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Martin Halla
Susanne Pech
Martina Zweimüller

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Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Martin Halla
University of Innsbruck and IZA

Susanne Pech
University of Linz

Martina Zweimüller
University of Linz

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

The Effect of Statutory Sick Pay Regulations on Workers' Health[*]

Social insurance programs typically comprise sick leave insurance. An important policy parameter is how the cost of sick leave are shared between workers, firms, and the social security system. We show that this sharing rule affects not only absence behavior, but also workers' subsequent health. To inform our empirical analysis we propose a simple model, where workers' absence decision is taken conditional on the sharing rule, health, and a dismissal probability. Our empirical analysis is based on high-quality administrative data sources from Austria. Identification is guaranteed by idiosyncratic variation in the sharing rule (caused by different policy reforms and sharp discontinuities at certain tenure levels and firm sizes). An increase in either the workers' or the firms' cost share (both at the public expense) decrease the number of sick leave days. Variations in the workers' cost are quantitatively more important (by a factor of about two). Policy-induced variation in sick leave has a significant effect on subsequent health (care cost). The average worker in our sample is in the domain of presenteeism, i.e. an increase in sick leave (due to reductions in the workers' or the firms' cost share) would reduce health care cost.

JEL Classification: I18, J22, J38

Keywords: statutory sick-pay regulations, sick leave, presenteeism, absenteeism, moral hazard, health care cost

Corresponding author:

Martin Halla
University of Innsbruck
Department of Public Finance
Universitätsstraße 15
6020 Innsbruck
Austria
E-mail: martin.halla@uibk.ac.at

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1 Introduction

Governments typically provide public insurance against health-related shocks to individual productivity. In most developed countries, social insurance programs comprise not only disability insurance, but also sick leave insurance, which covers temporary withdrawals from the labor market. An important policy parameter in this context is, how to split the associated costs between sick workers, firms, and the social security system. Theoretically, policy-makers should find a sharing rule that maximizes welfare, by trading of the distortionary costs of the public insurance program with the benefits it provides in reducing exposure to risk (Chetty and Finkelstein, 2013).

The key issue is that individual's health is not perfectly observable for others. Thus, moral hazard problems may arise. If workers bear only a small fraction of the cost, they face a high incentive to be absent from work despite being healthy. This adaption of work-absence behavior called *absenteeism* is not only costly for firms, but puts also an unwarranted burden on the social security system. In contrast, in a setting where workers bear a substantial share, they may choose to attend work despite being sick. This so-called *presenteeism* may have adverse long-run consequences for all parties involved (Chatterji and Tilley, 2002; Johns, 2010). Presenteeism may impair the worker's future health, decrease her life-time productivity, and increase her demand for different components of the social security insurance in the future. Moreover, negative externalities on co-workers may arise.[1]

A rarely discussed aspect is that sick leave insurance programs may also lead to either firm-driven presenteeism or absenteeism. In a setting where firms bear a large share of the cost, they may compel sick workers (for instance, under the threat of a layoff) to attend work. Whereas, if firms bear a negligible share of the cost, they face a moral hazard to promote absenteeism. They may ask healthy workers to go on sick leave, to adjust labor demand in the short term. Both adaptions may have the same negative consequences as in the case of worker-driven absenteeism and presenteeism. Moreover, firms may pass their costs onto the public by exerting too little effort in preventing or monitoring absences.

Two inter-related empirical questions of interest arise from this discussion. First, how does the sharing rule affect workers' absence behavior? Second, how does the sharing rule (via its impact on absence behavior) affect workers' subsequent health. An analysis of the first question is comparable easier, since less data is needed. The general finding of the literature on the first question is that higher costs reduce absence.[2] One shortcoming of this literature is the focus on variation in workers' cost share, and the disregard of the potential role of the firm. Two notable exceptions are Fevang *et al.* (2014) and Böheim

[1] Chatterji and Tilley (2002) show that firms may even offer sick pay in order to prevent presenteeism.

[2] See, for instance, Johansson and Palme (1996); Henrekson and Persson (2004); Johansson and Palme (2005); Ziebarth and Karlsson (2010); Puhani and Sonderhof (2010); Markussen *et al.* (2011); Pettersson-Lidbom and Thoursie (2013); Ziebarth and Karlsson (2014); De Paola *et al.* (2014).

and Leoni (2011), who show that firms' absence cost also have an impact on their workers' absence behavior.

To answer the second question, a link to health data is necessary. Although the impact of the sharing rule on workers' subsequent health (via its impact on absence behavior) is of great interest, and may even help policy-makers to draw near an optimal sharing rule, the empirical evidence is sparse. We are only aware of two empirical papers, both using the *German Socio-economic Panel* to analyze changes in statutory sick pay (Puhani and Sonderhof, 2010; Ziebarth and Karlsson, 2014). Both papers do not find any significant effects on workers' subjective health.[3]

In this paper, we aim to answer both questions. We study the effects of workers' and firms' cost shares on absence behavior and the resulting effects on subsequent health. We first outline a simple theoretical framework where the absence decision is a worker's individual choice taken conditional on health, the cost shares and a dismissal probability. The workers' absence behavior (triggered by different cost shares) has an effect on subsequent health. This model provides a precise definition of absenteeism and presenteeism, and describes under which circumstances either behavior arises. It helps us to specify the parameters of interest, and informs our empirical model.

For our empirical analysis we use administrative data from Austria. Austria has a Bismarckian welfare system with almost universal access to high-quality health care and a long tradition of sick leave insurance. We have access to the database of the *Upper Austrian Sickness Fund*, which covers all private sector workers in the province of Upper Austria. These data include detailed information on sick leave and health care service utilization. We complement this data with information from the *Austrian Social Security Database* (ASSD). This is an matched-firm-worker dataset which includes individuals' exact employment histories (including basic firm information). Our identification strategy exploits exogenous variation in workers' and firms' cost shares — induced by policy reforms, and sharp discontinuities at certain tenure levels and firm sizes — within a *Two-Stage Least Squares* (2SLS) estimation approach.

Our main findings are as follows: As predicted by our model, there is strong empirical evidence for an effect of the sharing rule on workers' absence behavior. An increase in either the workers' or the firms' cost share (both at the public expense) decrease the number of sick leave days significantly. Variations in the workers' cost share turn out to be quantitatively more important (by a factor of about two). Our reduced form estimation shows that the sharing rule has also significant effects on workers' subsequent health care cost. The estimated coefficient from our second stage is a local average treatment effect that informs us about the change in health care cost due to a change in sick leave days that is triggered by a change in the sharing rule. This parameter is of particular

[3] Puhani and Sonderhof (2010) find that the reduction of statutory sick pay decreased the average number of hospital days, which is interpreted as a decrease in the utilization of the health care system.

relevance to policy-makers. Within our sample, the average worker is within the domain of presenteeism: An increase in annual sick leave days by one day (due to reductions in the workers' and/or the firms' cost share) would reduce total outpatient health care cost by about 1 percent and the number of hospital days by about 3 percent. Cost-saving would result from improvements in physical and mental health.

The remainder of the paper is structured as follows. In Section 2 we present our theoretical model. The empirical analysis is presented in Section 3. First, we discuss the relevant institutional background in Section 3.1. Our estimation strategy and its identifying assumptions are discussed in Section 3.2. Then, in Section 3.3 we describe our data, our health indicators, and the estimation sample along with descriptive statistics. Our estimation results are presented in Section 3.4. Section 4 summarizes and concludes the paper.

2 Theoretical model

We formulate a simple model of a worker's absence decision which allows us to take account of the phenomena of absenteeism and presenteeism. Absenteeism is defined as the sick leave of a healthy worker. Since a healthy worker needs no recuperation, being on sick leave does not alter her future health. Presenteeism is the decision of a worker to attend work despite being sick. This in turn impedes her full recovery and, thus, has adverse implications on her future health. Since presenteeism and absenteeism are distinct with respect to a worker's health in the present and in the future, we consider two periods $s = 1, 2$. We assume that a worker's preferences for consumption C_s, leisure and recuperation time L_s and health H_s in each period s are represented by

$$U(C_s, L_s, H_s) \tag{1}$$

where the per-period utility function U is strictly increasing in C_s, L_s and H_s. Marginal utility of each variable is decreasing, i.e. $\frac{\partial^2 U}{\partial C_s^2} < 0$, $\frac{\partial^2 U}{\partial L_s^2} < 0$ and $\frac{\partial^2 U}{\partial H_s^2} < 0$. Moreover, we assume that the marginal rate of substitution of consumption for leisure $\left|\frac{dC_s}{dL_s}\right| = \frac{\partial U/\partial L_s}{\partial U/\partial C_s}$ is decreasing with increasing health H_s. As the worker experiences a higher level of health, she is willing to forego less consumption for an additional unit of recuperation time, since consumption becomes relatively more important. A sufficient condition for $\left|\frac{dC_s}{dL_s}\right|$ to be decreasing with increasing H_s is $\frac{\partial^2 U}{\partial C_s \partial H_s} > 0$ and $\frac{\partial^2 U}{\partial L_s \partial H_s} \leq 0$.[4]

In each period s the worker earns a labor income $w_s t_s^w$, where w_s denotes the exogenous

[4]Note that the assumption that a sicker worker attaches a relatively higher weight on leisure as opposed to consumption has been made quite frequently by former theoretical studies on absence behavior (see, for instance, Chatterji and Tilley, 2002). An overview of this literature is provided by Brown and Sessions (1996). There is some empirical evidence that marginal utility of consumption is indeed increasing with higher health levels (Finkelstein *et al.*, 2009, 2013; Viscusi and Evans, 1990).

(after-tax) wage rate and t_s^w denotes the contracted working time. When the worker calls in sick, she receives only the fraction $1-\eta_s^W$ of her wage rate w_s for any unit of time she is absent from work. Hence, consumption in period s is given by

$$C_s = w_s(t_s^w - \eta_s^W t_s^a), \tag{2}$$

where t_s^a, $0 \leq t_s^a \leq t_s^w$, denotes the time that the worker is on sick leave, and η_s^W indicates that part of the wage rate which the worker has to forego per unit of absence time. Being absent from work increases leisure time. As total time in each period s is normalized to 1, leisure is given by $L_s = 1 - t_s^w + t_s^a$. The worker has an incentive to choose a shorter absence time t_s^a (and by this a larger C_s and smaller L_s) in each period s, the higher her current health status H_s is. This is a direct consequence of the property of the worker's preferences that a higher health status H_s entails a lower marginal rate of substitution $\left|\frac{dC_s}{dL_s}\right|$ between consumption and leisure.

While the initial health status H_1 is a random draw from some distribution $\mathcal{H}$ and thus exogenously given, future health H_2 is influenced by the worker's record, namely by her former health H_1 and her former duration t_1^a of sick leave. To model these effects, we write $H_2 = H_2(H_1, t_1^a)$ and assume that a higher initial health H_1 imply a higher health H_2 in the future, i.e. $\frac{\partial H_2}{\partial H_1} > 0$. For the effect of t_1^a on H_2 it is crucial whether initial health H_1 is below or a above a certain threshold H^*, which determines whether a worker is healthy or sick in period 1. If $H_1 < H^*$, the worker is sick in period 1, and sickness absence promotes recovery from illness. Hence, we assume that $\frac{\partial H_2}{\partial t_1^a} > 0$ with $\frac{\partial H_2^2}{(\partial t_1^a)^2} < 0$ and $\frac{\partial H_2(H_1, \bar{t}_1^a)}{\partial t_1^a} = 0$ for some $\bar{t}_1^a > 0$. That is, there is some maximal length of sick leave that contributes to the worker's future health: after having been $\bar{t}_1^a$ units of time absent from work, the worker is healthy again by reaching some maximal health level $H_2^* = H_2(H_1, \bar{t}_1^a)$; taking sick leave for longer than $\bar{t}_1^a$ will not increase her future health above H_2^*, i.e. $\frac{\partial H_2}{\partial t_1^a} = 0$ for any $t_1^a \geq \bar{t}_1^a$. These assumptions allow us to model the phenomenon of presenteeism: if a sick worker chooses a $t_1^a < \bar{t}_1^a$, she will not make full recovery, and her future health is negatively affected. For the case that the worker is healthy in period 1, i.e. $H_1 \geq H^*$, we assume that $\frac{\partial H_2}{\partial t_1^a} = 0$ for any $t_1^a \geq 0$, and thus $\bar{t}_1^a = 0$. This assumption describes the phenomenon of absenteeism: calling in sick despite being healthy does not affect the worker's future health.[5]

The worker's absence behavior in period 1 is assumed to affect her likelihood of employment in period 2. This is a consequence of the institutional setting where firms are required to pay a fraction η_s^F of the total sick leave costs $w_s t_s^a$ of a worker. The remaining sick leave costs, i.e. not covered by the firm and the worker, are financed by the social security system whose respective cost share is equal to $1-\eta_s^W-\eta_s^F$. We take up the proposi-

[5]Moreover, as for a sick worker a sickness absence of length $\bar{t}_1^a$ will suffice to be healthy again, we regard a sick worker who is absent from work for longer than $\bar{t}_1^a$ as being in the domain of presenteeism.

tion by Shapiro and Stiglitz (1984) and, within the context of sick leave, by Barmby *et al.* (1994) that unemployment is used as a worker discipline device to reduce absenteeism. Transferring this idea to our framework, one may suppose that the threat of a dismissal is larger for a worker who has been on sick leave for a long time, and that firms will carry out the threat more likely, if they have to bear a large proportion of the sick leave costs. To take account of this, we write $\rho = \rho(t_1^a, \eta_1^F)$ with ρ denoting the probability of continued employment in period 2, and assume that $\frac{\partial\rho}{\partial t_1^a} < 0$, $\frac{\partial\rho}{\partial\eta_1^F} < 0$, $\frac{\partial^2\rho}{(\partial t_1^a)^2} < 0$, $\frac{\partial^2\rho}{(\partial\eta_1^F)^2} < 0$ and $\frac{\partial^2\rho}{\partial t_1^a\partial\eta_1^F} < 0$. That is, an increase in the duration t_1^a of sick leave as well as in the firm's fraction η_1^F of the sick leave costs reduces a worker's probability ρ of keeping her job, and either reduction in ρ (due to an increase in t_1^a or η_1^F) is increasing with increasing t_1^a and with increasing η_1^F.

In case that the worker keeps her job in period 2, she chooses again her level t_2^a of absence. For sake of simplicity we abstract away from periods $t > 2$. This implies that sickness absence in the second period only affects consumption C_2 and leisure L_2 in the second period and has no further effects. If the worker becomes unemployed she receives an exogenous social security benefit b which she uses for consumption C_2 and has a leisure time $L_2 = 1$.

