

Meeting the Global Challenge of Funding Retirement:

A Case Study of Financial Innovation and Engineering in the Design and Implementation of a Solution

Robert C. Merton

Institute of Global Finance

University of New South Wales and Finsia

August 23, 2012

Providing Core Retirement Funding for Working- and Middle-Class Households

Lifecycle Hypothesis: Balance between the standard of living during the work years and the standard of living in the retirement years.

Goal: Provide standard of living in retirement equal to the standard of living enjoyed in *latter* part of the work life.

Goal Representation: Provide inflation-protected income for life in retirement adequate to maintain the standard of living in *latter* part of work life

Objective Function: Maximize probability of achieving desired target income (replacement ratio) subject to a minimum income (replacement ratio) and other risk constraints

Criteria for Good Design

The Next-Generation Solution must:

1. Offer robust, scalable low-cost investment strategies that make efficient and effective use of all dedicated retirement assets to maximize the chances of achieving the retirement income goal.
2. Manage the risk of not achieving this goal.
3. Integrate all sources of retirement savings into a tailored dynamic portfolio strategy, based on salary, age, gender, plan accumulation and other retirement-dedicated assets
4. Be effective for members who are and remain *completely unengaged*.
5. Provide meaningful information and choices with easy implementation to members who *do* engage:
 - Whether they are on track to realize their retirement goals.
 - What they can do if they are not.
6. Allow trustees to control their costs and eliminate balance sheet risk.

These Criteria Are Not Met By DB or Traditional DC Plans

Defined-Benefit (DB) plans are unsustainable

- Accounting standards and actuarial principles underestimate their cost.
- Longer life spans, volatile markets, and falling interest rates exacerbate the problem.

Traditional Defined-Contribution (DC) plans were not designed to provide core retirement benefits.

- They require participants to make complex financial decisions.
- They are not integrated with other retirement assets.
- They focus on the wrong goal: wealth instead of income for life.

Optimal Allocation Requires Integration of All Sources

Create a personal balance sheet for each member that integrates various sources of retirement income.

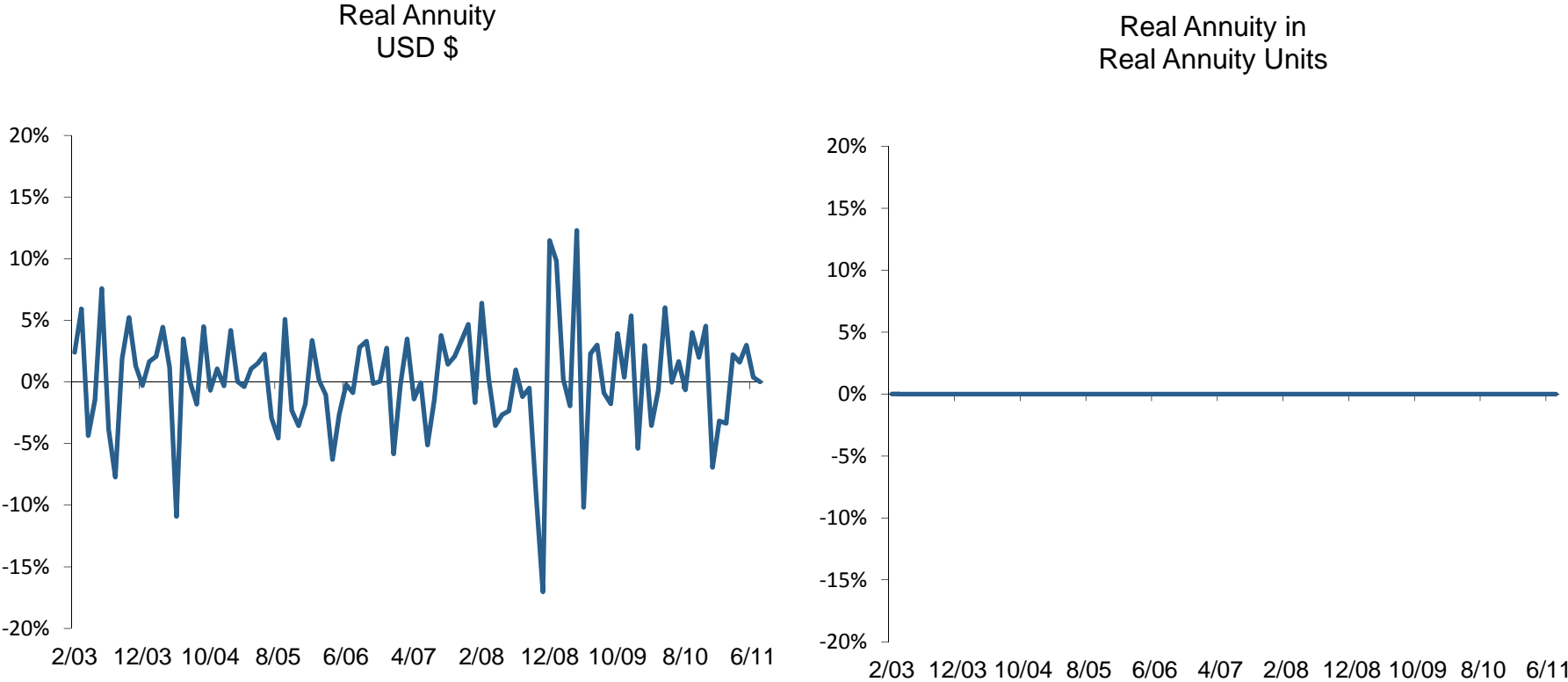
Assets	Liabilities
<ul style="list-style-type: none">• Age Pension & government benefits• DB plan rights• Current Superannuation (“DC”) plan balance• Projected future contributions (human capital)	<ul style="list-style-type: none">• Minimum retirement-income requirement• Surplus available for Desired Income goal

