

Improving retirement outcomes by default: The case for an IRA QDIA

Takeaways

- Cash is the de facto default for individual retirement account (IRA) contributions, despite being generally prohibited as a default investment option in 401(k) plans. Unless individuals voluntarily invest IRA assets, they tend to stay in cash indefinitely.
- IRA cash is highly "sticky." Among rollovers conducted in 2015, 28% remained in cash for at least seven years. (The chart below breaks this trend down by age group.) Younger investors, women, and those with smaller balances are especially prone to staying in cash for years following a rollover, and direct-contribution cash is even "stickier" than rollover cash.
- For investors under age 55, we estimate that the long-term benefit of investing in a target-date fund (versus staying in cash) upon rollover is equivalent to, on average, an increase of at least \$130,000 in retirement wealth at age 65. Enabling an IRA qualified default investment alternative (QDIA) could deliver approximately \$172 billion in long-term benefits to all rollover investors in retirement each year.

28%

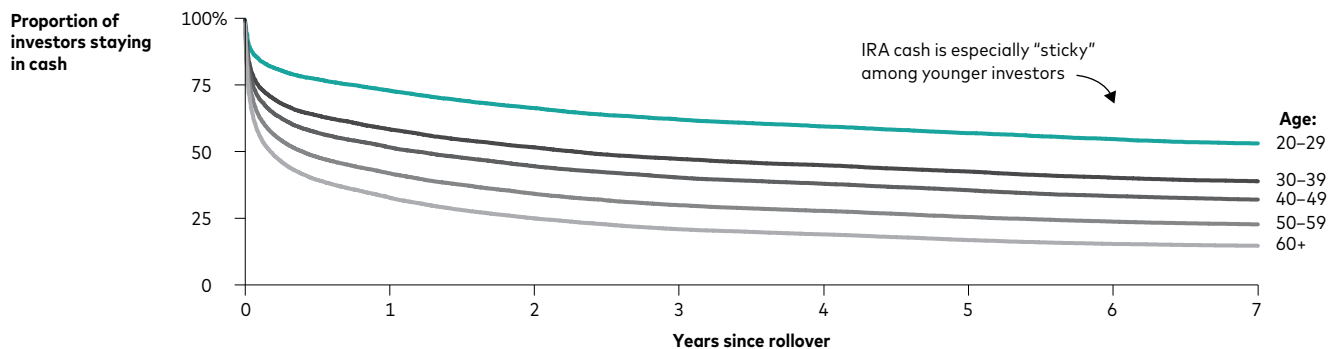
Share of IRA investors who leave their rollovers entirely in cash for seven-plus years.

\$130K+

Estimated per capita benefit of an IRA QDIA at age 65, which is worth more than two years of retirement expenses, for investors under age 55.

\$172 billion

Estimated annual net benefit to all rollover investors in retirement.



Source: Vanguard analysis of rollovers to IRAs initiated in 2015 and tracked until year-end 2022.

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Introduction

Over the past two decades, retirement security has become increasingly dependent on workplace defined-contribution (DC) savings plans and their subsequent rollovers into IRAs. DC plans and IRAs enable over 100 million Americans to save and invest for retirement in a tax-advantaged way, promoting long-term financial security and wellness.

Many more Americans participate in DC plans than own IRAs, yet IRAs have eclipsed DC plans in terms of annual contributions and assets. Rollovers are the prime reason: For each \$1 contributed to a DC plan in 2020, approximately \$1.14 rolled to an IRA (Investment Company Institute, 2023).

Although IRAs are designed to support long-term retirement wealth accumulation, a substantial proportion of IRA assets are held in cash-like instruments (e.g., money market funds), which typically offer modest returns and do not outpace inflation, undermining retirement readiness.

The mechanics of retirement contributions represent one key driver of the diverging asset allocation: IRA contributions often land as cash, requiring investors to actively choose among myriad investment options.¹ By contrast, 401(k) and state-based auto-IRA programs make it far easier—and often automatic—to invest contributions in diversified and balanced options such as target-date funds (TDFs) through the

implementation of the U.S. Department of Labor’s qualified default investment alternative (QDIA) rule, with very positive effects (see the “Where and why defaults work” box on page 3).

QDIAs have been particularly effective in helping 401(k) investors achieve age-appropriate asset allocations and avoid extreme portfolios. In 2005, two years before the Pension Protection Act (PPA) enabled QDIAs,² participants under 25 allocated only 57% of their assets to equities. By 2022, participants allocated 87% to equities, and TDF QDIA adoption reached 90% of 401(k) plans (Clark, 2023). Over the same time period, the prevalence of extreme equity allocation (i.e., 0% or 100%) plummeted to 7% from 34%.

