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# Debt and Mental Well-being Among Older Adults: Does Employment Status Matter? – Combining Population Inference and Target Trial Frameworks

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## Abstract

While debts are widely used financial tools, few longitudinal studies investigating potential causal links between debts and mental wellbeing exist among older adults. Older adults, particularly those not employed, are less likely to have increasing incomes to help them pay off their debts. This study investigates whether older adults with non-mortgage debts in three different labour market states have lower mental wellbeing and, separately, whether it is likely that reducing their debts helps to improve mental wellbeing. Using the English Longitudinal Study of Ageing, the study focuses on the English context, which is particularly interesting due to the high levels of, and a unique policy approach to, private indebtedness.

The results indicate that people with debts have lower mental wellbeing (more depressive symptoms and lower quality of life) in all categories, but the mental pain linked to debts is stronger for people who are jobless (not working, not retired). The analysis from a causal perspective suggests that getting rid of debts may reduce depressive symptoms among people who are jobless but may also improve quality of life among the retired and employed. Both these findings suggest that mental health services should work closely with debt advice when needed.

## Introduction

This paper examines the debt-mental wellbeing connection and its moderation by labour market status, from the two separate but connected perspectives of population associations and causal effects. The paper does so while analysing representative data on older adults in England. Due to its ageing population, high prevalence of non-mortgage debts and unique policy approach to issues arising from indebtedness, England offers an interesting study context.

In an era of ageing populations, a focus on debts and older adults is important. Older adults are familiar with debt and unlikely to be immune to the mental health consequences of debts (Zurlo *et al.*, 2014). In fact, they may be particularly vulnerable to mental distress arising from their debt payments because they, especially those not employed, are typically not in a position to be able to expect increasing incomes to cope with debts.

However, the available research on debt and mental wellbeing has often not clearly differentiated population inference (that is, questions that aim to describe an actual population) and causal inference (that is, questions that aim to estimate the effects of interventions or changes of exposure in that population). While there is evidence that debts are associated with lower mental wellbeing, adjusting for other socioeconomic variables (Drentea and Reynolds, 2012), it remains uncertain whether this association should be interpreted as a population association or as a causal effect.

Both population inference and causal inference (from observational data) are of importance and are aims of this paper; but, without a deliberative distinction between the two, there is a risk of ineffective policy measures. From a policy viewpoint, an accurate description of the population at risk – how many people are affected, to what degree, and what kinds of characteristics and circumstances they have – is crucial, in the first place, in order to target support to the right people efficiently. In contrast, understanding the counterfactuals under different interventions and scenarios is important in order to find the most effective forms of support. While analytically separate, questions of population and causal inference are very much connected thus important to analyse in tandem – without knowing the right people to target the support at, the effects of the support cannot be defined.

Moreover, earlier research on older adults has ignored potential moderation of associations (a term referring in this paper to population inference) and causal effects (referring to causal inference). It is unclear whether debts are associated with, and cause, worse mental wellbeing similarly for all people or differently for people with different characteristics. This paper considers, in particular, such moderation by a person's labour market status. Joblessness, defined throughout this paper as a labour market status in which a person is not in employment while not yet retired, may determine the extent to which debts are associated with worse mental wellbeing in older adults.

As an explanatory variable of interest, the paper focuses on non-mortgage debts (which are henceforth just called debts) because the association between mortgage debts and mental wellbeing is less clear (Hojman *et al.*, 2016). The unit of analysis here is individual, but debt is measured at benefit unit level.

The study uses two mental wellbeing outcome variables: depressive symptoms and quality of life summary score. The key moderating variable of labour market status is applied to three groups: employed, retired and jobless. The jobless category consists of older adults who are unemployed, unable to work due to sickness, or not in the labour force due to caring for family members, for example. This category is of particular interest because those neither participating in paid employment nor retired have a lower ability to cope with their debts and lower expected and more uncertain income in the future.

The first perspective of this study, population inference, investigates whether people who are jobless and with debt have lower mental wellbeing than one would expect knowing the separate associations of debt and joblessness with mental wellbeing alone. There is a clear policy implication of such a population inference question. For example, debt help organisations with limited resources need to decide which subgroups present the largest differences and most scope for potential positive effects of mental health interventions.

The second perspective focuses on a "what if" scenario. It conceptualises the parameters of interest using a target trial framework, adapted from epidemiological literature. This part of the study aims to estimate the effect of getting rid of debt on mental wellbeing and to investigate whether these effects vary by labour market status. The paper argues that this target trial framework is a useful tool worth introducing to social policy researchers to help them formulate clearly defined causal questions. The second perspective provides tentative implications regarding whether and for whom there would be any mental wellbeing benefits of some interventions that help older adults to get debt free.

The paper begins with a description of the unique policy approach to private indebtedness in the UK, then discusses the link between debt and mental health, and finally provides an argument for treating labour market status as a key moderator in the debt-mental wellbeing association. This is followed by an introduction to the English Longitudinal Study of Ageing (ELSA), and its variables used in the current study. Then the analytical plan for, and results of, the population inference and causal inference from observational data questions are then presented. The results show that while the mental pain linked to debts is observed in all three labour market groups, the population association is largest in the jobless group. The causal inference from an observational data perspective shows that getting rid of debts reduces a number of depressive symptoms among the jobless. The paper ends with an argument that policymakers should consider further integration of mental and debt help services.

## Background

### Institutional context

The United Kingdom (UK) has witnessed substantial growth in the levels of household indebtedness in the last 50 years (Office for National Statistics, 2020). Around half of British adults have some non-mortgage debt, with the median amount owed at around £4,500 in 2016-18 (Office for National Statistics, 2019). Cross-sectionally the level and amount of unsecured debt decreases curvilinearly with age, with a steeper decrease after mid-life (Hood *et al.*, 2018). Older adults nevertheless often have debt. In Great Britain, the number of adults aged 55 and older with non-mortgage debts – often used interchangeably with financial or unsecured debts, albeit not as synonyms – has been increasing in recent years due to population ageing, standing at four million, around a fifth of the age-group, in 2016-2018 (Office for National Statistics, 2019).

