Social Science & Medicine 89 (2013) 1–7

Contents lists available at SciVerse ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Estimating the causal effect of alcohol consumption on well-being for a cross-section of 9 former Soviet Union countries

Emmanouil Mentzakis [a], Marc Suhrcke [b,c], Bayard Roberts [d,*], Adrianna Murphy [d], Martin McKee [d]

[a] Economics Division, School of Social Sciences, University of Southampton, Southampton, UK
[b] Health Economics Group, Faculty of Medicine and Health Sciences, University of East Anglia, Norwich Research Park, Norwich, UK
[c] UKCRC Centre for Diet and Physical Activity, Institute for Public Health, Cambridge, UK
[d] European Centre on Health of Societies in Transition, Faculty of Public Health and Policy, London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London WC1H 9SH, UK

ARTICLE INFO

Article history:
Available online 29 April 2013

JEL classification:
C26
I18

Keywords:
Former Soviet Union
Alcohol consumption
Well-being
Instrumental variables
Causal effects

ABSTRACT

While the adverse health and economic consequences attributable to alcohol consumption are widely acknowledged, its impact on psychological wellbeing is less well understood. This is to a large extent due to the challenge of establishing causal effects of alcohol consumption when using standard single-equation econometric analyses. Using a unique dataset collected in 2010/11 of 18,000 individuals and also community characteristics from nine countries of the former Soviet Union, a region with a major burden of alcohol related ill health, we address this problem by employing an instrumental variable approach to identify any causal effects of alcohol consumption on mental well-being. The availability of 24-h alcohol sales outlets in the neighbourhood of the individuals is used as an instrument, based on theoretical reasoning and statistical testing of its validity. We find that increased alcohol consumption decreases well-being and that ignoring endogeneity leads to underestimation of this effect. This finding adds a further and previously under-appreciated dimension to the expected benefits that could be achieved with more effective alcohol policy in this region.

Introduction

Alcohol is major contributor to the global burden of disease; accounting for about 3.8% of all global deaths and 4.6% of global disability-adjusted life-years (Rehm et al., 2009). In addition to its adverse health effects, alcohol has serious economic consequences. Of the estimated 1% of gross national product in high and middle income countries attributable to alcohol related harm, the largest shares were due to productivity loss, costs of law enforcement and other indirect costs (Rehm et al., 2009).

The costs, both human and economic, associated with alcohol are far greater in the former Soviet Union (fSU), where the long tradition of hazardous drinking has been exacerbated in recent years by the large-scale production of cheap, easily available sources of alcohol in a population that has faced massive social and economic dislocation. It is now clear that alcohol is the main proximal cause of the large fluctuations in life expectancy that have characterised this region in the past two decades (Leon et al., 1997; Shkolnikov, McKee, & Leon, 2001) and research using individual-level data has found that approximately 40% of deaths of working age men in a typical Russian city could, conservatively, be attributed to hazardous alcohol consumption (Leon, Shkolnikov, & McKee, 2009; Tomkins et al., 2012). In Ukraine it was estimated that alcohol was responsible for 24% of male deaths and 6% of female deaths in 2004 at all ages (Krasovsky, 2009).

Beyond its association with premature mortality, there is an extensive literature on its detrimental effects on psychological well-being and mental health; alcohol dependent adults face an increased likelihood of major depression, phobias, anxiety and personality disorders among others (Cargiulo, 2007). These problems are common even among moderate drinkers, who are more likely to develop psychosocial problems than organ damage (Thakker, 1998). In contrast, some research reports better physical health among light and moderate consumers, although the association is less consistent for mental health (Green, Perrin, & Polen, 2004). Lang et al. (Lang, Wallace, Huppert, & Melzer, 2007) reported better cognition and subjective well-being and fewer depressive symptoms for moderate drinkers when compared to those who never had a drink, while Leigh reported beneficial effects on

* Corresponding author. Tel.: +44 (0) 20 7927 2050; fax: +44 (0) 20 7927 2358.
E-mail addresses: Bayard.roberts@lshtm.ac.uk, bayard_roberts@hotmail.com (B. Roberts).

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http://dx.doi.org/10.1016/j.socscimed.2013.04.019

outcomes of stress, mood elevation and relaxation (Leigh & Stacy, 1991).

However, establishing causal pathways between alcohol consumption and well-being is not straightforward. Issues of reverse causality – e.g. individuals with low well-being (i.e. ill-being) self-medicate or are more prone to increased alcohol consumption – can bias estimates and thus lead to misguided policy recommendations. This endogeneity problem is rarely acknowledged or accounted for in the literature, so that existing studies of associations between alcohol and mental well-being must be viewed with caution. Such problems have recently been discussed in a study of the link between major depression and alcohol consumption in New Zealand, which used structural equation modelling in a birth cohort to argue that associations between alcohol and well-being were best explained by a causal model where problems with alcohol increased the risk of depression (Fergusson, Boden, & Horwood, 2009).

