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Dackehag, Margareta; Ellegård, Lina Maria; Gerdtham, Ulf; Nilsson, Therese

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Department of Economics
School of Economics and Management

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Margareta Dackehag
Lina Maria Ellegård
Ulf-G Gerdtham
Therese Nilsson

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LUND UNIVERSITY

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ABSTRACT

This paper examines the short-term effect between take-up of Social Assistance Benefit (SAB) and mental health. Using a panel dataset including rich yearly register data on e.g. income, income sources, unemployment and types of pharmaceutical consumption for over 140,000 Swedes 2006-2012, we quantify the importance of the psychosocial dimensions (e.g. shame and guilt) of the socioeconomic status – mental health nexus. Our main independent variable is an indicator for SAB, which is the means-tested last-resort option for individuals with no other means to cover necessary living expenses, received by six per cent of all Swedish households annually. Mental ill-health is measured by data on prescribed antidepressants, anxiolytics, or hypnotics. While SAB strongly associates with psychopharmaca consumption in a cross-section of observations, the association largely disappear once we introduce individual fixed effects. These results indicate that other mechanisms than shame or guilt related to the SAB experience are more important for mental health in the short term.

KEY WORDS – mental health; socio-economic status; social assistance; shame; guilt; individual fixed effect

JEL CODES – I12; I14; I18

INTRODUCTION

Mental health problems impose a massive burden on societies. According to the World Health Organization more than 20 per cent of all individuals develop a mental disorder at least once over their lifetime (World Health Organization 2001). Since 1990 the number of people suffering from depression or anxiety or both has increased by nearly 50 per cent, and recent statistics suggest that depression alone affects more than 300 million people across the globe making depression one of the main causes of disability worldwide (World Bank 2014). In Sweden, roughly a quarter of all sickness absence spells are due to mental problems, particularly anxiety and depression (Försäkringskassan 2014; Inspektionen för socialförsäkringen 2014).

It is well known that low socioeconomic status associates with worse mental health. Using various indicators like an individual's income, material wealth, education or labour market position, a wide range of studies report a social gradient in mental health (see. e.g. Reiss 2013; Fryers, Melzer, and Jenkins 2003; Marmot and Bell 2012). Financial strain is also known as a correlate of major depression (Szanton, Thorpe, and Whitfield 2010). From a theoretical perspective, such a gradient could be explained by the circumstance that individuals with low income cannot cover direct costs related to preventive care or pharmaceutical costs related to developed mental illness. A socioeconomic gradient in mental health has also been attributed to e.g. the social causation hypothesis (Dohrenwend and Dohrenwend 1969) and the relative income hypothesis positing that mental health problems are a result of socioeconomic deprivation or relative position in the income distribution (c.f. Bergh, Nilsson, and Waldenström 2016, Gerdtham and Johannesson 2004).

Further attention has been directed at the psychosocial dimensions of low socioeconomic status, particularly the *shame* and *guilt* that people can experience as a consequence of economic hardship. As stated by Sen (1983) shame is at the 'irreducible absolutist core' of the idea of poverty and inability to support oneself. A large strand of research in psychology also suggests that shame is a very destructive emotion causing feelings of incompetence and powerlessness (Tangney and Dearing 2002) – negative emotions that almost unequivocally have deleterious effects on mental wellbeing (Mirowsky and Ross 2003). Thus, shame and guilt could be important mediators in the relationship between socioeconomic status and mental health.

Based on the above discussion, one may argue that the relationship between socioeconomic status and mental health should be particularly evident in periods when an individual is unable to support him- or herself and has to rely on others. In a welfare state context, this corresponds to the situation where an individual has to apply for and rely on means-tested Social Assistance Benefit (SAB). Qualitative studies in sociology suggest that SAB dependency represents a suffering per se, irrespective of the income loss or low material standards, and that one of the worst things related to being a SAB recipient is the feelings of shame and guilt (see Mayer and Timms (1970) on Britain, Rank (1994) on USA, and Angelin (2009) and Dahlgren and Starrin (2004) on Sweden).

A number of qualitative studies suggest that SAB uptake relates to poor health and mental illness (Underlid 2005; Angelin 2009; Wilton 2004). Also several quantitative studies indicate a negative relationship between SAB and mental health outcomes (see e.g. McMunn et al (2001); Spady et al (2001); Weitoft et al (2008); Mörk, Sjögren, and Svaleryd (2014)). The focus of this quantitative strand of research has so far been on the impact of SAB during childhood, i.e. effects of living in a family receiving SAB. In general, these studies examine the

relationship using survey and cross section data. For example McMunn et al (2001) use the 1997 Health Survey for England, where parents of about 5,700 children aged 4–15 filed a self-completion booklet, to assess the relationship between SAB and children's psychological health. Weitoft et al (2008) instead use register data on SAB and hospital care for suicide attempts and find that even among children in families with one month of assistance there is a relative risk of hospitalization, although adjustment of background variables clearly attenuates the relationship. Similarly, Mörk, Sjögren, and Svaleryd (2014) use register data on family SAB and control for fixed effects, and find that children face substantially larger risks of hospitalizations with psychiatric diagnoses and consumption of antidepressants in years when the family receives SAB. Yet the relative risks are in relation to very low baseline risks of hospitalization and psychiatric diagnoses (2 and 5 cases per 1,000 children, respectively) and SAB uptake and healthcare consumption is measured in the same year, leaving open the possibility that the SAB application relates to the income loss from having to take care of a sick child.

