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Abstract
We use rich longitudinal survey and register data on Swedish individuals to examine the relationship between financial strain and mental health. Specifically, we consider the longitudinal relationships between payment difficulties and subjective (self-reported anxiety) as well as objective (psychiatric drug use) measures of mental ill-health. Among previously healthy individuals, payment difficulty experiences are strongly associated with self-reported mental ill-health. The association with later psychiatric drug use is weaker and differs by gender. Psychiatric drug users are on the other hand at high risk of later experiencing payment difficulties. This indicates that policy measures regarding the payment difficulties–health nexus ought to prioritize activities improving mental health.

Introduction

There is great variation in gross household debt across OECD countries, ranging from 60 percent of net disposable income in Eastern European countries to over 300 percent of net disposable income in Denmark and Sweden (André 2015; Winstrand and Ölcer 2014). Nevertheless, most OECD countries have seen a considerable increase in gross household debt since the mid-90s (OECD 2014). Loans for house purchases continue to comprise the lion's share of household borrowing, on average two thirds of total household debt in the OECD area (OECD, 2014). However, in recent years the share of unsecured (non-collateralized) debts has expanded markedly and in some cases, e.g. the US and the UK, grown more than secured debts. Magri et al (2011) observe for the Euro area that consumer credit, i.e. the type of loans that finance immediate consumption (taking the form of credit card or store card, personal loans, overdraft, leasing etc.) amounts to almost 15 percent of household debt on average.

Taking on credit for basic consumption does not necessarily imply a lack of cash and the use credit for day-to-day living expenses may very well be rational, not the least if interest rates are close to zero or negative. However, short-term credits generally have high interest rates (significantly higher than when lending involves investment or any collateral), and recent studies suggest that the average individual taking on credit for day-to-day living expenses are low-income earners, often lacking a financial buffer (André 2015, Magri et al. 2011; del Rio and Young 2006). Consistently, debt problems often relate to unsecured debts and more often affect low-income earners (del Rio and Young 2008, Anderloni et al. 2012, Oksanen et al. 2015). It is thus likely that individuals or households taking on credit for every day necessities are strapped for cash, have liquidity constraints and are at major risk of getting into payment difficulties. Bridges and Disney (2004) observe among low-income households in the UK, that those who are in arrears on loans from financial institutions also are in arrears on their utility bills. In addition, they find a strong association between housing arrears and utilities arrears. Furthermore, taking on credit for daily necessities may actually be a sign of already having payment difficulties. Individuals tend to lend from several credit institutes and may also lend to pay interest rates for previous credit loans (see e.g. Poppe 2014). Investigating applicants for payday loans, a type of high-cost consumer credit, from a US financial institution, Bhutta et al. (2015) find indications of persistent payment difficulties, the applicants tend to fall into arrears and apply for new loans more often than the general population.

In most societies, credits and debts are central for the economic conditions of individuals. By providing households with a possibility to consume expensive goods (e.g. a car or a house), enabling consumption smoothing over time and facilitating investments in human capital (e.g. education) that likely increases the individual's future income, credits may, from a theoretical perspective, enhance health and welfare.

Debts may however also impose a hazard to both mental and physical health, leading to decreases in individual welfare. One straightforward reason is that resources, which otherwise would have been spent on health improving investments instead, e.g. a gym membership or consumption of cultural activities, go to interest payments and mortgages. A second reason is that when a significant share of an individual's income is allocated to debt-related payments, debt can be a source of stress, which in turn may have negative consequences for the individual's mental well-being, either directly or indirectly through increased consumption of harmful goods like cigarette smoking or alcohol as a way to "self-medicate" against the increased stress level. This channel seems particularly plausible if the debt-related payments are high enough to push the individual into arrears, or into payment difficulties with respect to other living expenses. The view of debt as a stressor gives salience to the potential link between payment difficulties and mental health and has attracted much research interest.

Thus, from a theoretical viewpoint, there are reasons to expect positive as well as negative relationships between debt and mental health problems, whereas actual payment difficulties, if anything, have a negative impact. Empirical studies from various countries and contexts suggest that the negative effect of debt dominates: [1] for instance, Drentea and Reynolds (2012) note a significant correlation between debt and depressive symptoms in the US, while Brown et al. (2005) show that psychological distress is higher among British households with a larger amount of non-mortgage debt. Further, there are indications that payment difficulties indeed are linked to worse mental health. Cannuscio et al (2012) and McLaughlinet al (2012) show that individuals having payment difficulties with respect to mortgages are at increased risk for angst and severe depression in the US, and Gathergood (2012) find similar results in the UK. Using data on Swedish households, Ahnquist et al. (2007) note that women with persistent payment difficulties (8 and 16 years back in time) more often report anxiety and angst than women who have not had financial problems.

However, the vast majority of studies fail to demonstrate whether debts or payment difficulties, or both, *cause* mental health problems, or if the causal link runs from poor mental health to an elevated risk for high debt and payment difficulties (Drentea and Reynolds 2012; Reading and Reynolds 2001; Worthington 2006, Gathergood 2012). Due to the possibility of reverse causality, it is methodologically challenging to examine whether debts and payment difficulties affect mental health. Similarly, most empirical approaches fail to fully take into account (un-)observable factors that may coincide with both financial problems and poor health, or affect the propensity to feel stressed by a given economic situation (Reading and Reynolds 2001; Bridges and Disney 2010).

[1] Examples of the measures of mental health that have been examined in the literature are anxiety (Drentea 2000; Drentea and Lavrakas 2000; Drentea and Reynolds 2012; Gathergood 2012a), hopelessness (Meltzer et al. 2011), suicides (Meltzer et al. 2011, 2012; Hatcher 1994; Hintikka et al. 1998) and psychosis (Jenkins et al. 2008). General mental health measured as the standardized General Health Questionnaire Scores (GHQ12) has been examined in the studies by Brown et al. (2005), Gathergood (2012a), Roberts et al. (2000), Nettleton and Burrows (1998) and Selenko och Batinic (2011).

It is also remarkable that despite a growing number of contributions, knowledge is still lacking on how debt and financial payment difficulties affect objective measures of mental health. All existing analyses rely on self-reported and subjectively assessed measures of mental health. As discussed by e.g. Butler et al. (1987), Van Doorslaer and Gerdtham (2003) Kjellsson et al. (2014) and Ljungvall et al. (2015) self-reported health measures are likely to be contaminated with measurement errors following that individuals report mental health problems that they do not have, or reversely do not report health issues that they do have, or just do not respond truthfully.

