

# Baby Bonds: Design principles for inclusive wealth building

## Takeaways

Policymakers are introducing, and in some cases passing, legislation to create “Baby Bonds” programs. If designed well, these programs can help children across the income spectrum begin building assets at birth and accumulate sufficient wealth to help pay for higher education or other financial needs.

We leverage Vanguard's proprietary 529 data, capital market projections, and record-keeping experience to yield four principles. In doing so, we are not advocating for a particular policy, but rather providing information that might help policymakers consider tradeoffs when designing these programs.

**1 Provide broad access—open accounts for all at birth.** Children across the income spectrum can gain from Baby Bonds programs that begin asset accumulation at birth.

**2 Target larger funding to lower-income families.** Tailoring program contributions can help maximize the impact of limited resources.

**3 Use multi-asset portfolios to offer better long-term returns.** A portfolio made up of stocks and bonds, rather than Treasury securities exclusively, could enhance the value of Baby Bonds accounts, reduce program costs, or both.

**4 Aim for low administrative costs and promote lifelong engagement.** Operate the program at scale to minimize costs. Engaging family members and the beneficiary digitally, allowing private contributions, and facilitating auto-portability can ensure that the beneficiary receives the maximum benefit from these assets.

## Baby Bonds: Empirical insights inform our four program principles

**1. Open accounts for all at birth:**

**-11%**

Decline in account balance at age 18 associated with every year of delay in 529 account opening.

**2. Target larger funding to lower-income families:**

**2.5x greater**

529 balance of typical family making more than \$100,000 per year compared with that of one making less than \$50,000 a year.

**3. Use multi-asset portfolios:**

**90%**

Portion of market simulations in which a 529-style multi-asset investment delivers higher account balances at age 18 versus investing in 4% Treasury bonds.

**4. Aim for low costs and promote lifelong engagement:**

**+5**

Percentage points by which digitally engaged workplace retirement plan enrollees' savings rates exceed those of non-digitally-engaged enrollees—a hint that engagement with a Baby Bonds account could boost its balance.

**Sources:** For principles 1 and 2: Vanguard calculations, using data from Ascensus as of December 31, 2022. Principle 3: Vanguard capital market projections, using 529 asset allocation glide path shown in Figure 6 (for more on the VCMM, see Appendix 2). Principle 4: Vanguard.

**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. Distribution of return outcomes from VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of December 31, 2022. Results from the model may vary with each use and over time. For more information on VCMM, see Appendix 2.

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## Introduction

Policymakers across a number of states and at the federal level are introducing and, in some cases passing, legislation to create Baby Bonds programs. For example, in 2021, the American Opportunity Accounts Act (AOAC) was introduced. This federal legislation would seed a savings account for every American under age 18 with a \$1,000 initial contribution with subsequent income-targeted annual contributions.

Baby Bonds programs aim to ensure that children reach adulthood with financial resources that can be used to pay for higher education, buy a home, start a business, or save for retirement. A growing body of research (Darity and Hamilton, 2010; Zewde, 2018; Mitchell and Szapiro, 2020) finds that having Baby Bonds programs in place across most of the U.S. could significantly narrow the racial wealth gaps between 18-year-olds from white families and 18-year-olds from Black and Hispanic families.

The design of these programs generates different real-world impacts, however. Some programs, such as those in Washington and Connecticut, deposit meaningful sums of money into accounts

for lower-income families (e.g., \$4,000 in Washington and \$3,200 in Connecticut for Medicaid-eligible births). The investment objective and strategy for these programs resembles that of the privately financed, state-sponsored 529 plans that many families use to save for their children's education.<sup>1</sup> Others, like the Pennsylvania Keystone Scholars and the Nevada College Kick Start programs, open accounts for all but do not ensure sufficient asset accumulation to pay for college without meaningful individual contributions.<sup>2</sup>

These plans have made different key design choices when it comes to:

- **Who.** Is the program designed for all children, or is it targeted to certain income groups?
- **What.** How much capital is allocated per child?
- **When.** Are the accounts funded only when the child is born—or on a recurring basis over time?
- **How.** How is the capital invested, with what real return expectations, and through what administrative arrangements?

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<sup>1</sup> At the end of 2019, some 13 million 529 accounts held \$346 billion in assets, and the average account balance was \$26,100 (Investment Company Institute, 2020). As long as beneficiaries spend these assets on qualified educational expenses, the assets compound tax-free.

<sup>2</sup> The Keystone Scholars program opens an account for all newborns with \$100. The Nevada College Kick Start Program opens an account for each kindergartener in public school with \$50, which parents must then claim by the end of the child's fourth-grade year.

We use 529 record-keeping data, capital market projections, and modeling capabilities to offer perspectives on a few of these design questions. In doing so, we are not advocating for a particular policy, but rather providing information that might help policymakers consider tradeoffs when designing such programs. Our analyses yield four principles to guide policy decisions and plan design.