Evidence of associations between SAB and child ill-health is by itself not evidence of a similar link among the actual SAB recipients. To tackle the issue of guilt and shame related to the SAB experience, it is necessary to also explore this direct relationship. Improved knowledge and a correct understanding of the links between socioeconomic status and mental health are important from a theoretical perspective, but also have important policy consequences. If the centrality of guilt and shame in the economic hardship – mental illness nexus is established, profound policy implications could follow, e.g. policies specifically targeting the stigmatization of receiving social assistance.

A challenge for such research is that there are several other potential explanations behind an association between getting SAB and poor mental health. A first alternative explanation is reverse causality: mental problems may reduce the individual's ability to participate on the labour market. Mental illness often implies reduced productivity and as shown by Peng, Meyerhoefer, and Zuvekas (2016) exhibiting depressive symptoms reduces the individual's likelihood of obtaining employment, in turn reducing his or her possibility to earn an income. Reverse causality could also be explained by the social selection hypothesis (Eaton 1980), which posits that individuals with mental health problems drift down in socioeconomic position due to psychopathology and inability to fulfil expected role obligations. A second alternative explanation for a SAB-mental health link is a selection effect; individuals may be predisposed for both features. A third explanation, more relevant in the long run, is that low income and poor socioeconomic status imply lower health investments (due to different preferences or optimization) and thus worse health status. These explanations are however often confounded in empirical analyses.

We use a panel dataset with rich annual register data on over 140,000 Swedes to examine the importance of the guilt and shame of not being able to support oneself or one's family for mental health. To measure mental ill-health, we use register data on consumption of common psychopharmaca – antidepressants, anxiolytics, and hypnotics. These measures are related to register data on earlier SAB in regressions that include individual fixed effects to control for individual predisposition for SAB and mental problems, lags and leads to rule out reverse causality, and control variables picking up educational attainment and disposable income. Thus, rather than picking up the effects of socioeconomic position, pre-existing mental problems, or selection effects, we isolate the (short-term) effect of SAB on mental health. All analyses are performed separately for women and men, acknowledging the vast gender differences in

prevalence of mental health problems and disorders (c.f. Whiteford et al 2013). Noting that individuals with higher education have both a lower risk of mental problems and of SAB uptake, we further estimate an interaction model to allow for heterogeneous responses depending on educational attainment.

The paper contributes to a growing literature on the determinants of mental health by estimating the importance of the psychosocial dimensions in the socioeconomic status – mental health gradient and applying appropriate econometric methods. A second contribution lies in the fact that the paper uses high quality register data. The study thus complements existing literature that uses subjectively reported indicators of SAB, income, unemployment and mental health. As shown by e.g. Kjellsson, Clarke, and Gerdtham (2014) and Ljungvall, Gerdtham, and Lindblad (2015) the use of self-reported health measures often generate measurement errors (misreporting and misclassification) that may matter for estimated disparities in health. A third contribution is the fact that we explore the question if there is a socioeconomic gradient in the guilt-shame-mental health relationship. Studies suggest that for middle-class people more than working class people, SAB uptake is a circumstance that needs to be concealed from others (McFadyen 1995; Starrin, Blomkvist, and Janson 2003). Thus, SAB may be more shameful and associated with more stigma for high-skilled individuals than for low-skilled individuals. Similar findings exist for unemployment and unemployment benefits: e.g. sociological research provide evidence from interviews with individuals residing in middle-class areas who avoided telling anyone outside their family about their unemployment (Warren 1986; Starrin, Jönsson, and Rantakeisu 2001). The loss of status is particularly tangible for groups in the middle and upper middle classes, e.g. managers (see Newman, 1999).

Our individual fixed effects regressions suggest that the strong cross-sectional associations between SAB and psychopharmaca consumption largely are explained by selection. Thus, shame and guilt related to SAB does not appear to be the reason why SAB and mental health are correlated, indicating that the other mechanisms are responsible for the cross-sectional associations. One exception is the finding that highly educated individuals (in particular men) exhibit risk increases due to SAB in the fixed effects analyses. The relative effects (around 20-30 percent) should be understood against a backdrop of rather low baseline risks for mental problems. Nonetheless, the result is in line with the previous qualitative research and indicates that this group would be the most vulnerable to the shame mechanism.

The next section gives an institutional background about SAB and health care in Sweden. Thereafter, we delineate our data and empirical specification and present the results. The paper ends with a discussion of interpretations and limitations and some concluding remarks.

INSTITUTIONAL BACKGROUND

Social Assistance Benefit

Sweden has a comprehensive social safety net offering income support to individuals lacking labor market income. Most benefits – e.g. sickness, unemployment, parental and pension benefits – are proportional to the individual's previous labor income. Individuals whose (labor and non-labor) income and wealth fall below a statutory level are eligible to the means-tested SAB, which is meant to ensure that all households cover necessary living expenses such as food, rent, clothing, medication etc. (Kruse and Ståhlberg 2013). The SAB is a form of cash income allowance granted at the municipality level. In contrast to the income-related benefits, which are approved for longer periods and are unrelated to the individual's consumption and wealth, individuals have to apply monthly for SAB. The application process implies a thorough

examination of the household's economy. To be eligible, the individual must have exhausted all other income sources (including financial assets) and actively search for work. Unusual expenses require approval in advance. SAB applications are reviewed and approved by the municipality social services.

