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PRACTITIONER'S DIGEST

The "Practitioner's Digest" emphasizes the practical significance of manuscripts featured in the "Insights" and "Articles" sections of the journal. Readers who are interested in extracting the practical value of an article, or who are simply looking for a summary, may look to this section.

TOWARDS REPLACING THE DEFINED BENEFIT PLAN: ASSURED RETIREMENT INCOME PROVIDED BY A LIQUID INVESTMENT FUND PAGE 14

Miguel Palacios, Hayne Leland and Sasha Karimi

Our paper describes a fund that offers investors a fixed minimum annual payment per share over their retirement years, similar to a "defined benefit" plan. Our straightforward fund structure (mutual fund, CIT, or ETF) provides daily liquidity and is built from the most liquid of assets: U.S. Treasury instruments, and a well-diversified equities fund (e.g. an S&P500 index such as SPY). Given the supply and liquidity of these securities, our proposed fund can grow to large size while maintaining low-cost management.

The income assurance in the proposed fund is backed by the full faith and credit of the U.S. government via continuously-verifiable holdings of zero-coupon U.S. Treasury STRIPS. The algorithm governing asset allocation allows the maximum allocation to the high-return (e.g., equities) asset, subject to the minimum income assurance. This assurance holds even if stocks crash to zero or interest rates go negative.

For investors approaching retirement, the fund provides a desirable way to transition smoothly from an asset accumulation plan (such as investment in a target-date fund) to a decumulation plan that provides definable and assured minimum income in retirement. Its STRIPS portfolio spins off income (which can optionally be reinvested) every year for a period of 20 years, e.g. from age 65 to age 85. If equities outperform, income will likely exceed the assured minimum income amount. And the investment algorithm is highly likely at retirement to provide value to purchase optional Qualified Longevity Annuity Contracts (QLACs) to continue lifetime income payments after age 85. A key characteristic of the fund is that each share, no matter when purchased, provides a minimum $1 of annual income over the 20 years following retirement. This direct link between shares held and minimum dollar income in retirement provides a savings "nudge" for investors to accumulate sufficient shares to achieve a desired and secure retirement income goal.

A SIX-COMPONENT INTEGRATED APPROACH TO ADDRESSING THE RETIREMENT FUNDING CHALLENGE PAGE 28

Robert C. Merton and Arun Muralidhar

Countries are facing multiple crises and challenges in 2020, including a looming retirement crisis, the challenge of funding infrastructure, and the various economic challenges associated with the novel coronavirus. The paper proceeds with a six-component, integrated approach to help countries and individuals fund their retirement objective. To maximize the chances for success, governments should ensure that the retirement system is SUPER (Sustainable, Universal, Portable, Efficient and well Regulated). We lay out the "key design" principles that a candidate integrated retirement system design must satisfy to be considered as a possible "solution". The six components include: (i) a sustainable DB/social security; (ii) a well-designed DC plan with a comprehensive default option; (iii) more retirement benefits from accumulated assets; (iv) creation and issuance of a new retirement bond (SeLFIES) by governments; (v) working longer in a retirement friendly environment; and (vi) allowing broader life cycle crisis-coverage.

On the assumption that the retirement goal can be expressed as guaranteeing real retirement income so retirees can continue to maintain their pre-retirement standard of living, the paper describes how each of the six components can be designed or improved: from improving funding for and management of social security systems (and tying benefits to standard of living indices) to effective design of a next generation DC pension plan (that accommodates individual preferences and the flexibility to work with just what individuals are capable of expressing), to boosting retirement income through annuities and home-equity release programs (without requiring additional savings or risk taking), to facilitating working in retirement and lifetime consumption smoothing. One key component of this six-component approach was the recommendation that governments begin to issue SeLFIES as they address four of the six components, and can help governments fund long-term needs for infrastructure, SDGs or even COVID- 19-related spending with long-term domestic debt.

This paper synthesizes all six components into an integrated package, but presents it in a transparent, detailed, modular fashion, so that any one module can be replaced with a different version and the rest of the system still works. This also means that all six components need not be implemented simultaneously, but can be done in a secular fashion. However, while they may be implemented piecemeal, a SUPER (sustainable, universal, portable, efficient and well regulated) pension system will not be feasible without all six components.

HOW MUCH CAN COLLECTIVE DEFINED CONTRIBUTION PLANS IMPROVE RISK-SHARING? PAGE 55

Deborah Lucas and Daniel Smith

A Collective Defined Contribution (CDC) plan is a hybrid structure that proponents suggest can provide participants with more predictable retirement benefits than a traditional DC plan by using an internal risk-sharing mechanism, while operating at the lower costs of a DB plan through centralizing asset

management. A CDC approach has been adopted in several countries, and has been suggested as an alternative for unsustainable U.S. public sector DB plans.

We develop and calibrate a stochastic model of a CDC system to address a number of critical questions for evaluating the likely efficacy of such a system. What investment policies are consistent with maximizing a fairly safe "scheduled benefit" for retirees in a CDC system? How high of a scheduled benefit is attainable, assuming typical contribution rates and realistic investment returns? How effectively can a CDC system share investment risk across multiple cohorts of workers? Are the achievable outcomes significantly better than what could be obtained in a more standard DC system that is augmented with standard puts and calls to put a collar on investment risk?

