Appendix: Summary of Key Papers Reviewed for:

Understanding the Impact of the Low Interest Rate Environment on Retirement Security in the United States, A Review of Academic and Practitioner Research

This appendix contains brief summaries of papers reviewed.

Papers by topic

TOPIC 1: RETROSPECTIVE AND PROSPECTIVE STUDIES OF INTEREST RATES

- Bernanke 2015, *Why are interest rates so low, part 3: The Global Savings Glut*
- Dotsey 2016, *Monetary Policy and the New Normal*
- Drozd 2018, *The Policy Perils of Low Interest Rates*
- Eggertsson et al. 2019, *A Model of Secular Stagnation: Theory and Quantitative Evaluation*
- Fischer 2016, *Why Are Interest Rates So Low? Causes and Implications*
- Gagnon et al. 2016, *Understanding the New Normal: The Role of Demographics*
- Hamilton et al. 2016, *The Equilibrium Real Funds Rate: Past, Present and Future*
- Rudolph 2014, *Sustained Low Interest Rate Environment: Can it Continue? Why It Matters*
- Rudolph et al. 2015, *Transition to a High Interest Rate Environment: Preparing for Uncertainty*
- Summers 2014, *U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound*

TOPIC 2: STUDIES OF HOW PERSISTENT LOW-INTEREST RATES COULD AFFECT THE RETIREMENT SECURITY OF INDIVIDUALS

- Blanchett et al. 2018, *Low Returns and Optimal Retirement Savings*
- Byrne et al. 2018, *Investing for Retirement in a Low Returns Environment: Making the Right Decisions to Make the Money Last*
- Fichtner et al. 2018, *Retirement Saving and Decumulation in a Persistent Low-Return Environment*
- Finke et al. 2013, *The 4 Percent Rule Is Not Safe in a Low-Yield World*
- Horneff et al. 2018, *How will persistent low expected returns shape household economic behavior?*
- Munnell et al. 2013, *The Impact of Interest Rates on the National Retirement Risk Index*
- VanDerhei 2013, *What a Sustained Low-Yield Rate Environment Means for Retirement Income Adequacy: Results from the 2013 EBRI Retirement Security Projection Model*

TOPIC 3: STUDIES OF HOW PERSISTENT LOW INTEREST RATES COULD AFFECT INSTITUTIONS: PENSION FUNDS, INSURANCE COMPANIES, ASSET MANAGEMENT FIRMS, AND SOCIAL SECURITY

- Antolin et al. 2011*, The Economic Impact of Protracted Low Interest Rates on Pension Funds and Insurance Companies*
- Beer et al. 2015*, Implications of ultra-low interest rates for financial institutions' asset liability management–a policy-oriented overview*

- Berkowitz et al. 2018, *Getting More from Less in Defined Benefit Plans: Three Levers for a Low-Return World*
- Cembalest et al. 2015, *What if we live in a low-return world: Implications for pension funds*
- Fichtner 2016, *What Low Interest Rates Mean for Social Security and Retirees*
- IMF 2017, *Low growth, low interest rates, and financial intermediation*
- OASDI 2018, *The 2018 OASDI Trustees Report*
- Rudolph 2014, *Sustained Low Interest Rate Environment: Can it Continue? Why It Matters*

STUDIES ON RELATED TOPICS

- Bajtelsmit et al. 2018, *Retirement Adequacy in the United States: Should We Be Concerned?*
- Dynan 2017, *The Federal Reserve's Impact on Main Street, Retirees, and Savings*

Antolin et al. 2011, The Economic Impact of Protracted Low Interest Rates on Pension Funds and Insurance Companies

CITATION

Antolin, Pablo, Sebastian Schich, and Juan Yermo. "The Economic Impact of Protracted Low Interest Rates on Pension Funds and Insurance Companies." *OECD Journal: Financial Market Trends* 2011, no. 1 (December 2011). http://www.oecd.org/finance/financial-markets/48537395.pdf.

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT

A period of protracted low interest rates is a feasible, even if not the most likely, scenario going forward and such a scenario would adversely affect pension funds and insurance companies. Protracted low interest rates affect investment opportunities and have a potentially significant adverse effect on life insurance companies and institutions whose liabilities consist of a fixed investment return or benefit promises, such as is the case for defined-benefit pension funds. It cannot be ruled out that the financial institutions affected engage in "gambling for redemption" in an attempt to match the level of return promised to beneficiaries when financial markets were more elevated.

SUMMARY

Overall effect depends on the duration of assets and liabilities: DB pension funds and life companies with long-dated, interest rate-sensitive liabilities will, unless they are hedged, have a negative duration gap (duration of liabilities greater than the duration of assets). Thus, they will be negatively affected by a reduction in long-term interest rates.

Investment valuations and returns: Impact depends on asset allocation. In the U.S., pension funds have lower allocations to bonds, and higher allocations to equities, relative to life insurance companies.

DEFINED BENEFIT PENSION PLANS

- The impact is the largest when future benefits are fixed (guaranteed return not linked to salaries or inflation).
- When pension benefits are linked to salaries or inflation, to the extent that protracted low interest rates anticipate low growth and low inflation economic conditions in the future, which would reduce benefits to be paid, the impact of low interest rates reported liabilities would be reduced over time. (However, wage adjustment could be sluggish.) The impact also depends on the valuation method used.
- Increases in longevity will be more heavily felt in low-interest-rate environments: cash flows to be paid in the far future are more heavily weighted.
- DB funds may intensify their search for yield, buying higher-risk products, including some that may have limited liquidity and transparency (some evidence of growing appetite for alternative investments observed).
- Pension funds may seek to hedge interest risk by increasing their allocation to bonds and by increasing the duration of their investment portfolios, as well as engaging in derivative transactions in a large and coordinated way, creating further downward pressure on bond yields.

LIFE INSURANCE COMPANIES

- Reinvestment risk due to low interest rates.
- Counter party-risk introduced by hedging activities.
- Credit risks introduced when using lower-rated government bonds and corporate bonds as offsets.
- Many insurers may have to adjust the pricing of variable annuities and/or specific features to reduce their exposure to rising hedging costs.
- Important consideration: the contribution of investment income to overall profitability (large bond holdings for U.S. insurance companies).
- Accounting rules may delay recognition of lower interest rates' impact on insurance liabilities. (IFRS 2013 increased the sensitivity of insurance-company liabilities to interest rates.)
- The risk of "gambling for redemption": It cannot be excluded that some life-insurance companies might face this temptation to shift portfolio allocation to riskier assets classes. However, it is difficult to identify clear cut evidence of this activity.

DEFINED-CONTRIBUTION FUNDS

- DC funds may experience temporary improvement in investment performance as their bond holdings gain value due to the drop in interest rates.
- For DC fund holders close to retirement, the gain in asset value is likely to be offset by the lower annuity values they will get as a result of lower interest rates.

OTHER RELEVANT CONCLUSIONS

- The yield curve would be flatter compared to an equilibrium with higher rates and growth.

Bajtelsmit et al. 2018, Retirement Adequacy in the United States: Should We Be Concerned?

CITATION

Bajtelsmit, Vickie, and Anna Rappaport. "Retirement Adequacy in the United States: Should We Be Concerned?" Society of Actuaries, 2018. https://www.soa.org/research-reports/2018/retire-adequacy-us-concern/.

STUDY CATEGORY

Industry

TOPICS ADDRESSED

Studies on related topics

ABSTRACT (CONSTRUCTED FROM EXECUTIVE SUMMARY)

The question of whether Americans are adequately prepared for the costs of their future retirements has been the subject of significant debate and research over the last few decades. This is a complex issue about which reasonable and educated minds can differ. Retirement adequacy research has offered mixed conclusions, with some studies predicting that a large percentage of the population is at risk for significant hardship in retirement, and others providing a significantly more optimistic outlook. In this paper, we summarize the current research on retirement adequacy and clarify the differences in stakeholder perspectives, research objectives, empirical methodology, and model assumptions that have led to divergent conclusions.

Several major stakeholders are interested in measuring retirement income adequacy, but each may view the issue through a different lens. Employers and plan sponsors are interested in the adequacy of their own retirement plan offerings and how they compare with their competitors. Government and policy makers are interested in the health of the system as a whole. And individual households and their financial advisers are interested in whether the households will have a financially successful retirement, given their resources and goals. These different perspectives are summarized in Table 1. When interpreting the results of retirement adequacy research, it is important to consider the perspective of the research sponsor and the population group that is the focus of the particular study.

The most common method used for measuring retirement adequacy is to calculate a replacement ratio of post-retirement income to some measure of pre-retirement income, and then to compare this value to a target percentage replacement that is deemed to be "adequate." The data for this calculation are generally drawn from national surveys or employee records, and the analysis can be at the population level or by subgroup (e.g., by income or age). This approach has four main problems: (1) there are many ways to measure both the numerator and the denominator of the ratio; (2) there isn't an agreed-upon definition of what constitutes an "adequate" replacement ratio; (3) focusing on replacement ratios at the date of retirement ignores changes in income and expenses that may occur over the retirement period; and (4) target ratios do not consider individual circumstances. In contrast, wealth-based measures of adequacy often incorporate the full retirement period, estimating the ability of households to cover lifetime expected cash flow needs from their financial resources. This type of analysis can be done for particular representative households or adapted to an individual's unique circumstances.

The two main empirical approaches used in U.S. retirement adequacy studies are simulation and survey analysis. In some cases, a comparison metric is developed that allows comparison of adequacy assessments for a population over time and across different populations.

- In retirement simulations, researchers forecast future income and expenses for one or more households, incorporating known information about the household's finances and risk exposures. Risks are often modeled stochastically, using probability distributions to estimate risky events or outcomes—e.g., using a random draw from historical investment returns in each year of a life path, rather than applying an average value to each year.
- Many studies use publicly available surveys, such as the Survey of Consumer Finances and the Health and Retirement Survey, or proprietary surveys to estimate replacement ratios and/or develop assumptions for simulation models.
- Several research groups have developed metrics for assessing retirement preparation at the population level. Examples include the National Retirement Risk Index (Center for Retirement Research at Boston College), the Aon Hewitt Real Deal, and the Retirement Readiness Rating (Employee Benefit Research Institute).

Although the major studies reviewed in this report have significant differences in empirical approaches, data, and measures of adequacy, they relatively consistently conclude that from 25% to 35% of the population is at risk of being unable to maintain their pre-retirement standard of living throughout the retirement period (See Tables 3, 4 and 5). However, these results should be tempered by SOA research based on surveys, focus groups, and in-depth interviews, which generally indicate that many retirees are quite content with living at lower standards of living in retirement than they maintained during their working years. When we use less generous measures of retiree needs (such as consumption-based measures or minimum needs measures), the percentage who are at risk is naturally lower.

After careful consideration of this body of research, it is clear that the U.S. retirement system lies somewhere between crisis and serendipity. The research shows that a large majority of Americans are on track to support a reasonably comfortable retirement. The people who are at least risk are those in the highest-income groups, who have many types of income and assets to support their retirement, and those who have participated in employer-sponsored pensions and retirement plans throughout their career. For the lowest-income groups, Social Security will replace a substantial proportion of pre-retirement earned income. Those who face the greatest challenges include vulnerable populations, such as the disabled, widowed, divorced, unemployed, and people employed in industries or jobs that typically do not provide retirement benefits to workers. These groups tend to be underrepresented in existing research studies.

Based on this literature survey, our main conclusions and recommendations for future research are as follows:

- The current system of voluntary employment-based retirement plans has been largely successful from the perspective of companies sponsoring plans for individuals with long-term employment covered by such plans. Although more can be done to encourage higher savings rates, and the shift from defined benefit to defined contribution plans may reduce retirement adequacy for younger generations, employer retirement plans are an important pillar of the retirement system. Encouraging more employers to sponsor plans and more employees to participate would strengthen the overall system.
- Similarly, the mandatory Social Security system has done much to reduce poverty in old age. However, adequacy studies using replacement ratios may overstate the success of this safety net for those in the lowest-income groups, because too many rely solely on Social Security as their only source of support and therefore do not have any financial cushion to meet emergencies. Given that reliance, it will be important to understand solvency issues in a way that continues to protect our most vulnerable citizens.

- For households without access to employer retirement plans, Social Security will still prove a base level of lifetime inflation-adjusted income, but this alone will not allow them to maintain their pre-retirement standard of living. Considering the generally low levels of household wealth, these households will usually need some combination of delayed retirement and Social Security claiming, continued paid work at older ages, increased saving, downsizing of their spending, and reliance on family to meet their retirement needs.
- Although a lot of research has focused on median or typical households, there is a need for future research that delves into the retirement challenges of particularly vulnerable populations, such as those who are widowed, divorced, long-term disabled, or long-term unemployed. For the U.S. retirement system to be deemed "adequate," modifications to the social safety net and/or employer programs will be necessary.
- The significant differences in methodologies that are used in retirement adequacy research makes direct comparisons of results more difficult. Some important distinctions based on assumptions in the models include the following:
    - Most studies do not adequately account for major unexpected expenses or shocks, such as poor investment performance, long-term care, death of a spouse, and unexpected out-of-pocket medical expenses. If these risks are not included in the models, the results will tend to overstate the degree of adequacy in the system.
    - Most studies assume that the adequacy objective is to maintain pre-retirement living standards. If retirees are satisfied and reasonably happy with a lower level of spending, this assumption may understate the degree of adequacy in the system.
    - Most studies assume that people retire at a "normal" retirement age. Important issues omitted from many of the studies include the impact of changes in retirement ages, phased retirement, and work during retirement.
    - Studies differ significantly in their treatment of housing wealth. If housing wealth is accessible to meet retirement needs, overall adequacy is higher.
    - Most studies focus on the retirement adequacy of current and near retirees. Future cohorts of U.S. retirees may face more difficulty than today's retirees because of demographic issues, high debt load, lower likelihood of being married and owning a home, potential future reforms to Social Security, shifts in employment, and changes in the structure of employee benefit plans.

