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Retirement savings adequacy and retirement income planning: The asset-salary ratio approach

Abstract

Financial planning can help individuals toward greater financial security in retirement but can often be complex. In this paper, we examine how a simple measure, the asset–salary ratio (ASR), can be used to gauge an individual's retirement readiness. We discuss how varying key assumptions alters retirement income planning outcomes, including savings, investment returns, salary growth, retirement timing, and length of contributions. Finally, we provide a perspective of ASRs based on historical returns for various worker cohorts. Our results and discussions are useful both to individuals and practitioners for retirement income planning.

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1. Introduction

Many Americans save for retirement through their workplace retirement plan, and over three-quarters of them save with a defined contribution (DC) plan (EBSA, 2023). Compared with defined benefit (DB) plans, DC plans combine plan features, such as auto enrollment and portability, with access to equity markets through qualified default investment alternatives (QDIAs). But individuals need to manage their retirement solvency risk—that is, their risk of having insufficient accumulated assets to support their target standard of living in retirement. With a marketplace of complex financial products and many existing diverging views of savings adequacy, it is not surprising many households with workplace plans do not have an accurate perception of their retirement readiness (Kim & Hanna, 2015). Reducing retirement planning complexity may help households better gauge their retirement preparedness.

Determining one measure of retirement savings that provides a sufficient savings metric for everyone is difficult due to differences in life expectancy, spending habits, and other individual characteristics (Poterba, 2014). Nonetheless, a single measure can be informative as a benchmark for peer group comparisons and as a tool to simplify retirement savings and planning. Without a DB plan that provides lifetime retirement income, the measure should focus on retirement savings accumulations that need to be withdrawn upon in retirement or converted to retirement income. This is because accumulated savings in retirement accounts are likely the single most important attribute for retirement security, especially among households for whom Social Security does not meet expected retirement income needs (Poterba, 2014).

Earlier work by Hammond and Richardson (2010) uses the asset–salary ratio (ASR) as a proxy for estimating the adequacy of an individual participant's DC retirement plan funding. The ASR is a plan participant's accumulated retirement assets divided by their salary at a given point in time. We translate this metric into a target ASR (Par ASR) to meet a target retirement income replacement rate because the primary purpose of a DC plan is not to accumulate assets per se,[1] but rather to support a stream of retirement income for consumption in retirement. The ASR is a simple and meaningful metric individuals can use to check the adequacy of their current retirement accumulations and help households gauge if they are on track to meet their retirement income goals and whether if they are saving enough for retirement (Skinner, 2007).

This paper reviews the ASR methodology and discusses how it can help workers across the age spectrum assess if they are on track across several different initial assumptions. When translating ASR to a retirement income replacement rate, it is necessary to determine how retirement income will be generated. We use a composite withdrawal strategy consisting of both liquid cash withdrawal and annuity income. We conduct sensitivity analysis on projected outcomes when adjusting the underlying assumptions. Finally, we provide historical ASR outcomes for various worker cohorts. While future returns may differ, examining how ASR outcomes differ over a variety of macroeconomic climates assists with retirement planning for an uncertain future.

2. ASR and replacement rates

Replacement rates: We adopt a retirement income goal based on the practitioner approach of replacement rates (Kim et al., 2014) because in contrast to traditional economic theory (Ando & Modigliani, 1963; Modigliani & Brumberg, 1954), most individuals don't smooth their consumption over the lifecycle (Agarwal et al., 2015; Aguiar & Hurst, 2013). A replacement rate (RR) is what preretirement salary workers can replace with their accumulated balance at retirement.

Many financial planning researchers and advisors suggest a 70% to 80% pretax replacement ratio would be enough to support the preretirement standard of living. We focus on 80% because it has a simple and intuitive grounding. If someone is earning $100,000 pretax, saving 10% of each paycheck for retirement, and paying 7.65% in OASDI taxes (Social Security and Medicare taxes), that person's pay is about $82,000 before federal and state income taxes. If in retirement, this person receives $82,000 pretax (or 82% of preretirement income) generated from their savings accumulation, their standard of living is effectively unchanged because they do not pay OASDI taxes or need to save for retirement. For many this is an upper bound for their income needs because most Americans spend less in retirement than when they worked (Hurd & Rohwedder, 2023). However, this can vary depending on additional individual circumstances (Blanchett, 2014), health care (Clark et al., 2020), caregiving costs (Kolluri et al., 2023), or housing (Quinby & Wettstein, 2022). For simplicity, we focus on an 80% replacement rate in this paper.

Social Security provides a basic retirement income benefit for most Americans, with over 90% of Americans over age 65 receiving a Social Security benefit.[2] On average, it replaces about 40% of preretirement income (Biggs & Springstead, 2008; Khan et al., 2018). But this can range from 20% to

1 One exception is bequest. See Lockwood (2018) for a discussion of how bequest motives affect late-life financial planning..

2 Some workers in the public sector are not covered by Social Security. https://www.ssa.gov/news/press/factsheets/basicfact-alt.pdf.

more than 50%, depending on lifetime wages and claiming age. Table A1 in the appendix shows the estimated Social Security replacement rate (SSRR) at various wages and claiming ages. For simplicity, we assume Social Security provides a 30% replacement rate. This is akin to someone with average career earnings of $100,000 claiming at age 65 (Burkhalter & Rose, 2025). We also assume scheduled benefits are payable in full. Our 30% assumption is more conservative assumption to allow for the possibility of years away from the labor force or time in non-covered work. Future policy changes as the Social Security trust fund nears depletion around 2033 may reduce benefits, supporting a conservative approach.[3] These two numbers—an 80% desired replacement ratio and a 30% SSRR—result in a requirement that retirement savings replace 50% of preretirement pay. An individual then needs sufficient accumulated assets at retirement to generate a 50% income replacement rate.