Non-mortgage debts are arguably convenient financial tools for the purchase of goods and services, alleviating financial shortfalls, and in some circumstances

providing new economic opportunities not possible without lending. For most people with non-mortgage debts, these financial tools do not seem to cause significant problems. In the Wealth and Assets Survey (WAS) conducted between 2016-2018, 57% of British adults with financial debt reported that their debts were "not a problem at all", 30% reported debts to be "somewhat of a burden" and 14% "a heavy burden" (Office for National Statistics, 2019).
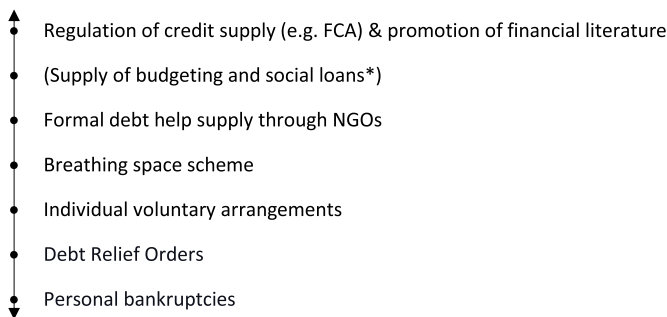
Nevertheless, debts can cause social and economic hardship and exacerbate existing inequalities. Debts with worse terms are often targeted at people in disadvantageous socioeconomic circumstances without much choice of better options (Dwyer, 2017). People with existing disadvantages are also more likely to experience disruptions arising from debts due to payment difficulties (Dwyer, 2017). The troubles arising from debts may range from mental stress from debt payments to bailiff orders.

It is challenging to estimate the proportion of the population that experience such debt problems. This is because there is no widely shared view on the threshold after which debts turn from useful financial tools into "problem debts". According to a strict definition used in the WAS, some four percent of British households in 2016/2018 were identified as having a problem debt[1]. The WAS figures, however, differ substantially from the estimates presented by other organisations using different definitions (Palframan, 2019).

The British policy approach to personal indebtedness has evolved within the wider background of the changing distributional landscape and role of public welfare provision. In a country with decreased public welfare provision – in the UK known as "austerity" – and a strong reliance on private savings to insure against social risks – "asset-based welfare" – easy access to credit has emerged as a substitute form of "safety net" (Dagdeviren et al., 2020; Rowlingson et al., 2016; Soederberg, 2014). It is argued that debts are used as a financial tool, without much choice, to substitute for a lack of savings and voids in social security, such as delays in payments of the main social assistance benefit, known as Universal Credit (Millar and Whiteford, 2020).

Although the provision of formal debt help was less affected by the budget cuts from 2010 onwards, the crisis loans and Community Care Grants elements of the Social Fund were terminated in 2013. Their role was, to a varying extent, transferred to local authorities (Gibbons, 2015). For older individuals, the changes related to austerity have mainly affected people who are neither employed nor retired, especially long-term sick and disabled people, who have seen substantial restrictions in entitlement to both cash and care (Burchardt et al., 2020). Employed older adults and the retired have been less affected by these cuts because their pensions have been secured.

Examples of the UK's policies on debt problems are shown in Figure 1[2]. The approach has several distinct elements compared to the approaches taken by European welfare states. First, the preventative measures in the UK emphasise credit regulation, industry responsibility and financial literacy. Less weight is given in social security to income replacement to prevent people from falling into debt problems after income shocks, an approach taken in Northern European countries (Angel and Heitzmann, 2015; Wiedemann, 2018). Second, the non-profit sector is heavily involved in the provision of formal debt help and in alleviating debt problems, with a small role of some for-profit actors (Eurofound, 2020). This is in

**Preventative policies → preventing entry to debt problems**

Regulation of credit supply (e.g. FCA) & promotion of financial literature

(Supply of budgeting and social loans*)

Formal debt help supply through NGOs

Breathing space scheme

Individual voluntary arrangements

Debt Relief Orders

Personal bankruptcies

**Curative policies → providing routes to exit from debt problems**

**Figure 1.** Examples of UK social policies to address debt problems*.
*Not exclusive list. Source: (Eurofound, 2020).

contrast to other European countries in which formal debt help is often provided by local authorities or in the form of legal help or social work (Alleweldt *et al.*, 2014; Dubois and Anderson, 2010; Eurofound, 2020). Third, the curative measures for debt problems are more debtor friendly in the UK than in continental European countries (Angel and Heitzmann, 2015; Eurofound, 2020; Hoffmann, 2012; König, 2016). For example, the UK offers Debt Relief Orders as a cheaper, nonjudicial and simplified alternative to traditional personal bankruptcy procedures (Conway, 2021). Debt relief order is a measure to discharge debts, after a 12-month restriction period, for debtors with less than £30,000 of debts, little spare income or assets. This type of "no income, no assets" policy measure is not available in many European countries (Heuer, 2020). Thus, the lack of generous social insurance, and the sustained easy access to credit is, at least in principle, compensated for by the curative policies for debt problems.

The debate on personal indebtedness in the UK would benefit from a social epidemiological perspective. This overall design of debt policy – in so far as it has a conscious design at all – neglects the potential impact of problem debts on mental wellbeing. Very little is discussed about the implications of indebtedness for the population's (mental) health and wellbeing, especially among vulnerable population subgroups. Some important exceptions exist in the social policy literature (see Balmer *et al.*, 2006; French and McKillop, 2017), but these have not analysed older adults or vulnerable subgroups separately.

### Debt and mental wellbeing

Research from the UK and elsewhere has consistently observed a relationship between household debt and depression (Richardson *et al.*, 2013). The finding that people with non-mortgage debts tend to have a higher risk of depression and lower mental wellbeing (Richardson *et al.*, 2013) is, as such, very policy-relevant. However, there is debate on the extent to which this association can be interpreted as debts causing worse mental wellbeing. It is possible that the observed association reflects

to a large extent some third, unknown, confounding-factor; or that lower mental wellbeing causes indebtedness; or both.