Integrated Retirement Investment Approach and Asset Allocation Risk Measures

	Total Assets	FC/SS/DB	DC Pension	
Total	\$1000	\$700	\$300	Ratio
Fixed Income	700	700	0	0%
Equity	300	0	300	100%
Total	\$1000	\$500	\$500	Ratio
Fixed Income	700	500	200	33%
Equity	300	0	300	67%
Total	\$1000	\$100	\$900	Ratio
Fixed Income	700	100	600	67%
Equity	300	0	300	33%

Measuring Risk: Deferred Annuities Monthly Returns

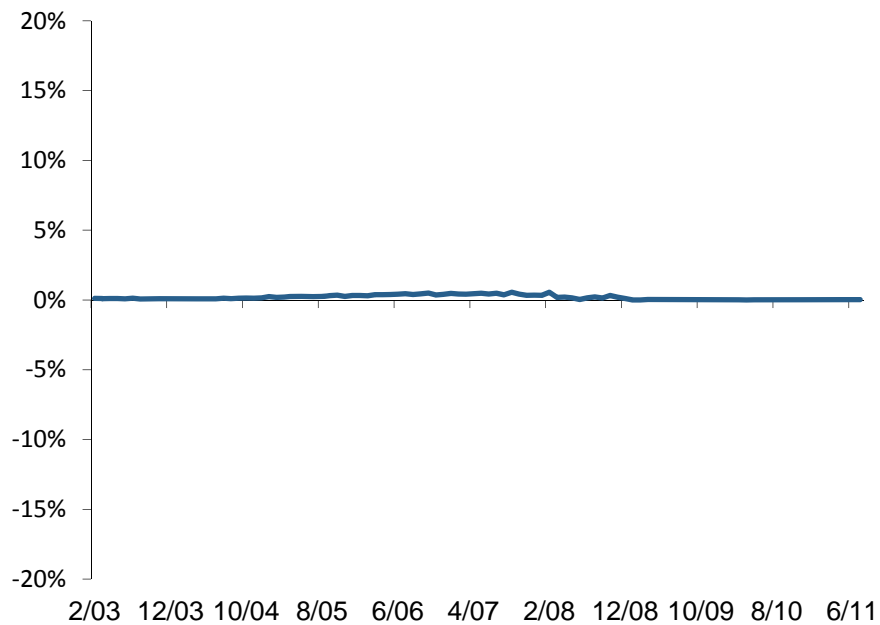
High risk in value terms, low risk in income terms



