



# Costing Young Minds

The fiscal consequences of the lack of spending on young adult mental health

**Melissa Bui** - researcher, Intergenerational Foundation

Foreword by **Norman Lamb**, Chair, Children and Young People's Mental Health Coalition



The Intergenerational Foundation ([www.if.org.uk](http://www.if.org.uk)) is an independent, non-party-political charity that exists to protect the rights of younger and future generations in British policy-making. While increasing longevity is to be welcomed, our changing national demographic and expectations of entitlement are placing increasingly heavy burdens on younger and future generations. From housing, health and education, to employment, taxation, pensions, voting, spending and environmental degradation, younger generations are under increasing pressure to maintain the intergenerational compact while losing out disproportionately to older, wealthier cohorts. IF questions this status quo, calling instead for sustainable long-term policies that are fair to all – the old, the young, and those to come.

For further information on IF's work please contact Liz Emerson:

Intergenerational Foundation

19 Half Moon Lane, London, SE24 9JS

0044 (0)7971 228823

@inter\_gen

[www.if.org.uk](http://www.if.org.uk)

[liz@if.org.uk](mailto:liz@if.org.uk)

This work is licensed under a Creative Commons Attribution-ShareAlike 3.0 Unported License.

-----  
Melissa Bui, report author, is an IF researcher. She holds a bachelor's degree in Economics from the University of Nottingham and an MSc in International Social and Public Policy from the London School of Economics.  
-----

IF gives grateful thanks to Mark Connolly PhD, and Nikos Kotsopoulos of Global Market Access Solutions, who have acted as contributory researchers and provided methodological support of this research.

Front cover image courtesy of Andrew Neel: <https://unsplash.com/photos/JBfdCFerDeQ>

# Contents

---

	<b>Page:</b>
Foreword by Norman Lamb, Chair, Children and Young People's Mental Health Coalition	<b>4</b>
Executive summary	<b>5</b>
1. Introduction	<b>6</b>
2. Modelling the cost of depression	<b>8</b>
2.1. Why the government perspective?	<b>8</b>
2.2. How might depression impact a young person's contribution to public finances?	<b>8</b>
3. Method and data	<b>11</b>
3.1. Estimating tax revenues	<b>12</b>
3.2. Estimating government expenditures	<b>14</b>
3.3. Mortality costs	<b>15</b>
4. Results and discussion	<b>16</b>
4.1. The fiscal cost of depression	<b>16</b>
4.2. Varying the model assumptions	<b>19</b>
5. Conclusion and recommendations	<b>23</b>
References	<b>25</b>
Appendix	<b>29</b>

---

## Foreword

I have spent a long time campaigning for better mental health in our society, for many years as a Member of Parliament, as Chair of an NHS Trust, and now as Chair of the Children and Young People's Mental Health Coalition, of which the Intergenerational Foundation is a valued member.

I have seen many seminal moments in the years campaigning for better mental health. But I have not seen anything as significant a threat as COVID-19 and the ensuing lockdown. The effect, particularly for our most vulnerable children and young people, is enormous, and we are years away from knowing the full force of this.

During this time of crisis, it is of course important to get our emergency response right. But we must also look at the long term, to look to the years to come that will be so impacted by the virus, to consider the young people whose long-term life chances are at risk of being blighted, the children whose lives will be shaped by the pandemic, and those who are not even born yet and the world they are coming into. Ignoring prevention and early intervention will affect children, young people, their families, and public services for a generation.

I have seen first-hand some decision-makers' reluctance to embrace prevention. But the evidence is clear: if a Government's goal is to allocate resources as effectively as possible, there is no better deal than preventing mental health problems occurring and worsening. This approach also ultimately helps young people the most, by ensuring their mental health is nurtured and supported from the start of life onwards.

This report offers a crucial piece of the puzzle in tackling inequalities in health. We know beyond doubt that you are more likely to have mental health problems if you are from a disadvantaged family or community. This is completely unacceptable and entirely preventable. I am proud to have been asked to write about such an important piece of work, and hope that you the reader use it to help further our shared goal, of a society where everyone's mental health is valued equally and no one is more at risk of mental health problems because of who they are or where they are from.



**Children & Young People's  
Mental Health Coalition**

**Sir Norman Lamb,**

**Chair, Children and Young People's Mental Health Coalition**

## Executive summary

- Depression in early adulthood can lead to cognitive, behavioural and biological changes which play key roles in shaping outcomes in later life. Possible adverse outcomes include prolonged spells of unemployment, disruption of education, reduced life expectancy and decline in physical health.
- As public resources are limited, mental health disorders such as depression are often in competition for NHS funding with other health conditions. Economic considerations typically take precedence in decisions on how to allocate public resources. Depression is a unique medical condition as the majority of costs are broader and often fall on households, whereas healthcare costs represent a minor component compared to all other costs.
- To build an economic case for further spending on depression, IF investigates how having depression during early adulthood impacts public finances over the lifetime of these individuals.
- We found that the government loses a total of £2.9 billion from a single cohort of depressed individuals who pay less tax and consume more publicly funded services such as healthcare and social security services between the ages of 16 to 40 years old. At the individual level, this is equivalent to losing £37,770 in net tax contributions per depressed person.
- To put these figures into perspective, the fiscal loss associated with each depressed individual between the ages of 16 to 40 could pay for 35 ten-session courses of CBT treatment, which translates to 2.7 million courses for an entire age cohort.
- 95% of this fiscal cost for government can be explained by the impact of depression on employment status, as depressed individuals spent more time outside employment and thus had larger gaps in their contribution records and requiring government income support to maintain living standards.
- The slower accumulation of tax contributions meant that a depressed person became a net contributor to the public finances 11 years later than their non-depressed counterparts.
- The results of our model imply that increasing spending on interventions for depression could lead to higher tax revenues that would benefit the public finances. The government can retrieve approximately £1.74 billion in additional tax revenue by halving the size of the impact that depression has on the likelihood of not being in employment, education or training (NEET). This accounts for approximately 60% of the total fiscal cost. On the contrary, if the link between depression and unemployment worsens, then the fiscal cost of depression can rise up to the value of £5.2 billion.
- The COVID-19 crisis has worsened the mental health and employment prospects of young people in the UK. It is therefore a particularly crucial time to increase spending on mental health to improve young people's chances of returning to and staying in employment, as well as drive additional tax revenue potentially worth billions of pounds.

# 1. Introduction

Approximately half of all mental health disorders start by the age of 14 years old and three-quarters by the age of 24 (Kessler et al., 2005). When mental health disorders develop at a young age, they can have numerous adverse impacts on outcomes in later life. To name a few, poor mental health can hamper educational attainment (Fletcher, 2013; Myer, 2009), increase the likelihood of unemployment and – for reasons including but not limited to suicide – decrease life expectancy (Lawrence, Kisely and Pais, 2010).

With respect to public spending on mental health, the government has promised to prioritise young people in future funding decisions. In 2019, the National Health Service (NHS) announced their commitment to raise the level of annual investment in mental health services to £2.3 billion by 2023/24 and for public spending on young people to grow at a faster rate than overall mental health spending (Alderwick and Dixon, 2019). However, there still appears to be a significant amount of unmet need for mental health services among younger patients. For instance, 26% of children referred to specialist children’s mental health services were rejected in 2018/19, which may indicate that services for this age group are rationed due to funding constraints. In 2019, children had to wait on average two months before their treatment commenced (Crenna-Jennings and Hutchinson, 2020).

