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ALCOHOL MORTALITY, DRINKING BEHAVIOUR,

AND BUSINESS CYCLES:

ARE SLUMPS REALLY DRY SEASONS?

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ABSTRACT: This paper explores the connection between alcohol mortality, drinking behaviour and macroeconomic fluctuations in Finland by using both aggregate and micro-level data during the past few decades. The results from the aggregate data reveal that an improvement in regional economic conditions measured by the employment-to-population rate produces a decrease in alcohol mortality. However, the great slump of the early 1990s is an exception to this pattern. During that particular episode, alcohol mortality did indeed decline, as there was an unprecedented collapse in economic activity. The results from the micro-data show that an increase in the employment-to-population rate and expansion in regional GDP produces an increase in alcohol consumption while having no effect on the probability of being a drinker. All in all, the Finnish evidence presented does not overwhelmingly support the conclusions reported for the USA, according to which temporary economic slowdowns are good for health. In contrast, at least alcohol mortality seems to increase in those bad times that are not exceptional economic crises like the one experienced in the early 1990s. However, there is evidence that alcohol consumption is strongly procyclical by its nature. This suggests that alcohol consumption and mortality may be delinked in the short-run business cycle context.

JEL: E32, I12, R11
KEY WORDS: alcohol mortality, drinking, business cycles

TIIVISTELMÄ: Tutkimuksessa tarkastellaan alkoholikuolleisuuden, juomakäyttäytymisen ja suhdannevaihtelujen välistä yhteyttä Suomessa käyttäen makro- ja mikrotason aineistoja viimeisen kahdenkymmenen vuoden ajalta. Makrotason aineiston valossa alueellisen työllisyysasteen paraneminen alentaa alkoholikuolleisuutta. 1990-luvun suuri lama on kuitenkin poikkeus tässä suhteessa, sillä tuolloin alkoholikuolleisuus aleni talouden taantuessa voimakkaasti. Mikrotason aineistosta saatujen tulosten mukaan alueellisen työllisyysasteen paraneminen ja alueellisen BKT:n kasvun ripeytyminen kasvattavat alkoholin kulutusta. Suhdannevaihteluilla ei ole sitä vastoin lainkaan vaikutusta niiden suomalaisten osuuteen, jotka ovat raittiita. Tulokset eivät siten ole täysin sopusoinnussa aiemmin Yhdysvalloista saatujen tulosten kanssa, joiden mukaan tilapäiset taloudelliset taantumat ovat hyväksi ihmisten terveydelle. Suomen tulosten valossa näyttää pikemminkin siltä, että alkoholikuolleisuus yleistyy taloudellisten taantumien aikana, jotka eivät ole poikkeuksellisia talouskriisejä kuten Suomen 1990-luvun alun lama. Alkoholikulutus on sitä vastoin selvästi myötäsyklistä. Tämän tähden alkoholikulutus ja toisaalta alkoholikuolleisuus eivät ole välttämättä tiukassa yhteydessä suhdannevaihtelujen aikajänteellä.

JEL: E32, I12, R11
AVAINSANOJA: alkoholikuolleisuus, alkoholikulutus, suhdanteet

1   Introduction

Economic conditions matter for health. This notion has produced a strand of literature. The results are mixed. The first empirical studies based on time-series analysis revealed a positive relationship between measures of health and economic conditions (Brenner, 1973; 1975; 1979). However, many authors concluded that these studies suffer from serious technical problems (Gravelle, Hutchinson & Stern, 1981; Stern, 1983; Wagstaff, 1985). Studies that have tried to control for the shortcomings have usually failed to find a consistent relationship between health and economic conditions (Forbes & McGregor, 1984; McAvinchey, 1994; Joyce & Mocan, 1993). Recent studies for developed countries have, surprisingly, found a negative relationship between economic conditions and health (Ruhm, 2000; 2003a, 2003b; Neumayer, 2004).[1] There is substantial evidence that mortality declines in slumps. These studies use fixed-effects (FE) models in order to exploit within-region changes in macroeconomic conditions that automatically control for time-invariant factors that may be spuriously correlated with economic conditions across regions.

