Investor Behavior Research

Saving and Investing in 529s

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Vanguard

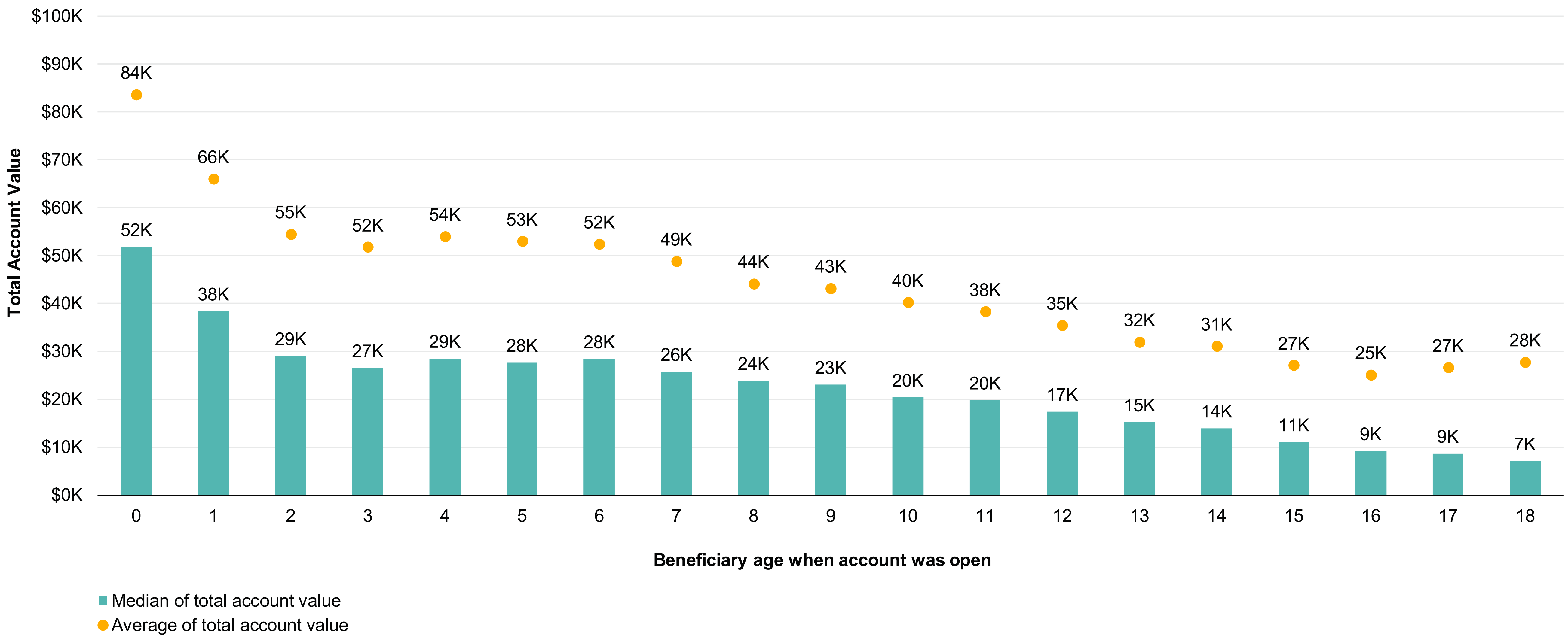
Overview

Summary Statistics	Market	Vanguard Study
Number of State Plans reviewed	—	10
Number of Beneficiary Accounts	16 million	1.9 million
Total Assets	$411 billion	$56 billion

	Median Values	Average Values
Account owner Age	48	51
Beneficiary Age	12	13
Length of account ownership (years)	6	7
Account balance	$11,600	$30,000

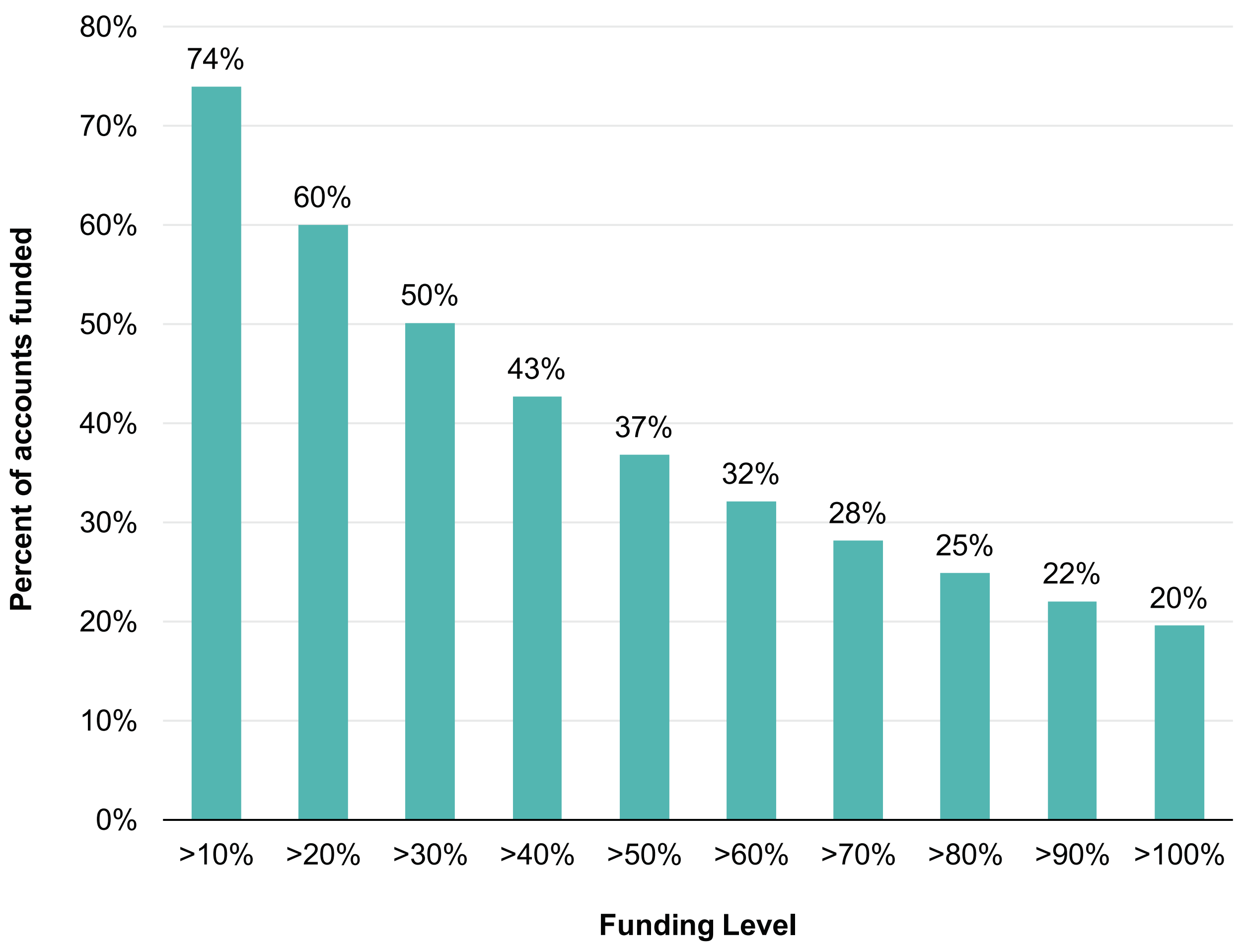
Note: Plans included in this study— The Vanguard Plan, Arkansas, Hawaii, Idaho, Iowa, Missouri, North Dakota, Ohio, Pennsylvania, and Colorado.
Source: College Savings Plan Network.
Vanguard calculations, using data from Ascensus as of 12/31/2022.