To add to these shortfalls, both the nature of COVID-19 pandemic and the government’s response will have lasting consequences on public mental health and funding needs. We expect to see a rise in psychological distress amongst those who contract or come into close contact with the virus, including patients, their family members and exposed healthcare workers, based on a similar experience from the SARS epidemic (Lee et al., 2007). However, unlike previous pandemics, the government must also deal with the mental health consequences of the largest societal lockdown in British history. Limited social interaction, restricted access to open spaces and prolonged cohabitation with other members of the household may exacerbate problems such as loneliness, substance abuse and domestic abuse, which all can take a toll on a young person’s mental health (Galea, Merchant and Lurie, 2020). For those who seek help, although there has been a commendable effort to reach out to patients through online services, there has been evidence that these services can only be accessed by existing patients (Killaspy, 2020). Some young people have also been removed from waiting lists for other mental health services as a result of the pandemic (Norfolk and Suffolk NHS Foundation Trust, 2020). Furthermore, young adults under the age of 25 are estimated to be two and half times more likely to be working in a sector that has shut down (Joyce and Xu, 2020). Given the damaging effects of unemployment on one’s mental health and the impending recession, the harm this will do to young people’s mental health is likely to be a long-term problem for the NHS.

Understandably, the public discourse on how to best respond to poor mental health is typically framed as an ethical or moral issue (Knapp and Lemmi, 2014). However, as government resources are usually limited, health policy-makers must weigh the issue of mental ill-health against other conditions – which are also tied with multiple moral and ethical concerns – to decide how much funding can be allocated. Government must also recognise that health problems create and contribute to economic consequences, many of which fall on the government because of current and future social benefit costs and lost tax revenues. In a post-COVID-19 world, this will be no less true; the prioritisation of testing and treating COVID-19 patients has unfortunately not only disrupted the diagnosis and treatment of mental health issues, but also other health conditions (Jones et al., 2020). Mental health services also tend to be vulnerable to funding cuts during recessions (Cooper, 2011).



As economists and policy analysts have highlighted, the simultaneous need to improve health and quality of life outcomes as well as retrieve the best value for money from available resources is the primary reason why economic arguments often take the forefront in the decision process (Knapp and Lemmi, 2014).

This paper aims to present an economic case for public spending on young adult mental health by estimating the fiscal cost of one of the most common mental health disorders in the UK: depression. The recorded prevalence of depression in the UK has been rising over the past years. According to the Quality and Outcomes Framework (QOF),<sup>1</sup> 10.74% of the adult population in contact with services in England were diagnosed with depression in 2018/19 (NHS, 2019).

Although several studies have already attempted to capture the cost of depression on the public health system or society in the UK context (for instance, McCrone et al., 2008; Thomas and Morris, 2003), this study is the first to estimate the cost on public finances or, in other words, from the government perspective. Following a framework by Kotsopoulos et al. (2013), and aligned with principles of generational accounting and the intergenerational consequences of public spending (see Auerbach, Gokhale and Kotlikoff, 1994), we simulate the effect of having depression between the ages of 16 to 40 on an individual's employment outcome, usage of healthcare services, receipt of disability benefits and likelihood of premature mortality, which in turn have ramifications for how much tax they contribute to the public purse. As we hope this study demonstrates, failing to address the lasting impacts of depression on young people can have lasting economic and health consequences that influence their life trajectory, the costs of which largely fall on the government and households.

---

<sup>1</sup> The Quality and Outcomes Framework is a system which manages the performance of General Practitioners (GPs) in the UK by rewarding them for the quality of their care.

## 2. Modelling the cost of depression

### 2.1 Why the government perspective?

There are multiple perspectives from which we can approach the cost measurement of a health condition. Within the health economics and medical literature, it is most common for studies to adopt either a healthcare system perspective, which only takes into account healthcare costs incurred, or a societal perspective, where there is an attempt to measure the cost of illness or the loss of consumer surplus that can be attributed to ill health (Jo, 2014). We will present the argument that the government public economic perspective, a perspective that is rarely adopted in conventional health economics studies, can also be a useful tool for informing allocation of public funding.

The government perspective is based on the premise that changes to health status can influence the choices that people make in terms of education and workforce activity, which in turn influences lifetime earnings and the amount of tax an individual is likely to contribute and their usage of publicly funded services. Examples of such key events include change of employment status, underemployment, disruption of education, premature mortality, retiring early (Connolly et al. 2017) and lifestyle changes such as taking up smoking. For some changes, the fiscal outcome is straightforward. For instance, falling into unemployment leads to a reduction in overall tax revenue and increases social security payments. Other changes such as reduced life expectancy have a more ambiguous fiscal impact; whilst premature mortality drives down tax revenue, it also lowers government expenditure on benefits payments and healthcare services.

Fiscal health model experts Connolly et al. (2017) have described how the fiscal framework complements the varied needs of key actors in health policy outside health service networks because they help with evaluating the sustainability of funding decisions as well as their effects at the macroeconomic level. From their experience, policy analysts, politicians and journalists have become more receptive to fiscal health models. They also highlight that the public sector in the UK has a record of using similar methods to inform health policy decisions, for instance in the evaluation of services for adults with autism by the National Audit Office (National Audit Office, 2017). However, even when the government public economic perspective has been adopted to inform NHS decisions, the models used typically only consider the direct healthcare costs incurred which underestimate the broader consequences of health conditions.

### 2.2 How might depression impact a young person's contribution to public finances?

The direct and most observable impact that depression has on public finances is through increased usage of healthcare services. This direct cost has been widely estimated in the literature and its composition can provide evidence for changing approaches to the treatment of depression over time. For instance, in 1993 pharmaceutical costs accounted for only 11.3% of total healthcare costs in the UK, with the main driver of the cost of depression being admission to mental hospitals (40%) (Kind and Sorenson, 1993). Ten years later, the main contributor to the cost of depression was antidepressant costs, which reflects the widespread closure of mental health hospitals (Thomas and Morris, 2003). Other approaches to intervention include relapse



prevention (Borghi and Guest, 2000), fatality prevention and school-based services (Nabors, Leff and Mettrick, 2001).

Depression can also lead to behavioural, cognitive and biological changes which play key roles in shaping future outcomes. Firstly, low mood, stress and low motivation can lead to disengagement during important stages of development such as education and the job application process, potentially hindering progression and, in some cases, leading to the termination of their participation (Fletcher, 2008). The high correlation between educational attainment and earnings makes the issue of under-attainment a fiscal problem. Along similar lines, individuals with depression in adulthood may experience prolonged spells of unemployment due to struggles with the job application process.

The impact of health conditions on employment status is particularly important from a fiscal viewpoint in contexts like the UK where there is a comprehensive social protection system. Nevertheless, the risk of collinearity between educational attainment and employment means that studies cannot accurately estimate both cost domains.

Secondly, having depression can also result in the decline of one's physical health which may lead to excess costs in healthcare, mortality and social security payments (Donohue and Pincus, 2007). For instance, depressive symptoms can increase the probability of contracting a physical illness such as cardiovascular disease, obesity or diabetes (Penninx et al., 2013), development of unhealthy habits and, interestingly, lead to higher rates of noncompliance with medical treatment which reduces one's likelihood of recovery (DiMatteo, Lepper and Croghan, 2000). These factors have been found to partly explain excess mortality amongst depressed patients. Studies have related excess mortality to other factors including hazardous lifestyle behaviours such as smoking, unhealthy eating, excessive alcohol consumption and lack of physical activity (Dierker et al., 2002; Holahan et al., 2003; Luppino et al., 2010; Roshanaei-Moghaddam, Katon and Russo, 2009). Although chronic diseases are more likely to drive excess mortality in old age (Zivin, 2015), the relationship between mental and physical health is still important for young people as the need to manage an additional illness on top of depression can raise healthcare costs throughout adulthood.

## Challenges with estimating the cost

However, these costs can be difficult to capture. Studies interested in measuring the cost of depression typically adopt a top-down approach. In the top-down approach, estimates of costs are derived using aggregate data on publicly funded services (Jönsson and Bebbington, 1994). However, the type of cost domains that can be included is limited to the data available. For instance, it is difficult to capture the costs of the impact of depression on physical health, as where there is an attempt to capture information on the disability background of the recipients of public resources, it is typical for only one medical condition to be recorded in aggregate data.<sup>2</sup>

---

<sup>2</sup> One way to overcome the issue of limited data availability is to estimate the cost of depression using a bottom-up strategy, where information on a range of costs is extracted from a representative sample of individuals. Studies have used the bottom-up method to estimate costs which may have been otherwise difficult to derive using aggregate data, including relapse prevention costs (Borghi and Guest, 2000), school-based services (Nabors, Leff and Mettrick, 2001) and criminal justice costs (Knapp et al., 2002). However, the bottom-up method is vulnerable to criticism on the representativeness of the sample, which is why the researchers often opt for a top-down approach.