Furthermore, some of these newer studies have also not only used fixed regional effects on aggregate regional data, but individual microdata as well (Ruhm, 2003b; Ruhm & Black, 2002). Physical health seems to improve during bad times. Ruhm (2003b) asks whether these improvements in health during bad economic times arise owing to changes in health behaviour. Using US microdata from the Behavioural Risk Factor Surveillance System 1987-2000, he shows that smoking, body-mass index, and leisure-time physical inactivity decline when economic conditions worsen. In addition, drinking seems to decrease during temporary economic slowdowns. Ruhm and Black (2002) argue that this pattern arises owing to the decline in alcohol use among heavy consumers. These are all provocative claims, because they challenge the conventional wisdom according to which economic progress is always and everywhere good for one's health.[2]

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[1]   Ruhm (2005) provides a survey of this literature.
[2]   It should be noted, however, that there are some studies (e.g., Dee, 2001) that report that binge drinking, i.e. the consumption of large amounts of alcohol on the same occasion is strongly countercyclical. Such a result supports the hypothesis that drinking, at least binge drinking, is sometimes used as a form of self-medication in time of psychological stress.

This paper focuses on the relationship between alcohol mortality, drinking behaviour and macroeconomic fluctuations in Finland.[3] We use both aggregate and micro-level data for the past few decades to pursue the issue at hand. The connection between drinking behaviour and business cycles is a complex one, because there are a number of different factors at work at the same time. For instance, drinking may decrease in slumps, because people have less money to spend on alcohol along with other items of consumption. In addition, there may be less work-related stress during economic slowdowns, which induces less drinking among workers. On the other hand, the unemployment that typically soars during slumps can stimulate consumption of alcohol among unemployed persons. In this paper, we do not make an attempt to disentangle those different effects that may have an impact on drinking behaviour. The aim of this paper is more modest; we aim to provide a comprehensive picture of the connection between alcohol mortality, drinking behaviour and macroeconomic fluctuations based on the data sets that are well-suited to give an answer to that particular question.

By investigating the effects of macroeconomic conditions on alcohol mortality and drinking behaviour in Finland, we aim to increase the understanding of these matters in several ways. First, these matters have not been investigated in Finland before, and it is not clear that the US results on alcohol mortality and drinking behaviour are also valid in other countries such as in Finland. There are a number of reasons for this. There may be some differences in the way in which people react to changes in macroeconomic fluctuations across countries. In addition, there was an extreme economic slowdown in Finland during the early 1990s. The national unemployment rate rose very rapidly from 3 to 17 per cent. This makes it possible to investigate the issue during a very deep economic crisis, which is not a possibility with data from very many countries. Second, this study is interesting because of the relatively large regional differences in economic outcomes and health in Finland. In this respect, this study will complement and expand earlier studies of regional health differences in Finland (e.g. Vartiainen, Puska, Jousilahti, Korhonen, Tuomilehto & Nissinen, 1995) by incorporating the effects of economic conditions into the analysis. In particular, the prevalence of large regional disparities is helpful in identifying the effects of business cycle fluctuations on alcohol mortality and drinking behaviour. Third, since

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[3] There has been quite a large amount of research on socio-economic differences in mortality within a sociological tradition in Finland. Perhaps the most well-known paper in this literature is Martikainen and Valkonen (1996). There has also been some research concerning alcohol mortality (e.g., Mäkelä, 1998; Martikainen et al., 2001). These studies, however, for the most part, focus on the difference in various types of mortality between socio-economic groups, and they do not directly estimate the impact of business cycle fluctuations on mortality. A paper on the relationship between unemployment and overall mortality in a style more familiar to economists is Jäntti et al. (2000).

the data sets we use in this study cover a longer time span (1975-2002) than the earlier data used in this strand of the literature, we are in a better position to investigate the effects of the business cycle, as there are a greater number of macroeconomic peaks and troughs in our data sets. Fourth, we provide evidence on the issue based on both aggregate data and micro-level data. It has been common to use either aggregate data or micro-level data in the literature.

The paper is organised as follows. Section 2 provides a description of the data sets. Section 3 reports the estimation results. The last section concludes.

