Will Improving Access to Psychological Therapies "Cost the Exchequer Nothing"?

William Whittaker, Matt Sutton
Health Economics
Health Methodology Research Group
Community-Based Medicine
University of Manchester
Contact: william.whittaker@manchester.ac.uk

Abstract

The Government has embarked on a programme to increase the availability of psychological therapies. This followed high-profile reports by Layard and colleagues on the economics of such a programme who claimed the programme would "cost the Exchequer nothing". In part, these analyses relied on two statistics: the proportion of Incapacity Benefit (IB) claimants diagnosed with mental and behavioural disorders; and estimates of the costs to the Exchequer of periods on IB. These are cross-sectional associations that have been used to support a case for intervention and constitute forms of cost-of-illness and human capital arguments. We subject these two statistics to more rigorous longitudinal analysis using nationally representative data from the first sixteen waves (1991-2006) of the British Household Panel Survey. The panel structure of the survey enables us to model the effect of depression on the probability of being on, transiting onto and remaining on IB. The detailed income and benefits questions allow us to derive and analyse an individual-level proxy measure of 'contributions to the Exchequer'. In addition, we can control for covariates and unobservable heterogeneity in our estimations. Our results reveal that simple estimates of the effects of depression on IB claims and on contributions to the Exchequer are confounded substantially by observable covariates and unobservable heterogeneity. We also find that the effects of depression on the on-flow and off-flow rates of IB are different and that the effect of depression on IB claims is only a partial assessment of the impact of depression on the Exchequer.

Background

Cognitive Behavioural Therapy (CBT) was recommended by the National Institute for Health and Clinical Excellence (NICE) as an effective treatment for depression in 2004 (NICE, 2004 (amended 2007)). In the 2007 Comprehensive Spending Review the Government committed itself to improving access to psychological therapies for the depressed and those with anxiety disorders as a Public Service Agreement (PSA) target. The NHS programme, Improving Access to Psychological Therapies [http://www.iapt.nhs.uk/], is the process by which this PSA target will be delivered. This programme is currently in its first phase of roll out across a number of Primary Care Trust areas.

The high-level commitment to this programme follows influential reports by Layard and colleagues of The Centre for Economic Performance's Mental Health Policy Group at the London School of Economics. In 2006 Layard made the case for expanding availability of psychological therapies in the British Medical Journal (Layard, 2006a). This was supported by a more substantial report (Layard, 2006b) and a number of other papers published on the LSE Programme website [http://cep.lse.ac.uk/research/mentalhealth/] including a draft cost-benefit analysis (Layard et al, 2006c).

The case described in the cost-benefit analysis relies on two key empirical findings:

1. that the proportion of Incapacity Benefit (IB) claimants diagnosed with mental and behavioural disorders is 40%; and
2. that the treatment will result in higher contributions to the Exchequer.

Finding 2. is calculated using predicted tax gains earned in employment minus the benefits previously paid to the depressed on IB. Based on a (one-off) £750 cost per treatment cycle, Layard et al. (2006c) estimate the returns to the Exchequer are almost immediate with the treatment paying for itself within a year. Overall, these findings lead Layard et al (2006c) to suggest that increasing the availability of psychological therapies "**would cost the Exchequer nothing**" (p.1; emphasis in original).

Both findings are cross-sectional associations but are used to estimate the effects of *changes* in the level (and severity) of depression. Finding 1. is a form of *cost-of-illness* argument and relies on diagnostic coding. Finding 2. is a *human capital* formulation of the cost-benefit framework and is a partial assessment of the ways in which individuals contribute to the Exchequer. Neither is an approach favoured in health economics (Sheill et al, 1997; Byford et al, 2000) or traditionally used in NHS decision-making.

In this paper we subject these two simple empirical findings to a more rigorous longitudinal analysis. The Layard argument for the rolling out of CBT therapy rests on the premise that treating depression will result in transitions out of IB. In the analysis that follows we investigate whether there is a causal pathway between depression and IB claiming, and hence formally test if treating depression will have the desired effect of reducing the number of IB claimants. We then extend the analysis to ascertain whether the effect of depression on the probability of being on IB differs for those not claiming and those already claiming, since this may shed some light on whether it will be more efficient to treat or prevent IB claims associated with depression.

The second stage of our analysis addresses more comprehensively how depression influences the contribution that individuals make to the Exchequer. As above, we use longitudinal data and capture information on contributions made via income tax and National Insurance on earnings and claims made on a wider range of state benefits.

Data

To model depression and IB, and later, transitions into/within IB, we require panel data. Panel data allows us to observe changes to IB claiming and correlate these with changes of depression. In addition, panel data allows us to control for unobserved individual factors that may influence the decision to work and thus pay taxes (e.g. ability).