In personal IRA accounts, no such QDIA exists. Instead, all direct contributions and a substantial proportion of rollover contributions transfer as cash. Once transferred, these funds remain in cash unless they are reallocated to alternatives such as equity and bond mutual funds or individual securities.

Uninvested cash in retirement accounts is a significant problem that hinders millions of Americans saving for retirement. Accordingly, a systematic solution is needed. In this white paper, we review the prevalence, causes, and long-term costs of IRA cash. We then propose a structural solution to drive significantly improved outcomes for retirement savers through a better default: An IRA QDIA.

¹ There are several complementary reasons why cash allocations are higher in IRAs versus 401(k)s, including the fact that IRA owners are disproportionately likely to be in the decumulation phase (i.e., retired) compared with 401(k) owners.

² Although the PPA was passed into law in 2006, the provisions took effect starting in 2007.

Where and why defaults work

401(k) plans: The implementation of defaults in 401(k) plans has revolutionized retirement savings through two primary mechanisms: Opt-out participation defaults (i.e., automatic enrollment) and QDIAs. Under the PPA and Department of Labor rules, if an employer chooses a QDIA as the default investment, the employer is entitled to certain fiduciary protections. QDIAs have become nearly ubiquitous in the world of 401(k) plan design, and TDFs are now the default investment option for 98% of plans with QDIAs (Clark, 2023). TDF defaults significantly reduce the prevalence of extreme asset allocation, including cash-heavy positions, and help workers build wealth, outpace inflation, and invest in an age-appropriate way. Younger workers have especially benefited from these changes: In 2006, one-quarter of participants ages 18–24 had no equity exposure (Clark and Kukulka, 2023). By 2021, 97% of automatically enrolled participants ages 18–24 had equity allocations between 41% and 99%.

State auto-IRA plans: In recent years, states across the country have offered plans that replicate the structure and benefits of 401(k)s for smaller employers. These plans include features like automatic enrollment, automatic

contributions deducted from paychecks at default savings rates (e.g., 5%), and a modified default investment option where contributions sit in cash for only a short time (e.g., 30 days) before being exchanged for a TDF. Adoption is growing rapidly, with 15 states offering auto-IRA programs and seven additional states reviewing potential programs as of last year (Georgetown University Center for Retirement Initiatives, 2023a).

Scientific support: There is broad consensus among behavioral scientists that defaults are powerful tools for improving decisions and outcomes while preserving decisionmakers' autonomy (Jachimowicz et al., 2019). Compared to traditional interventions like financial literacy programs, defaults are considerably more effective, easier to implement, and less costly (Benartzi et al., 2017). Furthermore, defaults are particularly effective in domains where engagement is low and inertia is high. In the world of investing, inertia can be pervasive. In 2022, 94% percent of self-directed 401(k) participants and 83% of IRA investors made no changes to their investments (Clark, 2023). As a consequence, an IRA QDIA is likely to be extremely sticky, providing investors with compound growth over a long time horizon without requiring any effort, skill, or energy on their part.

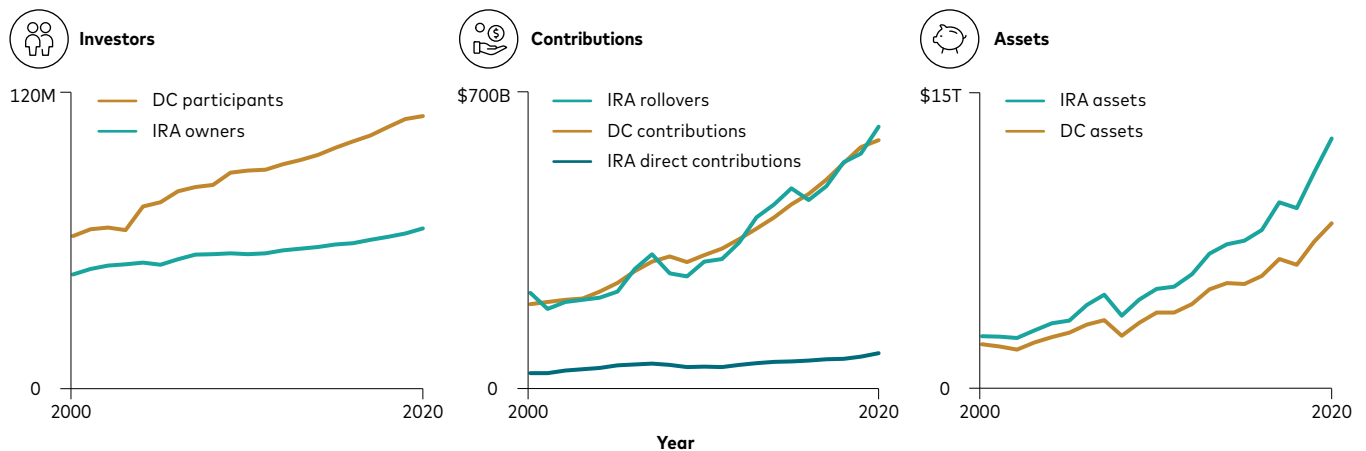
IRAs are growing rapidly but cash drag limits their potential