Annually, about four percent of the Swedes receive SAB. Approximately 40 percent of the recipients are below 30 years of age, and almost 60 percent of all SAB households have at least one foreign-born member. The average spell length is about six months, although about 40 percent of households with SAB have spells longer than 10 months. Since the SAB is granted at the municipality level, the benefit rate varies somewhat across geographical areas. The mean monthly SAB is about 7,500 SEK (€750) (Socialstyrelsen 2017). However, a quarter of recipients receive less than 5,000 SEK (€500) on an annual basis, meaning that the SAB is a complement to other income sources for them (Dahlberg et al 2009).

Health care and prescribed pharmaceutical costs

Health care visits and prescribed drugs are heavily subsidized in Sweden. Prescribed drugs are exclusively dispensed by pharmacies. The national health insurance covers all residents and subsidizes outpatient pharmaceutical expenditures exceeding SEK 2,200 (220 €) in out-of-pocket payments on a 12-month rolling basis (figures for 2012). When the payment cap is reached, the individual receives full reimbursement for the remainder of the 12-month insurance period. Similarly, there is a cost ceiling for health care visits. Importantly, the SAB covers out-of-pocket costs for prescribed drugs as well as GP visits if needed (SOSFS, 20131).

DATA AND EMPIRICAL STRATEGY

We use a rich annual panel dataset for 2006-2012 based on three official registers held by Statistics Sweden (the Longitudinal integration database for health insurance and labour market studies, *LISA*) and the National Board of Health and Welfare (the Prescribed Drug Register, *PDR*, and the National Patient Register, *NPR*). The LISA database contains background information such as age, gender, country of birth, family composition, and labour market, social and educational information, for all individuals above 16 years of age registered as residents in Sweden on December 31. LISA also includes income by source (e.g. wage income, SAB, pensions, unemployment and sickness benefits). The PDR contains detailed information on all dispenses of prescription pharmaceuticals, including the Anatomic Therapeutic Chemical (ATC) classification of the pharmaceutical, while the NPR comprises information about all episodes of inpatient or specialist outpatient care. Our study sample comprises the approximately 140,000 individuals who have been surveyed for the Swedish Survey of Living Conditions (SILC/ULF), an annual population-representative survey conducted by Statistics Sweden, at least once in 1980-2012. The database was created within *The Health Economics Program of Health, Healthcare and Policy*.

To operationalize mental ill-health, we use information about prescribed psychopharmaceuticals according to the PDR. We classify individuals as struck by mental ill-health in a given year if they have redeemed prescribed drugs belonging to certain ATC categories at least once during the year. Our most encompassing dependent variable, the dummy variable *psychopharmaca*, equals one if the individual redeemed drugs belonging to any of the three categories *N06A* (antidepressants), *N05B* (anxiolytics), or *N05C* (hypnotics and anxiolytics). We also study the three ATCs as separate dummy variables.

We estimate variants of the following equation using Linear Probability Model (LPM):

$$drug_{j_{it+1}} = \alpha * SAB_{it} + \beta_1 * BG_{it} + \beta_2 * BG_{it-y} + \beta_3 * H_{it-y} + \beta_4 * H_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

$drug_{j_{it+1}}$ denotes the dependent dummy variable under study (j=*psychopharmaca, N06A, N06B,* or *N06C*), measured in year *t+1*; *SAB*, our main independent variable, is a dummy equal to one if the individual received SAB anytime during the preceding year (*t*). λ_t is a vector of calendar year dummies capturing year-specific fluctuations in the use of psychopharmaca and ε_{it} is an idiosyncratic error term. To this model, we add four sets of covariates. The two sets BG_{it} and BG_{it-y} comprise general background variables. BG_{it} denotes covariates measured in the same year as the SAB status: age group dummies in 10-year intervals and dummies for educational attainment, immigrant status and living in a metropolitan area. BG_{it-y} includes covariates measured in earlier periods. Specifically, the natural logarithm of disposable income (ln(1+disposable income)) (in 100s of SEK), and dummies for uptake of parental benefit or old-age pension, single-person households, and households with children are measured in year *t-1*, while two dummies indicate uptake of SAB or unemployment benefit in any of the five years before *t*.

By measuring SAB the year before the (potential) psychopharmaca consumption, we mitigate the problem of reverse causality, i.e. that mental problems precede and induce SAB. One could consider using a dynamic specification, but as this might lead to bias in our FE model (Nickell 1981) we do not include a lagged dependent variable in our baseline (reassuringly, findings are robust to this add, see online Appendix Tables A3-A4). To further reduce the potential problem of reverse causality and to account for confoundings producing a spurious correlation between SAB and later mental illness, we add two sets of health-related covariates, H_{it-y} and H_{it}. H_{it-y} includes the following *lagged health* measures: dummies for disability benefit in year t-1 or sickness benefit in any of the five years prior to *t*, and a dummy for hospitalizations with

depression as main diagnosis in any of the 9 years prior to year *t*. The health covariate set H_{it} includes the same three variables measured in year *t*, i.e., the same year as SAB is measured (*current health*). Figure 1 shows the timeline for measurements of the variables in our analyses.