Variations in prevalence measures pose another key challenge for cost-of-illness studies. In the UK, estimates of the prevalence rate vary depending on the definition and method of estimation used, with methods of estimation ranging from professional diagnosis, diagnostic interviews, and self-reported diagnosis. A past study by Okumura and Higuchi (2011) demonstrated that disparities in prevalence estimates lead to substantial variation in fiscal evaluations. After estimating the net present value of lost earnings due to depression in Japan in 2008, they found that their results were highly sensitive to the 12-month prevalence rate. Varying the prevalence rate by 1.5 percentage points increased the cost by 48.6% - from \$11 billion to \$16 billion. If depression is underreported or underdiagnosed, then using the top-down approach can lead to underestimation of the cost of depression.

### 3. Methods and Data

The aim of this research is to estimate the fiscal consequences of depression amongst young adults based on current levels of public spending and the estimated life trajectory for this cohort. To achieve this purpose, we conducted a cohort analysis to compare the discounted net tax contributions from this group with an equally sized cohort of non-depressed individuals who will serve as the control. In other words, how much more does a cohort of individuals with depression cost the government in lost tax revenue and increased expenditure compared to a scenario in which they did not have depression? IF has attempted to answer this question by following a fiscal modelling technique adopted by Kotsopoulos et al. (2013). This research is the first known study to estimate the cost of depression from the government perspective. Based on an assumed prevalence rate of 10.74% and annual birth count of 731,213 in 2018, we expect 78,532 individuals to become diagnosed with depression in adulthood.

Although an individual pays taxes and consumes publicly funded services throughout the entire course of their lifetime, we have restricted the analysis to adults between the ages of 16 to 40. We chose to begin the analysis at 16 because individuals below this age threshold tend to be financially dependent on their guardians and are not yet eligible to apply for the most important type of disability benefit, the Employment Support Allowance. Thus, it is likely that a significant portion of the cost of depression incurred below this age are absorbed by the parents and carers of children with depression, rather than the government.

#### How have we calculated discounted net tax revenues?

We define net tax revenues as the total value of age-specific taxes paid to government including both direct taxes (income tax, National Insurance contributions and council tax) and indirect taxes minus age-specific government expenditures. Government expenditures refer to the public money spent on providing services such as education, healthcare and social security benefits to citizens. The equation combining these factors is shown in equations (1) to (3). We applied a discount rate of 3.5%, as recommended under NICE guidelines (National Institute for Health and Care Excellence, 2013), to give the Net Present Value (NPV) of net tax revenue between the ages of 16 and 40.

Figure 1. Discounted net tax revenue calculation

$$NPV \text{ of Net Tax Revenue}_j = \sum_{(i=1)}^{Lp} \frac{Tax_{ji} - Government \text{ expenditure}_{ji}}{(1+r)^i} \quad (1)$$

$$Tax_{ji} = Direct \text{ Tax}_{ji} + Indirect \text{ Tax}_{ji} \quad (2)$$

$$Government \text{ expenditure}_{ji} = Education_{ji} + Healthcare_{ji} + Social \text{ Security}_{ji} \quad (3)$$

Where j = Depression status; i = Year; r = Discount rate; Lp = Life expectancy (until 40 years old).

## 3.1 Estimating tax revenues

Tax revenues are dependent on four factors: employment status, earnings, direct taxes and indirect taxes collected from VAT applied to consumption. The rest of this section outlines how we estimated each of these components and pieced them together to simulate tax revenue contributions for depressed and non-depressed individuals.

### Likelihood of employment

Depression increases vulnerability to unemployment and thus people who suffer from depressive symptoms are more likely to see a gap in their lifetime tax contribution record. Although depression can also have fiscal consequences through its impact on educational attainment and consequently future earnings, we have chosen to focus our analysis on employment as a cost domain because of the risk of collinearity between educational attainment and probability of employment. IF has drawn from the results of a study by López-López et al. (2020) to simulate the likelihood of employment for individuals with and without depression at different ages. According to their estimates, 23% of individuals who experience depression throughout adulthood are expected to have had the disorder since childhood. These individuals are 5.17 times more likely to not be in employment, education or training (NEET) by the age of 24 compared to non-depressed individuals. The other 77% will have developed serious symptoms during early adulthood and are 3.7 times more likely to have NEET status.

We have therefore assumed that the depressed cohort in our model comprises two types of young adults: one group follows the employment trajectory of individuals who have experienced depression since childhood, in other words “childhood-persistent” depression, whilst the other reflects the life course taken by those who developed the disorder during early adulthood.

We used the odds ratios and prevalence rates for both trajectories of depression outlined above to estimate the expected NEET rates for depressed and non-depressed individuals. These were then used to derive the age-specific employment rates for both cohorts. We estimated NEET rates for 16-24 year olds using data from the Office for National Statistics (ONS) on average NEET rates across the entire population. For older adults, this breakdown of employment status was not available; as such we assumed that all unemployed or inactive persons over 24 years old are also NEET, which is a reasonable assumption as we expect the proportion of people still in full-time education to be very small beyond this age.

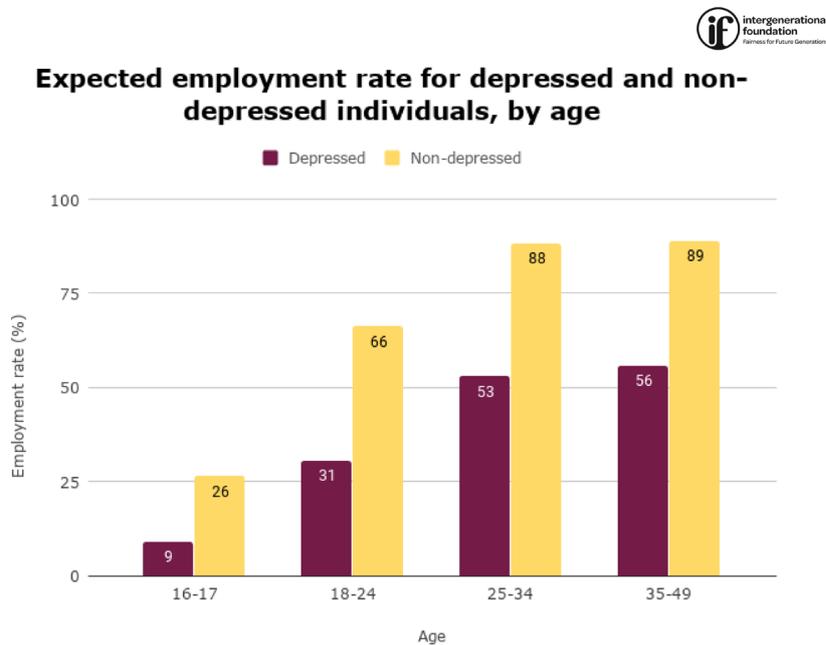
The expected rates of employment for depressed and non-depressed individuals at different time points is shown in Figure 2. Our derivations suggest that the gap in employment rate between depressed and non-depressed young adults is large at all ages. Between the ages of 18 and 24, people without depression were twice as likely to be employed as those with depression. Although the relative gap in employment rates reduces with age, people without depression over the age of 35 are still 56% more likely to be employed.

