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National intelligence and private health expenditure: Do high IQ societies spend more on health insurance?

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ABSTRACT

Studies show that high IQ people practice healthier lifestyles, which result in better health status. However, do such people spend more on healthcare? We employed hierarchical multiple regression analysis to examine the impact of national average IQ on private health expenditure, especially health insurance at cross-country level. Controlling for income, the old-age dependency ratio, and government expenditure on health, we found that IQ was positively significant on out-of-pocket healthcare expenditure but negatively associated with private health insurance expenditure. We suggest that high IQ societies pay less for health insurance because they are more capable of preventing illnesses or injuries and they live in healthier and safer environments, which are less vulnerable to diseases. In addition, they are more efficient at calculating risk and making choices according to their future healthcare needs. Hence, with price dispersion and various choices of health insurance plans available within the competitive market, high IQ people may be more efficient at obtaining lower effective prices of premiums.

1. Introduction

Intelligence (IQ) is a significant predictor of important life outcomes across domains. High IQ people learn faster, and are more efficient and innovative at problem-solving tasks, which results in enhanced job performance (Byington & Felps, 2010; Schmidt & Hunter, 2004), and consequently higher productivity at both individual and national levels (Hanushek & Kimko, 2000; Jones & Schneider, 2006, 2010; Ram, 2007; Weede & Kämpf, 2002). People with higher IQ have positive personalities, for example, they are more inclined to cooperate, more patient (i.e., less delay discounting), and more perceptive to gaining better rewards over a longer time horizon (Dohmen, Falk, Huffman, & Sunde, 2010; Jones, 2008; Shamosh & Gray, 2008). Therefore, at cross-country levels, societies with higher IQs have higher savings rates and enjoy less corruption (Jones, 2012; Potrafke, 2012).

Unlike pre-modern societies in which people with low IQs and child-like mentality are dominant, high IQ people in modern populations are more capable of understanding concepts and causal relationships, and therefore, they are able to think and act more rationally about overcoming poor health and preventing the spread of diseases (Oesterdiekhoff, 2012; Oesterdiekhoff & Rindermann, 2007; Rindermann, Falkenhayn, & Baumeister, 2014). High IQ people are associated with a better quality of life and healthier lifestyle practices (e.g., Batty, Deary, Schoon, & Gale, 2007; Jelenkovic, Silventoinen, Tynelius, & Rasmussen, 2014). Therefore, they have better health status, such as greater longevity and less mortality risk (Batty, Deary, & Gottfredson, 2007; Gottfredson & Deary, 2004). In addition, high IQ is associated with higher socioeconomic status, which assures better healthcare as well (Gottfredson & Deary, 2004). This study attempts to examine the effect of national average IQ on private expenditure on health, especially health insurance. Naturally, health insurance is associated with uncertainty of future healthcare needs. Policyholders would lose money spent on insurance premiums if they were not sick. Conversely, if individuals became sick when they were not covered by insurance, they might not have enough savings to support their out-of-pocket expenditure on health treatment. In the latter case, health insurance would cover policyholders by more than their savings would have.

As out-of-pocket expenditure on health is the most common type of health financing in developing nations and is a major financial burden for households, private health insurance provides access to financial protection by offering households an option to avoid huge out-of-pocket expenses (Sekhri & Savedoff, 2005). Along the same line, the relationship between national IQ and private health expenditure,

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particularly health insurance, has not been established yet. Because high IQ people are characterized as being more perceptive, have longer time horizons, and lead healthier lifestyles, it may be assumed that high IQ people are more likely to spend on health insurance to maintain their good health continuously and in preparation for health deterioration in old age. IQ may serve as a source of advantageous selection because it improves people's knowledge about health risks. High IQ people may be healthier, but at the same time, they may be more perceptive about potential health risks (Fang, Keane, & Silverman, 2008). For this reason, our study adds to the literature by establishing the impact of IQ on private health expenditure, particularly health insurance at a cross-country level.

2. Methods

2.1. Variables and model

Values for private health expenditure for each country are the average of people's expenditure on their own healthcare needs. Therefore, similar to average IQ test scores within a national society, we assume that an individual's decision on health expenditure is independent of other individuals' health expenditure. To investigate the impact of national IQ on private expenditure on health insurance, we set our dependent variable as private health insurance expenditure per capita at country level, namely *Insurance*. In addition, we employ two other measures of health expenditure as comparative models for *Insurance*, namely, *Total*, which is total private health expenditure per capita, and *Pocket*, the out-of-pocket health expenditure per capita. Out-of-pocket expenditure is any direct expenditure by households, which includes gratuities and in-kind outlays paid to health practitioners and suppliers of pharmaceuticals, therapeutic appliances, and other goods and services whose main purpose is to add to the restoration or improvement of the health status of individuals or population groups (World Bank, 2014). The value of *Total* is composed of the value of *Pocket*, *Insurance*, and other unspecified variables; however, *Pocket* forms the largest proportion of *Total*, about 70% (World Bank, 2014). To investigate the impact of IQ on healthcare expenditure, we employed a linear macromodel as follows:

$$Expenditure_i = \beta_0 + \beta_1\ Income_i + \beta_2\ Gov_i + \beta_3 Age65_i + \beta_4 IQ_i + e_i$$

where *Expenditure* denotes expenditure for three dependent variables, that is, *Total*, *Pocket*, and *Insurance*, which were incorporated separately into the model. *Income* denotes gross domestic product (GDP) per capita for country *i*. People with higher income are willing to spend more on their healthcare (Chernew, Hirth, & Cutler, 2003). *Gov* is general government expenditure on health as a percentage of total health expenditure. We expect that the effect of *Gov* on health expenditure variables will control the effect of *Income* because people would spend less on healthcare if their governments were willing to subsidize healthcare more. *Age65* is the percentage of the population aged 65 years and older. It is expected that an increase in *Age65* would increase both average private health expenditure and out-of-pocket expenditure owing to more health treatment needed during old age (Yang, Norton, & Stearns, 2003). Moreover, we expect that a higher value for *Age65* would influence younger generations to spend more on insurance in preparation for their own morbidity in old age. We suggest that *Age65* is a better variable to use than the common "life expectancy at birth" variable because the latter does not represent the current old age population. Data on *Total*, *Pocket*, *Insurance*, *Income*, and *Gov* were obtained from the World Health Organization's Global Health Expenditure Database (World Health Organization, 2014), while the data on *Age65* were obtained from the World Bank's World Development Indicators (World Bank, 2014). *IQ* is the national average intelligence for a specific country *i*, obtained from Meisenberg and Lynn (2011). Except for IQ data, which are purely cross-sectional, the data for the other variables were averaged over the years 1995–2012.[1] Finally, e_i is an error term. Data on *Total*, *Pocket*, *Insurance*, and *Income* were log transformed because increased healthcare expenditure and wealth at lower levels would have been more essential than at higher levels (Rindermann & Thompson, 2011). Finally, all data (including the log-transformed variables) were standardized to a standard deviation of one. Data analyses were performed using EViews 8.1. Table 1 shows the list of selected countries ranked by all variables.

In this study, more than 107 countries were selected based on the availability of data. Four countries, namely, the United Arab Emirates (UAE), Luxembourg, the United States (US), and Switzerland, were excluded from our analysis as they are potentially outliers. In particular, the UAE was excluded from our analysis because its value for *Age65* was too low, that is .774%, as 80% of its population comprises working-age immigrants (DubaiFAQs, 2015). Luxembourg was excluded from the entire analysis because its value for *Income* was too high, that is, US$75,090.81. For *Total*, the US (US$3421.98) and Switzerland (US$2184.21) were excluded. For *Insurance*, the US (US$2098.50) was excluded.

2.2. Spatial autocorrelation, race, and health

In a cross-national study, data points are not exactingly independent because neighboring countries are likely to share similar characteristics (Meisenberg & Woodley, 2014). Therefore, *p*-values are inflated by non-independence of data points because we are dealing with geographic data. This is caused by spatial autocorrelation, without any causal effects of the independent variables that the regression models suggest (Eff, 2004). Spatial autocorrelation is well documented in economics literature, in which three geographical regions are significant for global productivity, namely, East Asia, Latin America, and Africa. In particular, Sala-i-Martin (1997) and Sala-i-Martin, Doppelhofer, and Miller (2004) found that the inclusion of East Asian countries into cross-national growth regression is positively significant for global productivity growth. By contrast, both Latin America and Africa were found to be negatively significant. This method has been adopted by Jones and Schneider (2006) to examine whether IQ is significant on productivity growth at cross-country level.

We suggest that excluding one of the three regions (i.e., East Asia, Latin America, or Africa) at a time is important not only because of their spatial autocorrelation, but most importantly, because the populations of neighboring countries in each region are blood-related and relatively more homogeneous in their biological inheritance. Each race is susceptible to the same disease, or has the same risk level of having the disease; in addition, they share similar health-related behavior (Bamshad, 2005; Batai & Kittles, 2013; LaVeist, 1994). Therefore, different races may have different levels of affinity or needs for health insurance and medical care. Moreover, differences in culture and values among races may also influence their levels of affinity for health care and services (Dressler, 1993; Hunt, Schneider, & Comer, 2004). For this reason, inequalities in health and healthcare associated with race are well recognized and have been a focus of many health-related organizations (Cheng et al., 2015).

In our cross-national study, to alleviate the effect of race and spatial autocorrelation on private health insurance expenditure, we exclude one of the three world regions (i.e., East Asia, Latin America, or Africa) at a time from our analysis. In addition, Jones and Schneider (2010)

[1] One may be influenced to take in variables of healthcare facilities (e.g., the number of private hospitals, hospital beds, and physicians per capita) as predictors of Insurance because an increasing number in these facilities may indicate an improvement in private care, which may induce people to demand more for health insurance (e.g., Propper, Rees, & Green, 2001; Shin, 2012). However, there are many supportive arguments in the literature for the view that their relationship exists in an opposite direction, in which greater levels of private health insurance coverage will drive further growth of healthcare industries (e.g., McClellan et al., 2002; Shin, 2012; Simoens & Hurst, 2006; Van Doorslaer, Masseria, & Health Equity Research Group, 2004).