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DOES A SLUMP REALLY MAKE YOU THINNER? FINNISH MICRO-LEVEL EVIDENCE 1978–2002

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SUMMARY

This paper explores the relationship between height-adjusted weight and economic conditions in Finland, using individual microdata for the period 1978–2002. If anything, the results reveal that an improvement in regional economic conditions measured by the employment rate produces a decrease in BMI, other things being equal. The Finnish evidence presented does not support the conclusions reported for the USA, according to which temporary economic slowdowns are good for health. In contrast, at least BMI seems to increase during slumps. Copyright © 2006 John Wiley & Sons, Ltd.

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INTRODUCTION

Early time-series studies revealed a positive relationship between measures of health and economic conditions (Brenner, 1973, 1975, 1979). However, these studies suffer from serious technical problems (Gravelle *et al*., 1981; Stern, 1983; Wagstaff, 1985). Empirical studies that have purported to control these shortcomings have failed to find a consistent relationship between health and economic conditions (Forbes and McGregor, 1984; McAvinchey, 1994; Joyce and Mocan, 1993). Recent studies from developed countries have, surprisingly, found a negative relationship between economic conditions and health (Ruhm, 2000, 2003, 2005, 2006; Neumayer, 2004). These latest studies use fixed-effects (FE) models that exploit within-region changes in economic conditions that automatically control for time-invariant factors that are often spuriously correlated with economic conditions across regions. Furthermore, some of these latest studies have not only used fixed-effects models with aggregate regional data, but also individual microdata (Ruhm, 2005; Ruhm and Black, 2002). This evidence suggests that health improves during slumps.

Ruhm (2005) asks whether these improvements in health during economic slowdowns may be due to changes in health behaviour. Using US microdata from the Behavioral Risk Factor Surveillance System 1987–2000, Ruhm (2005) shows that smoking prevalence, body-mass index (BMI), and leisure-time

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physical inactivity decline when economic conditions worsen. One explanation for the finding that the average BMI declines in slumps is that during an economic expansion non-market 'leisure time' becomes more costly, which makes it less worthwhile for the individual to undertake time-consuming health investments. 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.

This paper explores the relationship between height-adjusted weight and economic conditions, using individual microdata from Finland covering the past two and a half decades. By investigating the effects of economic conditions on BMI in Finland, we aim to add to the understanding of the effect of economic conditions on BMI on at least three frontiers. First, these matters have not been studied in Finland before, and it is not clear whether the US results on BMI are valid elsewhere. Although the prevalence of obesity is increasing in Finland, obesity is still much more common in the USA. Second, the Finnish case is interesting because of the relatively large regional differences in economic outcomes and health status. This paper will add to results from earlier studies of regional health differences in Finland (see Nummela *et al.*, 2000) by incorporating the effects of economic conditions. In particular, large regional disparities are helpful in identifying the effects of business cycle fluctuations on health. Third, since the data set that we use in this paper covers a longer time span (1978–2002) than any earlier data used in similar research, 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 set.

Our analysis is structured as follows. Next section provides a description of the data. Penultimate section describes the empirical strategy and reports the estimation results. Last section concludes the paper.

THE DATA

The data on individuals that we are using in this paper comes from surveys conducted at the National Public Health Institute. The surveys on health behaviour started in 1978. They have been repeated annually using samples of 5000 randomly selected 15–64-year-old permanently resident citizens. The sample frame excludes non-citizens, about 4% of the population. The survey is carried out as a postal questionnaire. In average, 73% of those targeted have responded. The core questions have remained the same over the years. The data set contains questions, for example, on height, weight and physical activity. In addition, background variables such as age and education, which are important for health, are included in the survey.

To examine the effect of economic conditions, we link this data set, using information on individuals' places of residence, to data from regional national accounts produced by Statistics Finland. Individuals' places of residence are aggregated to 20 provinces that correspond to the so-called NUTS3 regions stipulated by the European Union. Regional national accounts by Statistics Finland are available from 1975. This means that we are in a good position to investigate the relationship between BMI and economic conditions.

Economic conditions are measured by the regional employment-to-population ratio and by the change in real GDP. The unemployment rate has been favoured as a measure of economic conditions in the literature. However, 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), argue that the employment rate is a better measure of labour market conditions for groups that frequently enter and exit the labour market. The reason for this is that these entries into and exits from the labour market do not change the size of the population, but they do change the size of the labour force. This means that the employment rate is a more stable measure than the unemployment rate.

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EMPIRICAL STRATEGY AND RESULTS

Econometrically, we estimate models of the following type:

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

where Y is the outcome (height-adjusted weight, i.e. log of BMI) 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 the region and survey year. Hence, in this FE set-up, the effects of economic conditions are identified by intra-region variations, relative to the corresponding changes in other regions.