SUMMARY

MEASURING RETIREMENT NEEDS

Key elements:

- Level of spending required:
    - Length of the retirement period
    - Changes in spending that may occur over the retirement period
- Alternative measures of retirement needs (mostly consistent with an underlying consumption smoothing assumption):
    - Cover only essential expenses
    - Cover expected consumption, based on actual average consumption
    - Maintain pre-retirement standard of living (relative to pre-retirement income, adjusted for future changes)
    - Happy and satisfied, even if income is less than required to maintain pre-retirement standard of living.
- Length of the assumed retirement period:
    - People may retire earlier, by choice, necessity or layoff
    - Phased retirement and part-time work in retirement are increasingly common

  - Income versus consumption and changing needs over time - declining consumption with age
- Shocks to consumption

MEASURING RETIREMENT INCOME AND RESOURCES

Potential sources of income:

- Social Security (most important source for mid-/low-income individuals)
- Income from assets and investments
- Employment-based DC benefits (401k)
  - Tax-deferred savings (IRA)
  - Regular retirement savings
- Pension benefits (employment-based)
- Insurance and annuity products
  - With promised and/or contingent payments
- Home equity

Treatment of income from assets:

- Challenge: availability and accuracy of reported income from assets
- Home equity:
  - About 80% of retirees own their homes and most have paid off their mortgage prior to retirement. Home equity is crucial for lower-and-middle-income retirees
  - Question is should home equity be treated as a consumable asset?
  - Sample studies listed
- Investment wealth, either tax-deferred or not
  - Median household income $67,090, retirement asset $101,350 (29% of net worth)
  - Few retirees convert their wealth to life annuities, instead draw it down as needed
- Two approaches to including investment wealth in analysis
  - Wealth is invested to earn returns and will be drawn down to meet any budget shortfalls (consumption needs > Social Security and pension income)
    - Commonly used in simulations
    - VanDerhei (2015), Bajtelsmit (2015)
  - Assume that household will follow a drawdown rule that will spread their accumulated wealth over expected lifetime
- Purchase of inflation-indexed annuity (NRRI)
- Annuitize or just spend interest and dividends, Favreault (2012)
  - Disagreement about return assumption
  - Required minimum distribution may have different effects on different income groups

COMPARISON OF THE MAJOR STUDIES

- Although some studies conclude that there is a retirement crisis in the United States and others conclude that the system is in good shape, the inconsistent outcomes can be shown to be due to differences in research objectives, methodology, assumptions, definition of adequacy and population studied. The truth is that our retirement system has both successes and failures.
- Considering this research as a whole, the results of papers summarized in Tables 3, 4 and 5 suggest that 30% to 40% of U.S. households are at risk of not having an “adequate” retirement. For the country as a whole, 70% success might be acceptable, but a 30% failure rate may not be acceptable to those in the 30%.

COMMENTS

- Considering this research as a whole, the results of papers summarized suggest that 60% to 70% of U.S. households are on track to have an "adequate" retirement. Interpretation of this result depends to a large extent on the perspective you bring to the question: a 70% success rate may be acceptable for the overall system, but not for the individuals and households in the remaining 30%.
- Issues that explain the differences in conclusions:
    - Stakeholder perspective and purpose of the research
    - Definition of retirement adequacy
    - Methodology and data sources employed
    - Post-retirement risks considered
    - Subject populations studies
    - Focus on a single year measure versus the full retirement period
- Differences across sub-population groups:
    - Career employees at firms offering retirement plans are generally in good shape, because these plans combined with Social Security benefits replace a sufficient percentage of pre-retirement income to allow participants a satisfactory retirement.
    - At the lower end of the income spectrum, replacement rates are also acceptable, because Social Security and other social programs replace a sufficient percentage of earned income.
    - Those predicted to fare worst in retirement are middle-income households without access to employer plans, non-homeowners and single people.
- Survey and focus group evidence suggests that many retiree households are satisfied, despite having much lower income relative to their working years.

Beer et al. 2015, Implications of ultra-low interest rates for financial institutions' asset liability management–a policy-oriented overview

CITATION

Beer, Christian, and Ernest Gnan. "Implications of Ultra-Low Interest Rates for Financial Institutions' Asset Liability Management–a Policy-Oriented Overview." *Monetary Policy & the Economy* 2 (Q2 2015): 15–53. https://www.oenb.at/dam/jcr:1ddbf409-4b76-4eff-bbcb-7621069fc5db/mop_2015_q2_analyses03.pdf.

STUDY CATEGORY

Industry paper

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT

In a historical perspective, interest rates are currently very low. The further course of nominal and real interest rates crucially depends on how the macroeconomy will develop over the cycle and in a long-term structural perspective. In this contribution, we analyze how ultra-low interest rates affect financial institutions and their asset-liability management. In the short term, the impact depends on the relative duration of assets and liabilities. Hence,

different financial institutions are affected differently depending on their balance sheet structures. Yet in the long term, the income of all types of financial institutions tends to suffer from ultra-low interest rates. A protracted period of (ultra-)low interest rates might compromise financial stability by eroding financial intermediaries' capital; by amplifying the risk of bubbles and bursts; by heightening bond market volatility and its potential to trigger runs and fire sales in illiquid markets; and by causing risk positions to grow in the search for yield. Consequently, risks from a protracted period of ultra-low interest rates have been gaining attention from financial regulators and supervisors. Adequate action requires an integrated view of monetary policy, macroprudential and microprudential regulation and supervision of various types of financial intermediaries including banks, institutional investors and shadow banks.

SUMMARY

This paper contains a useful discussion of how interest rate changes could affect institutions with different asset-liability structures.

INTEREST RATES AND ASSET PRICES

Yield curve slope in Euro area is lower than in UK, U.S. (i.e., relatively lower long rates in EA)

SCENARIOS

- Gradual increase in inflation and nominal interest rates, with real yields returning to positive territory.
- Prolonged period of (ultra-)low interest rates ("Japanese scenario"). Secular stagnation: negative real interest rates are needed to equate savings and investments.
- Inflation and inflationary expectations rise sharply if central banks exit expansionary monetary policies too late.

CONSIDERATIONS FOR INSTITUTIONS – ASSET IMPACTS

- First, as market yields are declining securities portfolios benefit from substantial windfall gains, as the prices of bonds and other asset classes such as stocks and real estate are soaring. This development may risk generating excessive and unrealistic yield expectations on the part of institutional investors' customers. Life-insurers and pension funds are confronted with an immediate increase in liabilities because the discounted value of future cash flows changes.
- Second, when yields have reached their lowest level bond prices will no longer rise, and this may also be associated with an end to the rise in the prices of other asset classes. During this phase at the latest, investors and their customers will need to adjust their yield expectations to a new lower level. The adjustment of expectations may also trigger a rebalancing of portfolios, leading to asset sales and price declines in various asset classes, further depressing portfolio performance.
- Third, at some point the interest rate cycle will reverse and nominal yields will move up again. Then, holders of long-term fixed rate bonds will suffer valuation losses, and, depending on other factors influencing earnings and price expectations, this will happen in other asset classes as well.

ASSET-LIABILITY MANAGEMENT

- Low interest rates imply ultra-low yields and high asset valuations for all kinds of asset classes; price risk is intricately linked to interest rate risk and needs to be considered simultaneously.
- Another crucial element to be considered by Asset Liability Management (ALM) is the liquidity of balance sheet positions, as a measure of a firm's ability to preserve its ability to pay.

- In a low interest rate environment changes in interest rates as well as changes in future expected cash-flows (e.g. dividends) of assets have a more pronounced impact on asset prices because the future is less heavily discounted compared to a high interest rate environment. In other words, low interest rates are a source of volatility.
- The purpose of a financial firm will generally determine at least one side of its balance sheet. For example, the promise of pension funds to pay pensions later entails long-term liabilities. Because of ALM considerations, such structural determination of one side of the balance sheet also affects decisions about the other side of the balance sheet.

INSTITUTIONS

- Life insurance companies and pension funds – long liabilities
- Investment funds – assets determined by investment style; Assets are heavily invested in equities
- Banks as intermediating between savers and borrowers determines at least part of both a bank's asset (loans) and liability side (deposits)
- Task of ALM often can be to invest in instruments that will limit the duration mismatch between assets and liabilities

LIFE INSURANCE COMPANIES AND PENSION FUNDS

- Life – long liabilities.
- Non-life – shorter liabilities.
- Life companies tend to have longer assets than non-life, due to ALM considerations.
- In a low interest rate environment increases in life expectancy have a more pronounced impact on pension funds' liabilities because future cash flows are discounted at a lower discount rate.
- Longer maturity of liabilities (typically the case for life insurers or pension funds) relative to assets implies that a fall in interest rates increases the net present value of liabilities by more than that of assets.

RELATED RISKS

- Search for yield.
- Risks to ability to generate longer-term income needed for investment guarantees or payouts, imply risks to financial soundness. A key risk to stability of European financial system.
- Especially true in the Japanese scenario (prolonged low rates).
- How quickly solvency risks show up on balance sheets depends upon accounting methods. (Will be slower if historical cost accounting is used than if market values are used.)

Asset management firms

- Role has grown; many kinds of investment managers.
- Assets: Short term money market instruments; various types of bonds on equities, commodities, derivatives, or less liquid forms of assets such as private equity, venture capital or private debt.
- Liabilities - funds usually issue shares to customers, which implies that investment risk lies with shareholders. However, there are also funds with some or considerable leverage (e.g. hedge funds).
- Open-end investment funds face liquidity risk: customers can sell back their shares at any time without notice.
- How will investment firms respond? Could include:
    - Portfolio optimization responses – attempts to improve risk-return; guard against sudden bond-yield reversals; the post-crisis increase in cross-asset correlation makes this difficult

    - Search for yield - coupled with herd behavior, creates risks of future price corrections
    - Movement into less liquid assets (increasing liquidity risk); but external mandates (e.g., asset allocation policies of pension funds or life companies that use asset managers) may limit extent to which these funds can move into illiquid assets.
    - If rates stay low for long, profitability could be squeezed.
- Unlike with insurance companies, regulators have not been concerned about stability risks related to investment funds. Could change if there is a sharp reversal in interest rates, stocks and other asset prices.
- A difficult investing environment, but probably not a financial stability risk.

Banks

- Banks - duration of deposits (liabilities) is typically shorter than the duration of assets.
- Short term: Initially, lower interest rates may even benefit banks as they lower funding costs and trigger a reappraisal of assets. Banks usually also profit from a parallel downward shift of the yield curve because relatively higher short rates help their short assets – unlike in the case of life insurers, with long liabilities.
- Long term: in a protracted period of ultra-low interest rates, it is quite likely that the yield curve becomes flatter. The flattening is supported by the zero floor on interest rates on deposits as long as it is not (legally) possible or not appropriate to charge negative interest rates on deposits. Net interest margins are compressed.
- Lambert and Ueda (2014) find that potential effects of ultra-low interest rates may include increased risk-taking (search for yield, encouraging leverage) and delayed balance sheet repair (e.g. evergreening of loans). Their regression results suggest that banks reduce their leverage, though only to a very small degree. Furthermore, as expected, banks increase their risky assets. Regarding balance sheet repair, Lambert and Ueda (2014) also find evidence for evergreening of nonperforming loans. In addition, the U.S. banks considered took advantage of lower long-term interest rates to extend the maturity of their debt and reduce the risk of maturity mismatches.
- Maddaloni and Peydró (2010), using data from the Euro area bank lending surveys and the U.S. senior loan officer surveys, implies that low short-term (i.e. policy) interest rates gave rise to softer lending standards in the run-up of the financial crisis.
- With ultra-low interest rates, the balance sheet structure of a bank is likely to change.
    - On the liability side, customers tend to move from fixed term deposits into non maturing (e.g. sight) deposits (e.g., out of CDs, into money market (MM) funds).
    - On the asset side, customers may, depending on their interest rate expectations (or their risk-taking behavior), either increasingly prefer longer tenors for fixed rate loans or variable rate loans linked to currently ultra-low base interest rates.
- If the duration of assets increases by more than the duration of liabilities, the net asset duration gap would widen. As a result, the balance sheet would exhibit a lower degree of natural duration netting capacity, and the reliance on external markets to hedge interest rate risk would increase.