2 The data

The aggregate data on alcohol mortality originates from Statistics Finland.[4] The data is comprehensive and is based on registers that cover all Finns. The data spans the period 1975-2001. Alcohol mortality is measured in this study by deaths per 100 000 inhabitants. There are large disparities in alcohol mortality across the Finnish regions (Fig. 1). The average alcohol mortality over the period 1975-2001 is around two-times higher in certain parts of the country compared with the region of Pohjanmaa, in which it is at the lowest level. Thus, there are large permanent regional differences across regions that have to be taken into account in the estimation of the models. Fig. 2 documents the relationship between the employment-to-population rate in the Finnish economy and overall alcohol mortality for the period 1975-2001. This figure reveals that alcohol mortality seemed to decline a lot during the great slump of the early 1990s.

The micro-level data we are using in this study is Health Behaviour and Health Among the Finnish Population conducted by the National Public Health Institute. This survey has been conducted annually since 1978. The data is repeated cross-section data; around 5000 randomly selected 15-64-year-old individuals are included every year. The survey is conducted as a postal questionnaire. The data set contains detailed questions on drinking behaviour and the questions have remained the same over the period. In addition, socioeconomic background variables such as age, education and marital status that are important for the drinking behaviour of individuals based on the literature are recorded in the survey. We include those particular variables as controls in the estimated models.

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[4]   Alcohol mortality is defined as deaths from alcohol-related diseases and alcohol poisoning. Using the ICD10 (1998-) classification, this refers to the following classes: F10, G312, G4051, G621, G721, I426, K292, K70, K860, O354, P043, X45.

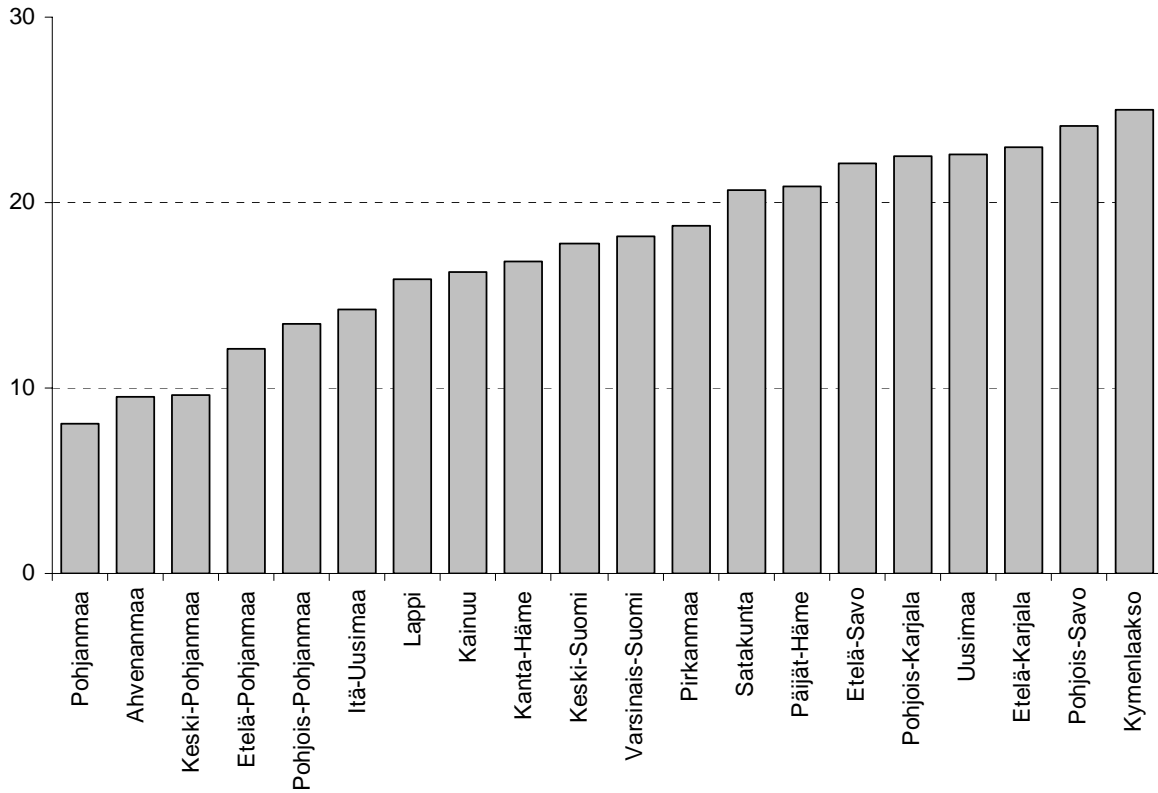**Fig. 1. Average alcohol mortality 1975-2001 per region (deaths per 100 000 inhabitants)**