Previous observational studies on debt and mental wellbeing often fall far short of a meaningful causal interpretation. The issues in interpretations of observational data in the context of social epidemiological research are debated at length elsewhere (Kaufman, 2019), but, in short, the argument is that no causal interpretation can be provided chiefly because, in observational studies, clear causal questions have rarely been explicitly asked and separated from questions of population inference. As a result, the analytical approaches chosen are not designed to provide an answer to causal questions, and, it is further argued (Hernán, 2018), the interpretations of the findings in these studies are left somewhere in the middle between descriptive population (what is) and causal (what if) inference. This is an important concern because social epidemiology as an academic discipline, like social policy, holds a mission-oriented approach towards improving population health and mental wellbeing, and reducing unfair health inequalities, e.g. (Fisher, 2022), tasks for which a clear distinction between inference about actual population ("at whom to target help?") and inference about counterfactual scenarios under an intervention ("what works?") is needed.

Another key limitation in the previous research on debt and mental wellbeing is a lack of consideration of heterogeneity, in terms of the varied circumstances in which indebtedness is experienced and its causes across different characteristics or population groups. Neglecting this may lead to, in the worst cases, policy implications that are harmful for some subpopulations.

Debts are not certainly depressing for all to the same extent. Qualitative investigations have suggested that debts are particularly stressful when combined with socioeconomic disadvantages such as long-term illness, unemployment or income poverty (Purdam and Prattley, 2021). Some quantitative evidence also supports this line of argument (Hodson *et al.*, 2014) but the potential moderating role of labour market status in the association has not yet been investigated.

Joblessness may be a key moderating-factor that determines the extent to which debts are linked to lower mental wellbeing among older adults. First, debts with worse terms are targeted to people in disadvantageous socioeconomic circumstances (Dwyer, 2017), including those not employed. Such debts may be particularly stressful, thus causing a stronger link between debt status and mental wellbeing in older adults who are not employed. Second, being out of work implies lower incomes and a weaker current ability to cover debt payments, which may trigger lack of material resources, stress and potential debt collection actions. Third, unemployment may also have a serious effect on repayment ability in the longer run. A joblessness period in later life may weaken employment prospects and future pension income, and thereby affect people's subjective repayment ability to cope with debts in the long term. All these factors then suggest that debts have a differential association with mental wellbeing in older adults by labour market status.

## Research questions

This study advances the research on debt and mental wellbeing in older adults by clearly separating questions of population inference from questions of causal effects.

It does so while studying the moderation of the connection between debt and depression by employment status. The research questions are:

- To what extent does the association between debt and mental wellbeing differ by three labour market statuses in the older adult population in England?
- To what extent does the effect of getting rid of debt on mental wellbeing differ by three labour market statuses in the older adult population in England?


## Methods

### Data and variables

The data set for this study is the English Longitudinal Study of Ageing (ELSA), which is an ongoing longitudinal household survey (Banks *et al.*, 2019). This study uses data from ELSA waves 1-9, conducted approximately every two years between 2002/3-2018/9. ELSA aims to represent people aged 50 years and over living in England. The sample was drawn from earlier respondents to the Health Survey for England (HSE), which uses a two-stage stratified random sample selection process with postcode sectors and then households drawn from Royal Mail's Postcode Address File. The details of HSE sampling are provided in its cohort profile (Mindell *et al.*, 2012). To maintain the representativeness of the target population, the ELSA study was refreshed at waves 3, 4, 6, 7 and 9 with additional samples with the same inclusion criteria except for the birth year. Participants were followed up for re-interviews in the subsequent waves. The data was mainly collected via computer-assisted personal interviews (CAPI). Financial information, including household debt, was collected at the level of a benefit unit (couple with any dependent children) from a financial respondent when couples kept their finances together and from each individual otherwise. For this study, some variables were taken from the harmonised, easy-to-use version of ELSA provided by the Gateway to Global Aging Data (Beaumaster *et al.*, 2019) and some variables were derived directly from the wave-specific ELSA datasets, all of which are openly available in the UK data service.

### Measures

As an explanatory variable of interest, this study focuses on self-reported non-mortgage debt, measured at a benefit unit level. Participants were asked whether they, or their partners, had (1) any credit or store card debt (recorded to zero if the respondents pays off the balance each month), (2) informal debt to relatives, friends or private individuals, and (3) any other type of debt excluding mortgage debt, such as hire purchase agreement, personal loans from financial institutions and overdrafts. These three categories were asked separately, but, for the purposes of this study, they were combined into a single dichotomous variable, which was coded 1 when the person, or other members of his/her benefit unit, reported any of the three types of non-mortgage debt and 0 otherwise. The supplementary materials provide the exact questions asked. While ELSA provides detailed data on assets, the gross debt variable, rather than a net debt variable, was used in this study. While lack of

available assets exacerbates the link between debt and mental well-being outcomes, evidence indicates that detrimental effects of debt are likely also for people with assets (Hiilamo, 2020). Moreover, few older adults in the sample and population are in net debt – that is, they have negative total wealth. Using a gross debt measure is the standard approach in the research on debt and health outcomes (Richardson *et al.*, 2013). In this study, the amount of debt was ignored in the population inference part while taken into consideration in the causally oriented analysis as a variable included in the propensity score model (see details below).

Two mental wellbeing outcome measures were used. The first is a continuous version of depressive symptom items reported in the eight-item Center for Epidemiologic Studies Depression Scale (CES-D 8) (Turvey *et al.*, 1999). People were asked whether they felt the following depressive symptoms much of the time during the previous week (yes or no): depressed; everything was an effort; restless sleeping; felt happy (reverse coded); lonely; enjoyed life (reverse coded); sadness; and unable to get going. The outcome ranged from 0 to 8, a higher value indicating a higher number of depressive symptoms. Second, quality of life was measured by the CASP-19 score. The details of this score are described in a previous study (Hyde *et al.*, 2003). The scale consisted of 19 items regarding control, autonomy, self-realisation and pleasure in life, each rated on a four-point scale. The theoretical range of this score was 0-57, a higher score reflecting a better quality of life. The score was obtained from a self-completion survey.