The aim of this paper is to examine the influence of alcohol use on psychological wellbeing while addressing the endogenous relationship between alcohol consumption and individual mental well-being using an instrumental variable (IV) approach. We utilise a unique dataset with information on individuals from 9 fSU countries, as well as information on their neighbourhood characteristics. The latter provides the opportunity to identify and use variables exogenous to the individual to estimate a causal effect of alcohol on the respondents' reported well-being.

Methods

Data source

For the analysis we use data collected in 2010/11 for the Health in Times of Transition (HITT) study (http://www.hitt-cis.net/) which was a follow-up to the 2001 Living Conditions, Lifestyles and Health (LLH) study. Standardised information on socio-economic, demographic, health and lifestyle characteristics was collected using cross-sectional surveys of 18,000 individuals (aged 18+) in 9 fSU countries (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine). Multistage random sampling with stratification by region and rural/urban settlement type was used, while within each primary sampling unit (approximately 100–200 per country), households were selected by standardized random route procedures. The research was approved by the ethics committee of the London School of Hygiene and Tropical Medicine. For more on the survey methods please see (Balabanova, Roberts, Richardson, Haerpfer, & McKee, 2012).

Outcomes of interest

As measures of well-being we utilise two commonly used subjective well-being questions that follow Likert response formats. "Life satisfaction" asks individuals, "How satisfied are you with your life as a whole?", and presents them with a visual analogue scale (VAS) between 1 = Not at all satisfied and 10 = Extremely satisfied, while "Happiness with life" is similarly framed: "Taking all things together, how would you say things are these days – would you say you are?", again with a VAS between 1 = Very unhappy and 10 = Very happy (Table 1). These questions draw upon a long-standing literature in psychology (Diener, Suh, Lucas, & Smith, 1999) and their use is rapidly expanding and gaining prominence within economics more generally (Di Tella & MacCulloch, 2006) and health economics in particular (Oswald & Powdthavee, 2008). Subjective well-being questions have been validated and modelled across contexts and countries (Blanchflower & Oswald, 2004) and are regarded as good empirical approximation of individual well-being and utility (Frey & Stutzer, 2002; Oswald & Powdthavee, 2008). Previous applications of well-being on Eastern European countries (Blanchflower & Oswald, 2007; Hayo & Seifert, 2003) have confirmed the findings of past literature, further validating the implementation of such instruments among fSU countries.

Table 1
Descriptive statistics for the restricted sample ($N = 2124$).

	Mean	S.D.	Min	Max
Satisfaction with life (How satisfied are you with your life as a whole? 1 = Not at all satisfied – 10 = Extremely satisfied)	5.907	2.265	1	10
Happiness with life (Taking all things together, how would you say things are these days – would you say you are? 1 = Very unhappy – 10 = Very happy)	6.456	2.025	1	10
Pure alcohol consumed per occasion (in cl)[a,b]	1.914	5.314	0	43
24 h Alcohol selling shop/kiosk/house/outlet in the neighbourhood	0.799		0	1
Male	0.444		0	1
Age	43.30	17.41	18	95
Married	0.617		0	1
Single	0.203		0	1
Higher education	0.275		0	1
Household size	3.607	1.802	1	15
Number of children	0.760	1.057	0	10
Employed	0.451		0	1
Unemployed	0.203		0	1
Wealth index	4.223	1.479	0	9
(Very) Good financial situation	0.232		0	1
Very good/good health	0.407		0	1
(Fairly) Easy to walk 1 km distance	0.741		0	1
(Fairly) Easy to climb stairs	0.654		0	1

[a] Converted from amount of strong spirits such as vodka usually consumed per occasion, where half litre of vodka assumed to contain 21.5 cl of pure alcohol.
[b] Stated consumption of >1 L of strong spirits was fixed at 1 L.

Alcohol exposure

For the alcohol consumption measure, a continuous variable of the amount of alcoholic drinks consumed in a typical drinking session (with a recall period of the previous 1 year) was used. Individuals are specifically asked "How much strong spirits such as vodka do you usually drink on one occasion?" and their consumption is coded in grams. Using an average alcohol content of 43 cl of alcohol per litre of drink we convert the variable into an alcohol consumption indicator (with results reported in Table 1). As this is a linear transformation it does not influence our findings but only affects the scale of the coefficients (i.e. an increased in the assumed alcohol content per litre would reduce the size of the coefficient). Further, given the possibility that increased alcohol consumption is correlated with higher recall bias (i.e. inebriated individuals are less likely to be able to accurately report their consumption) we cap alcohol consumption per occasion to 1 L for all those individuals reporting consumption higher or equal to 1 L (reducing the capping threshold of alcohol consumption per occasion or removing it altogether does not alter our findings).

Adjustment for confounding

The estimations control for a number of demographic and socio-economic factors common in well-being analyses, including age, gender, marital status, employment, household size, employment status, economic situation and health, as well for country effects (Table 1 for sample descriptive statistics and definitions). Such variables are considered exogenous to well-being and act as their own instruments in the IV estimation. Specifically, we use two proxies for economic status: (a) a self-assessed question on