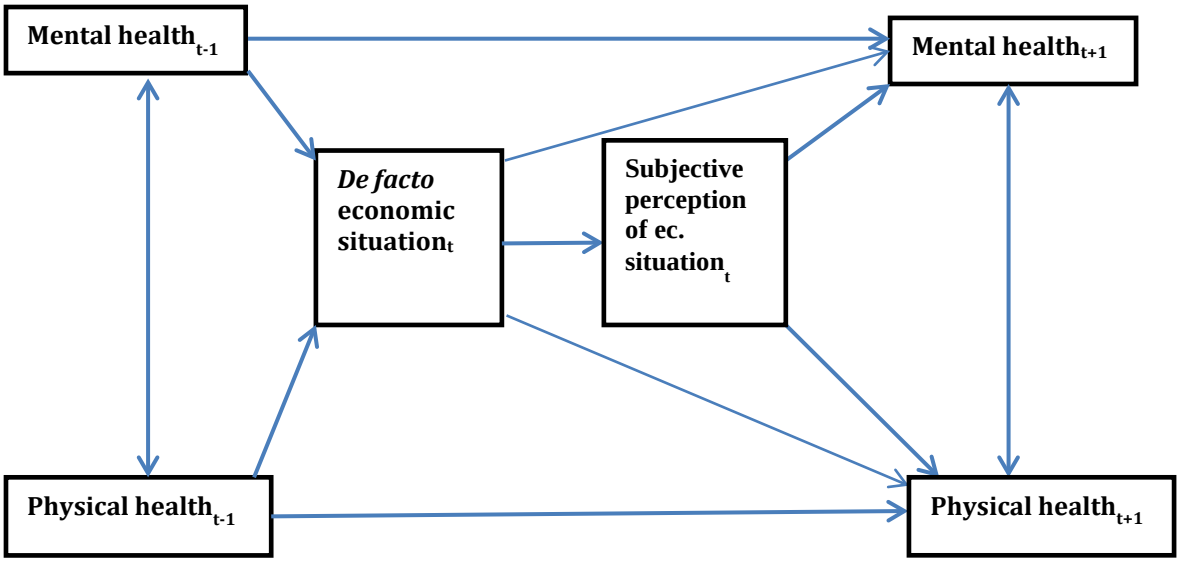
This chapter uses rich survey and register data on Swedes to examine the relationship between payment difficulties and mental health. Our focus on payment difficulties rather than debt is motivated by the fact that the presence of payment difficulties is a central component in the argumentation why debt would affect mental ill-health. We take advantage of longitudinal panel data on payment difficulties and both subjective and objective measures of mental health to provide a more comprehensive analysis than what is done in most of the previous quantitative literature. Our analysis investigates both directions of the relationship between bad health to payment difficulties, taking account of previous mental health status as well as previous experiences of payment difficulties. We find that payment difficulties are strongly associated with subjectively reported mental ill-health, but considerably less strongly related to objective health measures. For the latter measures, we find more support for a substantial link running in the other direction, from previous mental ill-health to later payment difficulties. This indicates that policy measures regarding the payment difficulties–health nexus should prioritize activities improving mental health.

The next section presents a theoretical and conceptual framework. Section 3 discusses the data and method, while section 4 presents the empirical analysis. Section 5 concludes the chapter with a discussion on the results and a reflection upon previous results in the literature.

Theoretical and conceptual framework

Figure 1 illustrates the conceivable associations between payment difficulties and mental health. The boxes denoted *Mental health* capture the individual's mental health in broad terms: medically diagnosed conditions as well as individual subjective perceptions of angst and depression. The box *de facto* economic situation refers to the individual's ability to cover her expenses. By contrast, the box *Subjective perception of economic situation* refers to the individual's perception about her economic situation; specifically, it describes how concerned she feels about her economic situation at a given *de facto* economic situation. To illustrate the role of the time dimension, we have indexed the boxes: *t-1* refers to previous time periods, *t* is the current time period, while *t+1* refers to later time periods.

Figure 1. Associations between payment difficulties and mental health



The figure includes an arrow running from the box *mental health at t-1* to the box *de facto economic situation at t*. The arrow represents that the individual's mental health status may causally affect the risk of running into payment difficulties. Specifically, mental illness can reduce the individual's earnings capacity by inhibiting the ability to obtain or remain in salaried employment; in this case, the individual has to rely on the social insurance system as her primary source of income. As the reimbursements from these systems typically are lower than wage income, the individual will find herself at increased risk for payment difficulties if she has limited possibilities to reduce her level of expenses.

Notably, the framework thus highlights that institutional differences between countries affect the associations between mental health and payment difficulties. In a country where the social insurance reimbursements are generous, the risk of ending up in a situation with payment difficulties is lower than in a country where the social

insurances are less generous (or entirely lacking). Put differently, the association reflected by the arrow in Figure 1 is weaker in the first country. For people with severe mental problems, it is also possible to come up with other reasons for why mental health may causally affect the economic situation. For instance, the mental condition may be associated with difficulties of handling the private economy, fear of being in contact with companies and authorities etc.

Next, consider the arrow running from the box *de facto economic situation at t* to the box *mental health at t+1*. This arrow captures the direct causal effect of payment difficulties on mental health. Even though it is intuitively plausible that payment difficulties may lead to mental problems, it is actually not trivial to make the causal link without first taking the route via the box describing the individuals *subjective perception* of her situation. One exception may be when, in order to avoid payment difficulties, the individual has to accept a mentally exhausting job, implying mental problems in the longer run. To give a concrete example, consider a woman who faces payment difficulties due a divorce from her bread-winning husband. The woman can get a job in elderly care, which has a generally stressful working environment. Thus, her objective economic situation may causally lead to worsened mental health, because the woman has to accept the job offer. Importantly, note that she does not have to perceive her economic situation as stressful *per se* – it is sufficient that she notes that she will run into economic problems unless she accepts the job offer, and thus accepts the job. In other words, her mental problems are not caused by worries about her economic situation; it is her *de facto* economic situation that – via the stressful job – causes mental illness.

It is much easier to conceive of a causal link between the box capturing the individual *subjective perception* of her economic situation at time *t* and the box capturing her later mental health at *t+1*. Individuals who are stressed or anxious about their economic situation by definition suffer from mental ill-health, if stress and anxiety fall within the definition of mental health. But also when adopting a narrower definition of mental ill-health, it is conceivable that the stress or anxiety directly related to the economic situation causally affects the risk of running into deeper mental problems.

The arrow between the *de facto* and the *subjective perception* boxes highlights that different individuals interpret a given *de facto* situation differently (Bridges & Disney, 2010). The same economic situation may make one person very stressed but hardly affect the stress level of a more cool-minded person. The individual-specific sensitivity to stress thus affects the association between *de facto* economic situation and *subjective perception* of the situation.

The individual's health status tends to be persistent over time. In Figure 1, this is reflected by the arrow running from *mental health at t-1* to *mental health at t+1.*

Although not shown explicitly in Figure 1, we consider the associations between payment difficulties and mental health to be a *circular process*. Hence *mental health at t+1* may affect *the de facto economic situation at t+2*, in its turn impacting on the *subjective perception of the economic situation at t+2*. The subjective perception may then influence *mental health at t+3* etc.

Take-away messages

The most important take-away message from the framework depicted in Fig. 1 is that a cross-sectional association between mental health and payment difficulties may reflect causal links running in both directions. If an individual at a specific point in time reports that she suffers from mental problems and payment difficulties, it is impossible to determine the order of precedence. Indeed, the causal link may go in both directions.

This insight has implications for researchers trying to examine empirically whether there *is* a causal link running from payment difficulties to mental problems. First, such an examination requires data in which the economic situation is measured before the mental health is measured. Second, to ensure that the payment difficulties predate the mental problems, it is necessary to have data about the study population's mental health at the point in time when the payment difficulties was measured as well as historical data on mental health. Unless the researcher controls for the possibility that individuals with payment difficulties already were in a worse mental state, it is impossible to rule out that a statistical association between previous scarcity and later mental problems only reflects that ill health is persistent and that the group with payment difficulties had worse health to begin with. Similarly, if the researcher wishes to examine the potential causal link running from mental problems to later payment difficulties, it is necessary to obtain data in which the mental problems are measured at *t-1*, while the economic situation is measured both in t-1 and in t. With such data, the researcher can account for the possibility that payment difficulties are persistent and that the group with worse mental health also had a tougher economic situation to begin with.