### Lifetime earnings

To estimate expected income over an individual’s lifetime, we used the Mincer model, which expresses earnings as a function of years of schooling and experience. We assume that all individuals, regardless of depression status, stay in full-time education until the age of 18, as this is the minimum school leaving age in the UK. For educational attainment beyond the age of 18, the likelihood of attaining a university degree has been assumed to be equivalent to the likelihood of participation in Higher Education, which was 50.2% in 2017/18 according to the latest ONS

estimates (Department for Education, 2019). We then inputted these parameters into a simple form of the Mincer earnings function using coefficients estimated by Hanushek et al. (2015), where income is expressed as a function of schooling, experience and the share of the prime-aged, fully-employed population that is female. This gave us the expected earnings profile of a young adult in the UK, which we inflated over time at the current inflation rate to account for productivity increases as individuals age. The analysis applies a simplifying assumption of no gender earnings' gap.

Figure 2.



Source: author's calculations  
© Intergenerational Foundation 2020 www.if.org.uk

### Direct and indirect tax rates

To derive gross tax revenue for both cohorts, we applied the following tax rates to projected lifetime earnings: current income tax rates, current National Insurance rates as well as ONS estimates of the average council tax and indirect tax rates in 2018 (Office for National Statistics, 2019). To approximate lifetime indirect tax, the VAT rate was applied to age specific consumption which, in turn, is a function of disposable income at each age of life.

## 3.2 Estimating government expenditures

Our estimates of total government spending on public benefits are made up of three different types of costs: healthcare, social security payments and education costs.

### Healthcare costs

We derived healthcare costs using statistics on inpatient attendances, outpatient attendances and antidepressant prescriptions by age from the Hospital Episode Statistics (HES) database and the NHS Business Services Authority (BSA) website (NHS Digital, 2019a, 2019b; NHS Business Services Authority, 2017). Using HES data, we firstly calculated the total number of outpatient attendances which listed a form of psychotherapy as the main speciality at different ages. This provided us with an estimate of outpatient activity from all patients with mental health disorders. We assumed that the proportion of these turnouts that can be attributed to depression is equivalent to the average ratio of outpatient attendances from people with depression relative to patients with mental health disorders across all ages.

Combining these figures with statistics on inpatient attendances from patients with depressive or recurrent depressive disorders and age-specific antidepressant prescription rates gave us the excess usage of healthcare services due to depression. These estimates were multiplied by the average unit cost of each service published by NHS Improvement and the Personal Social Services Research Unit (Curtis and Beecham, 2018; NHS Improvement, 2018). It was assumed that the impact of depression on individual use of healthcare services in England was equivalent to the population average across the UK population.

### Social security costs

A key component of cost estimations from the government perspective which distinguishes it from the societal perspective is the inclusion of projected tax contributions and social security payments. From the societal perspective, exclusion of social security payments is justified on the basis that benefits simply redistribute resources within society and cannot be categorised as spent resources (Jo, 2014). In contrast, from the government perspective, these payments pose real costs to public finances and therefore are crucial in order to estimate public economic consequences of a health condition.

To estimate social security costs, we extracted data on different benefit schemes provided on Stat-Xplore, an online database administered by the Department for Work and Pensions. We extracted data on the number of claimants and average weekly amount awarded, disaggregated by age and medical condition, on the following disability benefits: Employment Support Allowance, Personal Independence Payment and Disability Living Allowance (DLA).<sup>3</sup> This was then used to estimate the average amount received in disability benefits per depressed and non-depressed person. Where data on claimants with depression were not available, it was assumed that 40% of claims from people with a mental health disorder were filed by individuals diagnosed with depression, based on similar findings from past records by Viola and Moncrieff (2016). Due to lack of data, payments received in the form of other benefits, for instance housing and unemployment benefits, were assumed to be the same for depressed and non-depressed individuals.

---

<sup>3</sup> Since 2013, new claimants of Disability Living Allowance must be under 16 years old. However, existing claimants who were under 65 years of age before this change was made still receive DLA payments.

## Education costs

Education costs were derived by multiplying years of educational attainment for depressed and non-depressed individuals applied to annual spending estimates per pupil or student taken from Britton, Farquharson and Sibieta (2019). All costs were then converted to 2018/2019 prices and inflated at the current cost inflation rate (Gooding, 2020).

## 3.3 Mortality costs

Finally, to estimate the fiscal consequences of excess mortality, we derived the age-specific probabilities of survival for depressed and non-depressed individuals using the ONS National Life Tables (Morgan, 2019). We assumed that the relative likelihood of mortality between the depressed and non-depressed population is 1.52 as estimated by Cuijpers et al. (2014), which is in line with the methodology used in a recent NICE consultation paper on the cost-effectiveness of different treatments for depression (NICE, 2018).

## 4. Results and Discussion

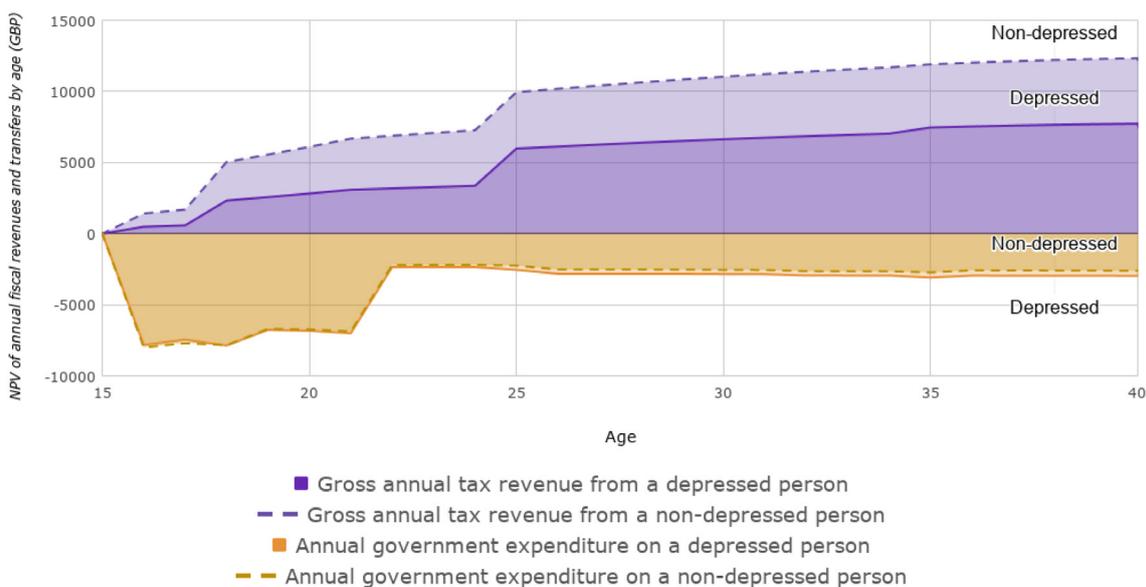
### 4.1 The fiscal cost of depression

Our estimates of expected tax contributions and government expenditures on a depressed and non-depressed individual are presented in Figure 3. All values above zero on the graph represent positive contributions to public finances through taxes paid, whilst values falling below zero represent the amount of money leaving the public purse for spending on healthcare, social security and education. The results demonstrate a typical pattern of tax revenue contributions and costs; between the ages of 16 and 21 years old, the government invests a substantial amount of money in a young person's education, leading to increased government expenditure at the beginning of life. Subsequently, as young individuals enter the workforce, their tax contributions increase as they gain more work experience. However, the results show that a depressed individual contributes considerably less tax revenue and requires higher levels of healthcare and social security payments than their non-depressed counterparts due to reduced rates of employment activity. A depressed person therefore costs the government an additional £37,770 in lost net tax revenue between the ages of 16 to 40 years old. Only £406 of this loss can be attributed to direct healthcare costs, accounting for 1% of the individual fiscal cost. This finding emphasises the importance of considering a broader range of costs in government models beyond those incurred by the NHS.

Figure 3.