Along with the basic results (Table I), several checks for the robustness of the results were performed (not reported, but available upon request). If anything, the results reveal that an improvement in regional economic conditions measured by the employment rate produces a decrease in BMI (Table I; Models 2 and 3). The same conclusion stems from the models in which economic conditions are measured by the change in real GDP (Table II; Models 2 and 3). However, it is important to note that we do not find a statistically significant negative effect when we include both year dummies and regional dummies (Table I; Model 1 and Table II; Model 1). In addition, the non-existence of a relationship between BMI and economic conditions prevails when we include region-specific time trends along with year dummies and regional dummies (not reported). There are reasons for preferring the results

Table I. Results from OLS regressions (dependent variable: log of BMI)

	Model 1	Model 2	Model 3
The regional employment rate	−0.0005	−0.218	−0.103
	(0.02)	(13.47)***	(12.42)***
Female	−0.050	−0.050	−0.050
	(48.58)***	(48.54)***	(48.74)***
Age	0.013	0.013	0.013
	(50.04)***	(49.55)***	(50.29)***
Age^2	−0.000	−0.000	−0.000
	(34.15)***	(33.38)***	(34.29)***
Married	0.013	0.012	0.013
	(9.12)***	(8.73)***	(9.18)***
Divorced	−0.004	−0.004	−0.004
	(1.75)*	(1.55)	(1.78)*
Widowed	0.025	0.023	0.025
	(6.89)***	(6.20)***	(6.88)***
Retired	0.024	0.024	0.024
	(10.10)***	(10.26)***	(10.16)***
Years of education	−0.006	−0.004	−0.006
	(8.45)***	(5.94)***	(8.42)***
Years of education^2	0.000	0.000	0.000
	(2.73)***	(1.08)	(2.74)***
Observations	93 389	93 389	93 389
R^2	0.25	0.25	0.25
Regional controls	Yes	Yes	No
Year controls	Yes	No	Yes
Region-specific time trends	No	No	No

Notes: *significant at 10%; **significant at 5%; ***significant at 1%. Robust t statistics in parentheses. Observations are assumed to be clustered by both region and year. Reference category: Male, single, not retired, living in Uusimaa, 1978, and Uusimaa*year. Regional controls, year controls, and controls for region-specific time trends are included as indicated.

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Table II. Results from OLS regressions (dependent variable: log of BMI)

	Model 1	Model 2	Model 3
The regional growth rate	−0.009	−0.030	−0.049
	(0.54)	(1.82)*	(2.17)**
Observations	93 389	93 389	93 389
R^2	0.25	0.25	0.25
Regional controls	Yes	Yes	No
Year controls	Yes	No	Yes
Region-specific time trends	No	No	No

Notes: All models include the same unreported individual-level control variables as in Table I. Otherwise, see notes to Table I.

Table III. Results from Probit models (dependent variable: probability of BMI ⩾ 25, BMI ⩾ 30 and BMI ⩾ 35)

	BMI ⩾ 25	BMI ⩾ 30	BM ⩾ 35
The regional employment rate	−0.025	−0.091	−0.060
	(0.25)	(1.73)*	(3.35)**
Sample mean	0.392	0.087	0.015
Observations	93 389	93 389	93 389
Regional controls	Yes	Yes	Yes
Year controls	Yes	Yes	Yes
Region-specific time trends	No	No	No

Notes: All models include the same unreported individual-level control variables as in Table I. Otherwise, see notes to Table I. We use classification of BMI recommended by the National Institutes of Health and World Health Organization, and used recently, for instance, by Ruhm (2005).

obtained from the models in which we have not taken region-specific time trends into account. First, region-specific time trends control for unobserved factors that vary within regions over time. In a small country like Finland, which is culturally and socially homogenous, these kinds of effects make less sense than in a larger area, say the European Union or the United States. Second, in Finland, as well as in most Western economies, there has been an upward trend in BMI. Chou *et al.* (2004) argue that when including region-specific time trends in regressions of this type, identification becomes cumbersome, because the region-specific time trends may account for trends in average height-adjusted weight in the country.

Re-running the basic results on subsamples reveals interesting results. There is some evidence for the decline in the probability of BMI ⩾ 30 and BMI ⩾ 35 during economic upswings (Table III). The pattern of the basic results applies separately to males and females (not reported). In addition, the effect is strongest for the individuals in later middle age (aged 45–65) (not reported). Our basic results remain the same when the amount of physical activity is included as a covariate (not reported). This means that physical activity is not the channel through which economic conditions affect BMI. If it were, then, when controlling for physical activity, the significant negative coefficient on the economic conditions covariate would become statistically insignificant. Therefore, economic conditions affect BMI independent of physical activity. By using Finland's GDP growth we obtain additional support for the conclusion that BMI tends to decline in good times (not reported).

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CONCLUSIONS

This paper explored the relationship between height-adjusted weight and economic conditions in Finland by using individual microdata for the period 1978–2002. If anything, the results reveal that an improvement in economic conditions measured by the employment rate produces a decrease in BMI. All in all, the Finnish evidence presented is not in accordance with the results reported by Ruhm (2000, 2003, 2005) for the USA, according to which temporary economic slowdowns are good for health. In contrast, at least BMI seems to increase during slumps.

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