COMMENTS

This paper focuses on the impact of low interest rates on financial stability rather than on retirement security. It is descriptive and analytic and does not involve modeling. Its conclusions do have relevance for retirement security to the extent stability of institutions affects retirement security, although the linkages are not discussed.

The paper discusses how the impact of low interest rates could have different effects upon (1) banks, (2) insurance companies and pension funds, and (3) investment funds and asset managers, reflecting (among other things) their different asset-liability structures. It also includes useful analysis of how the asset-liability structures and durations, which differ across institutions based upon their purposes, affect their vulnerability to risks from a prolonged low interest rate period and to risks from a sharp reversal in interest rates.

Relevant points:

- An extended period of low interest rates could compromise financial stability. A potential sharp reversal in yields (interest rates rise) also creates financial stability risks.
- Financial institutions such as life insurance companies, pension funds, investment funds, and banks have differing asset-liability structures suited to their purposes, with different asset and liability durations. They will be affected differently by interest rate shocks and by long-term trends. This paper gives a good summary of potential impacts, and of research into post-crisis impacts.
- Banks – tend to have shorter liabilities (deposits), longer assets (loans). Initial impact of low interest rates on bank profitability could be positive. Longer-term could be negative as long-short spreads are reduced. Banks could respond (e.g., search for yield, riskier loans), and customers could respond (e.g., move into short MM deposits, out of longer-term CDs).
- Insurance companies and pension funds – tend to have long liabilities (except non-life insurers) and need to have cash flow to meet guaranteed long-run income or make payouts. They face incentives to search for yields, which creates a significant risk to financial soundness and stability (at least per Euro regulators). Accounting methods affect how quickly solvency risks show up on balance sheets – slowly if based on historical costs, quicker if market value accounting.
- Investment funds and asset managers could engage in a search for yield (made harder by a post-crisis rise in cross-asset correlations) and/or reduce liquidity, heightening risks of runs on assets. Financial regulators have not considered them to be a financial stability risk, but that could change if a sharp reversal in interest rates causes asset values to fall.
- The authors generally believe that life insurance companies and pension funds have the greatest long-term risks from prolonged low interest rates, because of their long liabilities with guaranteed returns or payouts, and poor investment yield opportunities in the near term.

Berkowitz et al. 2018, Getting More from Less in Defined Benefit Plans: Three Levers for a Low-Return World

CITATION

Berkowitz, Daniel B, Andrew S Clarke, Kevin J DiCiurcio, Kimberly A Stockton, and Daniel W Wallick. "Getting More from Less in Defined Benefit Plans: Three Levers for a Low-Return World." In *How Persistent Low Returns Will Shape Saving and Retirement*, edited by Olivia S. Mitchell, Robert Clark, and Raimond Maurer, 26, 2018. https://www.oxfordscholarship.com/view/10.1093/oso/9780198827443.001.0001/oso-9780198827443-chapter-4.

Also https://pensionresearchcouncil.wharton.upenn.edu/wp-content/uploads/2017/09/WP-2017-7-Clarke-et-al..pdf

STUDY CATEGORY

Industry study – 3 authors from Vanguard

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT

As global interest rates hover near historic lows, defined benefit pension plan sponsors must grapple with the prospect of lower investment returns. This paper examines three levers that can enhance portfolio outcomes in a low-return world. The levers include increased contributions; reduced investment costs; and increased portfolio risk. The authors use portfolio simulations based on a stochastic asset class forecasting model to evaluate each lever according to two criteria—its magnitude of impact and the certainty that this impact will be realized. Their analysis indicates that increased contributions have the greatest and most certain impact. Reduced costs have a more modest, but equally certain impact. Increased risk can deliver a significant impact, but with the least certainty.

SUMMARY

- The authors stochastically model future asset values of a hypothetical defined benefit pension plan at 10 years under different contribution, cost, and asset allocation assumptions. They also estimated impact on funded ratio.
- From 1926 through 2016, a portfolio with a 60 percent allocation to global equities and 40 percent to global fixed income generated an annualized real return of 5.5 percent. For the 10 years through 2026, authors estimate that the median return for the same portfolio will be about two percentage points lower.
- Authors generally encourage well-funded corporate defined benefit (DB) plans to adopt a liability-driven investment (LDI) strategy.
- Authors evaluate each lever according to its magnitude and certainty of impact. 'Magnitude' is defined as the change in the expected value of a $100 million portfolio over a 10-year investment horizon. 'Certainty' refers to the change in the projected dispersion of portfolio values.

Modeling approach:

- 60/40 global equities, global fixed income portfolio, rebalanced annually 10-year performance evaluated.
- 10,000 simulations.
- Expected annualized return was 5.7 percent nominal (5.6% in Table 1), asset class projections from the Vanguard Capital Markets Model.
- No standard deviation given, but portfolio value at 10 years had p25=136, p50=174.1, p75=220.9, with IQR=84.9, $ millions. (When the equity allocation increases by 10 percentage points, the IQR increases to about $104 million. The hedge fund allocation reduces the difference between 25th and 75th percentile portfolio values to about $69 million.)

Authors analyze each lever relative to a cost-free portfolio.

SCENARIOS EXAMINED

Increase Contributions for a Significant and Certain Impact on Portfolio Value

- Consider a DB plan with $60 million in assets and $73.4 million in liabilities. Its funded ratio is 82 percent.
- Portfolio manager initially allocates 60 percent of plan assets to global equities and 40 percent to global bonds.
- Authors model changes in the portfolio's value over a 10-year period and present probabilities that a portfolio will achieve a 90 percent or 100 percent funded status assuming three levels of annual contribution: $0; $1 million; and $2 million.
- $1 million raises the probability of reaching full funding from 47 percent to 66 percent.
- $2 million per year yields an 81 percent probability, increasing the sponsor's flexibility to implement LDI strategies that limit the plan's vulnerability to changes in interest rates and asset and liability values.

Reduce Costs for a More Modest but Certain Impact on Portfolio Value

- $100 million in plan assets, 7 percent return.
- Net of 100 basis points in annual fees, the portfolio's value would grow to about $178 million after 10 years.
- If fees had been 50 basis points, however, the portfolio would have accumulated an additional $9 million in assets. Over 30 years, annual savings of 50 basis points would translate into more than $90 million in additional assets.

Increase Risk for a Potentially Significant but Uncertain Impact

- Higher equity allocation. A move along the efficient frontier to a risker portfolio, with a higher expected return.
- Style factor tilts. Authors focus on three—Size, value, and credit are notable for both the extensive literature documenting each and the empirical research on their performance; possible risk-based or behavioral explanations for the persistence of their excess returns (Banz 1981; Fama and French 1992, 1993; Pappas and Dickson 2015)….like any active strategy, inevitable periods of underperformance.
- Actively managed equity funds. Need talent, cost, and patience.
- Alternative investments. Authors consider hedge funds and private equity. Neither is a separate asset class but rather a repackaging of publicly or privately traded traditional asset classes. Both represent a form of active management; spread between winners and losers is extreme. Wallick et al. (2015c) found that hedge funds generally did not deliver long-term outperformance relative to a portfolio balanced between global equities and global fixed income.

A DECISION HIERARCHY FOR PLAN SPONSORS

- Increased contributions deliver the most powerful combination of certainty and impact. Reduced costs have a smaller impact, but a high certainty that the impact will be realized.
- In ideal circumstances, increased risk has a significant and positive impact, but the likelihood of realizing this impact is uncertain.

COMMENTS

A prospective analysis of 10-year terminal asset values under alternative assumptions about (a) increasing contributions, (b) reducing costs, and (c) taking more risk for higher expected return. Not surprisingly it concludes that increasing contributions or reducing costs will increase terminal assets with certainty. Plausible contribution increases increase assets by more than plausible cost reductions. Higher expected returns lead to higher asset values, with uncertainty. Largely tells us what we already know, so not a terribly useful paper from our perspective. Included because it is quantitative.

Bernanke 2015, Why are interest rates so low, part 3: The Global Savings Glut

CITATION

Bernanke, Ben S. "Why Are Interest Rates so Low, Part 3: The Global Savings Glut." *Brookings* (blog), April 1, 2015. https://www.brookings.edu/blog/ben-bernanke/2015/04/01/why-are-interest-rates-so-low-part-3-the-global-savings-glut/.

STUDY CATEGORY

Other: Blog post

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT

Ben Bernanke looks at whether the global savings glut is to blame for low interest rates. Global trade imbalances and unequal financial flows create account inequities, contributing to low global interest rates.

SUMMARY

Factors discussed:

- Demographics
- Productivity
- Inequality within countries
- China's unusually high national savings rate

Key conclusions regarding prospective interest rates:

- Economists attribute much of the secular decline in policy rates since the 1990s to the global decline in the neutral rate.
- Model-based studies see demographic trends-and to a lesser extent, slower productivity growth-in developed countries as the main culprits. Since these changes are persistent, the model predicts that the rates will remain depressed for the foreseeable future.

Blanchett et al. 2018, Low Returns and Optimal Retirement Savings

CITATION

Blanchett, David, Michael Finke, and Wade Pfau. "Low Returns and Optimal Retirement Savings." In *How Persistent Low Returns Will Shape Saving and Retirement*, edited by Olivia S. Mitchell, Robert Clark, and Raimond Maurer, 2018. http://www.oxfordscholarship.com/view/10.1093/oso/9780198827443.001.0001/oso-9780198827443-chapter-3.

Also see https://pensionresearchcouncil.wharton.upenn.edu/wp-content/uploads/2017/09/WP-2017-5-Finke-et-al..pdf

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 2: Direct impact on retirement security of individuals

ABSTRACT

Lifetime financial outcomes relate closely to the sequence of investment returns earned over the lifecycle. Higher return assumptions allow individuals to save at a lower rate, withdraw at a higher rate, retire with a lower wealth accumulation, and enjoy a higher standard of living throughout their lifetimes. Often analysis of this topic is based on the investment performance found in historical market returns. However, at the present bond yields are historically lower and equity prices are quite high, suggesting that individuals will likely experience lower returns in the future. Increases in life expectancy, especially among higher-income workers who must also rely more heavily on their private savings to smooth spending, further increases the cost of funding retirement income today. The implications are higher savings rates, lower withdrawal rates, the need for a larger nest egg at retirement, and a lower lifetime standard of living. Authors demonstrate this using a basic life cycle framework and provide a more complex analysis of optimal savings rates that incorporates Social Security, tax rates before and after retirement, actual retirement spending patterns, and differences in expected longevity by income. The authors find that lower-income workers will need to save about 50 percent more if low rates of return persist in the future, and higher-income workers will need to save nearly twice as much in a low return environment compared to the optimal savings using historical returns.

SUMMARY

DEFINITION MEASURE OF RETIREMENT SECURITY

The model assumes that the individual seeks to maintain his or her level of after-tax pay during retirement, compared to his or her after-tax income immediately before retirement (retirement age = 65)

ASSET CLASSES AND SOURCES OF RETIREMENT INCOME CONSIDERED

- Social Security
- Pre-tax savings (401(k) or IRA)

SCENARIOS EXAMINED

- Authors focus on returns net of inflation, investment expenses, asset management fees and taxes.
- They evaluate the retirement planning consequences of a future 0 percent to 2 percent real future portfolio return.
- Real interest rates (Yield curve for TIPS): With 1 percent rate, after-investment-fee return may be negative
- Expected real equity return (after fee and tax): 2-4 percent.

Stochastic scenarios:

- Low asset returns: bond yields begin at a 2 percent real rate. The mean real return starts at 2 percent and follows a random distribution that rises to 3.5 percent at the 75th percentile and 5.25 percent at the 95th percentile (or falls to 1 percent at the 5th percentile).
- Moderate asset returns: bond yields begin at a 2 percent real rate. real return rises to 4 percent on average.
- High expected returns: based on long-term averages but incorporates today's low bond yields.

METHODOLOGY

Key elements of model (based on Blanchett and Idzorek, 2013, 2015):

- Estimates the required savings rate needed to fund a spending amount after tax that smooths consumption immediately after retirement and then maintains a typical retiree's subsequent declining spending path.
- Incorporates the impact of progressive taxation at different levels of income before and after retirement.
- Estimates the amount of Social Security income that a retiree at different levels of income can expect to receive.
- Assumes that all savings are pre-tax (e.g., in a Traditional 401(k) or IRA).
- Real spending needs fall each year in retirement.
- Earnings paths are based on empirical data, annual savings rise with income over life cycle.
- Younger and higher-income workers will need to fund more years of retirement spending. Allows for a 20 percent probability of depleting savings during retirement when generating a lifetime spending path.
- Workers' portfolios are assumed to decrease the fraction in risky assets as they near retirement (glide path).
- 50 bps portfolio fee. Retirement age: 65.
- Model is stochastic.

Longevity:

- Increases in longevity raise the cost of retirement for those who need to replace the largest portion of their retirement income with savings.
- The results show that rising longevity and falling real interest rates doubled the cost of buying safe income over the last 35 years.

KEY CONCLUSIONS

- Saving rates would need to rise by roughly two-thirds for most Americans given persistent low returns (4.3 percent to 7 percent for low earning couples; 9 percent to 16.4 percent for high earning couples).
- Lower-income workers will need to save about 50 percent more if low rates of return persist in the future, and
- Higher-income workers will need to save nearly twice as much in a low return environment compared to the optimal savings using historical returns.
- Delaying retirement can greatly improve retirement security.

