Interest-rate risk and household portfolios

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Changes in real interest rates have significant implications for households. First, when interest rates decrease, asset prices soar, resulting in capital gains for long-term asset owners. These gains are substantial and unevenly distributed (Binsbergen, 2021; Greenwald et al., 2021). Second, lower interest rates make it harder to save for retirement. To finance $1 of expenditure at the age of 70, a 35-year-old worker needs to invest 71 cents at a 1% rate of return, compared to only 36 cents at a 3% rate of return. The fact that capital gains arise when future rates of return worsen complicates our understanding of who benefits or loses from long-term interest rate fluctuations.

The goal of our paper is twofold. First, we seek to understand why certain households choose to invest more in long-term assets. Second, we evaluate the extent to which the distribution of interest-rate risk among households is optimal.

We start by analyzing US households' balance sheets to identify who benefits from changes in the market value of assets and liabilities induced by interest-rate fluctuations. At first glance, the data suggest that interest-rate risk is unequally distributed, as three stylized facts illustrate. First, the interest-rate sensitivity of wealth is hump-shaped over the life cycle. Second, within an age group, the interest-rate sensitivity of wealth increases with both earnings and wealth. In other words, middle-aged and richer households invest more in long-term assets that rapidly appreciate in value when rates fall. Third, over the last 60 years, trends in wealth inequality have tracked changes in the valuation of long-term bonds.

The interest-rate sensitivity of wealth must, however, be interpreted in the broader context of a household's life-cycle problem. Therefore, we set up a parsimonious life-cycle model to assess these stylized facts against an optimal benchmark. In our model, households choose the interest-rate sensitivity of their wealth by mixing a short- and a long-term asset. Accounting for households' stochastic stream of labor income, the progressive Social Security system, and stochastic interest rates, we find that the patterns we document in the data are broadly consistent with the model's predictions, reflecting a close-to-optimal distribution of interest-rate risk across households.

Two forces explain why the model matches the US data well. First, older investors have shorter investment horizons, so they are less affected by rate fluctuations and hence should invest less in long-term assets. Second, because human capital and Social Security have their own exposures to interest-rate risk, they create substitution effects that cause younger and poorer households to reduce their long-term asset holdings. In particular, young households are endowed with a large stock of long-

duration human capital, and low-income households are endowed with a large stock of long-duration Social Security, both of which reduce the need for long-term assets. These forces generate both the hump-shaped life-cycle profile and the within-cohort heterogeneity observed in the data.

While it might appear that interest-rate risk is far from equally distributed in the data, our model shows that, to truly bear identical interest-rate risk, households with the same investment horizon need to hold different portfolios. Thus, while interest-rate shocks can result in sizeable changes in *wealth* inequality, they generate much smaller changes in *welfare* inequality. Indeed, our model generates large changes in the concentration of wealth—roughly half of historical variations since 1960—without any increase in within-cohort welfare inequality.

Our study shows that portfolio-choice theory is a useful tool for understanding why wealth inequality rises and falls over long periods of time, why the inclusion of Social Security wealth significantly changes these trends, and why we should interpret the implications for welfare with caution.