The Effects of Employment on Cognitive Decline beyond the Retirement Window

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Research question and study aims: Among older adults (>65 years), dementia ranks as the leading cause of neurological disability and third leading cause of overall disability. Steep cognitive decline with age—sometimes at younger ages—corresponds with onset of dementia (Deary et al. 2009). Research suggests that work may reduce risk of dementia in older age by producing resilient cognitive and/or neurobiological architectures (Tucker-Drob & Salthouse 2011). If true, the employment-cognition relation could bolster the case for federal policies to promote work not only at older ages, but also in the decades prior to usual retirement ages. Such efforts can potentially have longer-run effects on employment and hence on retirement security, as well as benefits from improved cognitive functioning.

Because the employment-cognition relationship could reflect an adverse impact of cognitive decline on employment, researchers use quasi-random variation in retirement age cutoffs to isolate the causal effect of employment. This work shows (with some mixed evidence) that employment delays the onset of cognitive decline (e.g., Celidoni et al. 2017; Mazzonna & Peracchi 2017). However, because it relies on retirement policy changes, this more rigorous research focuses on a narrow age range (the mid to late 60s). Thus, it remains an open question whether employment at earlier pre-retirement ages delays cognitive decline. Whereas severe cognitive impairment (and dementia onset) typically occurs after age 65, pathologically meaningful cognitive decline is detectable as early as age 40 (Salthouse 2009), and over 25% of adult men aged 45-64 years in the US are not working. These factors motivate one of our core questions: What is the causal impact of employment on cognitive decline at ages 45-65?

In this earlier age range, there is a large race difference in employment, and there are stark disparities in later-life dementia. For instance, only 65% of Black men aged 45-64 (vs. 78% of white men) are employed, while older Black adults have a 2.5-fold higher dementia risk relative to older white adults (Garcia et al. 2019). These factors motivate our second core question: Do race gaps in employment during middle-to-older-age help explain Black/white differences in cognitive decline?

Data: We extract cognitive health indicators and employment history from REGARDS (REasons for Geographic and Racial Differences in Stroke, see Howard et al. 2005), a national longitudinal study of 30,119 Black or white adults. UAB (University of Alabama-Birmingham, with Crowe as Co-I) leads this study and we have received approval for analysis (#2023-PA713). Black and southeastern residents are over-sampled. We measure cognition using annual cognitive assessments via the Six-Item Screener. Longitudinal employment data come from a supplemental survey of REGARDS participants between March 2011 and March 2013, 3.5 to 9.5 years after participants enter the study (MacDonald et al. 2014). This survey collected detailed retrospective data on employment status and other job-related variables, allowing us to measure longer-term employment changes. We also use the HRS (Health and Retirement Study), which consists of a nationally representative sample, and an over-sample of Black adults (crucial for our project). We focus on four cognition assessments that are asked across waves: Immediate Word Recall, Delayed Recall, Serial 7s, and Backwards Counting. As in prior work, these will be aggregated to a "global" cognitive score and mapped to cognitive status using the Langa-Weir classification (Crimmins et al. 2011). Employment history is captured at sample entry, and employment status is recorded in each wave. Restricted-use data on county and industry have been obtained (RDA #2023-095). The HRS and REGARDS have sufficiently large samples to permit subgroup analysis by Black/white adults. We also use data from County Business Patterns (CBP) to construct instrumental variables (IVs) used in one of our strategies. The CBP data, which are annual, are derived from the universe of jobs covered by Unemployment Insurance (UI), and hence provide very accurate measures. We map counties into Commuting Zones (CZs), which define local labor markets.

Methods: One strategy we use purges pre-retirement employment variation of endogeneity with respect to individual-level cognitive changes by aggregating the data to the local labor market level (CZ). Here, the employment variation reflects local labor market changes rather than individual changes that could be driven by changes in cognition. We will also control for local shocks—most notably opioid use and

abuse—that can affect both employment and cognition. The second strategy constructs IVs for individual variation in employment patterns based on commuting-zone (CZ) employment changes in workers' industries, including using Bartik shocks to generate exogenous local change. There is substantial geographic variation in employment change by CZ, and large reductions in employment at ages 45-64 in parts of the southeast (which is more pronounced for men).

In preliminary results using the HRS, an individual-level OLS regression of the Laguna-Weir global cognitive score on number of years since a respondent last worked for pay yields an estimated coefficient of −.148 ($p<.01$); the magnitude implies that 10 years since last employment would predict a 0.36 standard deviation lower cognitive score. When we aggregate to the CZ and year the estimated magnitude is a shade larger and still strongly significant ($p<.01$). This aggregate estimate could still be biased by common influences on employment and cognition (such as opioid use), which we will explore using data sources such as Opioid Dispensing Rate Maps (2023) and the NCHS Data Visualization Gallery (2023). When we instrument for the individual employment measure with the 10-year employment growth rate in the worker's current or most recent industry, the estimated effect is somewhat larger than the OLS estimate, but only marginally. This runs counter to the bias if adverse cognitive changes reduce employment; but if cognitive decline reduces permanent income (or wealth), it could increase employment, implying bias towards zero in the OLS estimates. We will explore many variants of these models, including different time horizons for the employment change and different IVs capturing exogenous changes in local labor demand.

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