Health Insurance and Retirement Incentives

Daniele Marazzina

Joint work with Emilio Barucci & Enrico Biffis

In this paper we study retirement incentives in a continuous time framework where agents face health shocks and medical expenses, and can dynamically adjust their portfolios and labor supply in response to changes in health and market conditions. We find that health insurance tends to have important effects on retirement and investment decisions, raising stock market participation and accelerating retirement. We measure some of these effects in closed-form, and use our model as a benchmark to quantify the labor supply responses and welfare costs of different forms of employer-provided insurance and social programs.

One of the main challenges of pension and healthcare reforms is to understand labor market responses and quantify their fiscal effects. Unfortunately, observed labor supply and retirement behavior are difficult to rationalize without a benchmark against which to compare agents' decisions. In this paper, we develop a parsimonious lifecycle model that allows us to model the labor supply and retirement incentives of an agent in response to aging, medical expenses, wealth shocks, and health insurance.

We work with preferences for leisure and consumption that are characterized by a non separable utility function with constant relative risk aversion. Agents are faced with a rising mortality risk profile resulting from the natural aging process and health shocks triggering medical expenses. Agents can save by investing in a riskless asset and in a risky asset. They also have access to a private life and health insurance market, and can modulate their labor supply in response to changing health and market conditions. An important feature of the model, is that agents can also choose to retire and benefit from a discrete jump in leisure in exiting the job market. We solve the model in closed form, characterizing the main drivers of investment, insurance demand, and consumption when the optionality of labor supply is fully taken into account. We then extend the baseline model to include employer provided health insurance (with tied and retiree coverage), and quantify the impact of these insurance channels on labor and retirement decisions by using our model as a benchmark.

Our analysis is in line with recent literature emphasizing the importance of health insurance and saving (e.g., French and Jones, 2011) in understanding retirement behavior, and suggesting that healthcare programs can have significant effects on labor supply and retirement behavior. In addition to the extant literature, the model allows us to gain structural insights into the option value of retirement, and hence into the incentives to save and work induced by different features of health insurance programs.

To give an idea of the trade-offs at play, consider the insights of Farhi and Panageas (2007), who show that with an option to retire the wealth of an agent does not only quantifies the resources available for future consumption, but also the distance to retirement, in the sense the exercise of the option is optimal when reaching a wealth threshold from which the agent can optimally consume without outliving her resources. The higher the life expectancy of the agent, the higher the endogenous wealth target, and the stronger the incentive to work longer to support future consumption. Let us introduce now aging and health shocks triggering medical expenses. Even though adverse health shocks reduce life expectancy, out-of-pocket medical expenses deplete the agent's resources and increase the
distance to retirement. The availability of health insurance can therefore have a significant impact on the agent's decisions, through the nonlinear payoff of the retirement option.

More generally, we show that the interplay between insurance and self-insurance can produce a wide range of optimal consumption and investment patterns once agents' heterogeneity is taken into account. In particular, our simple model can produce results that are observationally similar to those delivered by richer models by allowing for labor supply flexibility and retirement incentives. For example, even if in our baseline model we abstract from risky wages beyond health state dependence, we can obtain upward sloping (or hump shaped) stock portfolio holdings over time without the need to have positive correlation (or cointegration, respectively) between wages and the financial market (e.g., Benzoni et al., 2007).

On the methodological side, our contribution is related to the literature on lifetime asset allocation in continuous time. We address an optimal consumption-investment-retirement problem, assuming that agents have to take five different decisions: the retirement date which is irreversible; the labor rate before retirement; the consumption rate, the bequest and the portfolio decision. Mortality is fully described by an independent Poisson process. The agents are also exposed to an exogenous health shock that occurs at the random time and triggers instantaneously medical expenses. Again, we assume this random time to be distributed according to an independent Poisson process. The health shock also leads to higher death risk and lower wage; however, the agents can insure against medical expenses and death risk. Optimal portfolio optimization problems are often very complex because of their dynamic and stochastic nature, high dimensionality and the constraint complexity. The techniques to solve these problems belong to two large families: stochastic dynamic optimal control and duality-based methods. In this work we deal with the second class of methods, in the spirit of He and Pages (1993); Choi et al. (2008), coupled with a regime-switching framework to deal with the shocks in the mortality risk, obtaining explicit solutions and the optimal strategies for the considered agents. As an example, we prove that agents retire when a wealth threshold, which is computed analytically and depends on the mortality rate as well as the provided health insurance, is reached. Moreover the presence of tied coverage, i.e., health coverage provided by the employer while the agents are actively working, induce the agents to postpone their retirement decision, while a retiree coverage, i.e., health coverage provided by the employer after the retirement decision, even if coupled with a tied one, accelerates retirement with respect to the baseline model without insurance.

**Keywords**: Intertemporal optimal consumption and portfolio; Labor income; Retirement; Health insurance; Regime Switching

**References**