A second important take-away message from the framework is that the causal effect of payment difficulties on mental health partly runs via elevated stress and anxiety for the economic situation – that is, via the effect on the individual's subjective perception of her economic situation. As a consequence, it is unrealistic to expect that payment difficulties have the same health implications for all individuals, because different individuals will be differently stressed by the given situation. From this perspective, payment difficulties are only a subset of the many stressors that can affect individual mental health, and differently so for different individuals. Instead of focusing on payment difficulties *per se* as harmful for health, one might want to consider the individual's inability to stay calm as response to e.g. payment difficulties as the root of the problem.

For empirical research, the above reasoning suggests that the association between mental health and objective measures of payment difficulties – such as arrears, or failure to pay bills – should be weaker, or disappear, if one accounts for the individuals' subjective perception of their own situation (e.g. if the individual is distressed by the economic situation). In this context, it is important to note the difference between i) self-reported measures of *de facto* payment difficulties and ii) self-reported measures of the individuals' *subjective perception* of the situation. Examples of measures of type i) are survey questions like "Have you experienced difficulties in paying your bills the last year?" or "How large are your interest payments in relation to your net income?" Examples of measures of type ii) are questions like "Are you concerned about your economic situation these days?". Whereas the first two questions are aimed at describing the *de facto* situation, and thus does not lend themselves to ambiguous interpretations, the last question asks about the individual's perception of the situation. This is not to say that questions of type i) are perfect measures. For instance, individuals who get very stressed by falling behind with their bills may find such failures salient, and thus have a higher probability of recalling them when asked.

Estimation

Guided by the framework in the previous section, we use regression analysis to address two basic questions:

1. Does self-reported *de facto* payment difficulties precede mental problems?
2. Do mental problems precede self-reported *de facto* payment difficulties?

We take as our starting point the link suggested by the previous empirical research, by analyzing whether payment difficulties influence later mental health. We then proceed by investigating the foundation for a causal link running from mental health to later payment difficulties. With regards to question 1, our estimates will capture the direct effect of *de facto* payment difficulties *and* the indirect effect running through *subjectively perceived* difficulties, in terms of the framework. With regards to question 2, our estimates will capture the direct effect of mental problems on the risk of payment difficulties *and* the possible elevated propensity to report payment difficulties among people that are easily distressed.

Technically, we estimate OLS regressions of the following type:

$$y_t = \alpha + \beta * X_{t-1} + \varepsilon$$

where y is the dependent variable measured at time t (either a measure of mental health, or a measure of payment difficulties), α is the mean value of the dependent variable and ε is a random error term with mean zero. X are independent variables, measured at time t-1, i.e. before the dependent variable. β are coefficients to be estimated, each showing the average effect of a marginal change in an independent variable on the dependent variable, holding all other predictors constant. The next section describes the data and variables. As we are interested in average marginal effects, estimations of a linear probability model (LPM) using OLS perform sufficiently well relative to probit and logit models (Angrist and Pischke, 2008).[2]

Data

Data sources

We use data from two waves 2006-2007 of a large population-representative survey of Swedish inhabitants (ULF, the Swedish Living Conditions Surveys), combined with register data about the individuals interviewed in the survey. This gives us a unique longitudinal panel data set mirroring the Swedish population that includes both subjective and objective measures of mental health, and that allow us to study individuals that in a previous period never experienced payment difficulties or mental health problems.

[2] We get similar results when we estimate the baseline model with logit instead of LPM, see Appendix Table A5.

The survey comprises questions about the individual's experience with payment difficulties during the last year (that is, the 365 days before the interview). In 2008 ULF was integrated with Eurostat's Survey on Income and Living Conditions (SILC). The integration implied changes in the collection of information and the battery of survey questions, decreasing the reliability of a comparison over time. With respect to payment difficulties, SILC provides more detailed information about the sources of payment difficulties (housing or rental arrears, arrears in other loan payments, arrears in utility bills etc.). However, we only have access to a composite measure of payment difficulties, the measure most similar to the measure used in the survey waves of 2006 and 2007.

We obtain a fuller description of the individuals' economic situation by adding register information from Statistics Sweden's database LISA (Longitudinell Integrationsdatabas för Sjukförsäkrings- och Arbetsmarknadsstudier). Our database contains information from LISA for everyone that has participated in the ULF-survey, not only the year they participated in the survey, but also the ten years before and the ten years after the interview took place.

The ULF-survey comprises one question specifically referring to the mental health of the respondent. To this self-reported health measure, we add objective register information about the respondents' yearly consumption of psychiatric drugs and hospitalizations due to mental problems. The source of this information is the Swedish Prescribed Pharmaceutical register, which is available from July 2005 onwards, and the Swedish Inpatient register, which is available since 1987. However, concerning the Swedish Inpatient register, we use data from 1997 and onwards as the system of classifying diagnoses changed from ICD9 to ICD10 that year.

Given the longitudinal approach, it is important to keep track of the point in time when the dependent and independent variables are measured. The ULF-survey questions are phrased so as to measure the respondents' situation at time of the interview, or the whole year (*t*). Thanks to our rich register data, we can construct independent and dependent variables measured either the years before (*t-1*, *t-2*, etc.) or the year after (*t+1*) the interview took place.

It is useful to note that variables measured before the survey interview (*t-1*, *t-2*, etc.) are only used as independent variables, never as dependent variables; we call these variables *lags*. Similarly, variables measured the year after the interview are only used as dependent, never as independent variables; these variables are called *leads*. Variables measured during the interview year are used as dependent variables in some estimations and as independent variables in others.

Variables

Our measure of *de facto economic situation* is a dummy variables that indicates whether the ULF-survey respondent has had troubles paying his/her bills (for rent, food, other expenses etc.) during the year preceding the interview (1=yes, 0 =no). Below, we will refer to this circumstance as the individual's experience with *payment difficulties*.

The measure captures long-term and severe difficulties as well as short-term and non-persistent difficulties. It is reasonable to assume that transitory scarcity generally has negligible effects on mental health, so that if there is a causal effect, it is driven by individuals with persistent payment difficulties. Because there is no way for us to identify the severity of the reported payment difficulties, we will likely underestimate the association between scarcity and mental health.

Our first measure of *mental health* is a dummy variable, *angst*, which equals one for respondents who report that they suffer from distress or anxiety at the time of the interview (t). We further have a set of dummy variables that each equal one if the individual consumed certain psychiatric drugs – *antidepressants* (ATC code N06A)[3], *sedatives* (ATC code N05B) or *hypnotics* (sleeping pills, ATC code N05C) - during a given year (*t-1, t,* or *t+1*). In addition to the dummy variables indicating either of these substances, we have a dummy variable equaling one if the individual consumed *any* of the three substances –*psychopharmaca*.

Our final measure of mental health, which is only used as independent variable, is the individual's history of hospitalizations due to depression or anxiety (ICD code F32-F33, F41, F43). One dummy variable indicates hospitalizations during the interview year (*t*), a second variable indicates hospitalizations during any of the nine years before the interview (*t-9*), to reflect the possibility of mental health problems reoccurring over time.

The advantage of the register measures is that they avoid measurement errors due to individuals misreporting their health. To obtain the pharmaceuticals or become hospitalized, a medical professional has to be involved in the decision-making, suggesting that the individuals consuming these substances or being hospitalized suffer from mental problems to a considerable extent.