ASR and Par ASR: Individuals are responsible for their plan funding adequacy in a DC system. A participant's funding ratio is their accumulated assets divided by the present value of future liabilities at a given point in time. Future liability is the amount needed to generate retirement income that matches a desired retirement replacement income rate. If current accumulated assets are enough to generate the target amount of retirement income, then they have enough accumulations under the generating assumptions to meet their futures liabilities—generating the target amount of income *throughout* retirement. If current accumulated assets are not enough to generate this amount of retirement income in expectation, then they are underfunded. The ASR required for individuals' target replacement rate increases as they get closer to retirement due to the shorter time horizon for additional savings and investment return compounding.

This gives us two versions of the ASR. The first is a worker's ASR at any point in time, *t*. The second is the *Par ASR*. The Par ASR reflects the required ASR (at time *t*) to meet the retirement income target at retirement. The Par ASR is dynamic, factoring in years to retirement, future contributions, salary growth, and market returns. Workers with an ASR below the Par ASR are not on track to meet their retirement income goals and could consider altering contribution amounts, retirement plans, or investment portfolios. Workers with an ASR above the Par ASR have more than enough assets to meet their needs, subject to the Par ASR assumptions. These workers could also view this as a hedge against market downturns, employment shocks or potential plan leakage due to unforeseen circumstances. See Hammond and Richardson (2010) for a more detailed discussion. To determine the final Par ASR at retirement, we need to know the target replacement rate of retirement income and how that retirement income is generated.

Taking our approach, what ASR (Par ASR) does the individual need to meet this income replacement target? This requires settling how a retiree generates retirement income, choosing the replacement rate goal, and converting that goal replacement rate back into the Par ASR.

2.1. Composition of retirement income

Constructing the Par ASR based on a target replacement rate requires knowing how retirees will generate income from their accumulated balance. Earlier ASR research (Heller & King, 1989, 1994; Hammond & Richardson, 2010) assume as a benchmark that individuals buy a 25-year annuity, which closely matches income from a life annuity. However, we augment this to match household decisions that retirees often generate retirement income from multiple income types. For example, many retirees with an in-plan annuity option generate retirement income with income from a life annuity in combination with liquid cash withdrawals for retirement income (Brown et al., 2025). A composite approach to generating retirement income through life annuities and liquid withdrawals incorporates several risk mitigation aspects for retirees. A fixed life annuity provides lifetime income, providing insurance against longevity risk and managing downside risk (Brown et al., 2008). A variable life annuity protects against longevity risk with upside market capture ability to mitigate inflation risk. The remaining portion of liquid assets provides upside market capture ability and liquidity to finance short-term shocks, such as unforeseen health care needs or emergency expenses.

Bengen (1994) developed the well-known 4% rule. It describes a strategy in which retirees can withdraw an amount equal to 4% of the initial accumulated portfolio, adjust the withdrawal amount for inflation for 30 years, and have a 98% chance of success (Cooley et al., 1998). However, there is no guarantee the retiree's portfolio will last that long based on actual investment returns. Updating with more recent market data, withdrawal rates with a 98% chance of lasting 30 years have been lower, between 3.3% and 3.8% (Arnott et al., 2023). Generally, life annuity payout rates are higher than 4%. One could think of the range of retirement replacement rates strategies ranging from using only the 4% rule and zero guaranteed income (no annuitization) to only guaranteed income with a fixed annuity (full annuitization).

3 https://blog.ssa.gov/social-security-board-of-trustees-projection-for-combined-trust-funds-one-year-sooner-than-last-year/