- 1 Provide broad access—open accounts for all at birth.** Children across the income spectrum stand to gain from Baby Bonds programs that begin asset accumulation at birth.
- 2 Target larger funding to lower-income families.** Tailoring program contributions can help maximize the impact of limited resources.
- 3 Use multi-asset portfolios to offer better long-term returns.** Placing Baby Bond contributions in portfolios with equity exposure, not just exposure to long-term U.S. Treasury securities, could enhance the value of these accounts, reduce program costs, or both.
- 4 Aim for low administrative costs and promote lifelong engagement.**

**Who would benefit most from a Baby Bonds program? Insights from 529 participant behavior**

We rely on a December 2022 dataset containing demographic, portfolio, and transaction information from records of over 500,000 accounts from the Vanguard 529 College Savings Plan offered by Nevada. This plan is available to families nationally, and more than 98% of accounts are owned by a non-Nevada resident. (See **Figure 1** for summary statistics.) We analyze participant behavior by income to glean insights that could be relevant for a lower-income population served by a Baby Bonds program.<sup>3</sup> Our dataset excludes more than 9,000 account records where the beneficiary is also the account holder, as these accounts tend to be held by adult investors. Using these data, we generate four key principles to guide policy decisions and plan design.

**FIGURE 1**  
**Summary statistics—Vanguard 529 College Savings Plan offered by Nevada**

	Average	Median
Beneficiary age	11.4	11
Account owner age	50.6	48
Beneficiary age at account opening	4.8	2.7
Length of account ownership (years)	6.9	5.7
Account balance	\$50,300	\$25,500
2022 contribution (conditional on contributing)	\$4,300	\$1,000
Equity allocation	63%	74%

**Note:** Number of accounts used in dataset: 534,000. This number and the account balances and 2022 contributions shown in the table reflect rounding.  
**Sources:** Vanguard calculations, using data from Ascensus as of December 31, 2022.

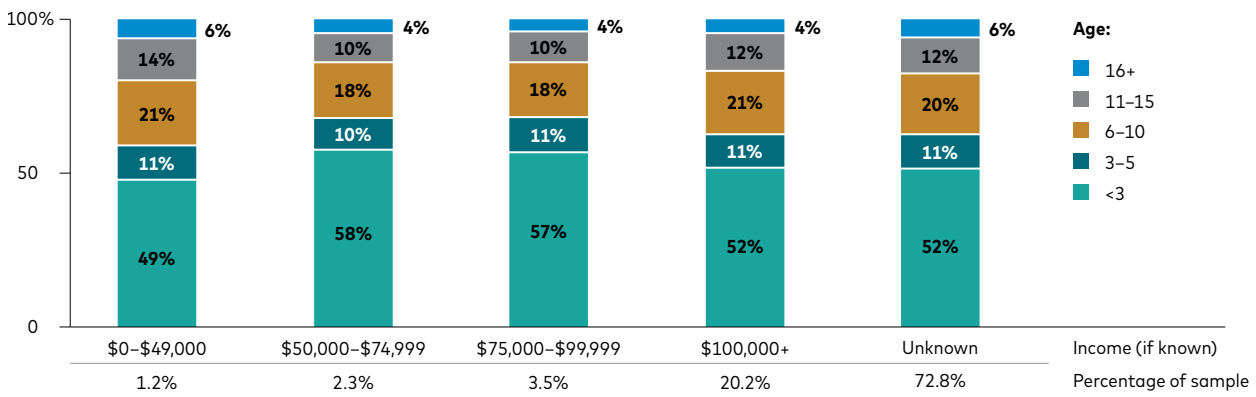
**3** Our data contains family income information for a subset of roughly 145,500 accounts, which tend to be newer accounts than those found in the overall sample. Accounts with income information have been open between 0 and 11 years, while accounts without income information have been open between 0 and 20 years.

**1 Provide broad access—open accounts for all at birth.** Children across the income spectrum stand to gain from Baby Bonds programs that begin asset accumulation at birth.

Accounts that are opened when the beneficiary is younger have more time to compound and result in higher balances at age 18. In our sample, the median age of the beneficiary at 529 account opening is 2.7 years, and the average age is 4.8 years.<sup>4</sup> As **Figure 2** shows, families who start saving earlier are not simply higher income. About half of families opened 529 accounts when the beneficiary was 3 or older, with little variation by income. Just 52% of families making over \$100,000 annually opened the account before the

beneficiary turned 3—a proportion that’s virtually identical to the 49% of families making under \$50,000 who did the same. This means that, across the income spectrum, roughly half of account beneficiaries are missing out on at least three years’ worth of compound growth before they incur their first higher education expense. A Baby Bonds-type program that begins asset accumulation at birth would nudge families to begin asset accumulation earlier, thus maximizing the beneficiary’s investment horizon.

