Beyond the Status Quo: A Critical Assessment of Lifecycle Investment Advice

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Principles of Lifecycle Investing

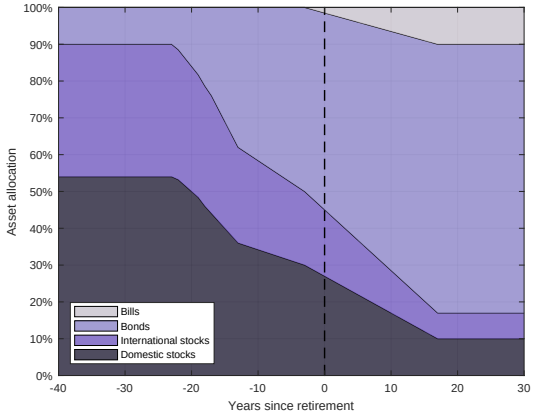
- Two central tenets underlie lifecycle investment advice:
  - ✓ Diversify across stocks and bonds.
  - ✓ Reduce equity allocations with age.

Principles of Lifecycle Investing

- Two central tenets underlie lifecycle investment advice:
  - ✓ Diversify across stocks and bonds.
  - ✓ Reduce equity allocations with age.
- This advice is ubiquitous:
  - Financial advisors and CFA study materials [e.g., Blanchett et al. (2023)].
  - Textbooks [e.g., Bodie, Kane, and Marcus (2024)].
  - Popular books [e.g., Dave Ramsey, Suze Orman, and Tony Robbins].
  - Academic studies [e.g., Campbell and Viceira (2002) and Cocco, Gomes, and Maenhout (2005)].
  - US regulations [Pension Protection Act of 2006].
    - Qualified Default Investment Alternatives (QDIAs) provide "long-term appreciation and capital preservation through a mix of equity and fixed income exposures based on the participant's age," [29 CFR §2550.404c-5(e)(4)(i)].

Target-Date Funds

- Where is the $600 billion in annual retirement contributions invested?
  - TDFs are the default in 98% of employer plans [Vanguard (2023)].
  - Participants use the default (83% own TDFs; 59% invest fully in a TDF) [Vanguard (2023)].



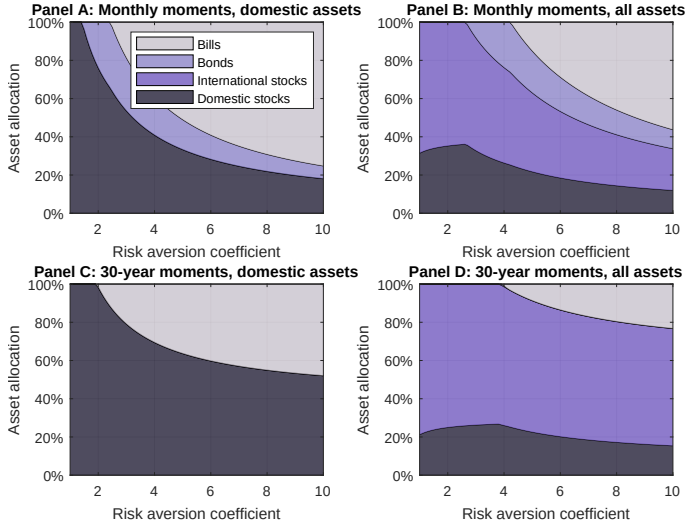
Our Paper

- We challenge the two central tenets:
  - ✗ Diversify across stocks and bonds.
  - ✗ Reduce equity allocations with age.
- Within a lifecycle model with labor income risk, Social Security income, and longevity risk, a US couple optimizes utility over real retirement consumption and bequest.
- The optimal lifetime allocation of 33% domestic stocks, 67% international stocks, 0% government bonds, and 0% government bills vastly outperforms age-based, stock-bond strategies.
- To match the expected utility of the optimal strategy with a 10.0% savings rate, a couple using the TDF must save 16.1%.

Our Contribution

- Normative literature on the optimal design of lifecycle investment strategies [e.g., Michaelides and Zhang (2017, 2022); Dahlquist, Setty, and Vestman (2018); Kraft, Munk, and Weiss (2019); Gomes, Michaelides, and Zhang (2022); and Duarte, Fonseca, Goodman, and Parker (2024)].
- Modeling investment opportunity set:
  - Including **international stocks** within a lifecycle investing framework.
  - Modeling **long-horizon returns** using the block bootstrap approach to preserve the empirically relevant features of investment opportunities and non-normalities that affect the return distribution without requiring ex-ante specification of which aspects matter most.

