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Alcohol consumption and sickness absence: evidence from microdata

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Background: Aggregate time-series evidence has shown that overall per capita alcohol consumption is associated with sickness absence. This study re-examines the relationship between alcohol consumption and sickness absence by using individual-level microdata and methods that yield results which are less likely to be due to spurious correlations. **Methods:** Data on sickness absence and alcohol consumption for 18 Finnish regions over the period 1993–2005 was used. Sickness absence was measured as the number of sickness absence days during 1 year. Alcohol consumption was measured as the number of alcohol drinks consumed per week. The individual-level relationship between alcohol consumption and sickness absence was estimated by using Poisson regression models. Unobserved determinants of lifestyle behaviours associated with the region and survey year were controlled for. Personal characteristics as well as the clustering of observations by regions were also taken into account. **Results:** The estimates show that alcohol consumption is associated with sickness absence. The positive relationship between alcohol consumption and sickness absence is particularly pronounced for low-educated males. **Conclusions:** Aggregate time-series evidence for the relationship between alcohol consumption and sickness absence is confirmed by using individual-level microdata. The policy lesson is that it is important to take into account the effects of alcohol consumption on the prevalence of sickness absence (i.e. labour supply on an intensive margin) when one is considering the level of taxation of alcoholic beverages.

Keywords: alcohol consumption, sickness absence, Poisson models

Sickness absence constitutes a substantial loss of actual working time. It is therefore not surprising that there is a growing number of studies that have evaluated the factors that have an influence on sickness absences.[1–2] Within economics, particular emphasis has been put on the effects of the design of the sickness insurance system on sickness absence. Owing to the high prevalence of sickness absence in Sweden, quite a large amount of research has been done by using data from that country.[3–4]

Research has also shown that health behaviour has a bearing on sickness absence. In particular, heavy drinkers have substantially higher rates of sickness absence.[5–6] However, it has been an open question as to whether the relationship between alcohol consumption and sickness absence prevails at more moderate levels of alcohol use. In fact, in the literature, disagreement exists regarding the effects of moderate alcohol consumption on labour market outcomes, such as wages or employment. On the one hand, there is research that argues that moderate alcohol consumption may be beneficial for wages.[7–8] On the other hand, some authors are more cautious.[9]

In an important recent contribution, it is argued through the use of aggregate time-series evidence from Sweden over the period 1935–2002 that overall per capita alcohol consumption is strongly associated with sickness absence.[10] Alcohol consumption turns out to be an essential determinant of sickness absence in Sweden, even when taking into account the effects of unemployment.

Nevertheless, time-series evidence is rarely conclusive, because it is possible that there is some third factor (such as the shifts in preferences over time) that has an influence on both per capita alcohol consumption and sickness absence that cannot be taken into account in the models. For this reason, the time-series association between the variables of interest can be spurious. The analyses based on individual-level microdata are therefore useful complements to time-series analyses: the risk of spurious correlations is lower. The aim of this article is to estimate individual-level models to examine whether there is a positive relationship between the number of alcohol drinks consumed in a week and the number of sickness absence days in 1 year. In contrast to time-series evidence, we are able to control for unobserved determinants of lifestyle behaviours associated with the region and survey year. Our empirical approach is similar to the one adopted to study the effect of overall economic conditions on health and health behaviour.[11] The sickness insurance system in Finland remained unchanged during our period of analysis 1993–2005.

The Finnish case is interesting, because alcohol consumption has severe negative health consequences in Finland (including morbidity and mortality).[12] In particular, alcohol-related mortality increased by 16% among men and by 31% among women over the period 2004–05 after a large reduction in the price of alcohol in 2004.[13] As a result, alcohol killed more Finns aged 15–64 years than cardiovascular disease or cancer did in 2005.[14] There has also been a considerable increase in sickness absence since the early 1990s. Sickness absence is an important indirect cost of alcohol consumption from a societal perspective.[15] The issue is policy-relevant, because taxes are being used as an instrument to influence alcohol consumption.[16] Taxation influences the overall price level of wines and spirits in all Nordic countries and real prices have a substantial influence on the consumption of alcoholic beverages.[17]

Methods

Sample

The data on individuals' health that we are using originates from *Health Behaviour and Health among the Finnish*

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Table 1 Variable definitions and descriptive statistics