**Projected age-specific annual tax contributions and government expenditure for a depressed and non-depressed person**



Source: author's calculations  
Intergenerational Foundation 2020 [www.if.org.uk](http://www.if.org.uk)

Table 1 compares the fiscal consequences of depression at both the cohort and the individual level between the ages of 16 and 40. The total fiscal cost accumulates quickly even at a young age. After the depressed cohort turns 16, there is a discounted fiscal loss of over £34 million compared to non-depressed individuals. This reaches £1 billion at the age of 24 and £2.9 billion by the age of 40. To put this figure into perspective, a course of Cognitive Behavioural Therapy (CBT) treatment (comprising 10 CBT sessions and 2 GP visits) costs the government on average £1078 when converted into 2018-19 prices (NICE, 2018). This means that by the age of 40, the fiscal loss associated with depression for one young person could pay for 35 courses of CBT treatment which translates to 2.7 million courses at the cohort level.

**Table 1. Discounted net tax contributions at the individual and cohort level**

Year	Depressed		Not Depressed		Fiscal loss of depression	
	Cohort (n=78,532)	Individual (n=1)	Cohort (n=78,532)	Individual (n=1)	Cohort (n=78,532)	Individual (n=1)
16	-£330,473,218	-£4,230	-£296,293,946	-£3,793	-£34,179,271	-£438
20	-£1,188,988,365	-£15,226	-£745,993,542	-£9,551	-£442,994,823	-£5,675
25	-£1,125,252,624	-£14,404	£18,694,570	£258	-£1,143,947,194	-£14,662
30	-£597,098,255	-£7,606	£1,221,340,276	£15,710	-£1,818,438,531	-£23,315
35	-£92,317,536	-£1,083	£2,333,622,817	£30,037	-£2,425,940,354	-£31,120
40	£397,009,695	£5,275	£3,339,884,755	£43,045	-£2,942,875,060	-£37,770

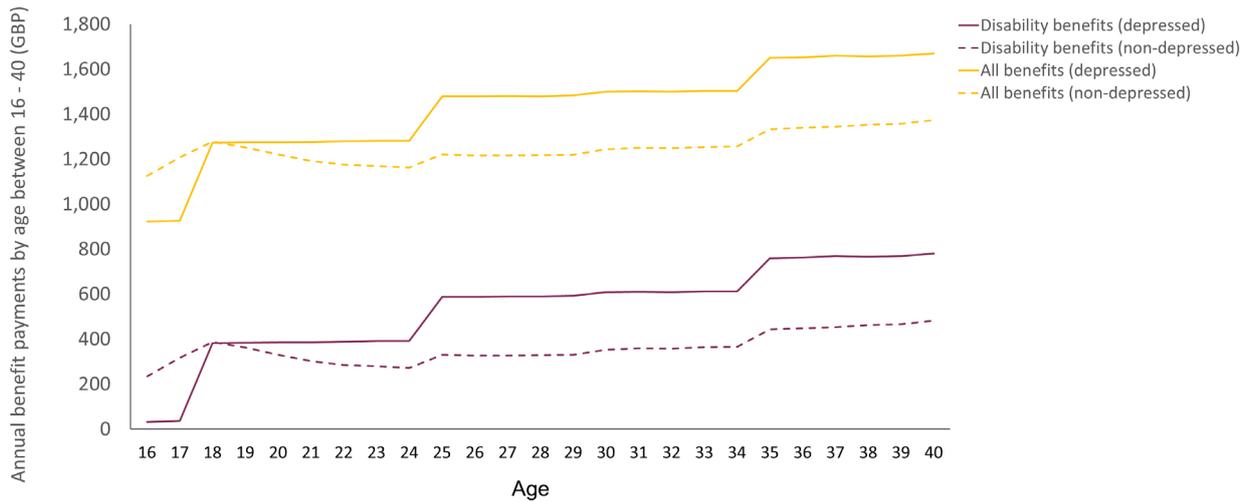
Source: author's calculations

From the government perspective, it may also be useful to know the point at which an individual's net fiscal contribution becomes positive, as this is when they no longer impose a net fiscal burden on the public purse. Because tax revenue is lower and government spending is higher for a depressed individual, their net fiscal contribution takes longer to turn positive. As projected by our model, the value of a depressed person's annual fiscal contribution through taxes only begins to exceed the amount of public money spent on them at the age of 35, specifically 11 years later than their non-depressed counterparts.

While a fiscal loss of £2.9 billion between the ages of 16 to 40 years old is already large, it is likely that our figures underestimate the true fiscal cost. Firstly, our results show that 95% of this loss is driven by the effect that depression has on employment status. Given the higher rates of unemployment, we would expect to observe a large transfer of resources from the government to the depressed cohort in benefit payments. However, our breakdown of government expenditure on social security (Figure 4) suggests that government transfers are only marginally higher overall for a depressed person. It is likely that depressed individuals receive a substantial amount of money through benefits other than disability such as housing, Income Support and Job Seeker's Allowance. Due to lack of data, we were not able to investigate whether depressed individuals receive more transfers than their depressed counterparts from these other government sources.

Figure 4.

**Projected annual costs to government by-age for different benefit payments for depressed and non-depressed persons aged 16 - 40**



Source: author's calculations

Secondly, antidepressants only accounted for 1-3% of total healthcare costs (see Figure 5), which is likely to be an underestimation of the true medical costs as only the cost of the drug itself was considered in our calculations. The prescription of a course of antidepressants is typically accompanied by two GP visits, which cost approximately £36 each for a 9.22 minute consultation (NICE, 2018). However, GP visits were not included as a cost domain due to the absence of data.

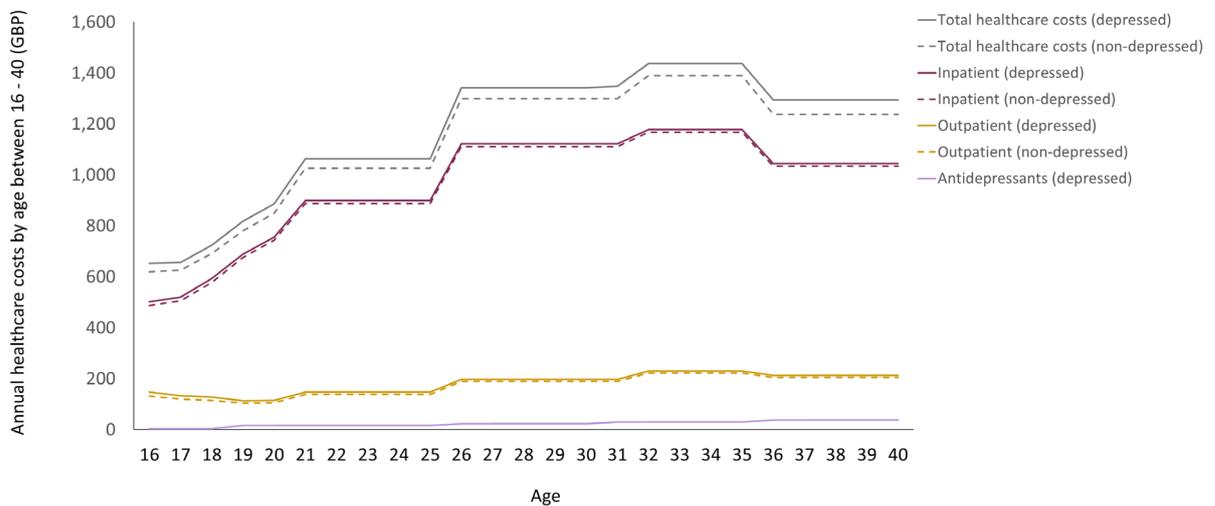
Thirdly, our model only considers the employment losses experienced by individuals who experience full-threshold symptoms during adulthood. López-López et al. (2020) found that people who had depression through adolescence and during childhood, but not as adults, also experienced an increased risk of falling into NEET status during adulthood, most likely because of the disruptive presence of depression during key stages of development in a young person's life.