Mean-variance Asset Allocation



Roadmap

- Methodology:
  - Lifecycle model and optimization.
- Results:
  - Base case static asset allocation results.
  - Modifications of the static base case model.
  - Deviations from static optimization.
  - Reconciling with the status quo.

Base Case Lifecycle Design

- A US household composed of a female and a male. Mortality is based on SSA tables.
  - Pre-retirement:
    - Eligible to work from age 25 until retirement at 65.
    - 10% savings rate if labor income exceeds $15,000 USD.
  - Post-retirement:
    - 4% withdrawal rate of wealth at retirement in the first year and inflation-adjusted amounts after that.
    - Social Security benefits based on SSA formulas, including SSI if their retirement income falls below the threshold.
    - Bequest based on remaining wealth upon the death of the last survivor in a couple.

Household Portfolio Choice Problem

- The household chooses a static asset allocation across domestic stocks, international stocks, bonds, and bills to maximize expected utility:

$$\max_{\{w\}} \quad \mathbb{E}_0[U(C,B)] = \mathbb{E}_0\left[\sum_{t=T_{ret}+1}^{T_{max}} \frac{\left(C_t/\sqrt{H_t}\right)^{1-\gamma}}{1-\gamma} + \theta\frac{(B+k)^{1-\gamma}}{1-\gamma}\right], \tag{1}$$

$$\text{s.t.} \quad R_t^p = w' R_t, \tag{2}$$

$$\mathbb{1}'w = 1, \tag{3}$$

$$w \geq 0, \tag{4}$$

$$W_0 = 0. \tag{5}$$

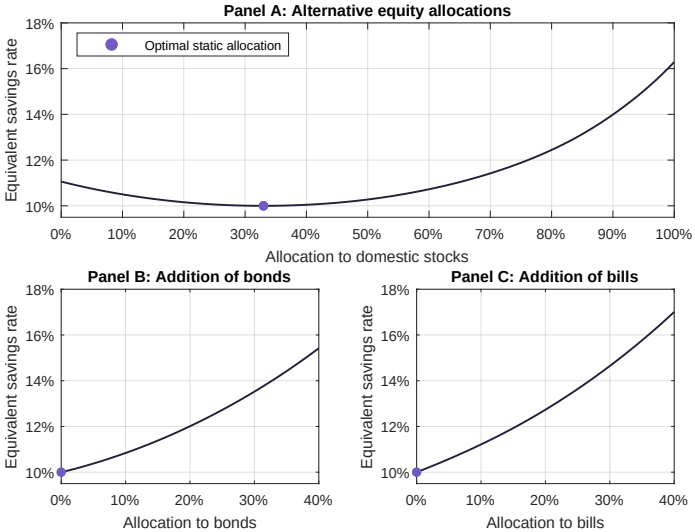
Simulation Components

1. **Longevity**: random longevity using SSA conditional mortality probabilities.
2. **Labor income**: based on the model of Guvenen, Karahan, Ozkan, and Song (2021) that allows for investor heterogeneity, permanent and transitory income shocks, and employment and nonemployment states.
3. **Asset class returns**: a stationary block bootstrap approach.
   - We draw a time series of monthly real returns for the four asset classes that covers the couple's lifespan with an average block length of 120 months.
   - The sample is a comprehensive dataset for domestic stocks, international stocks, bonds, and bills spanning nearly 2,600 years of returns from 39 countries over 1890-2023.

Optimal Lifecycle Portfolio

Strategy	QDIA	Asset class weights: Domestic stocks	International stocks	Bonds	Bills	Equivalent savings rate
Panel A: Base strategy						
Optimal	No	33%	67%	0%	0%	—
Panel B: Alternative strategies						
Bills	No	0%	0%	0%	100%	56.2%
Domestic Stocks	No	100%	0%	0%	0%	16.3%
Balanced	Yes	60%	0%	40%	0%	19.3%
TDF	Yes	[10%, 54%]	[7%, 36%]	[10%, 73%]	[0%, 10%]	16.1%

Deviations from Optimal Lifecycle Portfolio



Modifications to the Static Base Case

- Model parameters: average block length, the coefficient of relative risk aversion, bequest utility parameter, scaling household consumption parameter, and subjective discount factor.
- Alternative constant and varying with the level of wealth withdrawal rates, retirement ages, contribution rates, and lower income limits to contribute.
- Household types: singles or same-sex couples and heterogeneous income types.
- Correlation between labor income and stock returns.
- Leverage.