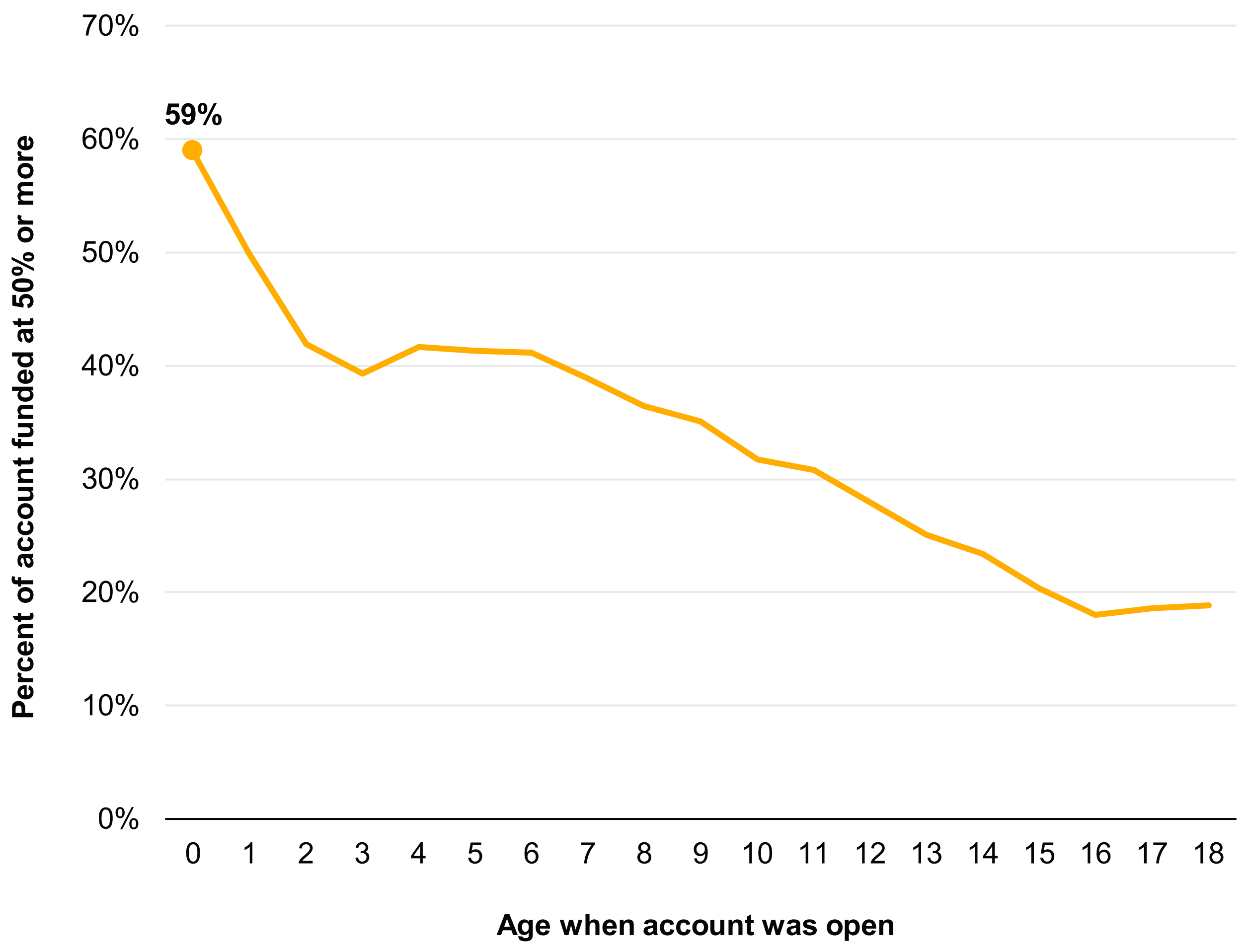
Account Value as Beneficiaries Enter College



Beneficiaries aged 17 &18 used as a proxy for those entering college.
Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Percent of funded accounts for beneficiaries entering college





Funding level is calculated for beneficiaries entering college (17- & 18-year-olds) by taking their total account balance and dividing by the cost of college. The cost of college is the average net cost of attendance reported in the College Board Trends in College Pricing and Student Aid 2022 report ($19,250) multiplied by 4 years. Percent of funded accounts include all accounts funded up to and including that level (50% funded includes everyone funded at 50% or more).
Source: Vanguard calculations, using data from Ascensus and collegeboard.org as of 12/31/2022.

Contribution Statistics

Contributor Types:

- **Automatic contributors:** rely exclusively on one or both available automatic investment options: recurring contributions or payroll deductions
- **Manual contributors:** rely exclusively on ad hoc contributions and/or gift contributions
- **Mixed Contributors:** combine these two approaches and boost their savings with an ad hoc contribution in addition to recurring contributions

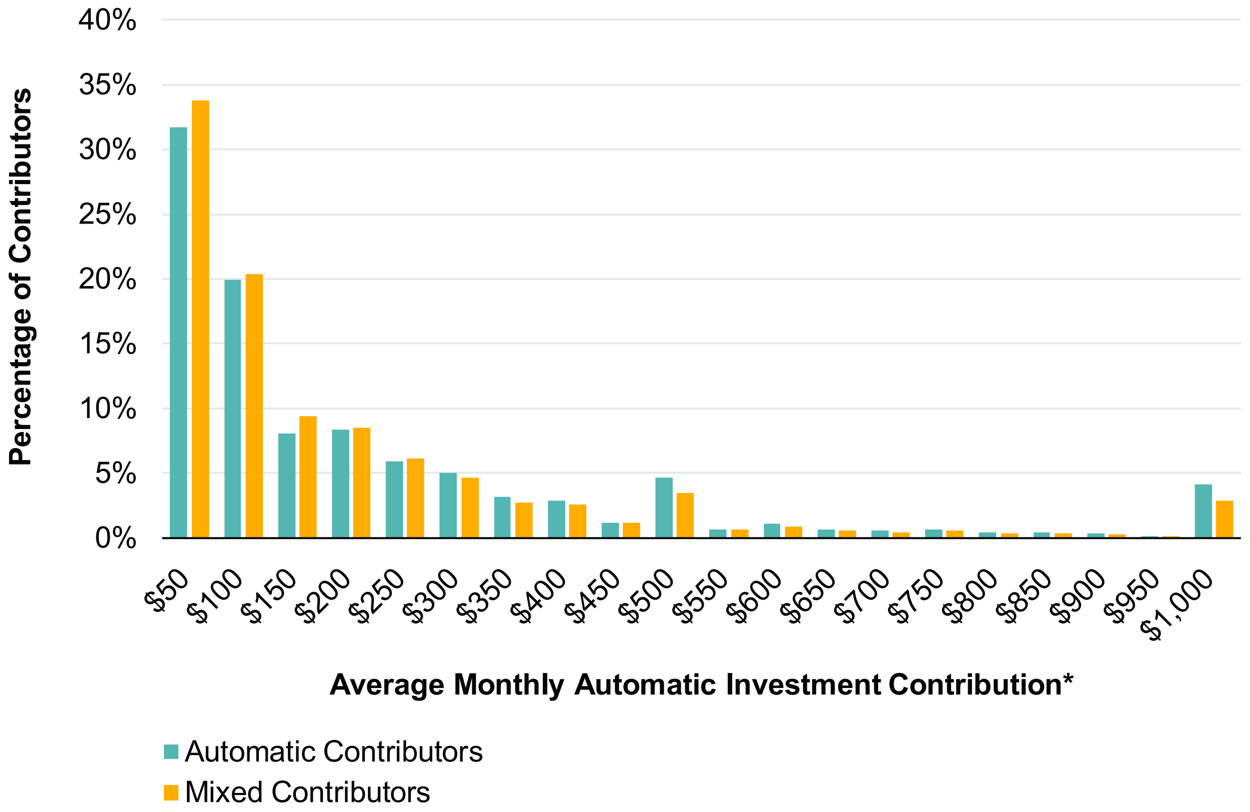
	0-4	5-8	9-12	13-16	17+
Median Account balance	$4,800	$9,900	$14,200	$19,500	$14,300
Proportion contributing	84%	73%	67%	60%	37%
Median annual contribution (contributing accts)	$2,000	$1,900	$2,000	$2,300	$2,500