Byrne et al. 2018, Investing for Retirement in a Low Returns Environment: Making the Right Decisions to Make the Money Last

CITATION

Byrne, Alistair, and Catherine Reilly. "Investing for Retirement in a Low Returns Environment: Making the Right Decisions to Make the Money Last." In *How Persistent Low Returns Will Shape Saving and Retirement*, edited by Olivia S. Mitchell, Robert Clark, and Raimond Maurer. Oxford University Press, 2018. https://www.oxfordscholarship.com/view/10.1093/oso/9780198827443.001.0001/oso-9780198827443-chapter-5.

Also see https://pensionresearchcouncil.wharton.upenn.edu/wp-content/uploads/2017/09/WP-2017-7-Byrne-Reilly.pdf

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 2: Direct impact on retirement security of individuals

ABSTRACT

Low returns on financial assets and increasing longevity mean saving for retirement is becoming more challenging than it has been in the past. Generations retiring in the near term (boomers) face increased longevity but have lived through periods with strong market returns boosting their assets, and many also have DB entitlements.

Younger generations also face increasing longevity, and in addition are likely to earn much lower investment returns on their retirement assets and few have DB plans. The challenge for them is tougher. The authors model the likely outcomes for different cohorts under scenarios for savings behavior, investment returns and life expectancy. The authors take account of likely pillar one entitlements and varying replacement rate requirements and expected longevity in different demographic and income groups. The authors show that younger generations do face substantial challenges, but there are plausible courses of action involving increased contributions and delayed or partial retirement that can provide reasonable income replacement rates in retirement. The authors map out the steps that the retirement industry (government, employers, financial services providers) needs to take to support people in following these courses of action, such as providing more flexibility over social security.

SUMMARY

Definition measure of retirement security:

- Replacement rate

Asset classes and sources of retirement income considered

- DC savings
- Social Security

Scenarios examined

- Investment returns:
    - Older participants: returns mainly based on realized historical returns
    - Younger participants: returns mainly based on forecasted future returns (SSGA's Investment Solutions Group)
    - Consider the higher life expectancy for the younger cohort

METHODOLOGY

- Portfolio: 80 percent S&P500 stocks and 20 percent U.S. government bonds throughout working lives
- All participants join the plan at the age of 22 and invest 9 percent of their salary (base case)
- Nominal wage growth 2 percent per annum
- Model is deterministic, not stochastic

MODEL RESULTS

- Age cohorts: Due to lower expected returns, younger cohorts are clearly at a disadvantage to older workers

- Replacement rate at retirement age of 65 if start saving since age 22:
    - 211 percent for individuals currently 60 years old; 27 percent for individual currently 25 years old.
    - Changes needed to improve retirement security for younger cohort: With feasible increases in DC contributions and delay in retirement, a 25-year-old could expect to reach a 40 percent replacement rate.
- Income groups:
    - Difference across income groups: higher earners expect to spend a longer period in retirement due to higher life expectancy, while receiving a lower replacement rate from Social Security. Assuming systematical saving throughout the career.
    - Calculating required saving rates to achieve 70 percent replacement rate at a retirement age of 65 for a 25-year-old at the start of her career, considering the expected Social Security replacement rates for different income cohorts.
- Very positive impact of postponing retirement on retirement security: even in the low Return environment, people who save systematically for retirement should be well equipped to retire even at modest deferral rates (but lower earners are less likely to work at higher ages).
- Low earners receive a high replacement rate from Social Security, they only need to save a small proportion of their salaries.
- Late starters:
    - Model examined a 45- and a 55-year-old start saving for retirement at various contribution rates and alternative retirement ages.
    - Participants who start the retirement saving late do face more challenges, yet they can also significantly improve their retirement readiness with a disciplined approach to saving and by postponing retirement.
    - 20 percent contribution rate and working until age 70 provides only a fraction of the 40 percent DC replacement rate that can be achieved by individuals who start saving systematically from age 25.

KEY CONCLUSIONS

Increasing longevity and low expected returns confront today's workers with a more challenging environment in retirement saving than previous generations. Yet, if they save systematically throughout their careers and extend their working lives to age 70, a 10 percent contribution rate should be sufficient for most wage-earners to achieve a reasonable replacement rate in retirement. Those aiming to retire earlier will obviously need to contribute more.

Those on very low incomes can achieve a reasonable replacement rate in retirement with savings rates in the low single digits, whereas those on higher incomes will require 12 – 15 percent saving rates.

For those who have started saving for retirement late, deferring retirement is an extremely powerful tool for improving retirement readiness.

COMMENTS

The paper:

- Focuses on the impact of the differentials across age cohorts, income groups, and starting age for retirement saving.
- Focuses on DC savings and examines the impact of income level on longevity and replacement rate from Social Security.
- The conclusions are based on deterministic analysis and do not consider uncertainty in future investment returns.

Cembalest et al. 2015, What if we live in a low-return world: Implications for pension funds

CITATION

Cembalest, Michael, and Anthony Gould. “What If We Live in a Low-Return World: Implications for Pension Funds.” Investment Insights. J.P. Morgan Asset Management, 2015..

STUDY CATEGORY

Industry

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT

Pension plans have always needed a combination of growth assets and fixed income in order to meet their funding goals.

An environment of low returns across asset classes means that plans must now also re-examine traditional asset-only investment practices and shift toward asset/liability-aware strategies.

This added dimension will require companies to integrate pension funding into their overall risk management strategies. As plans inch closer to full funding, they must evolve their funding strategies appropriately and harness the latest investment solutions—ranging from dynamic asset allocation strategies to liability hedging—to fulfill corporate objectives as well as meet plan needs.

In future years, we may look back at this period as one of historically abnormal asset class returns. Alternatively, if recent economic trends persist, then it is likely that we will be living in a world of low asset returns for a considerable period. Fortunately, there are investment strategies available to pension investors that may mitigate this challenging investment environment.

SUMMARY

DEFINED-BENEFIT PENSION FUNDS AND LIFE ANNUITY PROVIDERS

- Increased incentive to de-risk (corporate DB pension plans)
- Regulatory environment (FAS 158)
- Increasing number of plans moving into closed or frozen status
- Changes in mortality table (longer duration in liability) -> increased demand for long-duration assets
- Supply and demand imbalance of corporate bonds
- Greater demand for High-grade corporate bonds that may serve as a better hedging tool than government bonds, which have close to zero yields
- The supply of corporate bonds is expected to fall short of demand, creating further downward pressure on long-term bond yields in coming years

What does this mean for pensions?

- More contributions needed in order to fund the promised benefits, regardless of how the liability is treated for accounting or regulatory purpose
- Public plans: Under GASB 67/68, an environment of lower asset returns, and bond yields is likely to hurt the funded status
- Corporate plans:
    - Accounting principles establish a direct link between asset returns and overall corporate earnings. Lower expected returns -> higher pension costs -> worse income statement
    - De-risking may remain the dominant driver of anticipated asset allocation changes over the next 3 years, (2015) unless they are waiting for improvements in funded status and/or are hoping for higher yields at which to invest their hedge assets

The case for risk assets and real-world strategy: (may be most relevant for corporate pensions)

- Use leverage to gain additional asset exposures
- Allocation to hedge funds, private equity and real estate investments that have built-in leverage
- Consider direct allocation investments with illiquid assets

OTHER RELEVANT CONCLUSIONS

Case for lower returns across asset classes:

- Low growth and low equity returns
- Dividend; unlikely to change
- EPS. main driver is GDP growth (correlation = 0.62)
- Valuation change (P/E). Dominant driver of long-term equity returns will likely be the rate of economic growth
- Low growth and low fixed income yields
- Lower trend rates of nominal GDP growth -> lower returns are the new normal

COMMENTS

The investment strategies suggested in this report can be considered as examples of the "search for yield" activities discussed in the first two studies, which would lead to greater investment risks for insurance companies and pension funds and even systemic financial instability.

Dotsey 2016, Monetary Policy and the New Normal

CITATION

Dotsey, Michael. “Monetary Policy and the New Normal.” Economic Insights. Federal Reserve Bank of Philadelphia Research Department, First Quarter 2016.

STUDY CATEGORY

Non-peer-reviewed-academic

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT (CONSTRUCTED)

Asks whether the U.S. economy has entered a period of long-run, or secular, stagnation.

- Reviews the Robert Gordon argument for secular stagnation in productivity, and reviews several of its critiques.
- Argues that monetary policymakers must pay attention to long-run productivity in setting interest rates. Higher long-run productivity implies a higher real interest rate, which suggests the targeted federal funds rate should be higher, all else equal. Thus, the appropriate policy target depends in part on productivity.

SUMMARY

FACTORS DISCUSSED

Examines what average hourly productivity would have been in 2012 if the 1948-1972 trend had continued uninterrupted as opposed to following the 1972-1996 trend: The difference is substantial.

Arguments for sustained low productivity growth:

- Robert Gordon of Northwestern University points out that the U.S. economy has roughly returned to its less robust growth rate of 1972-1996 and he believes that productivity is likely to remain on this slower track
- Headwinds for productivity growth (Robert Gordon, 2012)
- Today's advances in information technology and communications may not lead to the same level of productivity growth resulted from earlier breakthroughs
- Plateaued education attainment
- Slowing population growth: aging -> lower worker-to-pop ratio-> reduced output growth per capita; aging -> greater share of the pop depends on support funded by taxes, Social Security, Medicare -> higher taxes and reduction in incentives and innovation
- Inequality, globalization, energy and environmental restrictions, debt-burdened consumers and government
- Regulatory burdens
- U.S. may experience only 0.9 percent per capita growth going forward. Such an eventuality would represent more than a halving of the per capita growth rate of 2.33 percent over the period 1891–1972 (Robert Gordon, 2012)

More optimistic views of future productivity growth:

- Gordon's conclusion may be premature: Productivity growth may experience an unexceptional era before taking off (Chad Syverson, 2013). The question is: Will history repeat itself?
- Joel Mokyr (2014, Northwestern U.): It is not just that scientific discoveries lead to improved technology, but that improved technology leads to scientific discoveries. (The low-hanging fruit may have been picked, but we now have ladders.)
- Erik Brynjolfsson and Andrew McAfee (2014): They point to the tremendous gains in computational speed and power as well as the development of software that they believe will serve as launch pads for an upcoming inflection point in productivity. Man combined with machines is a powerful tool.

Productivity, interest rates, and monetary policy

- There is great uncertainty surrounding our prospects for growth.
- Policymakers must be attentive to trend changes in productivity, although gauging long-term changes is a very challenging task. (Comment: demographic changes are easier to predict and may be more difficult to change by policies.)

- How productivity growth affects interest rates:
    - Growth and interest rates "are joined at the hip".
    - High productivity growth -> pays off to save more and invest for greater future consumption.
    - Greater future productivity is reflected in higher current interest rates that are needed to induce individuals to provide the necessary capital. Firms are willing to pay higher interest rates because their investments are more profitable when productivity growth is high.
    - Policymakers seek to calibrate monetary policy with the neutral federal funds rate, which is the natural real rate plus whatever inflation rate they consider optimal for keeping price increases stable and output growing at its potential (long-term as well as cyclical productivity change).
- No conclusions on prospective interest rates.

IMPORTANT STUDIES MENTIONED

Gordon, Robert G. "Is U.S. Economic Growth Over? Faltering Innovation Confronts Six Headwinds," National Bureau of Economic Research Working Paper 18315 (August 2012).

Syverson, Chad. "Will History Repeat Itself? Comments on 'Is the Information Technology Revolution Over?' "International Productivity Monitor, 25 (2013), pp. 37–40.

Dotsey, Michael. "How the Fed Affects the Economy: A Look at Systematic Monetary Policy," Federal Reserve Bank of Philadelphia Business Review (First Quarter 2004).

Mokyr, Joel. "The Next Age of Invention," City Journal (Winter 2014).

Brynjolfsson, Erik, and Andrew McAfee. The Second Machine Age, New York and London: W.W. Norton & Company, 2014.

COMMENTS

Although there is a clear theoretical relationship between growth and interest rates, empirical evidence shows there can be substantial uncertainty in this relationship, as documented by Hamilton et al. (2015).

Compared to productivity growth, demographic changes are easier to predict and may be more difficult to change by policies.

Drozd 2018, The Policy Perils of Low Interest Rates

CITATION

Drozd, Lukasz A. "The Policy Perils of Low Interest Rates." Federal Reserve Bank of Philadelphia Research Department, Q1 2018. https://www.philadelphiafed.org/the-economy/monetary-policy/the-policy-perils-of-low-interest-rates. .

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

SUMMARY

FACTORS DISCUSSED

- Reduction in demand for debt-financed investment. Declining rate of population growth.
- Higher propensity to save due to changes in the distribution of income, both between labor income and capital income and between those with more wealth and those with less.
- Reduction in relative price of capital goods.
- Lower pre-tax interest rates required for any given after-tax interest rate.
- Global moves to accumulate central bank reserves in safe assets (U.S. Treasuries in Particular).