One final point to emphasise is the finding that, between the ages of 16 to 18, a depressed person receives substantially less money through disability benefit payments than their non-depressed counterparts. On average, the amount of disability benefits received by a depressed person is equivalent to 10% of the amount received by a non-depressed person at this age. The reason behind this seems to be because people with mental health disorders were much more likely to apply for Employment Support Allowance (ESA), which one only becomes eligible for at the age of 18. Between the ages of 16-18, a depressed person is only eligible for Personal Independence Payment (PIP), which bases benefit payments on how your disability impacts ability to complete everyday tasks. Although one of the reasons behind the low number of claims for PIP benefits could be lack of eligibility, it is possible that people with depression may be deterred by the application process itself. In 2017, the High Court ordered the Department for Work and Pensions to get rid of an addition to the PIP eligibility criteria which excluded "overwhelming psychological distress" as an acceptable reason for not being able to undertake journeys, a key criteria for the mobility component of the PIP (Kennedy et al., 2019). Nevertheless, we cannot say with confidence that people with depression between 16 and 18 receive less in social security payments overall than their non-depressed counterparts.

This is because lack of data on unemployment and housing benefits meant that we had to assume that receipt of these other types of benefit payments did not differ by depression status. In reality, it is likely that people with depression are more likely to claim these benefits than people without depression.

Figure 5.

**Projected annual healthcare costs to NHS by treatment category by-age for depressed and non-depressed (16 – 40)**



Source: author's calculations

## 4.2 Varying the model assumptions

We conducted a one-way sensitivity analysis to test how variation of key input parameters and model assumptions affect the estimated fiscal cost of depression. We found that our results were most sensitive to the assumed impact of depression on employment status and its prevalence, whereas changes in relative likelihood of mortality and the inflation of healthcare costs led to only marginal changes. The results of the sensitivity analysis are presented in Table 2.

The prevalence of depression and mental health disorders more generally is difficult to accurately measure, which has given rise to a number of alternative measures. Our model uses the prevalence rate of 10.74% as the baseline value, representing the percentage of patients aged 18 and over in England who have been professionally diagnosed with depression. According to the Adult Psychiatric Morbidity Survey, only 63% of those who had been diagnosed with depression over the previous 12 months demonstrated symptoms of depression in the past week (McManus, 2016). As such, it can be argued that one-week prevalence rates may provide better estimates of the expected number of people with full-threshold symptoms at any given time. We tested to see if assuming a one-week prevalence rate of 3.3% would significantly change in the fiscal outcome. The results appear to be sensitive to our assumptions on prevalence, as lowering the rate from 10.64% to 3.3% reduced the cohort fiscal cost by more than a half from £2.9 billion to £1.37 billion. On the contrary, the fiscal cost at the individual level increased. This is because the aggregate healthcare and social security costs recorded in 2018 was assumed to be distributed amongst a much smaller group of depressed people.

**Table 2. Results of one-way sensitivity analyses**

Parameter	Scenario	Cohort fiscal loss
<b>Depression prevalence rate</b>		
10.74%	Baseline	-£2,942,875,060
3.30%	Very conservative	-£1,366,152,923
<b>Relative mortality rate a</b>		
1.52	Baseline	-£2,942,875,060
1.3	Conservative	-£2,940,503,476
<b>Relative likelihood of NEET status</b>		
4	Baseline	-£2,942,875,060
1.94	Conservative	-£1,193,750,801
8.6	Optimistic	-£5,222,081,245
<b>Inflation of healthcare costs</b>		
Annual inflation (1.7%)	Baseline	-£2,942,875,060
Annual inflation + 2%	Optimistic	-£2,964,837,041
<b>Depreciating employment impact</b>		
No reduction	Baseline	-£2,942,875,060
25% reduction	Conservative	-£2,839,434,428
50% reduction	Very conservative	-£2,721,484,935

Source: author’s calculations

<sup>a</sup> Relative values represent the likelihood of that event occurring relative to the depressed cohort.

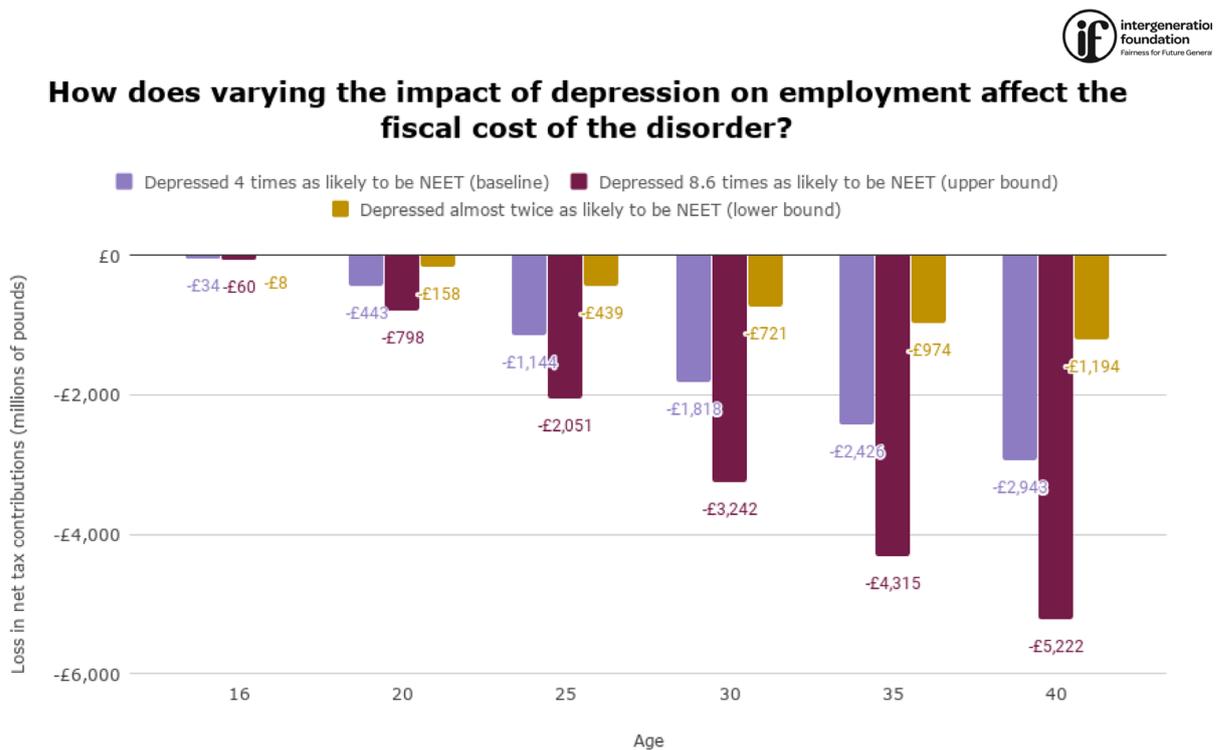
The fiscal results were even more sensitive to our assumptions on the relative likelihood of NEET status. According to our baseline estimates, people with depression throughout adulthood are on average approximately 4 times more likely to fall into NEET status than the non-depressed population. We derived the upper and lower bound estimates for this parameter using the 95% confidence intervals on the impact of “childhood-persistent” and “early adulthood” depression on likelihood of NEET status (see Table A in the Appendix for the breakdown of these estimates and their confidence intervals). In the best-case scenario, a depressed person is almost twice as likely as their non-depressed counterparts to fall into this category of employment, whereas in the worst-case scenario, they would be 8.6 times more likely.

These values were used to simulate how the fiscal cost of depression changes as the impact of depression on employment status varies. The results are presented in Figure 6. If the association between depression and NEET status were to strengthen, we would observe an increase in the fiscal consequences of depression, with losses in net tax contributions potentially rising up to the

value of £5.2 billion pounds. Conversely, the government could save a total of £1.74 billion in lost net tax contributions – or 60% of the fiscal cost – by reducing the baseline impact by half. Minimising the impact of depression on the likelihood of employment should therefore be a key policy goal.