**FIGURE 2**  
**Beneficiary ages at account opening vary little by annual family income**



Sources: Vanguard calculations, using data from Ascensus as of December 31, 2022.

<sup>4</sup> Industry data often show that 529 accounts are typically opened when the beneficiary is age 6 or 7. If our sample included beneficiaries funding their own accounts, its average beneficiary age at account opening would increase to 5.3 years.

Longer investment horizons translate into larger balances. **Figure 3a** shows the median and average balances of accounts with 17- or 18-year-old beneficiaries based on how old the beneficiary was when the account was opened.<sup>5</sup> Beneficiaries ages 17–18 whose account was opened before they were 3 have considerably higher balances than those who were 3 or older when their account was opened for them. **Figure 3b** illustrates how this translates directly into the number of years of higher education the beneficiary can pay for using 529 account funds. For example, a beneficiary whose account was opened before they were 3 could just about fully fund either a

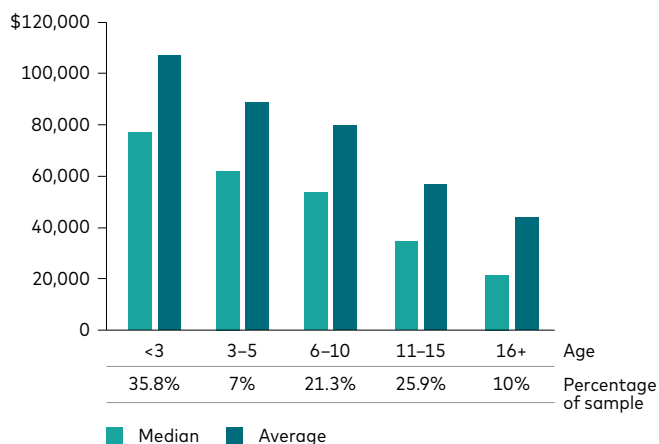
4-year in-state public college degree or 2.3 years at a 4-year nonprofit private college. In contrast, a beneficiary whose account was opened after they were 10 could barely cover a single year of a 4-year private college.<sup>6</sup>

Higher balances in longer-tenured accounts could reflect a variety of forces beyond compounding. It could be that families who open accounts earlier in the beneficiary's life have higher incomes, contribute more consistently, or allocate their assets with higher returns. Below we explore these dynamics.

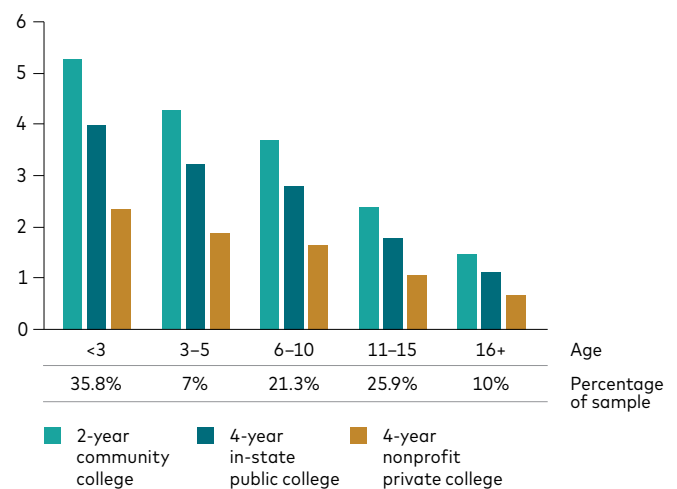
**FIGURE 3**

**529 accounts that begin asset accumulation before the beneficiary is 3 years old attain significantly larger balances**

a. 529 account balances of beneficiaries at age 17–18, by beneficiary age at account opening



b. Number of years of higher education a beneficiary can afford at age 17–18, by beneficiary age at account opening



**Notes:** Figure 3a shows the average balances of 529 accounts of beneficiaries ages 17 or 18 as of December 31, 2022. The sample is pulled from the group of more than 500,000 accounts. For more information about the dataset, see Appendix 1. Figure 3b shows the number of years of higher education a beneficiary can afford based on the median 529 account balance of account beneficiaries ages 17 or 18 and the average annual net cost of attending a two-year community college (\$14,510), a four-year in-state public college (\$19,250), or a four-year nonprofit private college (\$32,800) as determined by the College Board's Annual Survey of Colleges using student financial aid data from the National Center for Education Statistics' Integrated Postsecondary Education System (IPEDS). The College Board's Trends in College Pricing and Student Aid 2022 is available at: <https://research.collegeboard.org/media/pdf/trends-in-college-pricing-student-aid-2022.pdf>.

**Sources:** Vanguard calculations, using data from Ascensus as of December 31, 2022 (Figure 3a). Vanguard calculations, using data from Ascensus, the College Board's Trends in College Pricing and Student Aid 2022, and IPEDS as of December 31, 2022 (Figure 3b).