Fig. 2. The employment-to-population rate and alcohol mortality in Finland 1975-2001

Note: Both series are de-trended and normalised to having an average of 0 and a standard deviation of 1.

To examine the effect of economic conditions, we link these data sets, using information on individuals' place of residence, to data from regional national accounts produced by Statistics Finland. Individuals' residence is aggregated to twenty provinces that correspond to the so-called NUTS3 regions stipulated by the European Union. Recently constructed regional national accounts by Statistics Finland are available from 1975. This means that we are in a good position to investigate the relationship between alcohol mortality, drinking behaviour and macro-economic conditions, because the time span of the data includes a number of business cycle fluctuations.

Macroeconomic fluctuations are measured by the regional employment-to-population rate and by the change in regional real GDP in this study. The unemployment rate has been favoured as a measure of economic conditions in most of the previous literature. Unfortunately, the regional unemployment rates are not available for the entire period of investigation in our case. Further, some authors, e.g. Clark and Summers (1982), have argued that the employment-to-population rate is a better measure of labour market conditions for groups that frequently enter and exit the labour market. The reason for this that these entries and exits to the labour market do not change the size of population, but they do change the size of the labour force. This means that the employment rate is more stable measure than the unemployment rate. This point is relevant, because Ilmakunnas and Maliranta (2003) report that the turnover of jobs and workers was intensive in the Finnish economy during the turbulent 1990s.

3   Empirical strategy and results

Econometrically, we estimate models of the following type for the micro-data:

$$Y_{ijt} = \alpha_j + \beta X_{ijt} + E_{jt} + \lambda_t + \varepsilon_{ijt}$$

where Y is the outcome (measures of drinking behaviour) for individual i living in region j in year t. X is a vector of individual characteristics (such as age and education), E measures economic conditions (the employment-to-population ratio or the growth rate of regional real GDP), ε is an error term, and α and λ represent unobserved determinants of lifestyle behaviours associated with respectively, the region and the survey year. The fixed effects for regions are important, because there are large, permanent differences in alcohol mortality and drinking behaviour across the Finnish regions. Some of these differences may arise, for in-

stance, from the varying strictness of prevailing religious attitudes and other preferences towards drinking. Thus, in this FE set-up, the effects of macroeconomic fluctuations are identified by intra-region variations, relative to the corresponding changes in other regions.[5] For aggregate data on alcohol mortality, we estimate FE models that are otherwise similar, in order to explain (the log of) alcohol mortality, but naturally we are unable to include individual-level controls. Controls for gender structure of the regions are included in the models, instead.

The estimation results reported in Tables 1-2 reveal that an improvement in regional economic conditions measured by the employment-to-population rate produces a decrease in alcohol mortality over the period of investigation, other things being equal. However, the great slump of the early 1990s is a clear exception to this pattern. During that particular episode, alcohol mortality did decline, as there was an unprecedented collapse in economic activity. This estimation result is in line with figure 2.

Table 1. The effect of macroeconomic fluctuations on alcohol mortality for the population between 16 and 65

	1975-2001	1975-1987	1988-2001	1990-1996
Employment-to-population rate	-0.024	-0.032	-0.004	0.119
	(-2.24)*	(-1.28)	(-0.23)	(3.18)*
N	536	280	256	140
Regional GDP growth	-0.625	-0.590	-0.387	0.409
	(-1.34)	(-1.10)	(-0.48)	(0.56)
N	516	280	236	140

Notes: Dependent variable is the natural logarithm of alcohol mortality per 100 000 inhabitants per region. Regressions include controls for the proportion of the population that is male, year, and region. Robust standard errors are reported in parentheses. They are corrected for clustering by regions. * significant at 5%; ** significant at 1%.

