Econ-ARK: Economically Informed Financial Advice

Revolutionizing economic modelling with open-source computational tools

The future of economic modelling

Challenges to economic modelling

Traditional economic modelling remains inaccessible and unsuitable for business and policy application

Complexity

Real-world complexity has been difficult to incorporate into applied economic modelling

Simplifying mathematical assumptions

Economists traditionally addressed challenges of complexity by making simplifying assumptions

- These assumptions often lead to **nonsensical policy and financial advice**

Financial planning is hard

Nobody should feel incompetent whilst navigating the financial advice landscape -- lifecycle saving decisions *really are* complex, so complex that getting the answer *right* requires the best computational tools we have

- Current methods used to give financial advice are not based on analysis of what is **optimal for the customer**

Computational advances

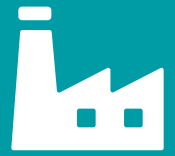
Advances in computational power

Computation

Advances in computational **power** and **algorithms** now allow economists to solve more complex models that can answer real world questions

Household decisions

Lifecycle models can robustly solve the complex decision-making processes of households, including consumption, savings, and investment choices



Firm behavior

Industrial organization models can simulate the production, pricing, and investment decisions of firms, helping to understand market dynamics

Macroeconomics

General equilibrium models can be used to capture interaction of households and firms across entire economies, allowing for monetary and fiscal policy analysis and forecasting

Econ-ARK leverages computation to bridge the gap between theory and `real-world' application

"The widespread adoption of advanced computational methods by economists in government and industry is hindered by the intricate, idiosyncratic development of economic models by a small number of pioneering scholars and their protégés."

CHRIS CARROLL

Structural models vs. AI

Why is structural economic modeling different to AI?

- ## Interpretable

  Structural models use powerful computers to make **economic mechanisms** transparent, interpretable and open to scrutiny

- ## Scenario generation

  Structural models are used to run counterfactual `what if' analyses, **robustly** illuminating the impact of policies on possibly **unobserved economic variables**

- ## Rigour

  Structural models allow for rigorous testing, validation, and **communication of economic mechanisms** to both academic and policy audiences

- ## Bridging Theory & Data

  Computational resources are used to discipline theoretical models. Instead of abandoning economic theory, structural models align theory with the `real world'

- ## No Black Boxes

  Unlike many AI/ML approaches, structural models are not opaque 'black boxes' but rather rely on clear, economic relationships between variables

The Econ-ARK project

Open-source tool-kit enabling the application of advanced economic analysis to business and policy

- ## Computational Economics

  Advance the frontier of computational techniques in economics so that policy makers and the private sector can tackle complex, **high stakes** problems using structural economic models

- ## Open-Source

  Provide a modern, robust, and open-source set of high-quality computational tools for the research community outside and within academia

- ## Modular Design

  Allow researchers to mix, match, and extend the tool components within their existing workflows to model their own problems

- ## Lowering Barriers

  Make it much easier for new scholars to begin using these powerful computational techniques in their research

Personalized financial advice

Personalized financial advice

Primary area of focus for Econ-ARK has been models that use fund data to generate optimal portfolio allocations for individuals -- **lifecycle models**

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Why use structural economic models for financial advice?

Existing **third party methods** to generate personalized financial advice are 'black boxes' and incorporate ad-hoc financial `modelling' with opaque subjective judgements regarding how people should save

- Existing methods do not consider what is economically and mathematically optimal for the customer
- Existing methods cannot provide a defensible economic justification for advice

Econ-ARK tools can be used to provide customized advice regarding **optimal** accumulation, decumulation and asset composition

Advice can be customized based on **individual characteristics such as:**

- wealth
- occupation
- income
- risk preferences
- family size

Advice based on structural modelling has a foundation in rigorous economic reasoning that can be **clearly explained**

- Economic rigor enables fund managers to meet their **fiduciary duties and improve customer engagement and financial outcomes**

Personalized financial advice

How much should an individual save and how should they allocate their savings?

Check out the Econ-ARK lifecycle model tutorial for complete technical details (and to run the models yourself!)