We use the British Household Panel Survey (BHPS) to model IB, depression, and contributions to the Exchequer. The BHPS was designed as an annual survey of each adult (16+) member of a nationally representative sample of more than 5,000 households, making a total of approximately 10,000 individual interviews. The same individuals are re-interviewed in successive waves and, if they split-off from original households, all adult members of their new households are also interviewed. Children are interviewed once they reach the age of 16. Thus the sample should remain broadly representative of the population of Britain as it changes through the 1990s (Taylor et al. 2001).

The BHPS contains four booster samples. The first began in wave seven, this was a sub-sample of the United Kingdom European Community Household Panel (UKECHP). Together with a low-income sample of the Great Britain panel, this sample was generated for the European Community Household Panel (ECHP). The ECHP sample additions tend to

overstate low-income households and individuals. The remaining new samples were added in waves nine and eleven, these were (extended) samples in Scotland and Wales, and a new sample from Northern Ireland. The Northern Ireland, Scotland, and Wales new samples overestimate the respective population by 7, 2.5, and 4 times that of the United Kingdom population distribution respectively (Taylor et al. 2001).

The panel nature of the data enables us to construct profiles of individuals over time, recording IB status, as well as other personal characteristics, and is thus ideal for our transitions analysis. In particular, within the BHPS are a whole range of questions about health and benefits received.

To model IB we use the variables f125 and f116.[1] f125 asks respondents whether they claimed IB at any point since September of the previous year. Question f116 asks the same question, but for severe disability benefit. In an attempt to isolate cases caused only by depression we include a dummy variable for severe disability allowance claimants.

To measure depression we use the General Health Questionnaire responses contained within the BHPS, specifically, the question asking "Have you recently been feeling unhappy or depressed". There are several other possible measures for depression, including GHQ 'caseness' and whether the respondent has depression or anxiety health problems. After preliminary analysis, we chose to use the GHQ specific question on depression as it had fewer missing cases and was less likely to be affected by contact with healthcare services.

[1] Pre-1995, IB was National Insurance Sickness Benefit (f134) and/or Invalidity Pension (f117), here we splice the two together.

In addition to our depression variable, we also include gender, age, age squared, region dummies, marital status dummies, a financial difficulty measure, membership of a minority ethnic group and measures of educational attainment.

Method

IB Claiming

We model the probability of IB claiming using the following logistic model:

$$P(IB_{it} = 1) = f(x_{it}) + u_{it} \quad (1)$$

Where $P(IB_{it} = 1)$ is the probability you have claimed IB in the past year, and $f(x_{it})$ $(= \beta_k x_{itk})$ is a range of covariates, including lagged depression; that we think may be correlated with IB claiming, these include region dummies, gender and ethnic minority dummies, wave dummies, age and age squared, and a dummy for whether the respondent is in financial difficulty. We also include marital status in our analysis to control for the possible damaging effects of relationship dissolution, or added pressure to participate in the labour market if coupled (to support the spouse, for example). In addition, to control for potential 'opportunity costs' of claiming IB, we include in our model dummies for educational attainment, where those with more qualifications are seen as having (arguably) higher relative costs of entering IB.

To explore whether the propensity to claim IB differs by IB status in the previous year, we split our sample into two groups: those who have not claimed in the past year; and those who

have claimed in the previous year. The two groups are mutually exclusive and exhaustive and allow us to test whether there are significant differences in the determinants of the on-flow and off-flow rates. We split our sample into the following two groups:

$$P(IB_{it} = 1 \mid IB_{t-1} = 0) = f(x_{it}) + u_{it} \quad (2)$$

$$P(IB_{it} = 1 \mid IB_{t-1} = 1) = f(x_{it}) + u_{it} \quad (3)$$

Where the observations included in (2) are those at risk of transiting onto IB, and those included in (3) are those at risk of persisting with IB claiming. We exclude from our analysis those who we know transit into retirement in the following wave since these respondents are not at risk of IB claiming.

Having modelled the two groups separately, we then perform a Chow test that tests if the differences in the slope and intercept coefficients are significantly different between the two groups. If there are significant differences, the marginal effects for lagged depression in the two estimates will be indicative of the change in probability claiming were we to treat depression for each of the two groups.

Contributions to the Exchequer

Our next stage of our analysis is to test and quantify the effects of depression on contributions to the Exchequer. The BHPS contains questions on the usual gross and net pay the respondent receives per month. From this we can approximate the tax each respondent pays from their employment. The BHPS also contains a measure for the total amount of benefits received in the past month (including family benefit, housing benefit, and council tax benefit as well as IB). An individual's contribution (C) to the Exchequer at time *t* can be estimated as:

$$C_{it} = T_{it} - B_{it} \quad (4)$$

in which T is the difference between gross and net pay and B is the sum of state benefits.