Table 2. The effect of macroeconomic fluctuations on alcohol mortality for the population between 16 and 65, some variations

	1975-2001	1975-2001	1975-2001	1975-2001
Employment-to-population rate	-0.024	-0.037	-0.021	-0.045
	(-2.24)*	(-5.37)**	(-4.52)**	(-8.71)**
N	536	536	536	536
Year dummies	Yes	Yes	No	No
Regional dummies	Yes	No	Yes	No

Note: See notes to Table 1.

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[5]   We take into account the fact that observations are clustered by regions in the calculation of standard errors of estimates. Moulton (1990) has stressed that otherwise standard errors are seriously biased downwards in a data set that combines aggregate variables such regional unemployment on micro units, because there is a correlation of error terms within regions.

The evidence from the micro-data on the probability of being a drinker and the amount of alcohol consumption shows that there is no overall connection between business cycles and the probability of being a drinker in the data after controlling for the respondent's age, education and marital status (Table 3). The only statistically significant results emerge for alcohol consumption. They show that an increase in the employment-to-population rate and an expansion in regional GDP produces a substantial increase in alcohol consumption. This result may be driven by the income effect. Thus, there is some evidence that is in line with the notion that slumps are healthier times.

Table 3. The effect of macroeconomic fluctuations on the probability of being a drinker and alcohol consumption

	1982-2001	1982-1987	1988-2001	1990-1996	1982-2001	1982-1987	1988-2001	1990-1996
Dependent variable	Drinker	Drinker	Drinker	Drinker	No. drinks	No. drinks	No. drinks	No. drinks
Employment-to-population rate	0.001 (0.01)	-0.050 (1.66)	-0.114 (1.09)	-0.084 (0.36)	0.429 (1.46)	0.590 (1.01)	0.481 (1.28)	1.199 (2.14)*
Log of regional GDP growth	0.021 (0.44)	0.019 (1.31)	-0.052 (1.03)	-0.063 (0.82)	0.358 (2.33)*	0.440 (1.30)	0.340 (2.07)*	0.331 (1.40)
N	72947	12004	49861	25160	44496	12275	32221	16545

Notes: A drinker is someone who has reported a positive number of drinks during the survey week. The dependent variable (i.e. number of drinks) is the number of glasses (regular restaurant portions) of the following the respondent has had during the previous week (7 days): beer/free-mixed highballs/strong alcohol, spirits (restaurant portion 4 cl), wine or equivalent. Regressions control for the respondent's age, education and marital status. Regressions contain regional and annual dummies. Regressions in columns 1-4 are probit models. Regressions in columns 5-8 are Tobit models. Robust standard errors are corrected for clustering. Observations are assumed to be clustered by year and region. * significant at 5%; ** significant at 1%.

4 Discussion

This paper explored the relationship between alcohol mortality, drinking behaviour and macroeconomic fluctuations in Finland. This objective was pursued by using both aggregate and micro-level data. The results from the aggregate data reveal that an improvement in regional macroeconomic conditions measured by the employment-to-population rate produces a substantial decrease in alcohol mortality over the period of investigation, other things being equal. However, the great slump of the early 1990s is an interesting exception to this pattern.

During that particular episode, alcohol mortality did indeed decline, as there was an unprecedented collapse in economic activity. This is a rather remarkable result, as it is possible that it is due to the fact that drinking of the kind that leads to death is eventually sensitive to changes in incomes.

The results from the micro-data reveal that an increase in the employment-to-population rate and expansion in regional GDP produces an increase in alcohol consumption while having no effect on the probability of being a drinker. An explanation for this pattern is that soberness may be driven by people's preferences that are immune to temporary business cycle conditions, while alcohol consumption responds positively to the income level that typically increases during good economic times.

The Finnish evidence presented does not overwhelmingly support the conclusions reported for the USA, according to which temporary economic slowdowns are good for health. In contrast, at least alcohol mortality seems to increase in those bad times that are not exceptional economic crises like the one experienced in Finland in the early 1990s, but there is evidence that alcohol consumption is strongly procyclical by its nature. This suggests that alcohol consumption and mortality may be delinked in the short-run business cycle context.

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