The growth in private-sector DC and IRA participation, contributions, and assets has been rapid (see **Figure 1**). American workers were saving over \$585 billion each year in DC plans as of 2020 (U.S. Department of Labor, 2023), which led to total DC plan assets exceeding \$10.5 trillion in 2023 (Investment Company Institute,

2023). But annual contributions to IRAs (\$701 billion as of 2020) far exceed all DC plan contributions, largely due to rollovers (\$618 billion in 2020). Investors now hold an estimated \$13.5 trillion in IRAs (Investment Company Institute, 2023)—approximately \$3 trillion more than in DC plans, despite the fact that 45 million fewer Americans own IRAs than participate in DC plans.

FIGURE 1

While DC participants far outnumber IRA owners, IRA assets comfortably outpace DC assets

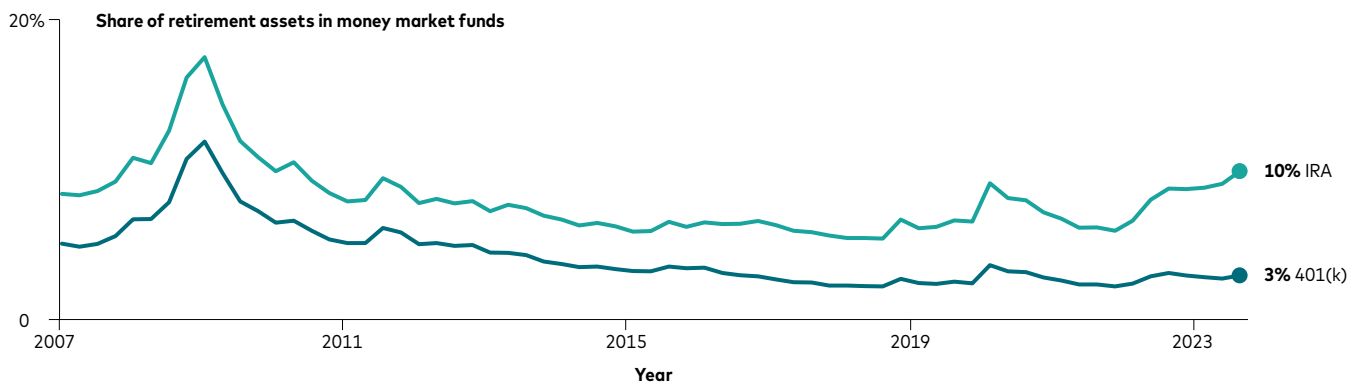


Sources: Vanguard compilation, with IRA statistics gathered from IRS administrative data (*Individual Retirement Arrangements Study*, 2023), and DC statistics gathered from summarized U.S. DOL Form 5500 data (U.S. Department of Labor, 2023). IRA and DC contributions reflect gross inflows.

IRA accounts are hindered by major cash drag: IRA investors allocated approximately 10% of their assets to money market funds in 2023, which is about three times higher than the corresponding 3% allocation by 401(k) participants (Investment Company Institute,

2023). As depicted in **Figure 2**, cash allocation in IRAs has been consistently higher than in 401(k)s since 2007. And the gap has widened in recent years: Since 2018, IRA cash allocations nearly doubled (from 5.4% to 9.9%) while 401(k) cash allocations remained in the 2%–4% range.

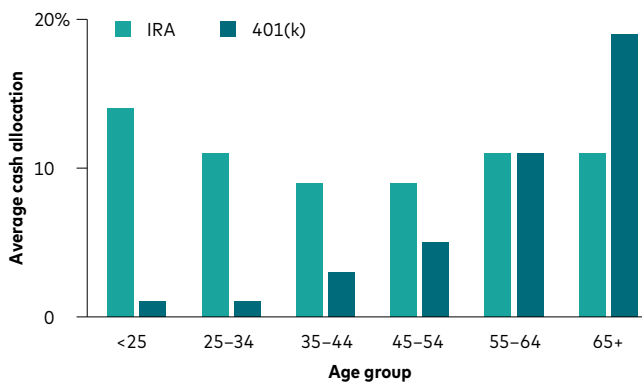
FIGURE 2
IRA allocations to money market funds exceed those in 401(k) accounts and are on the rise



Sources: Vanguard compilation, with IRA and 401(k) asset allocation data from Investment Company Institute (2023).

