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Social capital and cigarette smoking: New empirics featuring the Norwegian HUNT data

M. Kamrul Islam[a,b,*], Sherman Folland[c], Oddvar M. Kaarbøe[d]

[a] Department of Economics, Fosswinckelsgate 14, University of Bergen, 5007 Bergen, Norway
[b] Uni Research Rokkan Centre, Bergen, Norway
[c] Department of Economics, Oakland University, Rochester, MI 48309, USA
[d] Department of Health Management and Health Economics, University of Oslo, 0373 Oslo, Norway

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ABSTRACT

Using a rich Norwegian longitudinal data set, this study explores the effects of different social capital variables on the probability of cigarette smoking. There are four social capital variables available in two waves of our data set. Our results based on probit (and OLS) analyses (with municipality fixed-effects) show that the likelihood of smoking participation is negatively and significantly associated with social capital attributes, namely, community trust (−0.017), participation in organizational activities (−0.032), and cohabitation (−0.045). Significant negative associations were also observed in panel data, pooled OLS, and random effects models for community trust (−0.024; −0.010) and cohabitation (−0.040; −0.032). Fixed-effects models also showed significant negative effects for cohabitation (−0.018). Estimates of alternative instrumental variables (IV) based on recursive bivariate probit and IV-GMM models also confirmed negative and significant effects for three of its characteristics: cohabitation (−0.030; −0.046), community trust (−0.065; −0.075), and participation in organizational activities (−0.035; −0.046). The limitations of our conclusions are discussed, and the significance of our study for the field of social capital and health is described, along with suggested avenues for future research.

1. Introduction

The idea that one's social milieu and social experiences affect their physical circumstances and well-being has an ancient history. In our era, the concept of social capital was brought forward by Loury (1977), Bourdieu (1985), Coleman (1988), and most prominently in the recent work of Putnam (2000, 1995, 1993). Putnam et al. (1993) defined social capital as referring to the "features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions" (p.167). In general, four main theoretical ingredients can be identified in the definition of social capital: social trust/reciprocity, collective efficacy, participation in voluntary organizations and social integration for mutual benefit (Lochner et al., 1999).

Social capital is a multidimensional phenomenon. Nevertheless, the notion can be broadly divided into *cognitive* and *structural components*, where the former component includes norms, values, attitudes and beliefs, and the later includes established roles and social networks supplemented by rules, procedures and precedents. The cognitive component of social capital measures people's perceptions of the level of interpersonal trust, sharing, and reciprocity, and the structural component studies the extent and intensity of associational links and activity in society such as measures of informal sociability, density of civic associations, and indicators of civic engagement (Islam et al., 2006a). Social capital can also be separated as *horizontal* and *vertical* social capital. Within horizontal social capital, *bonding social capital* and *bridging social capital* can also be categorized. *Bonding social capital* refers to the relations within homogenous groups (the strong ties that connect family members, neighbors, and close friends, etc.), while *bridging social capital* is heterogeneous by definition (for detailed distinctions with examples, see Islam et al., 2006a). Bonding and cognitive social capital are hypothesized to be vital for establishing and favoring healthy norms and controlling abnormal social

* Corresponding author at: Department of Economics, Fosswinckelsgate 14, University of Bergen, 5007 Bergen, Norway.
E-mail address: kamrul.islam@uib.no (M. K. Islam).

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behavior. Structural social capital (e.g., social participation) is supposed to complement attributes of cognitive social capital.

Social capital research has described the effects of social ties on the family, friend networks, and relationships with the community as being important contributors to socio-economic outcomes that cannot be explained by a conventional, rational economic model. For example, educational outcomes, crime rates, TV watching by children, and health measures have all proven to be beneficially associated with social capital. The health connection alone has attracted many researchers and resulted in a vast literature; for example, see Kawachi (1999), Kawachi and Berkman (2001), Poortinga (2006), and Turrell, Kavanagh, and Subramanian (2006). Economists have been prominent in conceptual studies of social capital; for example, see Glaeser et al. (2002), Becker and Murphy (2000), Durlauf, (2002), and Akerlof (1998). But only recently have health economists focused on the social capital and health hypothesis, which has given more attention to econometric issues. Among these more recent studies are Mellor and Milyo (2005), Islam et al. (2006b, 2008), Folland (2006, 2007, 2008), Brown et al. (2006), LaPorte and Ferguson (2004), d'Hombres et al. (2010), Ljunge (2014), and Fiorillo and Sabatini (2015).