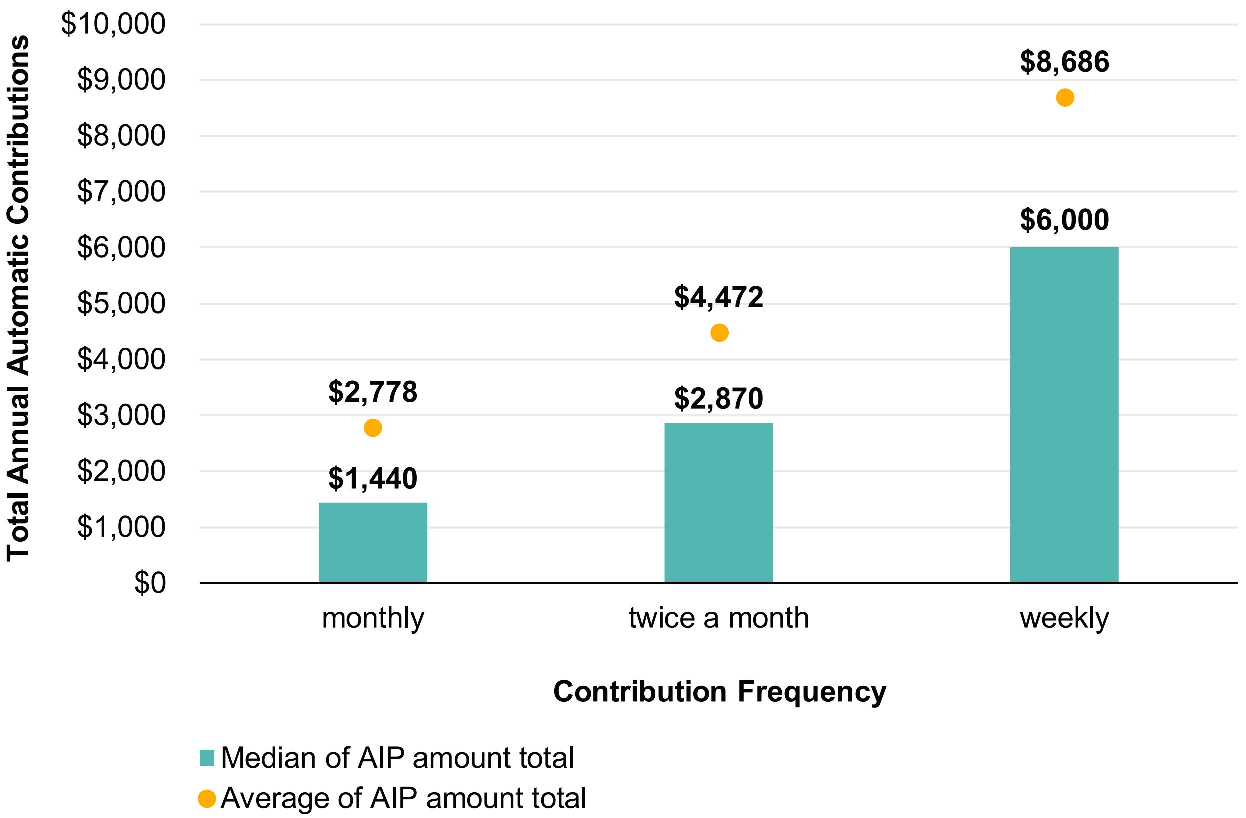
			Median		
	Proportion of accounts	Contributing accounts	Account balance	Number of Contributions	Annual contribution (contributing accts)
Automatic Contributors	27%	44%	$12,001	12	$1,300
Manual Contributors	23%	38%	$11,853	1	$3,000
Mixed Contributors	11%	18%	$12,587	13	$3,200
Non-Contributors	40%	—	$10,754	0	—

Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Automatic Investment Plans

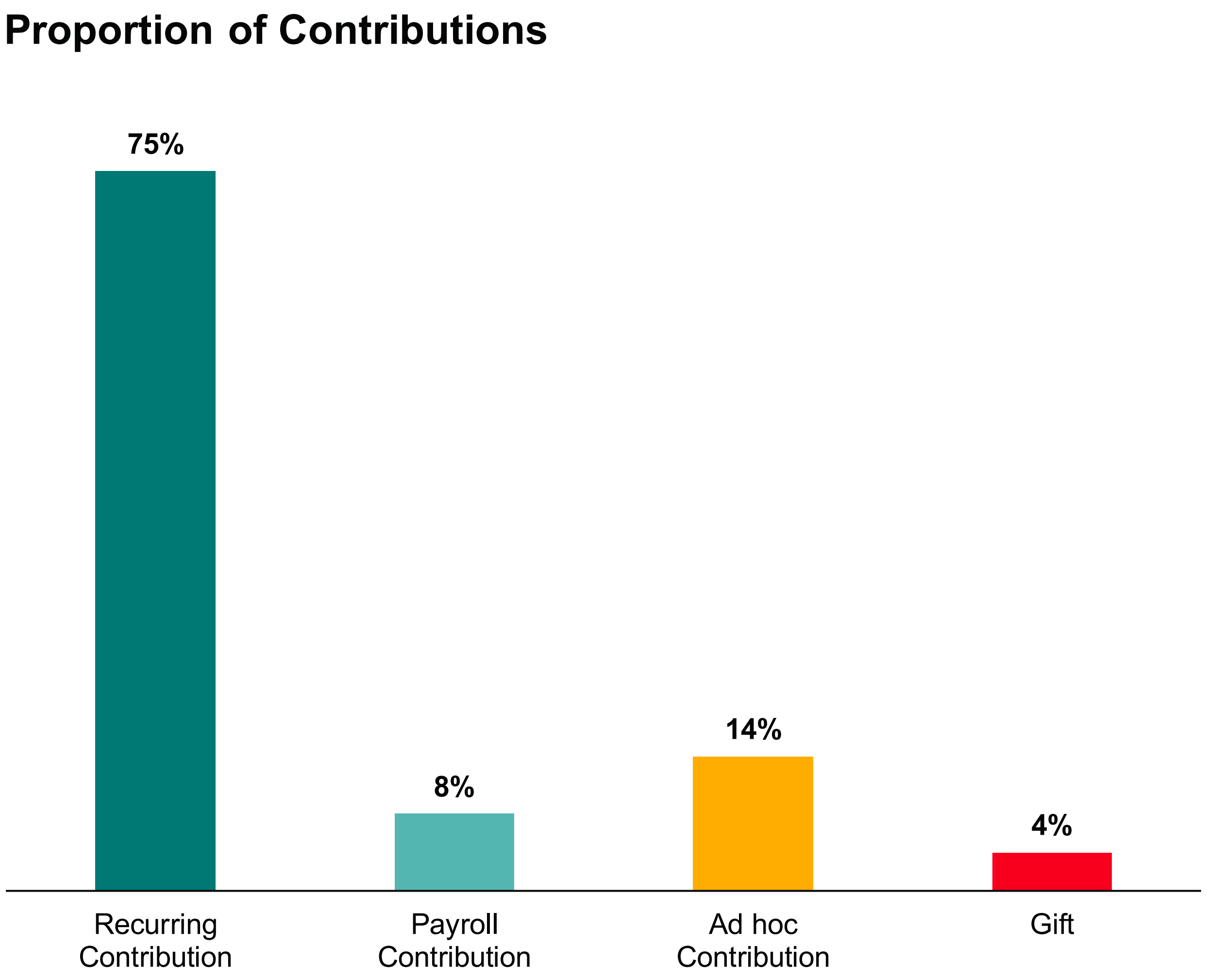
- At the median, automatic only investors invest $1,300 annually though automatic investment plans
- At the median, mixed investors invest $1,200 annually though automatic investment plans
- 75% of automatic investments occur monthly