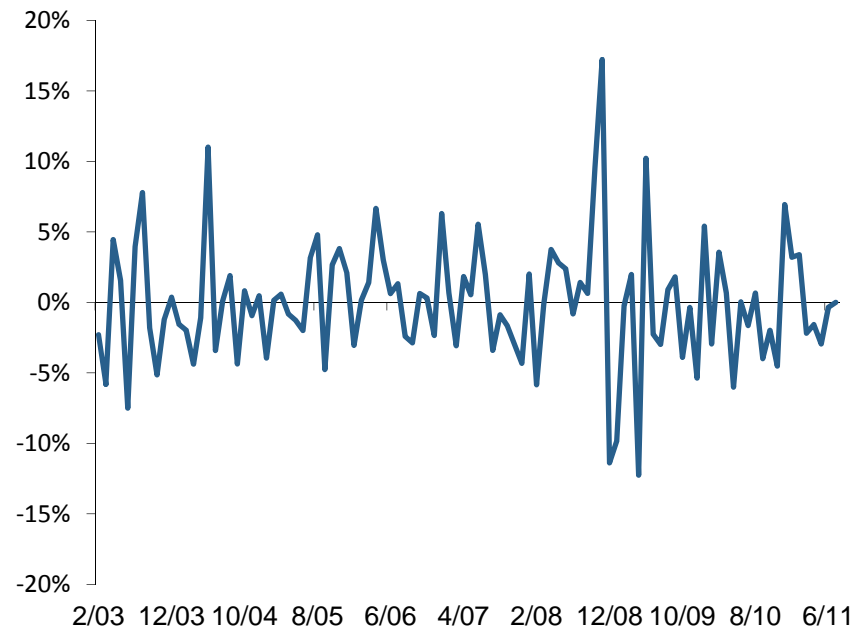
Measuring Risk: T-Bill Monthly Returns

Stable-value returns do not meet stable-income goals