FIGURE 1. RANGE OF INCOME REPLACEMENT RATES BY ASR

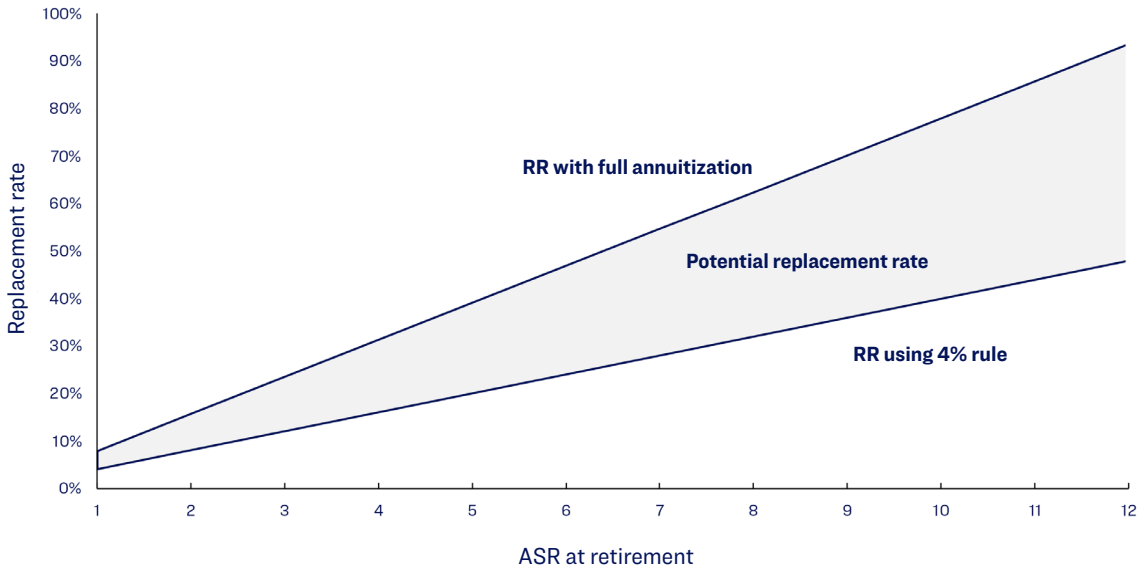


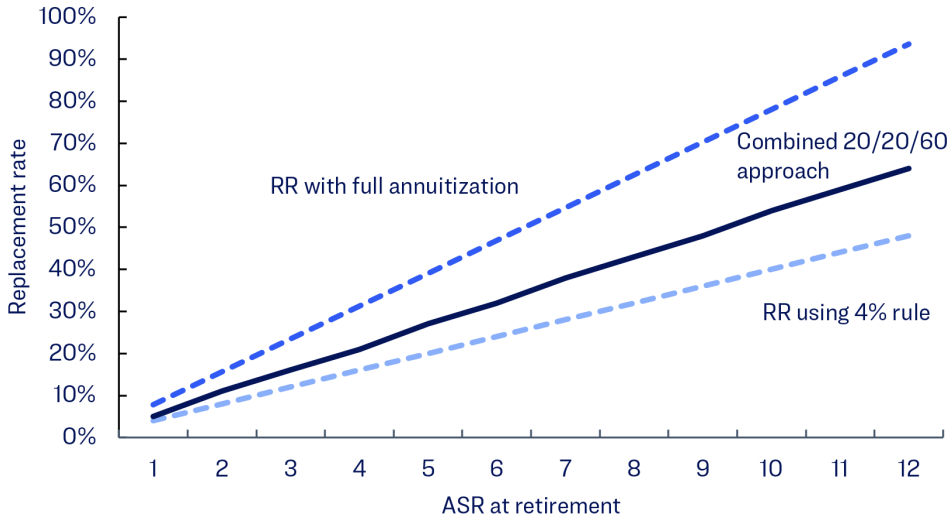
Figure 1 displays potential replacement rates for the initial retirement year. For example, someone retiring with an ASR of 10 generates a 40% replacement rate with only a 4% cash withdrawal and no annuitization, while generating a 78% replacement rate with full annuitization and no cash withdrawals assuming an annuity payout of 7.8%. To extrapolate, a worker retires with a $100,000 final salary and an ASR of 10—this means a final accumulation of $1 million, as $1 million is 10 times the final salary. A 4% withdrawal generates $40,000, for a replacement ratio of 40%, i.e., $40,000 of retirement income divided by the $100,000 final salary. An annuity with a 7.8% payout rate would generate $78,000, for a replacement rate of 78%.

We adopt a three-part composite approach strategy to cover the income gap from between what Social Security provides and a retiree's income needs with: i) a fixed annuity that provides guaranteed lifetime income, managing downside risk and longevity protection, ii) a variable annuity that provides lifetime income based on the return of the underlying investments, which allows for upside market capture, inflation, and longevity projection, and iii) withdrawals on remaining non-annuitized assets that provide an accumulated base for needed liquidity, bequests, and further ability for upside market capture and inflation protection.

To calculate rates from the annuities, we consider a fixed life annuity (or single premium immediate annuity—SPIA) that has an annual payout rate of 7.8% for a 67-year-old, which approximates market values prevailing interest rates in the first half of 2024. For each $100,000 annuitized, the retiree receives $7,800 per year for life from the insurance company. For the variable life annuity, we consider a basic variable annuity with broad base equity exposure to the S&P 500. In 2024, approximate market payout rates are 7% for a 67-year-old based on an assumed interest rate of 4%. Future annuity payouts increase when returns on the underlying investments are above 4% and decrease when returns are below 4%.

We assume a retiree uses fixed and variable annuities in their retirement income portfolio. We further assume that 40% of the portfolio is annuitized with half in a fixed life annuity and half in a variable life annuity. The retiree will draw down the remaining balance using the common 4% rule. Finally, we assume the worker retires at age 67, the current Social Security age to receive full nonreduced benefits. By construction, this 20/20/60 approach falls nearly in the middle of the range of our replacement rate possibilities (Figure 2). In practice, individuals can alter the retirement income-generation components as they prefer. Note that this method only provides income replacement rate in the first year of retirement and not the sequence of income generated from the accumulated assets throughout retirement, but it is structured to consider multiple risks retirees encounter throughout their retirement, as discussed earlier.

FIGURE 2. REPLACEMENT RATE WITH COMBINED ANNUITY AND WITHDRAWAL APPROACH



Notes: Annuity replacement rate calculations use fixed annuity payout rate of 7.8% and variable annuity payout rate of 7%.

3. The Par ASR

Under this set of assumptions, the Par ASR required to produce an 80% total replacement is 9.3 (assuming an SSRR of 30%). This 9.3 Par ASR now becomes the accumulation target for employees: *a final balance across retirement accounts that is 9.3 times greater than their final pay*. Is 9.3 achievable? The answer will depend on i) the number of years of savings, ii) the savings rate, iii) the return on underlying assets, and iv) the path of future salaries. An employee with (i) a 35-year career, (ii) a combined employer/employee contribution rate of 10%, (iii) an investment return rate of 8%, and iv) annual salary increases of 2.9% will be able to accumulate enough in retirement savings to achieve this ASR of 9.3. Are these assumptions reasonable? Among TIAA participants in 2023 working at one employer throughout the year where TIAA is sole recordkeeper, the median total contributions from the employer and employer are 13.2%.[4] We begin with a 10% base because it is common in financial planning and many individuals leave jobs before vesting in employer contributions or may have periods without having access to an employer-sponsored plan. Average annualized monthly returns from a 60/40 portfolio of S&P 500 and Barclays Aggregate Bond index were 9.9% from 1976 to 2023—much higher than our assumed 8%. Average nominal salary growth from 1979 to 2023 was 3.6%, which is slightly higher than our assumed 2.9% growth estimate. We examine this further in Section 5.[5] Overall, shorter careers will need a higher savings rate; similarly, lower asset returns will also require a higher savings rate.