Although we control for a comprehensive set of covariates, still there may be unobserved confounders that the model fails take into account. In particular, the health covariates may be imperfect proxies for mental health, as sickness and disability benefits may be granted for somatic reasons and as hospitalizations for depression is very rare. By including individual Fixed Effects (FE), μ_i, we eliminate the influence of all unobserved confounders that exert a constant influence over time. In other words, the FE control for each individual's predisposition for mental problems. Because of this advantage, our preferred models include FE. However, to illustrate the importance of accounting for FE, we also present pooled estimations without FE.

Due to gender differences in mental health, all models are estimated separately for men and women. In our heterogeneity analysis with respect to educational attainment, we interact the SAB dummy with dummy variables for having completed secondary or tertiary education.

In the analysis we use LPMs. Compared to models designed explicitly for binary dependent variables (such as logit or probit), the main disadvantage of LPM is that it may produce predictions outside the [0, 1] interval. Being interested in inference rather than predictions, this argument is however less relevant (James et al 2013). We choose LPM as it allows for straightforward inclusion of FE and since it makes the interpretation of interaction terms far easier. Standard errors are clustered at the individual level.

DESCRIPTIVE STATISTICS

Our working sample consists of more than 1,500,000 observations. Table 1 presents descriptive statistics (weighted by the number of panel appearances) separate for men and women. The share of SAB recipients is 2 percent for both genders. This is half the share for the full Swedish population, a relationship that refers to the age structure of our sample that consists of repeated cross-sections. In contrast to the share of SAB recipients, women are over-represented when it comes to psychopharmaca consumption. 29 percent of all women have used drugs in at least one of the three studied ATC categories in a given year, compared to 16 percent of all men. Looking into the different drug types, we observe that hypnotics (N05C) is most common (17/10 percent of women/men), followed by antidepressants (N06A; 15/8 percent) and anxiolytics (N05B; 10/6 percent). Our sample approximates the psychotropic drug use pattern for the whole Swedish population pretty well (Board of Health and Welfare: http://www.socialstyrelsen.se/statistik/statistikdatabas/lakemedel). The higher prevalence of mental illness among women is also visible in their higher risk of having been hospitalized with depression as main diagnosis. Notably though, it is very rare among both genders to have been hospitalized for this reason.

RESULTS

This section presents the pooled OLS results followed by our preferred FE results. Lastly, we present the heterogeneity analysis with respect to education.

Pooled OLS

Tables 2 and 3 show the pooled OLS results for women and men, respectively. Each table has the same structure: the first row shows the estimates for *psychopharmaca*, while the second-fourth rows show the estimates for antidepressants, anxiolytics and hypnotics. For every dependent variable we run four specifications, which add to the baseline specification without

covariates (column 1) the general background variables (column 2), variables measuring health in earlier years (column 3) and, finally, health measured in year t (column 4). The set of health covariates includes hospital admissions for mental problems and receipt of sickness or disability benefit.

According to our most elaborate OLS specification (Table 2, column 4), women currently on SAB face a six percentage-point increase in the risk of using any of the three studied psychopharmaca during the next year; this corresponds to a 24 percent increase in relation to the baseline risk of 29 percent (see Table 1). Analysing drug types separately, we find that SAB involves a nearly four percentage-point (27 percent) increase in the risk of using antidepressants. There is a strong association between SAB and mental health also with respect to later use of anxiolytics and hypnotics; SAB increases the risk by over three percentage points for anxiolytics (30 percent) and four percentage points for hypnotics (23 percent).

The results in Table 3, column 4 suggest that SAB is associated with later mental health problems also for men. Men receiving SAB face a strongly significant nine percentage point increase in the use of any psychopharmaca; i.e., a 53 percent increase from the baseline risk of 16 percent. We find consistently strong effects for each of the drug categories: the relative increases for antidepressants/anxiolytics/hypnotics are, respectively, 58/56/47 percent.

Relating the full specifications in columns 4 to the specifications with fewer control variables (columns 1-3), it may be noted that for both women and men, the correlations are often markedly stronger when we do not control for standard demographic and socioeconomic background variables (cf. columns 1 and 2). One notable exception is hypnotics for women, for which the confounding factors work in the opposite direction and attenuate the correlation.

Somewhat surprisingly, the inclusion of health-related control variables has very little impact on the estimates (cf. columns 3-4 and columns 2). However, these variables may not be sufficiently strongly related to individual disposition for mental illness to guard against this confounding factor. The health-related control variable most closely related to current mental problems is the depression hospitalization variable, which by itself captures a tiny share of the population. The other two variables are quite general and capture all sorts of health problems, thus potentially not specific enough to discriminate between mental and somatic health problems. Indeed, online Appendix Tables A1-A2 show that the OLS correlations are markedly weaker – often half as large – when including controls for earlier consumption of any of the three psychopharmaca types. As explained above, we are reluctant to include these control variables in the FE models due to the risk of Nickell bias. To further explore the role of latent mental ill-health risk, we move on to the FE specifications.

Individual fixed effects

The FE estimations produce starkly different results. As is evident in Table 4 focusing on women, all estimates are relatively small and most are insignificant. The only significant finding – at the 10 percent level – is the 0.5 percentage point increased risk for hypnotics among women on SAB. This 3 percent increase from the baseline risk is only a small fraction of the 24 percent increase found in the OLS specification. Thus, even our most elaborate OLS estimate mainly reflects that women with a predisposition for mental illness also have a higher risk for SAB uptake. The evidence does not support a relation running from SAB to later mental illness.