We also consider additional health variables of a more general type, as measured by benefit receipt from the social insurance system due to health-related income losses. The health variables in question are used only as independent variables. Sickness benefit is paid when the individual is temporary disabled to work, while disability benefit pertains to permanent reductions in work ability. We use dummy variables

[3] Some pharmaceuticals in the class of antidepressants are also used to treat various anxiety diagnoses (TLV, 2008).

indicating sickness or disability benefit receipt, respectively, during the interview year (*t*) and before the interview year. Because the benefit forms reflect health conditions of different duration, we account for disability benefit the year prior to the interview (*t-1*) and for sickness benefit in any year in a five-year period prior to the interview (*t-5*).

Our dataset also contains a rich set of background variables for the survey respondents. One subset of these background variables consists of dummy variables measured before the interview. Two variables indicating that the individual received unemployment benefit or was on welfare during any of the five years before the interview, two variables indicating that the individual received old-age pension or parental leave benefits during the year before the interview, and two variables indicating that the individual lived in a single-person household or had children of age below 18 in the household. In addition, the household's (logarithmic) disposable income is measured before the interview. The reason why we lag these variables is that the contemporary values of them may be correlated with the payment difficulties arising during the interview year. Notably, we consider a longer time-span with regard to unemployment and welfare benefits. These variables describe, to a varying degree, a vulnerable economic situation. Just as with variables measuring previous health status, we are interested in making our analysis as comprehensive as possible, taking account of prior circumstances that may influence the association between payment difficulties and mental health.

The remaining background variables are time-invariant or refer to the situation during the interview year: age, sex, type of housing (own house, cooperative apartment, or tenancy), living in one of the three metropolitan municipalities, educational level, born in foreign country (taking the value 1 if born outside Sweden, 0 if born in Sweden) and parents' citizenship (taking the value 1 if non-Swedish, and 0 if Swedish). Lastly, we include a dummy indicating whether the interview took place in 2006 or 2007.

See Appendix Table A1 for a complete variable description.

The empirical relationship between payment difficulties and mental health

Descriptive statistics

Out of the 10,988 individuals in our sample, 12 percent reported that they experienced payment difficulties during the past year. Table 1 shows how the health variables in our data depend on the respondents' payment difficulty status. Overall, the table indicates that the group reporting payment difficulties has a higher prevalence of mental health problems later: they report higher prevalence of angst around the time of the interview, and they are more likely to use psychiatric drugs the year thereafter.

We also see that the group with recent payment difficulties has a history of bad health. The absolute rates are very small, but the likelihood of having been hospitalized due to depression or anxiety is 3-4 times higher in the group with payment difficulties. Similarly, they are more likely to have received either sickness or disability benefits from the social insurance in the past years. These differences indicate the importance of accounting for previous and present health status around the interview, of accounting for already present differences in health between individuals with and without payment difficulties.

Table 1. Health variables, by payment difficulty status

	No payment difficulties					**Payment difficulties**				
Variable	***Obs.***	***Mean***	***St.dev.***	***Min***	***Max***	***Obs.***	***Mean***	***St.dev.***	***Min***	***Max***
angst(t)	9,661	0.18	0.38	0	1	1,289	0.43	0.50	0	1
psychopharmaca (t+1)	9,689	0.17	0.38	0	1	1,299	0.22	0.42	0	1
antidepressants(t+1)	9,689	0.09	0.28	0	1	1,299	0.16	0.36	0	1
sedatives(t+1)	9,689	0.05	0.23	0	1	1,299	0.08	0.27	0	1
hypnotics(t+1)	9,689	0.10	0.30	0	1	1,299	0.11	0.31	0	1
hospital depression(t-9)	9,689	0.01	0.08	0	1	1,299	0.03	0.16	0	1
hospital depression(t)	9,689	0.001	0.038	0	1	1,299	0.004	0.062	0	1
sickness benefit(t)	9,647	0.08	0.28	0	1	1,295	0.15	0.36	0	1
sickness benefit (t-5)	9,689	0.26	0.44	0	1	1,299	0.37	0.48	0	1
disability benefit(t)	9,647	0.06	0.23	0	1	1,295	0.13	0.33	0	1
disability benefit (t-1)	9,643	0.06	0.24	0	1	1,295	0.12	0.32	0	1

Table 2 further indicates that there are other systematic differences between the two groups. The group with payment difficulties is markedly younger on average, which is reflected in their lower uptake of old-age pension, their higher uptake of other benefits and welfare, and the higher prevalence of children in the household. Their disposable income is somewhat lower, despite the fact that the educational attainment is similar. Finally, payment difficulties are slightly more prevalent in the metropolitan areas,

among women, single-person households, renters and individuals with foreign background.

It is easy to envision that these background characteristics *per se* may have an impact on mental health, which is not related to payment difficulties. Thus, it is vital to account for these factors in the analysis of the relation between recent payment difficulties and later mental health. Such a multivariate analysis is the subject of the next two sections.

Table 2 Background characteristics by payment difficulty status

	No payment difficulties					**Payment difficulties**				
Variable	***Obs.***	***Mean***	***St.dev.***	***Min***	***Max***	***Obs.***	***Mean***	***St.dev.***	***Min***	***Max***
unemployment benefit$_{(t-5)}$	9,689	0.15	0.36	0	1	1,299	0.30	0.46	0	1
welfare$_{(t-5)}$	9,647	0.05	0.21	0	1	1,295	0.26	0.44	0	1
old-age pension$_{(t-1)}$	9,643	0,31	0.46	0	1	1,295	0.09	0.29	0	1
parental benefit $_{(t-1)}$	9,643	0.14	0.35	0	1	1,295	0.21	0.40	0	1
disposable income$_{(t-1)}$, log	9,625	8.02	0.72	0	11.66	1,290	7.66	0.78	0	10.45
single adult household$_{(t-1)}$	9,643	0.52	0.50	0	1	1,295	0.73	0.45	0	1
children 0-17$_{(t-1)}$	9,643	0.53	0.92	0	9	1,295	0.82	1.12	0	7
age$_{(t)}$	9,689	51.46	18.82	16	97	1,299	39.98	14.87	17	92
female$_{(t)}$	9,689	0.51	0.50	0	1	1,299	0.58	0.49	0	1
renter$_{(t)}$	9,663	0.28	0.45	0	1	1,296	0.58	0.50	0	1
house-owner$_{(t)}$	9,663	0.55	0.50	0	1	1,296	0.28	0.45	0	1
coop. apartment$_{(t)}$	9,663	0.17	0.37	0	1	1,296	0.14	0.35	0	1
metropolitan area$_{(t)}$	9,689	0.34	0.47	0	1	1,299	0.38	0.49	0	1
max primary educ$_{(t)}$	9,634	0.23	0.42	0	1	1,297	0.18	0.38	0	1
max secondary educ$_{(t)}$	9,634	0.45	0.50	0	1	1,297	0.51	0.50	0	1
max tertiary educ$_{(t)}$	9,634	0.32	0.47	0	1	1,297	0.31	0.46	0	1
foreign born$_{(t)}$	9,647	0.13	0.33	0	1	1,295	0.24	0.42	0	1
parents non-Swed. citizens$_{(t)}$	9,662	0.11	0.31	0	1	1,293	0.22	0.41	0	1

Estimation results

We first consider whether payment difficulties precedes mental problems, and second whether mental problems precede payment difficulties.

Do payment difficulties precede mental problems?

Table 3 shows how the association between recent payment difficulties and later mental problems is modified when we account for successively more confounding factors. Column 1 displays the difference between the groups with and without payment difficulties before adjusting for any confounding factor – in fact, this is just the difference between the left and right columns of Table 1 above. We adjust for background characteristics in column 2; in column 3, we also account for health problems that were present already before the interview year; in column 4, we additionally account for health problems present during the interview year. Finally, the estimates in column 5 capture the association between previous payment difficulties and later mental health for the sub-group of individuals who had no history of mental problems at the time of the survey interview.