From these assumptions it follows that the decision problem of a worker can be decomposed in two parts: she chooses t_1^a (and, by this, determines C_1, L_1, H_2 and ρ) in the first stage, and t_2^a (and, by this, C_2, L_2) in the second stage. Of course, in the first stage the worker will take into account her optimal second-stage decision $\hat{t}_2^a$, which she will make in period 2 given that she is still employed. Formally, this two-stage decision problem can be stated as follows. In the second stage, after the resolution of the employment uncertainty, the worker solves an optimization problem under certainty for given H_2: She chooses her (C_2, L_2)-bundle by maximizing $U(C_2, L_2, H_2)$ for given H_2 subject to $C_2 = w_2(t_2^w - t_2^a\eta_2^W)$ and $L_2 = 1 - t_2^w + t_2^a$. Substituting both constraints into $U(\cdot)$ and differentiating with respect to t_2^a gives us the first-order condition

$$-w_2\eta_2^W\frac{\partial U}{\partial C_2} + \frac{\partial U}{\partial L_2} = 0 \tag{3}$$

for an interior optimum $\hat{t}_2^a$, $0 < \hat{t}_2^a < t_2^w$. At $\hat{t}_2^a$, the marginal utility of leisure is equal to the marginal cost of leisure in terms of foregone consumption. Substituting $\hat{t}_2^a$, which depends on w_2, t_2^w, η_2^W and H_2, into $U(\cdot)$ gives us the indirect utility function to this problem which we denote by $U_2^e(w_2, t_2^w, \eta_2^W, H_2)$.[6] Moreover, we abbreviate utility in case of non-employment by $U_2^n \equiv U(b, 1, H_2)$, where we assume that the social security benefit b is sufficiently below labor income such that $U_2^n < U_2^e$.[7] This assumption ensures that the

[6] In case of a boundary solution $\hat{t}_2^a = 0$ indirect utility is given by $U_2^e = U(w_2t_2^w, 1 - t_2^w, H_2)$, and in case of a boundary solution $\hat{t}_2^a = t_2^w$ by $U_2^e = U(w_2t_2^w(1 - \eta_2^W), 1, H_2)$.

[7] A sufficient condition for $U_2^n < U_2^e$ is that $b < w_2t_2^w(1 - \eta_2^W)$ where $w_2t_2^w(1 - \eta_2^W)$ is the labor income

worker has an incentive to stay in employment in period 2 (as the outcome 'employment'is the favorable state of the world); otherwise she would anyway decide to be unemployed in period 2.

In the first stage, the worker decides on her absence level t_1^a in period 1 where she takes into account her optimal absence level $\hat{t}_2^a$ in case of continued employment. We assume that her preferences are described by expected utility. Hence, her first-stage decision problem is to maximize

$$U(C_1, L_1, H_1) + \rho(t_1^a, \eta_1^F)U_2^e + (1 - \rho(t_1^a, \eta_1^F))U_2^n \tag{4}$$

subject to $C_1 = w_1(t_1^w - t_1^a\eta_1^W)$ and $L_1 = 1 - t_1^w + t_1^a$. By substituting both constraints and $H_2 = H_2(H_1, t_1^a)$ into (4) and differentiating with respect to t_1^a we obtain the first-order condition for an interior solution $\hat{t}_1^a$ as

$$-w_1\eta_1^W \frac{\partial U}{\partial C_1} + \frac{\partial U}{\partial L_1} + \frac{\partial \rho}{\partial t_1^a}(U_2^e - U_2^n) + \left(\rho \frac{\partial U_2^e}{\partial H_2} + (1-\rho)\frac{\partial U_2^n}{\partial H_2}\right)\frac{\partial H_2}{\partial t_1^a} = 0. \tag{5}$$

Remember that for $H_1 \geq H^*$ the last term on the LHS of (5) is zero, as absenteeism has no effect on future health. Hence, a healthy worker chooses a sickness absence $\hat{t}_1^a$ where her marginal utility of leisure in period 1 is equal to the marginal cost of leisure in terms of foregone consumption in period 1 and the marginal loss in expected utility which stems from a decrease in the employment probability ρ in period 2. For $H_1 < H^*$ the last term on the LHS of (5) is positive. A marginal increase in t_1^a increases health in period 2, and by this second-period utility. Obviously, this additional positive effect is taken into account by a sick worker, when choosing $\hat{t}_1^a$.[8]

We are interested in the effects of the worker's or the firm's cost share parameter, η_1^W and η_1^F, respectively, on the worker's absence behavior in period 1. We will estimate this relationship in the first stage of our regression analysis below.

Proposition 1: An increase in the worker's or firm's share η_1^W, η_1^F of sick leave costs decreases the duration $\hat{t}_1^a$ of sick leave, regardless of whether the worker is healthy or sick, i.e. $\frac{\partial \hat{t}_1^a}{\partial \eta_1^W} < 0$ and $\frac{\partial \hat{t}_1^a}{\partial \eta_1^F} < 0$ for any $H_1 \gtrless H^*$.

Proof: See the Appendix.

The negative effect of the worker's cost share parameter η_1^W on her absence time $\hat{t}_1^a$ has its equivalent in consumer theory: if the price η_1^W of a good (here: of sickness absence) is increased, it is optimal to reduce demand for that good (here: to reduce the optimal

at $t_2^a = t_2^w$. At $t_2^a = t_2^w$, $L_2 = 1$, hence we have $U_2^n < U(w_2 t_2^w(1 - \eta_2^W), 1, H_2) \leq U_2^e$ for any given H_2.

[8]Note that without further assumptions we cannot exclude the case that for $H_1 < H^*$ the LHS of (5) is positive at $\bar{t}_1^a$ which implies that (5) will be fulfilled for some $\hat{t}_1^a > \bar{t}_1^a$. For the remainder of this section, we will neglect this special case, and restrict our analysis to an absence behavior $\hat{t}_1^a \leq \bar{t}_1^a$.

absence level $\hat{t}_1^a$).[9] This negative price effect occurs irrespectively of the initial health status H_1 of a worker. In any case, an increase in η_1^W would entail a decrease in first-period consumption for unchanged absence time, and a worker has an incentive to mitigate this consumption loss by decreasing her absence time, no matter whether she is in good or bad health.[10]

The driving force behind the negative effect of the firm's cost share η_1^F on a worker's absence time $\hat{t}_1^a$ is that a rise in firm's cost share η_1^F increases the worker's risk to become unemployed which makes the worker worse off. Therefore, it is optimal for the worker to counteract this increase of her unemployment risk (to some extent) by reducing her sickness absence.

Although the theoretical analysis does not give a definite answer to the question of the quantitative importance of these effects, it is plausible to presume that an increase in the worker's cost share η_1^W decreases the duration $\hat{t}_1^a$ of sickness absence by a larger extent than an increase of the firm's cost share η_1^F, i.e. $\frac{\partial \hat{t}_1^a}{\partial \eta_1^W} < \frac{\partial \hat{t}_1^a}{\partial \eta_1^F} < 0$. For this note that an increase of η_1^W decreases first-period consumption C_1 (for given t_1^a) of the worker, while an increase of η_1^F decreases the likelihood ρ of keeping her job in the next period. In either case the optimal worker's response is to counteract the respective negative effect by reducing her absence time. Given that the worker is more concerned about the first effect (reduction of C_1) than by the second effect (reduction of ρ) she will reduce her absence time to a greater extent if her own cost share η_1^W (instead of the firm's cost share η_1^F) increases.

Finally, we are interested in the reduced form effects of both cost share parameters η_1^W and η_1^F on the worker's future health status H_2. These effects are given by

$$\frac{\partial H_2}{\partial \eta_1^j} = \frac{\partial H_2}{\partial t_1^a} \frac{\partial \hat{t}_1^a}{\partial \eta_1^j} \quad j = F, W, \tag{6}$$

from which it follows, together with our assumptions and results from above, that the effects of both, η_1^W and η_1^W, on future health are negative if $H_1 < H^*$; otherwise the effects are zero.

Proposition 2: If a worker is sick in period 1, her health H_2 in period 2 will be negatively affected by an increase in the worker's or firm's share η_1^W, η_1^F of sick leave costs, i.e. if $H_1 < H^*$, $\frac{\partial H_2}{\partial \eta_1^W} < 0$ and $\frac{\partial H_2}{\partial \eta_1^F} < 0$. However, if a worker is healthy in period 1, a change of either cost share parameter has no effect on her health in the next period, i.e. if $H_1 \geq H^*$, $\frac{\partial H_2}{\partial \eta_1^W} = \frac{\partial H_2}{\partial \eta_1^F} = 0$.

[9] Note that this result has been found by other theoretical studies on sick leave behavior, although in somewhat distinct models.

[10] More formally, for unchanged t_1^a, the RHS of the first-order condition (5) becomes negative if η_1^W is increased. By decreasing t_1^a the first-oder condition is restored, as $\frac{\partial U}{\partial C_1}$ decreases with decreasing t_1^a, and $\frac{\partial U}{\partial L_1}$ as well as the entire marginal effect on expected utility (via the impact on ρ and on H_2) increases with decreasing t_1^a (see also the Proof of Proposition 1 in the Appendix).

The explanation of this finding is straightforward: although all workers, irrespective of their initial health status H_1, reduce their absence time due to an increase in either cost parameter, it is only the future health of the sick workers that is negatively affected via this channel; the absence behavior of the healthy workers does not influence their future health. When a sick worker indeed reacts more strongly to a variation of her own cost share η_1^W as compared to the firm's cost share η_1^F, her future health will react also more strongly to a variation of η_1^W than of η_1^F, i.e. if $\frac{\partial \hat{t}_1^a}{\partial \eta_1^W} < \frac{\partial \hat{t}_1^a}{\partial \eta_1^F}$ for $H_1 < H^*$, then $\frac{\partial H_2}{\partial \eta_1^W} < \frac{\partial H_2}{\partial \eta_1^F}$, (which is immediate from 6).

3 Empirical analysis

For our empirical analysis we use administrative data from Austria. Austria has a Bismarckian welfare system, which provides high-quality health care to every resident. Statutory health insurance is compulsory and linked to employment. Thus, workers have no choice over the provider or the insurance package. We focus on private sector workers who are — depending on the location of the employer — assigned to one out of the nine so-called *District Health Insurance Funds* (*Gebietskrankenkassen*). These cover approximately 75 percent of the Austrian population. In the case of unemployment or retirement, workers stay with their previous *District Health Insurance Fund*.

Health insurance contributions increase (up to a ceiling) proportionally with income, but are completely independent of the personal risk of the insured. It covers, among others, all health care expenditures in the inpatient and outpatient sector. Insurants have free choice of providers and unrestricted access to all contracted general practitioners, resident medical specialists and hospitals in Austria. Contracts are negotiated at the district level between the respective *District Health Insurance Fund* and the *Austrian Medical Chamber*.

3.1 Austrian sick leave insurance system

Austria has a long tradition of sick leave insurance, which compensates workers for lost wages caused by temporary (occupational and non-occupational) sickness or injury. Sick workers receive their compensation from two sources: First, for a pre-defined sick leave duration, workers continue to receive (part of) their salary from the firm. Under specified circumstances, firms will get (partly) reimbursed for salaries paid to sick workers. Second, after this initial period of firm-financed sick leave has ended, workers receive public sickness benefits.[11] While the basic system has not changed over time, specific regulations were

[11] As long as workers are fully compensated by the firm, public sickness benefits are suspended. As soon as workers are only compensated 50 percent of the gross wage, they additionally receive half of the public sickness benefits. Sickness benefits amount to 50 percent of the gross wage for days 4-42 of sick leave and 60 percent after day 42.

subject to multiple changes.

These reforms are the outcome of a political process — often triggered by budgetary considerations — which lacks any solid concept or substantive debate. Unsurprisingly, the relevant stakeholders participating in this debate are groups representing the respective interests of firms (such as the *Austrian Economic Chamber*) and of workers (in particular, the *Austrian Chamber of Labour*). The former are lobbying for low firms' cost shares, while the latter push for low workers' cost shares.

In this subsection, we provide a brief chronological discussion of these (admittedly very intricate) reforms.[12] Strikingly, the reforms in the most recent years appear like a 'random walk', where some reforms are undone shortly after they were enacted. Before we proceed to our estimation strategy, we will explicate in the next subsection the precise sources of variation in the sharing rule, which we exploit for empirical identification.

3.1.1 Reforms affecting the workers' cost share

Since 1921 a tenure-based sick-pay scheme is in place for white-collar workers. The generosity of this scheme increases with the worker's tenure with the firm and provides at least six weeks of fully compensated (and fully firm-financed) sick leave.[13] White-collar workers with a tenure of at least five years are paid their regular gross wage for the first eight weeks. After fifteen years of tenure eligibility increases to ten weeks, and after twenty-five years of tenure eligibility increases to twelve weeks. When eligibility for full compensation has expired, white-collar workers are entitled to another four weeks of partly compensated (and partly firm-financed) sick leave. The workers' total compensation amounts to 80 percent of gross wages during this period.[14] After this period, workers receive 60 percent of their gross wages.[15] The maximum duration of entitlement is one year.

In contrast, blue-collar workers traditionally had to bear almost all the cost of being sick on their own. They were eligible only for one week of fully compensated sick leave, until a reform in 1974 partly removed the difference in the cost sharing rule for blue-collar and white-collar workers. This reform introduced a tenure-based sick-pay scheme for blue-collar workers that was comparable, but not equal to the white-collar workers' scheme. Blue-collar workers received, depending on their tenure, a firm-financed compensation payment that amounted to 100 percent of their gross wage for the first four, six, eight or ten weeks of sickness. After this period, the sickness insurance system kicked in, and blue-collar workers received sickness benefits which accounted for 60 percent of their gross wages. Compared to white-collar workers, blue-collar workers were still disadvantaged

[12] Table B.1 in Appendix B provides a complete overview of all reforms since 1974.

[13] In case of an occupational accident, workers are eligible for at least eight weeks of fully compensated sick leave.

[14] Firms have to pay 50 percent of gross wages to their white-collar workers, and workers additionally receive sickness benefits from the public social insurance which amount to 30 percent of their gross wages.

[15] This compensation is fully born by the public social insurance.

because they were eligible for fully compensated sick leave for a shorter period (two weeks less) in each tenure group and they were not eligible for any firm-financed sick leave thereafter.[16] In 2001, a reform aligned (almost entirely) the blue-collar workers' sick-pay scheme with that of white-collar workers (see above). This reform clearly shifted the cost of being sick from blue-collar workers to firms.

3.1.2 Reforms affecting the firms' cost share

As mentioned above, firms are obliged to pay workers on sick leave (part of) their salary for a pre-defined period. The length of this period varies across workers (depending on their occupation and tenure) and over time. Under specified circumstances, firms get (partly) reimbursed for their expenses by a public fund.[17] Figure 2 shows that this reimbursement varies across firms, across workers, and over time. Between 1974 and 1978 firms received a 100 percent reimbursement of salaries paid to sick blue-collar workers. There was no reimbursement in the case of white-collar workers. In 1979, this reimbursement was restricted to smaller firms (defined as firms with a total wage bill below a certain threshold). In 1982, the reimbursement was again extended to larger firms (i. e. firms above the wage bill threshold), but these firms only received 80 percent of the salaries paid to sick blue-collar workers. In 2000, a major reform took place, which completely abolished reimbursement for sick blue-collar workers (per September 2000). This shifted the sickness cost from the social security system to blue-collar workers' firms. However, part of the reform was already undone in 2005. The new regulation (which is currently in place) applies to blue- and white-collar workers. Small firms with less than 51 workers (yearly average) receive a partial reimbursement.[18] Larger firms are not eligible for any reimbursement.

3.2 Estimation strategy

This section presents our estimation strategy. First, we discuss the different sources of exogenous variation in the cost sharing rule and derive our empirical measurements. Then, we explain our econometric model and and spell out the identifying assumptions.

[16] There is another differences between white-collar and blue-collar workers, i. e. white-collar workers' eligibility is renewed each half year, whereas blue-collar workers' eligibility is renewed each year. This difference has remained until today.

[17] This fund is predominantly financed by the *Austrian Workers' Compensation Board* (AUVA) and by compulsory payments of firms.

