aged 0-4, 5-11 and 12-15, house ownership, household size. Regional dummies refer to the 10 standard regions in the England. Pooled probit estimation where dependent variable is labour market participation as defined in the text.

Table 4: Probit results of the predicted change in employment (WLD), BHPS 1991-1998 (England)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.
Disabled	-0.3227**	0.0128	-0.3207**	0.0128	-0.2848**	0.0141	-0.3485**	0.0192	-0.3461**	0.0192	-0.3025**	0.0214
Post 1996	0.0520**	0.0051	0.0518**	0.0051	0.0534**	0.0054						
Disabled x Post 1996	-0.0428**	0.0157	-0.0448**	0.0159	-0.3740**							
Disabled x 1991							0.0407	0.0264	0.0407	0.0256	0.0462	0.0245
Disabled x 1992							0.0296	0.0257	0.0276	0.0256	0.0110	0.0237
Disabled x 1993							0.0015	0.0235	0.0039	0.0246	0.0007	0.0235
Disabled x 1994							-0.0132	0.0222	-0.0113	0.0224	-0.0224	0.0212
Disabled x 1995							-0.0182	0.0214	-0.0183	0.0203	-0.0207	0.0212
Disabled x 1996												
Disabled x 1997							-0.0301	0.0202	-0.0324	0.0191	-0.0278	0.0199
Disabled x 1998							-0.0411*	0.0219	-0.0420**	0.0211	-0.0406*	0.0208
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	46395		46395		44340		46395		46395		44340	
R2	0.0541		0.0574		0.1773		0.0527		0.0560		0.1768	

Note: Robust s.e; bootstrapped s.e for interaction terms, **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, higher degree, degree, A-level, O-level and below, children aged 0-4, 5-11 and 12-15, house ownership, household size. Regional dummies refer to the 10 standard regions in the England. Pooled probit estimation where dependent variable is labour market participation as defined in the text.

Table 5: Probit results for the change in employment (DALD), BHPS 1991-2002 (England)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.
Disabled	-0.3606**	0.0135	-0.3572**	0.0135	-0.3163**	0.0150	-0.3731**	0.0208	-0.3693**	0.0209	-0.3316**	0.0231
Post 1996	0.0481**	0.0048	0.0482**	0.0480	0.0482**	0.0050						
Disabled x Post 1996	-0.0242	0.0149	-0.0243	0.0148	-0.0130	0.0145						
Disabled x 1991							0.0317	0.0283	0.0311	0.0286	0.0402	0.0278
Disabled x 1992							0.0318	0.0258	0.0300	0.0269	0.0291	0.0253
Disabled x 1993							0.0154	0.0267	0.0155	0.0284	0.0208	0.0257
Disabled x 1994							-0.0172	0.0243	-0.0153	0.0261	-0.0237	0.0258
Disabled x 1995							-0.0064	0.0236	-0.0083	0.0235	-0.0054	0.0235
Disabled x 1996												
Disabled x 1997							-0.0209	0.0217	-0.0227	0.0232	-0.0108	0.0218
Disabled x 1998							-0.0296	0.0235	-0.0299	0.0231	-0.0073	0.0234
Disabled x 1999							-0.0294	0.0249	-0.0296	0.0254	-0.0093	0.0243
Disabled x 2000							-0.0127	0.0245	-0.0130	0.0253	-0.0010	0.0239
Disabled x 2001							0.0141	0.0252	0.0142	0.0255	0.0204	0.0244
Disabled x 2002							-0.0134	0.0261	-0.0144	0.0266	-0.0120	0.0252
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	69811		69811		66616		69811		69811		66616	
R2	0.0558		0.0592		0.1781		0.0565		0.0599		0.1787	

Note: Robust s.e; bootstrapped s.e for interaction terms, **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, higher degree, degree, A-level, O-level and below, children aged 0-4, 5-11 and 12-15, house ownership, household size. Regional dummies refer to the 10 standard regions in the England. Pooled probit estimation where dependent variable is labour market participation as defined in the text. Disability is proxied for 1999, see text for details.