We see from the first row of Table 3 that the probability of self-reported anxiety is 25 percentage points (ppts) higher in the group with payment difficulties (column 1). The difference between the groups decreases to 19 ppts when we account for background characteristics (col. 2), and to 16-17 ppts when we adjust for already present health differences (col. 3-4). In the last column, we see that even when considering only the subset of individuals who had no mental health problems or sick leave history, the risk of reporting mental problems around the time of the interview is 15 ppts higher for the group that experienced payment difficulties during the year of the interview. The increase is substantial: it corresponds to a 70 percent increase from the baseline rate.[4]

Compared to the four first columns, the specification in column 5 comes closest to a causal estimation of the effect of payment difficulties on later mental problems, in the sense that the association to a much less extent picks up health differences that were already present at the time when some individuals ran into payment difficulties. But does the strong positive correlation mean that there is a causal link? Not necessarily. As discussed in the theoretical framework, the association may still reflect individual heterogeneity in how one reacts to payment difficulties, which may be related to the propensity to develop mental problems. Moreover, due to the formulation of the survey questions, we cannot rule out that the payment difficulties arose just around the time of the interview, i.e. within the same period as the reported mental problems.

[4] See Table 1 and recall that 12 percent of respondents have payment difficulties; (1-0.12)*18 + 0.12*43=21 percent in the sample report anxiety.

The next rows of the table present the associations between recent payment difficulties and later consumption of psychiatric mediations. With register variables measured the year after the interview, we can be sure that the payment difficulties precede the (potential) mental problems.

TABLE 3: Recent payment difficulties (*t*) and later mental problems (*t+1*)

Dependent variable	1	2	3	4	5	Obs. without/ with covariates
angst (t+1)	0.252*** (0.0143)	0.196*** (0.0152)	0.165*** (0.0148)	0.159*** (0.0146)	0.146*** (0.0185)	10,950/ 10,765
psychopharmaca (t+1)	0.0490*** (0.0122)	0.0649*** (0.0125)	-0.000878 (0.00992)	-0.0126 (0.00894)	0.0146 (0.00991)	10,988/ 10,801
– *antidepressants* (t+1)	0.0721*** (0.0105)	0.0605*** (0.0109)	0.0182** (0.00917)	0.0113 (0.00868)	0.00381 (0.00833)	10,988/ 10,801
– *sedatives* (t+1)	0.0248*** (0.00784)	0.0309*** (0.00829)	0.00946 (0.00770)	0.00670 (0.00750)	0.00326 (0.00719)	10,988/ 10,801
– *hypnotics* (t+1)	0.00700 (0.00910)	0.0322*** (0.00938)	-0.00446 (0.00880)	-0.0102 (0.00871)	0.0194** (0.00874)	10,988/ 10,801
Background char.	No	Yes	Yes	Yes	Yes	
Health at t-1	No	No	Yes	Yes	Yes	
Health at t	No	No	No	Yes	Yes	
Interaction with health at t-1	No	No	No	No	Yes	

The table shows the estimated correlations between payment difficulties at time *t* and the dependent variables in the leftmost column. Robust standard errors in parentheses. *Background variables:* presence of unemployment benefit and welfare benefit, respectively, in any of the five years preceding the interview; old age pension, single adult household, children 0-17 years, parental benefit, disposable income (logarithmic) one year prior to the interview; dummy variable for every age, sex, housing (house-owner, coop. apartment, other housing forms as reference group), educational attainment (maximum secondary and tertiary education, respectively, lower educational attainment as reference group); foreign born, both parents non-Swedish citizens, living in metropolitan area (Stockholm, Göteborg or Malmö) and year dummy. *Psychopharmaca* is a dummy variable equaling one if the individual consumed any of the three substances antidepressants, sedatives or hypnotics. *Health at t-1* = has used psychiatric drugs during the year before, or has been hospitalized due to mental problems during any of the 9 years before, or has received sickness benefit any of the 5 years before, or received disability the year before the interview. *Health at t* = has used psychiatric drugs or been hospitalized for mental problems or received either sickness or disability benefit during the interview year. *Interaction with health at t-1* = interaction effect between previous health status and payment difficulties. The estimate in column 5 captures the association between payment difficulties and mental problems for individuals with no previous health problems. *** p<0.01, ** p<0.05, * p<0.1

18 percent of respondents used at least one of the three substances (antidepressants, sedatives, or hypnotics) in the year after the interview. As seen from column 1 in the row named *psychopharmaca*, individuals with payment difficulties had a 5 ppt higher risk overall, and the risk is even somewhat higher when we take into account systematic

differences in background characteristics (col. 2). However, as soon as we adjust for the individuals' history of mental problems, the association disappears (col. 3-5). In sharp contrast to the results for the anxiety measure, individuals with payment difficulties do not seem to increase their use of psychiatric drugs. This conclusion holds up also when considering antidepressants and sedatives separately (next rows of table).

However, when separately studying hypnotic substances – which are used by 10 percent of the sample respondents – there is an interesting risk increase for the group that has experienced payment difficulties recently, but has no history of using hypnotics. The estimate corresponds to a 20 percent increase in the risk of using hypnotics in the year after the interview. Though the increase is notable, it is considerably smaller than the 70% increase noted for the subjective health measure.

Within the group that *has* a history of using hypnotics, the probability of continuing to use them is actually lower for individuals who have experienced payment difficulties recently.[5] The negative estimate may reflect that the individuals with payment difficulties cannot afford to continue with their medicine. But most prescribed pharmaceuticals are fully subsidized for expenses above a rather low cap (ca 2,000 SEK/year).

Gender differences

Women are at special risk for mental disorders (see eg . Gustafsson 2014 and Marmot 2010), but previous research provides no knowledge about the role of payment difficulties and debt. We therefore also run the above estimations separately for women and men. The results, which are presented in Appendix Tables A3 and A4, indicate that the associations between previous payment difficulties and later mental health generally are similar across genders. We note, however, an elevated risk of consuming psychiatric drugs for previously healthy women who experience payment difficulties (Table A3 column (5)). This relates to gender differences with respect to antidepressants; specifically, women with no previous mental health problems who experience payment difficulties are more likely to start to use antidepressants than women without payment difficulties, though the estimate of 2.2 percentage points is statistically insignificant (p=0.103), whereas men in the same situation are *less* likely to initiate antidepressant consumption than men without payment difficulties (p=0.065; see Table A4 column (5)). For women, the estimates for both antidepressants and hypnotics thus suggest a link between previous payment difficulties and later mental problems. The results for men on the other hand point to different directions for the two substances. Potentially, payment difficulties give rise to e.g. sleeping problems in both sexes, but there may be gender differences in treatment for the same symptom, i.e. men may be prescribed

[5] This estimate is not shown in the table, but the reader may infer that it is negative because the estimate in column 5 (for the subgroup with payment difficulties but no mental problem history) is positive while the estimate in column 4 (for both subgroups with payment difficulties) is negative.

medications relating closely to that one symptom, whereas women's sleeping problems sometimes are taken as indications of depression, leading to prescription of antidepressants. [6] In all instance, we note that the magnitude of the relationship between previous payment difficulties and later mental problems is considerably weaker for objective health problems than for subjectively reported anxiety, just as when men and women were analyzed together.[7]

Do mental health problems precede payment difficulties?

We next analyze how payment difficulties relate to earlier mental problems.

