Health, disability insurance and labour force participation

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Working Paper no. 218

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We are grateful to Jerry Jones for research assistance and to the Department for Work and Pensions for providing data on disability benefits and claimant stocks. All remaining errors are of course our own. The paper was written while the first author was at the Bank of England. This paper represents the views and analysis of the authors and should not be thought to represent those of the Bank of England, Monetary Policy Committee members or Satoha Capital Management.

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The Bank of England's working paper series is externally refereed.

ISSN 1368-5562

Contents

Abstract

Over half a million men of working age left the labour market over the course of the 1990s. In this paper this remarkable decline is explored, and the roles played by the interaction of skills, long-term sickness and the disability benefit system are highlighted. The analysis shows that the decline in participation was almost exclusively among unskilled males and that this same group reported increasing long-term illness. The generosity of the disability insurance system relative to that of the unemployment insurance appears to have encouraged such workers to exit the labour market. Strong evidence is presented of sizable labour supply responses to disability insurance benefits, which would support that hypothesis. But it seems unlikely that this 1990s' experience will be repeated as disability benefits are now much less generous than they were at that time.

Key words: Labour force participation, disability benefits.

JEL classification: J22, J32.

Summary

The 1990s witnessed a rapid expansion of employment in the United Kingdom and an associated decline in unemployment to levels last seen in the 1970s. Yet over the same period, the aggregate participation rate was flat. This aggregate picture masks diverging trends in the activity rates of the sexes: female participation continued to increase, but over half a million men of working age left the labour market. Moreover, the decline in labour force participation was most pronounced among prime-age men (aged between 25 and 54), with early-retirement trends explaining very little of the change.

In this paper we focus on two important features in the data on rising male inactivity. First, the overall rise for men was accompanied by a rise in the numbers saying that they were too ill to work. The participation rate of prime-age males fell by a mere 0.7 percentage points between 1971 and 1989, but fell by 2.9 percentage points over the course of the 1990s. A feature of this fall was an increase in the number of those who cited health reasons for their inactivity. Many of these men also claimed disability benefits. This suggests that any explanation for declining male participation needs to address the rise in the inactivity among the long-term ill and the higher incidence of those claiming disability benefits. Second, the decline in male labour force participation was more pronounced among those with little or no formal qualifications. For those males who left school with no qualifications, the participation rate dropped almost 13 percentage points over the course of the 1990s.

One explanation that has been suggested for these trends is that a deterioration in the labour market opportunities for the low skilled coincided with increasing generosity of disability benefits, producing incentives for these workers to drop out of the labour market. However, testing such a hypothesis is not straightforward. The incentive for workers to drop out of the labour market and claim disability benefits depends upon the relative pay-off from looking for work. This makes it difficult to estimate the effect of benefits on individuals' labour supply decisions, as variation in benefits is driven primarily by differences in earnings. Since workers' earnings are likely to be highly correlated with taste for work, it is difficult to isolate the behavioural effects of disability benefits from these taste differences.

One way to get around this problem is to use a 'natural experiment', exploiting variation in benefit

levels that is unrelated to tastes for work. Such variation in benefits occurred in 1995, when the UK disability benefits program was reformed. Prior to 1995, those claiming disability benefits received an Additional Pension (AP) based on earnings history: people becoming sick were entitled to higher amounts of AP depending upon earnings. After 1995, new cohorts lost entitlement to AP. This reduced the value of the disability program to new cohorts of older men, but left younger men - with only a short earnings history - largely unaffected. We exploit the resultant variation in benefit levels to estimate labour supply elasticities.

Using this approach we obtain significant positive effects from benefits on labour supply. The elasticities are particularly large for the least-educated males. These results support the hypothesis that relatively generous disability benefits encouraged the early accommodation of health problems for those males who were most at risk of job loss.

The participation rate is a key determinant of sustainable supply capacity. Therefore future inflation will depend on whether or not the trends seen over the 1990s continue. So what does our analysis suggest? As entry into the disability benefits system tends to be a decision that results in permanent exit from the labour market, it seems unlikely that future demand shocks will generate similar-size flows out of the labour market. There are two reasons for this. First, future shocks may not have the same skill characteristics as those observed over the previous two decades. Second, the generosity of disability benefits has fallen significantly since the recession of the early 1990s. Hence the pull-factor of disability benefits has been reduced and workers are more likely to remain within the labour market following job loss.

1 Introduction

Trends in the UK labour force participation remain puzzling. The 1990s witnessed a rapid expansion of employment in the United Kingdom and an associated decline in unemployment to levels last seen in the 1970s. Yet over the same period, the aggregate participation rate was flat. But the aggregate picture masks diverging trends in the activity rates of the sexes. While female participation continued to increase, over half a million men left the labour market completely, particularly those who have little or no formal qualifications.(1) The female trend seems to reflect improved labour market opportunities for women. But what explains the male trend? One possibility is a continuation of the rise in early retirement. However, this is not the case. The decline in labour force participation has been most pronounced among prime-age men, and very few of these workers entered retirement; the largest flow was into long-term sickness. At the same time, there was a sharp increase in the number of such men claiming disability benefits.(2)

This paper seeks to explain why this has all happened. In pursuit of this we shall answer the following set of questions:

1. Was the rise in the inactive long-term ill due to more ill people or declining participation among the ill?

2. Was the decline in participation related to the rise in disability benefit rolls?

3. Can we identify significant labour supply elasticities with respect to disability benefits?

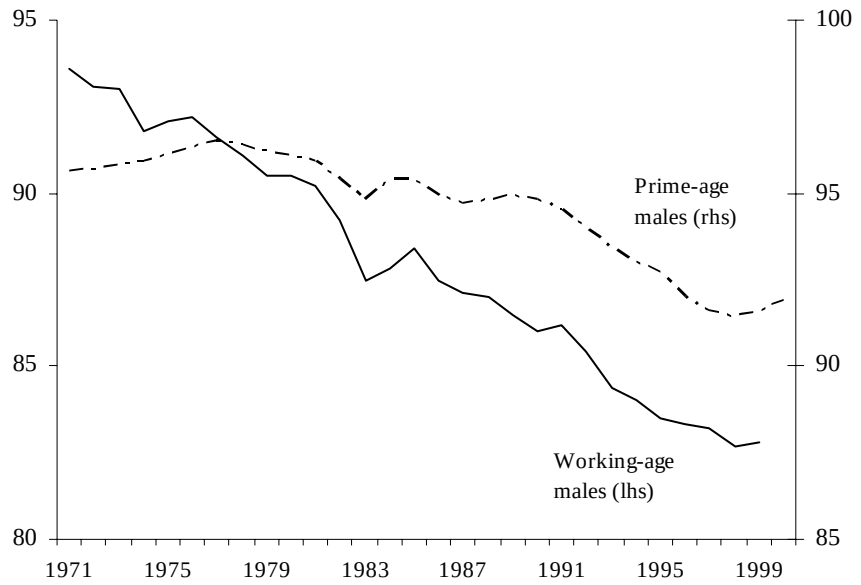
2 The basic facts

2.1 Aggregate trends

What are the basic facts regarding male labour force participation? Let us begin with the historical record. Chart 1 shows the participation rate for both working-age and prime-age males since

(1) Between 1992 and 2001, 540,000 males aged between 16-64 exited the labour market.
(2) The UK experience has certainly not been unique. Similar trends have been seen in a number of countries, for example: United States (see Bound (1989)); Netherlands (see Nickell and van Ours (2000)); and Canada (see Gruber (2000)).