Variable	Definition/explanation	Average (SD)	
		Females	Males
Dependent variable			
Sickness absences	The number of days absent from work owing to sickness during 1 year	9.05 (20.7)	7.94 (21.1)
Independent variables			
Drinks per week	The number of alcohol units consumed per week (1 unit = a drink of 4 cl)	3.54 (4.9)	8.81 (10.7)
Regional unemployment	The sex-specific regional unemployment rate[a]	14.77 (5.0)	15.96 (5.6)
Individual-level controls			
Age	Age in years	38.70 (12.5)	39.08 (12.4)
Married	Person is married or cohabiting, otherwise 0	0.64	0.63
Education	Years of education (including all education levels)	13.06 (3.5)	12.60 (3.6)

a: Source: Labour Force Surveys by Statistics Finland.

Population conducted by the National Public Health Institute.[18] The surveys started in 1978. They have been repeated annually, using samples of 5000 randomly selected 15- to 64-year-old permanently resident citizens. Hence, these repeated cross-sectional surveys constitute a representative sample of Finns. The sample frame excludes non-citizens, roughly 4% of the population. The survey was carried out as a postal questionnaire. On average, 73% of those targeted responded. The core questions have remained the same over the years.

Information on sickness absence is available over the period 1993–2005. Sickness absences are self-reported, but there is no particular reason to believe that workers gave systematically biased answers to this particular question, because their identity was not revealed to their employers after the survey. The survey also contains information on short sickness absences that are not recorded by the Finnish Social Insurance Institution (KELA), which pays out sickness benefits to the affected workers. The reason for this is that short sickness absences do not entitle workers to payment of sickness benefits, but they obtain normal pay from the employers. This is essential, because most of the sickness absences are presumably short. Unfortunately, it is not possible to compare our self-reported measure of sickness absence from *Health Behaviour and Health among the Finnish Population* with information published by Statistics Finland, because Statistics Finland uses the data supplied by KELA. Furthermore, relevant socio-economic background variables such as sex and education, important for sickness absence, are reported in the survey. As we are investigating sickness absence, we are including only those who are working during a year, because those not working cannot be absent from work.

To control for the effect of economic conditions on sickness absence we link the data, using information on individuals' residence, to the regional economic data compiled by Statistics Finland. The level of aggregation used is the 18 provinces that correspond to the NUTS3 regions stipulated by the European Union. Because there are 18 provinces and we are taking advantage of the survey over the period 1993–2005, we have 234 observations for the variable that captures economic conditions. Regional unemployment is included in all models among the explanatory variables, because the evidence from other Nordic countries shows that unemployment is an important determinant of sickness absences.[1,19] As a robustness check, we also use the region- and time-specific real disposable income per capita.

The variables that we are using are described in table 1. Females, on average, have a larger number of sickness absence days than males (table 2). It has become a stylised fact of the literature that females have higher sickness absence rates.[1]

Table 2 Average number of sickness absence days by year and sex

Year	Females	Males
1993	6.79	7.61
1994	8.84	6.70
1995	8.58	7.24
1996	7.90	8.44
1997	9.86	7.47
1998	7.53	7.56
1999	9.44	8.20
2000	8.42	8.98
2001	10.61	8.41
2002	9.63	7.53
2003	10.78	7.17
2004	8.14	7.73
2005	10.24	10.01

Source: Authors' calculations from *Health Behaviour and Health among the Finnish Population*.

There has also been a considerable increase in sickness absence over the period, both for females and males (table 2).

Empirical modelling

The individual-level models that we estimate have the following structure:

$$Y_{ijt} = \alpha_j + \delta D_{ijt} + \eta M_{jt} + \beta X_{ijt} + \lambda_t + \varepsilon_{ijt}$$

where Y_{ijt} is the outcome (the number of sickness absence days during 1 year) for individual i living in region j in year t. The D_{ijt} represents the variable of interest, which is the number of alcohol units consumed per week (1 unit = a drink of 4 cl). The M_{jt} is the region- and time-specific measure of the economic conditions (i.e. regional unemployment). The X_{ijt} is a vector of relevant individual-level controls. The α_j and λ_t represent unobserved determinants of lifestyle behaviours associated with the region and survey year. The ε_{ijt} is an error term. We assume that the error term follows a Poisson distribution, as our dependent variable, the number of sickness absence days during 1 year, is of a count nature and it is skewed to the right.[20] Poisson regression models the log of the expected count as a function of the predictor variables.