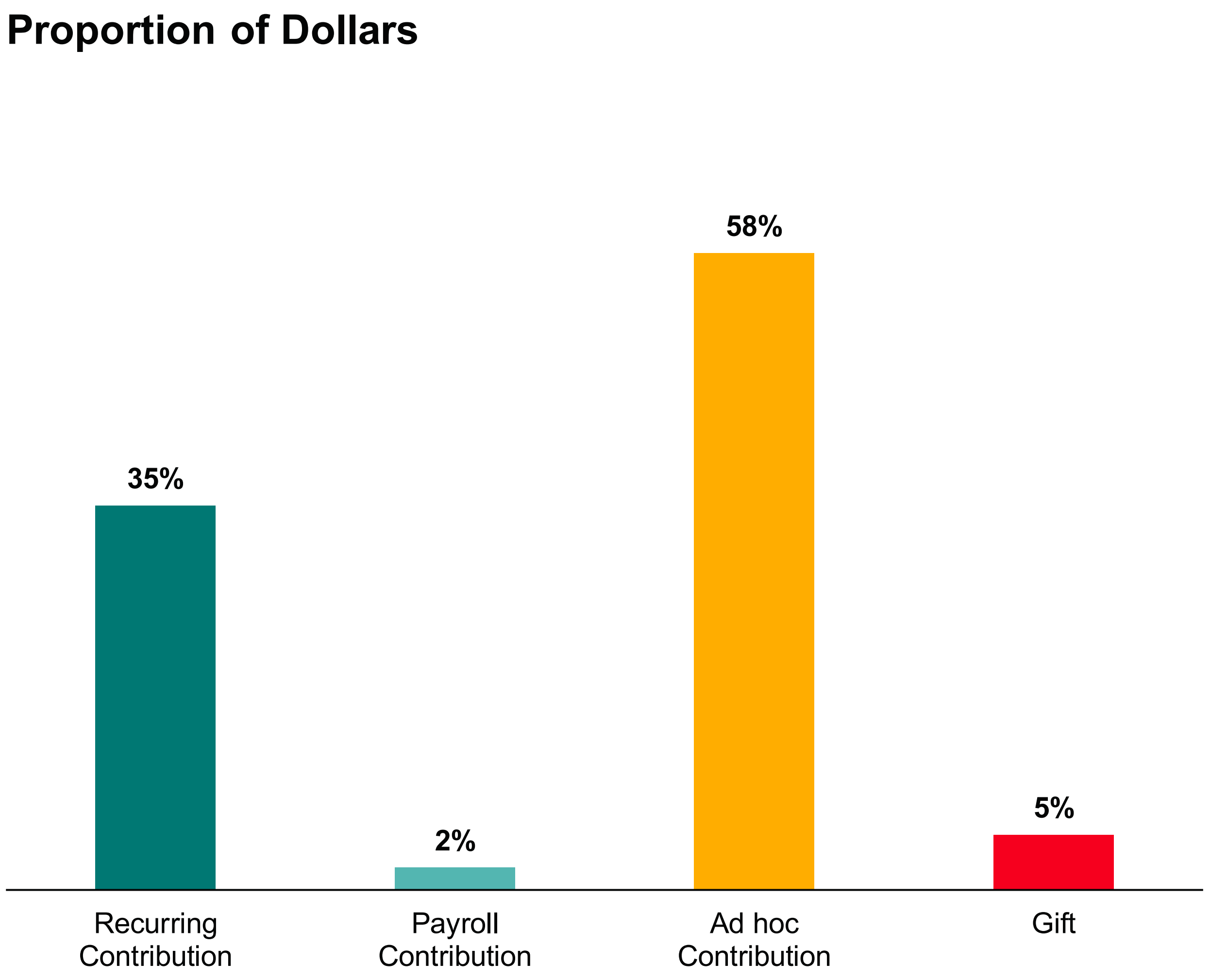




Note: Monthly contributions are calculated by taking the total amount invested through automatic contribution plans and dividing by 12. Contributions were then rounded to the nearest $50 with all contributions less than $50 being rounded up.
Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Contribution Methods





Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

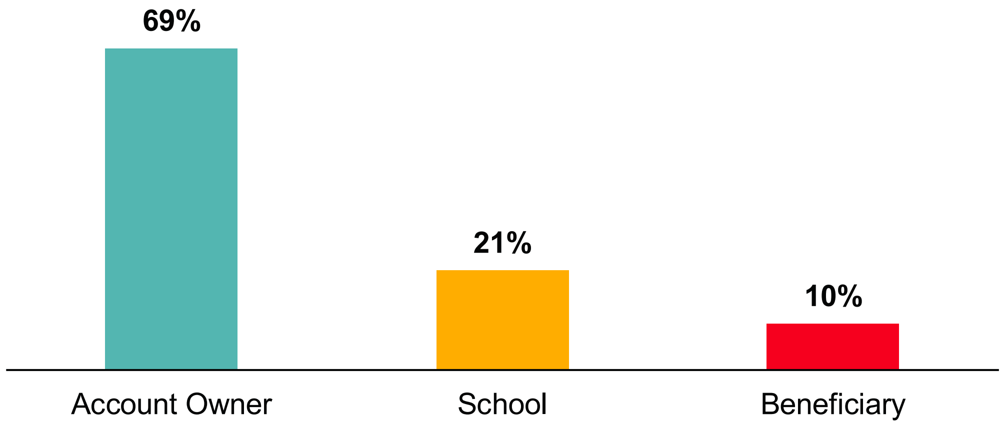
Withdrawals

	All accounts	
	Withdrawing accounts	**Non-withdrawing accounts**
Proportion of accounts	12%	88%
Withdrawal rate	6%	—
Proportion qualified withdrawals	98%	—

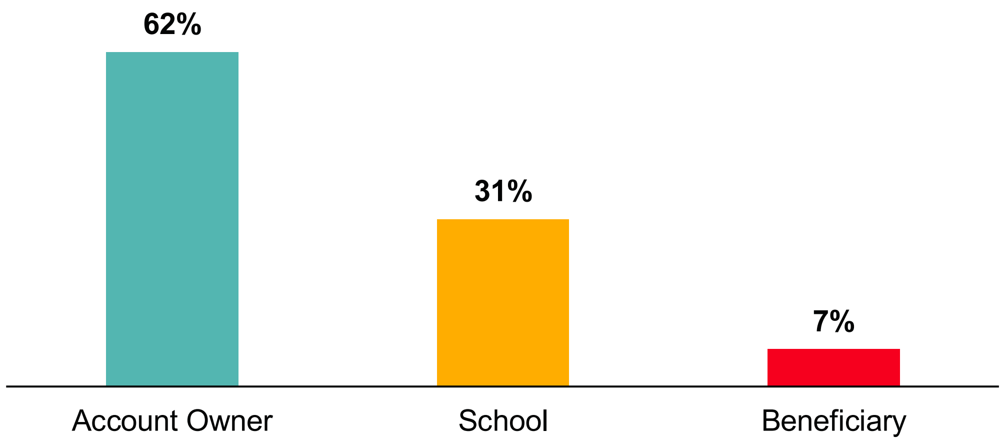
	All accounts	
Median Values:	**Withdrawing accounts**	**Non-withdrawing accounts**
Account Owner age	54	47
Beneficiary Age	20	11
Length of account ownership (years)	9	5
Account balance	$18,400	$11,000
Withdrawal amount	$10,000	—

Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Withdrawal Destination



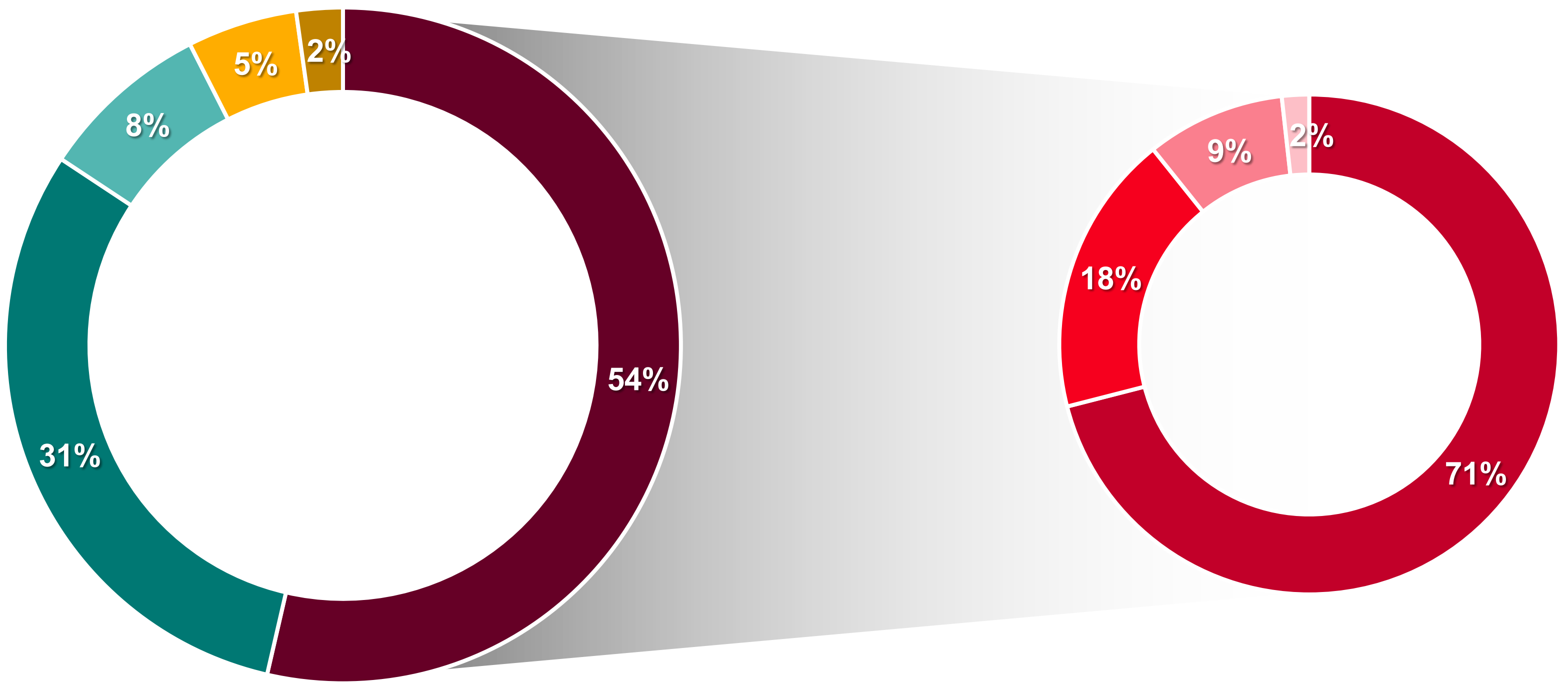
Withdrawal Amount



Asset Allocation

Key Statistics:

- Glide Path participation ranges from 44%-67%



54%	$29.6B	Glide Path Portfolio		21%	$21.0 B	Vanguard Target Enrollment Portfolios
31%	$17.2B	Stock Portfolio		18%	$5.4B	Aggressive Age-Based Portfolios
8%	$5.0B	Balanced Portfolio		9%	$2.7B	Moderate Age-Based Portfolios
5%	$2.9B	Short-Term Investments Portfolio		2%	$0.5B	Conservative Age-Based Portfolios
2%	$1.2B	Bond Portfolio				

Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Characteristics by investment style

Investor Types:

- **Pure glide path investors:** hold 100% of their assets invested in glide path portfolios
- **Self-directed investors:** choose their asset allocation and hold 0% of their assets in glide path portfolios
- **Cash Investors:** hold 100% of their assets in short-term investments
- **Mixed Investors:** hold glide path portfolios with other investment option

Key Statistics:

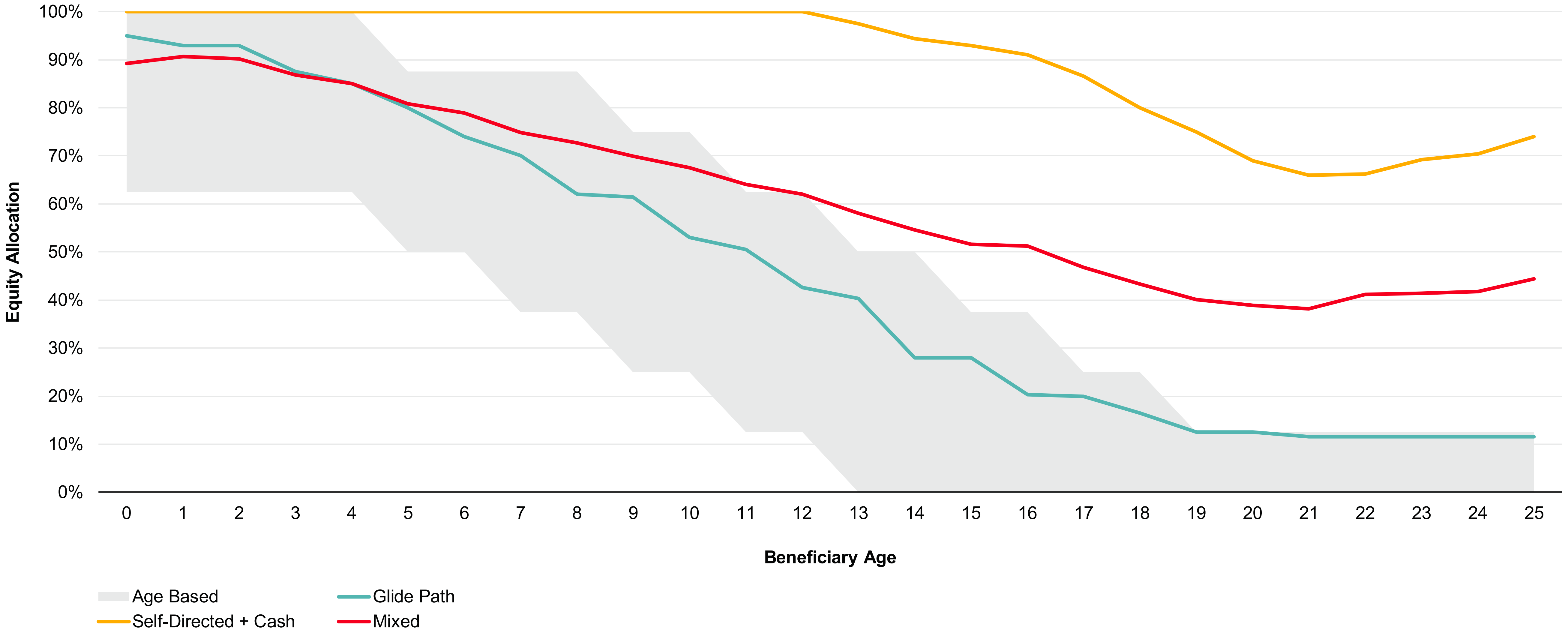
- Range of proportion of accounts for each investor type (by plan)
  - Pure Glide Path: 46%-71%
  - Self- Directed: 22%-35%
  - Mixed: 4%-14%
  - Cash: 2%-7%