We find that the optimized, unsubsidized CDC plan significantly outperforms a parallel optimized, options-augmented DC system, delivering higher and more predictable benefits for a given risk tolerance. Effectively, the CDC structure allows long-dated put and call options to be implicitly traded between cohorts, whereas a traditional DC system augmented with collar strategies using short-term options provides less effective risk-sharing. However, delivering a fairly safe benefit in the CDC system still entails a low income replacement rate relative to what is typically viewed as adequate. The model may be of practical value to investment advisers and fund managers evaluating system reforms, and can be adapted to analyze outcomes along plan-specific transition paths. The options-augmented DC model may be of independent interest as a product offering that can better tailor risk for participants in traditional DC plans. ?

WHAT DRIVES ACTIVE SHARE? ACTIVE STOCK SELECTION OR ACTIVE STOCK WEIGHTS PAGE 75

Aymen Karoui and Saurin Patel

In their seminal work, Cremers and Petajïsto (2009) introduce a new measure of active management named Active Share which gauges the distance between a fund's and its benchmark's holdings. Despite its popularity, we know little about what drives Active Share. In this paper, we focus on this question. To improve our understanding, we decompose Active Share into two components: Active Stock Weights (ASW) and Active Stock Selection (ASE). Active Stock Weights captures managerial ability by focusing on the deviation in the fund's portfolio weights from that of the market-capitalization based portfolio weights. Active Stock Selection captures manager's stock selection ability by focusing on stocks that are outside the benchmark. We find that that Active Share is positively correlated (88%) with ASE and negatively correlated (−55%) with ASW. Furthermore, ASW negatively predicts risk-adjusted performance, while ASE positively predicts risk-adjusted performance. The comparison between the highest and lowest quintiles sorted based on ASW and ASE reveals a difference of −0.84% and 1.25% in the annual risk-adjusted return, respectively.

Our paper makes two contributions to the active management literature. First, it offers new insights into understanding Active Share and its relation to managerial skill. By breaking the Active Share down into Active Stock Selection and Active Stock Weights components, our paper links fund activeness and managerial skill. Consistent with the intuition of Cremers and Petajisto (2009) and Petajisto (2013), our analysis clearly identifies stock selection as the driver of outperformance for high-Active-Share

funds. Second, our paper bridges an important gap between two popular activeness measures—Active Share (Cremers and Petajisto, 2009) and Active Weight (Doshi, Elkamhi, and Simutin, 2015)—that is missing from the extant literature. Both measures relate to activeness but they capture different dimensions of managerial skill.

We believe that our ASW and ASE measures are of interest to both academicians and practitioners as these measures add to our understanding of the portfolio management decision-making process. We now are able to clearly identify the source of managerial skill in Active Share. Our examination also shows that selectivity and weight allocation are two new and distinct dimensions of activeness that do not entirely overlap with the existing activeness measures in the literature.

MULTI-PERIOD PORTFOLIO SELECTION: A PRACTICAL SIMULATION-BASED FRAMEWORK PAGE 94

Kenneth Blay, Anish Ghosh, Steven Kusiak, Harry Markowitz, Nicholas Savoulides and Qi Zheng

Current multi-period portfolio selection theory is largely based on dynamic programming approaches first suggested by Markowitz (1959) and then detailed by Mossin (1968), Samuelson (1969), and Merton (1969). Unfortunately, these approaches suffer from what Richard Bellman termed "the curse of dimensionality" which states that the computing power required to solve dynamic programming problems increases exponentially as the number of state variables considered increases. This has remained a key limitation to advancing multi-period portfolio selection theory and, more importantly, the implementation of that theory in practice. While computational, theoretical, and numerical methods have advanced, solutions introduced to date have yet to effectively address many practical aspects of the multi-period portfolio selection problem.

In this paper, we introduce a simulation-based portfolio selection (SBPS) framework that addresses what we have determined to be three requisites for the development of practical multi-period solutions:

1. Solutions must evolve allocations and duration over time to align with expected cash flows
2. Solutions must consider real-world asset dynamics
3. Solutions must consider investment frictions and illiquidities

The SBPS framework decomposes the multi-period problem into three distinct parts: the objective function, simulation, and optimization. This not only provides substantial flexibility in addressing the central challenges of implementing and managing portfolios across a multi-period investment horizon, it also facilitates the advancement of multi-period portfolio selection research as innovations in any of the three areas can easily be incorporated into the proposed framework. This stands in contrast to dynamic programming approaches where consideration of additional real-world aspects of multi-period portfolio management likely requires a non-trivial reformulation of the solution to be used.

To provide intuition for the multi-period problem, we present an analytical framework that considers the distinction between growth and duration assets. As part of this exercise we also define objective functions for two common investor types: Growth investors, that seek to maximize terminal wealth,

and Income investors, that seek to maximize a series of future cash flows. We construct analytical solutions for these objectives under various scenarios. Through this analysis we develop several guiding principles relating to how portfolio allocations and durations should evolve over a multi-period investment horizon.

We then present a series of simulation-based portfolio selection solutions that use the Growth investor and Income investor objective functions, asset simulations that incorporate real-world asset dynamics, and an optimization algorithm that simultaneously considers the totality of allocation decisions across the investment horizon. We show that the solutions produced are not only aligned with the principles developed as part of our analytical exercise but also demonstrate the flexibility afforded by SBPS in allowing us to more effectively address the three stated requisites for practical multi-period solutions.