We report all estimates for females and males together as a pooled sample (with an indicator for females) as well as separately for females and males. Because of social norm and occupational structure differences between females and males, it is interesting to analyse females and males separately, too. By estimating the models separately for females and males, we allow that the same independent variables have different coefficients for females and males.

Table 3 The estimation results for the number of sickness absence days

	Full sample			Low-educated sample (individuals with <10 years of education)		
	Both sexes	**Females**	**Males**	**Both sexes**	**Females**	**Males**
Drinks per week	0.042 (3.75)***	0.076 (2.55)**	0.036 (2.68)**	0.084 (3.13)**	0.066 (0.59)	0.093 (2.95)**
Regional unemployment	0.136 (1.78)*	0.361 (2.15)**	0.004 (0.02)	0.469 (2.14)**	1.444 (2.38)**	−0.087 (−0.17)
Female	1.696 (6.17)***			1.988 (3.31)**		
Age	0.042 (1.08)	0.107 (1.48)	−0.075 (−0.81)	0.028 (0.36)	0.451 (2.68)**	−0.336 (−1.97)**
Age^2	0.000 (0.44)	0.000 (0.47)	0.001 (1.24)	0.001 (1.24)	−0.004 (−1.85)*	0.006 (2.87)**
Married	−1.168 (−3.87)***	−1.943 (−4.36)***	−0.057 (−0.13)	−1.573 (−1.20)	−3.649 (−3.01)**	0.631 (0.30)
Education	−0.511 (−17.47)***	−0.420 (−9.55)***	−0.619 (−16.74)***	−0.177 (−0.48)	0.549 (1.54)	−0.709 (−1.29)
Regional indicators	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes
N	30 062	16 187	13 875	5466	2691	2755

Notes: Marginal effects reported. Robust *t*-statistics in parentheses (clustering by region). Estimation method: Poisson regressions.
*: Significant at 10%; **Significant at 5%; ***Significant at 1%. The overall regional unemployment rate is used in Columns 1 and 4. The sex-specific regional unemployment rate is used in Columns 2–3 and 5–6.

Results

In all our Poisson regression results for the full sample, a larger number of alcohol drinks consumed per week is associated with a higher number of sickness absence days during 1 year (table 3). The relationship is stronger for females than it is for males in the full sample (table 3, Columns 2–3). When analysing sickness absences only for the individuals that have <10 years of education, we find that the relationship for both sexes is stronger than in the full sample, but the relationship for females is no longer statistically significant (table 3, Columns 4–5). The positive relationship between alcohol consumption and sickness absence is therefore particularly pronounced for low-educated males (table 3, Column 6). In terms of magnitude, the estimated effect for alcohol drinks in Column 6 means that if a low-educated male were to increase his number of drinks per week by one drink, the difference in the logs of the expected count would increase by 0.093 units, while holding the other variables in the model constant.

Sickness absences for both sexes combined and for females are more common in the regions of higher unemployment. This is not in accordance with the observations from other Nordic countries.[1,19] One apparent explanation for this pattern is that the regional and year indicators in our regressions capture the variation in the regional unemployment rates to a great extent, because regional unemployment differences in Finland are largely permanent.

The effects of other explanatory variables are not surprising. The indicator for females is positive and statistically significant (table 3, Columns 1 and 4). This replicates the finding in table 1. Being married is in most regressions associated with fewer sickness absences. Also, we find strong evidence that better educated individuals are more seldom away from work due to sickness.

To examine the robustness of our findings, we have re-run our regressions by using alternative specifications. First, we used the region- and time-specific real disposable income per capita as an alternative variable to capture economic conditions. Second, we included region-specific time trends in the regressions. In these models, the effects for the number of alcohol drinks consumed were virtually unchanged compared with the estimates presented in Columns 1–3 of table 3.

Discussion

This article examines the relationship between alcohol consumption and sickness absence. We take advantage of individual-level microdata from Finland over the period 1993–2005. The repeated cross-sectional data allows us to control for unobserved determinants of lifestyle behaviours associated with the region and survey year. This has not been possible in the previous research that has used aggregate time-series models.