Chart 1: Male participation rates, 1971-2000



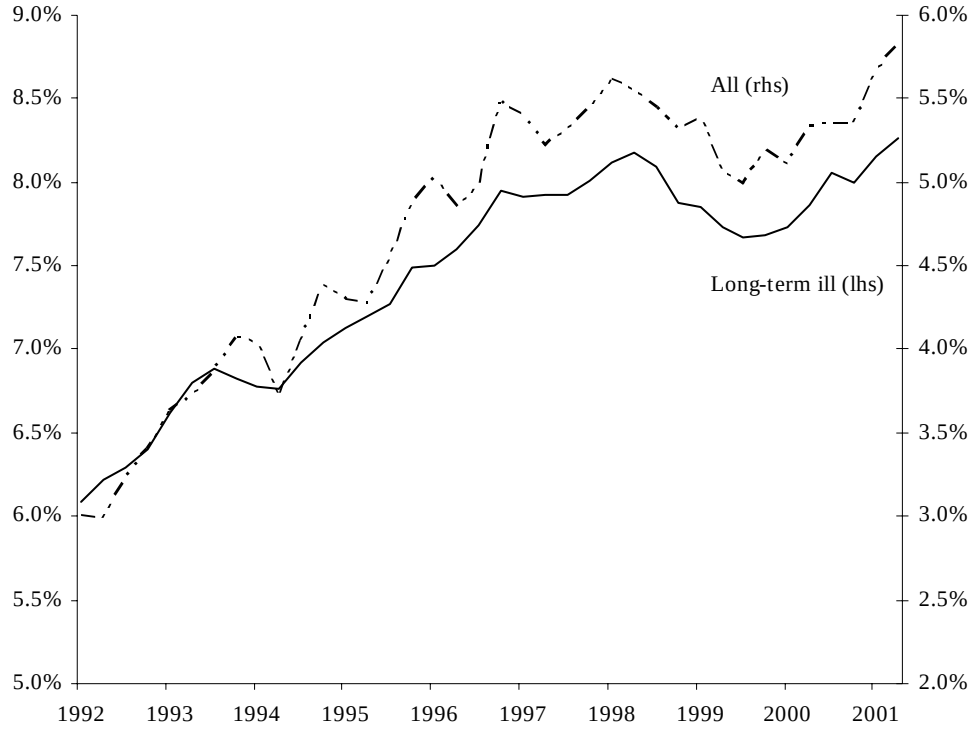
Source: OECD.

1970.[(3)] Two features are notable. First, there has been a steady decline in working-age participation over the past 30 years. This decline is primarily a result of the rise in early retirement among those aged 55 and over (see Blundell and Johnson (1999) and Disney (1999)). Second, the participation rate of prime-age males remained remarkably constant until the 1990s. The rate declined by a mere 0.7 percentage points between 1971 and 1989. In sharp contrast, the participation rate declined 2.9 percentage points over the course of the 1990s. It is this change that we intend to explore in this paper.

Chart 2 plots the male non-participation rate over the course of the 1990s. The non-participation rate has risen from 6.0% to 8.7% over the period. To put this in more concrete terms, 399,000 prime-age males have ceased to participate in the labour market over the decade. The chart also shows the long-term ill non-participation (inactivity) rate. This measure is very closely correlated with the aggregate measure and has risen from 3.1% to 5.3%. This suggests that a convincing explanation for declining male participation will need to address the rise in long-term ill inactivity in the male population. In addition, Chart 3 shows that, breaking down this rise in inactivity by disability benefit status, the rise in prime-age male inactives can almost entirely be accounted for

(3) In all that follows, working age is defined as 16-64 and prime age is 25-54.

Chart 2: Male non-participation rates, 1992-2001



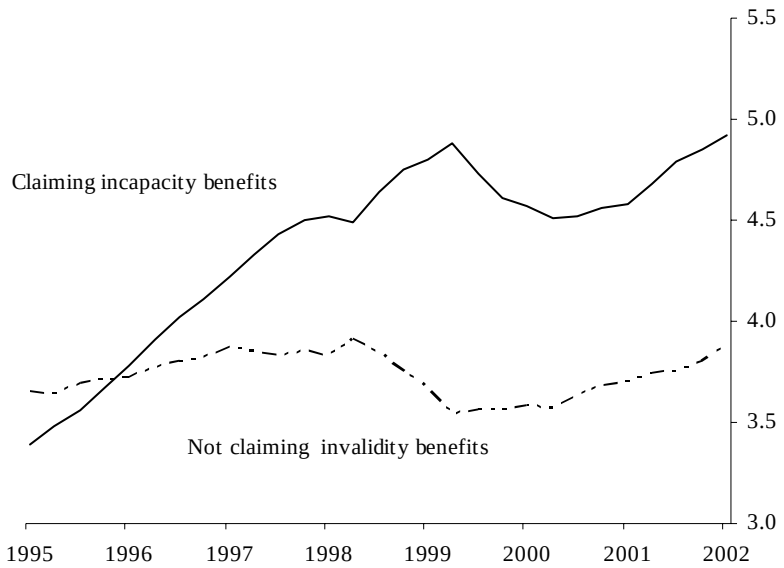
Source: Labour Force Survey.

by men who claim some form of disability benefit.

