Private Markets on the Glide Path

Exploring the role of semiliquids in retirement outcomes

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Introduction

With private markets fitfully making their way into defined-contribution, or DC, plans, investors and plan sponsors are weighing whether the operational complexity and due diligence burdens are worth the effort. While several studies have attempted to show the potential merits—and in some cases, demerits—of including private assets,[1] most have proxied private markets using traditional institutional-style finite-life drawdown vehicles that are not representative of the funds that will most likely be adopted by DC plans. Additionally, few—if any—studies have built out a model of the DC participant experience, incorporating key features, such as Social Security, contribution limits, and company match.

In the following study, we take a more realistic approach. We begin by modeling the representative private market vehicle as a "semiliquid" collective investment trust, or CIT, infinitely lived to meet plan cash flow needs. We explore varying allocations on a diverse set of actual plan participants drawn from our retirement services database to examine the distribution of outcomes, specifically the level of sustainable spending in retirement. To our knowledge, this is the first study to simulate semiliquid fund performance within a DC glide path framework, offering a more realistic lens on how private markets might affect participant outcomes.

Preliminary results suggest that semiliquid private market allocations may improve retirement outcomes across participants cohorts—albeit modestly. Importantly, no scenario produced worse outcomes than the base case (without private markets), and higher-balance participants, especially those with lower expected Social Security replacement rates, saw the greatest benefit. These findings offer early evidence that semiliquid structures may have a meaningful role to play in smart DC plan design.

The Investment Model

We began by drawing a sample of 300,000 401(k) plan participants from our managed accounts database. We then removed those under the age of 21, those over the age of 60, and those with contribution rates under 1%. This left us with a group of 265,375. The participant-specific inputs are limited to 401(k) account balance, current contribution rate, age, and gender. Admittedly, this will not paint an accurate picture of retirement readiness in all cases. For example, we treat each participant as an individual but we'd ideally look at household-level variables. Additionally, there are cases in which

1 BlackRock's The Power of Private Markets in DC Plans (June 2025) is good example and served as inspiration for this piece.

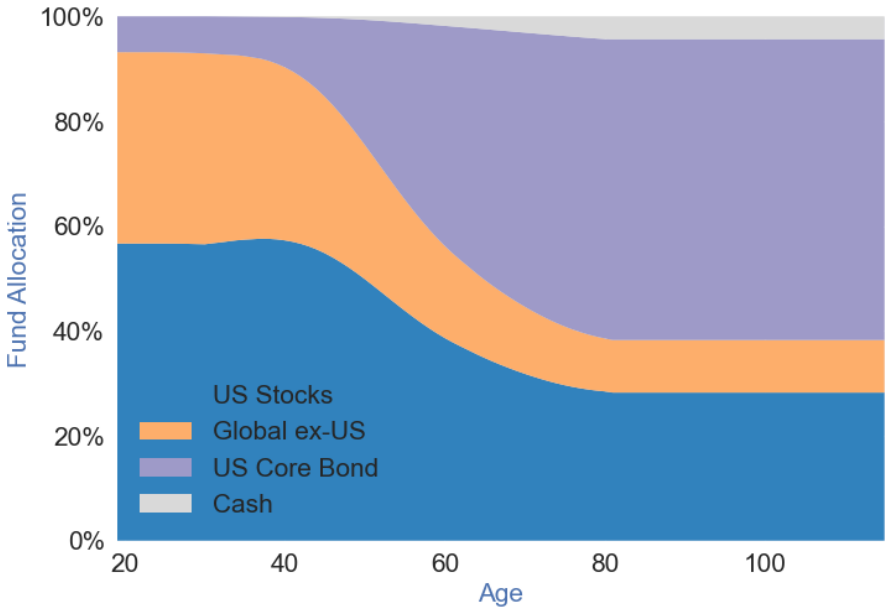
individuals may have unreported accounts or access to pensions or annuity incomes. That said, the distribution of characteristics is qualitatively close to that of other datasets and, we believe, representative of the current landscape.

We then ran this population through a stylized retirement simulation to observe the distribution of sustainable retirement income. We define sustainable income as that generated by the 401(k) account through retirement, plus that provided by Social Security.[2] We also define a retirement goal of 70% of salary at retirement. From this, we can calculate a "success ratio": the ratio of sustainable retirement income at the 25th percentile to the retirement goal.

