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Retirement and cognitive development in the Netherlands: Are the retired really inactive?☆

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ABSTRACT

This paper uses longitudinal data to analyze the relation between retirement and cognitive development in the Netherlands. Controlling for individual fixed effects and lagged cognition, we find that retirees face lower declines in their cognitive flexibility than those who remain employed, which appears to be persistent 6 years after retirement. However, the information processing speed of low-educated retirees declines faster. The magnitude of both changes in cognition is such that retirees appear 5–6 years younger in terms of cognitive flexibility, and older in terms of information processing speed. We show that these relationships between retirement and cognitive development cannot be explained by (1) feeling relieved from routine work, (2) changes in mood, (3) changes in lifestyle, and (4) changes in blood pressure. The decline in information processing speed after retirement particularly holds for the low educated. This could increase the social costs of an aging society.

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1. Introduction

The greying of the post-war baby-boom generation and increased longevity are forcing European countries to postpone the mandatory retirement age to maintain the financial sustainability of the pension systems. This places cognitive function at older ages among the top public health priorities (Mauer, 2010). Skirbekk et al. (2012) show that variation in cognitive functioning of older workers create large differences in the severity of the ageing problem between countries. Several studies in the economic literature analyze the physical and mental health of early versus later retirement (Dave et al., 2008; Coe and Zamarro, 2011). Furthermore, there is an emerging literature on the effects of labor market inactivity on a person's cognitive abilities. While the psychological literature raises the related question of whether the non-use of cognitive abilities causes cognitive decline (Schaie, 1994; Bosma et al., 2003), it does not relate the use or non-use of cognitive abilities to participation in the labor market. This raises the question of whether we have more cognitive stimuli at work or during retirement, which may mitigate the negative relation between cognitive capacity and age (Salthouse, 2006). Mazzonna and Peracchi (2012) develop a human capital model which explains that those retired lose the incentive to invest in cognitive repair activities. This model,

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however, assumes that individuals only aim to maintain their cognitive abilities for investment purposes. Instead, those who retire from a routine job or retirees who change their lifestyle might have more stimuli to maintain their cognitive abilities when retired. Moreover, Woollett and Maguire (2011), suggest that there might be a trade-off between various dimensions of cognition. This might particularly hold for low skilled who have a limited brain reserve (Staff et al., 2004).

Whereas Coe and Zamarro (2011) do not find any effect, Bonsang et al. (2012) and Rohwedder and Willis (2010) as well as Mazzonna and Peracchi (2012) find that retirement has a negative effect on cognitive functioning. These studies use the same or similar datasets and use country differences in the age pattern of retirement, retirement eligibility or the difference between the actual and legislated ages of eligibility for early and normal retirement to control for unobserved heterogeneity and the endogeneity of retirement decisions. Bingley and Martinello (2013) show that different levels of average schooling across countries drive the negative correlation between retirement and cognitive functioning. Their replication study shows that this explains a large part of the negative retirement effects found in the earlier studies.

Furthermore, most studies focus merely on cognitive ability as measured by a word recall test or a verbal fluency test due to lack of alternative data on other measures of fluid intelligence (Salthouse, 2012).[1] However, it should be noted that cognition refers to broad aspects of intellectual functioning including cognitive flexibility and information processing speed (Bosma et al., 2003; De Grip et al., 2008; Mauer, 2010).

This paper analyzes the effects of both the transition from work to retirement and being retired on the development of a person's cognitive abilities.[2] We distinguish between four dimensions of cognition: (1) immediate, (2) delayed verbal memory, (3) cognitive flexibility (Stroop test), and (4) information processing speed and three types of labor market activity namely employed, inactive and retired. Our analyses use longitudinal information on workers' cognitive abilities from the MAastricht Aging Study (MAAS; Jolles et al., 1995). We address the issue of causality using the panel structure of the data. In this data set, a person's cognitive abilities and labor market activity are measured at three points in time, wave 1 in 1993–1995; wave 2 in 1999–2001; wave 3 in 2005–2007. This allows us to measure the impact of changes in labor market activity on a person's cognitive abilities while controlling for individuals' fixed effects and lagged levels of cognition.[3]

The structure of these data allows us to distinguish between those who have been retired for at least 6 years and those who retired in more recent years. This allows us to differentiate between the short-term impact of the transition from work to retirement from the long-term impact of being retired. Furthermore, our data allow us to distinguish between retirement and non-retirement-related inactivity (i.e., unemployment or unpaid housework at an earlier age). This distinction could be important because retirement might be related to different life-style changes than being unemployed.[4]

Our dynamic fixed effects estimates show that those who retire face a significantly smaller decline in cognitive flexibility. This smaller decline appears to be persistent since those who have been retired for six years or more also show a significantly lower decline in cognitive flexibility. The size of the changes in cognitive flexibility related to retirement is considerable and compares to the loss in cognitive flexibility between the ages of 65 and 70–71 years old. However, workers who retire face a significantly higher decline in information processing speed compared to those who remain at work. This reverse change in cognitive development is of similar magnitude to the change in cognitive flexibility related to retirement. Following Coe and Zamarro (2011), we do not find a significant effect of retirement on (delayed) memory as Bonsang et al. (2012), Rohwedder and Willis (2010) and Mazzonna and Peracchi (2012) did. These results show that retirement may have different effects on the various dimensions of a person's cognitive ability.

It is important to note that in as far as our methodology could not remove any dynamic forms of endogeneity, consensus in the current literature is that a negative shock in cognition induces people to retire because they find it more difficult to prolong employment. Hence, those with high cognition remain working, i.e., there is a positive correlation between working and cognition in the absence of any true causal relation. In this case a positive coefficient for work on cognition could simply reflect endogeneity. However, in our paper, we find that retirement is positively related to cognitive flexibility (STROOP). Hence, this outcome cannot be explained by a negative selection into retirement.

We test some hypotheses that may mitigate the relationship between retirement and a person's cognitive development. The first hypothesis focuses on the possibly negative effect of continuous employment in an uninspiring job on a person's cognitive development. From this hypothesis, we derive the expectation that, after a certain age, working has a wearing effect on certain cognitive abilities after someone has been doing the same routines for many years. Therefore those who are low-educated especially may benefit from this relieved effect when they retire. However, as high-skilled workers retire from jobs that

[1] Mazzonna and Peracchi (2012) also include scores on numeracy and a modified measure of orientation in time in their analyses.

[2] Our data do not allow us to include non-cognitive abilities such as perseverance (see e.g., Heckman, 2006) and creativity (see e.g., Tremblay et al., 2010).

[3] We use the bias-corrected Least Squares Dummy Variable (LSDV) estimator developed by Kiviet (1995) to account for the inherent downward bias in dynamic panel regression with fixed effects. The dynamic fixed-effect model enables us to account for the effect on cognition of unobserved variables that are constant over time conditionally on lagged cognition.

[4] Other studies on the relationship between retirement and cognitive functioning consider anyone who is not in the paid labour force as being retired (Coe and Zamarro, 2011), while Bonsang et al. (2012) include all those who are out of the labour market with the intention to of staying out permanently. In these studies, those retired include the disabled.

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