The moderation variable was labour market status. This three-category variable was recoded from a self-reported employment status variable. Respondents were asked which category would best describe their situation from a list of six options. For the purposes of this study this variable was recoded to employed (including self-employed), retired and jobless (including unemployed, permanently sick or disabled and looking after home or family member or other). This recoding was conducted to ensure that the groups were large enough to be analysed separately and reflected, with a reasonable proximity, the different socioeconomic circumstances that people faced. A self-reported employment status variable was preferred over other operationalisations; but other operationalisations were also tested, confirming the main findings.

### Analytical approach and results

This study addresses the moderation of labour market status in the debt-mental wellbeing association from two perspectives. These two perspectives are presented here separately, but they are very much connected. The equations of the moderation scales and estimations are provided in the supplementary materials.

### *First perspective – population inference of debt and mental wellbeing*

The first perspective, investigating whether the mental burden associated with non-mortgage debt differs according to labour market status, describes the associations which exist between these variables in the actual population of people aged 50 and older in England. This is an instance of conventional finite-population survey estimation and inference. Association here is used to refer to differences in means

between the groups of interest. The analysis uses cross-sectional survey weights and other information about the complex sampling design, which are provided by the ELSA team. The calculations were done using survey estimation procedures in Stata 17.

This perspective estimates the mean level of mental wellbeing measures in the population by debt and labour market status. To quantify the direction and extent of the moderating of labour market status, two moderation scales were used. The additive moderation scale quantifies the extent to which the combined association of debts and labour market status with mental wellbeing differs, in absolute terms, from the sum of their separate additive associations with the mental wellbeing outcome. The equation for this measure is shown in the supplementary materials. There is additive moderation when this difference is different from zero. An alternative way of quantifying moderation is a multiplicative moderation scale in which the associations are compared in relative, rather than in absolute, terms. One of these relative associations measures is a ratio of means. The association moderation in the multiplicative scale quantifies the extent to which the combined, relative association of debt and moderation variable with the outcome differs from the product term of their separate, relative associations with the outcome. If the multiplicative modification differs from one, there is a multiplicative effect moderation. (VanderWeele and Knol, 2014).

These measures were calculated for each of the nine waves of the ELSA. Depending on the wave, some 7000 to 11000 people of all ages contributed to this analysis. To account for non-response in the quality of life (CASP-19 score) score, the survey weights were further multiplied by manually calculated self-completion weights, in which age, sex, education and depression-related non-response bias was taken into consideration. The confidence intervals for the moderation measures were computed using predicted values from regression models and the delta method (Hosmer and Lemeshow, 1992) by taking advantage of Stata's "margins" and "nlcom" commands (VanderWeele and Knol, 2014).

Table 1 presents the results. The mean number of depressive symptoms in 2018/9 ranged from 0.97 in the employed without debt group to 3.42 in people not employed or retired (the "jobless" category) and with debt. People with debt had more depressive symptoms than people without in all labour market categories throughout the period 2002/3-2018/9 (Figure 2). In 2018/9 the pooled difference in means was 0.22 depressive symptoms and the ratio of depressive symptoms was 1.16. In the jobless category, the association between debt and depression was, on the absolute scale, the greatest, with a difference in means of 0.89. On the additive moderation scale, this association in the jobless category was significantly higher than one would expect knowing the separate associations of debt and labour market status with depression.

The findings for the quality of life score are shown in Table 2 and Figure 3. In all labour market categories, those with debts had a lower quality of life score throughout the period 2002/3-2018/9. In 2018/2019, the association was strong in the jobless category, while the association was smaller in the employed and retired (but the null hypothesis of different from zero could not be rejected) (Table 2). There was some indication of association moderation on both additive and multiplicative moderation scales when the jobless category was compared to the employed

**Table 1.** Association between debt and number of depressive symptoms (0-8 CES-D 8 score) by labour market status among older adults in 2018/2019 in England. ELSA wave 9. n=6771

|  | All | Employed | Retired | Jobless* |
|---|---|---|---|---|
| A: $E(Y \mid \text{Debt}=0)$ | 1.35 | .97 | 1.39 | 2.53 |
| B: $E(Y \mid \text{Debt}=1)$ | 1.56 | 1.19 | 1.45 | 3.42 |
| **Difference (B-A)** | .22 | .22 | .05 | .89 |
| 95% CI | .08 - .35 | .05 - .40 | −.13 - .24 | .30 - 1.48 |
| **Ratio of means** (B/A) | 1.16 | 1.23 | 1.04 | 1.35 |
| 95% CI | 1.06 - 1.26 | 1.03 - 1.43 | .91 - 1.17 | 1.10 - 1.61 |
| **Additive moderation**** | – | – | −.17 | .66 |
| 95% CI | – | – | −.43 - .09 | .05 - 1.28 |
| **Multiplicative moderation***** | – | – | .84 | 1.10 |
| 95% CI | – | – | .67 - 1.02 | .82 - 1.37 |

*Jobless = Unemployed, sick or disabled, looking after home or family or other.
**Additive moderation scale= $B_{\text{retired/jobless}} - B_{\text{employed}} - A_{\text{retired/jobless}} + A_{\text{employed}}$)
***Multiplicative moderation scale= $(B_{\text{employed}} A_{\text{retired/jobless}})/(A_{\text{employed}} B_{\text{retired/jobless}})$)
95% confidence intervals were calculated using the Delta method.
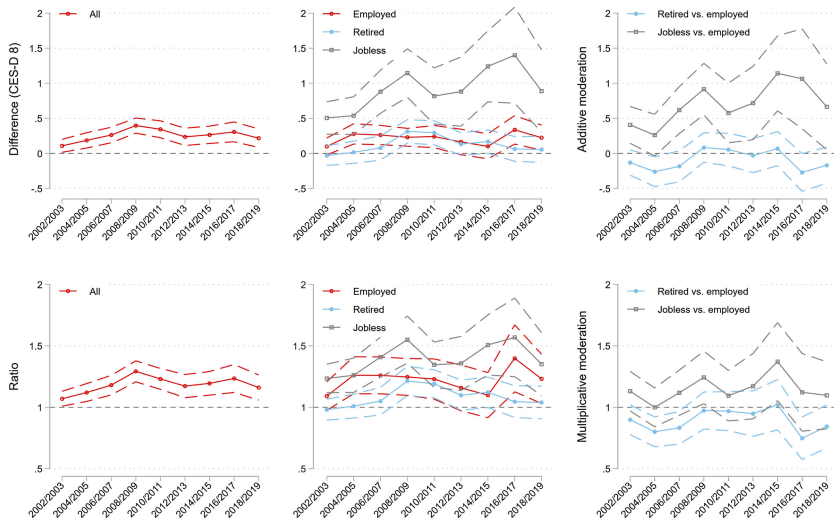