KEY CONCLUSIONS REGARDING PROSPECTIVE INTEREST RATES

- The hypothesis that the equilibrium real interest rates have declined is reasonable.

COMMENTS

- International factors are not well incorporated in studies that support this argument.

Dynan 2017, The Federal Reserve's Impact on Main Street, Retirees, and Savings

CITATION

Dynan, Karen. The Federal Reserve's Impact on Main Street, Retirees, and Savings, U.S. House of Representatives Committee on Financial Services, Subcommittee on Monetary Policy and Trade (2017).

STUDY CATEGORY

Other: Hearing

TOPICS ADDRESSED

Studies on related topics

ABSTRACT (CONSTRUCTED)

Five principal points:

1. Accommodative monetary policy since the Great Recession has produced a strong (albeit gradual) economic recovery in the United States—and a stronger recovery than would have occurred without accommodative monetary policy.
2. While the employment effects of accommodative monetary policy have differed across people, everyone has benefited from more job growth in the country and the greater increase in output that resulted.

3. The effects of accommodative monetary policy on savers and retirees have differed across people just as the effects of monetary policy on employment have differed across people. The lower interest rates associated with accommodative monetary policy have hurt some savers by reducing their interest income but have helped some savers by boosting prices of assets like stocks and houses.
4. The Federal Reserve should be accountable to the Congress for its actions, but some of the provisions in the CHOICE Act would materially impair the Federal Reserve's ability to support a strong economy and low and stable inflation.
5. Achieving financial security in retirement is an important challenge for many Americans, and various aspects of federal policy apart from monetary policy can and should be used to enhance financial security.

SUMMARY

FACTORS/BEHAVIORS EXAMINED:

Return on different asset classes, borrowing cost, labor market

Methodology: Narrative

KEY CONCLUSIONS

The effects of accommodative monetary policy on savers and retirees have differed across people just as the effects of monetary policy on employment have differed across people.

Some of the assets held by savers and retirees pay interest income, and the amount of that income depends on monetary policy as well as other forces. However, those assets represent a small share of all assets. But that policy has also boosted the returns on stock and real estate held by savers and retirees.

Research examining retirement-age households between 2007-2011 found middle- and upper- middle-class households are the most exposed to losses in interest income, while the losses generally amounted to less than 10 percent of their total income over the period studied.

Many savers are also borrowers, and therefore they benefit directly from the lower interest rates. For example, many homeowners were able to refinance into lower-cost mortgages.

The Federal Reserve's efforts (lowering interest rates) support the labor market, which is also important to retirement security. For many older workers, the benefits of being able to avoid unplanned retirements and to delay retirements when they chose (as well as the other benefits of accommodative monetary policy) were likely much larger than the costs of lower interest income.

COMMENTS

This memo mainly focuses on the short- and mid-term effects of the accommodative monetary on retirement related factors and does not discuss the impact of a lower longer-term neutral interest rate.

Eggertsson et al. 2019, A Model of Secular Stagnation: Theory and Quantitative Evaluation

CITATION

Eggertsson, Gauti B., Neil R. Mehrotra, and Jacob A. Robbins. "A Model of Secular Stagnation: Theory and Quantitative Evaluation." *American Economic Journal: Macroeconomics* 11, no. 1 (January 2019). https://doi.org/10.1257/mac.20170367.

Also: https://www.minneapolisfed.org/research/working-papers/a-model-of-secular-stagnation-theory-and-quantitative-evaluation

STUDY CATEGORY

Academic working paper

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT

This paper formalizes and quantifies the secular stagnation hypothesis, defined as a persistently low or negative natural rate of interest leading to a chronically binding zero lower bound (ZLB). Output-inflation dynamics and policy prescriptions are fundamentally different from those in the standard New Keynesian framework. Using a 56-period quantitative life cycle model, a standard calibration to U.S. data delivers a natural rate ranging from −1.5 percent to −2 percent, implying an elevated risk of ZLB episodes for the foreseeable future. The researchers decompose the contribution of demographic and technological factors to the decline in interest rates since 1970 and quantify changes required to restore higher rates.

SUMMARY

Modeling approach:

- A series of analytical and quantitative overlapping generation models (OLG) of varying degree of complexity in which the steady-state, full-employment real interest rate is permanently negative.
- Model parameters are calibrated to match U.S. data in 2015 and the observable demographic and productivity factors are reverted to their 1970 values.
- The model is deterministic, not stochastic.

Factors modeled:

- Slowdown in population growth/increase in life expectancy. Slowdown in productivity growth.
- Rising income inequality.
- Decrease in the relative price of investment goods.

Model results:

- The model generates a 4.02 percent decrease in the real interest rate from 1970 to 2015 (actual decrease was 4.09 percent).

Impact of major driving forces:

- Reduction in fertility: -1.84 percent
- Reduction in mortality: - 1.92percent
- Reduction in productivity growth: -1.90 percent
- Increase in government debt: +2.11 percent

Impact of less important driving forces:

- Changes in the labor share: -0.5 percent
- Change in relative price of investment goods: -0.44 percent
- Variation in consumer debt capacity: +0.13 percent

Key conclusions regarding prospective interest rates:

- The main driver of negative natural interest rates are aging population, low fertility, and sluggish productivity growth. While this trend may reverse itself, if current projections for fertility and productivity hold, the analysis suggests that the natural rate of interest will be low or negative for the foreseeable future.
- A key determinant of whether interest rates are likely to increase is whether the rate of productivity growth, which has slowed markedly since the 1970s, returns to its long-run rate of 2 percent per year.

Fichtner 2016, What Low Interest Rates Mean for Social Security and Retirees

CITATION

Fichtner, Jason J. "What Low Interest Rates Mean for Social Security and Retirees." Mercatus Center, December 9, 2016. https://www.mercatus.org/publications/monetary-policy/what-low-interest-rates-mean-social-security-and-retirees.

STUDY CATEGORY

Other: Web article

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT (CONSTRUCTED)

Low interest rates negatively affect Social Security's broader finances because the Social Security Trust Funds earn interest on U.S. Treasury bond holdings, contributing to quicker depletion of the funds. On the other hand, private sector annuities generally decline when interest rates decrease, but Social Security benefits do not. (Author does not quantify potential impacts.) The greater issue is the long-run unsustainability of Social Security.

SUMMARY

This paper focuses on Social Security. The author served in several positions at the Social Security Administration, including as deputy commissioner of Social Security (acting), chief economist, and associate commissioner for retirement policy.

Continued low interest rates, combined with slow economic growth and an aging population of baby boomers who are receiving Social Security payments and who are living longer, contribute to a quicker depletion of the Social Security Trust Funds. This lack of additional funds further threatens the financial security of retirees because it means they are at risk of greater Social Security benefit cuts much sooner as a result of Trust Fund depletion.

Social Security must invest its surpluses in special-issue Treasury bonds that are available only to Social Security. Low interest rates negatively impact Social Security's broader finances because Social Security Trust Funds earn interest on their U.S. Treasury bond holdings. Interest rates have been below 2 percent for most of 2016, and revenue generated from interest payments made to the Trust Funds has been declining since 2009. Despite the stimulative interest rates, there hasn't been much growth leading to more jobs, higher wages, and higher incomes - all items on which Social Security payroll taxes would be levied.

Seniors who can afford to delay claiming Social Security can potentially benefit from Social Security considerably. Social Security is basically an inflation-protected annuity. Private sector annuity providers generally make payouts less generous in response to lower interest rates, whereas the age adjustments of Social Security are fixed by law.

Low and stable interest rates coupled with moderate economic growth in wages. Nominal interest rates of 3 to 4 percent (100–200 basis points higher than where they are today) with similar economic growth rates would provide a stable interest-rate environment for the Social Security program and retirees.

Under current law, however, even if we do achieve a “Goldilocks” range of interest rates and economic growth, Social Security finances will remain on an unsustainable trajectory.

COMMENT

While the direct impact of sustained low interest rates on Social Security through lower earnings on the Trust Funds is negative, the impact is relatively small because Social Security is primarily financed by payroll taxes, not Trust Fund earnings. The larger issue for Social Security is the long run unsustainability of the current fiscal arrangement, due to demographic changes.

Fichtner et al. 2018, Retirement Saving and Decumulation in a Persistent Low-Return Environment

CITATION

Fichtner, Jason J., and Jason S. Seligman. “Retirement Saving and Decumulation in a Persistent Low-Return Environment.” In *How Persistent Low Returns Will Shape Saving and Retirement*, edited by Olivia S. Mitchell, Robert Clark, and Raimond Maurer, Vol. 1. Oxford University Press, 2018. http://www.oxfordscholarship.com/view/10.1093/oso/9780198827443.001.0001/oso-9780198827443-chapter-9.

Also https://pensionresearchcouncil.wharton.upenn.edu/wp-content/uploads/2017/09/WP-2017-10-Fitchner-Seligman.pdf

STUDY CATEGORY

Book chapter

TOPICS ADDRESSED

Topic 2: Studies of how persistent low-interest rates could affect the retirement security of individuals

ABSTRACT

Recent economic conditions have vastly changed the retirement landscape as a lengthy period of low interest rates have made building wealth for retirement harder and the risk of depleting wealth during the decumulation phase of retirement greater than at any time in recent history. The retirement environment presents challenges, over (i) the period for which interest rates remain low, and (ii) once interest rates appreciably increase--as fixed income assets then decrease in value. This paper addresses two related topics: first, how have households responded to the current low interest rate environment and second, are there alternative responses or investments which households might do well to consider? Beginning with the first topic: the researchers employ the HRS to first investigate impacts of the 2008 – 2014 low interest rate impacts on savings, wealth and asset allocation both ahead of and while in retirement. As well as employing a full sample the researchers report on the responses of the subset of households who have been relatively successful at building and preserving wealth over this period.

Following this analytic work, the researchers consider alternative portfolio and wealth management strategies targeting increases in equities and delayed participation in Social Security in terms of their potential to add value in persistent low return environments.

SUMMARY

Factors examined: Household wealth and portfolio allocation changes in the period in and after the Great Recession.

Methodology:

- Used a 1992–2014 panel of ~10,400 households from the Health and Retirement Study (HRS), with self-reports at two-year intervals.
- Methods included descriptive statistics and analytic graphics, as well as panel regressions and Tobit regressions.
- Models were deterministic, not stochastic.

Examined measures of:

- Total household wealth and of portfolio allocation.
- Bond and liquid allocations, an idea that these assets, generally thought of as safe for elders, will be vulnerable in a low interest rate environment.

For the regressions, the lefthand sides (LHS) were:

- Panel regressions: total assets, and assets for sample subgroups Tobit: asset allocations, and home loan-to-value ratios.
- Explanatory variable of main interest is low interest rate indicator, coded to equal 1 for all interviews following December of 2008, which was the month the Federal Reserve dropped the Federal Funds Rate to a target range of 0-25 basis points; this rate drives global interest rates for fixed income products.

- Included controls for retirement status, labor force participation (ahead of and after initial retirement, and including part-time work), employer retirement plan, Social Security program participation, race, sex, marital status, age, cohort, and being in the top or bottom 10 percent of the wealth distribution.

Bonds:

- The value of bonds held outside of mutual funds has increased over time, but from-and-to low average levels; there appears to be a general attenuation of growth in accumulations over the last two to three waves of HRS data (2010-14).
- Other patterns are consistent with the idea that the lower interest rates since the Great Recession have continued to mute allocations in this type of investment.
- Bonds historically play a protective role for seniors' income, especially absent inflation risks. Sixty-three percent of the sample falls within the most risk averse category; the least risk averse 13 percent of the sample [also has] lower reliance on bond portfolios [than before??].

Homes:

- Generally, then, even after the financial crisis, homeowners have not suffered a major decline in this key retirement asset.
- Homeowners have continued to pay down their mortgages, so the ratio of home loan to home value, LTV, has generally continued to decline.

Other property (e.g., real estate rental property):

- Notable break in the real estate holding habits of cohorts based on risk preferences. For the most risk averse, one observes increasing holdings, even following the Great Recession. Yet for the least risk averse, accumulation patterns generally flatten or decline from a peak in 2008.

Income and debts:

- Younger cohorts are earning higher incomes for longer.
- No general evidence of a compensating increase in income following the asset markdowns during the Great Recession - older households do not appear to have delayed exit or reentered the labor market to any marked degree.
- Younger cohorts have more income and hold higher mortgage balances at similar ages. All [cohorts] generally hold liquid balances between $10,000-$20,000 and manage their finances such that other debt tapers to the $4,000-$6,000 range by age 62-63.
- Overall, patterns suggest delayed income tapering may be aligned with delayed mortgage payoff, and that investments in bonds may be muted in the low interest rate environment since the Great Recession. By comparison, the value of stocks (equity and mutual fund holdings) has grown for most cohorts following the negative shocks related to the Financial Crisis.