[18] Eligible firms receive 58.34 percent of their expenses for a maximum of 42 sick leave days per worker and year. However, the reimbursement is paid only for sick leave spells that last at least eleven days. For workplace accidents somewhat different rules apply. Moreover, sick leave compensation due to workplace accidents is already reimbursed to small firms since October 2002. See Table B.1 for details.

3.2.1 Variation in cost shares

Our estimation strategy exploits variation in the cost sharing rule generated by (reforms of) the Austrian sick leave insurance system in the period between 1998 and 2012. As described in the previous section, the cost sharing rule — i. e. workers' incentives to take sick leave — varies with the worker's occupation, job tenure, firm size, and over time. This generates variation in both, the workers' cost share and the firms' cost share, and allows us to study the effect of each cost share on workers' absence behavior and the effect of the cost sharing rule on workers' health outcomes (via its impact on absence behavior).

Table 1 details the variation in the workers' cost share (denoted by $\mathcal{W}$) and the firms' cost share (denoted by $\mathcal{F}$). Both cost shares depend on the weeks of sick leave that the worker has already taken within the current year.[19] The variation in the workers' cost share is based on two sources: Firstly, variation across workers with different job tenure (0-5, 6-15, 16-25, >25 years), and secondly, variation between white-collar workers and blue-collar workers across time.

The first type of variation in the workers' cost share is based on decreases in the cost of being sick with job tenure. The Austrian sick-pay scheme changes discontinuously at a tenure of 6, 16 and 26 years which generates sharp discontinuities in the incentive to take sick leave at these thresholds. That means, a small difference in tenure, such as couple of months, leads to an immediate and considerable difference in the workers' cost of being sick.[20] For instance, consider a white-collar worker in the seventh week of sick leave: This worker is fully compensated if he has six years of tenure, whereas he loses 20 percent of her wage if he has only five years of tenure. Figure 1-a shows workers' cost shares across tenure groups for white-collar workers and different weeks of sick leave.[21]

The second type of variation is based on the abolishment of long-standing differences in the generosity of the sick-pay scheme between white-collar and blue-collar workers in 2001. For example, consider a worker with six years of tenure in the seventh week of sick leave: Before the reform in 2001, a blue-collar worker lost 40 percent of her gross wage, whereas a white-collar worker was fully compensated. After the reform, both groups of workers received their full wage. Figure 1-b shows workers' cost shares for different weeks of sick leave. Before the reform, blue-collar workers had higher cost between the seventh and the twelfth week of sick leave. In sum, the reform decreased the cost of being sick (in

[19] The default rule is that the current year starts with the date of entry. The contract of employment can also determine the calendar year as the relevant period. We will control for the calendar month of firm entry to account for potential differences across workers.

[20] In other words, the worker's cost share is a deterministic function of her job tenure. This kind of variation is usually employed in a sharp *regression discontinuity design* (RDD) where workers with tenure slightly below a certain threshold should provide the counterfactual outcome for workers with tenure slightly above that threshold, since the treatment status is 'as good as randomly assigned' in a small neighborhood around the threshold.

[21] Between 2001 and 2006, blue-collar workers were subject to the same cost shares. Before 2001, cost shares were higher for blue-collar workers (see Table 1).

any tenure group) for blue-collar workers, but had no impact on white-collar workers.[22]

The main source of variation in the firms' cost share comes from differences between small and large firms across occupation groups and changes in these differences over time. Figure 1-c shows firms' cost shares for workers with 6-15 years of job tenure for different occupations and time periods.[23] Before 2001, small firms were reimbursed their total sick leave cost for blue-collar workers whereas large firms were reimbursed only 70 percent. For sick white-collar workers, no such reimbursement existed in that period. For instance, in the third week of sick leave the firms' cost share for a sick blue-collar worker amounted to 30 percent in large firms and zero in small firms. In contrast, firms had to pay a cost share of 100 percent for a sick white-collar worker. After the abolishment of reimbursements firms had to bear the full cost share independent of their firms size or their workers' occupation. In the example above, the firms' cost share for a sick (blue-collar or white-collar) worker in the third week of sick leave amounted to 100 percent between 2001 and 2004. In 2005, a reform re-introduced reimbursements for small firms. Since then, firms' cost share for a sick (blue-collar or white-collar) worker in the third week of sick leave amounted to 42 percent in small firms and 100 percent in large firms.[24] Additional variation is generated by differences across workers' tenure groups. Figure 1-d shows the variation across tenure groups for blue-collar workers in large firms before the reform. An equivalent graph can be drawn for each group of Figure 1-c.

3.2.2 Quantification of the variation in cost shares

In principle, we could assign to each worker the exact worker's and firm's cost share she faces after a certain number of sick leave weeks. The worker's cost share η^W is a function of the worker's characteristics $\mathcal{I}$ (in particular, occupation BC and tenure T), the duration of the current sick leave spell ($S_{\mathcal{D}}$), and the time period (s). The firm's cost share depends additionally on the firm's characteristics $\mathcal{F}$ (in particular, firm size FS). Thus, a worker i, employed in firm f faces the following cost shares $\eta^W_{i,s,d}$ and $\eta^F_{i,f,s,d}$ in period s at sick leave duration d:

$$\eta^W_{i,s,d} = \{\mathcal{I}(BC_i, T_i), S_{\mathcal{D}}, s\} \tag{7}$$

$$\eta^F_{i,f,s,d} = \{\mathcal{I}(BC_i, T_i), \mathcal{F}(FS_f), S_{\mathcal{D}}, s\} \tag{8}$$

[22]This kind of variation is usually used in a *difference-in-differences* (DiD) estimation strategy where blue-collar workers would serve as a treatment group and white-collar workers would serve as a control group.

[23]Equivalent graphs can be drawn for the other three tenure groups.

[24]This kind of variation can be used in a *difference-in-differences-in-differences* (DiDiD) estimation strategy where blue-collar workers in small firms are compared to blue-collar workers in large firms before and after the 2001 reform, and white-collar workers are used as an additional control group. See Böheim and Leoni (2011).

Based on the information in Table 1 we define different cost schemes, which are unique schedules of cost shares over a sick leave spell of undefined length. As the lowest panel of Table 1 shows, there are eight ($z_0, z_1, \ldots, z_7$) different worker and thirteen ($Z_0, Z_1, \ldots, Z_{12}$) different firm cost schemes.

Figure 3 provides further information on these cost schemes. Panels (a) and (c) depict the evolution of the workers' and the firms' cost shares over sick leave spell length up to 16 weeks of sick leave. There is no variation in cost shares after the sixteenth week of sick leave.[25] In the case of firms' cost schemes, there is considerable variation already starting from the first week of sick leave. Compare, for instance, Z_0 (0 percent) with Z_5 (100 percent). In the case of workers, the schemes start to differ after week five. Nevertheless, we expect workers with different schemes already to adapt their behavior before week five, if they behave forward looking, since their future health status is uncertain. For instance, a worker with scheme z_0 should (compared to a worker with z_7) economize with her sick leave at an early stage, since she faces comparably higher cost after week five. Panels (b) and (d) of Figure 3 show the distribution of the cost share schemes. Some cost schemes are relatively uncommon. However, since we have a large number of observations (almost 5 millions), we still have a substantial absolute number of observations for each cost scheme (combination).

To operationalize the variation in cost shares across these different schemes, we assume a certain duration $\bar{d}$. We set $\bar{d}$ is equal to 16, and calculate the expected value of cost shares for a yearly sick leave of 16 weeks. The resulting expected cost shares for workers and firms are depicted in Figures 4 and 5, respectively. The specific choice of $\bar{d} = 16$ is to some degree arbitrary. However, this assumption should be innocuous, since there is a substantial correlation in the expected cost shares across different choices of $\bar{d} \leq 16$. We show in Section 3.4.4 that our results are not sensitive to the specific choice of $\bar{d}$.

Finally, it should be noted that there is a correlation between (the expected value of) workers' and firms' cost shares. Put differently, some pairings of workers' and firms' are more common than others. This has two upshots for our empirical analysis. First, the econometric specification of our estimation models has to comprise always both cost shares as explanatory variables. Second, we have to check whether the correlation between the two variables (conditional on other covariates) creates problems of multicollinearity. Fortunately, it turns out that (despite a high raw correlation) no problems of multicollinearity arise. In all estimated models, both variables turn out to be individually significant.

[25] Starting from the seventeen week, the worker's and the firm's cost share are across all cost schemes 40 and 0 percent, respectively.

3.2.3 Instrumental variable approach

Our first-stage estimation captures the effect of the sharing rule on absence behavior and is given by the following equation:

$$sick\,leave_{i,f,s} = \beta + \kappa \times \eta^{W}_{i,s,\bar{d}} + \delta \times \eta^{F}_{i,f,s,\bar{d}} + \beta \mathbf{X_{i,f,s}} + F_f + Y_s + \varepsilon_{i,f,s}. \tag{9}$$

The dependent variable $sick\,leave_{i,f,s}$ measures worker i's (employed in firm f) annual number of sick leave days in calendar year s. The explanatory variables of primary interest are the worker's and the firm's expected cost share for an annual sick leave $\bar{d}$ of 16 weeks, which are denoted by $\eta^{W}_{i,s,\bar{d}}$ and $\eta^{F}_{i,f,s,\bar{d}}$, respectively. Thus, the parameters κ and δ provide estimates of how workers adjust their absence behavior in response to a marginal increase in the cost share of workers and firms, respectively. The set of basic covariates $\mathbf{X_{i,f,s}}$ comprises information on sex, age (binary indicators for each year), occupation (blue-collar versus white-collar worker), tenure (binary indicators for each year), firm size (20 binary indicators based on percentiles), firm's wage sum (20 binary indicators based on percentiles), an indicator for small firms (as defined by the regulation for reimbursement of firms), and indicators for the calendar month of entry. Since workers within a firm typically belong to different occupational and tenure groups, we can also control for fixed effects at the firm level F_f.[26] Finally, we control for calendar year fixed effects denoted by Y_s.

In the second stage equation we are interested in a health measure of worker i at point $s + x$ (where $x \in \{1, 2\}$):

$$health_{i,f,s+x} = \gamma + \nu \times sick\,leave_{i,f,s} + \Gamma \mathbf{X_{i,f,s}} + F_f + Y_s + \epsilon_{i,f,t}. \tag{10}$$

The explanatory variable of primary interest $sick\,leave_{i,f,s}$ is most likely endogenous. In a contemporaneous specification ($x = 0$) there is an obvious problem of reversed causality, since health should affect absence behavior. While this source of bias should not be present in our lagged specifications ($x \in \{1, 2\}$), there may be some other unobserved factors which are correlated with absence behavior and health. Therefore, we use workers' and firms' cost shares (for a yearly sick leave of 16 weeks), $\eta^{W}_{i,s,\bar{d}}$ and $\eta^{F}_{i,f,s,\bar{d}}$, as instrumental variables and substitute the endogenous variable with the prediction $\widehat{sick\,leave}_{i,f,s}$ from (9).[27]

The identifying assumption of this instrumental variable strategy is that $\eta^{W}_{i,s,\bar{d}}$ and $\eta^{F}_{i,f,s,\bar{d}}$ affect workers' health only through the channel of the cost shares. While this assumption is not testable, we regard it is a quite palatable assumption. As discussed above,

[26] We do not include individual fixed-effects, since there is too little variation within workers; a typical worker does not change occupational group, and changes across tenure groups happen only at rare intervals.

[27] We also estimate the reduced form equation, which relates the health of worker i to her past cost shares.

the cost shares are a specific function of occupation, tenure, firm size and period (see 7 and 8). While each of these characteristics may have an independent effect on health, we can condition on all of them in a very flexible way. That means, our instrumental variables strategy rests only on variation in these variable which comes from a very specific functional form. For instance, regarding the part of the identification which comes from tenure, we allow for a direct effect of tenure on health. Given that we include binary indicators capturing the different tenure levels, we even allow health to vary discontinuously with tenure at the thresholds of 6, 16 and 26 years. We only have to assume that if health varies discontinuously with tenure these discontinuous jumps are the same for blue- and white collar-workers. An equivalent line of reasoning applies to firm size and occupation. With respect to the part of the variation which comes from occupation and period, we only have to assume that changes in the occupational gradient in health did not coincide with the timing of the reforms in sick leave insurance. We regard these assumptions as quite palatable.

3.3 Data sources

For our empirical analysis we use two linked administrative data sources from Austria. First, we have access to the database of the *Upper Austrian Sickness Fund*. This covers the population of all private sector workers and their dependents in the province of Upper Austria.[28] The more than one million members of the *Upper Austrian Sickness Fund* represent approximately 75 percent of the Upper Austrian population.

These data include detailed information on sick leave, health care service utilization in the outpatient sector (i. e., medical attendance and drug use) and some inpatient sector information, such as the number of days of hospitalization. For instance, we are able to observe each single doctor visit and each drug prescription, together with the exact date of service utilization.

Second, we complement these data with information from the *Austrian Social Security Database* (ASSD). This is an administrative record used to verify pension claims for the universe of Austrian workers (Zweimüller *et al.*, 2009). It is structured as a matched-firm-worker dataset. Here, we observe individuals' employment history (including basic firm information), unemployment, and various other qualifications on a daily basis. Information on earnings is provided per year and firm.

3.3.1 Health indicators

To evaluate the effect of variation in sick leave on health, we construct the following annual outcome variables: (i) total health expenditure in the outpatient sector; (ii) expenditure on

[28] Upper Austria is one of nine provinces in Austria and comprises about one sixth of the Austrian population and work force.

outpatient medical attendance (at general practitioners and resident medical specialists); (iii) expenditure on medical druges; and (iv) days of hospitalization. Note that (i) is the sum of (ii) and (iii). In the case of medical attendance we observe the field of the respective resident medical specialists and some information on the services provided. The prescribed medical drugs can be classified according to the Anatomical Therapeutic Chemical (ATC) Classification System code, and the number of days spent in hospital can be distinguished by the main admission diagnoses following the ICD-10 (International Statistical Classification of Diseases and Related Health Problems) classification system advocated by the WHO.

Obviously, the degree to which these measures reflect individual health varies among the variables. Whereas the number of days of hospitalization and the consumption of medical drugs can be expected to be highly correlated with a person's health status, expenditure on outpatient medical attendance may also capture aspects of preventative care, such as costs of health screening exams.

3.3.2 Estimation sample and descriptive statistics

Our estimations sample covers the period from 1998 through 2012. It includes all individuals in the regular working age who are in period s (when we measure the sharing rule) in permanent employment as either a blue or a white-collar worker.[29] The regular working age is sex-specific. It is 15 to 60 years of age for males, and 15 to 55 years of age for females. We consider any regular employment with a tenure of at least 1 year as permanent. Our estimation samples comprises almost 5 millions observations.

Summary statistics are provided in Table 2. The average worker is about 10 days on sick leave per year. In each year, about 50 percent of all workers have zero days of sick leave.[30] Figure 6 shows that even in the sample with non-zero sick leave days, there is considerable variation in this variable. In the overall sample, the standard deviation is about twice the mean.

Official data for the year 2012 (as reported by Leoni, 2014) show that almost 70 percent of all sick leave days are caused by diseases from just four ICD-10 chapters: musculoskeletal system and connective tissue (22.3 percent); respiratory system (19.6 percent); injury, poisoning and other external causes (17.3 percent); and mental and behavioural disorders (8.6 percent). A comparison with previous years shows that this

[29] An attractive feature of our data set is, that we observe workers health care cost in period $s+x$ (when we measure the outcome variables in the second stage) also in the case of non-employment. Thus, we do not have to worry about selective labor market exits into unemployed, retirement, etc.