Consumer data provides empirical information to estimate behavioral parameters and validate a structural model

This data could include survey responses, asset allocations, purchase histories, or other relevant consumer information

- The estimates used to generate the model shown here are derived from the Survey of Consumer Finances (SCF)

The behavioral parameters are the key inputs that define how consumers behave under various economic and market factors

The parameters have economic interpretation (risk aversion, discounting, housing preferences etc.) and can also capture behavioral biases

The structural lifecycle model represents the underlying economic and demographic processes that drive consumer behavior

- Tailored structural models can be developed and estimated to address diverse questions. For instance, a comprehensive asset allocation framework encompassing homeownership can be constructed by incorporating housing and mortgage related variables.

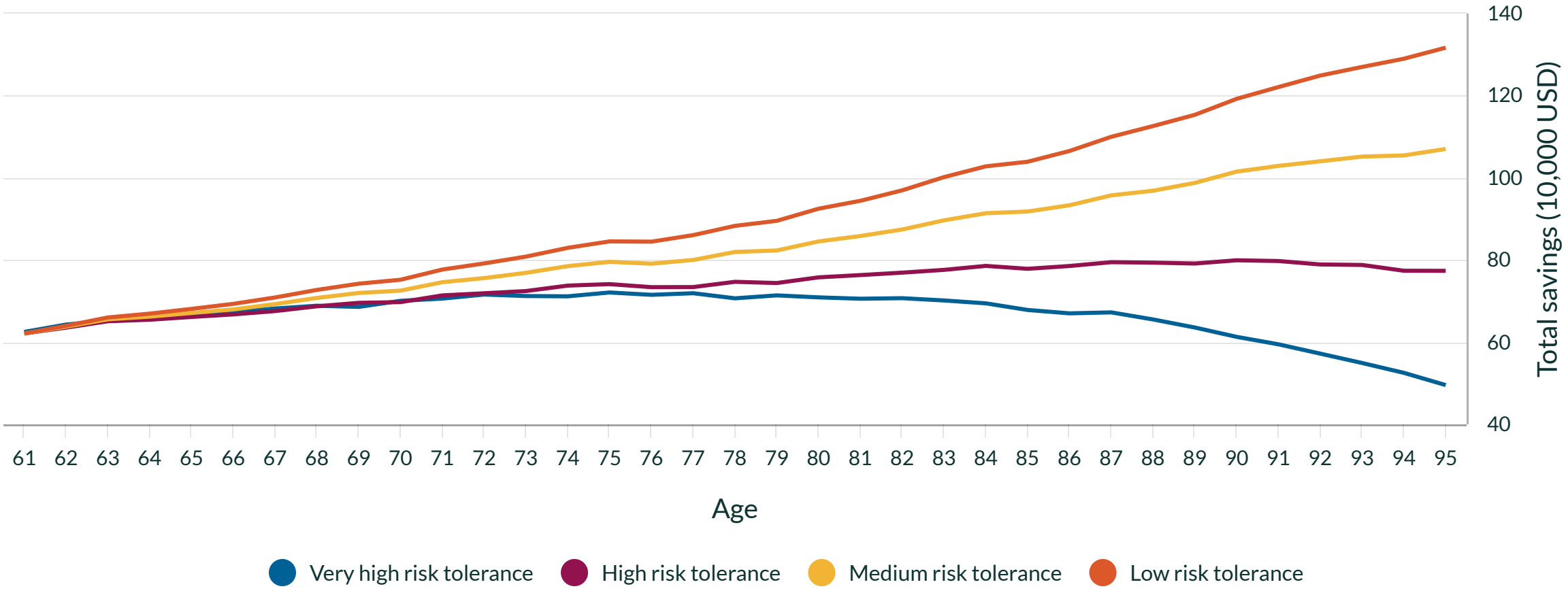
The structural model is used to run scenario simulations, where the behavioral parameters are perturbed to represent 'what if' questions.

- For example, how much should a customer save if they were highly risk averse?