Table 6: Probit results for the change in employment (LSI), FRS 1994/95-2002/03 (England)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.
Disabled	-0.2810**	0.0043	-0.2811**	0.0043	-0.2643**	0.0045	-0.2726**	0.0074	-0.2737**	0.0074	-0.2591**	0.0076
Post 1996	0.0592**	0.0026	0.0598**	0.0026	0.0443**	0.0026						
Disabled x Post 1996	0.0138**	0.0053	0.0138**	0.0049	0.0058	0.0052						
Disabled x 1994							-0.0086	0.0106	-0.0070	0.0107	-0.0007	0.0099
Disabled x 1995							-0.0286**	0.0109	-0.0272**	0.0101	-0.0164	0.0102
Disabled x 1996												
Disabled x 1997							0.0026	0.0105	0.0047	0.0103	-0.0014	0.0098
Disabled x 1998							-0.0005	0.0108	-0.0006	0.0103	-0.0060	0.0096
Disabled x 1999							-0.0160	0.0103	-0.0140	0.0102	-0.0153	0.0098
Disabled x 2000							0.0060	0.0103	0.0050	0.0101	0.0046	0.0101
Disabled x 2001							-0.0104	0.0102	-0.0078	0.0108	-0.0099	0.0097
Disabled x 2002							0.0289**	0.0100	0.0296**	0.0101	0.0266**	0.0101
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	233698		233698		233260		233698		233698		233260	
R2	0.0526		0.0581		0.1352		0.0531		0.0587		0.1356	

Note: Robust s.e; bootstrapped s.e for interaction terms, **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, full-time education leaving age and its sq, children aged 0-4, 5-11 and 12-15. Regional dummies refer to the 10 standard regions in the England. Pooled probit estimation where dependent variable is labour market participation as defined in the text.

Table 7: Probit results for the change in employment (LLSI), FRS 1994/95-2002/03 (England)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.	dF/dx	Robust s.e.
Disabled	-0.4178**	0.0049	-0.4169**	0.0049	-0.4032**	0.0053	-0.4290**	0.0086	-0.4282**	0.0087	-0.4192**	0.0094
Post 1996	0.0557**	0.0025	0.0561**	0.0025	0.0424**	0.0025						
Disabled x Post 1996	0.0059	0.0060	0.0062	0.0059	0.0002	0.0058						
Disabled x 1994							0.0313**	0.0122	0.0313**	0.0117	0.0366**	0.0113
Disabled x 1995							-0.0004	0.0113	-0.0004	0.0114	0.0078	0.0112
Disabled x 1996												
Disabled x 1997							0.0128	0.0119	0.0147	0.0119	0.0097	0.0114
Disabled x 1998							0.0077	0.0118	0.0081	0.0119	0.0034	0.0114
Disabled x 1999							0.0166	0.0118	0.0185	0.0112	0.0161	0.0115
Disabled x 2000							0.0077	0.0118	0.0076	0.0126	0.0076	0.0119
Disabled x 2001							0.0095	0.0117	0.0107	0.0118	0.0121	0.0115
Disabled x 2002							0.0417**	0.0121	0.0425**	0.0121	0.0407**	0.0115
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	233703		233703		233265		233703		233703		233265	
R2	0.0806		0.0852		0.1610		0.0810		0.0856		0.1787	

Note: Robust s.e; bootstrapped s.e for interaction terms, **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, full-time education leaving age and its sq, children aged 0-4, 5-11 and 12-15. Regional dummies refer to the 10 standard regions in the England. Pooled probit estimation where dependent variable is labour market participation as defined in the text.