[30] For very short sick leave spells we have a measurement error in our data. For a spell up to three days no medical certificate is necessary, unless the firm explicitly requests this. To achieve comparable measurement across firms we replace sick leave spells three days or shorter with zero. Given that only the total annual sick leave days matter for a given worker's cost, s/he has no incentive to strategically consume short versus long sick leave spells. Thus, this measurement error should only introduce noise, but not bias our estimates.

distribution of sick leave causes is quite stable over time, with the exception of mental and behavioural disorders, which are on the rise. Thus, the typical disease responsible for sick leave is non-contagious.

The worker's expected cost share for a sick leave of 16 weeks per year varies between 5 and 31 percent. The sample mean is about 17 percent. The equivalent firm's expected cost share has a larger variation (between 0 and 88 percent) and a mean of about 52 percent.

The average worker generates about €342 of total outpatient health care expenditures per year (median: €197), of which about two-thirds are spent for medical attendance and one-third on medical drugs. To proxy health expenditures in the inpatient sector, we use the annual days spent in hospital. About 14 percent of workers have at least one hospital day per year; the sample mean is about one. The variation in all these health indicators is substantial. This is in particular true for expenditures on medical drugs and hospitalization, where the standard deviation is about seven and five times the mean, respectively.[31]

3.4 Estimation results

In this section, we first summarize our estimation results on the effects of variations in cost shares on absence behavior. These estimates constitutes the first stage within our 2SLS estimation approach. Then, we present our reduced form estimates on the effects of exogenous variations in cost shares on workers' health. Following this, we report on our second stage results, which provide estimates of the effect of policy-induced sick leave changes on workers' health. Before we discuss how we can relate our estimation results to the presence of absenteeism versus presenteeism, we report on some robustness checks. In a final step, we explore potential treatment effect heterogeneity.

3.4.1 The effect of cost shares on absence behavior (first stage results)

Our first stage results summarized in Table 3 provide us with estimates on how variations in the sharing rule affect absence behavior. The estimated effects on variation in the worker's and the firm's cost share correspond with the comparative static effects discussed in Proposition 1: $\frac{\partial t_1^a}{\partial \eta^j}$, $j = F, W$.

As predicted by our model, all specifications show that an increase in either cost share decreases the days on sick leave. The estimated effects are highly statistically significant, which allows us to abstract from weak instrumental variable problems in the interpretation of our second stage (see below).

[31]Figure B.1 in Appendix B shows the distribution of each health indicator in our estimation sample (excluding individuals with zero values).

To assess the quantitative importance of these effects, we have to keep in mind that both explanatory variables capture the respective expected cost share. Thus, an increase in the worker's expected cost share of 10 percentage points decreases the annual sick days by about 0.8 days. An equivalent increase in the firm's cost share decreases the sick days by only about 0.4 days. Given a sample mean of about 10.4 sick days per year, these are equivalent to decreases of about 8 and 4 percent (semi-elasticities are provided in brackets), respectively. The relatively higher importance of the worker's cost share as compared to the firm's cost share corresponds with our expectation (see theoretical discussion).

As a robustness check, we control in specification (II) through (V) in turn for different health indicators measured in period $s-1$. In particular, we either include total outpatient expenditures, expenditures on medical attendance, expenditures on medical drugs, and days spent in hospital. The estimated effects vary only marginally due to the inclusion of lagged health indicators. The results from these robustness checks are very reassuring, since they provide evidence that the cost shares are not correlated with individual health status, and that the variation in the sharing rule is indeed exogenous.

This set of result has important implications. First, the significant effect of workers' and firms' cost shares on absence behavior confirms the existing literature (see Section 1). Second, for our subsequent analysis we can note that the workers' and the firms' cost share are strong instrumental variables.

3.4.2 The effect of the cost shares on workers' health (reduced form results)

Our reduced form results are summarized in Table 4. The estimated effects on variation in the worker's and the firm's cost share on health correspond with the comparative static effects discussed by Proposition 2: $\frac{\partial H_2}{\partial \eta_1^j}$, $j = F, W$. We use two different specifications of the lag structure and examine the effect of the sharing rules measured in period $s-1$ (see Panel A) and in $s-2$ (see Panel B) on current health outcomes. As predicted by our model, we find across all specifications and outcomes that an increase in either cost share negatively affects (future) health. More precisely, we find a rise in health care cost and in hospitalization.

Considering Panel A we see that an increase in the expected worker's cost share by 10 percentage points is estimated to increase total outpatient expenditures by €23, expenditures on medical attendance in the outpatient sector by €14, expenditures on medical drugs by €9, and days spent in hospital by about 0.1 days. The estimated coefficients on total outpatient expenditures, service expenditures and hospital days are statistically significant at the one percent level, the effect on medical drug expenditures is not statistically significant. To facilitate a comparison of the relative importance of these effects across outcomes, Table 4 also provides estimated semi-elasticities in brackets below the standard errors. The estimated effects are equivalent to increases by 7, 6, 7 and 11 percent. An equivalent increase in the expected firm's cost share has quantitatively smaller effects. Depending on the outcome the estimated effects are one-sixth to one-fourth (about plus 1 percent total health expenditures and expenditures on medical attendance, and about plus 2 percent expenditures on medical drugs and days spent in hospital). In Panel B we examine the effect of cost shares measured in period $s-2$ on current health outcomes and find very similar results compared to those obtained above. This may suggest that cost shares have not only short term effects but also medium term effects on health outcomes.

3.4.3 The effect of policy-induced sick leave changes on later health

Our second stage results are summarized in Table 5. They correspond with $\frac{\partial H_2}{\partial t_1^a}$ from our theoretical model. These estimates are *local average treatment effects* and give us the effect of policy-induced variations in sick leave on health. In particular, the variation comes from two policy variables: the workers' and firms' cost share. Again, we impose a lagged structure and estimate the effect of variation in past sick leave days (in period $s-1$ and $s-2$) on current health indicators. Across all outcomes and specifications we find that exogenous increases in sick leave — either due to a reduction in workers' or firms' cost share — improve subsequent health. More precisely, we observe a reduction in health care cost and in the extent of hospitalizations. With the exception of expenditures on medical attendance all estimated coefficients are highly statistically significant. For each specification we also report the Kleibergen-Paap Wald rk F statistic. The values around 70 indicate that our instruments are sufficiently strong.

Considering Panel A we see that an increase in annual sick leave days by one is estimated to decrease total outpatient expenditures, as well as, expenditures on medical drugs by €3-4. Thus, the cost-reducing effect of more sick leave in the outpatient sector is mostly driven by expenditures on medical drugs. For the inpatient sector we find a reduction of about 0.04 days spent less in hospital. The semi-elasticities (in brackets below the standard errors) facilitate a comparison of the relative importance of these effects across outcomes and imply that an increase in sick leave by 1 day decreases total health expenditures by 1 percent, expenditures on medical drugs by 3 percent, and days spent in hospital by 3 percent. A comparison across panels shows quantitatively higher effects when a lag of two years is considered. Moreover, the statistical significance is higher throughout. For instance, the effect on medical attendance (minus 0.6 percent) is significant at the ten percent level.

Physical or mental impairments To explore whether the estimated effects are driven by physical or mental impairments, we exploit the information on the type of medical drugs.[32]

[32] Our two other health care cost variables are less suited for this analysis. The field of the resident medical specialists is not fully informative, since many patients with mental problems consult a GP (and not a psychologist). We infer this from the information on who is prescribing antidepressants. Hospitalizations due to mental problems are rare and represent severe cases.

We distinguish between expenditures on nervous system drugs (ATC code N, comprising antidepressants and barbiturates), and other medical drugs. On average, expenditures for nervous system drugs account for 17.5 percent of all drug expenditures. Untabulated estimation results reveal that policy-induced increases in sick leave have a stronger effect on nervous system drugs (minus 8 percent) as compared to other drugs (minus 3 percent). Thus, by increasing sick leave one could improve physical and mental health.

3.4.4 Sensitivity analysis

Definition of the instrumental variables To implement our 2SLS approach, we have defined our instrumental variables as the expected value of workers' and firms' cost shares for an annual sick leave duration of 16 weeks (i.e., we have set d to $\bar{d} = 16$). As argued above, while the choice of $\bar{d} = 16$ is to some degree arbitrary, we expect it to be an innocuous assumption given forward-looking individuals and the high correlation in the cost shares across different choices of $\bar{d} \leq 16$. To check our supposition, we repeat our analysis for different choices of $\bar{d} = \{7, 8, \ldots, 15\}$.[33] As expected, we see little variation in the estimated coefficients across different choices of $\bar{d}$. See Figures B.2 and B.3 in Appendix B, which summarize the first and second stage results, respectively.

Controlling for the wage rate In principle, it is possible that the firm's cost share has an effect on wages. Firms could aim for constant labor cost across workers, and pay lower wages to workers for whom they have to pay higher sick leave cost. Theoretically, even the worker's cost share could have an effect on wages. For instance, workers with high cost of sick leave could try to bargain a higher wage. In practice, especially in the Austrian context, we assess these effects to be of minor importance. First, a large share of workers are covered by collective bargaining agreements. Second, wages are typically downward rigid. In our baseline specification we did not include the wage rate as a covariate, since it is a potential bad control (i.e., it could itself be an outcome). Nevertheless, as robustness check we re-ran our estimations with the daily wage rate as an additional covariate. The results based on this alternative specification (which allows for a correlation between wages and cost shares) are summarized in Appendix B. The inclusion of the wage rate changes our results only marginally. In the first stage estimation (see Table B.2), the effect of cost shares on absence behavior is now somewhat smaller, but still highly statistically significant. In the reduced form estimation (see Table B.3) and in the second stage estimation (see Table B.4), no significant changes arise.

3.4.5 Absenteeism or presenteeism

How can we relate our estimation results to the presence of absenteeism versus presenteeism? This can be achieved by mapping these two phenomena into the space of (policy-

[33]For lower values of $\bar{d}$, there is not enough variation across workers' schemes, see Panel (a) of Figure 3.

induced) sick leave and subsequent health care cost. See the stylized Figure 7. Here we define the domain of presenteeism, as the segment of the health care cost function which decreases in sick leave. This captures the idea that a sick worker who rests (instead of attending work), would recover faster and generate lower health care cost. This is in line with our theoretical model, where presenteeism is defined as a situation where a worker with a current level of health below H^* attends work. Absenteeism is present, when a worker with a current level of health greater or equal to H^* does not attend work. In the domain of absenteeism, the shape of the health care cost function is less clear. One may assume (as we did in our theoretical model) that staying home despite not being sick is equally healthy/unhealthy as being at work. This is captured by the sold line, which is horizontal in the domain of absenteeism (i. e., absenteeism has no effect on subsequent health care cost).

Alternatively, one may think that absenteeism (or more precisely the specific activities) are less healthy as compared to being healthy at work. This would be the case if absent workers engage for instance in risky activities. This case is captured by the scattered line, which is up-ward slopping in the domain of absenteeism (i. e., absenteeism increases subsequent health care cost).[34] As argued above, a negative effect on health care cost is ruled out per definition. This is equivalent to assuming that there are no unhealthy jobs (i. e. workers with unhealthy jobs would be permanently on presenteeism). Thus, a negative effect of sick leave on health care cost can only be found in the domain of presenteeism. We conclude that in our sample the average worker is in the domain of presenteeism and reductions in the workers' or the firms' cost share would reduce health care cost by increasing sick leave days.

3.4.6 Treatment effect heterogeneity

In a final step, we explore whether the effects of cost shares on absence behavior and subsequent health differs across workers, and whether they vary with macroeconomic conditions. Regarding the workers' characteristics, we consider the degree of labor market attachment and health as important dimensions. To approximate these variables we suggest to use sex and age. While Austria has a reasonably high female labor force participation (of about 0.7), men are on average more strongly attached to the labor market. After becoming a mother, many women only work part-time or leave the labor market completely. Younger workers (defined as below 50 years of age) can be expected to be healthier than older workers. To capture macroeconomic conditions we use local unemployment rates measured on a district-level, and assign each worker the annual local

[34]Note, our theoretical model rules out a positive effect of absenteeism on health care cost. A rationale worker would never go on sick leave (in the domain of absenteeism), if she knew that this deteriorates her future health. To allow for this behavior, one could incorporate a taste for risky activities or include myopia.

unemployment rate at her place of residence. We distinguish between observations with a local unemployment rate below and above the median of the total sample of district-years, which should mimic the situation of a recession versus a boom.

Which predictions can be derived from the theoretical model? While we obtain the definite result that a worker in good health chooses to be less absent (as compared to a worker in bad health), it is ambiguous whether the former or the latter will react stronger to cost share variations.[35] Analogously, we find that a worker with a higher degree of labor market attachment is less absent.[36] Yet the theoretical analysis cannot provide a definite answer, on how variations in the attachment affect the response to cost share variations. Finally, by assuming that a recession increases the likelihood of being dismissed[37], we can show that workers will reduce their sickness absence during recessions. Again, we have no definite result on the relative response to cost share changes.

Empirical results Table 6 summarizes the first stage estimation results for these six subsamples. In each case, we observe the same qualitative result. The first two columns show that the point estimates are somewhat larger in absolute terms for female workers as compared to male workers. However, one should not conclude that women (the group with lower labor market attachment) react stronger to increases in cost shares, since the difference in the estimated coefficients is not statistically significant. The next two columns show that old workers react significantly stronger to cost shares as compared to young workers. The effect of the worker's costs share is only statistically significant for older workers. The firm's cost share is significant for both groups, however, quantitatively more important for older workers. This suggest that workers with lower health status respond more to cost shares. The remaining two columns provide evidence for heterogeneous effects along the business cycle. While the reaction to the firm's costs share seems uniform, we see that changes in the worker's cost share are about two times more effective during recessions.[38]

Table 7 summarizes selected second stage estimation results. These estimations results inform us whether *one* additional policy-induced sick leave day has different effects on health for different subsamples (and abstracts as such from any heterogeneity in the first stage). Panel A relates to the outpatient sector (annual total expenditures, sum of medical attendance and medical drugs), and Panel B relates to the inpatient sector (annual days in hospital). In both panels we provide results of sick leave days in period $s-1$ and $s-2$. In each subsample, we find evidence for a negative effect of past sick leave days on health care cost, and thus evidence that the average worker is in the domain of presenteeism. A

[35] It depends on the shapes of all functions (in particular, on the second and third partial derivatives) and their relations to each other.

[36] We simply introduce a weighting parameter in the worker's expected utility of period 2, which captures how important (or necessary) it is to keep her job.

[37] That is we assume that the employment probability ρ depends also on a business cycle parameter.

[38] Since the composition of the workforce may change over the business cycle, we cannot disentangle whether the estimated behavioral change is within or across individuals.

comparison of the elasticities (provided in bracktes) shows that the relatives effects are by and large comparable across the respective subsamples. The only notable difference is between young and old workers. Among older workers we observe no evidence for cost-savings in the inpatient sector, but significant reductions in the outpatient sector. A possible explanation is that presenteeism causes different medical conditions among young and old workers, which lead to different medical treatments.

4 Conclusions

We show that depending on how the cost of temporary withdrawals from the labor market due to sickness are shared among firms, workers and the social security system, one observes different absence behavior and varying health care cost. Our empirical analysis based on Austrian data suggests that the average worker is in the domain of presenteeism. This result is in line with the persistent problem of early retirement (especially due to disability) in Austria compared to other OECD countries (OECD, 2011). Thus, a redistribution in the cost of sick leave from workers and firms to the public, would increase the inefficiently low level of sick leave, and may also help to increase the actual retirement age. An alternative public policy option is to reduce the risk and cost of unemployment. Clearly, we cannot conclude from our findings to the difficult issue on how an optimal sick-pay scheme and a sharing rule should look like. To clarify this problem, one has to provide a welfare analysis which would be an important next step (but is beyond the scope of this study).