We use pooled OLS to estimate the following equation:

$$C_{it} = \beta_k x_{itk} + v_{it} \quad (5)$$

Where C_{it} is monthly contributions per individual and x_{itk} is a range of covariates that may affect the amount of contributions made by individuals. These include: depression, gender, age and age squared, marital status, ethnic minority, regional dummies and dummies for the number of pre-school- and school-aged-children. To estimate whether the effect of depression on the rate of IB claiming and the cost of IB claims fully represent the effects of depression on contributions to the Exchequer we then extend the model to include an IB dummy and an interaction between the depression and IB claim dummy variables.

To ensure we have reliable estimates, we need to control for potential bias in the model. The first possible source of bias occurs were there to be a reverse causality issue between the dependent variable (contributions) and one of our independent variables. Our prime interest is with the depression variable, reverse causality here would require depression to be caused by contributions to the Exchequer - we believe this causal pathway is unlikely. The second potential source of bias stems from unobserved heterogeneity; certain individuals may be unobservably more or less likely to contribute than others and these unobservables may be correlated with other independent variables. To correct for this potential source of bias, we estimate (5) using fixed-effects assuming that the unobserved component is time invariant.[2]

[2] Strictly speaking there is another form of bias/endogeneity, this arises where we have selected samples from the population. As the BHPS is a representative sample, and all respondents have a contribution defined, we do not need to worry about this.

Results

Descriptive statistics

Table 1 provides summary statistics on rates of IB claiming and depression. Respondents reported depression at approximately 23% of interviews and IB claims at just 4% of interviews.[3] Depression is thus more prevalent than IB claiming. Approximately 43% of IB claimants are depressed, this figure is similar to the 40% figure found by WHO (2004) (for Western Europe) and Layard et al. (2006b) for the proportions with mental illness.

Depression is much more likely for those on IB, 42.55% compared with 21.90% of non-IB claimants. Table 1 also shows that the depressed are more likely to have claimed IB in the past year (7.34% compared with 2.93%).

Table 2 provides average rates of IB claiming, lagged depression, and both lagged depression and IB claiming across a range of stratifying variables. It is important to note that these are 'raw' estimates/ sample averages, these differences may not remain once we control for other factors in a multivariate model. There is a clear distinction between males and females, both for being IB claiming and being depressed. Females are less likely to claim IB, but more likely to be depressed.

The rates by region show a clear North-South divide, with regions in the north of Great Britain being almost twice as likely to be claiming IB than London, the South East, and South West. However, the rates of depression reveal a different story, for it is the southern regions

[3] This figure is lower than the 7.5% found by the Department for Health (2004), this may be because we exclude IB claimants where we know they also claimed Severe Disability Benefit at some point since their last interview.

here that experience the largest rates of depression. Only for Scotland do we find a significantly higher rate of depression than London, and even this is at a level close to the other southern regions. Of those who claimed IB, the rates of depression by region here reflect roughly the regional IB claiming differences, that is, that northern regions are, on the whole, significantly more likely to have claimed IB and been depressed in the past year.

Table 2 also contains average rates by marital status. The group most likely to claim IB are the divorced, who are more than twice as likely to claim IB as married respondents. The divorced also have the highest rates of depression. The third column of Table 2 reveals that the divorced are significantly more likely than any other group to have claimed IB and been depressed in the past year. Furthermore, this effect is particularly large at over twice the size as that of the married group (base). Being single is associated with a lower likelihood of being depressed and claiming IB.

Those with financial difficulties are almost three times as likely to be on IB, twice as likely to be depressed, and almost five times as likely to have been depressed and claimed IB benefit at some point in the last year. Table 2 also provides the sample averages for ethnic minorities. Relative to the base of White respondents, ethnic minorities are significantly less likely to be claiming IB, more likely to be depressed, and less likely to have claimed IB and been depressed at some point in the past year. Finally, degree-level educational attainment is associated with lower rates of IB claims and depression and no formal qualifications is associated with higher rates of both variables.

IB claiming

The results from estimation of equations (1), (2), and (3) are provided in Table 3. Marginal effects are shown. The results in the pooled model suggest a strong significant positive effect of reporting depression at the last interview on the probability of claiming IB since the last interview. The estimated marginal effect in a model estimated on the same sample but excluding all other covariates is 0.044. Thus, controlling for observables reduces the estimated effect of depression by 1.8% points. The effects of the covariates are generally consistent with the univariate relationships shown in Table 2. One exception is single status, which is associated with the lowest risk of IB claiming in the univariate analysis and the highest risk of IB claiming in the multivariate model. Another exception is minority ethnic group membership, which no longer exerts a significant effect on IB claiming.