Comparing asset allocation across age groups reveals a worrisome divergence between 401(k)s and IRAs: In 401(k)s, older participants have relatively more cash than younger participants, consistent with expectations of life-cycle investing models (see **Figure 3**). Among the Vanguard 401(k) participants summarized in *How America Saves 2023* (Clark, 2023), average cash allocations rose steadily with age, from 1% for investors ages 25–34 to 19% for investors age 65 and older. In contrast, among Vanguard IRA holders at year-end 2022, cash allocations were mostly flat across the age distribution, with investors 25–34 and investors age 65 and older both showing average cash allocations of around 11%. For investors under 25, IRA cash allocations far exceeded 401(k) cash (14% versus 1%) and were reminiscent of the 18% cash allocations in 401(k) accounts observed in 2006—just before the PPA was implemented (Vanguard, 2007).

FIGURE 3
Cash allocations rise with age in 401(k)s, in line with industry best practice, but are excessively high among young IRA investors



Source: Vanguard, with IRA allocations from analysis of Vanguard IRAs at year-end 2022, and 401(k) allocation data from *How America Saves 2023* (Clark, 2023). Average cash allocations are asset weighted.

The cash-drag culprits: IRA rollovers versus direct contributions

The vast majority of IRA contributions (88% in 2020) are rollovers from DC plans, rather than direct contributions. In many circumstances, rollovers arrive in the form of cash, especially when assets move between financial institutions. It is estimated that 39% of rollovers are transferred from a 401(k) provider to a different IRA provider (Hearts & Wallets, 2023). In this process, invested assets are entirely converted to cash (i.e., liquidated), undoing the age-appropriate allocations typical in 401(k) accounts and eliminating the prospect of real long-term growth. Unless individuals voluntarily reinvest these IRA assets, they sit in cash indefinitely.

The specter of rollover cash drag affects retirement savers of all ages and balances, regardless of the cause of the rollover. For instance, older workers on the verge of retirement have by far the largest balances in their workplace savings accounts, owing to accumulated savings and compound growth over longer time periods. On average, the DC plan balances of older

workers (age 65-plus) are about 44 times larger than those held by participants under age 25: \$232,710 versus \$5,236 in 2022 (Clark, 2023). If these older workers opt to roll over to IRAs upon retirement, the six-figure balances will often default to cash.

At the opposite end of the spectrum, low-balance accounts of younger workers who leave their employer can be involuntarily transferred into IRAs (if the balance is between \$1,000 and \$7,000) or cashed out entirely (if the balance is less than \$1,000). For these workers, their employer can automatically move them out of the retirement plan.

Direct contributions are another significant, albeit much smaller, source of retirement cash. All direct contributions arrive in the form of cash,³ as required by Section 408 of the Internal Revenue Code. As with rollover contributions, direct contributions remain in cash unless the account holder actively invests them.

³ In the case of direct contributions, cash-like products such as money market funds are likely selected as defaults by the IRA provider to minimize market risk for investors. (Importantly, unlike with an employer and its 401(k), the decision by an IRA provider to select a default investment is not typically a fiduciary function.) A byproduct of selecting money market funds as defaults is that it may undermine long-term investment growth for investors who are still working. For retirees, it can prevent them from meeting spending goals during retirement.

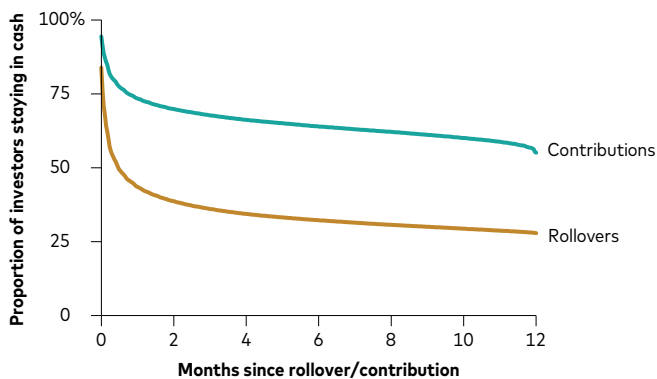
IRA cash is very "sticky"

There are many reasons to expect IRA cash to be "sticky," such as inertia (investors simply do nothing), inattention (investors are unaware of the cash), lack of financial literacy (investors mistakenly believe that money market funds are invested in the stock market), and risk aversion (investors fear losing money). According to Investment Company Institute, up to 43% of small-balance rollovers remain fully invested in cash for at least eight years (Holden and Bass, 2018). Building on this insight, we examined how long IRA cash remained uninvested for rollovers and direct contributions to Vanguard IRAs in 2022.⁴

IRA cash trap: 55% of direct contribution investors and 28% of rollover investors stayed in cash for at least 12 months.