The overall pattern is similar for men (Table 5). Although most FE estimates for men are significant, the estimates are much smaller than in the OLS specification; for instance, the estimate in column 4 suggest that SAB increases the risk of consuming any of the three

psychopharmaca types by roughly 1.5 percentage points; this 8 percent increase accounts for only a small share of the 53 percent increase found in the corresponding OLS specification. Looking at each of the three drug categories, the FE estimates imply that there is virtually no association between SAB uptake and later use of anxiolytics, while men on SAB face a 0.8 percentage point (10 percent) increase in the risk of using antidepressants and a 0.6 percentage point (6 percent) increase in the risk of using hypnotics. However, these increases still correspond to small fractions of the relative increase found in the earlier OLS specifications.

A comparison across columns in the FE result tables reveal that the time-variant individual control variables play a limited role in the FE estimations. This is further evidence that most of the variation in mental illness is driven by an individual-specific predisposition.

The age profile of our sample spans from teenagers to pensioners. Considering first the fact that pensioners have the possibility to apply for an elderly-specific SAB and second the possibility that 16- to 19-year-olds may suffer from mental health problems but live with their parents, we look further into the age profile and its influence on the results. We restrict the analysis to individuals of working age and also exclude the years at university (i.e. individuals 20-25 years of age) because of the particular living conditions for students (i.e. income around subsistence level is expected during those years and SAB applications during the summer break are relatively common). Compared to our main analysis, we find similar results using data on individuals who are 25-64 years old (cf online appendix Tables A5-A8). In general the OLS estimates are larger, the baseline in particular (column 1 in Table A5 and A6). However, in the full specification (column 4 in Table A5 and A6) the increased risk of psychopharmaca use related to SAB uptake is at most just above 1 percentage point greater than the main results. The FE estimates for women, although slightly larger, show fewer statistically significant

associations (Table A7). Compared to the main estimates, working-age men experience at least as strong risk increases related to SAB, although no longer statistically significant for the use of hypnotics, when we account for time-invariant factors (Table A8).

Analysis by educational attainment

The next step examines if there is an educational gradient in the link between SAB and mental health, in a FE framework. Table 6 shows the results for women. Using the full specification model, we regress the use of psychopharmaca (column 1), antidepressants (column 2), anxiolytics (column 3) and hypnotics (column 4) on the dummies for SAB, educational attainment, and their interactions. A first thing to note is that there is no association between SAB and psychopharmaca consumption for women with at most primary education. Neither is there evidence of a strong educational gradient – the interaction terms capturing the additional effect of SAB for women on secondary education and tertiary education, respectively, are almost always insignificant. The only exception is the additional risk of using anxiolytics associated with SAB. The risk is 1.6 percentage larger for women with higher education than the (zero) additional risk for women with at most primary education (column 3), although the estimate is only significant at the 10 percent level. In relation to the 6.6 percent baseline risk of anxiolytics for women with tertiary education but not on SAB, the increased risk associated with SAB amounts to 23 percent ((base coefficient -0.1 + interaction term 1.56)/baseline risk 6.6). Notably, although the earlier significant association between SAB and hypnotics use disappears in this analysis, the estimates indicate that it is driven by highly educated women (who experience a 13 percent increase from their mean risk of 13.5 percent).

Table 7 presents the corresponding estimates for men. The table reveals that SAB is not associated with an elevated risk for psychopharmaca consumption among men with at most

primary education; in fact, the only significant estimate is a *negative* correlation between SAB and anxiolytics of almost 1 percentage point (13 percent lower risk relative to the risk of men with primary education not on SAB). For the other substances, the SAB estimates for men with at most primary education are positive but insignificant and of small magnitude (1-6 percent higher risk for SAB beneficiaries). For men with higher educational attainment, there are more significant associations between SAB and psychopharmaca use. Men with tertiary education who receive SAB face an over 2 percentage point larger risk of using any of the three psychopharmaca than SAB beneficiaries with at most primary education (column 1). Compared to the 14 percent baseline risk for men with tertiary education, SAB uptake implies a 22 percent increase in the risk of any psychopharmaca ((base coefficient 0.8 + interaction term 2.3)/baseline risk 14.3). Looking at the three substances separately (columns 2-4) we find that there is practically no gradient for hypnotics, implying that the gradient for the aggregate variable is driven by highly educated men consuming antidepressants and anxiolytics. In particular for anxiolytics, the gradient is remarkable as it overturns the negative association for men with at most primary education. For men with tertiary education, the risk of anxiolytic consumption is 52 percent higher in years with SAB.

DISCUSSION

Examining individual panel data on SAB and information on later consumption of antidepressants, anxiolytics, or hypnotics, we observe that the widely reported social gradient in mental health to a large extent appears to be driven by individual-specific pre-disposing factors. In so far as that there is still a SAB-mental illness relationship after accounting for individual fixed effects, it appears to be driven by highly educated individuals, in particular men. For highly educated individuals, it may thus make sense to speak of SAB as a trigger of mental illness, but not for individuals with lower education. One rationale of this result may be that the resort to SAB may be particularly stigmatizing for individuals with higher initial

socioeconomic position, who in general run a much lower risk of SAB than less educated individuals. Relating to the literature on economic insecurity (Rohde, 2016), the low-educated individuals for whom the SAB status varies over time – i.e., the individuals that contribute to identifying the baseline SAB effect in our FE interaction model – are constantly in an insecure situation, meaning that SAB per se is not especially dramatic for them. For more highly educated individuals, who are less likely to be in an insecure situation in the first place, the contrast between SAB and non-SAB periods may be greater.