To be able to ensure that the mental problems are measured before the payment difficulty status, we only consider the register information about psychiatric drugs (i.e. we do not analyze self-reported anxiety). In both of the empirical specifications reported below, the estimates are adjusted for systematic differences in background characteristics and other kinds of health problems (measured by the uptake of sickness/disability benefits).

Notably, in these estimations, the variable indicating uptake of welfare benefits during any of the past 5 years plays an analogous role to the lagged health variables in the previous section; individuals who have received social welfare benefits in the past 5 years have definitely had recent experience of economic scarcity, which by itself may affect health etc. In our most elaborate empirical specification, we interact the historical social welfare benefit variable with the recent mental problems variable. By so doing, we intend to investigate the possibility that individuals experiencing payment difficulties today suffer from persistent financial distress. The estimates presented in column 4 of Table 4 below thus capture the association between recent mental problems and later payment difficulties for people with no history of social welfare benefits. The idea is to capture the effect for people who did not experience economic scarcity before the mental problems arose, though admittedly, scarcity may prevail even if one does not receive social welfare benefits.

[6] The proportion of antidepressant users is 12% for women and 6% for men, so women are much more likely to be prescribed antidepressants in the first place. But there is a similar gender difference for hypnotics (13% vs 7%).
[7] 26 % of women and 15% of men report anxiety.

TABLE 4 Previous mental problems (t-1) and later payment difficulties (*t*)

Independent variable	1	2	3	4	Obs.without/with covariates
psychopharmaca	0.0523***	0.0647***	0.0498***	0.0427***	10,988/10,801
(*t-1*)	(0.00952)	(0.00913)	(0.00906)	(0.00889)	
- *antidepressants*	0.108***	0.0972***	0.0780***	0.0736***	10,988/10,801
(*t-1*)	(0.0140)	(0.0129)	(0.0131)	(0.0132)	
- *sedatives*	0.0779***	0.0742***	0.0586***	0.0569***	10,988/10,801
(*t-1*)	(0.0178)	(0.0168)	(0.0167)	(0.0168)	
- *hypnotics*	0.00814	0.0378***	0.0245**	0.0196*	10,988/10,801
(*t-1*)	(0.0113)	(0.0108)	(0.0106)	(0.0102)	
Background char.	*No*	*Yes*	*Yes*	*Yes*	
Health at t-1	*No*	*No*	*Yes*	*Yes*	
Interaction scarcity at t-1	*No*	*No*	*No*	*Yes*	

The table shows the estimated correlations between payment difficulties at time *t* and previous mental problems (*t*-1)(leftmost column). Robust standard errors in parentheses. *Background variables:* presence of unemployment benefit and welfare benefit, respectively, in any of the five years preceding the interview; old age pension, single adult household, children 0-17 years, parental benefit, disposable income(logarithmic) one year prior to the interview; dummy variable for every age, sex, housing (house-owner, coop. apartment, other housing forms as reference group), educational attainment (maximum secondary and tertiary education, respectively, lower educational attainment as reference group); foreign born, both parents non-Swedish citizens, living in metropolitan area (Stockholm, Göteborg or Malmö) and year dummy. *Psychopharmaca* is a dummy variable equaling one if the individual consumed any of the three substances antidepressants, sedatives or hypnotics*. Health at t-1* = has been hospitalized due to mental problems during any of the 9 years before, or has received sickness benefit any of the 5 years before, or received disability the year before the interview. *Interaction with scarcity at t-1* = interaction effect between previous mental problems and dummy for having received social welfare in any of the 5 years before the interview. Column 4 shows the associations between previous mental problems and later payment difficulties for individuals with no history of scarcity (=no uptake of social welfare benefits in last 5 years). *** p<0.01, ** p<0.05, * p<0.1

Table 4 below tells a uniform message: the risk of running into payment difficulties is higher for individuals that have previously suffered from mental problems, no matter if these problems relate to depression, anxiety or sleeping problems. Further, the estimates in column 4 suggest that the association persists even when only examining the subgroup that had no previous experience of economic scarcity (as reflected by historical uptake of social welfare benefits). That is, people appear to have a higher risk to encounter payment difficulties following mental problems, even if their economic situation was manageable to begin with.

To illustrate the magnitudes of the estimated effects, the risk of experiencing (and reporting) payment difficulties is 42 percent higher for the individuals that used any of these substances than the baseline risk of 12 percent. From a straightforward comparison of the estimates for the individual substances in column 4, we see that the association with the payment difficulty risk is higher for antidepressants and lowest for hypnotics. Notably, the 42 percent increase in risk is considerably higher than the estimates for the objective measures in the previous section. This suggests that the mental problems captured by the objective measures are more important for later payment difficulties than the other way around.

Concluding remarks

Credit societies have evolved over time and many developed countries rely on consumer spending that is financed by borrowing. Rapid growth in real income per capita goes hand in hand with growth in consumption and in credit use (Coricelli et al 2006, Sainskrot 2015). Although taking on credit for basic consumption does not necessarily imply a lack of cash, individuals or households taking on credit for every day necessities are likely often strapped for cash, have liquidity constraints and are at major risk of getting into payment difficulties.

From a theoretical viewpoint there are reasons to believe that payment difficulties, if anything, have a negative impact on mental health and the existing literature has generally confirmed this prediction. However, the vast majority of studies fail to demonstrate whether payment difficulties *cause* mental health problems and most studies do not take into account unobservable factors that may coincide with both financial problems and poor health. It also noticeable that we currently do not know if payment difficulties affect objective measures of mental health which are less likely contaminated with measurement errors following that individuals report mental health problems that they do not have, or reversely do not report health issues that they do have and that this propensity may be correlated with measures of payment difficulties.

In this chapter we use unique and rich survey and register data on Swedes to examine the relationship between payment difficulties and mental health. Like previous studies, we find a strong and significant association between debt or payment difficulties and bad self-reported mental health. However, in difference to the previous literature, we have been able to also use objective register-based health measures, thereby avoiding the measurement errors typically associated with self-reported information. We find a less strong association between mental problems captured by objective health measures (rightmost arrows in Fig. 1). For these measures, we find more support for a strong causal link running in the other direction, i.e. from previous mental health to later payment difficulties (the left-most arrows in Fig. 1). Specifically, there is a strong and positive link between objective measures of previous mental problems and later self-reported payment difficulties even when we restrict attention to the subsample who had no apparent economic problems before their mental problems begun.

Though our result suggests that there may be a causal link from mental health to payment difficulties, we do not claim that our data provide ultimate evidence of such a link. Referring to the discussion around the theoretical framework, it is not unlikely that people with anxious personalities are more likely to recall and thus report that they have had payment difficulties, so this aspect is a source of bias. Moreover, though uptake of social welfare benefits certainly signifies an economically scarce situation, it is clearly possible to have small margins even if one does not have to seek public income support. Though we control for other factors related to payment difficulties (such as uptake of

other social benefits, living in a single household, country of birth etc.), from this analysis we cannot rule out that people with recent mental problems did not simultaneously experience more scarcity.

As our measure of payment difficulties is broad enough to encompass temporary as well as persistent payment difficulties, it is possible that the associations would be stronger for people with very severe payment problems due to e.g. indebtedness. But the results are nonetheless relevant in relation to the theme of credit for day-to-day expenses, as they concern a larger subgroup of the population, which is at risk of increasing debt-based consumption.