Our model is annual and in real (inflation-adjusted) terms. Results from this analysis serve as our base case before adding exposure to private markets. We can then evaluate the change in success ratios as private markets are incrementally added to the glide path portfolios.

The base-case glide path portfolios, shown below, consist of market-normal allocations to US stocks, non-US stocks, and investment-grade bonds proxied by the Morningstar US Market, Morningstar Global Markets ex US, and Morningstar US Core Bond indexes, respectively. The equity glide path is that of Morningstar's moderate target-date fund and descends from 93% to a level 36% throughout retirement. While strictly unique to Morningstar, it is broadly representative of the glide paths of other managers. Portfolios are rebalanced at the end of each year.

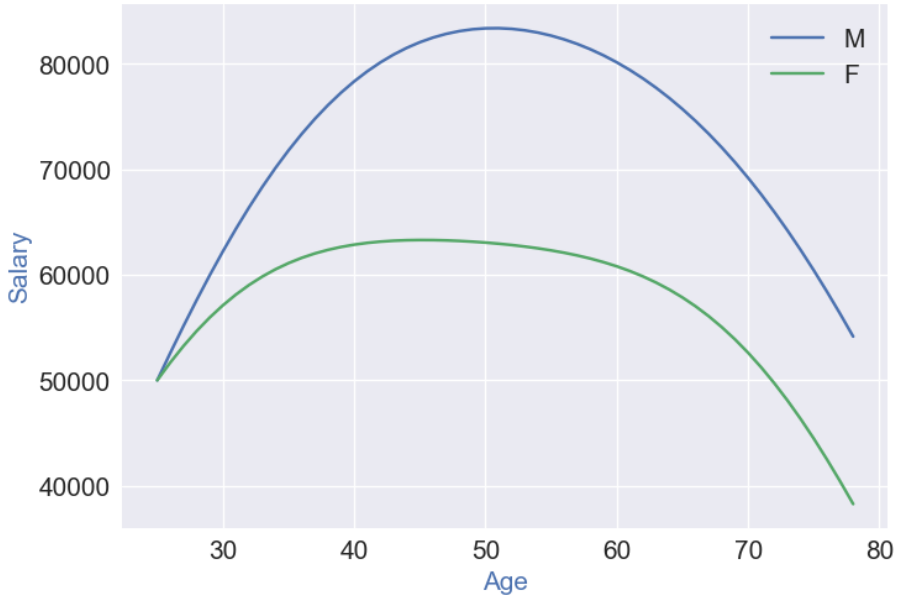
Exhibit 1 Base Case Glide Path Portfolios



2 Specifically, retirement income is the real dollar value of the account that can be withdrawn annually until the probability-weighted moment of death.

For each investor, we assume a salary growth curve. Our model is based on that proposed by Aaronson and Sullivan (2001), which in turn follows the classic polynomial estimation method pioneered by Jacob Mincer (1958).[3] Typical with such models, we see a peak in real wages for men and women at ages of 51 and 45, respectively. In contrast to Aaronson and Sullivan, our model parameters are generalized across all education levels since we lack such data.

Exhibit 2 Salary Curves



With the earnings curve, we can calculate the evolution of participant dollar contributions through accumulation by applying IRS limits and a company match. Our match estimates are derived from Vanguard's 2024 survey, "How America Saves."[4] Specifically, we take the weighted average of the first top 45% of plans surveyed. Rounding upward, this gives us a match of 86% on the first 5%.

Finally, and most importantly, we include a Social Security benefit. We assume everyone retires at 67 and is eligible for the full or normal benefit. This assumption may bias the estimates upward—it's not likely that everyone continually paid into the system at the salary growth but, as we will see, any bias here does not have a qualitative impact on our results: The majority of retirement income for most of our retirement investors will come from Social Security.

3 Aaronson, Daniel, and Daniel Sullivan. 2001. "Growth in Worker Quality." Economic Perspectives, Federal Reserve Bank of Chicago, 25(4): 53–74.