**Figure 2.** Association between debt and number of depressive symptoms by labour market status among older adults in England between 2002/3- 2018/19. 95% confidence intervals are calculated using the Delta method.

category in each wave. Findings from each wave (Figure 2) indicated no consistent changes in this association in the period. These findings are, it is worth noting, limited by the fact that people tend to misreport their debts (Zinman, 2009) and that detailed data on debt portfolios and amounts were not investigated. Further studies

**Table 2.** Association between debt and quality of life (0-57 CASP-19 score) by labour market status among older adults in 2018/2019 in England. 95% confidence intervals were calculated using the Delta method. ELSA wave 9. N=5672

|  | All | Employed | Retired | Jobless* |
|---|---|---|---|---|
| **A:** E(Y \| Debt = 0) | 41.72 | 43.80 | 41.38 | 35.49 |
| **B:** E(Y \| Debt = 1) | 40.64 | 42.17 | 41.09 | 32.64 |
| **Difference** (B-A) | −1.08 | −1.63 | −.29 | −2.84 |
| 95% CI | −1.79 - -.37 | −2.69 - -.57 | −1.28 - .69 | −5.64 - -.05 |
| **Ratio of means** (B/A) | .97 | .96 | .99 | .92 |
| 95% CI | .96 - .99 | .94 - .99 | .97 - 1.02 | .84 - 1.00 |
| **Additive moderation**** | – | – | 1.34 | −1.21 |
| 95% CI | – | – | −.10 - 2.78 | −4.19 - 1.76 |
| **Multiplicative moderation***** | – | – | 1.03 | .96 |
| 95% CI | – | – | 1.00 - 1.07 | .87 - 1.04 |

*Jobless = Unemployed, sick or disabled, looking after home or family or other.
**Additive moderation scale= $B_{retired/jobless}-B_{employed}-A_{retired/jobless}+A_{employed})$
***Multiplicative moderation scale= $(B_{employed} A_{retired/jobless})/(A_{employed}B_{retired/jobless}))$
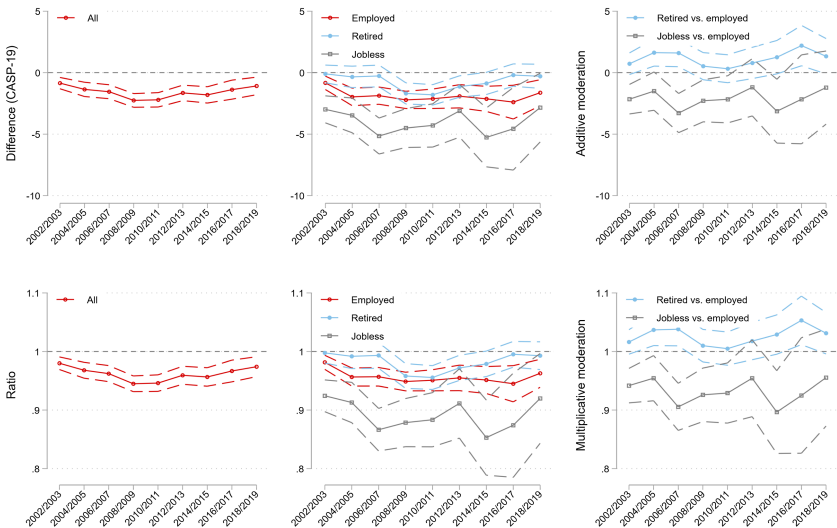


**Figure 3.** Association between debt and quality of life (CASP-19 score) by labour market status among older adults in England between 2002/3- 2018/19. 95% confidence intervals are calculated using the Delta method.

are needed to investigate trends in debt-mental wellbeing connection with detailed data on the amount and detailed composition of the debt held.

The finding that debt is more closely linked to lower mental wellbeing when combined with joblessness calls for researchers and people working with debt

**Table 3.** Definition of the target non-randomised "pseudo" trial in the PICO framework

| | | |
|---|---|---|
| **P**opulation | = | (a) Employed, (b) retired (c) jobless older adults aged 50 to 80 in England and holding some non-mortgage debt at time t (eight periods through 2002/3-2018/9). |
| **I**ntervention | = | Getting rid of their debts altogether, regardless of the amount, within an approximate, two-year time window before time t+1 (the subsequent wave). |
| **C**omparison | = | The comparison group was the peers not getting rid of their debts, i.e. those observed also being in debt at t+1. |
| **O**utcome | = | Number of depressive symptoms and CASP-19 score at time t+1. |

not to decontextualise debts from the individual socioeconomic circumstances in which debt is experienced. It is not surprising to find such an association (Richardson *et al.*, 2013), and also among older adults (Zurlo *et al.*, 2014), but the key contribution here, however, is showing that the strength of this association varies by labour market status. For those who were jobless, the association between debt and depressive symptoms was surprisingly strong given the separate associations of joblessness and debt with mental wellbeing.

*Second perspective – "What if" older adults got rid of their debts?*
The second research question – to what extent the effect of getting rid of debt on mental wellbeing differs by labour market status – is about causal effects. It needs to be addressed using the language and methods of causal inference, allowing for the fact that the data are observational rather than experimental, and exploiting their longitudinal nature and measured confounding variables. Combining them with the survey weights in the probability sample of ELSA then also allows the estimated causal effects to be generalised to the wider target population beyond the sample.