4 Based on author calculations from TIAA administrative data. We exclude participants who contribute to supplemental plans only, have a salary below $5,000 or above $500,000, or have an unknown salary.

5 U.S. Bureau of Labor Statistics, Employed full time: Median usual weekly nominal earnings (second quartile): Wage and salary workers: 16 years and over [LES1252881500Q], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/LES1252881500Q, June 27, 2024.y.

FIGURE 3. PAR ASR BY TARGET REPLACEMENT RATE

Notes: Assumes saving for 35 years before retirement with 10% contribution, 8% investment returns and 2.9% annual salary raises.

In Figure 3, we show a model employee who has a Par ASR target of 9.3 at retirement. The Par ASR 10 years before retirement is 4.9, and it's 2.2 20 years before retirement. Given the above assumptions, 10 years before their expected retirement date, workers need nearly five times their annual salary in retirement savings to be on track to replace half of their preretirement income. For reference, alternative Par ASRs are provided for an RR of 30%, 40%, and 60%. Because this approach combines key assumptions into one statistic, at *any age along the path to retirement, employees can look at their current ASR and determine if they are on track relative to the Par ASR*. If they are below the target for their age, they can increase their savings rate to something higher than 10%, and vice versa if they are above. Being above their Par ASR means workers are on track to save more than is strictly necessary for their goal. However, this may be useful if they want to offset negative scenarios that affect their retirement outcomes, like a cut to Social Security benefits. Social Security will comprise a larger proportion of retirement income for lower-income workers, but those workers will have a more difficult time increasing their savings rates. To explore how workers can use this framework, we examine how altering our above assumptions impacts the ASR in relation to the Par ASR.

4. Altering Par ASR assumption components

4.1 Delaying saving

Figure 3 also shows the impact of starting retirement savings later. If the employee does not begin saving until 25 years before retirement, then without making any other changes, their final ASR will be 4.9—same as the ASR of an employee who began saving 35 years before retirement at the 10 years before retirement mark. This ASR of 4.9 is well below a 9.3 goal. To reach an ASR of 9.3 over the now 25-year period, the savings rate would need to be 18.9% of salary instead of 10%.

Required savings rate =

(Current contribution rate (%) * Target Par ASR at retirement) /

Projected ASR at retirement using current savings rate

= (10% * 9.3) / 4.9

= 18.9%

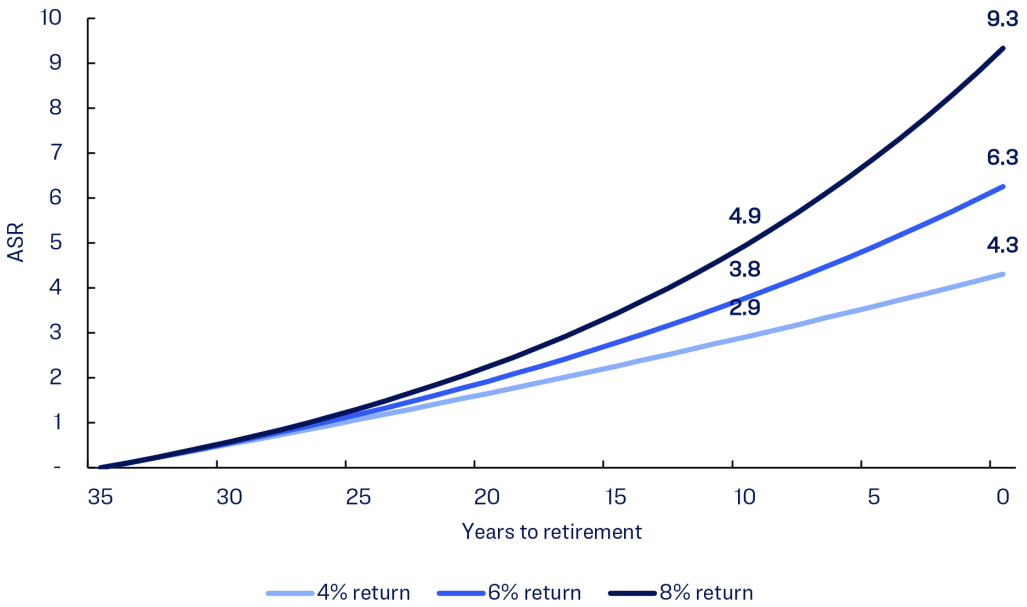
Similarly, a worker who begins saving 30 years before retirement would be projected to reach an ASR of 6.9. In this case, the savings rate would need to increase from 10% to 13.5% to reach a 9.3 ASR. This also highlights the importance of compounding. Waiting 10 years before starting to save requires increasing contributions by 89% while waiting 5 years before starting to save requires increasing contributions by only 35%—much less than half of 89%.

Next, we consider the impact of relaxing the assumption of a constant 8% return on investments.

4.2 Investment returns

Investment returns over a given interval are uncertain. Figure 4 illustrates how changes in investment returns impact ASR by years to retirement. As changes to accumulations become relatively more sensitive to investment returns than contribution dollar amounts, the impact of investment returns is greater closer to retirement. A lower investment return lowers the final ASR. This would lead to lower accumulated assets than the target ASR without adjusting savings rates, choosing to delay retirement, or having other sources of retirement income. This highlights the importance of asset allocation and diversification while saving. Similarly, those who save for fewer than 35 years will risk their account being underfunded according to our historical returns analysis in Section 6. Workers can overfund their account early in their careers to hedge against low investment performance in later years.