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5 Tables and Figures

Table 1: Sick leave cost shares for workers ($\mathcal{W}$) and firms ($\mathcal{F}$) by period and occupation, tenure and firm size groups (. . . continued on next page).

Weeks of sick leave	Blue-collar workers												White-collar workers			
	1998/01 – 2000/08								**2001/01† – 2004/12‡**				**1998/01 – 2004/12**			
Tenure groups	0 – 5		6 – 15		16 – 25		> 25		0 – 5	6 – 15	16 – 25	> 25	0 – 5	6 – 15	16 – 25	> 25
Firm size¶	Small	Large	Small	Large	Small	Large	Small	Large								
	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$
1	0/0	0/30	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
2	0/0	0/30	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
3	0/0	0/30	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
4	0/0	0/30	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
5	50/0	50/0	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
6	50/0	50/0	0/0	0/30	0/0	0/30	0/0	0/30	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
7	40/0	40/0	40/0	40/0	0/0	0/30	0/0	0/30	20/50	0/100	0/100	0/100	20/50	0/100	0/100	0/100
8	40/0	40/0	40/0	40/0	0/0	0/30	0/0	0/30	20/50	0/100	0/100	0/100	20/50	0/100	0/100	0/100
9	40/0	40/0	40/0	40/0	40/0	40/0	0/0	0/30	20/50	20/50	0/100	0/100	20/50	20/50	0/100	0/100
10	40/0	40/0	40/0	40/0	40/0	40/0	0/0	0/30	20/50	20/50	0/100	0/100	20/50	20/50	0/100	0/100
11	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50	0/100	40/0	20/50	20/50	0/100
12	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50	0/100	40/0	20/50	20/50	0/100
13	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50	40/0	40/0	20/50	20/50
14	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50	40/0	40/0	20/50	20/50
15	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	40/0	40/0	40/0	20/50
16	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	20/50	40/0	40/0	40/0	20/50
≥ 17	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0
Scheme																
$\mathcal{W}$	z_0	z_0	z_1	z_1	z_2	z_2	z_3	z_3	z_4	z_5	z_6	z_7	z_4	z_5	z_6	z_7
$\mathcal{F}$	Z_0	Z_1	Z_0	Z_2	Z_0	Z_3	Z_0	Z_4	Z_5	Z_6	Z_7	Z_8	Z_5	Z_6	Z_7	Z_8

† In 09/2000 the firm cost scheme was changed; however the old worker scheme was still in place until 12/2000. ‡ During the period from 10/2002 - 12/2004 a 50% reimbursement for firms with less than 51 workers was in place. However the reimbursement was paid for sick blue- and white-collar workers only in case of sick leave due to workplace accidents. ¶ The definition of small firms has changed in our sample period. Until 09/2002 a small (large) firms was defined by a total payroll below (above) 180 times the maximal daily social security contribution basis. Since 10/2002 a small (large) firm is defined by 51 workers or fewer (more than 51 workers).

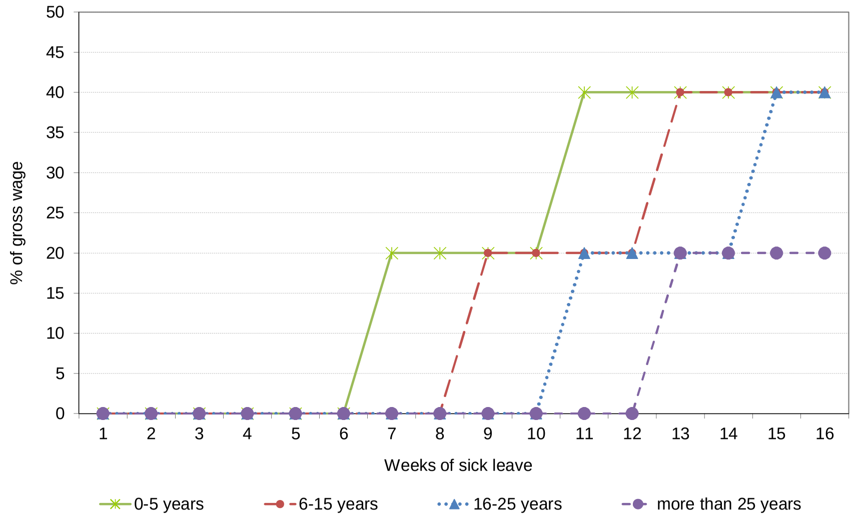
Table 1 (. . . continued)

Weeks of sick leave	All workers							
	2005/01 – 2012/12							
Tenure groups	0 – 5		6 – 15		16 – 25		> 25	
Firm size[¶]	Small	Large	Small	Large	Small	Large	Small	Large
	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$	$\mathcal{W}/\mathcal{F}$
1	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
2	0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
3	0/42	0/100	0/42	0/100	0/42	0/100	0/42	0/100
4	0/42	0/100	0/42	0/100	0/42	0/100	0/42	0/100
5	0/42	0/100	0/42	0/100	0/42	0/100	0/42	0/100
6	0/42	0/100	0/42	0/100	0/42	0/100	0/42	0/100
7	20/50	20/50	0/100	0/100	0/100	0/100	0/100	0/100
8	20/50	20/50	0/100	0/100	0/100	0/100	0/100	0/100
9	20/50	20/50	20/50	20/50	0/100	0/100	0/100	0/100
10	20/50	20/50	20/50	20/50	0/100	0/100	0/100	0/100
11	40/0	40/0	20/50	20/50	20/50	20/50	0/100	0/100
12	40/0	40/0	20/50	20/50	20/50	20/50	0/100	0/100
13	40/0	40/0	40/0	40/0	20/50	20/50	20/50	20/50
14	40/0	40/0	40/0	40/0	20/50	20/50	20/50	20/50
15	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50
16	40/0	40/0	40/0	40/0	40/0	40/0	20/50	20/50
≥ 17	40/0	40/0	40/0	40/0	40/0	40/0	40/0	40/0
Scheme								
$\mathcal{W}$	z_4	z_4	z_5	z_5	z_6	z_6	z_7	z_7
$\mathcal{F}$	Z_9	Z_5	Z_{10}	Z_6	Z_{11}	Z_7	Z_{12}	Z_8

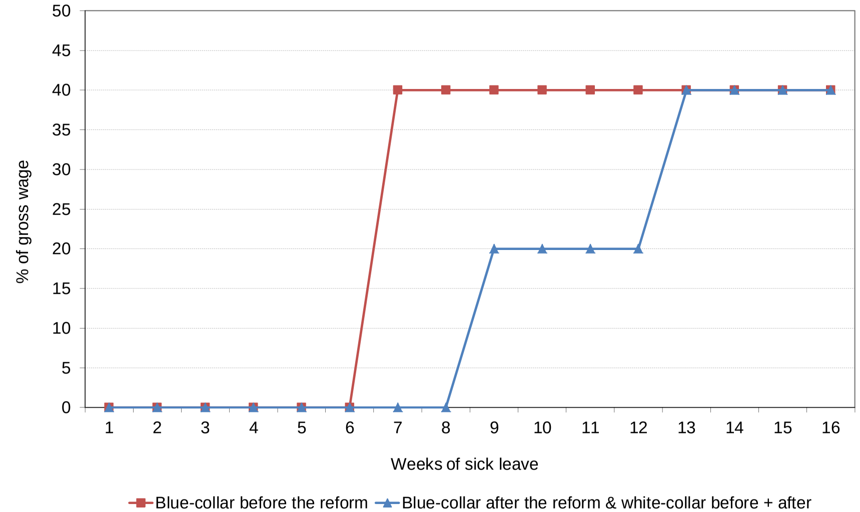
[¶] Since 10/2002 a small (large) firm is defined by 51 workers or fewer (more than 51 workers).

Figure 1: Selected workers' and firms' cost shares over sick leave spell length to highlight changes due to reforms

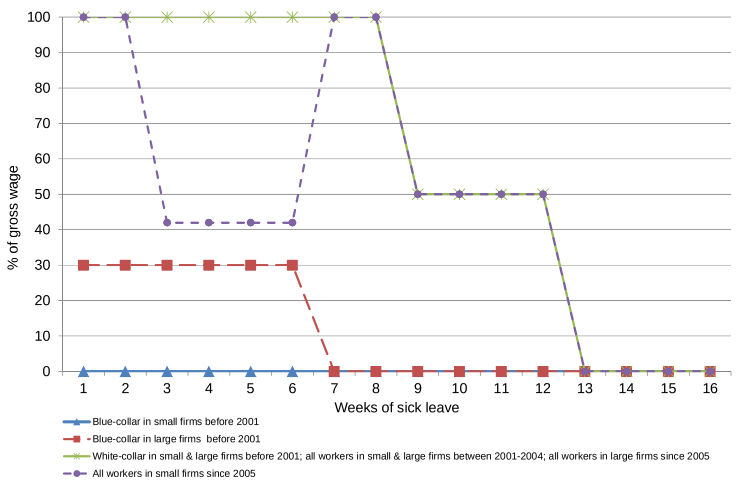
(a) Workers' cost shares for white-collar workers across tenure groups



(b) Workers' cost shares for workers with tenure of 6-15 years before and after the reform in 2001



(c) Firms' cost shares for workers with tenure of 6-15 years in small and large firms



(d) Firms' cost shares for blue-collar workers across tenure groups in large firms before 2001

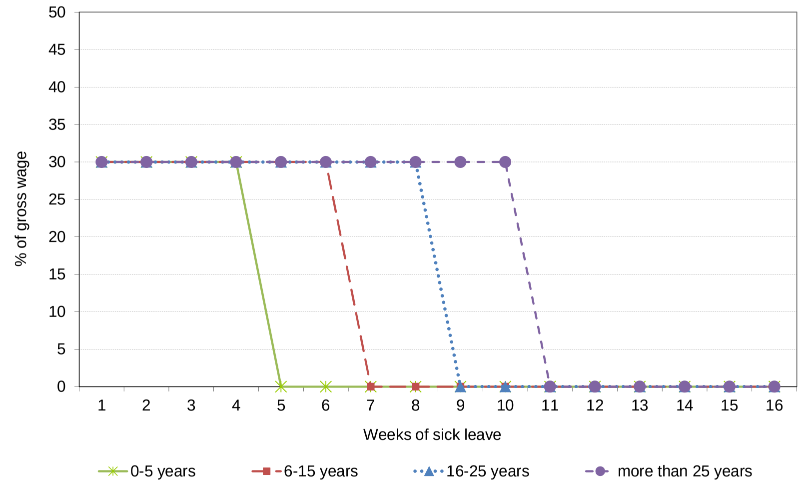
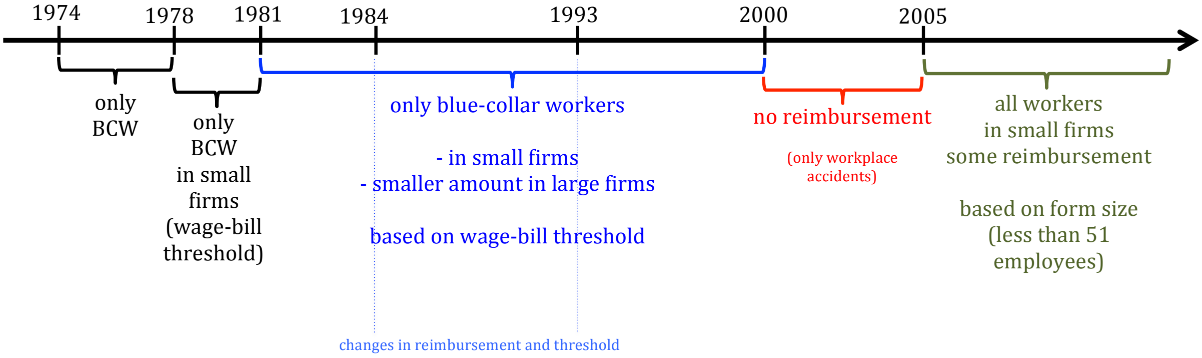


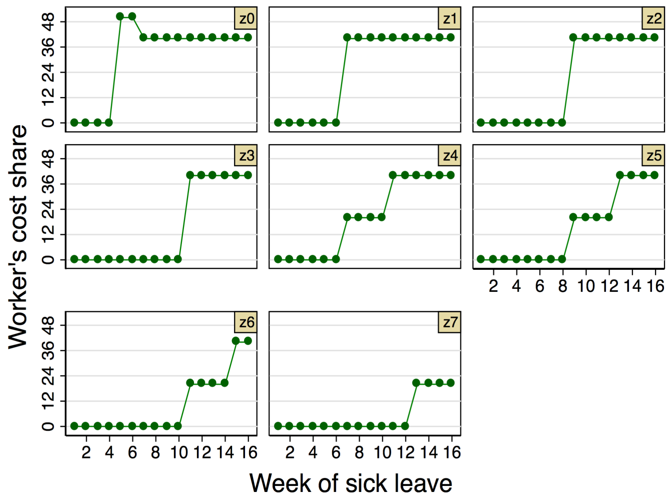
Figure 2: Policy-induced variation in firms' cost shares



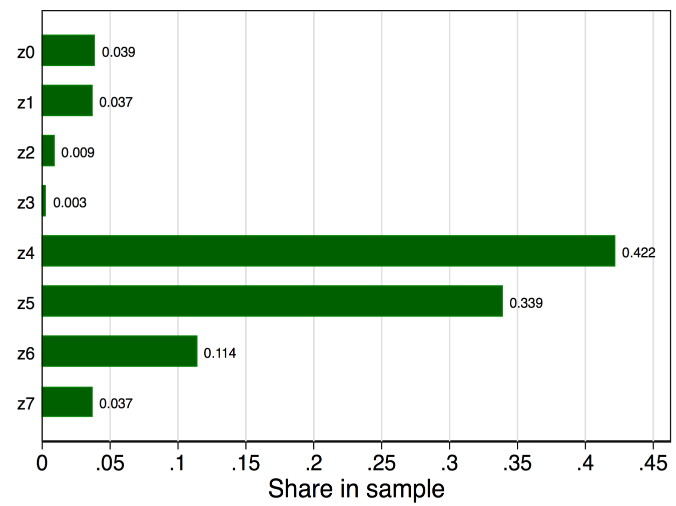
Notes: In 1993, the reimbursement for firms above the wage bill threshold was reduced from 80 to 70 percent.