	All accounts			
	Pure Glide Path	Self-Directed	Mixed	Cash
Proportion of accounts	58%	30%	9%	3%

	All accounts			
Median Values:	Pure Glide Path	Self-Directed	Mixed	Cash
Account Owner age	47	50	48	54
Beneficiary Age	11	13	13	19
Length of account ownership (years)	5	6	8	9
Account balance	$9,800	$15,800	$15,129	$5,500
Contribution (contributing accounts)	$1,800	$2,600	$2,400	$3,500
Equity allocation	53%	100%	62%	0%
Average equity allocation	51%	83%	59%	0%

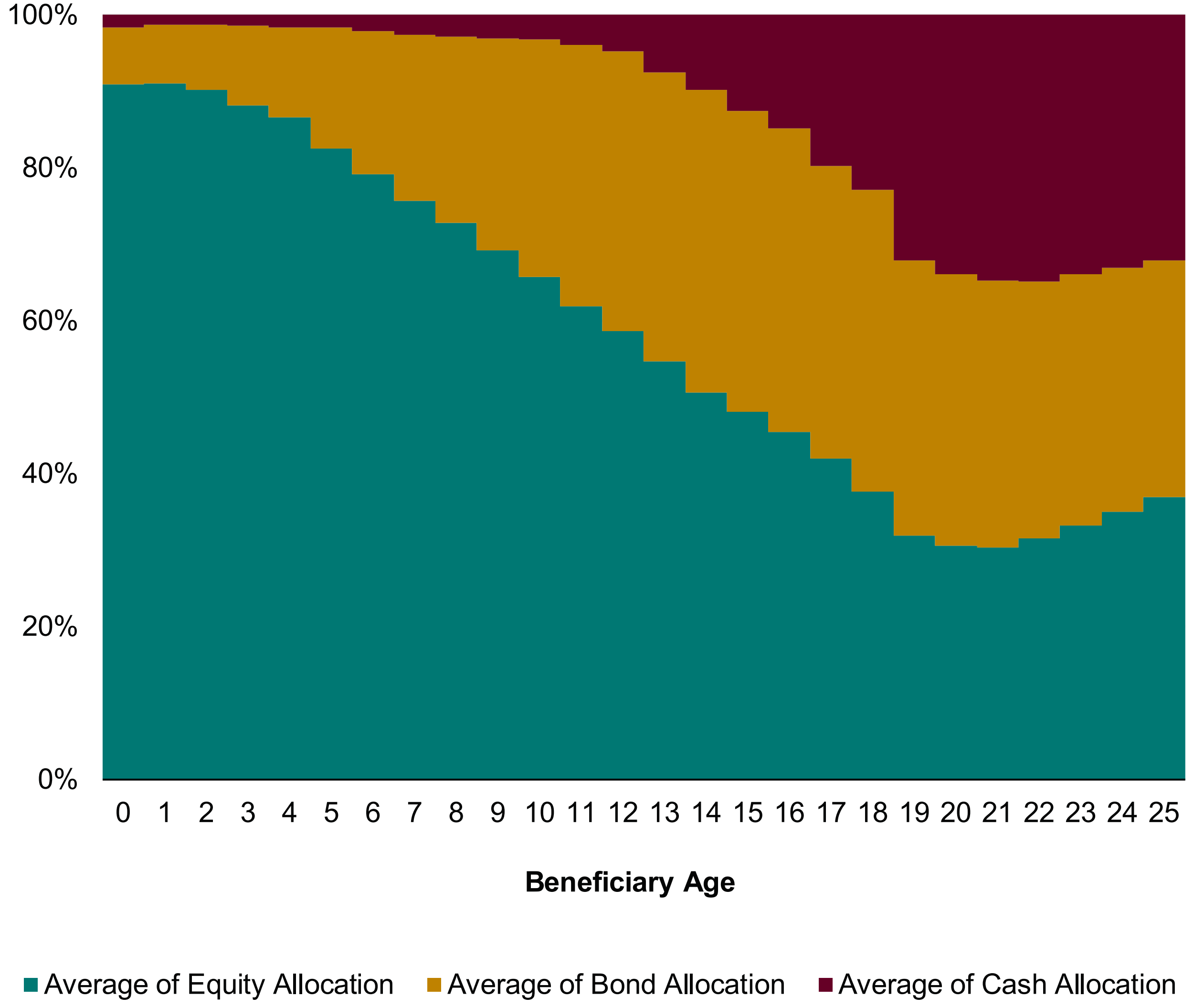
Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

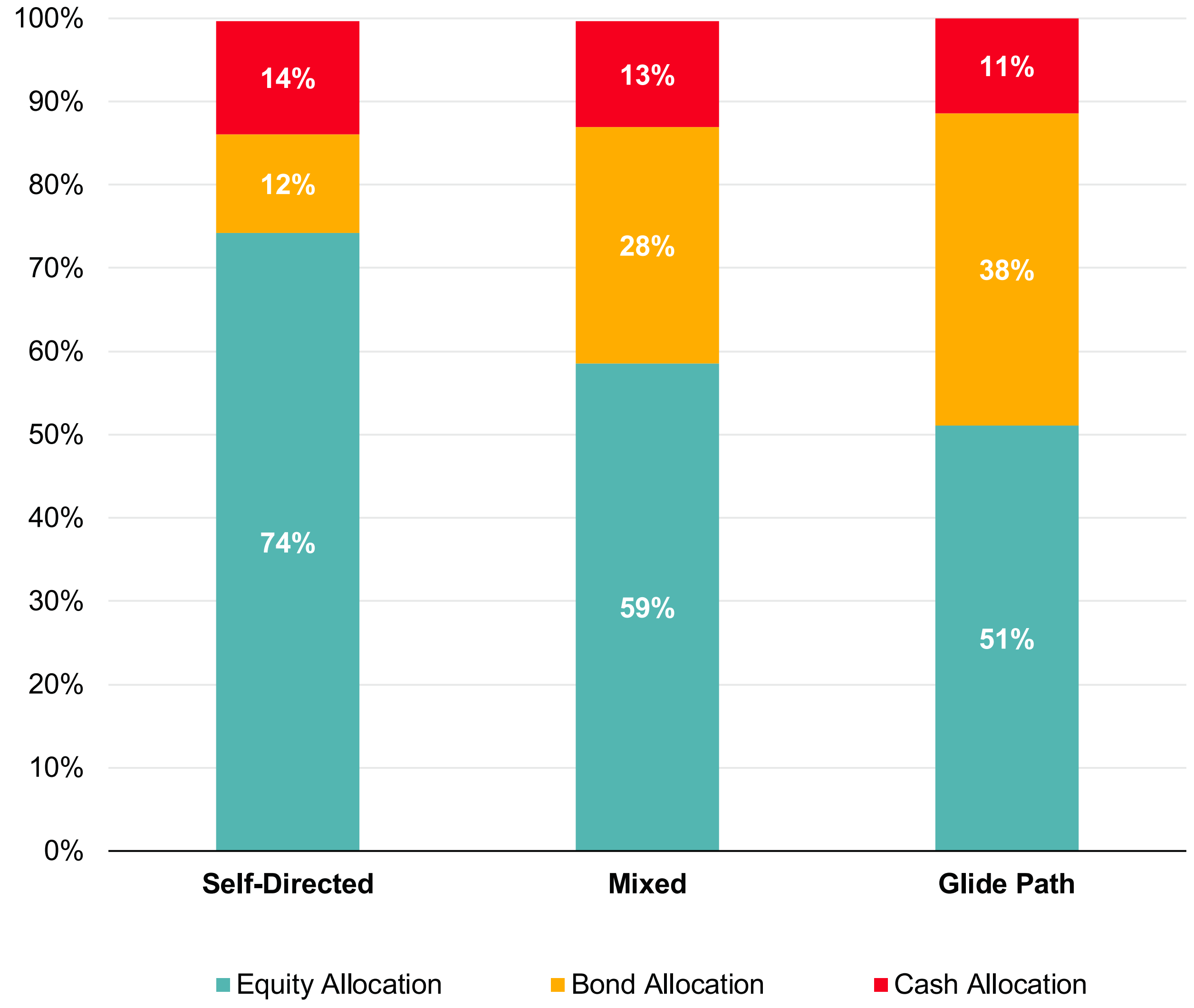
Mixed and self-directed clients demonstrate increased tolerance for market risk



Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Asset Allocation by Beneficiary Age and Investor Type





Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Trading Patterns

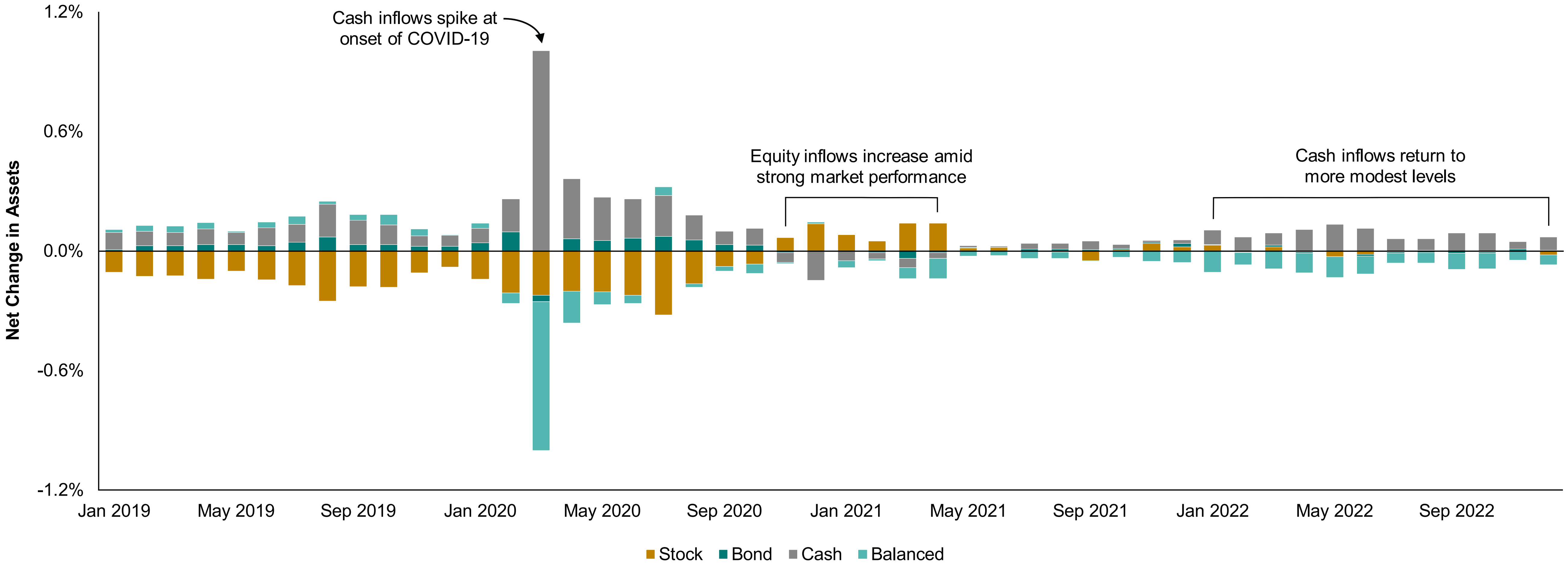
	All accounts	
	Trading accounts	Nontrading accounts
Proportion of accounts	4%	96%

Proportion of trading accounts based on investor type:	All accounts	
	Trading accounts	Nontrading accounts
Pure Glide Path Investors	17%	59%
Self-directed Investors	55%	30%
Mixed Investors	14%	9%
Cash Investors	14%	3%
Total	**100%**	**100%***

*Numbers do not sum to 100 due to rounding
Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Minimal exchange activity with patterns consistent with market stress

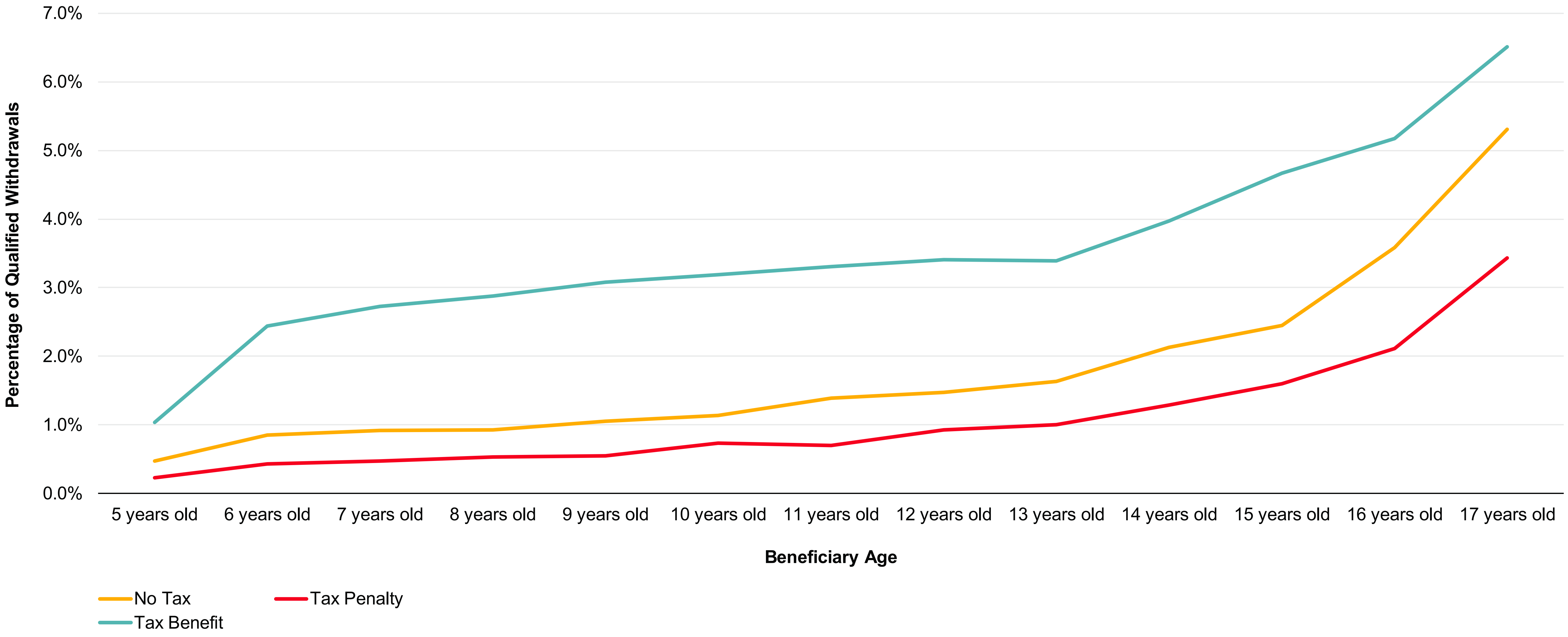
Exchange Cashflows by asset Group



Note: Chart shows monthly net cashflows for each asset type.
Sources: Vanguard calculations, using data from Ascensus, as of December 31, 2022.