FIGURE 4. ASR BY INVESTMENT RETURN RATE



Note: Assumes a worker contributes for 35 consecutive years contributing 10% of salary to retirement, and 2.9% salary growth.

4.3 Investment portfolio adjustments

Thus far in our analysis, we have not discussed investment portfolio composition of accumulations, only that the underlying investment portfolio produces an assumed rate of return. Of course, altering the investment portfolio that affects the expected rate of return impacts the expected ASR. The worker-investor can adjust their portfolio risk–return profile and expected rate of returns. Increasing the portfolio's risk–return profile implies greater (less) exposure to equities (bonds) and higher expected returns but with greater expected return volatility. Decreasing the risk–return profile implies less (more) exposure to equities (bonds), decreasing expected turns but with lower expected volatility.

Assume someone at 15 years to retirement has an ASR of 4.4, above their 50% RR Par ASR of 3.4. If they adjust their portfolio to an overly conservative position with only 4% expected future investment returns compared with 8%, they will fall off the Par ASR with a final ASR of 6.9 instead of 9.3 (Table 1). To stay at the Par ASR with expected returns of only 4%, contributions would require an increase from 10% to 24.2%. This level of contribution rate is likely beyond the ability of most employees, highlighting the risk of investments that are "too conservative." Such worker-investors will either retire at a lower standard of living or would have to work longer. Of course, being over Par ASR can allow for a more conservative investing style—earning only 6.25% instead of 8% still allows for the achievement of the 9.3 ASR.

TABLE 1. ABOVE–BELOW PAR ASR AND PORTFOLIO ADJUSTMENT

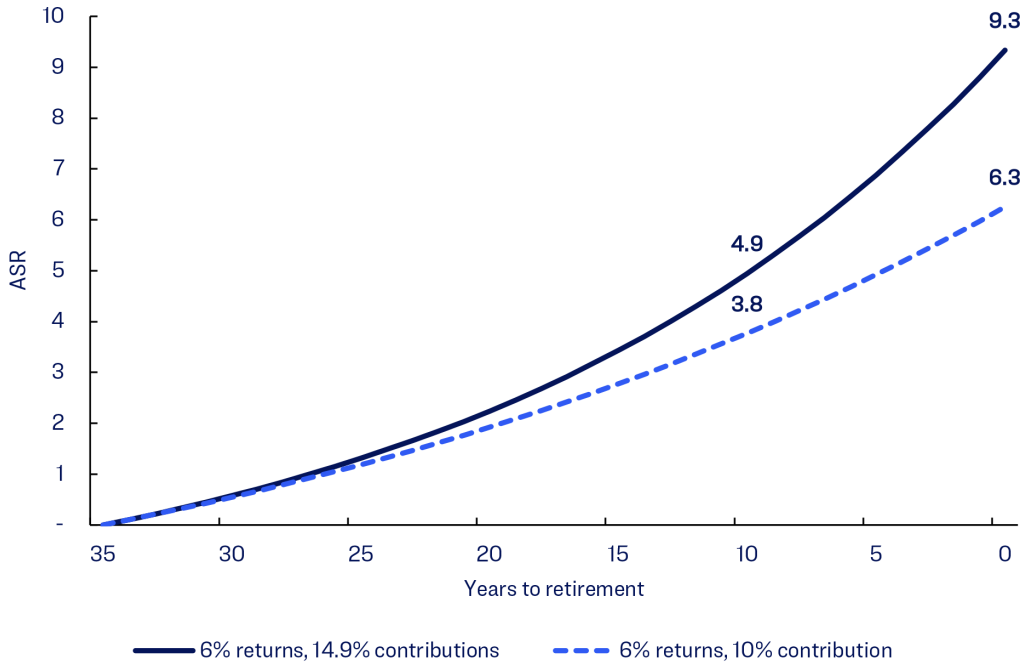
Years to retirement	ASR	Par ASR	Expected investment return	Contribution savings rate (%)	*Projected* ASR at retirement
15	3.4	3.4	8%	10%	9.3
15	4.4	3.4	4%	10%	6.9
15	4.4	3.4	4%	24.6.%	9.3
15	4.4	3.4	6.3%	10%	9.3

Note: Using 2.9% salary growth.