2.2 Disaggregated trends

In Table A we show changes in participation rates for certain characteristics of the male population. We break the sample into two periods: 1984-92 and 1992-2001. This break is both symmetric in terms of length and has the added advantage that it splits the data into a period in which the male participation rate was broadly constant and a period over which it was falling. The decline in participation was heavily concentrated among the least skilled. For those males who left school with no qualifications, the participation rate dropped almost 13 percentage points over the course of the 1990s. In contrast, the participation rate of college graduates remained constant. This concentration of inactivity among the least educated has been documented by Nickell and Quintini (2001) and Gregg and Wadsworth (1999) and it seems likely that this is a further labour market manifestation of the decline in demand for unskilled labour (see Nickell and Bell (1996)). In addition, the decline has been more pronounced among single men and older age groups.

Chart 3: Prime-age male participation rate by benefit status, four-quarter moving average



Sources: LFS and authors' calculations.

Finally, the decline has been disproportionately among those who report a health problem that limits their activity. This group has experienced a massive 21 percentage point drop in participation since 1984 compared to a mere 2.1 percentage points for those with no such health problems. We shall explore this facet of the data in more detail in Section 3.

TABLE A. MALE PARTICIPATION RATES IN THE UNITED KINGDOM

	1984	1992	2001	$\Delta_{84/92}$	$\Delta_{92/01}$	$\Delta_{84/01}$
Single	91.2	89.1	85.4	-2.1	-3.7	-5.8
Married	96.4	95.6	93.7	-0.8	-1.9	-2.7
No Quals	92.7	87.8	75.2	-4.9	-12.6	-17.5
Degree	97.0	96.7	96.3	-0.3	-0.4	-0.7
Age 25-34	95.9	94.9	93.2	-1.0	-1.7	-2.7
Age 35-44	96.4	95.1	92.5	-1.3	-2.6	-3.9
Age 45-54	93.2	91.5	87.9	-1.7	-3.6	-5.3
Disabled	84.6	75.3	63.5	-9.3	-11.8	-21.1
Not Disabled	98.3	97.8	96.2	-0.5	-1.6	-2.1
All	**95.3**	**94.0**	**91.3**	**-1.3**	**-2.7**	**-4.0**

Notes: Data from the Labour Force Survey and General Household Survey.
Sample is restricted to males aged 25-54.

The declines in participation for the unskilled and for those reporting limiting health problems are not independent. Suppose we split the data by educational qualification and health status. The aggregate participation rate for those with a health problem in 1984 was 84.6%. However, for those who also had no qualifications, the rate was 80.9%. In contrast, for those with a college

degree, the rate was 93.9%. By 2001, the aggregate rate had dropped to 63.5%. The rates by education were 44.7% and 91.3%. In other words, the decline in participation for those with a limiting health problem was almost entirely among the unskilled. It is this interaction between the unskilled and ill health that will form the crux of our analysis of the decline in participation.

2.3 Where have all the (inactive) men come from?

Finally, we wish to explore the economic status of prime-age men directly before they became inactive and the flows into and out of inactivity. To do this, we exploit the longitudinal data files from the LFS [4] to examine the labour force status of men who have become inactive. Chart 4 shows that the number of people flowing into inactivity for health reasons (ie long-term inactive ill, I_{sick}) have consistently exceeded outflows over the period. The gap between inflows and outflows was particularly large before 1997 when most of the rise in aggregate inactivity occurred.

Workers were more likely to move into I_{sick} from other categories of inactivity than from E or U. However, note that if we combine E and U flows, Chart 4 shows that the majority of inflows into I_{sick} come from those who were previously participating in the labour market. This is broadly consistent with the view that job loss led to males moving out of the labour market, particularly if they suffered from a long-standing illness. Unfortunately, these data do not tell us when those flowing into I_{sick} from other inactive categories previously last participated in the labour force. [5]

3 Health, disability and participation

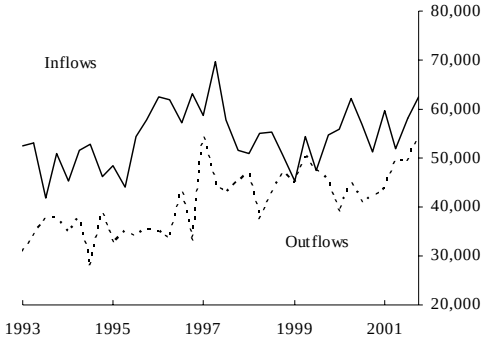
3.1 Trends in self-reported health

The previous section showed that participation declined strongly for those who reported a limiting health problem. We begin this section by exploring whether there is any evidence of a rise in the proportion of those who report such problems. Since those with health problems have lower participation rates, an increase in their share of the population will generate a decline in aggregate participation. To examine this issue, we make use of self-reported health status from the GHS and the LFS. The GHS has asked consistent health questions over the previous two decades.

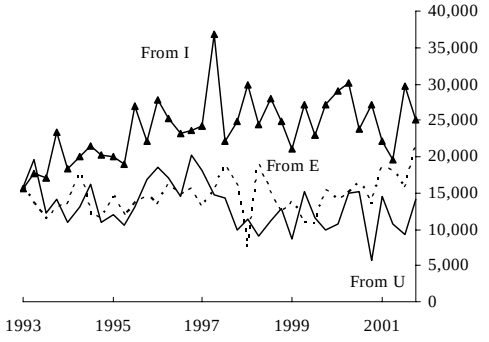
(4) For details of these files and a description of their basic properties, see Bell and Smith (2002).
(5) Note that I_{sick} and disability claimants are not definitionally the same. The first is a self-defined explanation of labour market status and does not necessarily imply receipt of DI benefits.

Chart 4: Prime-age male inactives who say they are not working for health reasons: gross flows