However, one should recall that the estimates for highly educated individuals are still modest. For example, while a 52 percent increase in the risk of consuming anxiolytics sounds impressive, it only corresponds to an increase from to 4.4 to 6.8 percent of men with tertiary education. Previous research indicated larger relative risk increases for children of parents' SAB. Although the risk for severe mental problems is rare also among children, it is possible that the guilt-shame mechanism simply is more important for children.

A remaining issue may be whether we are able to isolate the effect of feeling of shame and guilt, as our regressions do not include *current* disposable income, only income measured in t-1. The reason for not including current income is the fact that SAB feeds directly into the measure, meaning that it may lead to post-treatment bias (Angrist and Pischke 2009). However, by the same token, it is possible that our estimates of the SAB effect include the effect of a fall in income. It is therefore noteworthy the SAB coefficient is almost unaffected when current income is included in the model (results available on request).

Strengths and limitations

A strength of our analysis is that register data on pharmaceutical consumption is not affected by recall bias and that the data allows us to go beyond the study of self-reported mental

problems. Although mental problems *per se* are subjective experiences, subjective reports may include mental problems that are not severe enough to motivate public health interventions. Our register data only captures mental problems that are severe enough to have made a medical professional prescribe medications.

A limitation of our analysis is that the prescribed drug register only records redeemed prescriptions. However, as expenses for prescribed drugs are always reimbursed by SAB, and as the annual cap for out-of-pocket payments is rather low, we believe that failure to redeem prescriptions is not a severe problem for our analysis.

As in all observational studies, unobserved factors that are correlated with both SAB and mental problems may produce spurious relationships. We have tried to solve the problem using individual fixed effects and an elaborate time series structure of the model, but our approach does not account for time-variant shocks affecting both the individual's susceptibility to mental problems and the SAB risk. Notably though, as the correlation between SAB and mental problems turns out to be extremely weak (in the short run) for a majority of the population, there is not much scope for spuriousness.

In relation to the use of individual FE, it should be highlighted that our analyses are inherently short-term. We do not claim that SAB could not have a causal impact on mental health in the long run.

In terms of representativeness, one may recall that SAB is rarer, and psychopharmaca consumption more common, in our sample compared to the full population. This is due to the structure of our sample, which consists of repeated annual cross-sections of the Swedish population from 1980 onwards, implying an older average age than in the full population.

Although this may restrict the possibilities to generalize, one should note that the most severe restriction of generalizability arises when we include individual fixed effects, which essentially imply that we compare each individual with him- or herself. This is thus a restriction we share with most state-of-the-art research in economics and the social sciences.

CONCLUSIONS

Poor mental health and depression is the leading cause of disability in the world and associate with major impacts on individual well-being as well as economic costs. Attention has been directed to the association between socioeconomic status and mental health. Several qualitative studies emphasize the role of *shame* and *guilt* that people can experience as a consequence of economic hardship. But up to date there is very limited evidence on the role of the psychological dimensions derived from micro data analyses.

Using longitudinal register data on SAB uptake and types of pharmaceutical consumption we find that a large part of the association between uptake of social assistance benefit and mental ill-health reflects correlations rather than causation. This result indicates that the experience of applying for and receiving means-tested social assistance benefit, although possibly shameful, in general does not trigger episodes of severe mental problems, at least not in the short term (up to one year). Based on these results, we propose that policy interventions should be directed towards preventing and treating mental ill-health and towards supporting individuals' ability to attain economic security, rather than on efforts to minimize the stigma of receiving social support.