K-12 Paper Preview

K-12 Withdrawals



Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Behavior Patterns of K-12 Investors

Investor Types:

- **K-12 Investor:**
  Investors with beneficiaries ages 5-16 who made one or more qualified withdrawals in 2022
- **College Saver:**
  Investors with beneficiaries ages 5-16 who did not make any qualified withdrawals in 2022, however, it is possible that these assets will be used for K-12 tuition at a future date.

	All accounts	
Median Values:	K-12 Investors	College Savers
Percent of population	2.8%	97.2%
Beneficiary Age	12	11
length of account ownership (years)	5	6
Contributions (2022)	$3,500	$2,000
Account value	$7,500	$14,000
Withdrawals (2022)	$4,300	—

	All accounts	
Average Asset Allocation	K-12 Investors	College Savers
Equity	53%	64%
Bond	31%	31%
Cash	17%	6%

Source: Vanguard calculations, using data from Ascensus as of 12/31/2022.

Disclosures

Important information

For more information about Vanguard funds, visit vanguard.com to obtain a prospectus or, if available, a summary prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read and consider it carefully before investing.

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model® (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. VCMM results will vary with each use and over time.

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 importantly, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. 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 from as early as 1960. 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 time 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.

The Vanguard Life-Cycle Model (VLCM) is designed to identify the product design that represents the best investment solution for a theoretical, representative investor who uses the target-date funds to accumulate wealth for retirement. The VLCM generates an optimal custom glide path for a participant population by assessing the trade-offs between the expected (median) wealth accumulation and the uncertainty about that wealth outcome, for thousands of potential glide paths. The VLCM does this by combining two sets of inputs: the asset class return projections from the VCMM and the average characteristics of the participant population. Along with the optimal custom glide path, the VLCM generates a wide range of portfolio metrics such as a distribution of potential wealth accumulation outcomes, risk and return distributions for the asset allocation, and probability of ruin, such as the odds of participants depleting their wealth by age 95.

The VLCM inherits the distributional forecasting framework of the VCMM and applies to it the calculation of wealth outcomes from any given portfolio. The most impactful drivers of glide path changes within the VLCM tend to be risk aversion, the presence of a defined benefit plan, retirement age, savings rate, and starting compensation. The VLCM chooses among glide paths by scoring them according to the utility function described and choosing the one with the highest score. The VLCM does not optimize the levels of spending and contribution rates. Rather, the VLCM optimizes the glide path for a given customizable level of spending, growth rate of contributions, and other plan sponsor characteristics.

A full dynamic stochastic life-cycle model, including optimization of a savings strategy and dynamic spending in retirement, is beyond the scope of this framework.

Important information

All investing is subject to risk, including the possible loss of the money you invest. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. Diversification does not ensure a profit or protect against a loss.

Investments in stocks or bonds issued by non-U.S. companies are subject to risks including country/regional risk and currency risk. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. It is possible that tax-managed funds will not meet their objective of being tax-efficient. Because company stock funds concentrate on a single stock, they are considered riskier than diversified stock funds. Investments in bonds are subject to interest rate, credit, and inflation risk. High-yield bonds generally have medium- and lower-range credit quality ratings and are therefore subject to a higher level of credit risk than bonds with higher credit quality ratings. Although the income from a municipal bond fund is exempt from federal tax, you may owe taxes on any capital gains realized through the fund's trading or through your own redemption of shares. For some investors, a portion of the fund's income may be subject to state and local taxes, as well as to the federal alternative minimum tax. While U.S. Treasury or government agency securities provide substantial protection against credit risk, they do not protect investors against price changes due to changing interest rates. Unlike stocks and bonds, U.S. Treasury bills are guaranteed as to the timely payment of principal and interest.

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Bond funds are subject to the risk that an issuer will fail to make payments on time and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments.

The Factor Funds are subject to investment style risk, which is the chance that returns from the types of stocks in which a Factor Fund invests will trail returns from U.S. stock markets. The Factor Funds are also subject to manager risk, which is the chance that poor security selection will cause a Factor Fund to underperform its relevant benchmark or other funds with a similar investment objective, and sector risk, which is the chance that significant problems will affect a particular sector in which a Factor Fund invests, or that returns from that sector will trail returns from the overall stock market.

The Short-Term Inflation-Protected Securities Index Fund invests in bonds that are backed by the full faith and credit of the federal government and whose principal is adjusted periodically based on inflation. The fund is subject to interest rate risk because although inflation-indexed bonds seek to provide inflation protection, their prices may decline when interest rates rise and vice versa. The fund's quarterly income distributions are likely to fluctuate considerably more than the income distributions of a typical bond fund. Income fluctuations associated with changes in interest rates are expected to be low; however, income fluctuations associated with changes in inflation are expected to be high. Overall, investors can expect income fluctuations to be high for the fund.

Indexes for VCMM simulations

The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes through June 30, 2022. We chose these benchmarks to provide the most complete history possible, and we apportioned the global allocations to align with Vanguard's guidance in constructing diversified portfolios. Asset classes and their representative forecast indexes are as follows:

U.S. equities: MSCI US Broad Market Index.
Global ex-U.S. equities: MSCI All Country World ex USA Index.
U.S. REITs: FTSE/NAREIT US Real Estate Index.
U.S. cash: U.S. 3-Month Treasury—constant maturity.
U.S. Treasury bonds: Bloomberg U.S. Treasury Index.
U.S. short-term Treasury bonds: Bloomberg U.S. 1–5 Year Treasury Bond Index.
U.S. long-term Treasury bonds: Bloomberg U.S. Long Treasury Bond Index.
U.S. credit bonds: Bloomberg U.S. Credit Bond Index.
U.S. short-term credit bonds: Bloomberg U.S. 1–3 Year Credit Bond Index.
U.S. high-yield corporate bonds: Bloomberg U.S. High Yield Corporate Bond Index.
U.S. bonds: Bloomberg U.S. Aggregate Bond Index.
Global ex-U.S. bonds: Bloomberg Global Aggregate ex-USD Index.
U.S. TIPS: Bloomberg U.S. Treasury Inflation Protected Securities Index.
U.S. short-term TIPS: Bloomberg U.S. 1–5 Year Treasury Inflation Protected Securities Index.
Emerging-market sovereign bonds: Bloomberg Emerging Markets USD Aggregate Bond Index.
Commodities: Bloomberg Commodity Index.
Mortgage-backed securities (MBS): Bloomberg U.S. Mortgage Backed Securities Index.
Euro area aggregate bonds: Bloomberg Euro-Aggregate Index.
U.K. aggregate bonds: Bloomberg Sterling Aggregate Index.
Global aggregate bonds: Bloomberg Global Aggregate Index.
U.S. aggregate bonds: Bloomberg U.S. Aggregate Index.
Japan aggregate bonds: Bloomberg Japanese Aggregate Index.
Australia aggregate bonds: Bloomberg Australia Aggregate Index.
Canada aggregate bonds: Bloomberg Canada Aggregate Index.
Emerging markets: MSCI Emerging Market Index.
Developed markets ex-U.S.: MSCI World ex-US Index.

All equity indexes below are weighted by market capitalization:

Small-cap equities: Stocks with a market cap in the lowest two-thirds of the Russell 3000 Index.
Large-cap equities: Stocks with a market cap in the highest two-thirds of the Russell 1000 Index.
Growth equities: Stocks with a price/book ratio in the highest one-third of the Russell 1000 Index.
Value equities: Stocks with a price/book ratio in the lowest one-third of the Russell 1000 Index.

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For more information about any 529 college savings plan, contact the plan provider to obtain a Program Description, which includes investment objectives, risks, charges, expenses, and other information; read and consider it carefully before investing. If you are not a taxpayer of the state offering the plan, consider before investing whether your or the designated beneficiary's home state offers any state tax or other benefits that are only available for investments in such state's qualified tuition program. Vanguard Marketing Corporation serves as distributor for some 529 plans.

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