Simulations

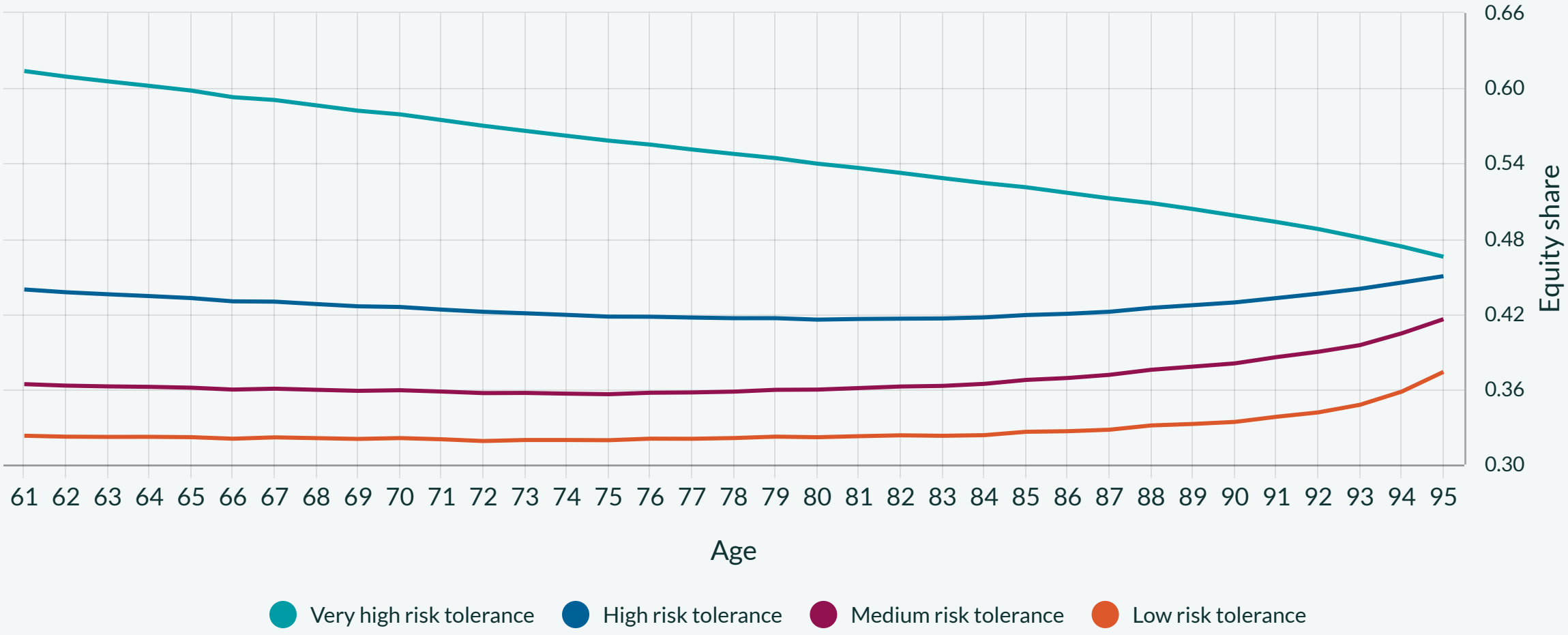
Scenario 1: Risk tolerance and retirement glide path

How much should retirees with different levels of risk save?