The second aim of the sensitivity analysis was to address some of the potential limitations of our study, one of which is our assumption that the size of the impact of depression on NEET status at the age of 24 remains constant throughout adulthood. It is reasonable to think that the association between depression and NEET status will lower with age. To address this potential shortfall, we assumed that the effect of depression on employment depreciates once an individual reaches 35 years old. Varying the depreciation rate leads to relatively small, but not insignificant reductions in the fiscal loss: assuming a depreciation rate of 50% triggers a 6.8% decrease in the fiscal cost at the cohort level, from £2.9 billion to £2.7 billion.

Figure 6.



Source: author's calculations  
 © Intergenerational Foundation 2020 www.if.org.uk

Previous studies by the PSSRU have assumed that healthcare costs increase at a rate higher than general inflation (for instance, Comas-Herrera et al., 2007). This is because “productivity increases in a labour-intensive industry such as health care would be more difficult to achieve than in other areas, and yet there is a pressure for wage increases to keep pace with those in other industries” (Baumol, 1995). Following the lead of PSSRU studies, we re-estimated the fiscal cost of depression under an updated inflation rate for healthcare costs of 2% above annual inflation. Although the total fiscal loss of depression reduces by £22 million, this accounts for a less than 1% reduction relative to our baseline estimates – a very marginal change in the results.



Lastly, we have assumed that excess mortality associated with depression is linked to both the risk of suicide and declines in physical health due to induced chronic diseases and unhealthy lifestyle behaviours. However, one could argue that drivers of declines in physical health predominantly lead to premature death in older age; as such we may be overestimating the relative risk of premature death for young people, which will be primarily driven by risk of suicide (Zivin, 2015). However, reducing the relative likelihood of mortality to a lower estimate of 1.3 led to negligible changes in the result.

## 5. Conclusion and recommendations

This research set out to estimate the fiscal consequences of depression between the ages of 16 to 40 years old, making this the first study to estimate the public economic consequences of depression from a government perspective. Our findings show that a depressed person is expected to cost the government an additional £37,770 as a result of lost tax revenues, increased health service use, social security payments and excess mortality between the ages of 16 to 40 years old. Applying our estimate to an annual birth cohort translates to a total fiscal cost of £2.9 billion between the ages of 16 and 40 for each birth cohort.

These figures suggest that there is a strong economic case for increased spending on depression that will enable those with depression to achieve a normal life trajectory. What the government loses in net tax contributions from each depressed person could pay for 35 courses of CBT treatment consisting of 10 sessions of each. If we consider the fiscal loss from the entire cohort, this would be equivalent to paying for 27 million courses of CBT treatment.

Our results also demonstrate that mitigating the impact of depression on employment outcomes can lead to large reductions in fiscal losses. Depression can lead to behavioural and cognitive changes such as low motivation, stress and low mood, which hinder progressions in employment searches. Most recent estimates suggest that having depression as an adult means you are four times more likely to not be in employment, education or training (NEET). Reducing this impact by half can produce an extra £1.74 billion in net tax contributions, or in other words, retrieve 60% of the total fiscal cost. Conversely, allowing the impact to worsen can potentially inflate the cost up to a value of £5.2 billion. For these reasons, we would expect policy responses that try to minimise the association between depression and unemployment to provide the best value for money for the public purse. Furthermore, we found that direct NHS costs only account for a small portion of the fiscal cost. We therefore recommend that research on the costs and benefits of services should not only consider benefits in terms of improved health or quality-adjusted life years, but also in terms of gains in employment and fiscal revenue linked to employment activity.

While this paper cannot comment on what types of treatment would provide the best net return on investment fiscally, our results highlight the value of public spending on the disorder and the importance of minimising the relationship between depression and employment outcomes. This is no less important in the context of COVID-19. Young people have been found to be two and a half times more likely as other employees to work in sectors that have shut down as a result of the lockdown (Joyce and Xu, 2020). Whilst depression has consequences on employment, unemployment can also exacerbate depressive symptoms and there is a real risk that the prevalence of depression amongst young people – and hence the fiscal cost – will rise in the aftermath of the pandemic.

Furthermore, as we accumulate billions of pounds worth of sovereign debt to tackle COVID-19, the question of how this enormous bill will be paid looms large. The implicit implication of our findings is that increasing expenditure on interventions for depression could result in higher tax revenues and it would have the added benefit of mitigating the controversy associated with raising taxes. Failing to invest in interventions which combat depression, on the other hand, runs the risk of prolonging spells of unemployment amongst young adults, which of course has huge fiscal consequences as this leaves large gaps in their tax contribution records. Despite recent levels of spending, a depressed person becomes a net contributor to public finances 11 years later than their non-depressed counterpart, largely as a result of spending more time outside employment.

Finally, while our results suggest that the fiscal cost of depression is already large, good quality data did not exist which would have allowed us to consider other costs which could be associated



with depression among young adults, such as expenditure on other types of benefits, the impact of mental health on physical health, or the consequences of childhood depression on employment outcomes in adulthood. Since we had to omit these factors, our estimates most likely underestimate the true fiscal consequences of depression. Public bodies could improve the availability of these statistics to help with developing a fuller picture of the cost of depression and mental health disorders more generally on public finances.

## References

Alderwick, H., & Dixon, J. (2019). The NHS long term plan.

Auerbach, A. J., Gokhale, J., & Kotlikoff, L. J. (1994). Generational accounting: a meaningful way to evaluate fiscal policy. *Journal of Economic Perspectives*, 8(1), 73-94.

Baumol, W. J. (1995). Health care as a handicraft industry. *Monographs*.

Borghini, J., & Guest, J. F. (2000). Economic impact of using mirtazapine compared to amitriptyline and fluoxetine in the treatment of moderate and severe depression in the UK. *European Psychiatry*, 15(6), 378-387.

Britton, J., Farquharson, C., & Sibieta, L. (2019). 2019 annual report on education spending in England.

Comas-Herrera, A., Wittenberg, R., Pickard, L., & Knapp, M. (2007). Cognitive impairment in older people: future demand for long-term care services and the associated costs. *International Journal of Geriatric Psychiatry: A journal of the psychiatry of late life and allied sciences*, 22(10), 1037-1045.

Connolly, M. P., Kotsopoulos, N., Postma, M. J., & Bhatt, A. (2017). The fiscal consequences attributed to changes in morbidity and mortality linked to investments in health care: a government perspective analytic framework. *Value in Health*, 20(2), 273-277.

Cooper, B. (2011). Economic recession and mental health: an overview. *Neuropsychiatry*, 25(3), 113-117.

Crenna-Jennings, W., & Hutchinson, J. (2020). Access to child and adolescent mental health services in 2019.

Cuijpers, P., Vogelzangs, N., Twisk, J., Kleiboer, A., Li, J., & Penninx, B. W. (2014). Comprehensive meta-analysis of excess mortality in depression in the general community versus patients with specific illnesses. *American Journal of Psychiatry*, 171(4), 453-462.

Curtis, L., & Beecham, J. (2018). GP prescription costs-changes over time.

Department for Education. (2019). Participation rates in higher education: Academic years 2006/2007 – 2017/2018 (Provisional).

Dierker, L. C., Avenevoli, S., Stolar, M., & Merikangas, K. R. (2002). Smoking and depression: an examination of mechanisms of comorbidity. *American Journal of Psychiatry*, 159(6), 947-953.

DiMatteo, M. R., Lepper, H. S., & Croghan, T. W. (2000). Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Archives of Internal Medicine*, 160(14), 2101-2107.

Donohue, J. M., & Pincus, H. A. (2007). Reducing the societal burden of depression. *PharmacoEconomics*, 25(1), 7-24.

Fletcher, J. (2013). Adolescent depression and adult labor market outcomes. *Southern Economic Journal*, 80(1), 26-49.

Fletcher, J. M. (2008). Adolescent depression: diagnosis, treatment, and educational attainment. *Health Economics*, 17(11), 1215-1235.