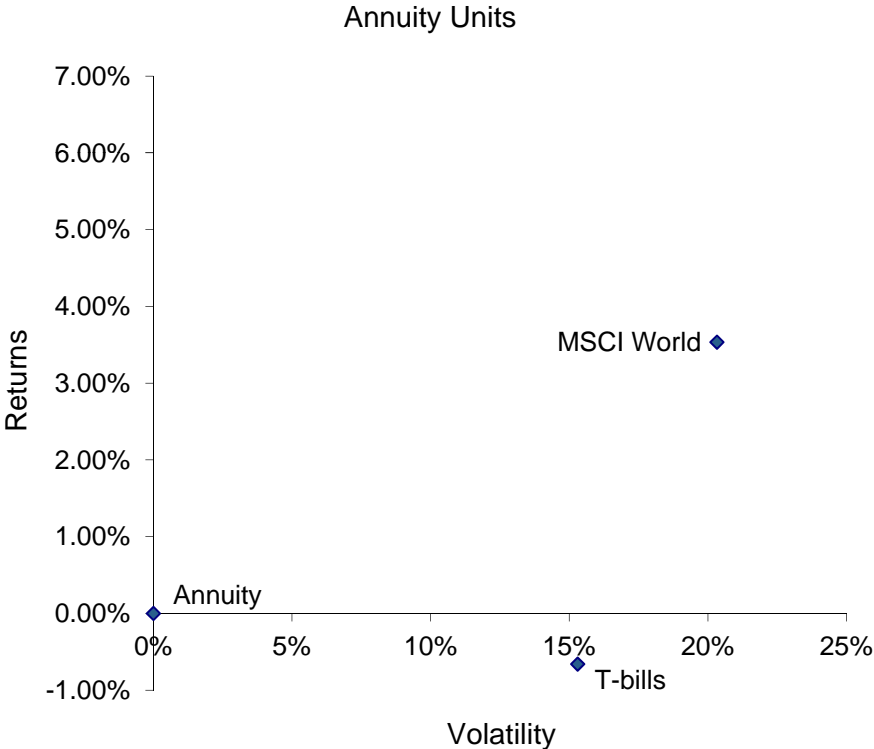
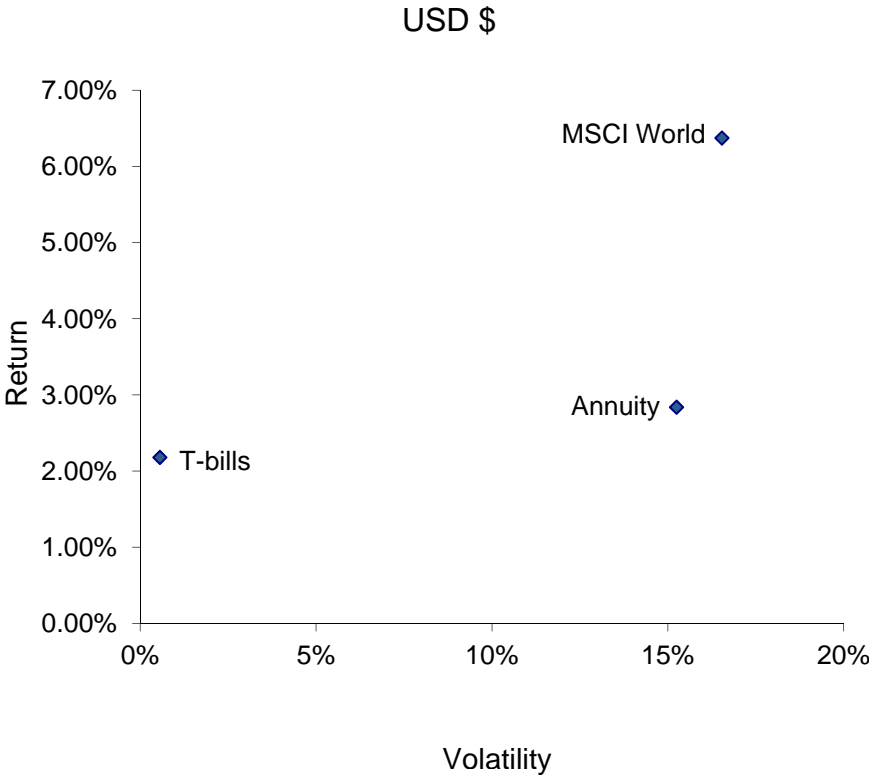
3 Month T-bill
USD\$