Wealth Experiences Through Retirement:

- Examined retired individuals (based on self-reporting) from retirement forward. All cohorts suffered wealth shock in the Great Recession.
- Patterns in recovery varied (measured by 2014 wealth).
- Overall wealth:

  - Bottom 10 percent of households lost more than half their wealth between 2008 and 2010, and had not yet recovered (as of 2014); on average they depleted their wealth around 16 years into retirement; bottom quartile within about 18 years of retirement.
  - This is less than the 20-or-so years that financial advisors might use for longevity.

By 18 years into retirement:

- Bottom 50 percent of all HRS households averaged only about $50,000 in net financial assets.
- 75th percentile of the distribution had just over twice that.
- Top 10 percent, who generally were older and had been retired longer at the time of the Great Recession, saw strong increases in their total assets, more than recovering their losses.
- Wealthiest 10 percent started with more assets before the Great Recession, but that does not explain why total wealth for this group grew afterwards.
- This subgroup held higher allocations to stock and mutual funds, and it has increased its proportional allocations over time. The same is true for allocations to bonds, though the proportions of these allocations are lower.

Asset classes:

- All groups reduced investment allocations to ST debt since the Great Recession.
- Cash increasingly made up a greater proportion of assets for those lower in the wealth distribution, until there was a collapse (correlated with insolvency).
- Lowest 25 percent appear to have relied on home equity to finance their retirement; for bottom 10 percent home equity drawdowns were nearly complete.

Regression and Tobit analysis:

- Wealth declines: people experienced an average wealth shock of $84,000-$85,000 over the low interest period of 2009-2014; the married, and better educated fared better.
- Work: It appears that some households reengaged in market work when confronted with lower asset balances, as labor force participation is correlated with lower asset balances. This relationship flips in the lowest 25 percent of the distribution …suspect that this has to do with a general paucity of assets for retirees in this group.
- Bond allocations: declines of roughly 0.1-0.2 percentage points for bond allocations during the low interest rate period… a fairly large attenuation effect given the low proportions of bonds reported above… attenuation is much larger for the top 10 percent of the wealth distribution, where bond holdings were greater earlier in retirement.
- Stocks and mutual funds: the low interest rate period was associated with declines in equity and mutual fund allocations of 1.4-1.5 percentage points; bottom 10 percent allocated away from this asset class, by roughly an additional percentage point, while the top 10 percent increased its allocation by roughly 9 percentage points.
- Home loan to value: 2 percentage point increase in LTV.
- Lowest 10 percent of wealth distribution had a 27 percentage point *increase* in LTV; top 10 percent had an LTV *decline* of11 percentage points.

COMMENTS

This is a descriptive and regression analysis of how household wealth has changed in and after the Great Recession, using a panel of ~10,400 households from the Household Retirement Survey (HRS). It notes tremendous divergence

in how different wealth groups were affected, with wealthier groups doing far better than bottom wealth groups. The key points of relevance to us are:

Most households took significant losses from which they have not fully recovered. Wealthiest 10 percent saw marked improvements in wealth since the Great Recession. Around a quarter of retired households reported negative net asset positions by 2014.

Those in the bottom quartile who own homes have extracted equity from their homes to finance their retirement.

The paper includes useful details on how different subgroups were affected. It also includes a useful literature review.

Finke et al. 2013, The 4 Percent Rule Is Not Safe in a Low-Yield World

CITATION

Finke, Michael, Wade D. Pfau, and David M. Blanchett. "The 4 Percent Rule Is Not Safe in a Low-Yield World." *Journal of Financial Planning* 26, no. 6 (2013): 46–55. https://www.onefpa.org/journal/Pages/The%204%20Percent%20Rule%20Is%20Not%20Safe%20in%20a%20Low-Yield%20World.aspx.

STUDY CATEGORY

Peer-reviewed academic

TOPICS ADDRESSED

Topic 2: Direct impact on retirement security of individuals

ABSTRACT

- The safety of a 4 percent initial withdrawal strategy depends on asset return assumptions. Using historical averages to guide simulations for failure rates for retirees spending an inflation-adjusted 4 percent of retirement date assets over 30 years results in an estimated failure rate of about 6 percent. This modest projected failure rate rises sharply if real returns decline.
- As of January 2013, intermediate-term real interest rates are about 4 percent less than their historical average. Calibrating bond returns to the January 2013 real yields offered on 5-year TIPS, while maintaining the historical equity premium, causes the projected failure rate for retirement account withdrawals to jump to 57 percent. The 4 percent rule cannot be treated as a safe initial withdrawal rate in today's low interest rate environment.
- Some planners may wish to assume that today's low interest rates are an aberration and that higher real interest rates will return in the medium-term horizon. Although there is little evidence to support this assumption, the researchers estimate how a reversion to historical real yields will impact failure rates.
- Because of sequence of returns risk, portfolio withdrawals can cause the events in early retirement to have a disproportionate effect on the sustainability of an income strategy. the researchers simulate failure rates if today's bond rates return to their historical average after either 5 or 10 years and find that failure rates are much higher (18 percent and 32 percent, respectively for a 50 percent stock allocation) than many retirees may be willing to accept.

- The success of the 4 percent rule in the U.S. may be an historical anomaly, and clients may wish to consider their retirement income strategies more broadly than relying solely on systematic withdrawals from a volatile portfolio.

SUMMARY

Measure of retirement security: Failure rates -- retirement savings being depleted before the end of the assumed 30-year period.

Asset classes and sources of retirement income considered: Withdrawal from a 50/50 stock-bond portfolio.

Scenarios examined:

1. Historical: 2.6 percent real for bond, 8.6 percent real for stock;
2. 1.75 percent real for bond, 5.5 percent real for stock;
3. 0 percent real for bond; 6 percent real for stock;
4. -1.4 percent real for bond and 4.6 percent real for stock;
5. Same as 4 but returns revert to historical mean (scenario 1) after 5 or 10 years.

Methodology (Model, key assumptions, and data):

- Monte Carlo simulation method (stochastic modeling)
- Constant equity risk premium
- Correlation matrix across asset classes based on 1926-2011 U.S. Data

Key conclusions:

- At a 4 percent annual withdrawal rate, the probability that a 50-50 stocks-bonds portfolio would fail to provide sustainable income would increase by 51 percentage points in the low-returns scenario relative to the high-returns scenario (6 percent vs. 57 percent).
- Even assuming return would revert to historical mean in 5 or 10 years, failure rates at a 4 percent withdrawal rate are still high (18 percent/32percent failure rates assuming reverting to historical mean after 5/10 years).

Fischer 2016, Why Are Interest Rates So Low? Causes and Implications

CITATION

Fischer, Stanley. “Why Are Interest Rates So Low? Causes and Implications. Remarks by Stanley Fischer, Vice Chairman, Board of Governors of the Federal Reserve System.” presented at the Economic Club of New York, October 17, 2016. https://www.federalreserve.gov/newsevents/speech/fischer20161017a.htm.

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

SUMMARY

Modeling approach:

- Simulation based on FRB/US model
- Deterministic, not stochastic

Factors modeled:

- Slow economic growth (slow growth in productivity and labor force); increase in average age of the population
- Weak investment in recent years; slow foreign economic growth

Factors that may raise interest rates:

- Increase in investment tendency (animal spirits)
- Expansionary fiscal policy

Model results:

- Effect of slow GDP growth: the slowdown to the 1.75 percent projected long run real GDP growth would reduce 120 basis points from the longer-run federal funds rate.
- Effect of aging population: Population aging could be pushing down the longer-run equilibrium federal funds rate down by as much as 75 basis points relative to the 1980s level (from another FRB model).
- Effect of weak investment: the shortfall in investment in the past couple of years has depressed the long-run equilibrium federal funds rate by about 60 basis points.
- Effect of developments abroad: A reduction in the equilibrium federal funds rate of about 30 basis points would be required to offset the effects in the United States of a reduction in foreign growth prospects similar to what we have seen in the U.S.
- What may contribute to higher interest rates in the future:
    - Increase in business-sector investment equal to 1 percent of GDP would raise the equilibrium funds rate by 30 basis points.
    - Increase in government spending of 1 percent of GDP would raise equilibrium interest rates by 50 basis points.
    - Tax cut of 1 percent of GDP would raise equilibrium interest rates by 40 basis points.

Key conclusions regarding prospective interest rates:

- A variety of factors have been holding down interest rates and may continue to do so for some time. But economic policy can help offset the forces driving down longer-run equilibrium interest rates.

Gagnon et al. 2016, Understanding the New Normal: The Role of Demographics

CITATION

Gagnon, Etienne, Benjamin K. Johannsen, and David Lopez-Salido. "Understanding the New Normal: The Role of Demographics." Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System, October 3, 2016. http://www.federalreserve.gov/econresdata/feds/2016/files/2016080pap.pdf.

STUDY CATEGORY

Academic working paper

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT

Since the Great Recession, the U.S. economy has experienced low real GDP growth and low real interest rates, including for long maturities. The researchers show that these developments were largely predictable by calibrating an overlapping-generation model with a rich demographic structure to observed and projected changes in U.S. population, family composition, life expectancy, and labor market activity. The model accounts for a 1¼–percentage-point decline in both real GDP growth and the equilibrium real interest rate since 1980—essentially all the permanent declines in those variables according to some estimates. The model also implies that these declines were especially pronounced over the past decade or so because of demographic factors most-directly associated with the post-war baby boom and the passing of the information technology boom. The results further suggest that real GDP growth and real interest rates will remain low in coming decades, consistent with the U.S. economy having reached a "new normal."

SUMMARY

Modeling approach:

An overlapping generations (OLG) model that is consistent with observed and projected changes in fertility, labor supply, life expectancy, family composition, and international migration, which is used to explore the extent to which demographic changes can explain the timing and magnitude of movements in real interest rates and real GDP growth during the post-war period and beyond.

The model is deterministic, not stochastic.

Factors modeled:

- Demographics in the United States
- Productivity (not the focus)

Model results:

- The demographic factors alone can account for a 1.25 percentage points decline in the equilibrium real interest rate in the model since 1980, much, if not all, of the permanent decline in real interest rates over that period

according to some estimates. The model also implies that these declines have been most pronounced since the early 2000s.

- Estimated contributions of major driving forces:
    - Falling fertility rates: -0.5 percentage points
    - Increased employment rates: -0.5 percentage points
    - Long life expectancy: -0.25 percentage points
- When productivity is considered, the predicted declines are essentially unchanged but the transition to the new normal over the past decades is more dramatic.
- The decline in interest rates and GDP growth are most directly connected to the consequences of the post-war baby boom.

Key conclusions regarding prospective interest rates:

- Going forward, the model predicts that the capital-labor ratio will remain elevated despite low rates of aggregate investment in capital because the growth rate of the labor supply will also be low, so that both interest rates and GDP growth will linger near their current low levels.

Hamilton et al. 2016, The Equilibrium Real Funds Rate: Past, Present and Future

CITATION

Hamilton, James D., Ethan S. Harris, Jan Hatzius, and Kenneth D. West. "The Equilibrium Real Funds Rate: Past, Present and Future." Working Paper, May 11, 2016. https://econweb.ucsd.edu/~jhamilto/USMPF_2015.pdf.

STUDY CATEGORY

Academic working paper

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT

The researchers examine the behavior, determinants, and implications of the equilibrium level of the real federal funds rate, interpreted as the long run or steady state value of the real funds rate. The researchers draw three main conclusions. First, the uncertainty around the equilibrium rate is large, and its relationship with trend GDP growth much more tenuous than widely believed. Their narrative and econometric analysis using cross- country data and going back to the 19th century supports a wide range of plausible estimates for the current level of the equilibrium rate, from a little over 0% to the pre-crisis consensus of 2%. Second, a bivariate vector error correction model that looks only to U.S. and world real rates well captures the behavior of U.S. real rates.

The model treats real rates as cointegrated unit root processes. As of the end of their sample (2014), the model forecasts the real rate in the U.S. will asymptote to an equilibrium value of a little less than half a percent by 2021. Consistent with our first point, however, confidence intervals around this point estimate are huge. Third, the uncertainty around the equilibrium rate argues for more "inertial" monetary policy than implied by standard versions of the Taylor rule. Their simulations using the Fed staff's FRB/US model show that explicit recognition of

this uncertainty results in a later but steeper normalization path for the funds rate compared with the median "dot" in the FOMC's Summary of Economic Projections.

SUMMARY

Modeling approach:

- Reduced form (statistical analysis, no structural model) econometric models that examine the behavior of the real interest rate over long periods of time and its empirical relation to factors such as the economic growth rate.
- The paper considers evidence from many countries, though with primary focus on the U.S.

Is the model stochastic:

- N/A (statistical models)

Factors modeled:

- Economic growth
- World-wide long-term average interest rates

Model results:

- The paper uncovers some evidence that higher trend economic growth rates are associated with higher average real rates, but the finding is sensitive to the sample period used. The authors conclude that factors in addition to changes in the trend growth rate are central to explaining why the equilibrium real rate changes over time.
- U.S. rate is co-integrated with a measure that is similar to the median of a 30-year-average of real rates around the world. The model forecasts the U.S. and world long-run real rate settling down at a value around a half a percent within about six years. However, the uncertainty is large and grows larger the further we try to look into the future.