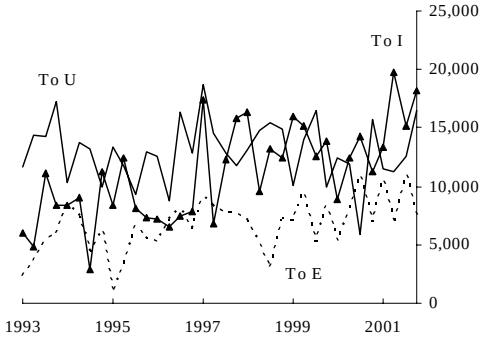
Flows in and out of inactive, sick



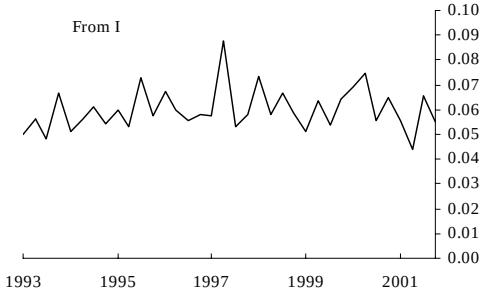
Inflows to inactive, sick



Outflows from inactive, sick

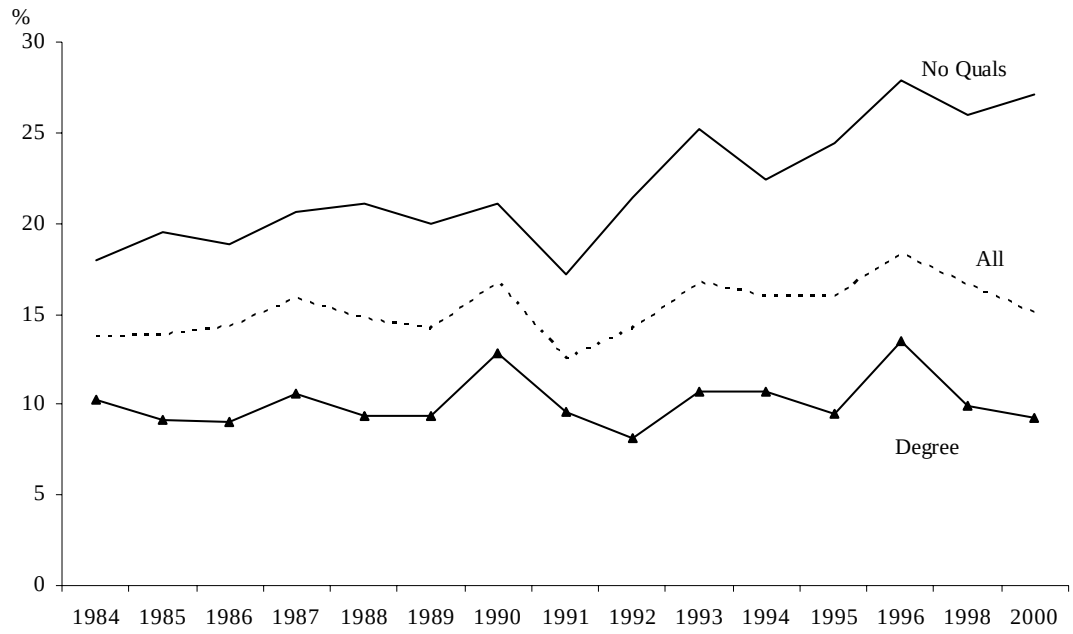


Inflows to inactive, sick



Sources: LFS and authors' calculations.

Chart 5: Percentage of prime-age males reporting a limiting long-standing illness

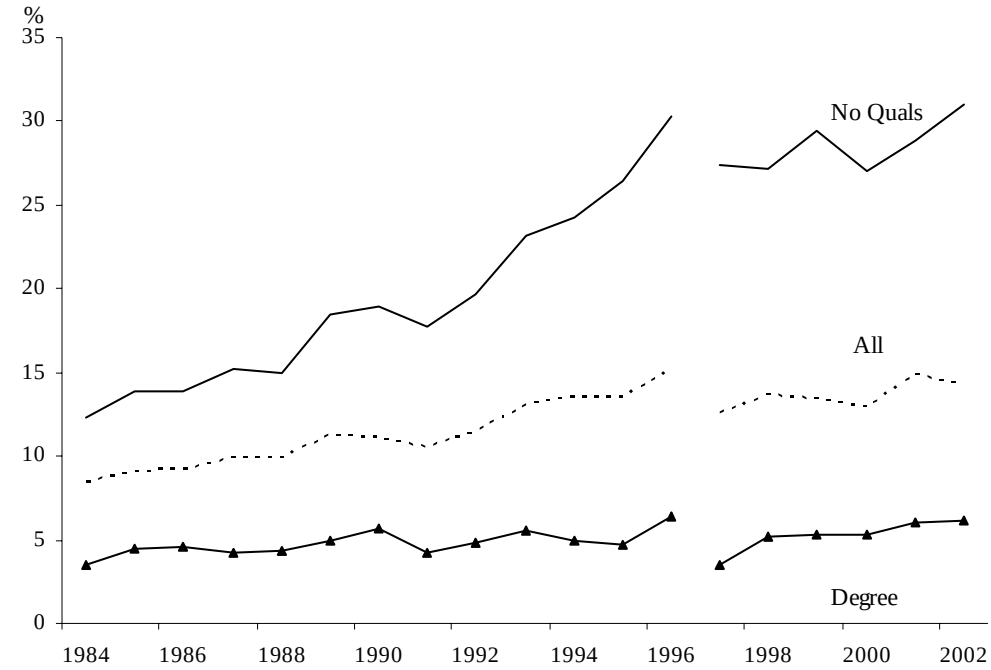


Sources: GHS and authors' calculations.

Respondents are first asked: 'Do you have any long-standing illness, disability or infirmity? 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'. There is then a follow-up question: 'Does this illness or disability limit your activities in any way?'. We report the aggregate percentage of prime-age males reporting a limiting long-standing illness, and also disaggregated by educational attainment. Chart 5 shows the results. At the aggregate level there is no noticeable increase in self-reported disability over the period. This stability masks a large rise in health problems for those with no qualifications. This group has experienced a 9 percentage point rise in the numbers reporting a limiting illness.

A different picture is presented using data from the LFS. The LFS suffers from a break in the series in 1997. Prior to 1997, respondents were asked: 'Do you have a health problem or disability that limits the kind of paid work that you can do?'. After 1997, respondents were first asked whether they had a health problem that was expected to last more than a year and then asked if it limited the kind of work they could do. Chart 6 plots the aggregate percentages and again disaggregates by educational attainment. Abstracting from the break in the series, these data reveal a large rise in the proportion of prime-age males who report health problems. The rise over the period is of the order of 8 percentage points, representing a doubling of the proportion. Like

Chart 6: Percentage of prime-age males reporting a health problem limiting the kind of paid work they can do



Sources: LFS and authors' calculations.

the GHS data, the trend rise is particularly severe for those with no qualifications, who experience a 21 percentage points rise over the period.