A Chow test for equal slopes in both groups (columns 3 and 4) was strongly rejected (p-value<0.0001). Thus the coefficients in the pooled model are an average of those from two distinct groups. Depression is significantly associated with both the on-flow and out-flow IB claimant rates. The effect of depression is smaller on the risk of transiting onto IB (marginal effect = 0.008) than it is on the risk of remaining on IB (marginal effect = 0.071).

Contributions to the Exchequer

The frequency distribution of the variable we have calculated is plotted in Figure 1. The distribution has less variation than the Normal distribution, with a large proportion of respondents contributing (or receiving) under £1000. Given the previous focus on IB claiming,

Figure 2 plots the frequency distribution for those on IB. As expected, the large majority of IB claimants make a negative contribution to the Exchequer.[4]

The results from estimating equation (5) with pooled OLS and fixed-effects models are given in Table 4. In the pooled model the estimated effect of depression on contributions to the Exchequer is -£72. In a model estimated on the same sample that excludes the other covariates, this coefficient equals -£121. Thus, £49 of the difference in the Exchequer contributions of the depressed and non-depressed is attributable to (a limited range of) observable covariates and the crude difference suffers substantially from omitted variable bias.

A test of the null that the unobserved effects are not significant was rejected (p-value <0.0001) and as such we favour the second set of results obtained from fixed-effects estimation. This model suggests that depression 'costs' the Exchequer £27 per person depressed per month. This effect is substantially smaller than the £72 in the pooled model which implies that individuals who report depression have unobservable characteristics that are associated with smaller contributions to the Exchequer.

The results from the models that include the dummy variable for IB claims are given in Table 5. In the pooled model, the coefficient on the depression main effect is reduced to -£48 but remains statistically significant. This suggests that IB claims are not a full explanation of the effect of depression on contributions to the Exchequer. The interaction between depression and IB claiming is positive and significant but, as with the previous set of results (Table 4),

[4] There are positive contributions here as the respondent is asked whether they have claimed IB in the past year, so at the time of interview, the respondent may be working, but has claimed IB at some point in the past year.

we can reject the null of insignificant unobserved effects (p-value<0.0001) and the fixed-effects model is our preferred specification. In this specification the interaction between depression and IB claiming is not significantly different from zero, suggesting that the significant effect in the pooled model represents the effects of unobservables. In the fixed-effects specification the effect of depression on contributions to the Exchequer remains negative and significant conditional on IB claiming.

Our other estimates work in the direction expected, with an increased presence of children reducing your contribution (child benefit, tax credits etc), a strong education effect (possibly picking up an employment effect), and a clear business cycle effect (negative contributions where the economy was in recession (1992, 1993) proceeded by positive, increasing contributions as the economy grew). We also find a strong North-South divide evident amongst contributions that remains in the fixed-effects specification.

Discussion

In our first analysis, we find a positive association between lagged depression and current IB claiming, this effect is reduced, but remains significant and positive when we control for a number of other factors that influence IB claiming. In our second analysis, we find both depression and IB claiming have statistically significant negative impacts on individual contributions to the Exchequer.

In future work we plan to:

- re-run the analysis using other measures of mental health status;
- extend the set of variables to include other health conditions;
- extend the model specification to dynamic panel estimators; and
- control for unobserved heterogeneity in our IB transitions model.

Our analysis has focused on two components of the case made by Layard and colleagues for the programme to increase the availability of psychological therapies. We have focused on the robustness of the 'burden'/*cost-of-illness* and productivity losses arguments. Our results suggest that both are substantially exaggerated because they rely on univariate cross-sectional associations. However, the reliance on employment rates for estimating the effect on net Exchequer contributions is only a partial assessment of how depression influences overall contributions to the Exchequer.

Our reservations about these two components of the justification for the programme do not impact on the more mainstream assessment of the cost-effectiveness of the programme as would have been analysed by NICE. Instead, we hope our analysis raises doubt about the appropriateness of making the case for healthcare investments based on these types of arguments. As is well known of the human capital approach, this framework, for example, would be a misleading assessment of the benefits of programmes to alleviate suffering in the population not of working-age.