4.4 Savings rate

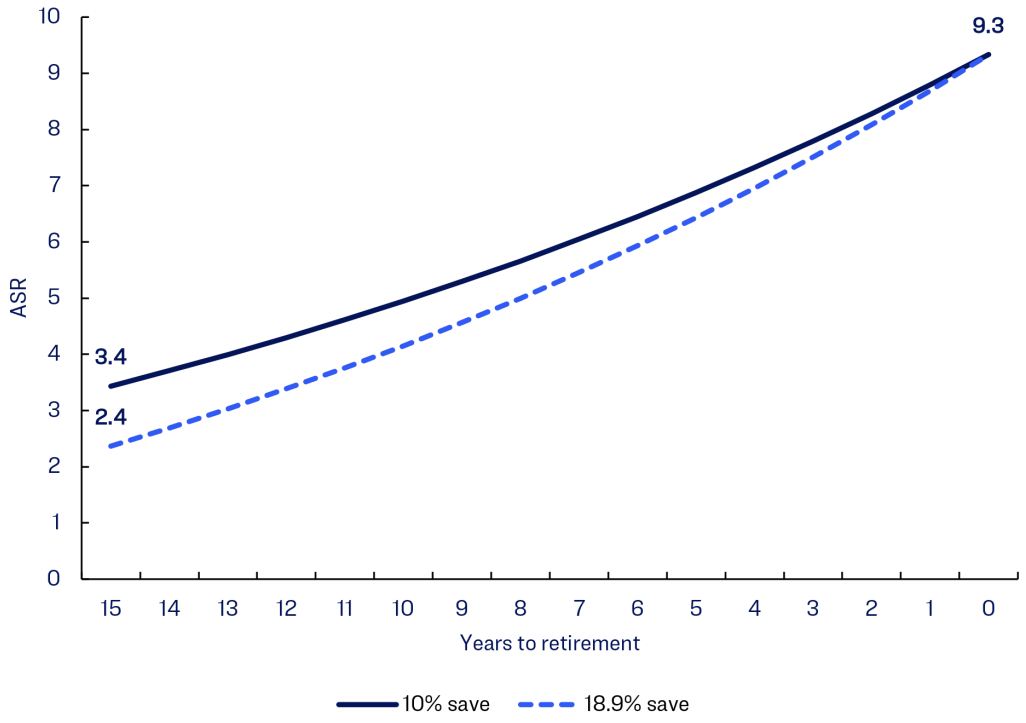
Alternatively, saving more can mitigate the headwind of smaller accumulated balances due to lower returns. As noted in Figure 4, a 10% contribution rate with 6% returns will result in falling short of the Par ASR, having a final ASR of only 6.3. However, increasing the savings rate to a combined employer/employee rate of 14.9% will allow the target ASR to be achieved (Figure 5). How does a delayed start affect the required savings rate? Someone who did not save for the first five years will need to save 13.5% to be on Par ASR to reach an ASR of 9.3 instead of 10% with an investment return of 8%. However, if the expected investment return is only 6%, someone who only started saving after five years will need to save 18.9% to achieve an ASR of 9.3. Of course, savings rates may change, or an employee may take out a loan or hardship withdrawal. Because accumulations get the investment return in conjunction with continued contributions, the path of savings and investment returns matter as well. We'll leave this for future briefs where we examine how changes *during* accumulation impact ASR.

FIGURE 5. ADJUSTING SAVINGS RATE, 35-YEAR CAREER BY CONTRIBUTION RATE, PORTFOLIO RETURNS OF 6%



Note: Using 2.9% salary growth.

FIGURE 6. CATCHING UP WHEN BELOW PAR ASR



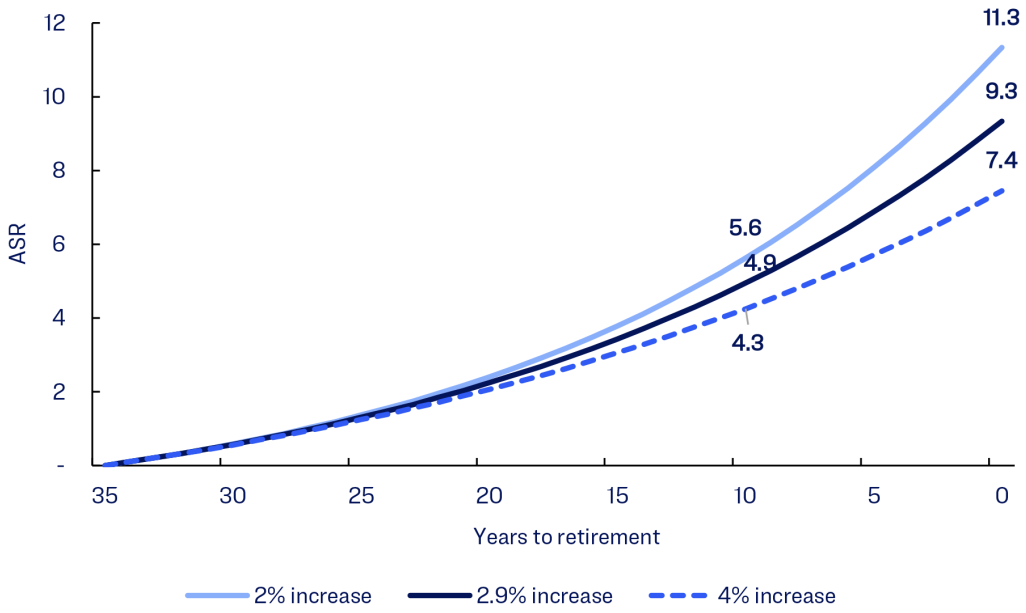
Note: Using 8% returns and 2.9% salary growth.

Suppose a saver is underfunded with an ASR of 2.4 and 15 years to retirement. They are well under the Par ASR. They can get to the Par ASR by increasing their contribution rate to 18.9% (Figure 6). But if investment returns are only going to be 6%, they would need to increase contributions from 14.9% in Figure 6 to 28.9%. Alternatively, as noted above, one could delay their target retirement date.

4.5 Employment income

Until now we have assumed individuals receive a year-over-year 2.9% annual salary increase. However, this is not the lifecycle career path of most workers. Figure 7 shows ASR results when altering the salary increase assumption. While a higher salary gives you a greater ability to save or pay down debts, it reduces your current ASR because the denominator (salary) increases. This may seem counterintuitive. Greater salary growth provides a higher total accumulated balance, but a lower *relative* balance. In other words, the larger the salary is and the faster it grows, the greater accumulated balance you need to comfortably replace that salary. Decreasing salary growth rate from 2.9% to 2% *increases* the final ASR to 11.3, well above the Par ASR for 50% RR. With 2% salary growth, contributions would only need to be 8.2% with 8% investment returns to reach Par ASR for 50% RR. Increasing the salary growth rate to 4% *decreases* the ASR to 7.4, well below the Par ASR for 50% RR. Contributions would need to increase to 12.5% to achieve the target Par ASR. This illustrates the importance of monitoring saving rates and standard of living when changes in salary occur.

