Journal of Economic Behavior & Organization 112 (2015) 112–126

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

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

Risk attitude and cognitive aging☆

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ARTICLE INFO

Article history:
Received 7 November 2013
Received in revised form 3 January 2015
Accepted 11 January 2015
Available online 18 January 2015

JEL classification:
D01
D80

Keywords:
Cognition
Risk attitude
Aging
SHARE

ABSTRACT

In this paper we investigate to what extent the decrease in the willingness to take risks with age can be traced to the cognitive aging process. We use data from the Survey of Health, Aging and Retirement in Europe (SHARE) that includes both a measure of financial risk preference and measures of cognitive ability for a representative sample of individuals aged 50+ in 11 European countries. The availability of a large set of variables in SHARE allows us to control for potential confounding factors that may be related to both cognitive skills and risk attitudes. Conditional on socio-demographic characteristics, about half of the age-related cross-sectional difference in willingness to take risks can be explained by a noisy measure of cognitive skills. Further analyses indicate this is a lower bound estimate due to attenuation bias resulting from measurement error in the measure of cognition.

1. Introduction

A growing empirical literature in economics indicates a systematic relationship between risk attitudes and age: Individuals become more risk averse as they get older.[1] If chronological age is associated with declining willingness to take risks at the individual level, aging societies will be confronted with an increase in aggregate risk aversion. As risk attitudes affect

☆ This paper uses data from SHARE release 2.5.0, as of May 24 2011. The SHARE data collection has been primarily funded by the European Commission through the 5th framework program (project QLK6-CT-2001-00360 in the thematic program Quality of Life), through the 6th framework program (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5-CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th framework program (SHARE-PREP, 211909 and SHARE-LEAP, 227822). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064, IAG BSR06-11, R21 AG025169) as well as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions).

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[1] Studies based on cross-sectional data document that older cohorts are on average less willing to take risks than younger cohorts (Barsky et al., 1997; Donkers et al., 2001; Borghans et al., 2008; Dohmen et al., 2011). Recent studies based on longitudinal data indicate that the difference in willingness to take risks is not solely driven by a cohort effect (e.g., Sahm, 2012). Dohmen et al. (2014) investigate how risk attitudes change over the life course, and provide evidence that individuals become less willing to take risks as they grow older. They propose different approaches to shed light on the age effect in the presence of the age-cohort-calendar time identification problem. Using different identifying assumptions they provide compelling evidence that aging

http://dx.doi.org/10.1016/j.jebo.2015.01.004
0167-2681/

individual decision making in a myriad of diverse contexts (e.g. investment and savings decisions, mobility, voting behavior), a distributional shift in willingness to take risks would have wide-ranging consequences for aggregate economic and socio-political outcomes. For example, the median voter in aging populations would become more risk averse, which would likely lead to resistance to reforms and a tendency to vote for status quo preserving policies. Likewise, an aging workforce that grows more risk averse will grow more dissatisfied with given levels of job insecurity and earnings risks, and variable pay incentives will lose some of their power (see e.g., Grund and Sliwka, 2010; Milgrom and Roberts, 1992; Prendergast, 1999; Sloof and van Praag, 2008).

However, it is an unresolved question whether the observed relationship between age and risk preference is a true age effect, or whether it reflects another factor that changes with age but is not strictly tied to chronological age. If changes in risk preferences are not driven by chronological aging, but rather by (biological) aging processes that are not strictly tied to calendar age, the implications of population aging might be less severe. In that case, cohorts that are young today might be in better physical and mental conditions when they reach the same chronological age as currently old cohorts.

In this paper, we consider cognition as a factor that might affect risk preferences, and that is related to biological aging but not completely determined by chronological age. Cognition tends to decline with age (see, e.g., Dixon et al., 2004).[2] However, there is also evidence that the process of cognitive decline can be affected by institutions (e.g., Rohwedder and Willis, 2010; Bonsang et al., 2012; Mazzonna and Peracchi, 2012) or purposeful investments.[3] Skirbekk et al. (2012) document that cognitive functioning is not necessarily lowest in countries with a chronologically older age structure. Their comparison of age variation in cognitive ability across countries reveals that older cohorts in the US and Northern Europe have maintained higher levels of cognitive functioning than the same-age cohorts in Southern Europe, China, Mexico or India, which is likely due to the fact that the contemporaneous old cohorts in Western countries enjoyed better conditions during childhood and adolescence, such as better nutrition, better health, healthy life-style, and longer duration and quality of schooling. Since these conditions have been continuously improved during the last decades, younger cohorts are likely to enjoy even higher levels of cognitive functioning when they reach the same age as the current older cohorts.