4 Vanguard: How America Saves Survey (2024). https://institutional.vanguard.com/content/dam/inst/iig-transformation/insights/pdf/2025/has/2025_How_America_Saves.pdf

With the above in hand, we run all 265,375 participants through the model and bin them into one of three success cohorts: Prepared, Vulnerable, and Critical. Success is defined as the 25th percentile sustainable retirement income divided by 70% of final salary. Prepared investors are those with a success ratio of at least 100%, Vulnerable are those with a ratio between 100% and 75%, and participants with success ratios below 75% are deemed Critical. [5]

From these cohorts, we construct three representative investors from the median participant attributes (income, age, account balance, contribution rate) and examine the impact of subsequent incremental private equity and private credit allocations on their success ratios. Results of the base case analysis are shown in Exhibit 3. In addition to their attributes, we show sustainable income generated by the retirement account at the 50th, 25th, and 5th percentiles, as well as total sustainable income. Rows marked with "SS" include Social Security.

Exhibit 3 Participant Cohort Representatives

Cohort Representative	Prepared	Vulnerable	Critical
Age	48	44	37
Balance	148,193	22,476	17,507
Salary	55,000	54,579	95,000
Contribution Rate (%)	9	6	6
Success Ratio	1.12	0.84	0.61
50 (USD)	20,375	3,545	3,512
25 (USD)	15,243	2,582	2,435
5 (USD)	9,894	1,599	1,378
50_ss (USD)	48,358	30,538	41,116
25_ss (USD)	43,212	29,659	39,827
5_ss (USD)	37,914	28,765	38,456

Not surprisingly, we see that the cohort representative with the highest balance (USD 148,193) and the highest contribution rate, 9%, is the most prepared. Although the critical representative has the longest savings horizon, they also show the lowest balance and the highest salary, thus making both the forecasted account balance at retirement low, and the amount of income to be replaced by Social Security (which falls proportionally as income rises) particularly challenging. It may be that many of these investors have unreported accounts—for example, a Roth IRA—still, the very low 401(k) balance remains striking.

5 We have slightly more male investors than female, thus making the median investor male. To avoid bias, we ran cohort results on a gender-neutral basis.

Fund Return Model

Simulating returns is always challenging. This is particularly so for private markets, which, being appraisal priced, do not move with the market and can exhibit highly skewed returns when compared with traditional assets. Additionally, the dispersion of private market returns across different managers is sufficiently large that assembling a composite to represent the group is a perilous, if unavoidable, undertaking. Compounding the difficulty is the fact that the type of private market exposure that is most likely to appear in DC plans will be in the form of a semiliquid CIT, not the standard institutional product. These vehicles have thin track records and virtually no history in the DC space. Past is rarely prologue, and in this instance, we don't even have a past.

Since the question we want to explore is entirely based on our return estimates, we chose to take a comparatively statistical and agnostic approach that leans heavily on the historical record and imposes as little subjectivity as possible. We proxy public markets via the Morningstar indexes cited previously, as well as two composites based on PitchBook's Private Equity All US and Private Debt All US indexes. Our time series runs from the inception of the PitchBook data series in June 1997 through June 2025. This period captures a wide range of markets.[6]

Significantly, the types of private market investments that will appear in DC plans will not be the finite-lived drawdown funds to which so much attention has been paid but, rather, less risky infinitely lived evergreen funds, purpose-built to handle the cash flow cadence of the 401(k) universe. Such vehicles will include a liquidity sleeve, an allocation to some combination of cash and public market analogues to allow for semimonthly redemptions and investments and periodic rebalancing.

The size and composition of the liquidity sleeve—be it cash, public market comparables, or a combination of the two—will affect the fund's overall risk and return profile and is ideally scaled to meet the expected needs of the plan and the investment policy of the glide path advisor. However, even with a very small liquidity sleeve, the evergreen structure will lower the risk/return profile of the fund.

This, of course, makes sense. One is trading the prospect of higher returns for greater liquidity—essentially narrowing the probability distribution and shifting it to the left. The question is, Might these necessary compromises render semiliquids redundant?