The social capital and health hypothesis simply stated is the proposition that improvements in a person's individual or community social capital (CSC) will cause, *ceteris paribus*, improvements in the person's health. The hypothesis poses econometric difficulties because it requires success in sorting out influences of other variables and addressing questions of endogeneity. However, the hypothesis remains plausible because there are known pathways by which social ties could have the hypothesized effect: 1) friendship and sociability often reduce stress, and stress is known to adversely affect health (Sapolsky, 1998); 2) social contacts provide new information sources about healthy behaviors and medical procedures; 3) following Coleman (1988), social ties enhance one's sense of obligation to loved ones, friends, and by implication, oneself (also Folland, 2006); and 4) by joining in groups, people may be able to better influence the development of better community health services (Mellor and Milyo, 2005; Kawachi et al., 1997).

Although there have been several studies on the relationship between social capital and smoking, only a few have been developed in an economic framework. First, we consider the literature from outside of economics, namely studies from the medical, epidemiological, and psychological literature.

Sapag et al. (2010) found a significant inverse relation between a measure of "trust in neighbors" and cigarette smoking in an urban setting in Santiago, Chile. Afifi et al. (2010) also studied an urban setting, in this case in Beirut, Lebanon, and in low-income neighborhoods, where they found negative correlations with smoking and "trust of friends and neighbors." Giordano and Lindstrom (2010) found an association between smoking cessation and trust and participation in groups. Lindstrom et al. (2003) found that social participation is positively associated with smoking cessation. Lee and Kahende (2007) studied factors that encouraged quitting smoking in the United States and found that, *inter alia*, being married or living with a partner were important (see also Homish and Leonard, 2005). Studies of adolescents (Glaser et al. (2010); Stewart-Knox et al. (2005), Page et al. (2006) have found that peer smoking behaviors are especially influential, and the social effect may encourage smoking if the peer cohort smokes. These findings may support the social capital and health hypothesis, but they do not address econometric issues such as the role of fixed- or random effects or the endogeneity issue.

Health economists have also recently studied social capital and smoking. Folland (2006) theorized how social capital would alter one's desired rate of trade between risk and reward, supported by data on several health risky behaviors in a cross-section of the United States. Brown et al. (2006) developed a "Petris Social Capital Index" and showed that a portion of this was associated with membership in a religious organization, which seemed to encourage reduced smoking. Folland (2008) developed an economic model based on utility maximization and showed that when smoking damages health and lowers the probability of survival, exogenous increases in social capital can promote reduced smoking. That model was tested using data from the National Longitudinal Survey of Youth 79, where a CSC measure proved to be negatively associated with smoking. Recently, Folland et al. (2014) developed a theoretical model of how one invests in social capital. Social capital is described as a form of leisure choice, which implies that it entails an opportunity cost. In the most general model, the relationship between cigarette smoking and social capital is ambiguous. Specifically, it is shown that since social capital improves the probability of survival, it might also increase smoking because it extends the number of hours one can enjoy their cigarettes.

By recognizing social capital as a complex construct, previous social capital health research has warned of the likelihood of *construct bias* if researchers use a single measure to estimate the effect of social capital on health (Sundquist and Yang, 2007). To address the aforesaid concerns, this paper examines the effects of the following three different forms/dimensions of social capital on smoking behavior: *bonding social capital* (family and friends), *cognitive social capital* (community trust), and *structural social capital* (social participation). In addition, it explores new empirics on an extraordinarily rich longitudinal Norwegian data set not previously applied in this field: The North-Trøndelag Health Study (known as the HUNT data set). The aim of this study was to integrate many of the ideas from the vast interdisciplinary literature on the role of social networks in terms of risky health behaviors. In particular, of the many papers on social capital and smoking, few attempt to address causality. The health economic papers that do measure the causal effects of social capital do not address smoking (e.g., Folland, 2007; dHombres et al., 2007; Fiorillo and Sabatini, 2015). The primary contribution of this paper is the use of a longitudinal (panel) Norwegian data set, which permits an examination of fixed/random effects and an instrumental variable (IV) approach to causality.

The remainder of this paper is organized as follows. The next section describes the data, the social capital variables, and the hypotheses. Section 3 describes the econometric approach used in this study. Section 4 presents the results, and the final section provides a discussion and conclusion and suggests implications and avenues for future research.

2. Data and variables

2.1. Data

The HUNT surveys (Helseundersøkelsen i Nord-Trøndelag) of a region in Norway contain extensive individual data about health and health-risk factors (for more information about HUNT, see Holmen et al. (2003), and the HUNT website (https://www.ntnu.edu/hunt). The HUNT data provide information about self-rated quality of life and health, body weight and height, lifestyle factors (alcohol and tobacco use and physical activities), family-related social capital (co-residence with spouse, partner, parents, etc.), labor market status, and other community-level social capital attributes.

The HUNT data collection was done in three waves. The present paper uses information compiled in HUNT 2 and HUNT 3. HUNT 2 was conducted from 1995 to 1997 and comprised 71.2 percent of the population aged 20 years and older (66,140 persons) as well as 8984 pupils aged 13–19 years. HUNT 3 was conducted from