<sup>5</sup> We focus on beneficiaries who are age 17 or 18, rather than those who are older, because they are less likely to be in the decumulation phase of their investment (i.e., they are less likely to have begun withdrawing from their account to pay for higher education).  
<sup>6</sup> For a deeper dive into goals-based savings in 529s, and the 529 glide path, see [https://corporate.vanguard.com/content/dam/corp/research/pdf/making\\_the\\_grade\\_a\\_goals\\_based\\_framework\\_for\\_529s.pdf](https://corporate.vanguard.com/content/dam/corp/research/pdf/making_the_grade_a_goals_based_framework_for_529s.pdf).

**2 Target larger funding to lower-income families.** Tailoring program contributions can help maximize the impact of limited resources.

Even when opening their accounts at similar times as higher-income families, lower-income families tend to have significantly lower balances when their beneficiaries reach college age.

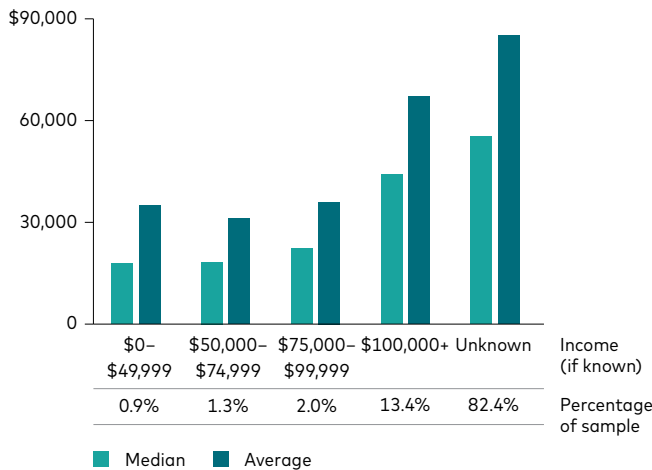
**Figure 4a** shows the median and average balances of accounts with 17- or 18-year-old beneficiaries based on annual family income, if known. The typical family making over \$100,000 annually has a nearly two-and-a-half-times-larger balance than that of the typical family making less than

\$50,000 per year. In fact, the account balances of families earning less than \$100,000 a year would only cover about one year's worth of in-state public college (**Figure 4b**).

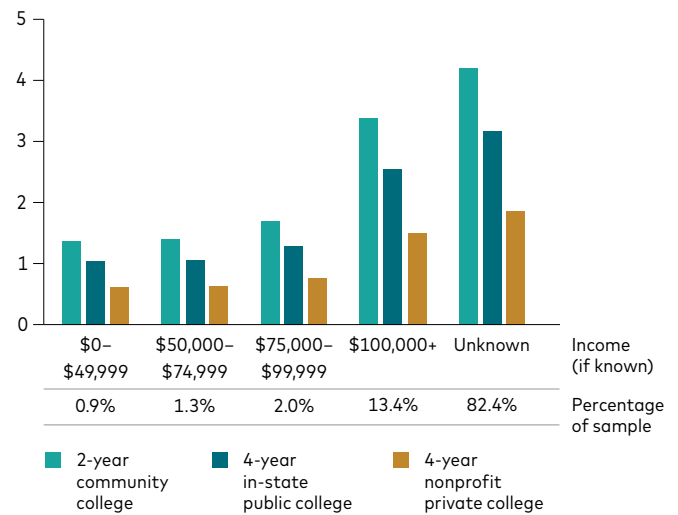
**Every year of delay in account opening is associated with an 11% decline in 529 balance levels at age 18.**

**FIGURE 4**  
**17- and 18-year-old beneficiaries from higher-income families have significantly higher 529 account balances than their lower-income counterparts**

a. Median and average 529 account balances of beneficiaries at age 17–18, by family income if known



b. Number of years of higher education a beneficiary can afford at age 17–18, by family income if known