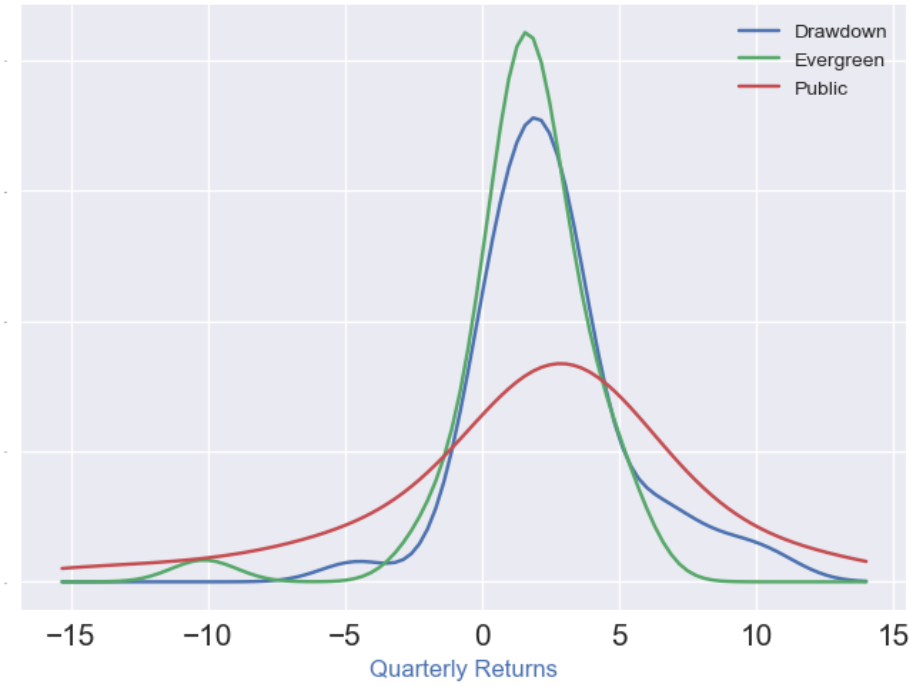
Exhibit 4 compares the probability distribution of quarterly returns for an average composite of PitchBook's drawdown indexes, its forthcoming evergreen indexes, and a composite of frequently used public markets indexes. The graph shows quarterly returns for the period of September 2014 through June 2025.

The Evergreen composite (in green) shows a relatively constrained and near-symmetrical distribution. It is narrower, with thinner tails, and a peak relative to that of the drawdown vehicles. It also sits to the

6 The trade-off is that the composition of the PitchBook indexes and the nature of the private market changed over this period. However, since the majority of the return generated in this exercise is generated from the public markets, we believe the trade-off is worth it.

left, indicating lower expected returns. The public composite (in red), has a far wider distribution than the others, with heavier tails. This, as we'll see, will help explain our results.

Exhibit 4 Drawdown, Evergreen, and Public Index Composites



Although much is made of the fundamentals that can drive private market returns, such as higher yields or greater growth potential, it's notable that a good deal of the contribution to performance in our model can be attributed to lower volatility and lower correlation with public markets because of appraisal pricing. It is unquestionable that the pricing mechanism adds considerable value to the returns. In fact, when we shifted the expected returns on private markets to match those of their public market peers, privates still add value in a majority of scenarios.[7]

However, appraisal pricing doesn't mean there's less risk. In fact, returns can shift catastrophically if the pricing process breaks down. The infamous case of Southland Royalty an oil and gas concern that was held at investment value (0.99 times invested equity) despite publicly available information that the company was under pressure until it was suddenly written down to 0. This is, of course, an extreme case but it could not have happened in the public market where information is continually priced into a

7 Specifically, we "recentered" the expected returns for the PitchBook Private Equity and Credit Indexes such that they equaled those of the Morningstar US Core and Bond indexes.

stock's price.[8] We also stress that the performance dispersion among privates has been significant. Manager selection is far more critical than it is with publics, where one can pick a cheaply priced index fund and do better than many if not most active managers.

To estimate returns to semiliquid funds, we started with the following assumptions. The fund consists of a private portion and a liquidity sleeve with a 10% cash target. We do this to keep things simple. A private equity product with a liquidity sleeve of exchange-traded funds may be a better alternative, but it would also require a larger sleeve, given the volatility of the asset class, and makes interpretation in the context of this analysis difficult. We also assume that net cash flows are directed such that allocations to and from the semiliquid fund are minimal, which can result in periods in which the semiliquid fund is notably over- or under- allocated to. In the model, there are cases in which a portion of the private sleeve is liquidated or increased—an event that is becoming less disruptive given the rapidly growing secondaries market. But for the most part, the allocation remains near the glide path targets.