Our analysis lent additional credence to the concept of IRA cash stickiness: 55% of direct contribution investors and 28% of rollover investors stayed in cash for at least 12 months, with minimal changes after the first three months following the contribution (see **Figure 4**).

FIGURE 4
IRA cash from direct contributions and rollovers is "sticky" for months



Notes: We considered direct contributions and rollovers that entered the account in cash. To minimize the number of cases where a second direct contribution occurred during the one-year period of study, we restricted our analysis of direct contributions to those of exactly \$6,000 (the annual contribution limit in 2022). We also only considered clients who had a positive IRA balance at the end of 2023. The resulting sample size represented roughly 279,000 direct contributions and 290,000 rollovers.

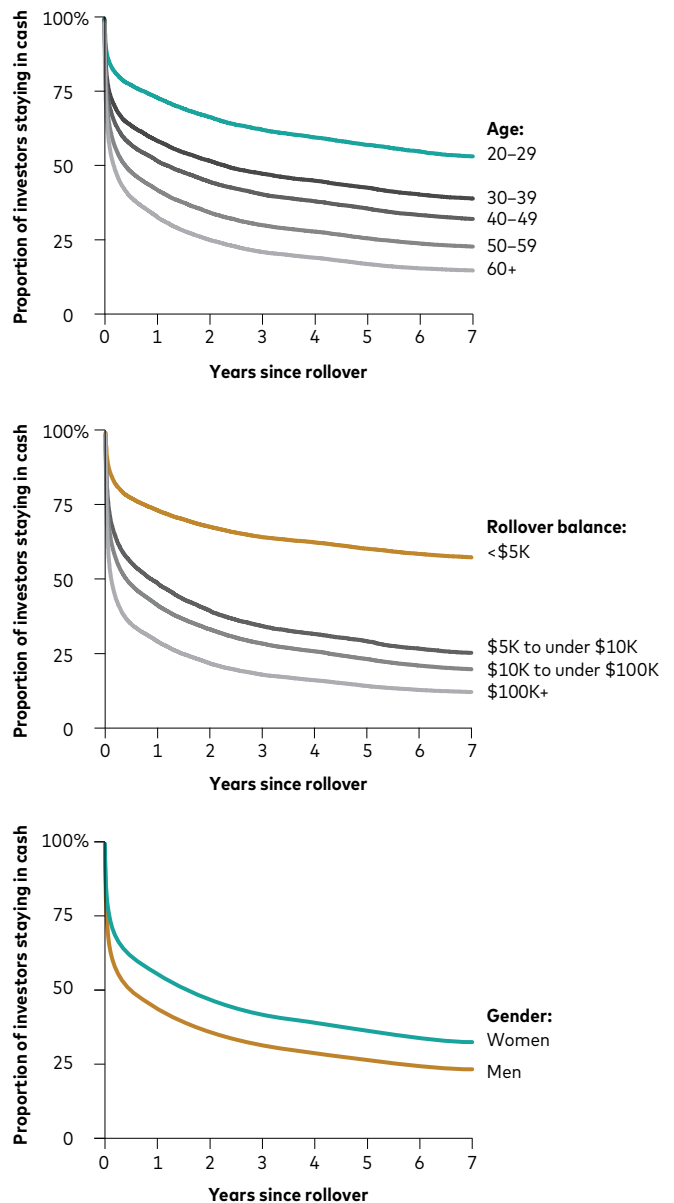
Source: Vanguard analysis of rollover and direct contributions in 2022.

⁴ We considered all rollovers of at least \$1,000 that entered the IRA in cash. For direct contributions, we only considered those of exactly \$6,000 (the annual IRA contribution limit in 2022). This minimized the number of cases where the one-year post-transaction period in which we tracked trading activity included another contribution to the same IRA.

To investigate the limits and contours of this “stickiness,” we tracked 401(k)-to-IRA rollovers completed in 2015 over the following seven-year period. Across all rollovers, the median time between rollover and investing was nine months, with 28% of rollovers that transferred in cash remaining uninvested for at least seven years. This pattern varied systematically by age, gender, and assets, as shown in **Figure 5**: Younger investors (ages 20–29) and those with smaller balances (under \$5,000) remained in cash for a median time period of seven years. By contrast, most older investors and/or those with balances exceeding \$100,000 moved out of cash within the first few months after the rollover. Compared to men, women were significantly more likely to remain in cash for years after the rollover.