Key conclusions regarding prospective interest rates:

- Comments on Secular Stagnation hypothesis: Advocates of this view are misinterpreting the delayed recovery from the Great Recession as evidence of chronically week aggregate demand. A comparison with previous cycles suggests that the equilibrium rate may have fallen, but not as much as the secular stagnation hypothesis would imply.
- Economic growth may not be the main driving force of interest rates. The model results suggest that the link between real interest rates and economic growth is weak and seems to have been buried by effects from other factors.
- Reasonable forecasts for the equilibrium rate will come with large confidence interval.
- The authors conclude that the long-run equilibrium U.S. real interest rate remains positive, and also conclude that forecasts that the real rate will remain stuck at or below zero for the next decade appear unwarranted. But they find little basis in the data for stating with confidence exactly what the value of the equilibrium real rate is going to be.

Horneff et al. 2018, How will persistent low expected returns shape household economic behavior?

CITATION

Horneff, Vanya, and Raimond Maurer. "How Persistent Low Expected Returns Alter Optimal Life Cycle Saving, Investment, and Retirement Behavior." In *How Persistent Low Returns Will Shape Saving and Retirement*, edited by Olivia S. Mitchell, Robert Clark, and Raimond Maurer. Oxford University Press, 2018. https://www.oxfordscholarship.com/view/10.1093/oso/9780198827443.001.0001/oso-9780198827443-chapter-8.

Also https://pensionresearchcouncil.wharton.upenn.edu/wp-content/uploads/2018/10/WP-2018-7-Horneff-et-al-10.3.18.pdf

STUDY CATEGORY

Book chapter

TOPICS ADDRESSED

Topic 2: Studies of how persistent low-interest rates could affect the retirement security of individuals

ABSTRACT

Many believe that global capital markets will generate lower returns in the future versus the past. The authors examine how persistently lower real returns will reshape work, retirement, saving, and investment behavior of older persons using a calibrated dynamic life cycle model. In a low return regime, workers build up less wealth in their tax-qualified 401(k) accounts versus the past, claim social security benefits later, and work more. Moreover, the better-educated are more sensitive to real interest rate changes, while the least-educated alter their behavior less. Interestingly, the distribution of wealth is more uniform in periods of persistent low expected returns.

SUMMARY

Factors/Behaviors examined:

- Work, retirement, saving, and investment behavior

Methodology:

- Calibrated dynamic life cycle model that incorporates:
    - population heterogeneity (age, gender, education)
    - stock market and labor market uncertainty
    - stochastic mortality
    - U.S. tax rules and minimum distribution requirements for 401(k) plans
    - real-world social security benefit formulas

Is the model stochastic: yes

Interest rate scenarios:

- Real risk-free interest rates of 0 percent and 2percent; equity risk premium of 5percent.

- Real risk-free interest rate of 0 percent and equity risk premium of only 2 percent ("Japanese style" economy).

KEY CONCLUSIONS

- Claim Social Security benefit later and work more: average age of claiming Social Security rises by about one year and average work hours are 5 percent higher.
- The better educated are more sensitive to real interest rate changes in terms of claiming and work behavior; the least-educated alter their behavior less.
- Workers build up less wealth in their tax qualified 401(k) accounts versus the past: middle-aged men and women (age 45-54) optimally accumulate about 20 percent less on average in the 0 percent yield scenario compared to in the 2 percent yield scenario.
- Wealth inequality is lower in periods of persistent low expected returns: saving reductions are most notable for the best-educated individuals.
- The findings are robust to alternative formulations examined.

IMF 2017, Low growth, low interest rates, and financial intermediation

CITATION

International Monetary Fund. "Low Growth, Low Interest Rates, and Financial Intermediation (Chapter 2)." In *Global Financial Stability Report: Getting the Policy Mix Right*. International Monetary Fund, 2017. https://www.imf.org/~/media/Files/Publications/GFSR/2017/April/ch2.ashx.

Also see https://www.imf.org/en/Publications/GFSR/Issues/2017/03/30/global-financial-stability-report-april-2017

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT

Advanced economies have experienced a prolonged episode of low interest rates and low growth since the global financial crisis. From a longer-term perspective, real interest rates have been on a steady decline over the past three decades. Despite recent signs of an increase in long-term yields, particularly in the United States, the experience of Japan suggests that an imminent and permanent exit from a low interest rate environment need not be guaranteed. A combination of slow-moving structural factors, notably population aging and slower productivity growth common to many advanced economies, could conceivably generate a steady state of lower growth and lower nominal and real interest rates in these countries.

What would be the consequences for the financial sector of such a scenario? This chapter examines this question, abstracting from the role of monetary policy and from temporary effects. The chapter argues that the persistence of a prolonged low interest rate environment would present a considerable challenge to financial institutions. Over the

long term, the scenario would entail significant changes to the business models of banks, insurers, and pension funds and the products offered by the financial sector.

In such an environment, yield curves would likely flatten, lowering bank earnings and presenting long-lasting challenges for life insurers and defined benefit pension funds. If bank deposit rates cannot drop (significantly) below zero, bank profits would be squeezed even further. Smaller, deposit-funded, and less diversified banks would be hurt most, which could increase the pressure to consolidate. As banks reach for yield at home and abroad, new financial stability challenges may arise in their home and host markets. These hypotheses are supported by the experience of Japanese banks.

Low growth and aging populations would likely lower credit demand by households and firms and increase household demand for liquid bank deposits and transaction services. Consequently, in this scenario, domestic banking in advanced economies may generally evolve toward provision of fee-based and utility services.

Pension arrangements and the products and business models of life insurers would also likely change significantly in the long term. In this scenario, defined benefit pension plans provided by employers would tend to become less attractive relative to defined contribution plans, which offer more portability. Rising longevity would likely boost the demand for health and long-term care insurance. Demand for guaranteed-return, long-term savings products offered by insurers could be expected to weaken, while that for passive index funds offered by asset management firms would likely grow.

Policies could help ease adjustment to such an environment. Prudential frameworks would need to provide incentives to ensure longer-term stability instead of falling prey to demands for deregulation to ease the short-term pain. For banks, policies should help facilitate smooth consolidation and exit of nonviable institutions, while limiting excessive increases in risk taking and ensuring that the too-big-to-fail problem does not worsen. Implementing economic solvency requirements that encourage life insurers to undertake necessary adjustments to their business models would be vital. Surveillance and regulation of asset management activities would become more important as this industry's share in the financial sector grows.

SUMMARY

DEFINED BENEFIT PENSION FUNDS AND LIFE ANNUITY PROVIDERS

- Long-term implications for insurance and pension: Higher required capital and lower benefit.
- Large existing stock of liabilities offering guaranteed returns creates cash flow obligations over the medium term that are difficult to meet through investment income given lower interest rates and flatter yield curves. Therefore, life insurers and defined benefit pension plans may require additional capital.
- For pension: The combination of lower population growth, aging, and prolonged low-interest rates will put pressure on retirement benefit levels, making DB plans less competitive than DC plans, which offer more portability.
- For insurers: mixed effects on demand for life annuities.

If existing product lines can be maintained by changing asset allocation:

- Life insurer or a mature or closed defined benefit pension plan: incentive to adopt liability-driven investment and find a bond portfolio whose duration is similar to the structure of its liabilities.
- Result of simulation analysis: Recovering adequate solvency margins by changing asset allocation appears feasible only by taking potentially unacceptable levels of risk ("Search for yield").
- "Search for yield" so far has been moderate in the insurance sector and corporate pension plans, while it is encouraged for DB public pension plans in the U.S. due to the unique regulatory and accounting rules.

- Asset allocation changes cannot adequately address the solvency challenge posed by negative cash flows on the current portfolio of liabilities. In the medium term, insurers and sponsors of DB pensions must find a way to capitalize their losses.

Options:

- Insurers: expand nonlife and protection businesses to cover losses from savings business.
- Pension: transferring pension obligation or at least financial risk to insurers after recapitalizing the plan.

OTHER RELEVANT CONCLUSIONS

The yield curve would be flatter compared to an equilibrium with higher rates and growth.

Munnell et al. 2013, The Impact of Interest Rates on the National Retirement Risk Index

CITATION

Munnell, Alicia H., Anthony Webb, and Rebecca Cannon Fraenkel. "The Impact of Interest Rates on the National Retirement Risk Index." Center for Retirement Research at Boston College, June 2013. http://boots.bc.edu/islandora/object/bc-ir:103846/datastream/PDF/download/citation.pdf.

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 2: Direct impact on retirement security of individuals

ABSTRACT (CONSTRUCTED)

This NRRI analysis shows that, as of 2010, more than half of today's households will not have enough retirement income to maintain their pre-retirement standard of living even if interest rates rise substantially above their current low. Households are less vulnerable than expected to today's historically low interest rates, but higher interest rates would also provide no real cure to the problem of inadequate retirement savings.

Three factors explain the modest effect of interest rates on retirement security. First, changes in interest rates never hit annuity payouts with full force, because the principal portion of the payout is unaffected by interest rates. Second, most households have relatively little financial wealth. Finally, housing wealth is significant for many households, but the impact of movements in interest rates is partially offset by changes in the amount that can be borrowed through a reverse mortgage.

SUMMARY

Definition measure of retirement security:

- National Retirement Risk Index: the share of working-age households who are "at risk" of being unable to maintain their pre-retirement standard of living in retirement.

Asset classes and sources of retirement income considered:

- Social Security DB benefits DC/IRA balance Net housing equity
    - Other non-financial and business assets.

Scenarios examined:

- 0 percent real interest rate
- 2 percent real interest rate (baseline)
- 4 percent real interest rate

Methodology (Model, key assumptions, and data):

- Deterministic projection.
- (Return assumptions for stocks and other risky asset classes are not provided in the paper).
- Interest rates enter the calculation by assuming that households purchase an inflation-indexed annuity with their financial assets and proceedings from a reverse mortgage.

Is the model stochastic: no

Key conclusions:

- Low interest rates have very limited impact on the NRRI (National Retirement Risk Index) overall. (54 percent at 0 percent real rate vs. 51 percent at 4 percent real rate).
- Impact on high-income group is greater than on low-income group.

COMMENTS

Three factors explain the low impact:

- Changes in interest rates only have limited impact on annuity income, only affecting the interest portion of annuity payout.
- Financial assets, which are affected by low interest rates, are only a modest portion of the total assets for most households.
- Housing wealth is significant for many, and the amount that can be borrowed through a reverse mortgage is inversely related to nominal interest rates.

OASDI 2018, The 2018 OASDI Trustees Report

CITATION

"The 2018 OASDI Trustees Report." The Board of Trustees, Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, 2018. https://www.ssa.gov/OACT/TR/2018/index.html.

STUDY CATEGORY

Other: Government report

TOPICS ADDRESSED

Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

SUMMARY

- Interest rates used in all three official projection scenarios are much higher than current level.
- The nominal annual yields of the three scenarios are 4.9 percent, 5.4 percent and 5.9 percent (assuming 2.6 percent CPI).
- The impacts on cost and projected time of depletion are small.
- Interest rate assumptions are made based on long-term historical average (The Long-range Economic Assumptions, p3).
- "The assumed ultimate long-range real interest rate for new issues is 2.7 percent. This ultimate assumption is consistent with a sustainable domestic fiscal policy over the long-range period and a gradual return to the sustainable rate of economic growth throughout the developed world."
- Interest rates on long-term Treasury securities average 3.17 percent over the last five economic cycles (from 1966 to 2007). Interest rates have been substantially lower recently due to the weak economy in most of the developed world.

COMMENTS

- Social Security benefits are the most important source of retirement income for most mid-/low-income retirees (See 2018 SOA report on retirement adequacy).
- Social Security Trust Funds are projected to deplete around 2034.
- Without the supplement from Social Security Trust Funds, Social Security taxes and other earmarked tax income can only cover 3/4 of the promised benefit payments, if no policy changes are implemented.
- The interest rates are quite high in all three alternative scenarios in the report. This leaves us with the question of what would happen to Social Security Trust Funds if the current low interest rate environment will be persistent?
- If the Secular Stagnation hypothesis holds, which means the sustained low interest rate environment is caused by long-term structural factors such as aging population and slowing productivity growth, wage growth would be slower in the future, leading to slower growth of Social Security tax income. This would make benefit cuts and/or Social Security tax increases more likely.

Rudolph 2014, Sustained Low Interest Rate Environment: Can it Continue? Why It Matters

CITATION

Rudolph, Max J. “Sustained Low Interest Rate Environment: Can It Continue? Why It Matters.” Canadian Institute of Actuaries, Casualty Actuarial Society, and Society of Actuaries: Joint Risk Management Section, June 2014. https://www.soa.org/research-reports/2014/research-2014-sustained-low-interest/.