Which of these data sources are we to believe? According to the GHS there has been no noticeable increase in aggregate self-reported illness among prime-age males, whereas there has been a sizable rise according to the LFS. The GHS benefits from maintaining a consistent question over time while the LFS has a clear break. However the LFS shows a rising trend within periods where the question was consistent so this seems unlikely to explain the discrepancy. Probably of more importance is the much smaller sampling size of the GHS. In 2000, the GHS sample for prime-age males was 3,800 compared to a sample size of 28,900 in the LFS. Hence the sampling error in the GHS is of an order of magnitude larger than the LFS. Fortunately, some independent evidence is available from the 1991 and 2001 Census. The census asks whether individuals have a limiting long-term illness. We have information on the percentage of the working-age population who report such an illness, though unfortunately it is not currently disaggregated by sex. The figures for England and Wales in 1991 and 2001 are 8.2% and 13.6% respectively. For a similarly defined sample, the figures from the LFS (adjusted for the break) are 12.3% and 18.4%

respectively. This strongly suggests that the trend captured by the LFS is the more reliable measure than that reported by the GHS.[6]

Does this trend increase in self-reported illness explain the movements in male participation? We are interested in decomposing the change in participation into that due to changing health status and that due to changing participation rates. Following Bound and Waidmann (1992) we can decompose changes in participation (ΔLFP) into changes in health status, w_j, holding constant the health-specific participation rate, changes in these participation rates, LFP_j, holding constant the health status and an interaction term between rates and composition. Hence

$$\begin{aligned} \Delta LFP &= \sum_j (w_j^{t_1} - w_j^{t_0}) LFP_j^{t_0} + \sum_j (LFP_j^{t_1} - LFP_j^{t_0}) w_j^{t_0} \\ &\quad + \sum_j (LFP_j^{t_1} - LFP_j^{t_0})(w_j^{t_1} - w_j^{t_0}) \end{aligned} \qquad \textbf{(1)}$$

Bound and Waidmann describe the movement of workers in relatively poor health out of the labour force and onto disability rolls as the earlier accommodation of health limitations. Note that the decomposition contained above does not imply causality. It may well be that the prevalence of self-reported health limitations is a function of the labour force state of the individual. Early accommodation is identified with the components $\sum_j (w_j^{t_1} - w_j^{t_0}) LFP_j^{t_0} + (\Delta LFP_d) w_d^{t_0}$ where the first term captures the impact of changes in self-reported health status keeping participation rates constant and the second term represents the change in participation rates among those with health problems (given by subscript d). We estimate these decompositions for both the GHS and LFS data, though clearly we place more weight on the second set of results. Tables B and C report the results. Using the GHS, 59% of the decline in participation is explained by some form of early accommodation. When we focus on those with no qualifications, it is notable that the 16 percentage points drop in participation is predominantly a result of a rising share of disabled and a decline in the participation rate among the disabled. Only 4.9 percentage points of the drop can be explained by declining participation among the non-disabled in spite of the fact that the non-disabled comprise the majority of this group. The results using the LFS data are even stronger. In this case, 68% of the decline in participation is a result of early accommodation. Again, the decline among those with no qualifications is heavily concentrated on those with health problems.

(6) Similar conclusions on the trend in long-term illness are reported by Cousins, Jenkins and Laux (1998).

TABLE B. DECOMPOSING THE CHANGES IN MALE LABOUR FORCE PARTICIPATION IN THE UNITED KINGDOM, 1984-2001

	All	College Grads	No Quals
$LFP^{2001} - LFP^{1984}$	-5.22	-2.91	-15.76
$\sum_j (w_j^{2001} - w_j^{1984}) LFP_j^{1984}$	-0.18	0.05	-1.59
$(\Delta w_d) LFP_d^{1984}$	1.10	-0.94	7.44
$(\Delta w_{nd}) LFP_{nd}^{1984}$	-1.28	0.99	-9.03
$\sum_j (LFP_j^{2001} - LFP_j^{1984}) w_j^{1984}$	-4.77	-2.96	-11.40
$(\Delta LFP_d) w_d^{1984}$	-2.90	-0.27	-6.47
$(\Delta LFP_{nd}) w_{nd}^{1984}$	-1.87	-2.69	-4.93
$\sum_j \Delta LFP_j \Delta w_j$	-0.27	0.00	-2.77
$\Delta LFP_d \Delta w_d$	-0.27	0.00	-3.33
$\Delta LFP_{nd} \Delta w_{nd}$	0.00	0.00	0.56

Notes: Calculations based on data from the GHS. *d* and *nd* subscripts refer to those reporting a health problem that limits activity ('disabled') and those not reporting a limiting health problem respectively.

TABLE C. DECOMPOSING THE CHANGES IN MALE LABOUR FORCE PARTICIPATION IN THE UNITED KINGDOM, 1984-2001

	All	College Grads	No Quals
$LFP^{2001} - LFP^{1984}$	-5.29	-1.19	-16.85
$\sum_j (w_j^{2001} - w_j^{1984}) LFP_j^{1984}$	-2.85	-1.02	-6.92
$(\Delta w_d) LFP_d^{1984}$	5.98	4.92	12.93
$(\Delta w_{nd}) LFP_{nd}^{1984}$	-8.83	-5.94	-19.85
$\sum_j (LFP_j^{2001} - LFP_j^{1984}) w_j^{1984}$	-1.66	0.20	-6.12
$(\Delta LFP_d) w_d^{1984}$	-0.73	-0.38	-2.91
$(\Delta LFP_{nd}) w_{nd}^{1984}$	-0.93	0.58	-3.21
$\sum_j \Delta LFP_j \Delta w_j$	-0.78	-0.37	-3.81
$\Delta LFP_d \Delta w_d$	-0.79	-0.34	-4.58
$\Delta LFP_{nd} \Delta w_{nd}$	0.01	-0.03	0.77

Notes: Calculations based on data from the LFS. *d* and *nd* subscripts refer to those reporting a health problem that limits the kind of paid work they can do ('disabled') and those not reporting such a health problem respectively. Adjustment has been made for the break in the disability series in 1997.

3.2 Is self-reported health status informative?

In one sense, it is irrelevant whether self-reported health status is a truly exogenous measure. The results presented so far show that declines in participation have been associated with a rising trend in self-reported ill health and a decline in the participation rate of such workers, with not much of

a change in participation for those without such illness. Whether individuals truly have a limiting illness does not affect this conclusion (though of course it has very important implications for policy).

But the trend rise in disability over the period is surprising. After all, mortality rates for prime-age males have been falling for hundreds of years and continue to do so. For example, among males aged 45-54, the mortality rate per 1,000 has declined from 5.5 in 1984 to 3.9 in 1999. It is possible, of course, that this decline could have increased the proportion alive reporting ill health. However, this cannot be empirically important. The change in mortality rates amounts to a mere 0.16% of the 45-54 age group. Even if all those who survived because of these medical advances reported a limiting illness, it would have tiny effects on the reported proportions.