It is useful to think of the analysis presented as a set of non-randomised pseudo-trials (García-Albéniz *et al.*, 2017). Conceptualising observational analysis as pseudo-trials helps to avoid the usual pitfalls in causal inference from observational data, including ill-defined causal questions, ill-defined study population, unclear comparison group and conditioning on post-treatment variables. The target trial of interest is summarised in the PICO framework (Schardt *et al.*, 2007) in Table 3. The target populations of interest are (a) employed (b) retired (c) jobless (neither employed nor retired) older adults aged 50 to 80 in England holding some non-housing debt at wave t. The intervention is getting rid of debts, regardless of the amount, within the approximately two-year window, between the baseline (wave t) and follow-up (the subsequent wave t+1). The comparison group consists of people who did not get rid of their debts – that is, who were in debt in the baseline and the follow-up, regardless of the amount to be paid. The two outcomes analysed, both measured at the follow-up, were number of depressive symptoms and quality of life (CASP-19 score). It is important to emphasise that the pseudo-trials focus loosely on a possible intervention through which people get rid of their debts, not a specific well-defined intervention that currently exists in practice. The term 'intervention' here thus refers to varying ways in which debt may be eliminated in a certain population as a measure to improve mental wellbeing in that population.

The sample for this perspective differed from the sample used in the first perspective. The inclusion criteria for the trial were being aged between 50 and 80 and having some debt in the baseline. People with no missing variables on pre-treatment characteristics at baseline and follow-up data on outcome were included in the analysis. Adults older than 80 were excluded because there were very few people aged 81 or older with debts. Furthermore, when calculating the population average treatment effect (see detail below), the observations without cross-sectional weights were excluded.

Eight such pseudo-trials were considered, each commencing every two years throughout the period 2002-2017. Furthermore, a pooled trial was conducted while pooling data from all waves together and analysing them in a single model, providing a summary effect estimate.

Using the inverse probability treatment weighting (IPTW) technique, this study aims to minimise the confounding bias, the inherent problem in observational studies arising from the fact that the observed treatment (getting rid of debts) and the outcome (mental wellbeing) may both be affected by pre-treatment characteristics (Hernán and Robins, 2020). Weighting the observed data with IPTW in effect creates a pseudo-population: in which the distribution of those pre-treatment characteristics that are used to define the weights is similar between the treated and comparison groups. IPTW thus breaks the link between the measured pre-treatment characteristics and treatment. The key untestable assumption behind this estimation is no unmeasured confounding – that is, that the variables used for the weighting are sufficient (Stuart, 2010). The credibility of this assumption is discussed in detail after presenting the results.

The inverse probability treatment weights are calculated as inverses of propensity scores – that is, fitted probabilities of the treatment (getting rid of debts) given measured pre-treatment variables. These probabilities were calculated from an estimated logistic regression model for the treatment, where there were explanatory variables. These included:

1. sociodemographic variables (age [continuous], age square, sex, marital status, number of household residents, number of children, place of birth [the UK or elsewhere])
2. socioeconomic variables (specific employment status [not the recoded version], education, income, wealth and non-housing wealth, mortgage, amount of debt, amount of credit card debt [a subcategory of debt], home-owner)
3. health (physical activity, memory score, number of depressive symptoms, ever had ill-health conditions [high blood pressure, cancer, heart problems, lung disease, stroke, arthritis], functional limitations in daily activities)
4. survey year
5. several characteristics of the spouse if any (employment status and age).

Furthermore, in the CASP-19 analysis, CASP-19 score at time t was also included. Some interactions with the moderating labour market status were also included.

The IPTW can be used to calculate an estimate of the "sample average treatment effect" – that is, the effect of getting rid of debts on mental wellbeing for the

respondents who are included in the observed sample (definitions of these causal effects and their estimators are given in the appendix). However, the IPTW technique can also be exploited to estimate the effect among the population of people from which the sample was drawn ("population average treatment effect"), using estimators of the same form but with the weights modified to also include the ELSA survey weights. Here this was done by multiplying the IPTW by the cross-sectional survey weights at time t and, because some people are not observed in time t+1, by attrition weights between t and t+1 (attrition weights were calculated similarly to IPTW, but age, debt amount, education, limitations in daily activities, depressive symptoms, survey wave and labour market status were used as predictors of the attrition). The estimates for the sample average treatment effects are provided in the appendix, while population average treatment effects are presented as main results. These are of foremost interest given their policy relevance.

Estimates of labour market status specific average treatment effects were obtained by calculating the effects separately for respondents with different employment statuses. Measures of moderation of the causal effects by labour market status were calculated analogously with the measures of moderation of associations discussed above (see the supplementary materials for their formulas). Standard errors of all estimates were calculated using bootstrap resampling with 1,000 replications per model.

Next the results are presented. The balance characteristics of the pooled trial show that the inverse probability treatment weighting (IPTW) created a pseudo population in which the distribution of the pre-treatment characteristics was similar between the treated and comparison groups (provided in Supplementary Tables 3-5).

Table 4 presents the results from the IPTW population pooled trial using the number of depressive symptoms as an outcome. Figure 4 presents the estimates from the eight individual trials and the pooled estimates for the population. Shown in the fifth row of Table 4, among the employed and retired, none of the models was able to reject the null effects. In the jobless category, by contrast, the population average treatment effect estimates indicated that being in a treated group – i.e., rid of their debts – was linked to an average reduction of 0.27 depressive symptoms, compared to the comparison groups who did not get rid of their debts. This is equal to a 9% reduction in the number of depressive symptoms. The wave-specific analysis did not show significant differences but their point estimates pointed mainly in the same direction. Similar findings were obtained with the sample average treatment effect model, which are shown in Supplementary Figure 1.

The results using the quality of life score as outcome variable are shown in Table 5. The wave-specific estimates are shown in Figure 5. These show that getting rid of debts was linked to a higher quality of life in all labour market categories with no evidence of effect moderation on either additive or multiplicative scales. The difference between the treated and comparison groups was 0.86 points on the original scale. The individual trials showed similar effects and estimates in the same direction. Almost identical estimates were obtained with the sample average treatment effect model, shown in Supplementary Figure 2.