Figure 1

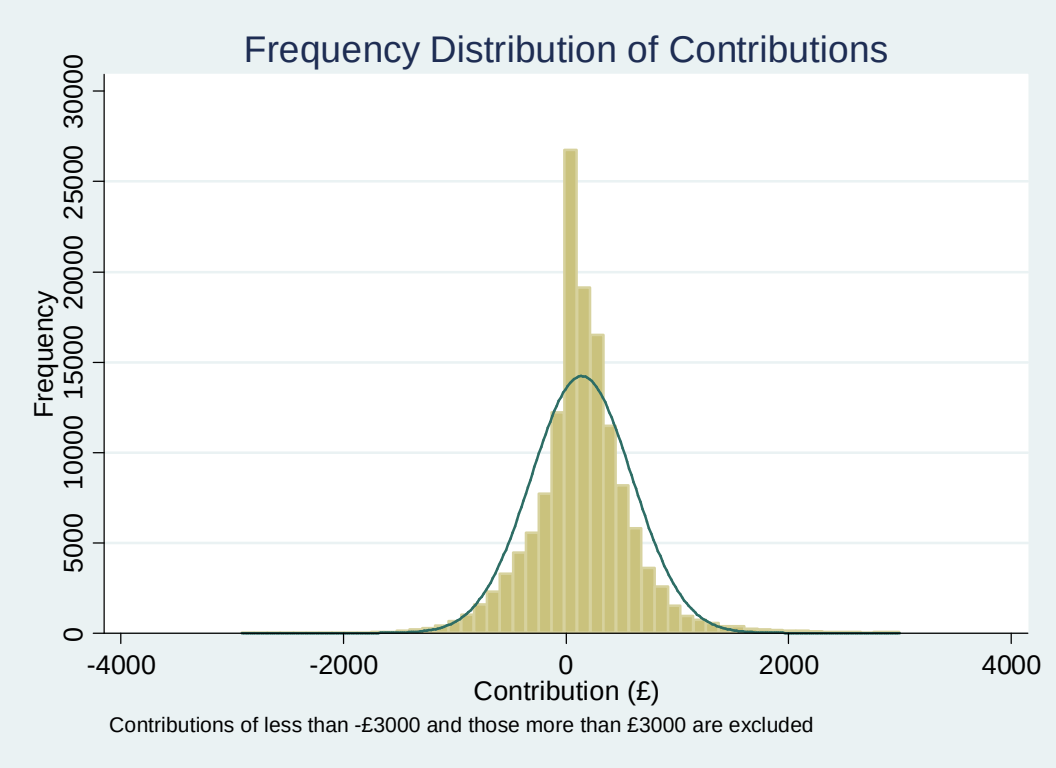

Figure 2

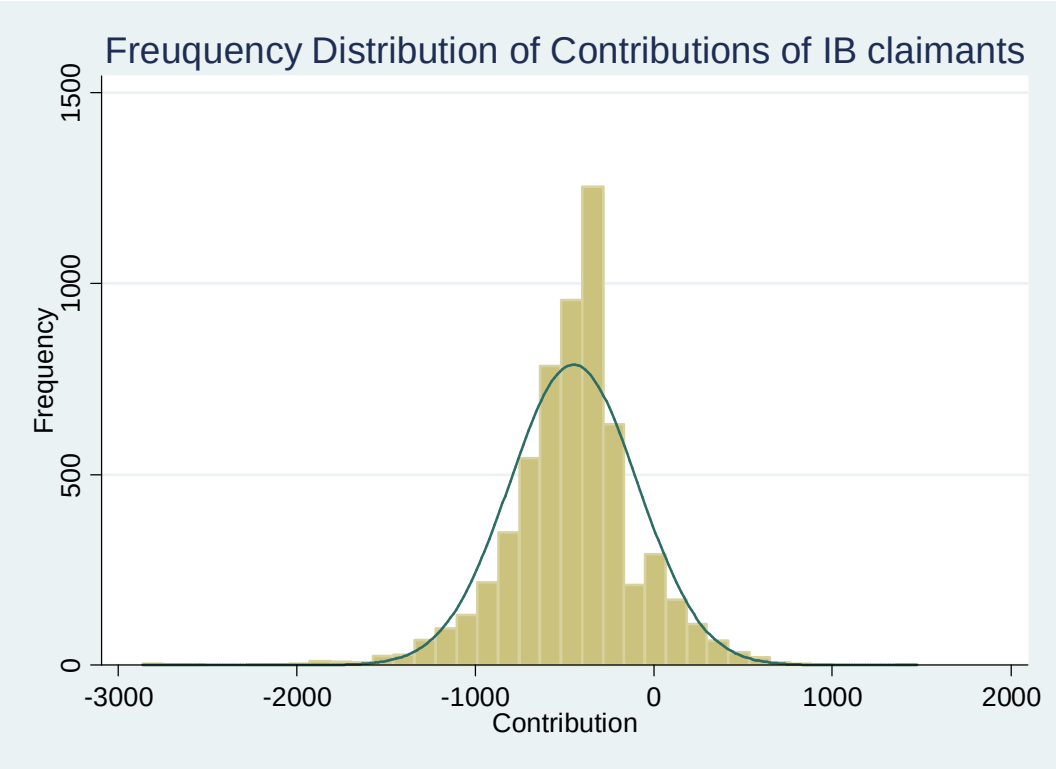

Table 1

	Yes	No	Total
Depressed at last interview	22,230	75,676	97,906
	(22.71)	(77.29)	(100.00)
Claimed IB since last interview	3,851	94,055	97, 906
	(3.93)	(96.07)	(100.00)
Depressed at last interview: Claimed IB since last interview?	1,613	20,599	22,230
	(7.34)	(92.66)	(100.00)
Not Depressed at last interview: Claimed IB since last interview?	2,220	73,456	75,676
	(2.93)	(97.07)	(100.00)
Claimed IB since last interview: Depressed at last interview?	1,631	2,220	3,851
	(42.55)	(57.65)	(100.00)
Not Claimed IB since last interview: Depressed at last interview?	20,599	73,456	94,055
	(21.90)	(78.10)	(100.00)

Table 2 Sample Averages

	Claimed IB since last interview	Depressed at last interview	Claimed IB since last interview and depressed at last interview
Gender			
Male (base)	4.74	19.05	1.75
Female	3.24**	25.85**	1.59*
Region			
London (base)	2.22	23.78	1.05
South East	1.69**	22.58**	0.74*
South West	1.58**	21.94**	0.69*
East Anglia	2.07	19.80**	0.80
East Midlands	3.63**	22.38**	1.44*
West Midlands	3.66**	23.10	1.38
North West	5.31**	23.51	2.17**
Yorks. & Humber.	3.02**	22.89	1.02
North East	7.79**	23.68	3.18**
Wales	7.01**	24.42	3.38**
Scotland	5.13**	21.01**	2.12**
Marital Status			
Married (base)	4.04	20.74	1.57
Couple	3.08**	23.91**	1.52
Widowed	2.82**	25.36**	1.22
Divorced	8.97**	30.42**	4.60**
Single	2.96**	24.78**	1.29**
Financial Difficulty			
No (base)	3.39	21.05	1.29
Yes	9.83**	40.65**	5.69**
Ethnic Minority			
No (base)	3.97	22.66	1.68
Yes	3.02**	23.80*	1.25**
Qualifications			
Other (non-degree) (base)	2.76	22.29	1.17
Degree	0.99**	21.25**	0.46**
No Qualifications	8.38**	24.54**	3.53**
All			
	3.93	22.71	1.67

** Sig. at 5%, * Sig. at 10% (relative to respective base)

Table 3 Probit models of whether claimed Incapacity Benefit since last interview

	Pooled		Transition from non-claiming		Persistent claiming	
Lag(Depressed)	0.026**	(0.001)	0.008**	(0.001)	0.071**	(0.018)