Description	Domestic stocks	International stocks	Bonds	Bills	Borrowing (% of wealth)
Panel L: Leverage					
Borrowing spread of 6.50% (High)	33%	67%	0%	0%	0%
Borrowing spread of 1.40% (Medium)	34%	66%	0%	0%	55%
Borrowing spread of 0.37% (Low)	28%	57%	15%	0%	100%

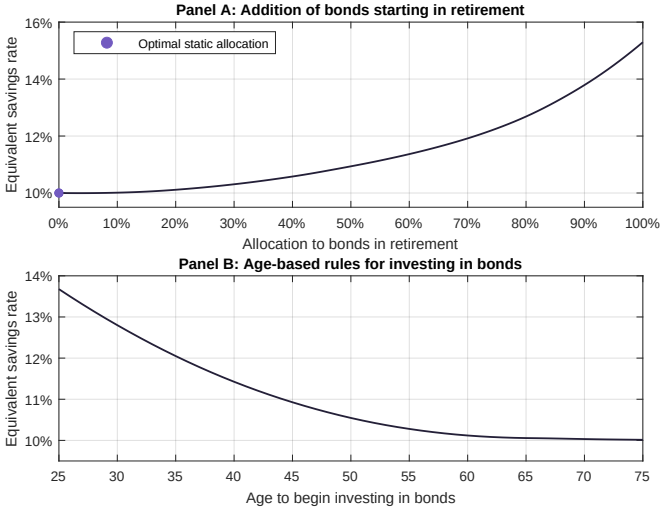
Static vs Dynamic Optimization

- Income and age-based contribution rates estimated by Parker, Schoar, Cole, and Simester (2023).
- Endogenous optimal retirement age based on (i) earnings, (ii) retirement wealth, and (iii) expected Social Security benefits.
- Time-varying investment allocations:
  - P/D ratios.
  - Age.

Conditional on Market State

Market state	Aggregate P_t/D_t	Domestic stocks	International stocks	Bonds	Bills
Panel A: Static asset allocation					
All	$[0, \infty)$	33%	67%	0%	0%
Panel B: Dynamic asset allocation					
Low P_t/D_t	$[0, 18.76]$	65%	35%	0%	0%
2	$(18.76, 23.47]$	28%	72%	0%	0%
3	$(23.47, 29.94]$	30%	70%	0%	0%
4	$(29.94, 43.67]$	31%	69%	0%	0%
High P_t/D_t	$(43.67, \infty)$	16%	75%	9%	0%

Age-based Strategies



Reconciling with the Status Quo

- Innovation along the two dimensions:
  - Including **international stocks** within a lifecycle investing framework.
  - Modeling **long-horizon returns** using the block bootstrap approach to preserve the empirically relevant features of investment opportunities and non-normalities that affect the return distribution without requiring ex-ante specification of which aspects matter most.

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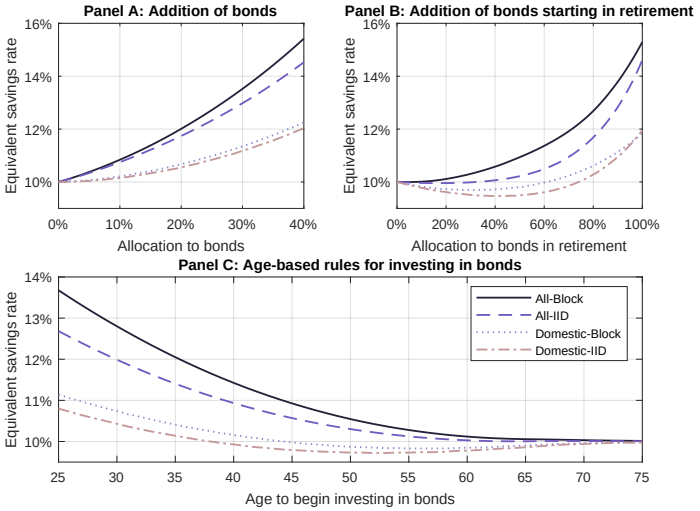

Conclusion

- We challenge two central tenets of lifecycle investing.
- Investors with access to international stocks optimally choose an all-equity portfolio for lifetime investment.
  - There is no significant economic benefit from holding bonds at any point during their lifetimes.
  - Our block bootstrap approach is key for modeling these long-horizon outcomes when investors are faced with changing investment opportunities and non-normalities.