

The impact of population aging on the labor market

Population aging in advanced economies represents one of the most pressing challenges these nations currently face. The extent of this demographic shift—measured by the age dependency ratio (ADR), which reflects the number of retirees relative to the working-age population—is unprecedented. These trends raise a critical question: how will population aging affect the labor market, whose performance is central to the welfare of households and society as a whole?

This research project seeks to investigate how population aging influences labor market outcomes. Specifically, the objective is to measure the effects of a substantial and realistic rise in ADR based on demographic projections for both the United States and Poland. The study will examine a broad array of labor market variables, including real wages, GDP per total hours worked, hours worked per employee, the employment-to-population ratio, GDP per capita, the unemployment rate, labor's share of income, age-specific unemployment rates, and the number of vacancies posted by employers. The resulting quantitative findings are expected to provide meaningful guidance for shaping effective economic and labor policies.

To explore this issue, I intend to construct a quantitative structural model that brings together two widely recognized macroeconomic frameworks. The first is the Diamond-Mortensen-Pissarides (DMP) model, a foundational tool for analyzing labor market frictions and dynamics. The second is the overlapping generations (OLG) model, commonly employed to study the economic consequences of demographic shifts, particularly population aging. A central question is whether this integrated framework can realistically capture the effects of changes in the age dependency ratio (ADR) on labor market outcomes.

To address this problem in my preliminary research, I have used the influential empirical study by Maestas, Mullen, and Powell (2023). Their work, which applies econometric methods to estimate the impact of rising ADR on labor market and macroeconomic indicators—including real wages, GDP per total hours worked, hours per worker, the labor force participation rate, and GDP per capita—serves as a critical reference point. In my initial analysis, I demonstrated that a stylized combination of the OLG and DMP models fails to reproduce these empirical results (in qualitative terms). However, my further investigations revealed that by incorporating one additional component into the model, it becomes capable of qualitatively aligning with the findings of Maestas, Mullen, and Powell (2023). This enhancement allows the model to meet two key objectives: qualitatively reproducing observed empirical patterns and offering a consistent, theory-based explanation for them. The added component is what I refer to as aging spillovers—a mechanism through which increases in the ADR negatively affect labor productivity. This concept is supported by a growing empirical literature linking demographic aging to declines in entrepreneurship and innovation, which in turn decreases productivity. Additionally, aging spillovers may arise from notable productivity losses among working individuals who provide unpaid care for elderly relatives, as documented in various studies.

Building on these insights, I plan to extend the current DMP-OLG model with aging spillovers to a comprehensive quantitative macroeconomic framework. This enriched model will not only aim to quantitatively replicate the empirical results of Maestas, Mullen, and Powell (2023), but will also allow for the assessment of aging's broader effects on a range of macroeconomic variables beyond those examined in their work.