For our private credit estimate, we use a provisional version of PitchBook's forthcoming Evergreen Private Debt Composite Index. Quarterly returns begin in March 2015 and are "back cast"[9] to June 1997 using a variety of public and private indexes in order to incorporate a significantly large number of markets. PitchBook's Evergreen Private Equity Index only goes back to 2022, so we use a somewhat more involved process in which we calculate a "liquidity factor" for the evergreen that essentially lowers returns and risk slightly to account for the liquidity. We don't model any external (CIT-level) expenses however the PitchBook indexes are fund composites and calculated net of fees.

Return Simulation Model

We now have a set of time series representing our investments with realizations over a variety of markets. The public markets represent the historical record, while the private market proxies represent an imputed estimate of how equity and credit semiliquid CITs may have behaved had they existed. From this dataset, we can examine how these assets may have performed over a broad range of implied scenarios.[10] We do this by using a technique called *bootstrap resampling*. The process is widely used in financial modeling, largely to address situations in which there are comparatively few observations in the data sample or when the probability distribution of the parameters to be estimated is unknown or cannot be estimated with confidence. Notably, appraisal pricing makes private market returns difficult to fit into a standard simulation models. Unlike returns on traditionals, they cannot be estimated using a well-behaved distribution such as a lognormal or a variety of the stable distributions.[11]

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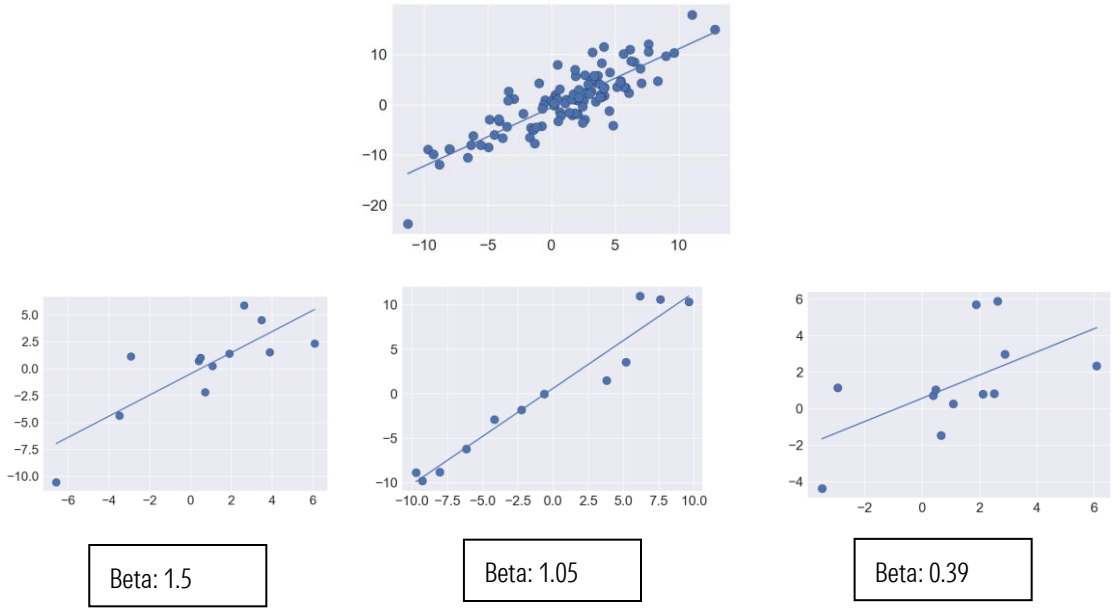
8 There's been at least one failure of a semiliquid. The Wildermuth Fund (WEIFX) was forced into liquidation due to a run on assets. However, this was instigated not by a pricing problems, but by management's breech of the regulatory maximum on illiquids. That said, the fund's comparatively smooth return history gave little indication of the risks.

10 I use the term "implied" because, unlike explicit scenario modeling, which incorporates macro and micro market variables, we use only the realizations themselves.

11 We also ran results using a gaussian copula—a parametric approach that doesn't assume returns are independent and identically distributed. But it assumes, of course, in the limit are gaussian. Not surprisingly, this produced narrower joint asset distributions of portfolio returns.