There are many ways of discharging debts: paying them off all at once, for example; or with steady repayments; or via debt collection actions or via personal

**Table 4.** Results from IPTW$_{PATE}$ (IPTW*cross-sectional weights*attrition weights) model with continuous number of depressive symptoms as an outcome. Estimated average numbers of depressive symptoms if individuals in the population remained in debt at time t+1 and if they got rid of their debts and their differences. 95% normal confidence intervals are calculated using bootstrapping (1000 replications)

| | All (n=14565 (5629 treated)) | Employed (n=7064 (2390)) | Retired (n=5248 (2415)) | Jobless* (n=2253 (824)) |
|---|---|---|---|---|
| A: Comparison: in debt also t+1 | 1.64 | 1.20 | 1.62 | 3.05 |
| B: Treated: got rid of debt before t+1 | 1.57 | 1.19 | 1.61 | 2.78 |
| **Difference in means (B-A)** | −.06 | −.02 | −.01 | −.27 |
| 95% CI | −.14 - .01 | −.12 - .08 | −.13 - .11 | −.49 - −.06 |
| **Ratio of means** (B/A) | .96 | .98 | .99 | .91 |
| 95% CI | .92 - 1.01 | .91 - 1.07 | .92 - 1.07 | .84 - .98 |
| **Additive moderation\*\*** | – | – | .01 | −.26 |
| 95% CI | – | – | −.15 - .16 | −.49 - −.02 |
| **Multiplicative moderation\*\*\*** | – | – | 1.01 | .92 |
| 95% CI | – | – | .90 - 1.12 | .82 - 1.04 |

*Jobless = Unemployed, sick or disabled, looking after home or family or other.
**Additive moderation scale= B$_{retired/jobless}$-B$_{employed}$-A$_{retired/jobless}$+A$_{employed}$
***Multiplicative moderation scale= (B$_{employed}$ A$_{retired/jobless}$)/(A$_{employed}$B$_{retired/jobless}$))

bankruptcy. Therefore, the estimates obtained should not be conceptualised as effects of predetermined specific treatment but rather as some unknown weighted average of the varying ways in which people got rid of their debts vs. varying ways in which people did not. Furthermore, a key untestable assumption is that getting rid of debts should precede the mental wellbeing outcome.

This finding (that getting rid of debts may improve mental wellbeing in people in disadvantageous labour market positions) should be assessed alongside the wider evidence available. The claim is supported not only by the previous evidence, but also wider scientific understanding of the causes of mental wellbeing. Clear mechanisms for the causal link from debts to mental health problems exist, which include shame, stress and experienced stigma, documented in several qualitative investigations (Purdam and Prattley, 2021; Sweet et al., 2018). The findings align with the predominant theories of the causes of mental wellbeing (Fisher, 2019; Thoits, 2010). Debt can be conceptualised as a source of chronic stress arousal, making the observed findings consistent with the chronic strain theory. This theory asserts that the influences of stress are particularly strong on mental health when the source of stress is prolonged, which is the case for debt in disadvantaged circumstances (Thoits, 2010).

Some investigations, relying on the instrumental variable (IV) and policy change designs, echo these findings that debts cause mental health problems, and getting rid
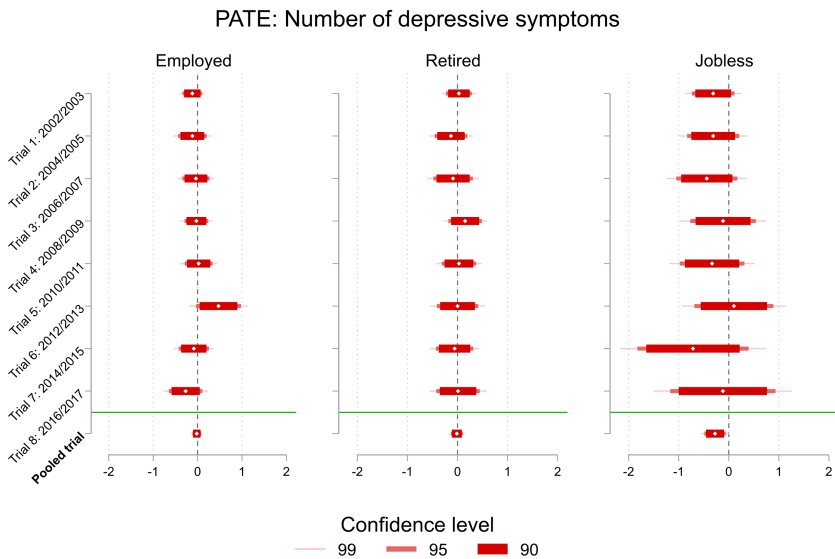
PATE: Number of depressive symptoms



**Figure 4.** Results from IPTW for the population (PATE, IPTW multiplied by cross-sectional weights at time t and attrition weights). Number of depressive symptoms (CES-D 8) is the continuous outcome. Mean differences in the outcome between the treated and comparison groups in each trial and the pooled summary estimate. Normal confidence intervals are calculated using bootstrapping (1000 replications). Number of observations per trial are shown in Supplementary Table 1.

of them improves mental wellbeing (Gathergood, 2012). However, unlike these studies, this study used a confounder-control type of approach by breaking the link between pre-treatment characteristics and the treatment. The analysis here relied on a different set of assumptions to the previous studies. In particular, previous causal estimates are obtained from units (people) that may not be representative, without assumptions, of actual populations. This study thus provided additional support for the causal claims that reducing debt may improve mental wellbeing among disadvantaged subpopulations. These findings support the idea that helping reduce debt may improve mental wellbeing.

It is worth noting that while no specific treatment was investigated here, people who were in the jobless category would be more eligible for the Debt Relief Order (DRO), a policy measure that would write off debts. Calculations based on wealth and debt amount (criteria on spare income and previous DRO were not taken into account) suggested that no more than a third of people in the jobless category may be eligible for DRO compared to less than 15% in the retired and less than 10% in the employed groups. This would suggest that the DRO eligibility criteria target the policy measure effectively, but subsequent studies are needed to assess the mental health effects of DROs.