Female	-0.012**	(0.001)	-0.004**	(0.001)	-0.057**	(0.019)
Age	0.005**	(0.000)	0.002**	(0.000)	0.045**	(0.006)
Age Squared	-0.000**	(0.000)	-0.000**	(0.000)	-0.000**	(0.000)
Financial Difficulties	0.031**	(0.002)	0.016**	(0.002)	0.051**	(0.023)
Ethnic Minority	-0.001	(0.002)	-0.000	(0.001)	-0.082	(0.057)
No Qualifications?	0.022**	(0.001)	0.009**	(0.001)	0.018	(0.020)
Degree	-0.016**	(0.001)	-0.006**	(0.001)	-0.140**	(0.050)
South East	-0.004*	(0.002)	0.000	(0.001)	-0.116*	(0.059)
South West	-0.005**	(0.002)	-0.001	(0.002)	-0.093	(0.070)
East Anglia	0.002	(0.003)	0.001	(0.002)	0.005	(0.081)
East Midlands	0.014**	(0.003)	0.007**	(0.002)	0.004	(0.057)
West Midlands	0.016**	(0.003)	0.007**	(0.002)	0.037	(0.055)
North West	0.031**	(0.004)	0.012**	(0.003)	0.049	(0.050)
Yorkshire & Humber	0.011**	(0.003)	0.008**	(0.002)	-0.048	(0.060)
North East	0.057**	(0.006)	0.023**	(0.004)	0.056	(0.051)
Wales	0.042**	(0.004)	0.019**	(0.003)	-0.006	(0.050)
Scotland	0.029**	(0.004)	0.012**	(0.002)	0.040	(0.050)
Couple	0.009**	(0.002)	0.004**	(0.001)	0.042	(0.032)
Widowed	-0.009**	(0.002)	-0.004**	(0.001)	-0.038	(0.065)
Divorced	0.016**	(0.002)	0.007**	(0.002)	-0.033	(0.028)
Single	0.016**	(0.002)	0.005**	(0.001)	0.061**	(0.026)
1993	0.000	(0.002)	-0.000	(0.002)	0.078*	(0.045)
1994	0.004	(0.003)	0.020**	(0.003)	-0.641**	(0.020)
1995	-0.010**	(0.002)	0.004*	(0.002)	-0.644**	(0.019)
1996	-0.001	(0.002)	0.003*	(0.002)	0.179**	(0.045)
1997	-0.002	(0.002)	-0.001	(0.001)	-0.001	(0.047)
1998	-0.001	(0.002)	-0.003**	(0.001)	0.079*	(0.042)
1999	0.000	(0.002)	-0.002	(0.001)	0.072*	(0.043)
2000	0.001	(0.002)	-0.001	(0.001)	0.085**	(0.039)
2001	-0.003	(0.002)	-0.002**	(0.001)	0.030	(0.042)
2002	-0.002	(0.002)	-0.002*	(0.001)	0.106**	(0.040)
2003	-0.002	(0.002)	-0.003**	(0.001)	0.082**	(0.041)
2004	-0.001	(0.002)	-0.002	(0.001)	0.112**	(0.040)
2005	-0.005**	(0.002)	-0.005**	(0.001)	0.028	(0.043)
Claim Severe Disability Allowance Next Year	0.001**	(0.000)	0.000**	(0.000)	-0.006*	(0.003)
Observations	97906		94204		3702	
Pseudo R^2	0.167		0.116		0.219	

