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Social Science & Medicine 66 (2008) 1871–1881

SOCIAL SCIENCE & MEDICINE

www.elsevier.com/locate/socscimed

Neo-materialist theory and the temporal relationship between income inequality and longevity change☆

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Available online 20 February 2008

Abstract

This study uses a neo-materialist perspective to develop theoretical predictions regarding temporal ties between income inequality and change in population health. The argument focuses on the relationship between income inequality and adoption of longevity-enhancing innovations. It asserts that longevity change should be influenced by preexisting levels of income inequality and that, consequently, income inequality can cause differential longevity improvement across jurisdictions even if inequality levels remain unchanged. State-level U.S. data from 1970 to 2000 are used to jointly model the effects of initial levels and change in income inequality on 10-year life expectancy change. Results confirm that states with higher levels of inequality experienced less subsequent improvement in life expectancy. Contrary to findings from prior research, analyses also reveal a strong negative association between change in inequality and change in longevity once initial levels of inequality and other state characteristics are controlled. Finally, direct tests of the relationship between income inequality and the adoption of innovations in quality of medical care indicate that the two are highly related and that differences in the average quality of care can account for the negative cross-sectional association between income inequality and life expectancy.

Keywords: USA; Income inequality; Longevity; Wilkinson hypothesis; Health determinants

Introduction

One great demographic shift in economically advanced nations over the past two centuries has been the dramatic growth in life expectancy. Empirical work has attributed longevity gains to improvements in material standard of living and the implementation of health-enhancing innovations in public health and medicine, though scholars have debated the relative importance of each (Catalano & Frank, 2001; Deaton, 2006; Fogel, 2004; McKeown, 1976; Preston & Haines, 1991; Szreter, 1988). A relatively recent literature has asserted that income inequality also has an important influence on health and mortality. Wilkinson (1992) went so far as to assert that it is the principal cause of health differences among wealthy nations. After an initial flurry of supportive cross-sectional findings, the empirical tide turned against the inequality hypothesis in more recent years (see Lynch, Harper, & Davey Smith,

☆ A portion of the results from this paper was presented at the 2006 Annual Meetings of the Population Association of America.The author was supported by the National Science Foundation through an Integrative Graduate Education and Research Traineeship and by a postdoctoral fellowship from the National Institute of Child Health and Human Development during portions of the research and writing. All opinions expressed herein are the sole responsibility of the author.

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doi:10.1016/j.socscimed.2007.12.034

2003 for a discussion), though supportive results do continue to emerge (e.g., Backlund et al., 2007; Ram, 2005; Subramanian & Kawachi, 2006; Zimmerman & Bell, 2006).

One indirect critique of the inequality hypothesis is that focusing on inequality is unwarranted because it is not a major cause of change in mortality/longevity. Lynch, Davey Smith, Harper, and Hillemeier (2004) find that changes in inequality over time fail to match up in any consistent way with changes in mortality. Although it is readily apparent that inequality, in isolation, is not a principal driver behind life expectancy improvements over time, it does not necessarily follow that income inequality has no important role in influencing changes in longevity or, in particular, differential change across populations.

Ultimately, improvements in health outcomes result from adoption of beneficial innovations – whether they be innovations that improve medical care, provide for public goods such as drinking water or waste disposal, increase food production, etc. And one claim of ''neo-materialist'' theory (Davey Smith, 1996; Lynch, Davey Smith, Kaplan, & House, 2000) is that income inequality harms population health because it weakens societies' willingness to make investments that promote the common good. If true, inequality could play an important role in affecting the rate of health change by influencing adoption of the innovations that are proximal determinants of heath improvements.

An important issue, particularly when discussing the relationship between inequality and *change* in health outcomes, is what the temporal ties between inequality and health look like. A number of authors have discussed the question of latency periods between exposure and emergence of observable health outcomes (Blakely, Kennedy, Glass, & Kawachi, 2000; Lynch et al., 2004; Mellor & Milyo, 2003; Subramanian & Kawachi, 2003). In this paper I use a neo-materialist perspective to discuss an issue that has received less attention: the temporal relationship between inequality as a distal cause and the adoption of innovations that are proximate determinants of health change. The argument I present asserts a tie between longevity change and pre-existing levels of inequality. It does not necessarily include (nor exclude) links between longevity growth and *change* in inequality. Rather, I argue that within a dynamic technological environment we should observe differential improvement in life expectancy between low and high-inequality populations, even in the absence of any differential change in inequality. One implication of the argument is that results from previous empirical studies of change in inequality and change in population health are likely to be biased by failure to account for the effect of initial levels of inequality on subsequent health change.

I test the proposed temporal ties using data on life expectancy and income inequality in the United States for a three-decade period, from 1970 to 2000. The tests include examinations of both the relationship between levels of inequality and subsequent longevity change, and of how observed change-on-change associations are affected by the inclusion of controls for initial levels of inequality and other state characteristics. I also use data on the quality of medical care to directly examine the relationship between income inequality and adoption of health-enhancing innovations.

Income inequality, innovation adoption, and longevity improvement

A substantial literature is devoted to the causes of longevity improvements in wealthy nations. In influential work, McKeown (1976) cited improved living standards as the predominant contributor. Though not denying the value of factors such as improved nutrition, subsequent work suggests that increased life expectancy in the West was initially attributable primarily to public health improvements such as provision of clean water and sewers and, more recently, to medical innovations such as antibiotics and immunizations (Colgrove, 2002; Cutler & Miller, 2005; Preston & Haines, 1991; Szreter, 1988). In either case, the gains were largely due to the development and implementation of new knowledge.

Of course, providing access to clean water or universal immunizations requires financial resources that are still out of reach for many populations. But even among societies endowed with the necessary resources, adoption of public health-enhancing innovations can still vary widely (e.g., Jencks et al., 2000) depending on social or institutional characteristics. For instance, Evans (1987) describes how intense socioeconomic stratification and concentration of power deterred the installation of a modern water filtration plant in 19th century Hamburg. This failure left the city vulnerable to a deadly cholera epidemic in 1892 that was avoided by other German cities that had pursued sanitary reforms. Szreter and Woolcock (2004) document a similar case in 19th century England, where class divisions blocked the construction of clean water and sewage systems. In a more contemporary example, Boyce, Klemer, Templet, and Willis (1999) find that states in which power is distributed less equally – partially as a function of income inequality – engage in less environmental protection