Evidence from the United States suggests that there may be some deterioration in health status over the period we are considering. Lakdawalla, Bhattacharya and Goldman (2001) use data from the National Health Interview Survey to show that over the period 1984 to 1996, the rate of disability among those in their 40s rose almost 40%. Their measure is based on individuals requiring personal care. This is a much stricter definition of disability than commonly used and is more likely to be closely correlated with true underlying health status. Lakdawalla *et al* suggest that the growth in disability among the young is associated with rises in the prevalence of asthma and diabetes in this age group. But it is also possible that survey respondents exaggerate the severity of health problems in order to rationalise labour force non-participation and/or receipt of disability insurance.

4 The disability program

In this section we examine the structure of benefits available to the disabled and document the large increase in disability rolls over time, focusing on the 1995 reforms.[7] We also explore the extent to which trends in male non-participation are matched by trends in disability benefit recipiency.

Prior to April 1995, the disability program had two components. Initial claims entered onto sickness benefit which was paid for the first 28 weeks of the claim. After this period, claimants

(7) For detailed history of disability benefits in the United Kingdom see Burchardt (1999).

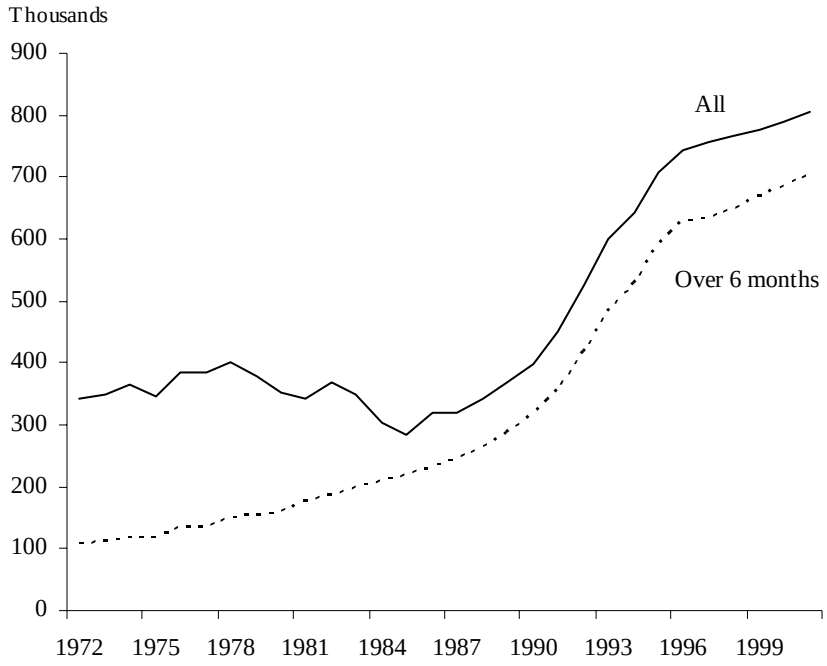
received invalidity benefit (IVB). Individuals on IVB also received an earnings-related Additional Pension (AP). This was based on earnings in the tax years 1978/79 to 1990/91. Consequently, each new cohort of people becoming sick after 1978/79 (until the 1990/91 cut-off) were entitled to higher amounts of AP. An age-related addition (IVA) was also payable with IVB. The IVA was higher for people becoming sick at younger ages. After 1985, the IVA was reduced by the amount of any AP paid. The system was reformed in April 1995 and the two separate benefits were replaced by incapacity benefit. New cohorts of sick lost any entitlement to AP. Consequently, the value of the disability program fell significantly at this point for older men. Younger entrants were largely unaffected because the average value of AP for younger men was lower than the age-related addition and therefore the offsetting of AP and IVA meant they had never gained from AP in the first place.

Chart 7 plots the number of males aged 25-54 claiming incapacity benefit in the United Kingdom. During the 1970s and 1980s, the numbers claiming remained remarkably constant. The only noteworthy point about this period was the ever increasing proportion of claimants who had been claiming for at least six months. This proportion rose from 31% in 1972 to 78% in 1989. In contrast, the 1990s have witnessed an explosion in the number of prime-age males claiming disability. At the start of the decade, 398,000 prime-age males claimed disability. The most recent figures for 2002 show that this has risen to 803,000. The size of this increase closely matches the drop out from the labour market over the period. Indeed a simple time-series correlation between the participation rate and the number claiming disability benefits produces a figure of -0.92.

The relative generosity of the disability system is portrayed in Chart 8. The figure compares the average amount received by males on disability benefit with the amount they would receive if unemployed for newly entering claimants. The figure assumes that the duration in both states is more than twelve months and is split by age group. The financial attractiveness of disability benefits relative to unemployment benefits rises over time as AP entitlement began to build up. The rise was particularly steep during the early years of the 1990s. For example, the average new disability benefit claimant aged 45-49 in 1981 would have received benefits 1.5 times larger than a comparable unemployed claimant. This figure had risen to 1.65 by 1989. It then rose to a peak of 1.98 in 1995. Following the abolition of AP in 1995, the relative generosity fell dramatically.

What medical ailment are all these claimants suffering from? Table D gives the percentage of the

Chart 7: Disability benefit claimants, males 25-54



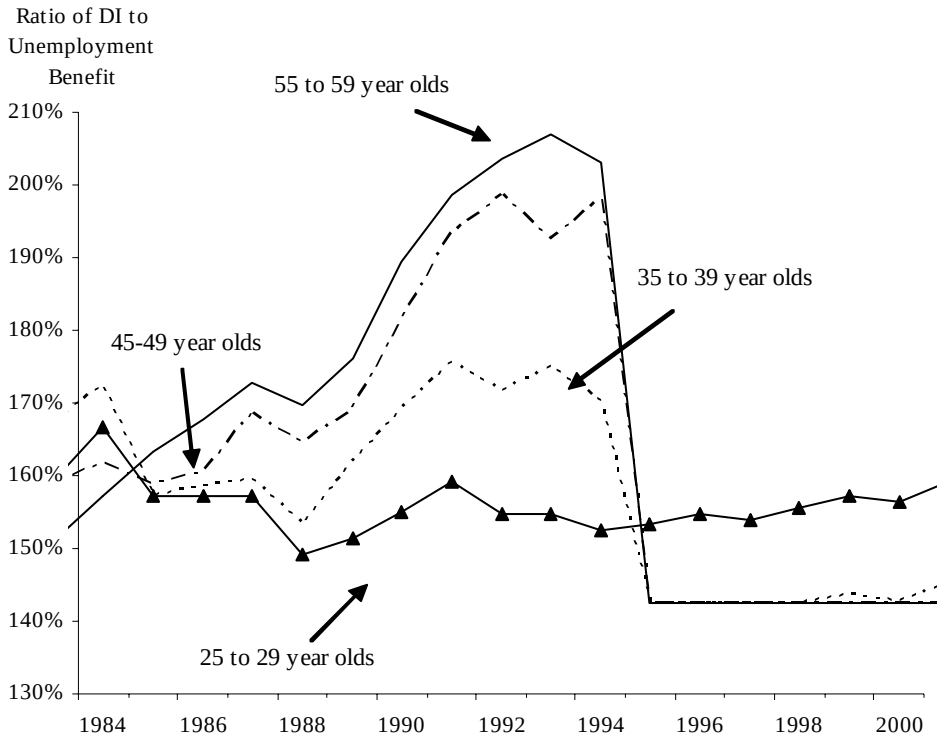
Source: DWP.