Taken together, our findings demonstrate that the IRA cash “default” is very sticky, and a substantial proportion of IRA investors, especially younger, less affluent, and female ones, fail to invest any of their rollover contributions for at least seven years. Policy interventions to enable a better default may offer considerable benefits to all investors, regardless of age or assets.

FIGURE 5
IRA cash is especially “sticky” among younger, lower-balance, and female investors



Notes: We considered rollovers in 2015 that were at least \$1,000 and entered the account in cash. We also restricted our analysis to clients who had a positive IRA balance at the end of 2022. The resulting sample size represented roughly 68,000 rollovers for the age and assets analyses, and roughly 67,000 for the gender analysis (with 41% of those involving women). We tracked subsequent trading activity in the IRA for seven years following the rollover and plotted, at each point during this seven-year period, the share of clients who had not yet conducted a single trade in the IRA.

Source: Vanguard analysis of rollovers to IRAs initiated in 2015 and tracked until year-end 2022.

Our recommendation: An IRA QDIA

We recommend enabling QDIAs in IRAs as the most effective tool for mitigating IRA cash drag and improving investor outcomes. As with 401(k) QDIAs, IRA QDIAs could take one of several forms, the most common of which is a TDF. TDFs or life-cycle funds incorporate a diversified mix of stocks and bonds (and sometimes annuities) that automatically rebalances and becomes more conservative over the investor's life span.⁵

Nearly all 401(k) plan sponsors (98% of plans; Clark, 2023) and the majority of state auto-IRA programs (Georgetown University Center for Retirement Initiatives, 2023b) that designate a QDIA choose TDFs—and for good reason. These funds offer a broadly diversified and professionally managed asset mix that automatically rebalances and manages risk across the investor's life span. TDFs provide a low-cost way to achieve a complete, balanced portfolio without requiring specialized knowledge, skill, or effort.

An IRA QDIA would reconcile a contradiction between the separate rules that govern DC plans versus IRAs: Cash is generally *prohibited* as a default allocation for 401(k) contributions but *permitted* to be the default allocation for IRA contributions.

The upside of enabling an IRA QDIA is that all contributions—both rollover and direct—would be automatically invested in age-appropriate portfolios for retirement savers and meet the fiduciary standard. Although the Internal Revenue Code (Section 408) currently requires that direct contributions to IRAs are made in the form of cash,⁶ it does not explicitly prohibit nor permit automatic reinvestment into other investments. From a policy perspective, implementing an IRA QDIA today may involve offering IRA providers safe-harbor relief from fiduciary liability and permitting transactions that are at risk of being deemed “self-dealing” and thus prohibited. Accordingly, it would be important to ensure that appropriate oversight and protections are in place to prevent investors from being exposed to high-cost default investment products.

As noted earlier, the Internal Revenue Code, IRA provider practices, and transfers between financial institutions already render cash as a de facto QDIA. Cash not only undermines the long-term best interests of investors, but is explicitly proscribed as a default in 401(k) plans. The PPA states that funds without equity exposure “cannot qualify as a QDIA” (U.S. Department of Labor, 2008). An IRA QDIA would reconcile a contradiction between the separate rules that govern DC plans versus IRAs: Cash is generally *prohibited* as a default allocation for 401(k) contributions but *permitted* to be the default allocation for IRA contributions.

⁵ The PPA allows for other QDIAs, including balanced funds, which maintain a steady mix of stocks and bonds across time through automatic rebalancing; and professionally managed accounts, which offer a mix of investments tailored to investors' personal situations and preferences, including time horizon and risk aversion.

⁶ Rollover contributions are specifically excluded from this requirement, which allows (but does not require) them to transfer in kind.

How much would IRA investors benefit from a QDIA?

To assess the long-term benefits of an IRA QDIA, we quantify the gains from a single rollover. This is a conservative estimate that does not take into account the potential impacts of reducing the cash drag from multiple rollovers or from annual direct contributions.⁷ We estimate the welfare benefits of defaulting to and staying in cash for a specified duration after a rollover—the “status quo” scenario—versus staying continuously invested in a TDF (the most common default in 401(k) plans) throughout a rollover—the “IRA QDIA” scenario.⁸

We estimate the welfare benefit as the equivalent one-time increase to retirement wealth at age 65 that would make the investor

indifferent between the status quo scenario and the IRA QDIA scenario, based on certainty fee equivalents (CFEs).⁹

As shown in **Figure 6**, the IRA QDIA scenario offers significant long-term utility to investors relative to staying in cash. Across four different rollover ages representing early-, mid-, and late-career job changes, the cumulative benefit consistently exceeds \$60,000 and typically exceeds \$100,000 in terms of welfare gain in retirement. The estimated benefits vary somewhat by age at rollover, which reflects the confluence of two factors: Employees age 45 and older have larger balances, which increase costs, but they tend to stay in cash for far shorter time periods than employees ages 25–34, which attenuates cash drag.