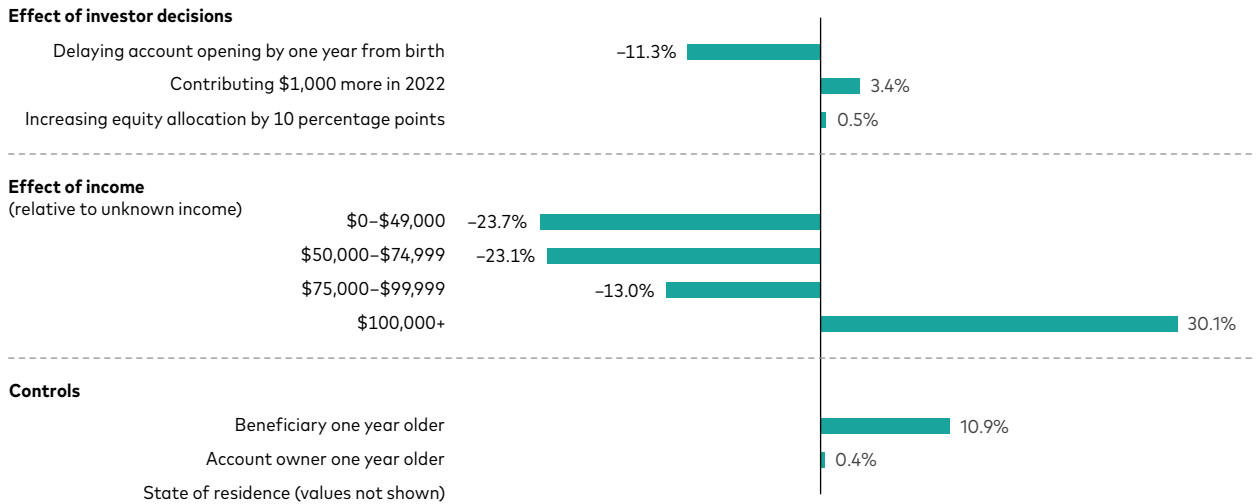
**Notes:** Figure 4b shows the number of years of higher education a beneficiary can afford based on the median 529 account balance of account beneficiaries ages 17 or 18 and the average annual net cost of attending a two-year community college (\$14,510), a four-year in-state public college (\$19,250), or a four-year nonprofit private college (\$32,800) as determined by the College Board's Annual Survey of Colleges using student financial aid data from the National Center for Education Statistics' Integrated Postsecondary Education System (IPEDS). The College Board's Trends in College Pricing and Student Aid 2022 is available at: <https://research.collegeboard.org/media/pdf/trends-in-college-pricing-student-aid-2022.pdf>.

**Sources:** Vanguard calculations, using data from Ascensus as of December 31, 2022 (Figure 4a). Vanguard calculations, using data from Ascensus, The College Board's Trends in College Pricing and Student Aid 2022, and IPEDS as of December 31, 2022 (Figure 4b).

Aside from time, contribution amounts and asset allocation play an integral role in asset accumulation. **Figure 5** shows the estimated effect of these considerations along with income. As expected, delaying account opening has a strong negative effect on account balances, while increasing contribution amounts and adding equity to the portfolio result in positive effects. In fact, controlling for income, every additional year of delay in account opening is associated with a 11% decline in 529 balance levels at age 18.

Additionally, the effect of income on balances is stark, likely reflecting the fact that lower-income families are not able to contribute as much as higher-income families. Together, all of the data laid out in thus far suggest three ways to maximize the benefits of a Baby Bonds program: universal early account opening, diversified portfolios, and ongoing contributions targeted to those who need it most.

**FIGURE 5**  
**Estimating the effects of investor actions and income on account balances highlights the importance of early account opening, continued contributions, and a diversified portfolio**



**Notes:** Log-level OLS model used. Dependent variable was the natural logarithm of balance in 529 account as of December 31, 2022. This chart shows the coefficients of the independent variables expressed as a percentage. These values can be interpreted as the marginal effect in percentage points. All values shown are significant at the 1% level. Adjusted R-squared was 0.26.

**Sources:** Vanguard calculations, using data from Ascensus as of December 31, 2022.

**3 Multi-asset portfolios can offer better long-term returns.** Placing Baby Bond assets in portfolios with equity exposure, not just exposure to long-term U.S. Treasury securities, could enhance the value of these accounts, reduce the costs of the program, or both.

### A Baby Bonds program modeled on 529 plans

Unlike the 529 plans analyzed above, some Baby Bonds programs, as currently envisioned, would have a single investment option. For example, the American Opportunity Accounts Act proposes to invest contributions in securities with interest rates calibrated to long-term U.S. Treasury yields. In December 2022, the 10-year Treasury yielded 3.5% and the 30-year yielded 3.6%. Accompanying analysis assumes that these securities, over time, could generate a return of 4%.