Figure 3: Workers’ and firms’ cost shares over sick leave spell length, by unique sequences

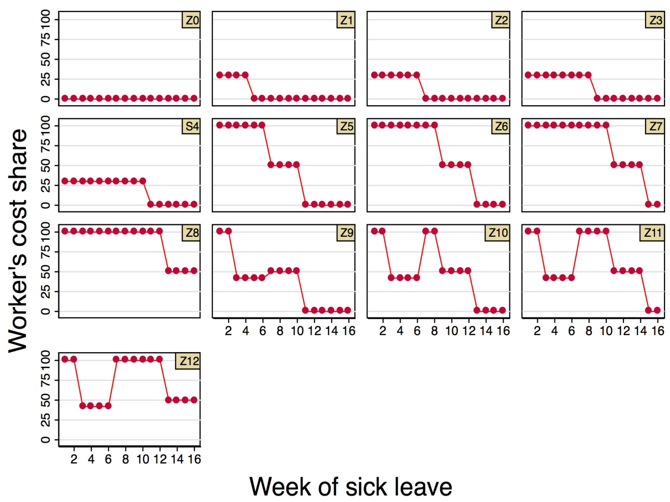
(a) Workers’ cost shares over sick leave spell length



(b) Distribution of workers’ sequences of cost shares



(c) Firms’ cost shares over sick leave spell length



(d) Distribution of firms’ sequences of cost shares

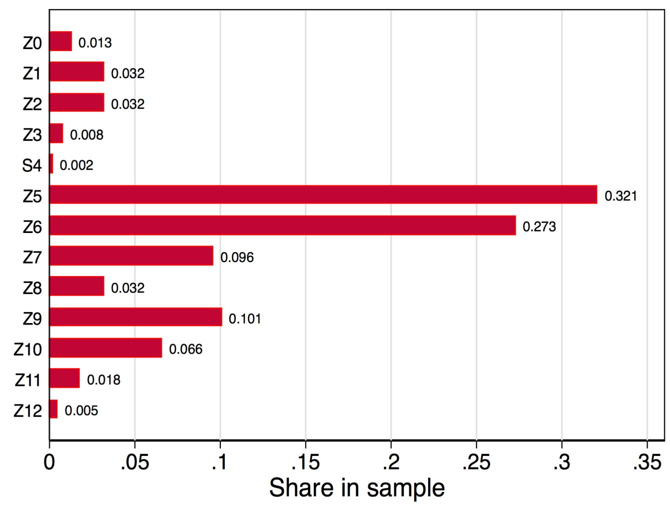


Figure 4: Workers' cost share for an annual sick leave of 16 weeks, by sequence

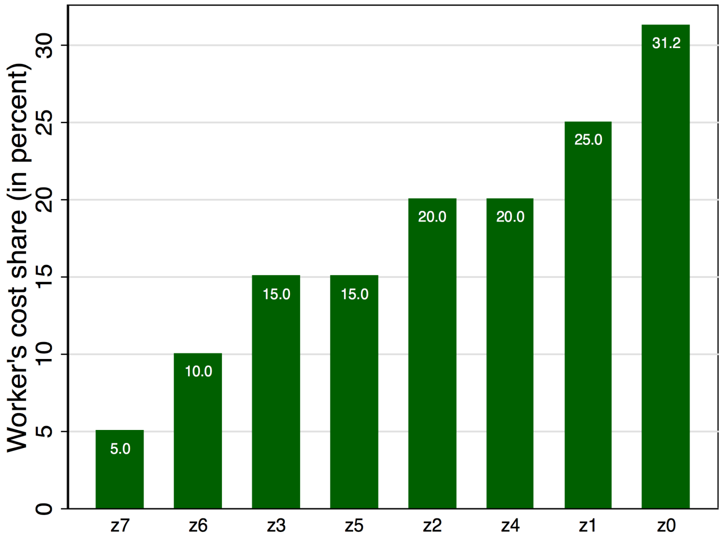


Figure 5: Firms' cost share for an annual sick leave of 16 weeks, by sequence

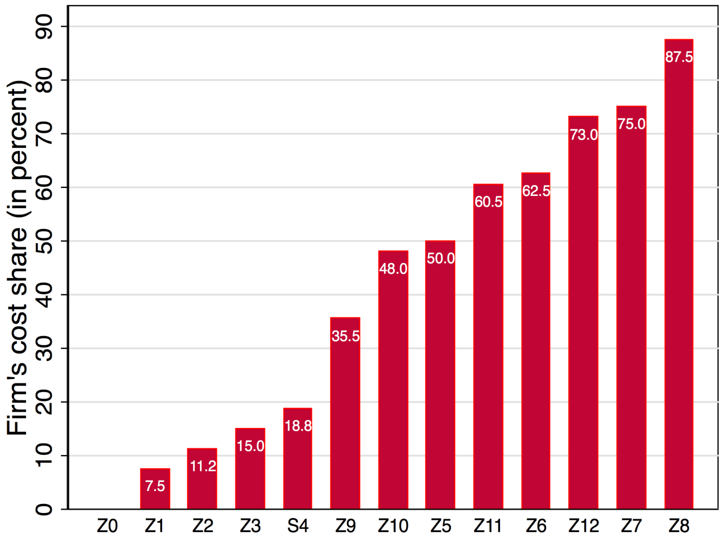
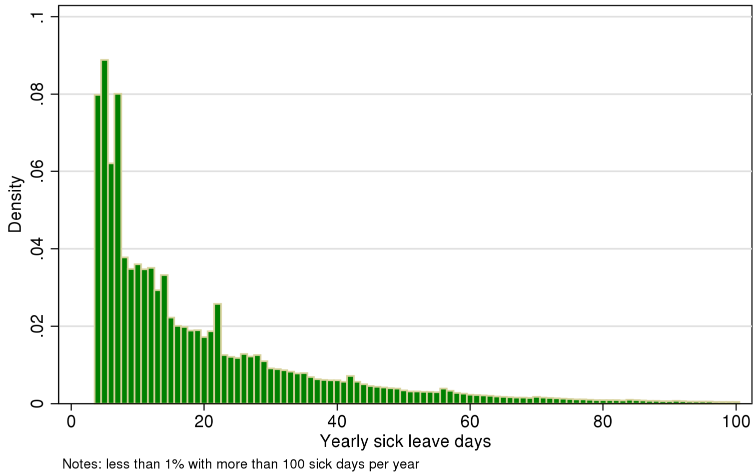


Figure 6: Distribution of annual sick leave days



Notes: This graph excludes observations with zero sick leave days (51%). Observations with sick leave spells of three days or shorter are set to zero (see footnote 30).

Table 2: Summary statistics

Variable	Mean	Std.Dev.	Min	Max
Endogenous and instrumental variables:				
Sick leave days	10.424	19.646	0	366
Worker's expected cost share	17.223	5.183	5	31
Firm's expected cost share	52.284	18.331	0	88
Outcome variables (measured in year s+1):				
Total outpatient health expend.	342.199	897.171	0	419,788
Expenditures on				
Medical attendance	226.807	269.350	0	23,320
Medical drugs	115.392	828.447	0	419,104
Hospital days	1.241	5.714	0	366
Control variables:				
Age	38.855	9.999	16	60
Female	0.422		0	1
Blue-collar	0.447		0	1
White-collar	0.555		0	1
Tenure (in years)	7.717	7.153	1	39
Tenure 1-5 years	0.456		0	1
Tenure 6-15 years	0.379		0	1
Tenure 16-25 years	0.125		0	1
Tenure >25 years	0.041		0	1
Firm size (workers)	1044.789	2687.135	1	43,667
Firm's wage sum (Euro)	2,042,333	4,948,437	0	48,500,000
Small firm	0.312		0	1
Period 1998-2000	0.199		0	1
Period 2001-2004	0.277		0	1
Period 2005-2011	0.524		0	1
N=4,819,556				

Table 3: The effect of cost shares on absence behavior (1st stage)[a]

	(I)	(II)	(III)	(IV)	(V)
Worker's cost share in s	-0.084***	-0.076***	-0.083***	-0.071***	-0.084***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
	[-0.81%]	[-0.73%]	[-0.80%]	[-0.68%]	[-0.81%]
Firm's cost share in s	-0.041***	-0.039***	-0.040***	-0.038***	-0.041***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
	[-0.39%]	[-0.37%]	[-0.38%]	[-0.37%]	[-0.39%]
Controlling for basic covariates:[b]					
Sex	yes	yes	yes	yes	yes
Age	yes	yes	yes	yes	yes
Occupation	yes	yes	yes	yes	yes
Firm size (20 percentiles)	yes	yes	yes	yes	yes
Firm's wage sum (20 percentiles)	yes	yes	yes	yes	yes
Small firm	yes	yes	yes	yes	yes
Tenure	yes	yes	yes	yes	yes
Month of entry	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
Controlling for health indicators ($s-1$)[c]					
Total outpatient	no	yes	no	no	no
Medical attendance	no	no	yes	no	no
Medical drugs	no	no	no	yes	no
Hospital days	no	no	no	no	yes
Number of observations	4,819,556	4,485,535	4,485,535	4,485,535	4,485,535
Mean of dep. var.	10.424	10.404	10.404	10.404	10.404

[a] This table summarizes estimation results of the effect of workers' and firms' cost shares on absence behavior. Each column represents a separate OLS estimation, where the dependent variable is equal to the annual sick leave days in period s. The explanatory variables of primary interest are the expected values of workers' and firms' cost shares based on an annual sick leave of 16 weeks in period s. Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively. [b] The set of basic covariates include information on sex, age (binary indicators for each year), occupation (blue-collar versus white-collar worker), tenure (binary indicators), firm size (20 groups based on percentiles), firm's wage sum (20 groups based on percentiles), an indicator for small firms (as defined by the regulation for reimbursement of firms), month of entry (binary indicators for calendar month), fixed effects at the firm-level and binary indicators for each calendar year. [c] Specification II through V control in addition for health indicators measured in period $s-1$: total health expenditures in II, expenditures on medical attendance in the outpatient sector in III, expenditures on medical drugs in IV, days spent in hospital in V.

Table 4: The effect of cost shares on health (reduced forms)[a]

	Total outpatient expenditures	Medical attendance	Medical drugs	Hospital days
PANEL A:				
Worker's cost share in $s-1$	2.262***	1.417***	0.845	0.013***
	(0.585)	(0.246)	(0.530)	(0.004)
	[0.66%]	[0.62%]	[0.73%]	[1.05%]
Firm's cost share in $s-1$	0.470***	0.239***	0.231**	0.003***
	(0.114)	(0.052)	(0.105)	(0.001)
	[0.14%]	[0.11%]	[0.20%]	[0.24%]
Number of observations	4,819,556	4,819,556	4,819,556	4,819,556
Mean of dep. var.	342.199	226.807	115.392	1.241
PANEL B:				
Worker's cost share in $s-2$	1.841***	1.249***	0.592	0.013***
	(0.656)	(0.284)	(0.574)	(0.004)
	[0.51%]	[0.52%]	[0.47%]	[0.99%]
Firm's cost share in $s-2$	0.440***	0.232***	0.208*	0.003***
	(0.127)	(0.054)	(0.114)	(0.001)
	[0.12%]	[0.10%]	[0.17%]	[0.23%]
Number of observations	4,369,416	4,369,416	4,369,416	4,369,416
Mean of dep. var.	363.356	238.528	124.828	1.312

[a] This table summarizes estimation results of the effect of lagged cost shares on different health indicators. Each column represents a separate OLS estimation where the dependent variable is equal to a health measure as indicated in the header. The explanatory variables of primary interest are the expected values of workers' and firms' cost share based on a yearly sick leave of 16 weeks in period $s-1$ ($s-2$). The set of basic covariates (measured in period $s-1$ and $s-2$, respectively) include information on sex, age (binary indicators for each year), occupation (blue-collar versus white-collar worker), tenure (binary indicators), firm size (20 groups based on percentiles), firm's wage sum (20 groups based on percentiles), an indicator for small firms (as defined by the regulation for reimbursement of firms), month of entry (binary indicators for each calendar month), fixed effects at the firm-level and binary indicators for each calendar year. Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.

Table 5: The effect of policy-induced changes in sick leave on health (2nd stages)[a]

	Total outpatient expenditures	Medical attendance	Medical drugs	Hospital days
PANEL A:				
Sick leave days in $s-1$	-3.765**	-0.292	-3.473**	-0.041***
	(1.774)	(0.796)	(1.651)	(0.011)
	[-1.10%]	[-0.13%]	[-3.01%]	[-3.30%]
Number of observations	4,807,649	4,807,649	4,807,649	4,807649
Mean of dep. var.	342.199	226.807	115.392	1.241
Kleibergen-Paap Wald rk F	72.624	72.624	72.624	72.624
PANEL B:				
Sick leave days in $s-2$	-5.772***	-1.334*	-4.438**	-0.055***
	(2.141)	(0.739)	(1.932)	(0.013)
	[-1.59%]	[-0.56%]	[-3.56%]	[-4.19%]
Number of observations	4,357,998	4,357,998	4,357,998	4,357,998
Mean of dep. var.	363.356	238.528	124.828	1.312
Kleibergen-Paap Wald rk F	66.502	66.502	66.502	66.502

[a] This table summarizes estimation results of the effect of policy-induced sick leave changes on health outcomes. Each column represents the second stage results from a separate 2SLS estimation, where the dependent variable is equal to a health measure as indicated in the header. The endogenous variable 'annual sick leave days in period $s-1$ ($s-2$)' is instrumented with two variables: expected values of workers' and firms' cost share based on an annual sick leave of 16 weeks in period $s-1$ ($s-2$). These expected cost shares are period, occupation and tenure specific. The set of basic covariates (measured in period $s-1$ and $s-2$, respectively) include information on sex, age (binary indicators for each year), occupation (blue-collar versus white-collar worker), tenure (binary indicators), firm size (20 groups based on percentiles), firm's wage sum (20 groups based on percentiles), an indicator for small firms (as defined by the regulation for reimbursement of firms), month of entry (binary indicators for each calendar month), fixed effects at the firm-level and binary indicators for each calendar year. Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.

Figure 7: A stylized functional relationship between sick leave and health care cost

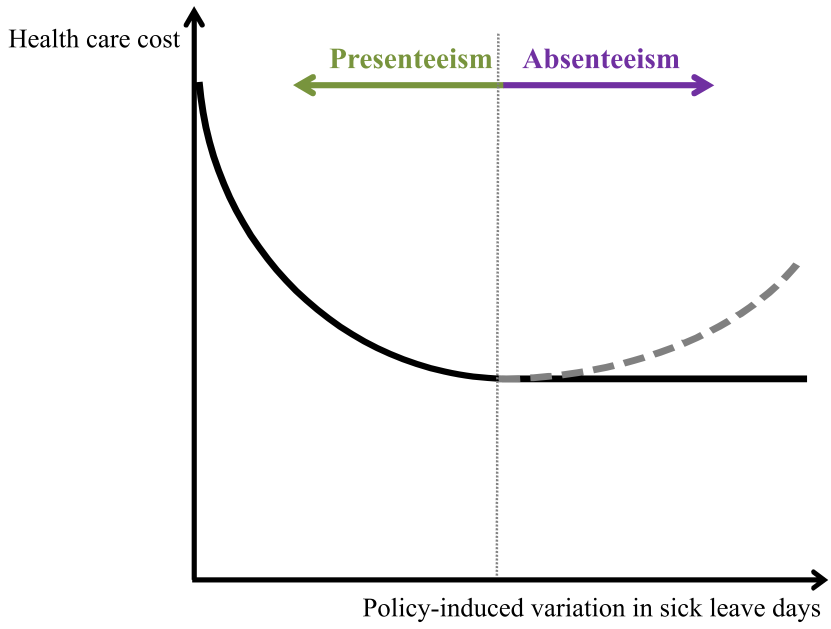


Table 6: The effect of cost shares on absence behavior among different groups[a]

	Sex		Age		Business Cycle	
	Male	Female	Young	Old	Boom	Recession
Worker's cost share in s	-0.078***	-0.106***	0.017	-0.314***	-0.072***	-0.169***
	(0.025)	(0.019)	(0.019)	(0.090)	(0.027)	(0.029)
	[-0.71%]	[-1.09%]	[0.18%]	[-1.96%]	[-0.67%]	[-1.63%]
Firm's cost share in s	-0.038***	-0.045***	-0.019***	-0.094***	-0.043***	-0.047***
	(0.006)	(0.007)	(0.004)	(0.017)	(0.007)	(0.006)
	[-0.35%]	[-0.46%]	[-0.20%]	[-0.59%]	[-0.40%]	[-0.45%]
Number of observations	2,785,935	2,033,621	4,133,314	686,242	3,267,303	1,332,357
Mean of dep. var.	10.957	9.694	9.492	16.038	10.785	10.368

[a] This table summarizes estimation results of cost shares on absence behavior for different subsamples. Each column represents a separate OLS estimation for a specific subsample, where the dependent variable is equal to the annual sick leave days period s. For further information, see notes to Table 3. Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.