There is also evidence that cognition is related to risk preference. Several empirical studies document a negative correlation between cognitive skills and measures of risk aversion (e.g., Burks et al., 2009; Dohmen et al., 2010; Benjamin et al., 2013). Other studies provide some evidence on the link between cognition and risky behavior. Banks (2010), Christelis et al. (2010), Grinblatt et al. (2011), Kim et al. (2012) and Bogan and Fertig (2013) show that cognitive functioning is associated with a higher incidence of stock ownership and more risky investment choices.[4] None of these studies, however, addresses the question of whether the process of cognitive decline is closely connected with changes in directly measured risk attitudes over the life course. Although Christelis et al. (2010) acknowledge that cognitive skills might be associated with risk aversion, they do not investigate whether such a relationship exists in the data they analyze.[5] As a result, it is not possible to infer from the study by Christelis et al. (2010) whether age effects in preferences disappear when controlling for cognition.

A key question to address is whether and to what extent the decline in willingness to take risks over the life course is related to cognitive decline. If this is the case, it is not obvious that future populations of aging societies will necessarily end up being more risk averse, particularly if cognitive decline of today's cohorts can be slowed down or delayed. In this paper, we investigate empirically whether the effect of age on willingness to take risks is (partly) explained by cognitive decline. We use data from the Survey of Health, Ageing, and Retirement in Europe (SHARE), which contains information on risk attitudes and cognitive skills for individuals that are sampled to be nationally representative of the non-institutionalized population aged 50 and older in various European countries. Cognitive skills are assessed with the help of short and simple tests of episodic memory (words learning and recall task), executive skills (verbal fluency task) and numeracy (arithmetical calculations task). The measure of risk attitude is based on the Survey of Consumer Finances (SCF) risk tolerance question, a widely used survey question that asks respondents to self-report their willingness to take financial risks.

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is associated with a decrease in willingness to take risk. Maximum entropy methods (Browning et al., 2012) support their finding that a substantial part of the cohort differences in risk attitudes observed in cross-sectional studies can be ascribed to changing risk attitudes over the life course.

[2] There is plenty of evidence from psychology and neuroscience that performance on a wide variety of cognitive tasks, including processing speed (Salthouse, 1996) and working memory (Van der Linden et al., 1994), declines over the life course.

[3] Rohwedder and Willis (2010) and Mazzonna and Peracchi (2012) provide evidence from cross-country comparisons that retirement institutions can affect the process of cognitive decline. Bingley and Martinello (2013) argue that differences in educational investments might drive the observed relationship between early retirement and cognition in cross-country studies that rely on differences in eligibility ages for retirement as an instrumental variable, because eligibility age for retirement affects investment decisions in education and education potentially also affects the process of cognitive decline. Bonsang et al. (2012), however, also document a significant negative effect of retirement on cognitive performance using longitudinal data from the Health and Retirement Survey in the U.S.

[4] Agarwal and Mazumder (2013) document that higher cognition is also associated with better financial decisions, and Korniotis and Kumar (2013) find that smarter investors enjoy higher returns on their portfolio. There is also a large literature that documents that financial literacy, which can be viewed as a component of cognitive ability, is an important driver of (the quality of) financial decision-making. Lusardi and Mitchell (2014) review this literature.

[5] Christelis et al. (2010) use data from one wave of the Survey of Health, Ageing, and Retirement in Europe (SHARE) to document that cognition is related to stock ownership, which is arguably driven by information processing, liquidity, wealth, risk preferences, life expectancy, and various additional factors. They conclude "that information barriers, rather than preference heterogeneity, can indeed explain the association between cognitive abilities and portfolio decisions." However, they do not analyze to what extent controlling for cognition alters the estimated relationship between age and stock ownership. In this paper we document explicitly how controlling for cognition affects the estimated association between age and risk preference.