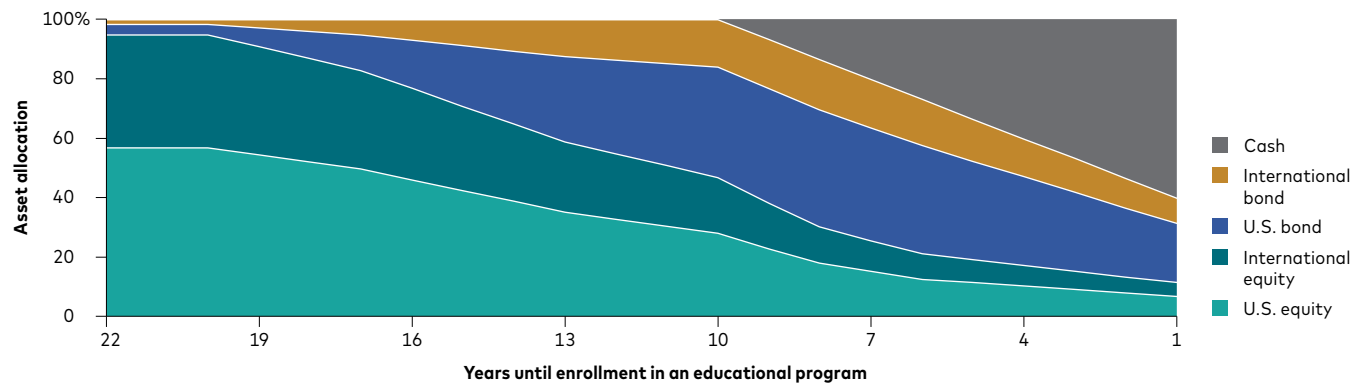
Our research suggests that an investment approach that allows for exposure to multiple asset classes including U.S. and international equities, much like a 529 or retirement target date fund, could enhance account values and/or reduce program costs. To test this, we ran two simulations. In the first, we invest Baby Bonds contributions in a multi-asset 529 glide path and compare account values with the value of an account that earns 4% annually.

We then explore an alternative approach that would target a 4% return, backed by a trust that invests in 100% equities. If returns exceed 4%, the surplus would be used to reduce the cost of continued contributions. In both simulations, we assume annual deposits of \$1,000 from birth to age 17.

**Figure 6** displays a 529 glide path that Vanguard has developed for “target enrollment” portfolios (Donaldson et al., 2020). When enrollment is 18 years in the future, the portfolio allocates 95% of its assets to global stocks. As enrollment approaches, the portfolio shifts from stocks to lower-risk bonds and cash.

In 90% of market simulations, a **529-style multi-asset investment approach delivers higher account balances at age 18** than would be achieved by simply investing in 4% Treasury bonds.

**FIGURE 6**  
529 plans suggest a glide path for a Baby Bonds investment



**Note:** For further details on asset classes shown here, see Appendix 2.

**Source:** Vanguard.



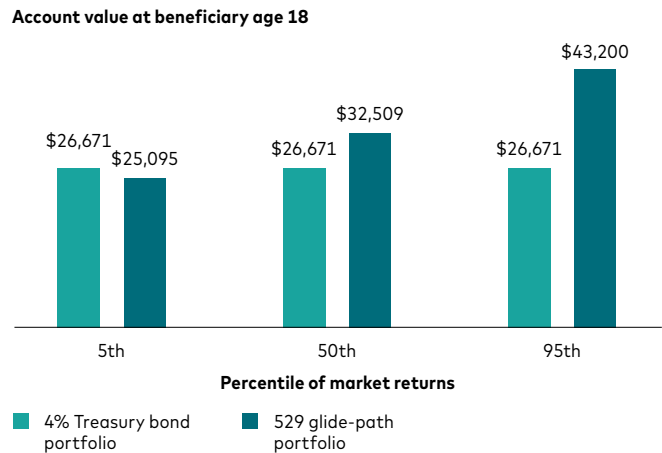
We use VCMM projections and the asset allocation glide path shown in Figure 6 to simulate the range of possible account values at age 18. We ran 10,000 market simulations. In 90% of them, the 529-style multi-asset investment approach delivers higher account balances at age 18 than result from simply investing in 4% Treasury bonds.<sup>7</sup>

**Figure 7** displays account values for the 529 glide path and the 4% Treasury bond portfolio in bad markets (5th percentile), average markets (50th percentile), and strong markets (95th percentile). In average markets, the multi-asset portfolio would be worth \$32,509 at age 18—about \$6,000 more than the Treasury investment. And in better-than-average markets, the margin of outperformance would be greater.

A Baby Bonds program modeled on 529 plans would have a high probability of producing more adulthood capital than one invested in Treasuries. Such an approach might also allow a Baby Bonds program to take advantage of the existing recordkeeping and account management infrastructure built for 529 plans.

In about 11% of our simulations, however, the multi-asset account underperforms. Those odds are attractive—but also perhaps inconsistent with a program that seeks to limit the role of luck in determining the resources that 18-year-old Americans can use to invest in their futures.

**FIGURE 7**  
**In most simulations, Baby Bonds owners are better off with a multi-asset portfolio**



**Sources:** Vanguard capital market projections, using the asset allocation glide path from Figure 6. For more information about the VCMM, see Appendix 2.

**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. Distribution of return outcomes from VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of December 31, 2022. Results from the model may vary with each use and over time. For more information on VCMM, see Appendix 2.

<sup>7</sup> If we use Vanguard forecasts for long-term Treasury yields, which are generally lower than 3% over the next 18 years, the multi-asset portfolio outperforms in 91.6% of the simulations.