claimant stock suffering particular conditions for a collection of years. The rise in disability claimants was associated with a large increase in the share suffering from mental and behavioural disorders, while there was a large decline in the proportion suffering from diseases of the circulatory system. An obvious implication of these shifts is that the mortality rate of the stock of disability claimants has declined.[(8)] Hennessey and Dykacz (1993) produce estimates of the four-year mortality rate of disability insurance claimants in the United States by medical ailment. The final column of Table D reports these estimates. It is clear that the average mortality rate of the stock of claimants has declined. Concentrating on the six ailments listed in the table and using the constant mortality rates reported by Hennessey and Dykacz, the average mortality rate of the stock declined from 16 to 10 over the past three decades.

The severity of the administration of the disability system also appears to have changed over the period. Data are available on the number of current disability claims that are subject to a reference to a medical examination. In 1983, 22.8% of claimants were examined. By 1990 this proportion had fallen to 15.3% and fell further to 13.9% in 1994. Hence it would appear that the medical

(8) Similar trends are observed among US disability claimants (see Bound and Burkhauser (1999)).

Chart 8: Ratio of DI to unemployment benefits, selected ages, 1984-2000



Source: DWP.

TABLE D. MEDICAL CAUSE OF DISABILITY CLAIM, MALES

Cause	1972	1979	1986	1992	2001	Mortality Rate
Neoplasms	0.6	0.6	1.3	1.6	1.3	81.0
Mental & Behavioural Disorders	12.3	10.7	13.8	13.6	30.0	5.4
Disease of Nervous System	10.2	8.9	8.7	7.2	4.5	10.6
Disease of Circulatory System	23.4	24.9	27.3	25.3	10.7	19.8
Disease of Musculoskeletal System	11.1	14.1	20.3	27.6	22.5	5.3
Disease of Respiratory System	19.8	15.8	11.2	8.3	3.3	24.9
Other	22.6	25.0	17.4	16.4	27.7	

Notes: Figures are percentages of the stock of claimants. The four-year mortality rate is from administrative follow-up of those awarded DI benefits in 1985 in the United States (Hennessey and Dykacz (1993)). Source: Social Security Statistics (various issues).

re-testing of disability claimants became less extensive over time.

From the perspective of labour force participation, the principal distinction between disability benefit and unemployment benefit relates to the exit hazard from such benefits. Unsurprisingly, the exit rate from unemployment benefits is much higher than that from disability benefits. To see this, we can make use of the LFS longitudinal files. When we combine all the available files from 1998 to 2000, we have a sample of around 40,000 prime-age males. Of these, around 4% report receiving incapacity benefit, while 3.5% report receiving unemployment benefits. To examine the hazard from these two out-of-work benefits, we examine the benefit and labour force status of these claimants twelve months later. After twelve months, 85% of incapacity benefit claimants are still claiming. In contrast, only 52% of the unemployment benefit claimants are still claiming. Indeed, even these estimates are likely to underestimate the difference in exit rates. We cannot identify whether the claims twelve months later are the same claim or represent a new claim. However, this is likely to bias the unemployment benefit hazard far more than the DI hazard since claimants to DI are unlikely to switch in and out of the benefit. Similar conclusions arise when focusing on labour force status. For those claiming DI, 88% are not participating in the labour market twelve months later. In contrast, for those claiming UB, 84% are participating in the labour market twelve months later. The conclusions from these facts are straightforward. Entry into the DI system leads to exit from the labour market that is unlikely to be reversed. This is in marked contrast to the UB system that exhibits a high attachment to the labour market.

5 DI supply elasticities

Is there any evidence to suggest that changes in DI benefits have effects on labour supply behaviour? This issue has been exhaustively examined in the United States. The standard

difficulty with estimating such supply elasticities is that workers tend to face identical benefit schedules. So any variation in the replacement rate is driven primarily by differences in earnings. Since a worker's earnings are likely to be highly correlated with taste for work, it is difficult to isolate the behavioural effects of DI from these taste differences. To estimate DI effects we need to identify differences in benefit levels across workers that arise independently on their underlying taste for work. An innovative paper by Gruber (2000) exploits Canadian DI benefit reforms that produced variation in benefits generosity across similar workers. This allows for a difference-in-difference estimate to derive the labour-supply response to DI benefits. He estimates that the elasticity of labour force non-participation with respect to benefit levels is 0.25 to 0.32. This estimate is for males aged 45-59.

In this section we exploit variation in the UK system to estimate DI supply elasticities. As outlined in the previous section, there have been a number of changes over time to the DI system that have generated significant variation in average DI benefit levels by age. Chart 9 shows the real level of DI benefits for different age groups. The chart reveals starkly differing time-series profiles for each group. Older workers benefited most from AP during the 1980s in contrast to younger workers. The consequence of this was that just prior to the 1995 reform, older workers were entitled to around 50% higher DI benefits than younger workers compared to 1984 when benefits were essentially equal across all age groups. The reform of 1995 had very large effects on the DI benefits of older workers. For example, the average DI benefits of a 55 year old male dropped by 37% while a 30 year old male experienced no change.