The most important finding is that alcohol consumption is associated with sickness absence. Aggregate time-series evidence from Sweden[10] is therefore confirmed by the use of individual-level microdata. Interestingly, the positive relationship between alcohol consumption and sickness absence is particularly pronounced for low-educated males. These observations carry a lesson that has been neglected in policy discussions. Based on the results, it is important to take into account the effects of alcohol consumption on the prevalence of sickness absence (i.e. labour supply on an intensive margin) when considering the level of taxation of wines and spirits.

One limitation of our approach is that we did not explore the question of causality. This would require an instrumental variables strategy, involving instruments that would predict alcohol consumption but not sickness absence days. Another limitation is that our data do not record how long the individual spells of sickness absences are. We were therefore not in a position to estimate duration models.

Key points

- Aggregate time-series evidence has shown that overall per capita alcohol consumption is associated with sickness absence, even when taking into account the effects of unemployment.
- This study re-examines the relationship between alcohol consumption and sickness absence by using individual-level microdata and methods that yield results which are less likely to be due to spurious correlations.
- The results show that alcohol consumption is associated with sickness absence, and particularly so for low-educated males. Therefore, the aggregate time-series evidence is confirmed in a microdata setting.

References

1 Holmlund B. Sickness absence: an introduction. *Swedish Econ Pol Rev* 2004;11:3–8.

2 Barmby T, Ercolani M, Treble J. Sickness absence: an international comparison. *Econ J* 2004;112:1–17.

3 Henrekson M, Persson M. The effects on sick leave of changes in the sickness insurance system. *J Lab Econ* 2004;22:87–113.

4 Larsson L. Sick of being unemployed? Interactions between unemployment and sickness insurance. *Scand J Econ* 2006;108:97–113.

5 Persson J, Magnusson P. Sickness absenteeism and mortality in patients with excessive drinking in somatic out-patient care. *Scand J Prim Health Care* 1989;7:211–17.

6 Holder DH, Blose JO. A comparison of occupational and nonoccupational disability payments and work absences for alcoholics and nonalcoholics. *J Occup Health* 1991;33:453–57.

7 Shields M. The impact of alcohol consumption on occupational attainment in England. *Economica* 2001;68:427–53.

8 French M, Zarkin G. Is moderate alcohol use related to wages? Evidence from four worksites. *J Health Econ* 1995;14:319–44.

9 Johansson E, Alho H, Kiiskinen U, Poikolainen K. Abstaining from alcohol and labour market underperformance—Have we forgotten the ''dry'' alcoholics? *Alcohol Alcohol* 2006;41:574–79.

10 Norström T. Per capita alcohol consumption and sickness absence. *Addiction* 2006;110:1421–7.

11 Ruhm C. Are recessions good for your health? *Quart J Econ* 2000;115:617–50.

12 Herttua K, Mäkelä P, Martikainen P. Differential trends in alcohol-related mortality: a register-based follow-up study in Finland in 1987–2003. *Alcohol Alcohol* 2007;42:456–64.

13 Herttua K, Mäkelä P, Martikainen P. Changes in alcohol-related mortality and its socioeconomic differences after a large reduction in alcohol prices: a natural experiment based on register data. *Am J Epidemiol* 2008;168:1110–18.

14 Statistics Finland. *Kuolemansyyt 2005*. Helsinki: Statistics Finland, 2006.

15 Lehto J. Economics of alcohol. *Addiction* 1997;92:S55–9.

16 Anttila A-H, Sulkunen P. The inflammable alcohol issue: alcohol policy argumentation in the programs of political parties in Finland, Norway and Sweden from the 1960s to the 1990s. *Contemp Drug Probl* 2001;28:49–86.

17 Leppänen K, Sullström R, Suoniemi I. *The Consumption of Alcohol in Fourteen European Countries. A Comparative Econometric Analysis*. Helsinki: National Research and Development Centre for Welfare and Health (STAKES), 2001.

18 Helakorpi S, Patja K, Prättälä R, Uutela A. *Suomalaisen aikuisväestön terveyskäyttäytyminen ja terveys*. Helsinki: National Public Health Institute, Series B18, 2005.

19 Askildsen JE, Bratberg E, Nilsen ØA. Unemployment, labour force composition and sickness absence: a panel data study. *Health Econ* 2005;14:1087–101.

20 Wooldridge J. *Econometric Analysis of Cross Section and Panel Data*. Cambridge: The MIT Press, 2002.

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