The bootstrap resampling approach (resampling for convenience) is mechanically simple and involves repeatedly taking random subsets or blocks of data from a "population," calculating a statistic of interest, and observing the distribution of that data.[12] We illustrate the concept in Exhibit 5. The scatter chart at the top, includes 120 months of returns of small-cap stocks on the US stock market as proxied by the Morningstar US Market Index. In this easy-to-relate scenario, we seek to estimate a beta for small-cap stocks. This, of course, can be done by calculating the beta for the entire 120-month period. However, we may also want to know how stable that beta might be, so we grab repeated 12-month samples of small-cap and market returns and calculate the beta for each sample. This gives us a distribution of beta estimates, which we can then factor into our model or use to understand the stability of our estimate.

Exhibit 5 Resampling Betas



We can now see that the beta does, in fact, move around quite a bit and can determine the statistical significance of that estimate.

For this analysis, we use essentially the same approach. Our core dataset is the quarterly total returns on each asset. From this, we repeatedly take random blocks ranging in size from two to eight quarters, which we then combine until we have 400 quarters of returns. We do this 5,000 times (for 5,000

12 This is actually one of many uses.

simulations). From this, we can calculate annual returns for each asset. The value of this approach is that the data—as sampled—accounts for things that traditional models don't, such as correlation from one period to the next (autocorrelation) as well as preserving the changing correlations among assets from one period to the next.

Results

We can now run our cohorts through the model, comparing results with the base case (no private funds) scenario. We run allocation scenarios in which the semiliquid CITs receive varying allocations. Our one rule is that the total exposure to semiliquids not exceed 15% of assets.

In Exhibit 6, we show how changes in allocations to privates affect the success ratio. Ranking on success ratio, we show the allocation to private equity and private credit as a percentage equity and fixed income in the columns headed "PE" and "PC." In all cases, privates improve the outcomes, albeit not dramatically so. It's also worth noting that in no scenarios do they produce a worse outcome to the base case.

Exhibit 6 Participant Cohort Representatives

Prepared			Vulnerable			Critical		
PE	PC	success_ratio	PE	PC	success_ratio	PE	PC	success_ratio
0%	0%	1.180	0%	0%	0.832	0%	0%	0.577
5%	0%	1.186	0%	5%	0.834	0%	5%	0.577
0%	5%	1.189	5%	0%	0.834	5%	0%	0.578
10%	0%	1.194	0%	10%	0.835	0%	10%	0.578
5%	5%	1.196	5%	5%	0.836	5%	5%	0.578
0%	10%	1.196	10%	0%	0.836	0%	15%	0.579
15%	0%	1.203	0%	15%	0.836	10%	0%	0.579
0%	15%	1.205	15%	0%	0.838	10%	10%	0.581
10%	10%	1.212	10%	10%	0.839	15%	0%	0.581
15%	15%	1.229	15%	15%	0.843	15%	15%	0.582

Notably, the combination of private funds differs from one cohort to another. This is due to the different time horizons associated with the different cohorts.

In Exhibit 7, we show the incremental sustainable spending for each combination of private funds at a variety of probability levels. Note that the success ratio is calculated at the 25th percentile; thus, this is the only column that is monotonic. Not surprisingly, results vary more widely as we move from the center of the distribution to the highest and lowest percentiles.

Exhibit 7 Participant Cohort Representatives

Prepared

PE	PC	75	50	25	5	Success Ratio
5%	0%	$ 176.11	$ 212.39	$ 225.66	$ 328.69	1.186
0%	5%	$ 536.60	$ 305.67	$ 310.21	$ 186.09	1.189
10%	0%	$ 298.47	$ 350.35	$ 497.68	$ 666.67	1.194
5%	5%	$ 657.59	$ 483.28	$ 561.34	$ 531.73	1.196
0%	10%	$ 868.86	$ 615.33	$ 582.16	$ 397.76	1.196
15%	0%	$ 433.73	$ 568.70	$ 812.28	$ 1,053.58	1.203
0%	15%	$ 1,339.37	$ 938.71	$ 888.28	$ 616.58	1.205
10%	10%	$ 1,210.10	$ 1,029.18	$ 1,137.22	$ 1,099.75	1.212
15%	15%	$ 1,688.00	$ 1,778.15	$ 1,743.82	$ 1,644.95	1.229