FIGURE 6

An IRA QDIA could generate more than \$100,000 in additional retirement savings across most investor age groups

Rollover age	Median income	Median cash duration	Estimated benefit at age 65
25	\$62,000	7 years	\$130,182
35	\$80,000	2 years	\$164,406
45	\$83,000	1 year	\$163,189
55	\$97,000	5 months	\$66,837

Notes: We considered a single investor who begins working at age 22, retires at age 65, has an income of \$62,000 at age 25, and experiences annual income growth of inflation plus 1.5%. Median income was derived from the 2022 Survey of Consumer Finances data (Board of Governors of the Federal Reserve System, 2023) among individuals in the labor force who had DC accounts and IRA or Keough accounts with positive balances. We calculated medians for ages within three years of the rollover age (e.g., 22–28 for age 25). Cash durations were derived from medians observed for each age group, as discussed in this white paper. Projected returns for TDF versus cash are derived from the Vanguard Capital Markets Model® (VCMM).

Source: Vanguard, with the estimated benefit derived from the Vanguard Financial Advice Model (VFAM), a utility-based life-cycle investing model that allows us to evaluate the welfare effects of advice interventions. The VFAM incorporates market and inflation predictions from the VCMM. For additional details on the VFAM and VCMM, see Appendix 1 and Appendix 2, respectively.

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of November 30, 2023. Results from the model may vary with each use and over time. For more information, see Appendix 2.

- 7 We focus on rollovers for two reasons: First, rollovers constitute a much larger source of IRA contributions. Second, they are easier to model than direct contributions because they are one-off, discrete transfers rather than recurring, as direct contributions tend to be.
- 8 We simulated outcomes for rollover investors using the VFAM, which quantifies the value of competing financial planning strategies using life-cycle modeling and expected utility (Padmawar et al., 2022). For all scenarios, we considered a single investor who begins working at age 22, retires at age 65, has an income of \$62,000 at age 25, and experiences annual income growth of inflation plus 1.5%. In reality, we would expect IRA rollovers to trigger small changes in asset allocation as an investor moves from one QDIA to another and holds different specific securities. We made the simplifying assumption that the investor would nonetheless move from one age-appropriate asset allocation to another, and characterized the switch as staying continuously invested in a TDF.
- 9 CFEs translate the improvements in a participant's consumption, wealth, and portfolio stability into units of returns.

To put these utility estimates in context, \$130,000 equates to more than two years of retirement expenses for the average American household (\$54,975 per year; U.S. Bureau of Labor Statistics, 2023). By the same logic, \$164,000 would cover nearly three years' worth of retirement expenses. In other words, changing the default from cash to a TDF for IRA contributions would likely enable millions of Americans to live more comfortably in retirement, have greater protection against longevity risk, and/or retire earlier.

What is the aggregate benefit of enabling an IRA QDIA?

To estimate the aggregate benefit of the proposed solution, we combined the welfare estimates from Figure 6 with national rollover statistics published by the IRS.¹⁰ Specifically, the IRS reports the number of rollovers occurring annually for each of the four age groups (20–29, 30–39, 40–49, and 50–59) that our model simulations represent. We (conservatively) assumed that only external rollovers create cash drag, and that the aggregate external rollover rate of 39% (Hearts & Wallets, 2023) is the same for each age group. The aggregate welfare benefit for a given age group g is thus $(39\% * R_g * B_g)$, where R_g is the number of annual rollovers for age group g and B_g is the welfare estimate reported for age group g in Figure 6. Performing this calculation for each of the four

age groups and summing the results, we estimated an aggregate annual benefit to investors of **\$172 billion**.

Our estimate is conservative in several ways: First, we projected benefits only for external rollovers (i.e., from one institution to another). Internal rollovers, which constitute 61% of rollovers (Hearts & Wallets, 2023), and direct contributions are not reflected. The true net benefit of an IRA QDIA is likely to be higher because all direct contributions and many internal rollovers are made in cash rather than in kind. Second, we estimated benefits for only a single rollover event. Given that the average worker changes jobs once every three years in their 20s and 30s alone (U.S. Census Bureau, 2023), and roughly one in six DC plan participants completes a rollover after their participation ends (Clark, 2023), retirement savers are likely to experience several rollovers across their careers. Despite these conservative adjustments, the marginal utility of the proposed solution remains considerable.

Changing the default from cash to a TDF for IRA contributions would likely enable millions of Americans to live more comfortably in retirement, have greater protection against longevity risk, and/or retire earlier.