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Appendix

Table A1. Variable description

Variable	***Variable definition***	***Source***
angst(t)	reports suffering from distress or anxiety at the time of the interview (t) (1=yes, 0=no)	ULF, the Swedish Living Conditions Surveys
psychopharmaca(t-1, t, t+1)	consumed any of the following psychiatric drugs: antidepressants (ATC code N06A) or sedatives (ATC code N05B) or hypnotics (sleeping pills, ATC code N05C) - during a given year (t-1, t, or t+1) (1=yes, 0=no).	Swedish Prescribed Pharmaceutical register
antidepressants (t-1, t, t+1)	consumed antidepressants (ATC code N06A) - during a given year (t-1, t, or t+1) (1=yes, 0=no).	Swedish Prescribed Pharmaceutical register
sedatives(t-1, t, t+1)	consumed sedatives (ATC code N05B) - during a given year (t-1, t, or t+1) (1=yes, 0=no).	Swedish Prescribed Pharmaceutical register
hypnotics(t-1, t, t+1)	consumed hypnotics (sleeping pills, ATC code N05C) - during a given year (t-1, t, or t+1) (1=yes, 0=no).	Swedish Prescribed Pharmaceutical register
hospital depression(t-9)	hospitalizations due to depression or anxiety (ICD code F32-F33, F41, F43) during any of the 9 years prior to the interview (t-9) (1=yes, 0=no)	Swedish Inpatient register
hospital depression(t)	hospitalizations due to depression or anxiety (ICD code F32-F33, F41, F43) during the interview year (t) (1=yes, 0=no)	Swedish Inpatient register
sickness benefit(t)	received sickness benefit during the interview year (t) (1=yes, 0=no)	LISA (Longitudinell Integrationsdatabas för Sjukförsäkrings- och Arbetsmarknadsstudier
sickness benefit (t-5)	received sickness benefit during and of the 5 years prior to the interview (t-5) (1=yes, 0=no)	LISA
disability benefit(t)	received disability benefit during and of the 5 years prior to the interview (t-5) (1=yes, 0=no)	LISA
disability benefit (t-1)	received disability benefit during and of the 5 years prior to the interview (t-5) (1=yes, 0=no)	LISA
unemployment benefit$_{(t-5)}$	received unemployment benefit during and of the 5 years prior to the interview (t-5) (1=yes, 0=no)	ULF
welfare$_{(t-5)}$	received social welfare benefit during and of the 5 years prior to the interview (t-5) (1=yes, 0=no)	ULF
old-age pension$_{(t-1)}$	received old-age pension during the year prior to the interview (t-1) (1=yes, 0=no)	ULF
parental benefit $_{(t-1)}$	received parental benefit during the year prior to the interview (t-1) (1=yes, 0=no)	ULF

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--TABLE A1 CONTINUED --

disposable income$_{(t-1)}$, log	disposable household income at year prior to the interview (logarithmic)	LISA
single adult household$_{(t-1)}$	living in a single adult household during the year prior to the interview (t-1) (1=yes, 0=no)	LISA
children 0-17$_{(t-1)}$	children under 18 years of age living in the household during the year prior to the interview (t-1) (1=yes, 0=no)	ULF
age$_{(t)}$	dummy variable for every age	ULF
female$_{(t)}$	female respondent (1=yes, 0=no)	ULF
tenant$_{t)}$	Tenant during the interview year (t) (1=yes, 0=no)	ULF
house-owner$_{(t)}$	House-owner during the interview year (t) (1=yes, 0=no)	ULF
coop. apartment$_{(t)}$	Owner of coop. apartment during the interview year (t) (1=yes, 0=no)	ULF
metropolitan area$_{(t)}$	living in metropolitan area (Stockholm, Göteborg, Malmö) during the interview year (t) (1=yes, 0=no)	ULF
max primary educ$_{(t)}$	attained maximum primary education during the interview year (t) (1=yes, 0=no)	ULF
max secondary educ$_{(t)}$	attained maximum secondary education during the interview year (t) (1=yes, 0=no)	ULF
max tertiary educ$_{(t)}$	attained maximum tertiary education during the interview year (t) (1=yes, 0=no)	ULF
foreign born$_{(t)}$	born in foreign country (1=yes, 0=no)	ULF
parents non-Swed. citizens$_{(t)}$	parents have non-Swedish citizenship (1=yes, 0=no)	ULF

TABLE A2: Recent payment difficulties (*t*) and later mental problems (*t+1*), full specification

	angst(t)	*psychopharmaca(t+1)*	*antidepressants (t+1)*	*sedatives(t+1)*	*hypnotics(t+1)*
Independent variables					
payment difficulties$_{(t)}$	0.159***	-0.0126	0.0113	0.00670	-0.0102
	(0.0146)	(0.00894)	(0.00868)	(0.00750)	(0.00871)
unemployment benefit$_{(t-5)}$	0.0325***	-0.00278	-0.00146	0.00199	-0.00255
	(0.0110)	(0.00675)	(0.00624)	(0.00533)	(0.00618)
welfare$_{(t-5)}$	0.0639***	0.0231**	0.0334***	-0.00187	-0.00484
	(0.0179)	(0.0112)	(0.0115)	(0.00972)	(0.0111)
old-age pension$_{(t-1)}$	0.0275	-0.00860	-0.00127	-0.00843	-0.00290
	(0.0190)	(0.0133)	(0.0130)	(0.0114)	(0.0136)
parental benefit $_{(t-1)}$	0.0106	0.0154*	0.0107	0.00253	0.00509
	(0.0134)	(0.00799)	(0.00754)	(0.00601)	(0.00701)
disposable income$_{(t-1)}$, log	-0.00621	-0.00481	-0.00359	-0.000601	-0.000911
	(0.00589)	(0.00346)	(0.00327)	(0.00290)	(0.00351)
single adult household$_{(t-1)}$	-0.000418	-0.0126**	-0.0179***	-0.000734	-0.000789
	(0.00893)	(0.00559)	(0.00548)	(0.00499)	(0.00574)
children 0-17$_{(t-1)}$	-0.00796	-0.00575*	-0.00854***	0.00249	3.80e-05
	(0.00560)	(0.00332)	(0.00299)	(0.00243)	(0.00310)
female$_{(t)}$	0.0745***	0.00938*	0.00827*	0.00801**	0.00390
	(0.00745)	(0.00485)	(0.00451)	(0.00402)	(0.00472)
house-owner$_{(t)}$	-0.0489***	-0.0190***	-0.0117*	-0.0184***	-0.0159**
	(0.00985)	(0.00647)	(0.00610)	(0.00552)	(0.00644)
coop. apartment$_{(t)}$	-0.0124	-0.00766	-0.0107	-0.00259	-0.00795
	(0.0121)	(0.00764)	(0.00752)	(0.00723)	(0.00777)
max secondary educ$_{(t)}$	-0.0277***	-0.00428	-0.00442	-0.0123*	0.00785
	(0.0106)	(0.00725)	(0.00699)	(0.00660)	(0.00756)
max primary educ$_{(t)}$	-0.0267**	0.00326	-0.000621	-0.0175**	0.0142*
	(0.0118)	(0.00784)	(0.00763)	(0.00709)	(0.00812)
foreign born$_{(t)}$	0.0205	0.00769	-0.00523	-0.00589	0.00971
	(0.0169)	(0.0102)	(0.00948)	(0.00885)	(0.0101)
parents non-Swed. citizens$_{(t)}$	0.0210	-0.0111	-0.00460	0.000707	-0.00441
	(0.0181)	(0.0107)	(0.00982)	(0.00934)	(0.0105)
metropolitan area$_{(t)}$	0.0164**	-0.00936*	-0.00737	0.000428	-0.000511
	(0.00812)	(0.00521)	(0.00493)	(0.00461)	(0.00526)
psychopharmaca$_{(t)}$	0.185***	0.723***	0.307***	0.151***	0.275***
	(0.0181)	(0.0104)	(0.0159)	(0.0129)	(0.0161)
hospital depression$_{(t)}$	0.160	0.0472	0.220**	0.275**	-0.0659
	(0.104)	(0.0716)	(0.0982)	(0.110)	(0.107)
sickness benefit$_{(t)}$	0.0494***	0.00835	0.0330***	-0.00248	-0.00585
	(0.0153)	(0.0112)	(0.0108)	(0.00891)	(0.0104)
disability benefit$_{(t)}$	0.113***	0.0205	-0.0277	-0.0161	-0.0173
	(0.0422)	(0.0274)	(0.0313)	(0.0246)	(0.0320)