Table 8: Fixed effects estimation (BHPS 1991-1998)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Disabled	-0.0552	(7.19)***	-0.0552	(7.21)***	-0.0589	(7.59)***	-0.1109	(8.09)***	-0.1103	(8.07)***	-0.0913	(6.61)***
Post 1996	0.0329	(9.26)***	0.0335	(9.44)***	0.0220	(4.39)***						
Disabled x Post 1996	-0.0852	(7.82)***	-0.0852	(7.83)***	-0.0475	(4.31)***						
Disabled x 1991							0.1359	(6.88)***	0.1333	(6.77)***	0.0879	(4.41)***
Disabled x 1992							0.1020	(5.47)***	0.1007	(5.41)***	0.0676	(3.59)***
Disabled x 1993							0.0761	(4.09)***	0.0770	(4.14)***	0.0483	(2.55)**
Disabled x 1994							0.0427	(2.31)**	0.0423	(2.29)**	0.0162	(0.86)
Disabled x 1995							0.0134	(0.74)	0.0128	(0.71)	0.0011	(0.06)
Disabled x 1996												
Disabled x 1997							-0.0127	(0.73)	-0.0135	(0.78)	-0.0067	(0.38)
Disabled x 1998							-0.0540	(3.03)***	-0.0542	(3.05)***	-0.0294	(1.64)
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	46395		46395		44337		46395		46395		44337	

Note: **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, full-time education leaving age and its sq, children aged 0-4, 5-11 and 12-15. Regional dummies refer to the 10 standard regions in the England.

Table 9: OLS estimation – ever been disabled (BHPS 1991-1998)

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Disabled	-0.1776	(16.41)***	-0.1745	(16.21)***	-0.1335	(13.67)***	-0.1939	(14.16)***	-0.1910	(13.99)***	-0.1444	(11.20)***
Post 1996	0.0344	(6.55)***	0.0343	(6.53)***	0.0354	(6.92)***						
Disabled x Post 1996	-0.0408	(3.82)***	-0.0407	(3.82)***	-0.0311	(3.07)***						
Disabled x 1991							0.0389	(2.52)**	0.0388	(2.51)**	0.0328	(2.19)**
Disabled x 1992							0.0392	(2.65)***	0.0388	(2.63)***	0.0283	(1.97)**
Disabled x 1993							0.0132	(0.91)	0.0135	(0.94)	0.0104	(0.73)
Disabled x 1994							0.0081	(0.62)	0.0088	(0.67)	-0.0039	(0.30)
Disabled x 1995							-0.0036	(0.33)	-0.0030	(0.28)	-0.0048	(0.44)
Disabled x 1996												
Disabled x 1997							-0.0227	(2.01)**	-0.0225	(1.99)**	-0.0223	(2.01)**
Disabled x 1998							-0.0261	(2.04)**	-0.0259	(2.03)**	-0.0182	(1.45)
Regional dummies	No		Yes		Yes		No		Yes		Yes	
Characteristics	No		No		Yes		No		No		Yes	
Time dummies	No		No		No		Yes		Yes		Yes	
N	46415		46415		44354		46415		46415		44354	
R2	0.04		0.04		0.18		0.04		0.04		0.18	

Note: **indicates significance at 5% level, *indicates significance at 10% level. Characteristics refer to age, age sq, marital status, gender, full-time education leaving age and its sq, children aged 0-4, 5-11 and 12-15. Regional dummies refer to the 10 standard regions in the England. OLS estimation, disability defined as ever been disabled in the 12 waves of the BHPS.

Table 10: Disability and Employment Transitions overall (BHPS), percentage

		Time t-1			
		Unemployed Disabled	Unemployed Non-disabled	Employed Disabled	Employed Non-disabled
Time t	Unemployed Disabled	75.89	6.36	9.77	0.52
	Unemployed Non-disabled	16.63	67.42	5.03	5.90
	Employed Disabled	3.60	0.96	43.4	3.19
	Employed Non-disabled	3.88	25.27	41.79	90.39

Note: Based on a pooled sample from the BHPS where consecutive observations were available. Unconditional probabilities.