¹⁰ We used the "SOI Tax Stats - Accumulation and Distribution of Individual Retirement Arrangements" (IRS, 2023), with figures from the most recent year for which these statistics are available (2020).

When is cash appropriate for an IRA?

Although defaulting IRA contributions to TDFs instead of cash can offer a clear benefit, cash still holds utility for IRA investors. From a portfolio-construction perspective, the need for cash depends on three key dimensions of the investor's individual circumstances: risk tolerance, investment horizon, and funding level (Aliaga-Díaz et al., 2024). All else being equal, investors with less risk tolerance (versus more), shorter time horizons (versus longer), and overfunded goals (versus underfunded) are more likely to benefit from holding cash.

Lower risk tolerance enhances the benefits of cash because it renders portfolios more conservative and less volatile, aligning the risk-reward trade-off with investors' subjective preferences. Shorter time horizons reduce the opportunity cost of cash versus equities or bonds because they constrain investors' ability to capture risk premia. For instance, equities outperform cash over almost all 10-year time periods, but they underperform cash in one-year

"down market" timeframes, which tend to occur once every three to four years, on average. Lastly, investors who have already exceeded or "overfunded" their financial goals can maximize their probability of success by allocating entirely to cash, as any other asset allocation engenders risk of loss.

In the context of IRA investors, these principles imply that cash is relatively more appropriate for those who are risk-averse, already retired (i.e., in the decumulation phase), and have high accumulated balances. By contrast, cash is not likely to be recommended for risk-tolerant, younger investors (i.e., early accumulators) with less savings—coincidentally, the same group that stands to benefit most from an IRA QDIA. These results suggest potential value from a "smart default" approach to an IRA QDIA: For instance, selecting TDF defaults for younger workers versus maintaining cash defaults for older retirees. Future research could explore the welfare benefits of such a policy compared to a "universal default," such as TDFs for all.

To improve retirement outcomes, stop the flow of IRA cash drag at its source

IRA cash drag is a widespread, enduring, and costly problem—but it is not insurmountable. Defaulting contributions to TDFs will give people a better chance of retirement success by default: Our analysis indicates that enabling an IRA QDIA could generate over \$170 billion in additional retirement wealth for American workers each year from rollovers alone. It is time to bring the benefits of optimal retirement plan design into the IRA realm so that all retirement savers can enjoy a default that works in their favor, regardless of their knowledge, motivation, or engagement.

Changing the IRA contribution default to a TDF could confer benefits across the diverse spectrum of retirement savers and particularly support vulnerable populations. Our analysis indicates that younger investors, women, and those with lower balances are especially at risk of staying in cash following a rollover, suggesting elevated

levels of inertia. Defaulting younger IRA investors into an age-appropriate investment such as a TDF would likely render inertia a benefit rather than a hindrance to long-term outcomes. Similar patterns are evident in 401(k) plan design, where the effects of automatic enrollment (opt-out default) are especially pronounced for younger, lower-paid employees, who would otherwise participate, save, and invest at suboptimal rates (Clark and Young, 2021).

Given the increasing prevalence of automatic enrollment (from 10% of plans in 2006 to 58% in 2022; Clark, 2023) and TDF defaults, future generations of employees entering the workforce will increasingly benefit from automatic investing. But without structural change, they will be at increased risk of becoming "uninvested" when leaving their employer. Optimizing the default for IRA contributions today could generate compound benefits well into the future, putting millions of Americans on a better path to retirement.

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Appendix 1. The Vanguard Financial Advice Model

The Vanguard Financial Advice Model (VFAM) is designed to exhaustively simulate combinations of financial planning strategies over a life cycle of potential market and economic forecasts to assess how each strategy would perform. All projections presented are evaluated in inflation-adjusted dollars. Market and inflation expectations are utilized from the Vanguard Capital Markets Model (VCMM). See Appendix 2 for additional information on the VCMM.

2023 marginal tax and capital gains rates and breakpoints, as well as Medicare surcharge amounts and breakpoints, are assumed to continue, adjusted for inflation.

Capital gains are assumed to be realized in order from the highest basis lots to the lowest basis (FIFO).

Gross income and all expenses assumed to grow at the modeled rate of inflation.

Appendix 2. The Vanguard Capital Markets Model

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time. VCMM results presented are as of November 30, 2023.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns

captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based. Our simulations of market returns assume investors invest 60% of their equity sub-asset allocation to U.S. equities and 40% to non-U.S. equities. For bonds, our simulations assume sub-asset allocations of 70% to U.S. bonds and 30% to non-U.S. bonds.

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the VCMM is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta).

At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several simulation horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

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Investments in target-date funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the work force. The fund will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in target-date funds is not guaranteed at any time, including on or after the target date.

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ISGQDIA 072024