Galea, S., Merchant, R. M., & Lurie, N. (2020). The mental health consequences of COVID-19 and physical distancing: The need for prevention and early intervention. *JAMA Internal Medicine*.

Gooding, P. (2020). Consumer price inflation, UK: March 2020.

Hanushek, E. A., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2015). Returns to skills around the world: Evidence from PIAAC. *European Economic Review*, 73, 103-130.

Holahan, C. J., Moos, R. H., Holahan, C. K., Cronkite, R. C., & Randall, P. K. (2003). Drinking to cope and alcohol use and abuse in unipolar depression: a 10-year model. *Journal of Abnormal Psychology*, 112(1), 159.

Jo, C. (2014). Cost-of-illness studies: concepts, scopes, and methods. *Clinical and Molecular Hepatology*, 20(4), 327.

Jones, D., Neal, R. D., Duffy, S. R., Scott, S. E., Whitaker, K. L., & Brain, K. (2020). Impact of the COVID-19 pandemic on the symptomatic diagnosis of cancer: the view from primary care. *The Lancet Oncology*.

Jönsson, B., & Bebbington, P. E. (1994). What price depression?: The cost of depression and the cost-effectiveness of pharmacological treatment. *The British Journal of Psychiatry*, 164(5), 665-673.

Joyce, R., & Xu, X. (2020). Sector shutdowns during the coronavirus crisis: which workers are most exposed. Institute for Fiscal Studies. <https://www.ifs.org.uk/publications/14791>.

Kennedy, S., McInnes, R., Mackley, A., Bellis, A., Brown, S., & Steele, S. (2019). Mental health and the benefits assessment process. House of Commons Library.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593-602.

Killaspy, H. (Producer) (2020). Seminar Series: The Impact of Covid-19 on Mental Health Services, London, UK. Professor Helen Killaspy. Zoom Meeting [Video]. [https://zoom.us/rec/play/tJAufv9Ds3TtGX4gSDVvd9W9S\\_KPms1XNN8\\_QEz0a9VnkLN1ahNeZBY7TpXrq3cFWG4-je76a6DfyP](https://zoom.us/rec/play/tJAufv9Ds3TtGX4gSDVvd9W9S_KPms1XNN8_QEz0a9VnkLN1ahNeZBY7TpXrq3cFWG4-je76a6DfyP)

Kind, P., & Sorenson, J. (1993). The costs of depression. *International Clinical Psychopharmacology*.  
Knapp, M., & Lemmi, V. (2014). The economic case for better mental health.

Knapp, M., McCrone, P., Fombonne, E., Beecham, J., & Wostear, G. (2002). The Maudsley long-term follow-up of child and adolescent depression: 3. Impact of comorbid conduct disorder on service use and costs in adulthood. *The British Journal of Psychiatry*, 180(1), 19-23.

Kotsopoulos, N., Connolly, M. P., Sobanski, E., & Postma, M. J. (2013). The fiscal consequences of ADHD in Germany: a quantitative analysis based on differences in educational attainment and lifetime earnings. *The Journal of Mental Health Policy and Economics*, 16(1), 27-33.

Lawrence, D., Kisely, S., & Pais, J. (2010). The epidemiology of excess mortality in people with mental illness. *The Canadian Journal of Psychiatry*, 55(12), 752-760.

Lee, A. M., Wong, J. G., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., ... & Chua, S. E. (2007). Stress and psychological distress among SARS survivors 1 year after the outbreak. *The Canadian Journal of Psychiatry*, 52(4), 233-240.



López-López, J. A., Kwong, A. S., Washbrook, E., Pearson, R. M., Tilling, K., Fazel, M. S., ... & Hammerton, G. (2020). Trajectories of depressive symptoms and adult educational and employment outcomes. *BJPsych Open*, 6(1).

Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Penninx, B. W., & Zitman, F. G. (2010). Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Archives of General Psychiatry*, 67(3), 220-229.

McCrone, P. R., Dhanasiri, S., Patel, A., Knapp, M., & Lawton-Smith, S. (2008). Paying the price: the cost of mental health care in England to 2026. *King's Fund*.

McManus, S., Bebbington, P., Jenkins, R., & Brugha, T. (2016). Adult psychiatric morbidity survey: survey of mental health and wellbeing, England, 2014.

Morgan, E. (2019). National life tables: UK [Data file]. Retrieved from: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/datasets/nationallifetablesunitedkingdomreferencetables>

Myer, L., Stein, D. J., Jackson, P. B., Herman, A. A., Seedat, S., & Williams, D. R. (2009). Impact of common mental disorders during childhood and adolescence on secondary school completion. *SAMJ: South African Medical Journal*, 99(5), 354-356.

National Audit Office (2017). Supporting people with autism through adulthood. Available from: <https://www.nao.org.uk/wp-content/uploads/2009/06/0809556.pdf>

National Health Service (NHS) (2019). Quality and Outcomes Framework, Achievement, prevalence and exceptions data 2018-19 [PAS] [Data file]. England: NHS Digital. Retrieved from: <https://digital.nhs.uk/data-and-information/publications/statistical/quality-and-outcomes-framework-achievement-prevalence-and-exceptions-data/2018-19-pas>

National Institute for Health and Care Excellence (NICE) (2013). Process and Methods Guide: Guide to the Methods of Technology Appraisal 2013.

National Institute for Health and Care Excellence (NICE) (2018). Depression in adults: treatment and management. NHS Business Services Authority. (2017). Antidepressant prescribing 2015/16 and 2016/17 [Data file]. retrieved from: <https://www.nhsbsa.nhs.uk/prescription-data/prescribing-data/antidepressant-prescribing>

NHS Digital (2019a). Hospital Admitted Patient Care Activity 2018-19 [Data file]. Retrieved from: <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity>

NHS Digital (2019b). Hospital Outpatient Activity 2018-19 [Data file]. Retrieved from: <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity>

NHS Improvement (2018) 2017/18 reference costs and guidance [Data file]. England: NHS Improvement. Retrieved from: <https://improvement.nhs.uk/resources/reference-costs/>

Norfolk and Suffolk NHS Foundation Trust (2020). Specialist community mental health services for children and young people. Care Quality Commission.

Office for National Statistics (2019). Effects of Taxes and Benefits on UK Household Income: Financial Year ending 2018.



Okumura, Y., & Higuchi, T. (2011). Cost of depression among adults in Japan. *The Primary Care Companion to CNS Disorders*, 13(3).

Penninx, B. W., Milaneschi, Y., Lamers, F., & Vogelzangs, N. (2013). Understanding the somatic consequences of depression: biological mechanisms and the role of depression symptom profile. *BMC Medicine*, 11(1), 129.

Roshanaei-Moghaddam, B., Katon, W. J., & Russo, J. (2009). The longitudinal effects of depression on physical activity. *General Hospital Psychiatry*, 31(4), 306-315.

Thomas, C. M., & Morris, S. (2003). Cost of depression among adults in England in 2000. *The British Journal of Psychiatry*, 183(6), 514-519.

Zivin, K., Yosef, M., Miller, E. M., Valenstein, M., Duffy, S., Kales, H. C., ... & Kim, H. M. (2015). Associations between depression and all-cause and cause-specific risk of death: a retrospective cohort study in the Veterans Health Administration. *Journal of Psychosomatic Research*, 78(4), 324-331.

# Appendix

**Table A. Range of estimates for relative likelihood of NEET status**

<b>Depression status (prevalence)</b>	<b>Likelihood of NEET status relative to non-depressed population (95% CI)</b>
Early adulthood (77%)	3.7 (1.94 – 7.04)
Childhood persistent (23%)	5.17 (1.95 – 13.7)
Depressed cohort average	4.03 (1.94 – 8.6)

Source: author's calculations based on estimates from López-López et al. (2020)



## Notes





Intergenerational Foundation  
[if.org.uk](http://if.org.uk)