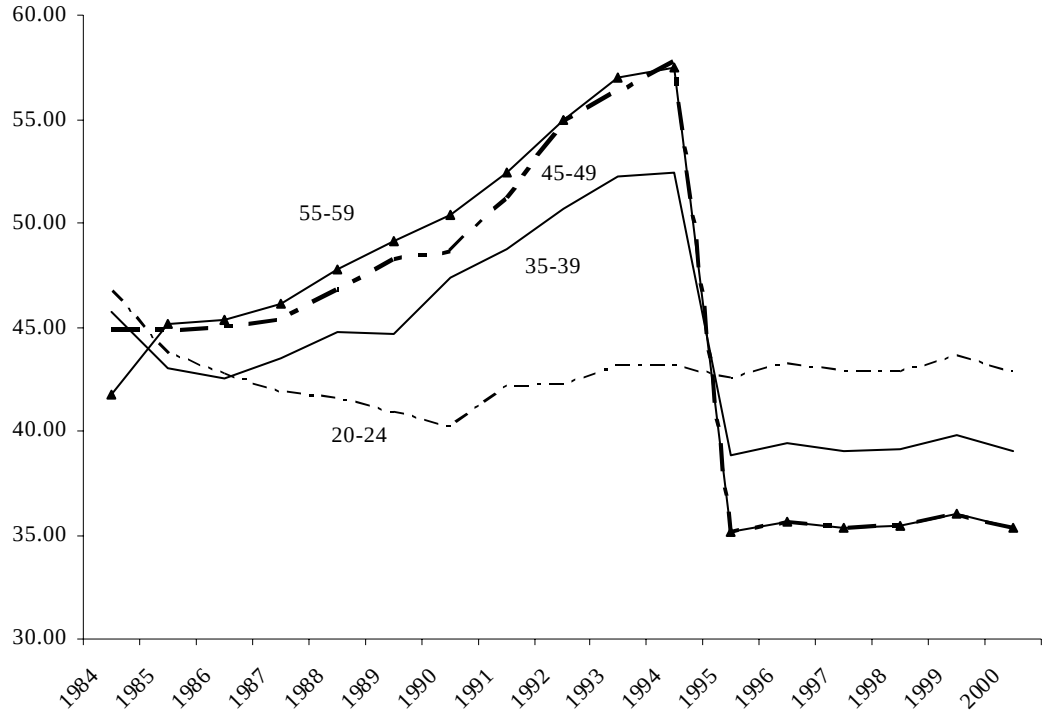
One possible empirical strategy would be to exploit the 1995 reform alone to estimate a difference-in-difference model similar to that of Gruber.[(9)] However, this would be to ignore the valuable information contained in the different trends in DI benefits prior to 1995. Hence we proceed by estimating a panel model which allows for age and time fixed effects. Our model is given as:

$$\ln(NLF_{it}) = \alpha_i + \beta_t + \gamma \ln(DI_{it}) + \delta_i trend + \eta_{it} \qquad \textbf{(2)}$$

where NLF_{it} is the non-participation rate of age-group i at time t, α_i are a set of age dummies, β_t are a set of time dummies and DI_{it} is the DI benefit level of age group i at time t. In addition to running this model for aggregate non-participation rate, we also estimate it using the non-participation rate of those males with no qualifications to explore whether the supply

(9) The variation in our data is by age group. In contrast, Gruber's analysis is based on the fact that the Canadian federal DI program increased its generosity at a point in time but one Canadian state did not implement this rise.

Chart 9: Real DI benefit levels for different age groups, 1984 prices



Source: DWP.

elasticity is larger for this group - since their replacement rate is higher. Finally we also estimate the model using the DI stock as the dependent variable. This provides a direct measure of the impact of DI benefits on DI receipt. In some specifications we also allow for separate time trends for each age group.

Table E contains our estimates. Column 1 shows that the elasticity of labour force non-participation with respect to DI benefits is estimated to 0.26. The estimate for those with no qualifications is significantly higher at 0.63. Both these estimates are significant at standard levels and suggest very sizable labour supply responses among males. Similar effects are found when the DI stock is used as the dependent variable.

TABLE E: ESTIMATED DI SUPPLY ELASTICITIES

	NLF	NLF	NLFNQ	NLFNQ	DI Stock	DI Stock
DI Benefits	0.258	0.065	0.628	0.433	0.451	0.524
	(0.092)	(0.072)	(0.181)	(0.096)	(0.161)	(0.125)
Age Trends		×		×		×
Sample Size	171	171	171	171	153	153

Notes: All regressions include age and time dummies. Regressions are weighted by age-group size. Sample period: 1984-2001.
× means that an age trend has been included in the regression.

Controlling for separate age trends reduces the coefficient on the basic specification and it becomes insignificant. If instead of assuming that each group has an unobserved 'fixed-effect' we can assume that the unobservable for each age group i follows a simple linear trend. Under this assumption we can consistently estimate the benefit elasticity using the full specification in equation **(2)**. These results are also shown in Table E. Under this assumption the results are more dramatic. For our baseline specification the benefit elasticity becomes insignificant and, for the non-participation rate of those with no qualifications, the coefficient is significantly reduced - but remains robust and significant. This result implies that we can identify significant (positive) benefit elasticities even under the assumption that the group effects follow a simple linear trend.

6 Conclusions

We are now in a position to answer the questions posed at the beginning of the paper.

1. Is the rise in the inactive long-term ill due to more ill people or declining participation among

the ill?

There has been a steady rise in the proportion of males reporting limiting long-standing illness. The proportion has roughly doubled over the course of the past two decades. Around 70% of the decline in participation is accounted for by this rising proportion and declining participation among the ill. Only 30% is accounted for by participation declines among the healthy. Again, the least educated are those who report the most health problems.

2. Is the decline in participation related to the rise in disability benefit rolls?

Yes. The decline in participation is almost exactly matched by a rise in disability benefit rolls. There has been no change in the number of inactive males who do not claim DI benefits.

3. Can we identify significant labour supply elasticities to disability benefits?

Yes. Using a difference-in-difference approach that exploits exogenous variation in DI benefits, we obtain sizable labour supply elasticities to DI benefits. The elasticities are particularly large for the least-educated males.

These results all point to a simple explanation of rising male non-participation. Increasingly generous DI benefits relative to UB encouraged the early accommodation of health problems for those males who were most at risk of job loss as a result of shifts in the relative demand for skilled and unskilled labour. Entry into the DI system tends to be a decision that results in permanent exit from the labour market since the hazard rates from DI are very low.

What does this suggest for future male participation trends and for the stock of those currently claiming DI? It seems unlikely that future demand shocks will generate the same size flows out of the labour market. First, future shocks may not be as skill-biased as those observed over the previous two decades. Second, the generosity of DI relative to UB has fallen significantly since the recession of the early 1990s. Hence the pull-factor of DI has been reduced and workers are more likely to remain within the labour market following job loss.

However, it seems equally unlikely that the stock of DI claimants will fall significantly. The

hazard rate from DI is extremely low, and the reduced level of DI does not affect those who were claiming prior to the reforms. Hence while the inflow into DI has fallen over recent years, the stock has remained broadly constant, as durations have continued to rise. This is also the view expressed by Faggio and Nickell (2003).

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