Table 7: The effect of policy-induced changes in sick leave on health among different groups[a]

	Sex		Age		Business Cycle	
	Male	Female	Young	Old	Boom	Recession
Panel A (Effect on total outpatient expenditures):						
Sick leave days in $s-1$	-3.922	-6.919*	1.035	-10.134***	-3.435*	-7.065**
	(2.406)	(3.690)	(1.950)	(3.639)	(2.073)	(2.841)
	[-1.34%]	[-1.69%]	[0.33%]	[-1.93%]	[-0.95%]	[2.21%]
Number of observations	2,778,095	2,024,234	4,121,435	681,349	3,260,863	1,328,571
Mean of dep. var.	293.392	409.061	311.951	524.382	361.146	319.280
Kleibergen-Paap Wald rk F	56.541	24.139	79.576	29.254	46.110	34.583
Sick leave days in $s-2$	-6.038**	-6.098	0.083	-14.858***	-5.918**	-6.779**
	(2.793)	(4.397)	(2.416)	(4.549)	(2.780)	(2.679)
	[-1.92%]	[-1.42%]	[0.03%]	[-2.64%]	[-1.55%]	[-1.99%]
Number of observations	2,514,983	1,838,026	3,746,891	606,625	2,881,192	1,288,986
Mean of dep. var.	314.494	430.081	330.947	562.624	382.405	340.929
Kleibergen-Paap Wald rk F	47.886	25.611	72.663	25.311	39.154	34.813
Panel B (Effect on hospital days):						
Sick leave days in $s-1$	-0.017	-0.036**	-0.023*	-0.028	-0.044***	-0.040*
	(0.014)	(0.018)	(0.014)	(0.020)	(0.012)	(0.022)
	[-1.46%]	[-2.67%]	[-2.09%]	[-1.35%]	[-3.41%]	[-3.29%]
Number of observations	2,778,095	2,024,234	4,121,435	681.349	3,260,863	1,328,571
Mean of dep. var.	1.162	1.348	1.103	2.072	1.289	1.214
Kleibergen-Paap Wald rk F	56.541	24.139	79.576	29.254	46.110	34.583
Sick leave days in $s-2$	-0.034*	-0.033	-0.044***	-0.023	-0.061***	-0.054**
	(0.017)	(0.020)	(0.015)	(0.024)	(0.015)	(0.025)
	[-2.73%]	[-2.35%]	[-3.77%]	[-1.04%]	[-4.48%]	[-4.21%]
Number of observations	2,514,983	1,838,026	3,746,891	606,625	2,881,192	1,288,986
Mean of dep. var.	1.246	1.404	1.167	2.205	1.361	1.283
Kleibergen-Paap Wald rk F	47.886	25.611	72.663	25.311	39.154	34.813

[a] This table summarizes estimation results of the effect of policy-induced sick leave changes on health outcomes. Each column represents the second stage results from a separate 2SLS estimation for a specific subsample, where the dependent variable is equal to total outpatient expenditures in Panel A and days spent in hospital in Panel B. For further information, see notes to Table 5. Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.

Appendix

A Proof of Proposition 1

We denote the LHS of (5) by V_1 and the LHS of (3) by V_2. Implicit differentiation of (5) and (3) gives

$$\begin{pmatrix} \frac{\partial \hat{t}_1^a}{\partial \eta_1^F} & \frac{\partial \hat{t}_1^a}{\partial \eta_1^W} \\ \frac{\partial \hat{t}_2^a}{\partial \eta_1^F} & \frac{\partial \hat{t}_2^a}{\partial \eta_1^W} \end{pmatrix} = -\begin{pmatrix} \frac{\partial V_1}{\partial t_1^a} & \frac{\partial V_1}{\partial t_2^a} \\ \frac{\partial V_2}{\partial t_1^a} & \frac{\partial V_2}{\partial t_2^a} \end{pmatrix}^{-1} \begin{pmatrix} \frac{\partial V_1}{\partial \eta_1^F} & \frac{\partial V_1}{\partial \eta_1^W} \\ \frac{\partial V_2}{\partial \eta_1^F} & \frac{\partial V_2}{\partial \eta_1^W} \end{pmatrix}. \tag{11}$$

By inverting the first matrix on the RHS of (11) and multiplying we obtain

$$\frac{\partial \hat{t}_1^a}{\partial \eta_1^j} = -\frac{\frac{\partial V_2}{\partial t_2^a}\frac{\partial V_1}{\partial \eta_1^j} - \frac{\partial V_1}{\partial t_2^a}\frac{\partial V_2}{\partial \eta_1^j}}{\frac{\partial V_1}{\partial t_1^a}\frac{\partial V_2}{\partial t_2^a} - \frac{\partial V_1}{\partial t_2^a}\frac{\partial V_2}{\partial t_1^a}}, \quad j = F, W, \tag{12}$$

Note that $\frac{\partial V_1}{\partial t_2^a} = 0$, hence (12) reduces to

$$\frac{\partial \hat{t}_1^a}{\partial \eta_1^j} = -\frac{\frac{\partial V_1}{\partial \eta_1^j}}{\frac{\partial V_1}{\partial t_1^a}}, \quad j = F, W. \tag{13}$$

We find that

$$\begin{aligned} \frac{\partial V_1}{\partial t_1^a} \; = \; & (w_1\eta_1^W)^2\frac{\partial^2 U}{\partial C_1^2} + \frac{\partial^2 U}{\partial L_1^2} + \frac{\partial^2 \rho}{(\partial t_1^a)^2}(U_2^e - U_2^n) + 2\frac{\partial \rho}{\partial t_1^a}\left(\frac{\partial U_2^e}{\partial H_2} - \frac{\partial U_2^n}{\partial H_2}\right)\frac{\partial H_2}{\partial t_1^a} \\ & + \left(\rho\frac{\partial^2 U_2^e}{\partial H_2^2} + (1-\rho)\frac{\partial^2 U_2^n}{\partial H_2^2}\right)\left(\frac{\partial H_2}{\partial t_1^a}\right)^2 + \left(\rho\frac{\partial U_2^e}{\partial H_2} + (1-\rho)\frac{\partial U_2^n}{\partial H_2}\right)\frac{\partial^2 H_2}{(\partial t_1^a)^2} \\ & + \rho\frac{\partial^2 U_2^e}{\partial H_2 \partial t_1^a}\frac{\partial H_2}{\partial t_1^a}. \end{aligned} \tag{14}$$

By application of the Envelope Theorem

$$\frac{\partial U_2^e}{\partial H_2} = \frac{\partial U(C_2, L_2, H_2)}{\partial H_2}, \tag{15}$$

hence, $\frac{\partial^2 U_2^e}{\partial H_2 \partial t_1^a}$ in the last line of (14) is given by

$$\frac{\partial^2 U_2^e}{\partial H_2 \partial t_1^a} = \left(-w_2\eta_2^W\frac{\partial^2 U(C_2, L_2, H_2)}{\partial H_2 \partial C_2} + \frac{\partial^2 U(C_2, L_2, H_2)}{\partial H_2 \partial L_2}\right)\frac{\partial \hat{t}_2^a(w_2, t_2^w, \eta_2^W, H_2)}{\partial H_2}\frac{\partial H_2}{\partial t_1^a} \tag{16}$$

with $\hat{t}_2^a(w_2, t_2^w, \eta_2^W, H_2)$ being the optimal absence time in period 2 for given H_2. Hence, for an interior solution $0 < \hat{t}_2^a < t_2^w$, $\frac{\partial \hat{t}_2^a(w_2, t_2^w, \eta_2^W, H_2)}{\partial H_2}$ is derived by implicit differentiation of

(3) as

$$\frac{\partial \hat{t}_2^a}{\partial H_2} = -\frac{\frac{\partial V_2}{\partial H_2}}{\frac{\partial V_2}{\partial t_2^a}} = -\frac{-w_2\eta_2^W \frac{\partial^2 U}{\partial C_2 \partial H_2} + \frac{\partial^2 U}{\partial L_2 \partial H_2}}{(w_2\eta_2^W)^2 \frac{\partial^2 U}{\partial C_2^2} + \frac{\partial^2 U}{\partial L_2^2}}, \tag{17}$$

which is negative due to assumptions on the signs of the second derivatives of (1). In case of a boundary solution $\hat{t}_2^a = 0$ or $\hat{t}_2^a = t_2^w$, we have $\frac{\partial \hat{t}_2^a}{\partial H_2} = 0$.

Due to the assumptions on per-period utility (1), $H_2(H_1, t_1^a)$ and $\rho(t_1^a, \eta_1^F)$, together with $U_2^e > U_2^n$ (see Section 2) we find: If $H_1 \geq H^*$ or if $H_1 < H^*$ and $\hat{t}_1^a \geq \bar{t}_1^a$, the sign of (14) is negative (the first three terms are negative, all other terms are zero). If $H_1 < H^*$ and $\hat{t}_1^a < \bar{t}_1^a$, all terms on the RHS of (14) have a negative sign, except the last term which is nonnegative (use (16), together with $\frac{\partial \hat{t}_2^a}{\partial H_2} \leq 0$, see above). Observe that the fourth term on the RHS of (14) is negative because $\frac{\partial U_2^e}{\partial H_2} > \frac{\partial U_2^n}{\partial H_2}$ which can be shown as follows: due to the properties $\frac{\partial^2 U}{\partial C_s \partial H_s} > 0$ and $\frac{\partial^2 U}{\partial L_s \partial H_s} \leq 0$ of (1), the marginal utility of health H_2 at any bundle (C_2, L_2, H_2) increases if C_2 is increased by a small amount and L_2 is non-increased by a small amount, i.e. $d\frac{\partial U}{\partial H_2} = \frac{\partial^2 U}{\partial H_2 \partial C_2} dC_2 + \frac{\partial^2 U}{\partial H_2 \partial L_2} dL_2 > 0$, if $dC_2 > 0$ and $dL_2 \leq 0$. From this consideration and by use of the Mean-Value Theorem, it follows that $\frac{\partial U(C_2^g, L_2^g, H_2)}{\partial H_2} > \frac{\partial U(C_2^h, L_2^h, H_2)}{\partial H_2}$ for any given H_2, if $C_2^g > C_2^h$ and $L_2^g \leq L_2^h$. Finally, remember that $U_2^n = U(b, 1, H_2)$ and $U_2^e = U(\widehat{C}_2, \widehat{L}_2, H_2)$ with $\widehat{C}_2$, $\widehat{L}_2$ being the optimal consumption-leisure decision for any given H_2, where $\widehat{C}_2 > b$ and $\widehat{L} \leq 1$; consequently $\frac{\partial U_2^e}{\partial H_2} > \frac{\partial U_2^n}{\partial H_2}$. Altogether, by excluding some peculiar exceptions in which the last term, when being positive, could dominate all other negative terms in (14), we have $\frac{\partial V_1}{\partial t_1^a} < 0$.

Moreover, we have:

$$\frac{\partial V_1}{\partial \eta_1^W} = -w_1 \frac{\partial U}{\partial C_1} + w_1^2 t_1^a \eta_1^W \frac{\partial^2 U}{\partial C_1^2} < 0 \tag{18}$$

$$\frac{\partial V_1}{\partial \eta_1^F} = \frac{\partial^2 \rho}{\partial t_1^a \partial \eta_1^F}(U_2^e - U_2^n) + \frac{\partial \rho}{\partial \eta_1^F}\left(\frac{\partial U_2^e}{\partial H_2} - \frac{\partial U_2^n}{\partial H_2}\right)\frac{\partial H_2}{\partial t_1^a} < 0. \tag{19}$$

By use of (18) and (19), respectively, together with $\frac{\partial V_1}{\partial t_1^a} < 0$, in (13) we find that $\frac{\partial \hat{t}_1^a}{\partial \eta_1^j} < 0$, $j = F, W$. Q.E.D.

B Additional Tables and Figures

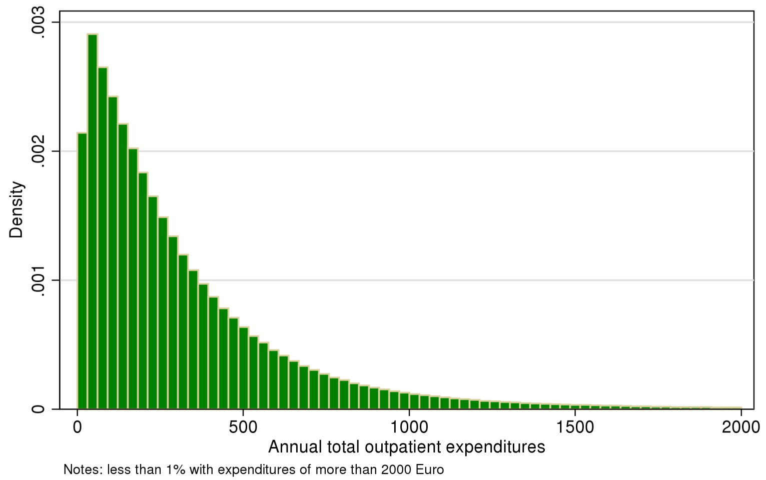
Table B.1: Important changes in sick-pay for workers and firms since 1974

Date	Federal law	Type	Description
1974/09	BGBl. 399/1974 EFZG	worker	Introduction of a tenure-based sick-pay scheme for blue-collar workers.[a]
		firm	Introduction of an insurance fund that reimburses firms for sick blue-collar workers. 100% of the sick leave compensation is reimbursed.
1979/01	BGBl. 664/1978 EFZG	firm	Reimbursement of sick leave compensation paid to blue-collar workers is restricted to firms with a total wage bill below a certain threshold (ATS 108,000).
1981/01	BGBl. 581/1980 EFZG	firm	The wage bill threshold is increased to ATS 122,400.
1982/01	BGBl. 596/1981 EFZG	firm	Reimbursement of sick leave compensation paid to blue-collar workers is extended to firms with a total wage bill above a certain threshold (ATS 129,600). However, these firms are reimbursed only 80% of the sick leave compensation paid to blue-collar workers.
1984/01	BGBl. 590/1983 ASVG	firm	The wage bill threshold is changed to 180 times the maximal daily social security contribution basis. (In this year, the maximal social security contribution basis amounted to 180× €58.14 = €10,464.9)
1993/01	BGBl. 833/1992 ASVG	firm	Firms with a total wage bill above the threshold are reimbursed only 70% (insteaed of 80) of the sick leave compensation paid to blue-collar workers.
2000/09	BGBl. I 44/2000 EFGZ	firm	Abolition and liquidation of the insurance fund. Firms are no longer reimbursed for sick blue-collar workers.
2001/01	BGBl. I 44/2000 EFGZ	worker	Blue-collar workers are subject to the same (more generous) tenured-based insurance scheme as white-collar workers. Differences in the renewal of claims remain.
2002/10	BGBl. II 443/2002 (VO)	firm	Reintroduction of a 50% reimbursement for firms with less than 51 workers (yearly average). The reimbursement is paid for sick blue- and white-collar workers but only in case of sick leave due to workplace accidents.
2005/01	BGBl. II 64/2005 (VO)	firm	Reimbursement for firms is increased to 58.34% and extended to all kinds of sick leave. The maximal duration of reimbursement is 42 days per worker and year. The reimbursement is paid only for sick leave spells that last at least eleven days. In case of workplace accidents reimbursement starts at day one but only for sick leave spells that last at least three days.