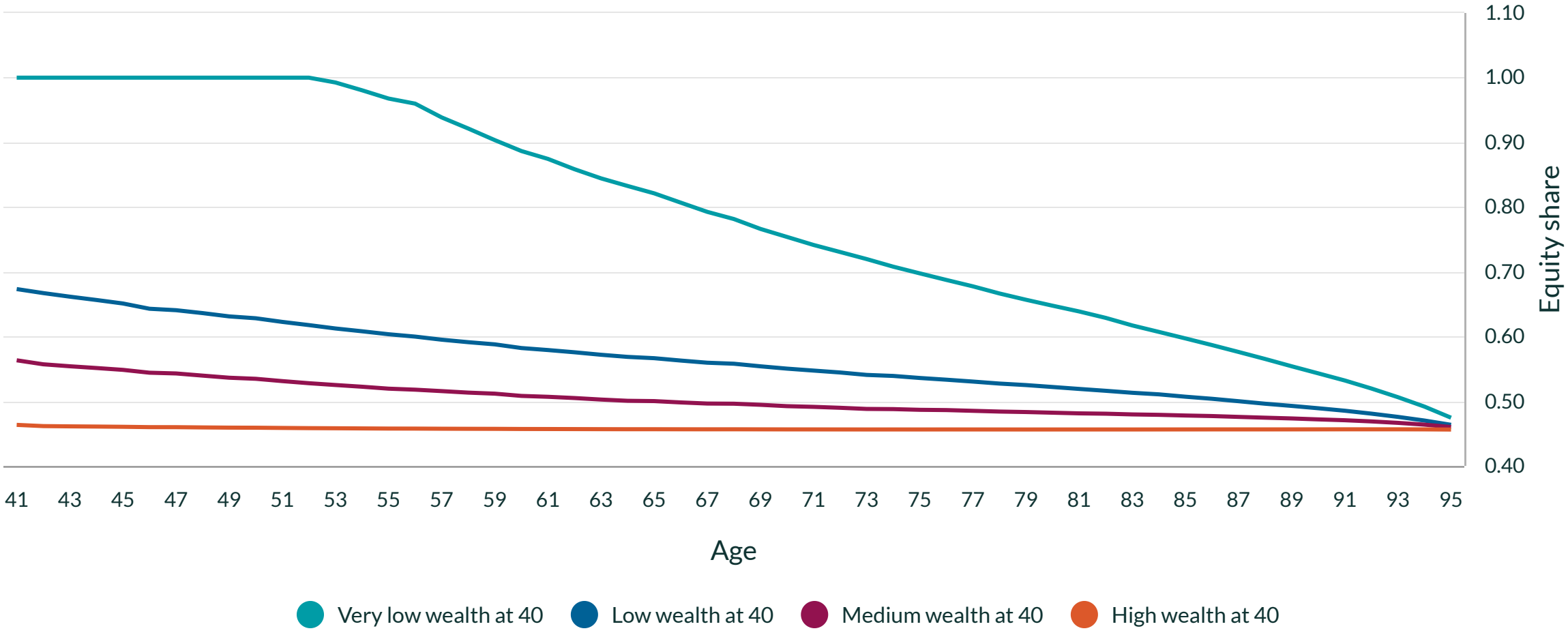
Scenario 2: Risk tolerance and retirement portfolio

Optimal equity shares for retirees with different levels of risk tolerance



Scenario 3: Wealth and portfolio share

Optimal equity share of portfolio for different levels of individual wealth



Engage with Econ-ARK

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Corporate Sponsorship

Become a corporate partner and support econ-ARK research and development. Help develop cutting-edge economic models and thought leadership in consumer finance.

Joint Research

Lead the frontier of the industry by collaborating with econ-ARK on technical research projects.

Bespoke Model Development

Work with econ-ark to build custom economic models tailored to your organization's needs, ensuring data-driven decision-making and strategic planning.

Training and Workshops

Participate in econ-ARK specialized training programs and workshops to up-skill your team on the latest economic modeling techniques and applications.

Further applications in consumer finance

Customer Insights

Gain insights into customer's behaviors, financial position and how they would respond to economic shocks

- **Example:** Identify customer segments under financial distress, target segments with 'emergency reserve building' products

Marketing Campaigns

Use economically informed behavioral models to evaluate and simulate effect of marketing campaigns

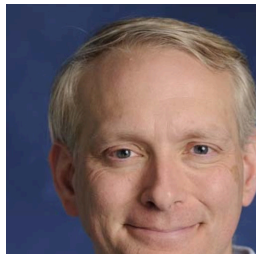
- **Example**: How do casual workers respond to a campaign to raise their awareness about their pension fund balance?

Credit Risk

Evaluate the impact of macroeconomic shocks to retirement security and balance sheets across a financial institution

- **Example:** How is a lender's asset health impacted by customer default risk if interest rates rise?

Econ-Ark team



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