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FIGURES

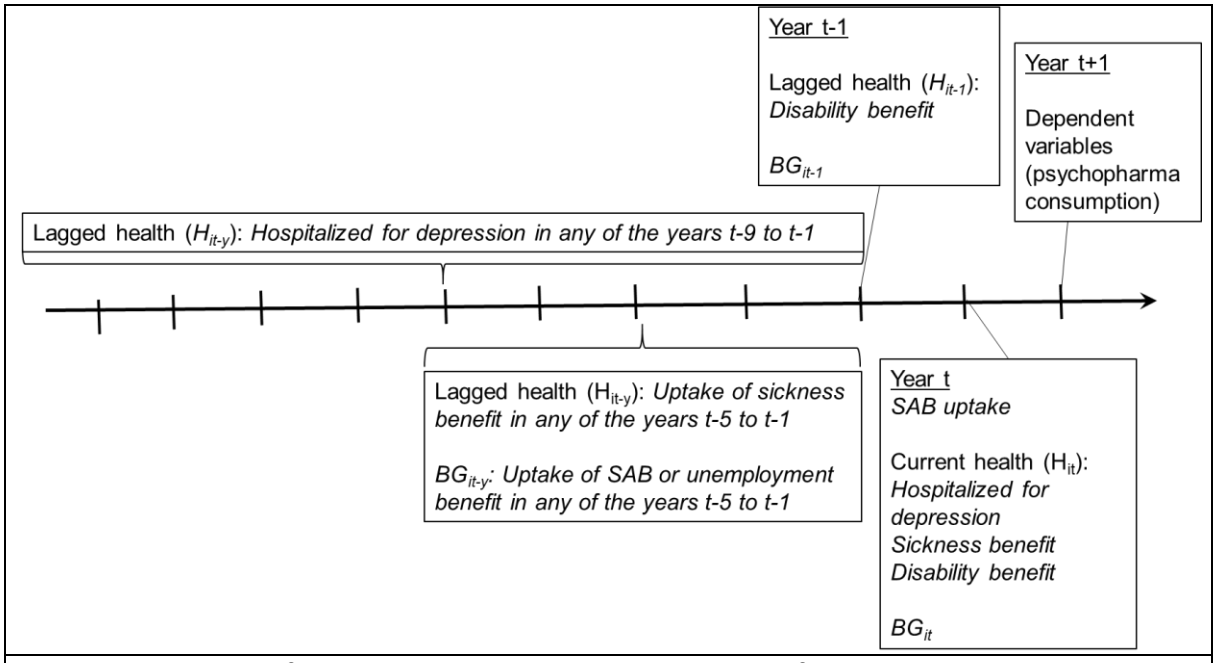

Figure 1: Timeline of variables in model. BG is an acronym for general background variables (see main text).

TABLES

TABLE 1. DESCRIPTIVE STATISTICS BY GENDER

	MEN Obs. 708,646		WOMEN Obs. 839,593			
Variable	Mean	St.dev.	Mean	St.dev.	Min (Men // Women)	Max (Men // Women)
age(t)	58.620	16.307	60.592	16.681	16	104 // 106
primary educ(t)	0.284	0.451	0.292	0.455	0	1
secondary educ(t)	0.444	0.497	0.421	0.494	0	1
tertiary educ(t)	0.272	0.445	0.287	0.453	0	1
foreign born(t)	0.123	0.329	0.129	0.335	0	1
parents non-Swed. citizens(t)	0.024	0.154	0.023	0.151	0	1
metropolitan area(t)	0.310	0.463	0.314	0.464	0	1
SAB(t)	0.022	0.145	0.021	0.144	0	1
SAB(t-5)	0.053	0.224	0.053	0.224	0	1
unemployment benefit(t-5)	0.109	0.312	0.114	0.318	0	1
old-age pension(t-1)	0.431	0.495	0.470	0.499	0	1
parental benefit (t-1)	0.079	0.270	0.090	0.286	0	1
ln(disposable income) (t-1)	8.109	0.739	7.976	0.708	0	14.262 // 14.920
single adult household(t-1)	0.408	0.492	0.496	0.500	0	1
children 0-17(t-1)	0.362	0.802	0.342	0.781	0	9 // 11
psychopharmaca (t+1)	0.163	0.370	0.290	0.454	0	1
antidepressants(t+1)	0.078	0.268	0.151	0.358	0	1
Anxiolytics(t+1)	0.055	0.227	0.100	0.300	0	1
hypnotics(t+1)	0.096	0.294	0.173	0.378	0	1
hospital depression(t)	0.001	0.039	0.002	0.047	0	1

hospital depression(t-9)	0.009	0.094	0.012	0.111	0	1
sickness benefit (t)	0.056	0.229	0.083	0.275	0	1
sickness benefit (t-5)	0.198	0.399	0.270	0.444	0	1
disability benefit (t)	0.058	0.234	0.093	0.291	0	1
disability benefit (t-1)	0.062	0.242	0.100	0.300	0	1

Note: Weighted by the number of panel appearances.

TABLE 2: POOLED OLS REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR T. *WOMEN* (n=839,593)

Dependent variable	1	2	3	4
Psychopharmaca(t+1)	0.0693***	0.0623***	0.0639***	0.0619***
	(0.00619)	(0.00571)	(0.00544)	(0.00538)
– Antidepressants(t+1) (N06A)	0.0870*** (0.00549)	0.0444*** (0.00510)	0.0440*** (0.00492)	0.0416*** (0.00487)
– Anxiolytics(t+1) (N05B)	0.0625*** (0.00459)	0.0358*** (0.00427)	0.0345*** (0.00414)	0.0326*** (0.00411)
– Hypnotics(t+1) (N05C)	0.0209*** (0.00509)	0.0417*** (0.00471)	0.0418*** (0.00455)	0.0401*** (0.00450)
Background variables	No	Yes	Yes	Yes
Lagged health	No	No	Yes	Yes
Current health	No	No	No	Yes

The table shows the estimated correlations between SAB in year t and the dependent variables in the leftmost column. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 3: POOLED OLS REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR T. *MEN (n=708,646)*

Dependent variable	1	2	3	4
Psychopharmaca(t+1)	0.106***	0.0764***	0.0728***	0.0870***
	(0.00609)	(0.00566)	(0.00532)	(0.00549)
– Antidepressants(t+1) (N06A)	0.0764*** (0.00482)	0.0475*** (0.00450)	0.0461*** (0.00431)	0.0423*** (0.00423)
– Anxiolytics(t+1) (N05B)	0.0567*** (0.00414)	0.0338*** (0.00392)	0.0335*** (0.00382)	0.0313*** (0.00380)
– Hypnotics(t+1) (N05C)	0.0589*** (0.00499)	0.0476*** (0.00459)	0.0477*** (0.00447)	0.0452*** (0.00443)
Background variables	No	Yes	Yes	Yes
Lagged health	No	No	Yes	Yes
Current health	No	No	No	Yes

The table shows the estimated correlations between SAB in year t and the dependent variables in the leftmost column. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 4: FIXED EFFECT (FE) REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR T. *WOMEN* (n=839,593).