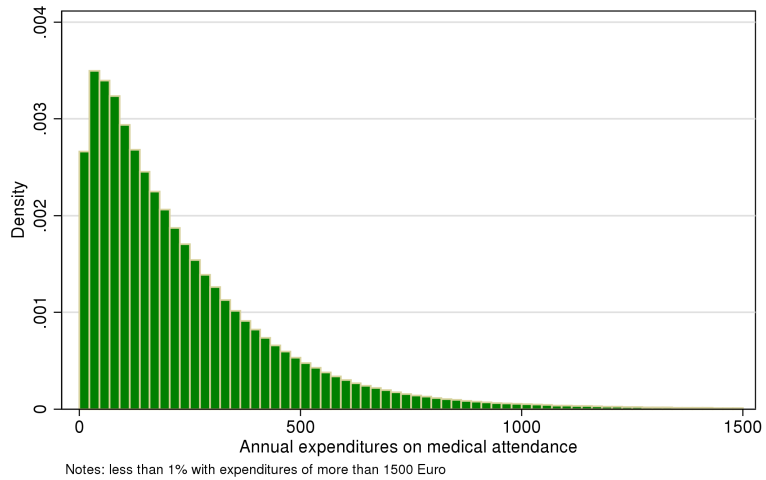
Notes: [a] Austria has a long tradition of sick leave insurance. One week of paid sick leave has been introduced already in 1917 in the General Civil Code (RGBl. 69/1916). For white-collar workers a more generous tenure-based sick-pay scheme exists since 1921 (BGBl. 292/1921 AngG). Until 1974 blue-collar workers were eligible only for one week of paid sick leave.

Figure B.1: Distribution of health indicators

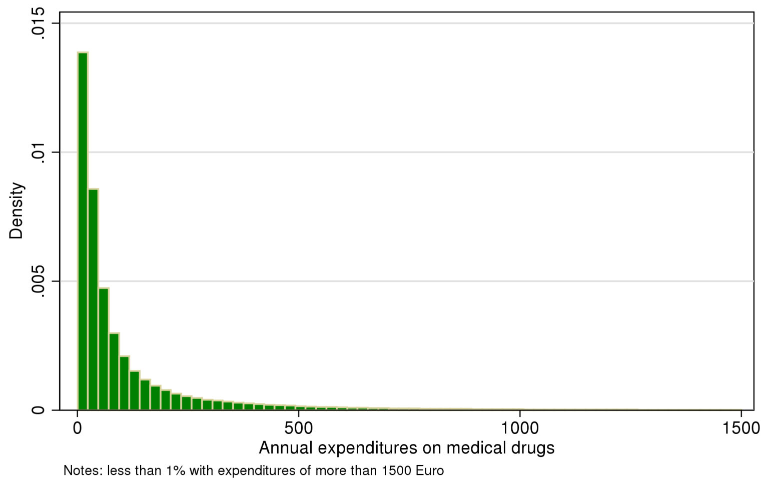
(a) Annual total outpatient expenditures



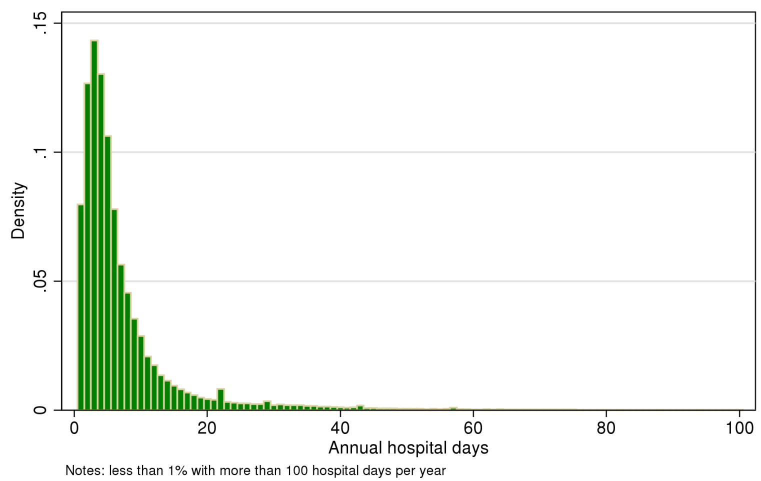
(b) Annual expenditures on medical attendance



(c) Annual expenditures on medical drugs



(d) Annual hospital days



Notes: Each graph excludes observations with zero expenditures (days). These amount to 11.5% in case of total outpatient expenditures, 12.1% in case of expenditures on medical attendance, 33.5% in case of expenditures on medical drugs and 85.8% in case of hospital days.

Figure B.2: Sensitivity analysis—first stage results: Alternative definition of the instrumental variables

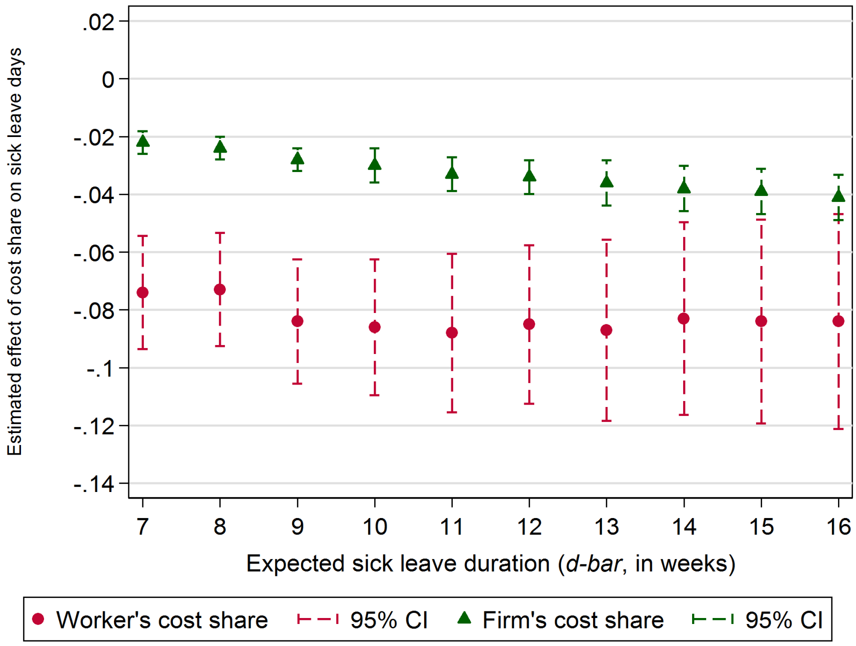
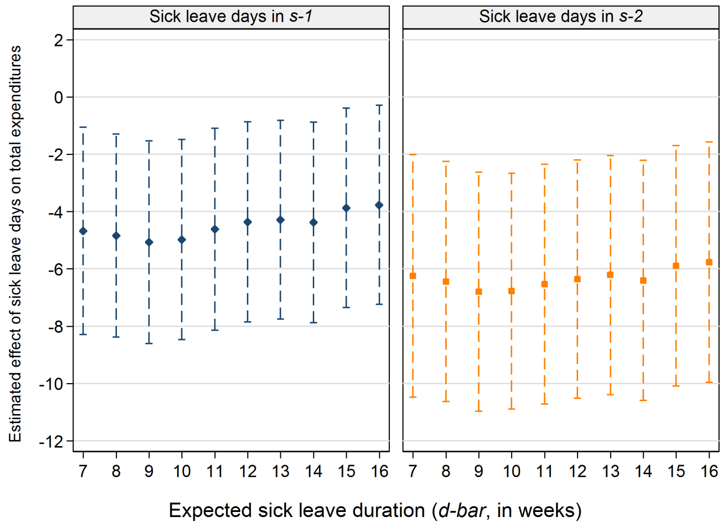
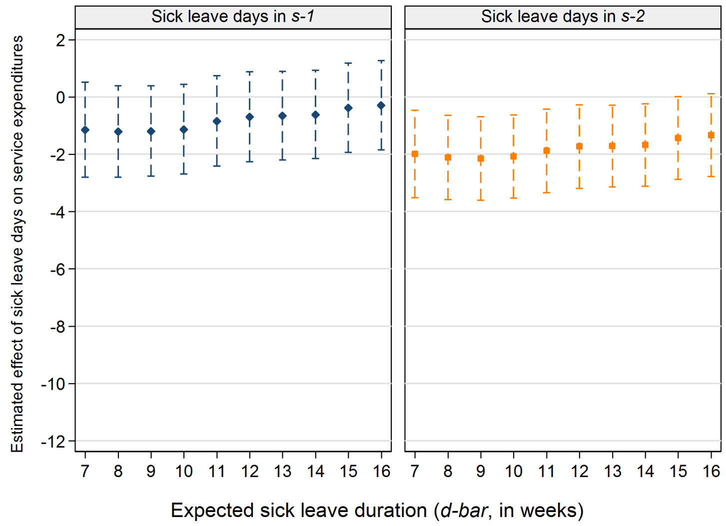


Figure B.3: Sensitivity analysis—second stage results: Alternative definition of the instrumental variables

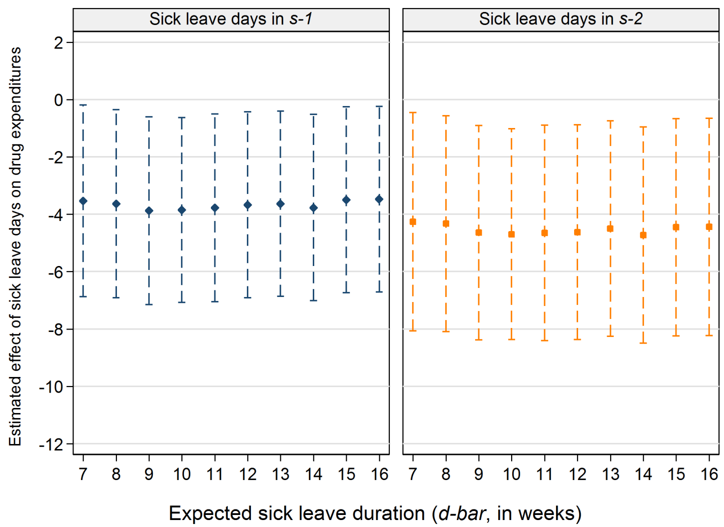
(a) Annual total outpatient expenditures



(b) Annual expenditures on medical attendance



(c) Annual expenditures on medical drugs



(d) Annual hospital days

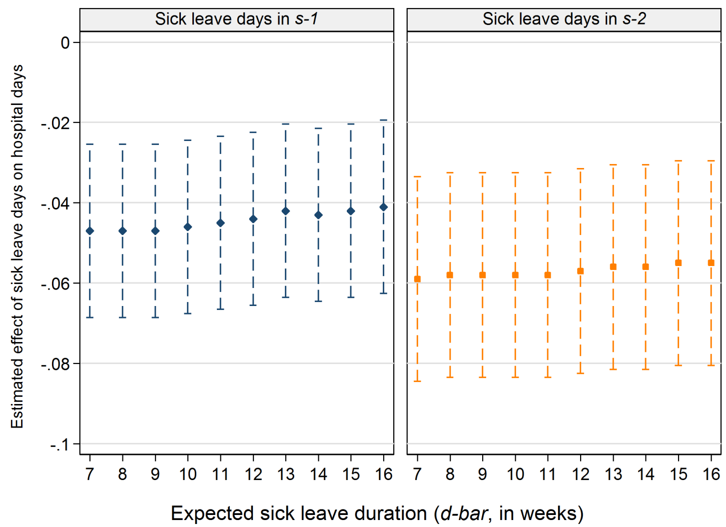


Table B.2: The effect of cost shares on absence behavior (1st stage) — conditional on wages[a]

	(I)
Worker's cost share in s	-0.056***
	(0.018)
	[-0.54%]
Firm's cost share in s	-0.035***
	(0.004)
	[-0.34%]
Number of observations	4,818,728
Mean of dep. var.	10.423

[a] This table summarizes estimation results of cost shares on absence behavior. For further information, see Table 3. The set of basic covariates additionally includes the real daily wage (annual wage divided by employment days).

Table B.3: The effect of cost shares on health (reduced forms) — conditional on wages[a]

	Total outpatient expenditures	Medical attendance	Medical drugs	Hospital days
PANEL A:				
Worker's cost share in $s-1$	2.700***	1.554***	1.146**	0.014***
	(0.585)	(0.259)	(0.523)	(0.004)
	[0.79%]	[0.69%]	[0.99%]	[1.13%]
Firm's cost share in $s-1$	0.552***	0.265***	0.288***	0.003***
	(0.114)	(0.055)	(0.105)	(0.001)
	[0.16%]	[0.12%]	[0.25%]	[0.24%]
Number of observations	4,818,728	4,818,728	4,818,728	4,818,728
Mean of dep. var.	342.191	226.806	115.385	1.241
PANEL B:				
Worker's cost share in $s-2$	2.298***	1.388***	0.910	0.014***
	(0.658)	(0.298)	(0.568)	(0.004)
	[0.63%]	[0.58%]	[0.73%]	[1.07%]
Firm's cost share in $s-2$	0.527***	0.259***	0.268**	0.004***
	(0.127)	(0.057)	(0.114)	(0.001)
	[0.15%]	[0.11%]	[0.21%]	[0.30%]
Number of observations	4,368,676	4,368,676	4,368,676	4,368,676
Mean of dep. var.	363.355	238.530	124.826	1.313

[a] This table summarizes estimation results of lagged cost shares on different health indicators. For further information, see Table 4. The set of basic covariates additionally includes the real daily wage (annual wage divided by employment days). Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.

Table B.4: The effect of policy-induced changes in sick leave on health (2nd stages) — conditional on wages[a]

	Total outpatient expenditures	Medical attendance	Medical drugs	Hospital days
PANEL A:				
Sick leave days in $s-1$	-3.761**	-0.092	-3.669**	-0.041***
	(1.817)	(0.813)	(1.698)	(0.011)
	[-1.10%]	[-0.04%]	[-3.17%]	[-3.30%]
Number of observations	4,806,828	4,806,828	4,806,828	4,806,828
Mean of dep. var.	342.191	226.806	115.385	1.241
Kleibergen-Paap Wald rk F	72.630	72.630	72.630	72.630
PANEL B:				
Sick leave days in $s-2$	-6.047***	-1.214	-4.833**	-0.056***
	(2.228)	(0.761)	(2.014)	(0.013)
	[-1.66%]	[-0.51%]	[-3.87%]	[-4.27%]
Number of observations	4,357,264	4,357,264	4,357,264	4,357,264
Mean of dep. var.	363.355	238.530	124.826	1.313
Kleibergen-Paap Wald rk F	65.782	65.782	65.782	65.782

[a]This table summarizes estimation results of the effect of policy-induced sick leave changes on health outcomes. For further information, see Table 5. The set of basic covariates additionally includes the real daily wage (annual wage divided by employment days). Robust standard errors (allowing for clustering on a firm-level and heteroskedasticity of unknown form) are in parentheses below. *, **, and *** indicate statistical significance at the 10-percent, 5-percent, and 1-percent level, respectively.