FIGURE 7. ASR FOR 35-YEAR CAREER BY SALARY RATE INCREASE, 8% RETURNS



4.6 Time to retirement date

Workers can also use the ASR as a guide to when retirement is possible based on their current ASR, target RR, and savings rate. To illustrate this, consider a worker with an ASR of 4 who is 10 years from their original expected retirement date. This worker aims to replace 80% of their preretirement income. With an initial retirement age of 67, we assumed SSRR was 30% and the remaining 50% RR came from the workplace retirement plan. Their ASR of 4 is below the Par ASR of 4.9 for that target replacement rate 10 years away from retirement. Keeping our initial assumptions the same on returns, salary growth, and contributions, that worker's ASR of 4 meets the 50% Par ASR curve at 13 years. But stating that the worker needs to work three years longer to meet their RR goal *overstates* how much longer the individual needs to work.

First, by working longer and at later ages, the worker gains a larger Social Security benefit and larger annuity payouts by beginning the annuity at older ages. By delaying the start of Social Security, the SSRR increases approximately 3.3 percentage points per year starting from age 67 to age 70 with delayed retirement credits.[6] This reduces the required RR from accumulated assets. Second, working later increases the payout from the life annuity. Annuity income is cheaper to buy at older ages as the mortality rate is higher for older individuals. Annuity payout rates are approximately 1.9% more per year from age 67 to 70. So, a payout rate at age 67 is 7.8% and increases to 8.0% at age 68, a 1.9% increase. Finally, accumulated assets benefit from investment returns and additional contributions. In this example, the worker needs to only work approximately 1.5 years longer to hit the 80% target.

Some other examples are provided in Table 2. A worker with a 5.5 ASR five years before their target retirement below their 50% Par ASR of 6.9 (or a $105,000 gap for a worker earning $75,000) needs to only work for 18 more months to hit their target 80% RR. This highlights the power of working longer at later life (Bronshtein et al., 2019). In our context, retiring at age 68.5 instead of age 67 overcomes a 20% accumulation gap compared to target accumulation at age 62. But this is conditional on the ability to work longer at later life, which is not always possible. However, this also illustrates the difficulty of retiring sooner (Quinby & Wettstein, 2021). Retirement income becomes relatively more expensive to generate the younger one plans to retire, increasing the Par ASR that needs to be meet sooner in the lifecycle at a younger age to support a longer retirement.

TABLE 2. POWER OF WORKING LONGER AT LATER LIFE, CATCHING UP WITH AN ASR BELOW PAR ASR

Years to retirement	ASR	50% Par ASR	Percent behind 50% Par ASR	Contribution rate needed to achieve 80% RR at age 67	Additional years of employment needed beyond age 67 to meet 80% RR with a 10% contribution rate
15	2.5	3.4	26.5%	18%	2 years
15	3.0	3.4	11.8%	14%	1 year
10	3.5	4.9	28.6%	27%	2.5 years
10	4.0	4.9	18.4%	21%	1.5 years
5	5.5	6.9	20.3%	37%	1.5 years
5	6.0	6.9	13.0%	27%	1 year

Note: Assumes 2.9% salary growth, and 8% returns.

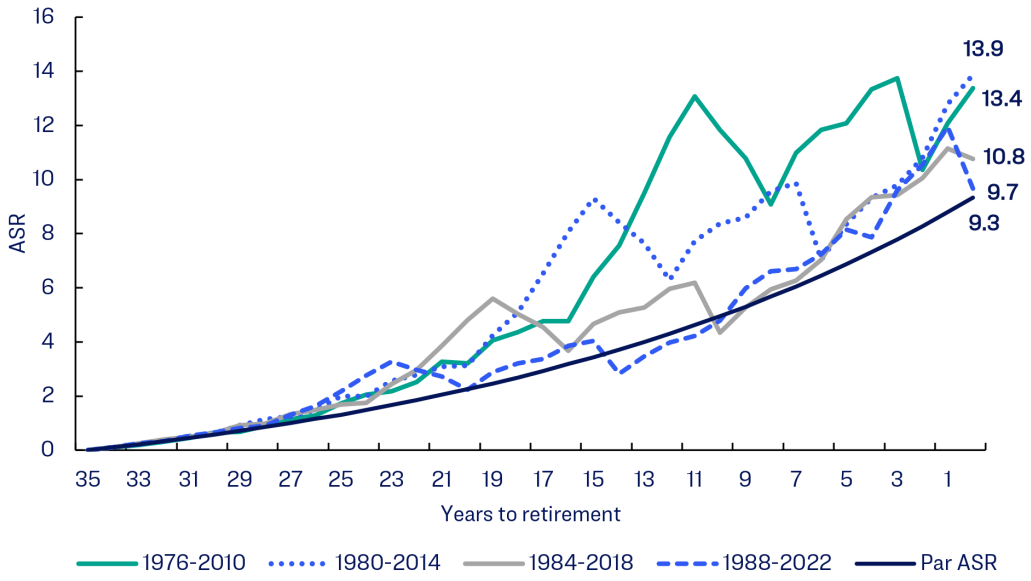
6 Based on Burkhalter and Rose (2025) replacement ratio calculations and that delaying Social Security claiming age past 67 increases benefits by 3.3% each year.

5. Historical outcomes

We next provide ASR outcomes based on historical investment returns for different worker cohorts. We examine historical outcomes when individuals use a common target date glidepath investment strategy. Because these strategies can vary widely despite similar naming conventions (Sherrill, 2019; Shoven & Walton, 2020), we adopt a basic target date glidepath construction of the S&P 500 index for broad equity exposure and Bloomberg Barclays Aggregate Bond Index for bond exposure. Our stylized glidepath starts with 86% equity 35 years to retirement decreasing to 61% equity at the final working year, similar to many target date strategies (Morningstar, 2024; Shoven & Walton, 2020). Worker-investors can also structure their portfolio risk–return profile to match their risk preferences with available investment options provided by the plan sponsor. We focus on outcomes with a glidepath approach because most new contributions in workplace retirement savings plans are to glidepath strategies (Davis & Richardson, 2020).