At-Risk

PE	PC	$ 75.00	$ 50.00	$ 25.00	$ 5.00	Success Ratio
0%	5%	$ 95.97	$ 73.13	$ 57.54	$ 21.45	0.834
5%	0%	$ 46.95	$ 75.27	$ 67.38	$ 58.73	0.834
0%	10%	$ 188.35	$ 133.22	$ 106.31	$ 64.97	0.835
5%	5%	$ 140.45	$ 111.58	$ 126.14	$ 85.64	0.836
10%	0%	$ 89.10	$ 136.30	$ 143.73	$ 126.30	0.836
0%	15%	$ 287.54	$ 218.02	$ 146.49	$ 121.88	0.836
15%	0%	$ 110.88	$ 217.59	$ 213.18	$ 211.54	0.838
10%	10%	$ 287.37	$ 244.43	$ 245.91	$ 204.54	0.839
15%	15%	$ 410.38	$ 383.05	$ 375.63	$ 341.05	0.843

Critical

PE	PC	75	50	25	5	Success Ratio
0%	5%	$ 143.50	$ 91.76	$ 57.68	$ 14.05	0.577
5%	0%	$ 105.54	$ 119.40	$ 86.26	$ 69.36	0.578
0%	10%	$ 248.92	$ 175.03	$ 113.08	$ 30.24	0.578
5%	5%	$ 210.67	$ 175.19	$ 124.83	$ 77.83	0.578
0%	15%	$ 323.99	$ 247.46	$ 162.39	$ 46.09	0.579
10%	0%	$ 151.11	$ 209.28	$ 186.95	$ 135.19	0.579
10%	10%	$ 431.20	$ 345.10	$ 278.88	$ 174.41	0.581
15%	0%	$ 227.13	$ 276.00	$ 288.79	$ 219.44	0.581
15%	15%	$ 598.13	$ 516.46	$ 399.47	$ 279.20	0.582

These numbers may be directional, but they are not dramatic. It's important to keep in mind that our cohorts are only saving a bit more than the company match. Small increases in savings could have significant impact on outcomes.

Although data supports the view that private funds add value, it's good to take stock of the standard caveats. First, the results do not include fund management expenses above those associated with the "private" or nonliquid portion of the private funds. At the relatively modest levels of incremental return, these could have a big impact and lead to very different results. We also assume that net cash flows are actively managed, such that liquidity problems are minimized though not avoided. Lastly, but maybe most importantly, we are using an aggregate of private fund returns to forecast what, in reality, will be fund-specific returns. By contrast, we proxied public market exposures with broad market indexes which are widely available as low-cost mutual funds and CITs. . Given the near-zero dispersion of index funds (which is due almost entirely to expenses and the composition of the underlying index) and the extremely high dispersion of privates, our level of uncertainty at forecasting private market returns is quite high.

That said, our results suggest that privates do add incremental return—although the value will differ across participant profiles. Higher-balance investors and especially those expecting lower levels of income replacement from Social Security will benefit the most. Plan sponsors will need to consider the type and structure of the semiliquid product(s) they add and work with a semiliquid manager and glide path manager (if needed) to determine the best composition and size of the liquidity sleeve.

Conclusion

This report offers an early but important signal: Private funds may add value to DC glide paths. While the improvements in retirement outcomes are modest, they are consistent. In no case did the inclusion of private funds lead to worse results than instances in which private funds were not present. Participants with higher balances and lower expected Social Security income stand to gain the most.

That said, the results come with caveats. Our analysis assumes active liquidity management and excludes certain fund-level expenses, both of which could significantly affect real-world performance. And while traditional assets were modeled using broad indexes, private market returns were forecasted using aggregated data, which introduces more uncertainty.

Even with these limitations, the results provide clear implications for anyone interested in DC plan design. As private markets continue to evolve toward the DC space, plan sponsors and advisors will need to carefully consider product structure, liquidity design, and coordination across fund managers. Will this increased complexity and the due diligence requirements be worth the incremental performance increases we found in this analysis? That is up for plan sponsors to decide.

Disclosures