## Discussion

In quantitative social sciences and epidemiology, there have been increasing concerns regarding the ambiguity of the parameters of interest (Kaufman, 2019;

**Table 5.** Results from IPW$_{PATE}$ (IPTW*cross-sectional weights*attrition weights) model with continuous quality of life score (CASP-19) as an outcome. Estimated average of the quality of life score if individuals in the population remained in debt at time t+1 and if they got rid of their debts and their differences. 95% normal confidence intervals are calculated using bootstrapping (1000 replications)

| | All (n=11398 (of which 4398 treated) | Employed (n=5663 (1939)) | Retired (n=4110 (1891)) | Jobless* (n=1625 (568)) |
|---|---|---|---|---|
| A: Y of Comparison: in debt also t+1 | 39.87 | 41.88 | 39.82 | 33.46 |
| B: Y of Treated: got rid of debt before t+1 | 40.73 | 42.66 | 40.29 | 35.13 |
| **Difference in means (B-A)** | .86 | .79 | .47 | 1.67 |
| 95% CI | .55 - 1.17 | .31 - 1.26 | −.12 - 1.06 | .58 - 2.75 |
| **Ratio of means** (B/A) | 1.02 | 1.02 | 1.01 | 1.05 |
| 95% CI | 1.01 - 1.03 | 1.01 - 1.03 | 1.00 - 1.03 | 1.02 - 1.08 |
| **Additive moderation**** | – | – | −.31 | .88 |
| 95% CI | – | – | −1.16 - .53 | −.32 - 2.09 |
| **Multiplicative moderation**\*** | – | – | .99 | 1.03 |
| 95% CI | – | – | .97 - 1.01 | 1.00 - 1.07 |

*Jobless = Unemployed, sick or disabled, looking after home or family or other.
**Additive moderation scale= B$_{retired/jobless}$-B$_{employed}$-A$_{retired/jobless}$+A$_{employed}$)
***Multiplicative moderation scale= (B$_{employed}$ A$_{retired/jobless}$)/(A$_{employed}$B$_{retired/jobless}$))

Lundberg *et al.*, 2021). Social policy literature is no exception in these concerns. This paper attempted to take these concerns seriously while embracing not only the importance of the description of a well-defined population – that is, population inference – but also considering separately potential counterfactuals in that population. While doing so, the study investigated the extent to which the relationship between debt and mental wellbeing is moderated by labour market status.

The second part of this paper aimed to investigate, within the limitations of observational data, the causal effect of getting rid of debts on mental wellbeing in older adults in different labour market states. In the context of the no unmeasured confounding and the uncertainty arising from it, there is a tendency to avoid causal language altogether in studies using observational data without quasi-experiment or instrumental variable type design. Studies often refer to their estimates of interest as "associations", which leaves several different interpretations open– including both population description and causal. This study made the deliberate, and still unconventional, decision to use causal language despite being a study design without any "exogenous factors". This decision was informed by arguments in epidemiological research that using causal language helps to define clear causal parameters of interest. This clarity of parameters of interest, in turn, helps to alleviate concerns about the ambiguity of the research questions, helps to avoid problems in the analytical
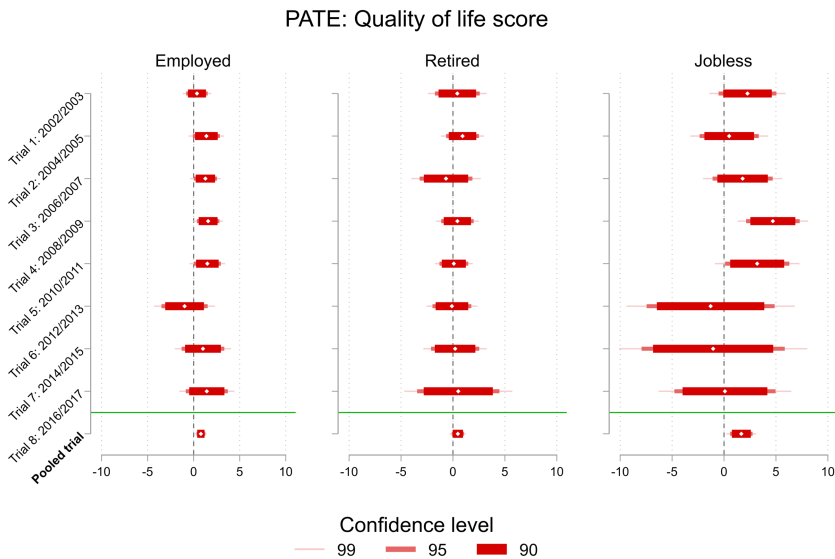
## PATE: Quality of life score



**Figure 5.** Results from IPTW for the population (PATE, IPTW multiplied by cross-sectional weights at time t and attrition weights). Quality of life score (CASP-19) is the continuous outcome. Mean differences in the outcome between the treated and comparison groups in each trial and the pooled summary estimate. 95% normal confidence intervals are calculated using bootstrapping (1000 replications). Number of observations per trial are shown in Supplementary Table 2.

approaches, helps understanding and transparency about the assumptions made, and makes the interpretation of the results clearer (Hernán, 2018). The paper thus puts forward an argument that, in this context, a target-trial framework used in epidemiology is also a useful mental tool for social policy scholars.

From a policy point of view, in many countries, easy access to credit is combined with institutional structures in which debt problems have serious consequences for people's lives – including, but not limited to, access to affordable housing and internet subscription. There is an obvious demand for forms of credit products (for example, to overcome transient economic difficulties); but policies are needed to balance the increasing availability of credit with potential routes out of heavy indebtedness among older adults. Interventions that help older adults to discharge their non-mortgage debts have the potential, when applied systematically, to produce significant improvements in mental wellbeing at a population level – particularly if these interventions are combined with other strategies to address issues among people who are jobless.

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**Competing interests.** The author(s) declare none.

## Notes

**1** The definition "A household is defined as being in problem debt if it falls into one of the following two groups: 1. *Liquidity problems*: a) household debt repayments represent at least 25% of net monthly income and at least one adult in the household reports falling behind with bills or credit commitments, or b) household is currently in two or more consecutive months arrears on bills or credit commitments and at least one adult in the household reports falling behind with bills or credit commitments.

2. *Solvency problems*: a) household debt represents at least 20% of net annual income and at least one adult considers their debt a heavy burden" (ONS).
**2** Scotland has its own legislation.

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