Figure 8 shows the ASR path for four different cohorts of workers who save 10% over the 35 years preceding retirement in the periods of 1976 to 2010, 1980 to 2014, 1984 to 2018, and 1988 to 2022. In all cohorts, workers experience both equity market boom and busts as well as both inflationary and deflationary periods, but at different points in time during their saving years. We assume a worker's salary growth is equal to nominal wage growth for each year, which has an annualized average of 3.6%.[7] With 10% contributions, market returns need to be 8.7% per year to stay on the Par ASR, which is shown with the red line in Figure 8. The ending ASRs for each of the four above cohorts were all above this Par ASR.

FIGURE 8. HISTORICAL ASR, 10% SAVINGS FOR 35-YEAR SAVERS BY WORKER COHORT



Notes: Assumes a standard target-date glide path model portfolio of S&P 500 and Bloomberg Barclays Aggregate Bond Index with monthly rebalancing.

7 For each year from 1979 to 2023, we used the quarterly annualized average. For years 1976 to 1978, we inputted the average nominal wage increase over the entire sample period.

Table 3 shows the resulting ASR across various saving rates for each worker cohort. Additionally, we show results for workers who save continuously for the 35 years prior to retirement (Panel A), 30 years prior to retirement (Panel B), and 25 years prior to retirement (Panel C). On average, saving 10% for 30 years resulted in an ASR of 9.4. Table 1 also illustrates the importance of saving for longer. At least historically, saving 10% for 35 years or 12% for 30 years provided ASRs above the 9.3 target for all cohorts. Illustrating the importance of compound returns, when the number of years of savings drops to 25 years (as shown on Panel C), saving 12% was only sufficient to provide an ASR of 9.3 or greater for two of the six cohorts, with an average ASR of 7.6, which results in a 41% replacement ratio.

TABLE 3. HISTORICAL ASR BY SAVINGS RATE AND WORKER COHORTS

Panel A: Save for 35 years

	Savings rate			
35-year saver	**5%**	**10%**	**12%**	**15%**
1976–2010	6.7	13.4	16.0	20.1
1980–2014	6.9	13.9	16.6	20.8
1984–2018	5.4	10.8	12.9	16.1
1988–2022	4.8	9.7	11.6	14.5
Average	6.0	11.9	14.3	17.9

Panel B: Save for 30 years

	Savings rate			
30-year saver	**5%**	**10%**	**12%**	**15%**
1976–2005	5.8	11.6	13.9	17.4
1980–2009	4.2	8.4	10.1	12.7
1985–2014	4.2	8.3	10.0	12.5
1990–2019	3.9	7.8	9.4	11.7
1994–2023	5.3	10.7	12.8	16.0
Average	4.7	9.4.	11.2	14.1

Panel C: Save for 25 years

	Savings rate			
25-year saver	**5%**	**10%**	**12%**	**15%**
1976–2000	5.3	10.6	12.7	15.9
1980–2004	4.0	8.0	9.6	12.0
1985–2009	2.5	4.9	5.9	7.4
1990–2014	2.6	5.2	6.3	7.9
1994–2018	2.3	4.5	5.4	6.8
1999–2023	2.4	4.8	5.8	7.2
Average	3.2	6.3	7.6	9.5

Note: Assumes a 60/40 portfolio of S&P/AGG with monthly rebalancing.

6. Summary

In this paper, we describe the purpose and construction of the ASR. We translate it into a replacement ratio and explore the impact of relaxing various initial assumptions about investment returns, salary growth, length of savings, and contribution rates. Finally, we evaluate ASR outcomes using historical investment returns for various worker cohorts. Adoption of simple financial planning metrics that reduce planning complexity may increase financial self-efficacy—belief in the ability to manage and plan one's finances. Because self-efficacy is related to positive financial outcomes (Asebedo, 2019; Chatterjee et al., 2011; Tang, 2021), this could help enhance financial security and well-being.

Our framework has a few limitations. Importantly, we assume a retirement age of 67 and that a worker saves consistently and continually for a set number of years prior to retirement. This may not match the workforce patterns of many, especially for individuals who leave the workforce for several years for caregiving or education. Other disruptive events can occur during working life. Workers may adjust savings as they get older or experience retirement plan leakage due to hardship, plan loans, or early distributions (Argento et al., 2015), or they may adjust their portfolios following (negative) market returns or macroeconomic conditions.

Overall, the ASR is an accessible dynamic measure individuals can use to gauge their retirement readiness based on their age, savings rate, and level of accumulated assets. It is easy to calculate (simply divide your accumulation by your current salary) and can be easily adopted for various retirement income targets. Simplifying retirement planning could help individuals improve their retirement security and self-efficacy along with enhancing employer benefit programs. Individuals could enhance their retirement planning by using a simple ASR approach in conjunction with working with a professional advisor.

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Appendix

TABLE A1. ESTIMATED SOCIAL SECURITY REPLACEMENT RATES

	Average career earnings			
RR% at age	Low ($31,076)	Medium ($69,057)	High ($110,491)	Max covered ($171,100)
62	41%	30%	25%	20%
65	49%	37%	30%	24%
67	56%	41%	34%	27%
70	69%	51%	42%	34%

Source: Burkhalter and Rose (2025).

Note: Uses Burkhalter and Rose (2025) data for workers born in 1985, assumes current-law scheduled benefits. Wages are indexed to 2024 levels.

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