Marginal effects; Standard errors in parentheses

All measure a discrete change of dummy variable from 0 to 1 except age and age squared

* $p < 0.1$, ** $p < 0.05$

Chow test for same slope and intercept was rejected with a p-value of 0.0000

Base contains males, those surveyed in 1991, the married, those living in London, and those with GCSE/A-Level qualifications as their highest qualification.

Table 4 Regression models of contributions to the Exchequer

	Pooled OLS		Fixed-Effects	
Depressed	-71.612**	(3.502)	-27.387**	(3.649)
Age	26.643**	(0.705)	27.965**	(1.125)
Age Squared	-0.330**	(0.008)	-0.334**	(0.013)
Ethnic Minority	-58.680**	(7.700)		
Female	-253.652**	(2.977)		
1 Pre-school aged child	-127.350**	(4.716)	-78.042**	(5.065)
2 Pre-school aged children	-187.653**	(9.179)	-119.200**	(9.394)
3 Pre-school aged children	-8.112	(258.411)	278.200	(275.477)
1 School aged child	-71.329**	(4.071)	-48.985**	(4.561)
2 School aged children	-138.820**	(4.808)	-88.763**	(5.578)
3 School aged children	-346.091**	(19.136)	-166.100**	(21.821)
Couple	-56.409**	(4.692)	-24.106**	(6.337)
Widowed	-141.331**	(12.081)	-170.550**	(17.144)
Divorced	-213.697**	(6.398)	-165.989**	(9.111)
Single	-147.294**	(4.750)	-95.286**	(6.764)
Degree	272.269**	(4.416)	254.911**	(8.717)
No Qualifications	-199.857**	(3.792)	-201.037**	(7.888)
South East	-18.856**	(6.512)	-20.681	(14.529)
South West	-78.650**	(7.624)	-7.165	(17.214)
East Anglia	-81.396**	(9.695)	-72.981**	(20.035)
East Midlands	-122.286**	(7.691)	-78.989**	(17.952)
West Midlands	-92.572**	(7.631)	-80.763**	(18.537)
North West	-85.070**	(7.329)	-73.003**	(18.215)
Yorkshire & Humber	-119.511**	(7.577)	-104.887**	(18.404)
North East	-137.707**	(8.368)	-119.667**	(19.427)
Wales	-170.627**	(6.906)	-144.139**	(17.475)
Scotland	-120.366**	(6.564)	-94.916**	(17.847)
1992	-11.509	(8.684)	-11.723	(7.722)
1993	-19.181**	(9.087)	-21.198**	(8.212)
1994	-3.579	(9.114)	-9.650	(8.461)
1995	3.013	(8.874)	-0.453	(8.076)
1996	5.614	(8.801)	4.208	(8.067)
1997	2.537	(8.516)	17.136**	(7.967)
1998	0.253	(8.561)	13.583*	(8.051)
1999	5.432	(7.968)	18.967**	(7.735)
2000	2.121	(7.980)	16.736**	(7.796)
2001	13.115	(8.019)	26.810**	(7.917)
2002	29.623**	(8.270)	34.608**	(8.169)
2003	31.129**	(8.347)	33.195**	(8.321)
2004	48.820**	(8.414)	53.092**	(8.497)
2005	47.029**	(8.829)	50.823**	(8.999)
2006	59.036**	(8.379)	65.295**	(8.768)
Constant	26.207	(17.220)	-224.723**	(27.455)
Observations	124065		124065	
R^2	0.182		0.047	
Pseudo R^2				