3 Month T-bill in
Real Annuity Units

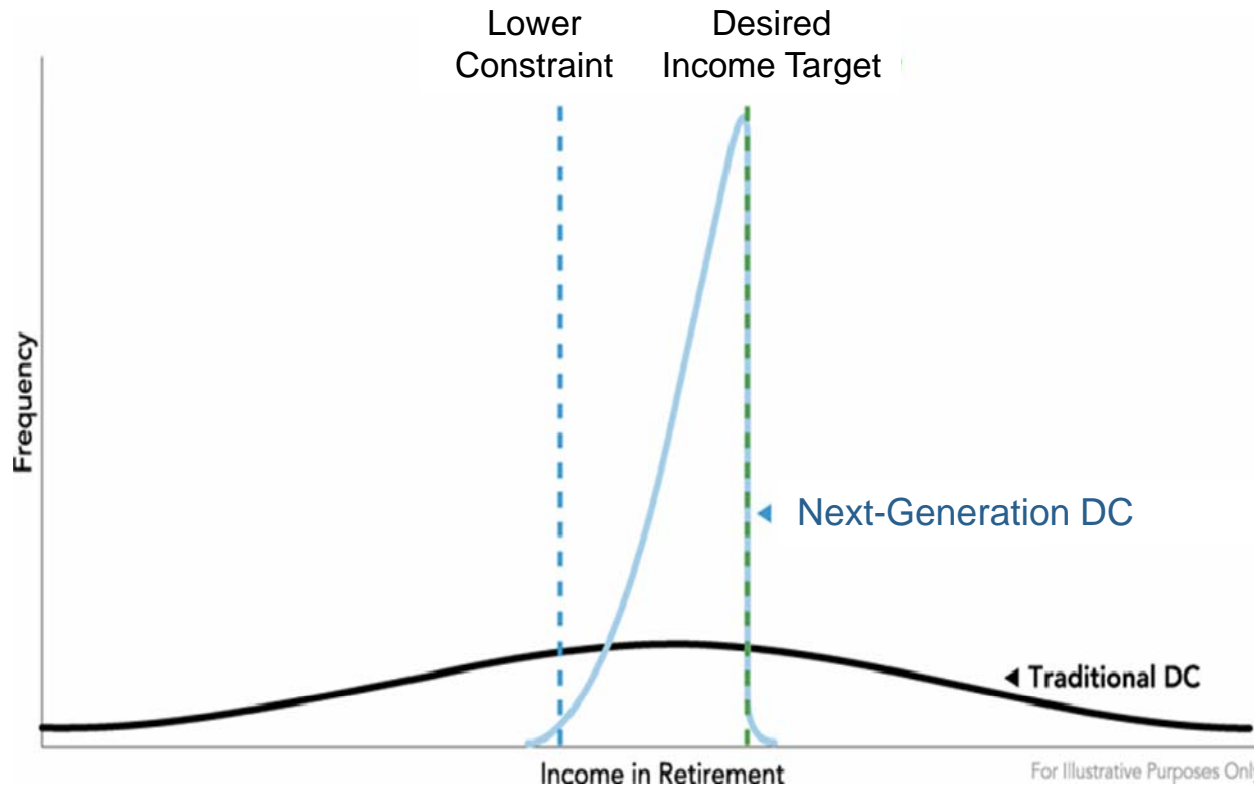


Measuring the Risk/Return Tradeoff: Value vs. Income



Focus on Achieving the Retirement Income Goal

Dynamic portfolio strategy cuts off excess upside possibilities to improve the chances of achieving the Desired Income target.



Getting the Member Engaged and Making Engagement Improve the Chances of Achieving the Goal

- Alert to all members if probability of success falls below a pre-set threshold.
Record of alerts kept on file
- Meaningful information on how well on track to realize retirement goals
- Only offer meaningful choices for the member to improve the likelihood of achieving his target goal, together with easy implementation.
 - Increase contribution rate (save more)
 - Increase retirement age (work longer)
 - Increase risk of investmentOther than death, there are no other ways
- Analogous to a medical report from annual checkup

Further Enhancements to Next-Generation Retirement Funding

- Interest-rate and age-dependent contribution rates to reduce member duration mismatch risk.
- Integration to include other retirement-dedicated assets
- House: pre-paid consumption and retirement-funding asset
- Bequest and asset-use efficiency: reverse mortgage
- Product efficiency: long-term care and life annuity
- Tail-Insurance on longevity: > 85 life annuities.
- Standard of living risk: consumption-linked income units

Determining the Contribution Rate to Fund Minimum-Acceptable Retirement Income

- The solution maximizes the probability of Desired Income, subject to a Minimum-Risk level of Income, given the current contribution rate and retirement age.
- Government policy is to ensure that contributions are adequate to fund a determined “subsistence” or Minimum-Acceptable Retirement Income
- Set the parameters of the solution : Set a retirement age. For each specified contribution rate, set Minimum-Risk Income at its maximum feasible amount, so Desired Income = Minimum-Risk Income [the lowest risk feasible strategy];
- For the policy-determined retirement age, vary the contribution rate parameter until the Minimum-Risk Income = Subsistence Income, determined by government policy . That contribution rate becomes the Policy Contribution Rate
- All retirement funding plans must set the Minimum-Risk Income to be greater or equal to the policy set Subsistence Income level.

The Role of Financial Innovation and Engineering in Addressing Financial Challenges in the Future

If we review what is needed in terms of innovation and financial engineering to implement this next-generation retirement solution

- Longevity and inflation bonds/swaps
- Valuation and risk of future contributions
- Increasing duration beyond existing instruments
- Dynamic replication portfolios to match annuity units
- Reverse mortgage design requires complete revamp and efficient placement
- Behavioral finance
- Securitization better get fixed

Difference in performance between this approach and target date funds is substantial

All of this has to be done for very low fees, on a massive scale, and must be totally reliable