STUDY CATEGORY

Industry

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment
Topic 3: Impact on institutions: pension funds, insurance companies, and asset management companies

ABSTRACT (CONSTRUCTED FROM THE REPORT EXECUTIVE SUMMARY)

The report describes the potential impact on assets and liabilities if nominal interest rates remained low for an extended period. It focuses on nominal interest rates rather than real rates because liability guarantees are supported by actual returns. It also addresses the questions:

- Is a long-term low interest rate scenario possible? The report concludes it is possible to have a long-term low interest rate scenario. It argues that the most likely scenario is for rates to be volatile rather than to slowly rise upward as is commonly assumed; the latter is more likely a best-case scenario.
- What could cause a long-term low nominal interest rate scenario, and should this be presented to management? The report concludes that several growth drivers could lead to long-term low nominal rates including slow growth driven by demographic changes, or by climate change and other sustainability issues. The report notes Robert Gordon's argument that economic headwinds could slow future growth. Federal Reserve actions could keep rates low. Some factors driving low growth could reverse, such as a return to higher velocity of money could cause interest rates to rise.
- What strategies should insurers and others providing oversight consider in response to an extended low interest rate scenario? It is cost-prohibitive for insurers to offset both a perennial low interest rate scenario and the risk of a potential rate spike.

SUMMARY FOR TOPIC 1

FACTORS DISCUSSED

- Growth as a driver of interest rate: 4 routes to sustained low interest rates. Each draws from the reasoning that low GDP growth will lead to a low interest rate environment as supply/demand will balance over the long-term at a low level of rates.
- The Gordon Conundrum: Robert Gordon argues that several historical, one-time, events have driven GDP growth over the past 250 years and that going forward we will revert to a very low-growth scenario that was the norm prior to that. Six headwinds for future growth: 1) lack of a demographic dividend; 2) Plateau in educational attainment; 3) rising inequality; 4) Interaction between outsourcing and technology; 5) events related to energy and the environment; 6) high consumer and government deficits leading to higher taxes, combined with lower benefits and services and possible currency devaluation.
- Sustainability and population growth: Economic growth would have to slow in this scenario, perhaps to a negative level, in order to pay to repair prior damage (e.g. pollution and soil degradation) and proactively prepare for the costs of overshooting an ecological footprint and maintaining quality of life. This could lead to low economic growth and a low interest rate scenario far into the future.
- Demographics: As the world's population ages, more and more people enter the decumulation phase of their lives, driving down asset prices, growth rates, and ultimately interest rates as supply overwhelms demand. Decrease in labor participation would also drive down economic growth.
- Confidence and the velocity of money: When debt is high it seems to lead to conservative practices by lenders and consumers, which slows the economy along with the velocity of money. A slow economy means demand for loans is low, and interest rates follow. As described earlier, currently the velocity of money is at historically low levels.

Key conclusions regarding prospective interest rates:

- Several concerns described in this paper could come to pass simultaneously. For example, it should not be considered an extreme scenario if all of the following were to happen at once: the velocity of money remains low; population growth and aging demographics combine to stress economic growth; and resource depletion and climate change make the environment volatile and challenging. All these factors may lead to sustained low growth and low interest rates.

SUMMARY FOR TOPIC 3

SOCIAL SECURITY

Not analyzed.

DEFINED BENEFIT PENSION FUNDS

After the tech crash and the Great Recession, pension managers have moved toward liability-driven investing. This is a new name for Asset Liability Management (ALM) with a focus on matching bonds to liabilities using duration and convexity metrics. Even with this goal it is common for assets to be shorter than liabilities. When interest rates are low, and stay low, this leads to increased pension valuations and higher contribution rates. Some pension managers have utilized alternative asset classes to increase returns.

It is very hard to invest asset portfolios long enough to match pension DB liabilities using duration-type metrics. Another tool is to match cash flows for 15 to 20 years and manage the remaining assets to maximize total return.

LIFE ANNUITY PROVIDERS

Individual Deferred Annuities:

- Deferred annuities compete with bank products like certificates of deposit (CDs), and usually maintain a spread over bank saving products.
- When interest rates stay low for a prolonged period it becomes harder to meet required spreads, and eventually the portfolio rate becomes too low to support the guarantees.
- Regulators should consider this growing issue and research long-term solutions such as limited duration guarantees or guarantees that reset periodically based on current conditions.

Individual Immediate (payout) annuities:

- Payout annuities have both interest rate risk through reinvestments and longevity mortality risk.
- If interest rates drop after issue, then future cash flows must be invested at lower rates than were priced for. For payout annuities these inflows are tied entirely to reinvestments of investment income and capital since there are no future premiums.
- Payout annuities are long duration products designed to prosper under periods of level or cyclical interest rates, so a long period of low interest rates impacts pricing negatively.

DEFINED-CONTRIBUTION FUNDS

Not analyzed.

ASSET MANAGEMENT FIRMS

Not analyzed.

OTHER RELEVANT CONCLUSIONS

N/A

COMMENTS

- This report is primarily narrative.
- This report overviews potential driving forces of low interest rates. In addition to the commonly discussed factors such as demographics and productivity, it mentioned sustainability costs and low velocity of money as possible contributors to low growth and low interest rates.
- The report discusses how different types of insurance products (including annuities and DB pension plans) are affected by low interest rates.
- The report also emphasizes the uncertainty in future path interest rates and the importance for insurers of being prepared for the uncertainty.

Rudolph et al. 2015, Transition to a High Interest Rate Environment: Preparing for Uncertainty

CITATION

Rudolph, Max, Randy Jorgensen, and Karen Rudolph. "Transition to a High Interest Rate Environment: Preparing for Uncertainty." Society of Actuaries, July 2015. https://www.soa.org/research-reports/2015/research-2015-rising-interest-rate/.

STUDY CATEGORY

Industry

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

COMMENTS

- This report provides useful information about the potential impact of changes in interest rates on life insurance companies. The structure of the report does not fit well into the template.
- Focuses on potential changes in interest rates in the near future.
- Predicting interest rates can be difficult, and insurance companies should stress test the impact of different potential interest rate scenarios.
- This study is unique in that it conducted a survey to examine current practices of life insurance companies regarding their interest risk management and stress testing.
- A plausible view of a rising interest rate scenario.
- Discussed the history of U.S. interest rates while also forming some ideas as to where rates might go in the near future.

- Provided a nice review of short-term and long-term U.S. interest rates since 1980: The discussion shows a fairly consistent pattern of declining interest rates since 1982 with rates recently reaching, in many cases, minimums from this period. The decline in interest rates is not isolated to Treasury rates but extends to corporate rates as well as consumer rates.
- The evidence presented in this analysis of the history of U.S. interest rates provides l**ittle reason to expect either real yields or risk premiums will change dramatically in the years ahead.** The evidence shows that both have been relatively stable in recent years. Moreover, the shape of the yield curve doesn't show any evidence of unusual yield behavior.
- Authors also discussed factors affecting interest rates from the perspective of Quantity Theory of Money.
- Note that this analysis focuses on possible changes in interest rate in the **near future** and the conclusion is **based on historical trend** rather than analysis of underlying driving forces.

Impact on Insurance Liabilities:

- Rising interest rates, from today's low levels, can be a positive or negative event depending on **how quickly the change takes place**. A slow up scenario is likely a best case, while interest rates that quickly increase 5 percent or more will trigger lapses and capital losses.

Recent experience in Japan with low interest rates for an extended period:

- Changes in product mix (away from offering interest-guarantee products).
- Cost cutting.
- Willingness to consider alternative investment asset classes. Guaranteed interest rate has been lowered but not abolished.
- Could also lead to more mergers as companies seek economies of scale.
- If rates continue their cycle, bottoming out and starting to rise again, it is possible that the life insurance industry will evolve with a new set of product features.
- Low interest rates: Lower guarantee and greater attempts to pass through risk to policyholder.
- The impact of interest rate changes on the industry is highly correlated across insurers, creating potential systemic risk that regulators and management teams should contemplate.

Survey: Company Practices:

- Survey is conducted to examine current practices of life insurance companies regarding their interest risk management (survey sent in 2014, 19 companies responded).

Key survey results:

- Companies currently focus on interest rate scenarios that regulators ask them to complete.
- Deterministic scenarios are often completed, but these tend to be historical remnants of discussions from a decade ago and need to be revisited in today's low interest rate environment.
- Very few test negative interest rates or rates higher than 9 percent.
- Larger ompanies are more likely to test stochastically generated scenarios, and most use the VM20 generator developed by the American Academy of Actuaries.
- About half of companies surveyed have adjusted their portfolio based on testing, and many have taken bets that rates will increase by shortening their asset duration below targets.
- The current interest rate environment is unique, especially due to central bank monetary policies, and it will be a challenge for modelers in the insurance industry to stay ahead of this risk.

Model analysis:

- Blocks of single premium deferred annuity (SPDA), Universal Life Insurance (UL), and UL with secondary guarantee (ULSG) policies were separately tested valuing the block using a present value of distributable earnings (PVDE) metric over 30 years discounting at the 10-year Treasury rate.
- While deferred annuity is directly related to our analysis of retirement security, UL can be also relevant since UL contracts typically include a saving component.

Summers 2014, U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound

CITATION

Summers, Lawrence H. "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound: Keynote Address at the NABE Policy Conference, February 24, 2014." *Business Economics* 49, no. 2 (April 2014): 65–73. https://doi.org/10.1057/be.2014.13.

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 1: Retrospective and prospective studies on interest rates and investment

ABSTRACT

The nature of macroeconomics has changed dramatically in the last seven years. Now, instead of being concerned with minor adjustments to stabilize about a given trend, concern is focused on avoiding secular stagnation. Much of this concern arises from the long run effects of short-run developments and the inability of monetary policy to accomplish much more when interest rates have already reached their lower bound. This address analyzes contemporary macroeconomic problems and proposes solutions to put the U.S. economy back on a path toward healthy growth.

SUMMARY

Factors discussed:

Global savings glut

- China and other Asian emerging market economies.
- Oil producers.

Key conclusions regarding prospective interest rates:

- A global excess of desired saving over desired investment, emanating in large part from China and other Asian emerging market economies and oil producers like Saudi Arabia, was a major reason for low global interest rates.

Major differences from secular stagnation hypothesis: 1) global perspective vs individual country/region; 2) attributing weak capital investment to fundamental factors or government policy decisions.

Overall, the author sees the savings glut interpretation of current events as providing a bit more reason for optimism than the stagnationist perspective.

If global imbalances in trade and financial flows do moderate over time, there should be some tendency for global real interest rates to rise, and for U.S. growth to look more sustainable.

COMMENTS

There is less supporting model-based analysis for this argument compared to the "secular stagnation" argument

VanDerhei 2013, What a Sustained Low-Yield Rate Environment Means for Retirement Income Adequacy: Results from the 2013 EBRI Retirement Security Projection Model

CITATION

VanDerhei, Jack. "What a Sustained Low-Yield Rate Environment Means for Retirement Income Adequacy: Results from the 2013 EBRI Retirement Security Projection Model." Employee Benefit Research Institute Notes, June 2013. https://www.ebri.org/docs/default-source/ebri-notes/ebri_notes_06_june-13_intrts_accs.pdf?sfvrsn=472e362f_0.

STUDY CATEGORY

Non-peer-reviewed academic

TOPICS ADDRESSED

Topic 2: Direct impact on retirement security of individuals

ABSTRACT

- Overall, 25–27 percent of Baby Boomers and Gen Xers who would have had adequate retirement income under return assumptions based on historical averages are simulated to end up running short of money in retirement if today's historically low interest rates are assumed to be a permanent condition, assuming retirement income/wealth covers 100 percent of simulated retirement expense.
- A low-yield-rate environment may have an extremely large impact on retirement income failure rates when viewed in isolation. However, the impact is muted somewhat when included as part of the entire retirement portfolio (e.g., Social Security benefits, possible defined benefit accruals, and net housing equity).
- There appears to be a very limited impact of a low-yield-rate environment on retirement income adequacy for those in the lowest- (pre-retirement) income quartile, given the relatively small level of defined contribution and IRA assets and the relatively large contribution of Social Security benefits for this group. However, there is a very significant impact for the top three income quartiles.

SUMMARY

Definition measure of retirement security:

- Retirement-income adequacy: having sufficient retirement resources to cover 100/90/80 percent of simulated expenses.

Asset classes and sources of retirement income considered:

- Social Security
- DB annuity/lump-sum withdrawal DC/IRA balance
- Net housing equity

Scenarios examined:

- Same as in Finke, et al. (2013)

Methodology (Model, key assumptions, and data):

- EBRI Retirement Security Projection Model (RSPM). (More simulation details are described in VanDerhei and Copeland (2011).)
- Individuals retire at age 65 and begin to withdraw money from DC/IRA accounts when DB and Social Security benefits cannot cover expenses.
- When individual accounts are depleted, housing equity is added to savings in the form of a lump-sum distribution (NOT a reverse annuity mortgage).

Is the model stochastic: Yes

Key conclusions:

- Low interest rates have a moderate impact on retirement income adequacy (55 percent adequacy rate under historical average scenario vs 40 percent under low interest rate scenario).
- If less stringent thresholds are used, the impact of low interest rates become very small.
- The lower interest rate scenario has a progressively larger impact on simulated retirement securityas income rises.

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With roots dating back to 1889, the Society of Actuaries (SOA) is the world's largest actuarial professional organization with more than 31,000 members. Through research and education, the SOA's mission is to advance actuarial knowledge and to enhance the ability of actuaries to provide expert advice and relevant solutions for financial, business and societal challenges. The SOA's vision is for actuaries to be the leading professionals in the measurement and management of risk.

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