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$

Table 5 Extended regression models of contributions to the Exchequer

	Pooled OLS		Fixed-Effects	
Depressed	-47.907**	(3.547)	-20.688**	(3.719)
Claimed IB in Last Year and Depressed	35.311**	(14.737)	-4.030	(15.409)
Claimed IB In The Last Year	-561.948**	(9.773)	-341.565**	(11.375)
Age	29.312**	(0.691)	29.133**	(1.118)
Age Squared	-0.351**	(0.008)	-0.341**	(0.013)
Ethnic Minority	-57.817**	(7.538)		
Female	-263.145**	(2.917)		
1 Pre-school aged child	-123.080**	(4.617)	-76.641**	(5.032)
2 Pre-school aged children	-182.959**	(8.987)	-117.715**	(9.332)
3 Pre-school aged children	107.437	(252.992)	322.156	(273.680)
1 School aged child	-78.244**	(3.987)	-52.137**	(4.532)
2 School aged children	-146.211**	(4.708)	-91.854**	(5.542)
3 School aged children	-357.046**	(18.734)	-172.747**	(21.679)
Couple	-48.246**	(4.595)	-20.922**	(6.297)
Widowed	-153.406**	(11.828)	-182.343**	(17.035)
Divorced	-190.045**	(6.272)	-158.441**	(9.053)
Single	-132.265**	(4.654)	-89.646**	(6.722)
Degree	260.432**	(4.327)	246.844**	(8.662)
No Qualifications	-175.673**	(3.727)	-184.943**	(7.849)
South East	-19.603**	(6.375)	-16.932	(14.434)
South West	-80.303**	(7.463)	-8.619	(17.101)
East Anglia	-79.613**	(9.491)	-70.062**	(19.904)
East Midlands	-112.600**	(7.531)	-73.674**	(17.835)
West Midlands	-84.921**	(7.471)	-78.103**	(18.417)
North West	-66.938**	(7.179)	-63.533**	(18.099)
Yorkshire & Humber	-113.861**	(7.418)	-104.251**	(18.284)
North East	-107.015**	(8.203)	-101.315**	(19.306)
Wales	-145.025**	(6.770)	-132.682**	(17.364)
Scotland	-102.155**	(6.431)	-85.861**	(17.732)
1992	-13.140	(8.501)	-12.365	(7.671)
1993	-16.971*	(8.896)	-19.332**	(8.158)
1994	-1.419	(8.923)	-6.236	(8.406)
1995	-4.766	(8.688)	-4.705	(8.024)
1996	5.346	(8.616)	4.698	(8.014)
1997	4.056	(8.337)	17.327**	(7.915)
1998	1.213	(8.381)	13.595*	(7.998)
1999	4.578	(7.800)	17.915**	(7.684)
2000	2.859	(7.813)	17.398**	(7.745)
2001	11.659	(7.851)	26.280**	(7.865)
2002	28.900**	(8.097)	35.224**	(8.116)
2003	29.552**	(8.172)	33.788**	(8.267)
2004	48.736**	(8.238)	54.278**	(8.442)
2005	44.322**	(8.643)	49.903**	(8.940)
2006	56.629**	(8.203)	63.505**	(8.711)
Constant	-39.388**	(16.885)	-256.160**	(27.290)
Observations	124065		124065	
R^2	0.216		0.059	

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$

References

Byford, S., Torgerson, D.J., & Raftery, J. (2000) 'Economic Note: Cost of illness studies.' *British Medical Journal*, vol.320, p.1335.

Department of Health (2004) *Choosing health – making healthy choices easier*.

H.M. Treasury (2007) *Pre-Budget Report and Comprehensive Spending Review: PSA Delivery Agreement 18: Promote better health and wellbeing for all.*

Layard, R. (2006a) 'The case for psychological treatment centres.' *British Medical Journal*, vol.332, p.1030-1032.

The Centre for Economic Performance's Mental Health Policy Group (Chaired by Lord Layard) (2006b) *The Depression Report: A New Deal for Depression and Anxiety Disorders: London School of Economics.*

Layard, R., Clark, D., Knapp, M., & Mayraz, G. (2006c) *Implementing the NICE guidelines for depression and anxiety. A cost-benefit analysis*. Mimeo.

Taylor, Marcia Freed (ed). with John Brice, Nick Buck and Elaine Prentice-Lane (2001) *British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices. Colchester: University of Essex.*

Sheill, A., Gerard, K., & Donaldson, C. (1987) 'Cost of illness studies: an aid to decision-making?' *Health Policy*, vol.8, p.317-323.

WHO (2004*) The Global Burden of Disease*.