## A lower-cost program

An alternative way to deploy a multi-asset investment strategy is to target a given return (e.g., 4%) for all beneficiaries and use excess investment returns to defray program costs. This approach, which the Pennsylvania Keystone Scholars program has adopted, places the investment risk in the hands of the government but offers lower expected returns to the beneficiary.<sup>8</sup> At the program's inception, the government borrows funds to invest for the first generation of Baby Bonds beneficiaries. The government establishes a trust, and any excess investment returns go back into the trust to repay the original debt or defray the cost of Baby Bonds for future beneficiaries.

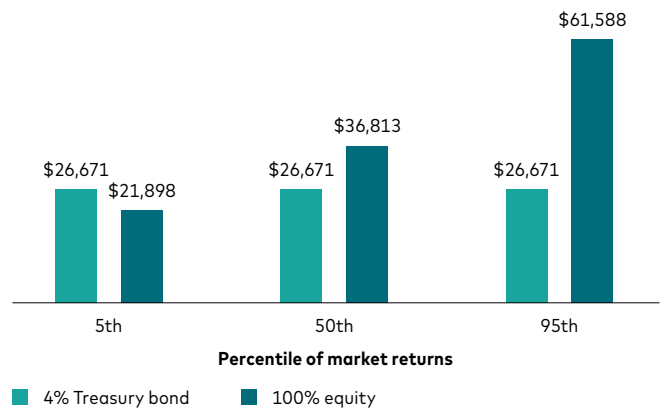
In our second simulation, shown in **Figure 8**, we assume the government, willing to take on greater risk than a typical 529 saver, invests Baby Bond assets in a global stock portfolio (60% U.S. stocks, 40% non-U.S. stocks). Again, we run 10,000 simulations using VCMM projections to simulate the range of possible account values at beneficiary age 18, assuming annual deposits of \$1,000 from birth until age 17. The global stock portfolio outperforms a fixed 4% return in 85% of simulations. In other words, in 85% of cases, the government would be able to contribute funds to the trust. In 15% of these simulations, returns fall short—meaning that the government would need to draw down on the trust. Our simulations indicate that a global stock

portfolio would generate an average surplus of \$15,977 per participant.<sup>9</sup> If account deposits of \$1,000 annually for 18 years total \$21,412 (after adjusting for 2% annual inflation), the average surplus generated by our proposed approach would cover 75% of the cost for the next generation of beneficiaries.

**FIGURE 8**

### An all-equity "trust" could reduce the cost of a program that targets a 4% return

Account value at age 18



**Source:** Vanguard capital market projections, assuming a portfolio of 100% global stocks. For more information about the VCMM, see Appendix 2.

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<sup>8</sup> Some estimate that a nationwide Baby Bonds program would cost \$60 billion per year in its first decade, with existing proposals suggesting modifications to the tax code to pay for such a program. Independent estimates are consistent with this projection. See, for example, estimates from the Committee for a Responsible Federal Budget: <https://www.crfb.org/blogs/cory-bookers-baby-bonds-plan>.

<sup>9</sup> Our estimates of taxpayers' per-participant contribution and surplus is inflated by our assumption that account deposits total \$1,000 per year from birth until age 18. If account contributions are lower, balances at age 18 would accordingly be lower.

## 4 Aim for low administrative costs and promote lifelong engagement.

The plumbing of a Baby Bonds program matters just as much as the investment particulars. At its worst, a Baby Bonds program could result in many low-balance accounts, many of which would never disperse their funds to the intended beneficiary, and which are expensive to administer. We offer two simple guidelines that together could make a difference in realizing the full potential of such a program.

- **Aim for low administrative costs.** Recordkeeping and asset management costs are lower when the rules are simple and the program operates at scale with significant assets under management and few transactions. Allowing beneficiaries above a certain age to decide when to use the funds or self-certify that their withdrawal is for an allowable use would be one way to limit administrative costs for both the record keeper and the beneficiary.
- **Promote lifelong engagement.** At birth, this requires establishing digital engagement with, and enabling private contributions from, guardians and other family members. We observe that Vanguard retirement plan participants who are digitally engaged have three times higher retirement balances and save more for retirement each month (11% average payroll deferral) compared with those who receive paper statements only (6% average payroll deferral).<sup>10</sup> Allowing guardians and other family members to make private contributions to the accounts would not only result in higher account balances—it would also invite families to actively engage in the program.<sup>11</sup>

Once beneficiaries reach adulthood, plan engagement needs to shift to ensure that they receive, and maximize the benefit of, the accrued assets. This engagement could occur through both digital and financial channels; among other things, it could involve financial education and nudges to encourage the adult beneficiary to delay withdrawal and thus maximize the investment horizon of their assets. That said, permitting a range of allowable uses of Baby Bond assets—including both investments in higher education or a home purchase and expenses for health events or other hardships—could also ensure that the beneficiary engages with the account.