Dependent variable	1	2	3	4
Psychopharmaca(t+1)	0.00259	0.00533	0.00511	0.00489
	(0.00373)	(0.00375)	(0.00375)	(0.00373)
– Antidepressants(t+1) (N06A)	0.00377	0.00541	0.00523	0.00484
	(0.00339)	(0.00342)	(0.00342)	(0.00340)
– Anxiolytics(t+1) (N05B)	0.00205	0.00318	0.00312	0.00289
	(0.00311)	(0.00312)	(0.00312)	(0.00312)
– Hypnotics(t+1) (N05C)	0.00421	0.00562*	0.00545*	0.00525*
	(0.00312)	(0.00314)	(0.00314)	(0.00314)
Background variables	No	Yes	Yes	Yes
Lagged health	No	No	Yes	Yes
Current health	No	No	No	Yes

The table shows the estimated correlations between SAB in year t and the dependent variables in the leftmost column. All specifications include individual fixed effects. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 5: FIXED EFFECT (FE) REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR T. *MEN* (n=708,646).

Dependent variable	1	2	3	4
Psychopharmaca(t+1)	0.0131***	0.0155***	0.0153***	0.0145***
	(0.00368)	(0.00369)	(0.00369)	(0.00368)
– Antidepressants(t+1) (N06A)	0.00835*** (0.00314)	0.00964*** (0.00316)	0.00943*** (0.00316)	0.00848*** (0.00314)
– Anxiolytics(t+1) (N05B)	4.61e-05 (0.00291)	0.000618 (0.00292)	0.000632 (0.00292)	0.000332 (0.00292)
– Hypnotics(t+1) (N05C)	0.00517* (0.00307)	0.00628** (0.00309)	0.00618** (0.00309)	0.00570* (0.00308)
Background variables	No	Yes	Yes	Yes
Lagged health	No	No	Yes	Yes
Current health	No	No	No	Yes

The table shows the estimated correlations between SAB in year t and the dependent variables in the leftmost column. All specifications include individual fixed effects. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 6.: FIXED EFFECT (FE) REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR t; INTERACTION WITH EDUCATIONAL ATTAINMENT. *WOMEN* (n= 839,593).

Independent variable	1 Psychopharmaca(t+1)	2 Antidepressants(t+1) (N06A)	3 Anxiolytics(t+1) (N05B)	4 Hypnotics(t+1) (N05C)
SAB(t)	0.00288	0.00336	-0.000976	0.00411
	(0.00665)	(0.00601)	(0.00555)	(0.00537)
Secondary educ. (t)	0.00851*	0.00893**	0.00512	-0.00736**
	(0.00474)	(0.00412)	(0.00348)	(0.00352)
SAB (t) X Secondary educ (t)	-0.000350	0.00234	0.00222	-0.00249
	(0.00826)	(0.00744)	(0.00683)	(0.00684)
Tertiary educ. (t)	0.0140**	0.0214***	0.000330	-0.0175***
	(0.00648)	(0.00584)	(0.00435)	(0.00430)
SAB (t) X Tertiary educ. (t)	0.0151	0.00159	0.0156*	0.0138
	(0.0108)	(0.00975)	(0.00911)	(0.00895)

The table shows the estimated correlations between the dependent variables, measured in year t+1, in the upper row and SAB in year t, educational attainment and the interaction term between SAB and educational attainment. All specifications include individual FE and control for background variables, lagged and current health as described in the main text. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 7: FIXED EFFECT (FE) REGRESSIONS OF MENTAL HEALTH PROBLEMS IN YEAR t+1 ON SAB IN YEAR t; INTERACTION WITH EDUCATIONAL ATTAINMENT. *MEN* (n= 708,646).

Independent variable	1 Psychopharmaca(t+1)	2 Antidepressants(t+1) (N06A)	3 Anxiolytics(t+1) (N05B)	4 Hypnotics(t+1) (N05C)
SAB	0.00802	0.00133	-0.00970*	0.00815
	(0.00644)	(0.00512)	(0.00500)	(0.00537)
Secondary education	0.00535	0.00850***	0.00402	-0.00126
	(0.00398)	(0.00328)	(0.00282)	(0.00308)
SAB X sec. education	0.00545	0.00739	0.0121*	-0.00620
	(0.00812)	(0.00667)	(0.00627)	(0.00676)
Tertiary education	-0.00422	0.00496	-0.00117	-0.0109***
	(0.00584)	(0.00465)	(0.00406)	(0.00409)
SAB X tert. education	0.0231**	0.0213**	0.0243***	0.00451
	(0.0103)	(0.00910)	(0.00810)	(0.00885)

The table shows the estimated correlations between the dependent variables, measured in year t+1, in the upper row and SAB in year t, educational attainment and the interaction term between SAB and educational attainment. All specifications include individual fixed effects and control for background variables, lagged and current health as described in the main text. Standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1.