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--TABLE A2 CONTINUED--

psychopharmaca$_{(t-1)}$	0.0878***	0.280***	0.172***	0.101***	0.183***
	(0.0188)	(0.0180)	(0.0163)	(0.0137)	(0.0167)
hospital depression$_{(t-9)}$	0.107**	0.110***	0.178***	0.0259	0.0764
	(0.0519)	(0.0325)	(0.0422)	(0.0407)	(0.0493)
sickness benefit $_{(t-5)}$	0.0239**	0.00453	0.0175***	-0.0105**	-0.00967
	(0.00978)	(0.00636)	(0.00594)	(0.00528)	(0.00626)
disability benefit $_{(t-1)}$	0.0101	0.0464	0.0591*	0.0510**	0.0392
	(0.0418)	(0.0292)	(0.0311)	(0.0247)	(0.0314)
Observations	10,765	10,801	10,801	10,801	10,801
R-squared	0.151	0.596	0.362	0.176	0.343

Note: All specifications control for age (dummy variables) and interview year. Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

TABLE A3 Recent payment difficulties (*t*) and later mental problems (*t+1*). Women

Dependent variable	1	2	3	4	5	Obs. without/with covariates
angst(t)	0.237***	0.184***	0.153***	0.144***	0.145***	5,687/5,598
	(0.0192)	(0.0210)	(0.0204)	(0.0202)	(0.0270)	
psychopharmaca (*t+1*)	0.0466***	0.0790***	0.0125	-0.0104	0.0275*	5,714/5,623
	(0.0171)	(0.0179)	(0.0143)	(0.0130)	(0.0155)	
- antidepressants (*t+1*)	0.0733***	0.0718***	0.0285**	0.0143	0.0220	5,714/5,623
	(0.0149)	(0.0157)	(0.0134)	(0.0126)	(0.0135)	
- sedatives (*t+1*)	0.0232**	0.0299**	0.00599	-0.000273	-0.00832	5,714/5,623
	(0.0112)	(0.0118)	(0.0111)	(0.0107)	(0.0108)	
- hypnotics (*t+1*)	0.00206	0.0401***	0.00249	-0.00894	0.0222	5,714/5,623
	(0.0130)	(0.0135)	(0.0126)	(0.0125)	(0.0136)	
Background char.	*No*	*Yes*	*Yes*	*Yes*	*Yes*	
Health at t-1	*No*	*No*	*Yes*	*Yes*	*Yes*	
Health at t	*No*	*No*	*No*	*Yes*	*Yes*	
Interaction health at t-1	*No*	*No*	*No*	*No*	*Yes*	

TABLE A4 Recent payment difficulties (*t*) and later mental problems (*t+1*). Men

Independent variable	1	2	3	4	5	Obs.without/with covariates
angst(t)	0.254***	0.209***	0.176***	0.175***	0.139***	5,263/5,167
	(0.0214)	(0.0222)	(0.0216)	(0.0214)	(0.0252)	
psychopharmaca (*t+1*)	0.0363**	0.0496***	-0.0203	-0.0172	-0.00176	5,274/5,178
	(0.0166)	(0.0170)	(0.0131)	(0.0117)	(0.0119)	
- antidepressants (*t+1*)	0.0605***	0.0462***	0.00317	0.00442	-0.0169*	5,274/5,178
	(0.0142)	(0.0147)	(0.0120)	(0.0114)	(0.00916)	
- sedatives (*t+1*)	0.0213**	0.0303***	0.0105	0.0114	0.0117	5,274/5,178
	(0.0105)	(0.0115)	(0.0104)	(0.0102)	(0.00920)	
- hypnotics (*t+1*)	0.00474	0.0277**	-0.0106	-0.00780	0.0188*	5,274/5,178
	(0.0121)	(0.0125)	(0.0116)	(0.0114)	(0.0106)	
Background char.	*No*	*Yes*	*Yes*	*Yes*	*Yes*	
Health at t-1	*No*	*No*	*Yes*	*Yes*	*Yes*	
Health at t	*No*	*No*	*No*	*Yes*	*Yes*	
Interaction health at t-1	*No*	*No*	*No*	*No*	*Yes*	

TABLE A5: Recent payment difficulties (*t*) and later mental problems (*t+1*). Logit, marginal effects at the means.

Dependent variable	1	2	3	4	5	Obs. without/ with covariates
angst	0.200**	0.1497**	0.124**	0.121**	0.0842**	10,950/
(t)	(0.010)	(0.0109)	(0.011)	(0.011)	(0.0115)	10,752
psychopharmaca	0.046**	0.0643**	0.001	0.012	0.0154*	10,950/
(t+1)	(0.011)	(0.0111)	(0.012)	(0.012)	(0.0068)	10,785
– *antidepressants*	0.022**	0.0242**	0.007	0.005	0.0041	10,988/
(t+1)	(0.006)	(0.0054)	(0.004)	(0.003)	(0.0036)	10,759
– *sedatives*	0.007	0.0324**	0.005	0.002	0.0038	10,988/
(t+1)	(0.009)	(0.0076)	(0.006)	(0.005)	(0.0038)	10,638
– *hypnotics*	0.058**	0.0448**	0.007	0.003	0.0148**	10,988/
(t+1)	(0.007)	(0.0072)	(0.005)	(0.004)	(0.0039)	10,638
Background char.	No	Yes	Yes	Yes	Yes	
Health at t-1	No	No	Yes	Yes	Yes	
Health at t	No	No	No	Yes	Yes	

The table shows the estimated correlations between payment difficulties at time *t* and the dependent variables in the leftmost column. Robust standard errors in parentheses. *Background variables:* presence of unemployment benefit and welfare benefit, respectively, in any of the five years preceding the interview; old age pension, single adult household, children 0-17 years, parental benefit, disposable income(logarithmic) one year prior to the interview; dummy variable for every age, sex, housing (house-owner, coop. apartment, other housing forms as reference group), educational attainment (maximum secondary and tertiary education, respectively, lower educational attainment as reference group); foreign born, both parents non-Swedish citizens, living in metropolitan area (Stockholm, Göteborg or Malmö) and year dummy. *Psychopharmaca* is a dummy variable equaling one if the individual consumed any of the three substances antidepressants, sedatives or hypnotics. *Health at t-1* = has used psychopharmaca during the year before, or has been hospitalized due to mental problems during any of the 9 years before, or has received sickness benefit any of the 5 years before, or received disability the year before the interview. *Health at t* = has used psychiatric drugs or been hospitalized for mental problems or received either sickness or disability benefit during the interview year. The estimates in column 5 captures the association between payment difficulties and mental problems for individuals with no previous or present health problems (obs. with/without controls: 6,283/6,173 for the subjective health measure *angst* and 6,293/6,181 for the objective health measures) . *** p<0.01, ** p<0.05, * p<0.1