At a more basic level, “lifelong” also entails making sure the assets do not go unclaimed. One strategy to reduce abandoned savings is auto-portability. [The Retirement Clearinghouse Auto Portability program](#), for example, automates the movement of an employee’s 401(k) savings account from their previous employer’s plan into an active account attached to the plan of their current employer. Our [research](#) shows that 401(k) participants with low balances stand to gain the most from auto-portability because they often do not roll over retirement savings into their new plans or tax-advantaged vehicles after changing jobs, leaving their assets stranded. Auto-portability of Baby Bond assets into other tax-advantaged, long-term accounts, such as 529 education savings accounts or employer-sponsored retirement savings accounts, could serve as a “way of last resort” to ensure that Baby Bond funds reach the beneficiary.

<sup>10</sup> Although broadband and internet usage is increasing every year, paper statements may still be necessary for the roughly 7% of adults who do not use the internet or the 23% of households that do not have broadband access at home (Pew Research Center, 2021).

<sup>11</sup> This implies that the individual (rather than the state) would be the “owner” of the account. Individual ownership would confer benefits of “engagement” as mentioned here, but it would also raise other considerations. For example, policy would need to specify whether Baby Bond contributions are subject to gifting restrictions and whether Baby Bond balances are included for the purposes of asset limit tests that determine eligibility for various means-tested safety-net programs.

## Conclusion

A growing body of research has established that a Baby Bonds program could reduce racial wealth gaps, providing all 18-year-olds with capital to finance education, home ownership, new businesses, and other wealth-building activities.

Our analysis suggests that Baby Bonds could meaningfully increase wealth accumulation and prepare future generations for higher education costs by beginning saving at birth. Targeting greater funding to accounts for lower-income families could help put them on more equal financial footing to finance higher education. Finally, the use of multi-asset portfolios could enhance the value of these accounts and/or reduce the costs of a Baby Bonds program. Keeping administrative costs low and actively engaging beneficiaries and their families could help ensure that beneficiaries receive, and maximize the benefit of, these accrued assets.

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## Appendix 1

### Summary statistics for dataset

FIGURE 9

#### Summary statistics for Vanguard 529 College Savings Plan offered by Nevada, by income-level availability

		Income known	Income unknown
Number of accounts		388,596	145,508
Median	Beneficiary age	12	9
	Account owner age	49	45
	Beneficiary age at account opening	2.8	2.5
	Length of account ownership (years)	6.1	5.1
	Account balance	\$26,244	\$23,770
	2022 contribution (conditional on contributing)	\$600	\$1,200
	Equity allocation	70%	74%
Average	Beneficiary age	12.1	9.8
	Account owner age	51.7	47.8
	Beneficiary age at account opening	4.9	4.6
	Length of account ownership (years)	7.5	5.5
	Account balance	\$53,280	\$42,466
	2022 contribution (conditional on contributing)	\$4,231	\$4,352
	Equity allocation	62%	67%

Sources: Vanguard calculations, using data from Ascensus, as of December 31, 2022.

**FIGURE 10**

**Summary statistics of Vanguard 529 College Savings Plan offered by Nevada, by income level**

		Income level			
		\$0-\$49,000	\$50,000-\$74,999	\$75,000-\$99,999	\$100,000+
Number of accounts		6,320	12,526	18,615	108,047
Beneficiary age		10	8	8	9
Account owner age		45	43	43	45
Beneficiary age at account opening		3.2	2.0	2.0	2.7
Median	Length of account ownership (years)	5.3	5.2	5.2	5.1
Account balance		\$13,482	\$14,046	\$15,878	\$28,730
2022 contribution (conditional on contributing)		\$250	\$800	\$1,200	\$1,800
Equity allocation		62%	66%	67%	67%
Beneficiary age		10.5	9.5	9.4	9.8
Account owner age		49.3	46.9	46.9	48.0
Beneficiary age at account opening		5.3	4.3	4.2	4.7
Average	Length of account ownership (years)	5.6	5.5	5.5	5.4
Account balance		\$24,848	\$23,614	\$25,961	\$48,525
2022 contribution (conditional on contributing)		\$2,096	\$2,266	\$2,609	\$5,026
Equity allocation		62%	74%	74%	74%

**Sources:** Vanguard calculations, using data from Ascensus, as of December 31, 2022.

## Appendix 2

### About 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. 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. 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 Vanguard Capital Markets Model 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.

**Index simulations:** The long-term returns of our hypothetical portfolios are based on data for the appropriate market indexes as of December 31, 2022. The asset classes and their representative forecast indexes are as follows:

U.S. equities, the MSCI US Broad Market Index; global ex-U.S. equities, the MSCI All Country World ex USA Index; U.S. bonds, the Bloomberg U.S. Aggregate Bond Index; global ex-U.S. bonds, the Bloomberg Global Aggregate ex-USD Index; cash, the Bloomberg 1–3 Month U.S. Treasury Bill 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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